The provision of schools by the DET in South Africa during 1983-1994

by

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Submitted in fulfilment of part of the requirements
for the degree of
Philosophiae Doctor (Architecture) in the
Faculty of Science
University of Pretoria

January 1997

FOREWORD

The Directorate: Building Services had, for its building work, a professional section of architects, quantity surveyors and engineers who, for all the school buildings had to obtain all the requirements from the Client Services Directorate. The Directorate: Building Services conveyed this information to the architects in the private sector for the satisfactory preparation of contract documents and subsequent provision of the school buildings.

This study is concerned mainly with and confined to primary and secondary school buildings in the black townships of the Republic of South Africa, excluding the Homelands and Independent States. Shortly after the author took up his position as Deputy Director: Building Standards in January 1983, it became evident that the success of the building programme and the imminent crisis caused by the neglect of embarking on a scientific investigation, at least ten years earlier, would hinge around standardisation, without delay and the implementation of a successful system with the utilisation of the professional bodies in the private sector.

The success of the system and extensive use of standardisation is demonstrated as the complete dependency of the Directorate: Building Services, on the use of modular design, standardisation in all sections, the efficiency of the communication system and the completeness of data supplied to all the relevant disciplines in the Private Sector.

The system proved to be an unqualified success, can boast of a unique record of successes, and it is very certain that the demise of this Directorate with the introduction of Provincialisation will be sorely missed by both the building and professional bodies in the Private Sector. It is hoped that this study will provide a sound basis for the Provinces who care to make a study of the system, to assist each Province to develop an equally effective, if not better, system to enable them to meet the challenge of providing all the facilities required by the growing educational demands.

ACKNOWLEDGEMENTS

Any study based on research is dependant upon the voluntary assistance of associated persons and instances. It is therefore prudent to make mention of the few instances without whose help this study would not have been possible.

Firstly, I am indebted to my supervisor, Prof dr D Holm, for his genuine interest, his time consuming efforts to polish a rough diamond with the success that his expertise achieves. A further extremely valuable contribution was his guidance in assisting me to so restructure the text to make it more user friendly.

I am also indebted to my two assistants, André Botes and Isia Krajewska, for their willingness to extract modules of the various schools to produce intelligently the figures in their required format. André also took over the typing in the absence of our typist. Quite a feat for a promising young architect.

I cannot omit to thank all my colleagues in the private sector who appreciated the approach of standardisation and correct procedure when applied to the heavy load of providing professional services on such a large scale. Their enthusiasm and moral support was most encouraging.

No one should fail to give due credit to our Creator without Whose guidance we cannot succeed and I quote: "God put me on this earth to accomplish a certain number of tasks now, I am so behind that I will never die!".

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PART I

CHAPTER I - THE PROBLEM AND ITS SETTING

1. THE STATEMENT OF THE PROBLEM

1.1 The purpose of this study is to examine and analyze the designs and methods of providing schools for the Blacks prior to the establishment of a professional sub directorate within the Directorate: Building Services, of the Department of Education and Training as well as the establishment of the professional sub directorate and its influence and effect on the design and provision of school buildings for the Blacks in South Africa, up until the time of fully integrated education in South Africa.

1.2 This study will conclude with an attempt to predict the future in the provision of school buildings in South Africa whilst implementing fully integrated education.

2. THE SUBPROBLEMS

2.1 The first subproblem is to investigate the pre-1983 approach towards the provision of school buildings for the Blacks in South Africa.

2.2 The second subproblem is to investigate standardisation with regard to the various types of teaching institutions.

2.3 The third subproblem is to investigate the process of design, documentation, inviting tenders, and site administration.

2.4 The fourth subproblem is to investigate the storing and retrieval system of documentation.

2.5 The fifth subproblem is to investigate the output of personnel.

3. THE HYPOTHESES

Basically this study attempts to place on record, for future reference and improvements to the system developed and practised by the Professional Services sub-directorate of the Department of Education and Training, Directorate: Building Services. The emphasis will be placed on the activities between the beginning of the year 1983 until the end of the year 1995.

3.1 The first hypothesis is that the pre-1983 approach towards providing school buildings for the Black population in South Africa was inadequate.

3.2 The second hypothesis is that standardisation was successful.

3.3 The third hypothesis is that the subdirectorate established a well planned system to streamline the entire process of rendering satisfactory professional services.

3.4 The fourth hypothesis is that the subdirectorate established a successful storing and retrieval system for documentation.

3.5 The fifth hypothesis is that the subdirectorate obtained good personnel output by employing only the minimum of **SPECIALISTS** in the professional disciplines.

4. THE DELIMITATIONS

4.1 The study is confined mainly to schools for the Blacks in South Africa excluding the Homelands and Independent States.

4.2 The study is confined to a short review of the conditions prevailing prior to the year 1983, with a more intensive study for the years between 1983 and 1994, and only with a brief review of the possibilities of the years ahead of the beginning of the "New South Africa".

4.3 During the period under review the new Government of National Unity's Reconstruction and Redevelopment Programme (RDP) was still an embryo and yet to be born thus no cognisance is given to this aspect.

4.4 During the whole of this period South Africa experienced a reasonably slow rate of progress, also enjoying acceptable stability in such a degree that it was indeed possible to plan a schools building programme at least two years in advance, the rate of change being predictable.

4.5 The life span of a state owned building was not made a formal issue and the authorities did not question the expected life span of a building being content to judge this aspect against any other contemporary building.

4.6 The thermal/energy performance of the school buildings was not specifically subjected to scientific analysis or research with regard to classroom comfort and other allied effects. This was never formalised.

4.7 The study will only attempt to project a possible solution for the satisfactory provision of schools for all the school going children in South Africa.

5. DEFINITIONS OF TERMS AND ABBREVIATIONS

5.1 **Primary School**. A Primary School is an institution for the prescribed schooling of children of school going age from Grade I to Standard 5. In this research and study, the children attending are black children and at least of average intelligence, whilst the school is State owned, staffed and controlled.

5.2 **Standardisation**. Standardisation is to accept only that which is made to conform to set standards. In this study standardisation refers to the rigid conformity to standards, not only in sizes, but also in design relationships of modules.

5.3 **Junior Primary**. For this study, Junior being the youngest and Primary being the first, Junior Primary will refer to the classes for children in Grade I, Grade II and Standard 1 of the Primary School.

5.4 **Senior Primary**. Senior being the oldest, and Primary being the first, in this study Senior Primary will refer to the classes for children in Standard 2 to Standard 5.

5.5 **Department of Education and Training** (DET). In this study DET refers to the Department of Education and Training of
the Central Government of South Africa. Also referred to as the Client Department.

5.6 **Sketch Design** (stages 1 and 2 of PROCAB). In this study, the term will refer to those drawings that, to an approved scale and to an accepted standard, reflect the private architect's interpretation of the requirements as briefed.

5.7 **Working Drawings** (stages 3 and 4 of PROCAB). In this study, the term will refer to those architect's drawings, drawn to the approved scales and to an accepted standard, which represent complete details of the proposed building works as required by normally recognised tradesmen and professional men to prepare Bills of

Quantities, Shop Drawings, and to competently erect the intended structure as originally proposed by the Sketch Designs.

5.8 Regional Inspectorate. The term Regional Inspectorate will refer to the Technical Section of any one of the eight Regional Chief Directorates of the Department of Education and Training known as, Orange Free State, Orange-Vaal, Highveld, Johannesburg, Northern Transvaal, Natal, Diamond Field and Cape Regions.

5.9 Norms. The term Norms will refer to the Space and Cost Norms for school buildings as determined by the State Treasury Department, spelt out in norms of standard cost units and assignable square metres.

5.10 Standard Cost Unit (SCU). The term, Standard Cost Unit (SCU) referred to in this study, is a Unit Cost where the unit is determined by a specific formula designed by the State Treasury Department relating to the curriculum and pupil number of a specific learning institution.

5.11 Assignable Square Metres (ASM). The term, Assignable Square Metres (ASM) referred to in this study is the assignable square metres for certain defined assigned areas as laid down by the State Treasury Department determined by a specific formula, relating to the curriculum and pupil registrations of a specific learning institution.

5.12 Permissable Standards. The term referred to in this study as acceptable standards will be determined by not exceeding the permissable ASM's and SCU's as determined by the specific formula for a given school as prescribed by the Treasury Department.

6. ASSUMPTIONS

6.1 The first assumption is that the need for State owned and directed schools will continue.

6.2 The second assumption is that the need for new schools will continue until saturation point is reached.

6.3 The third assumption is that the need to add to, alter and upgrade existing schools

will continue.

6.4 The fourth assumption is that the need for the State to employ architects, and other building construction related disciplines, to assist in the provision of school buildings both as consultants and employees will continue.

6.5 The fifth assumption is that liaison at all professional levels by registered practising professionals is desirable and that the discipline involved in the major part of the construction (building, civil engineering, structural engineering, mechanical engineering, electrical engineering or any other related discipline) shall be the leader of the professional team and, as such, be appointed as the principal agent (P/A) by the client department.

6.6 The sixth assumption is that, throughout South Africa, the responsible State or Provincial bodies will continue to maintain the efficient registration and filing of all new school buildings documented for construction purposes, as well as producing "as built" drawings of any school building where additions, alterations and/ or upgrading is intended where no such documentation exists in the official registry or registries.

7. THE NEED FOR THE STUDY

One of the primary functions of the Public Sector is to provide the facilities for the successful education of the Nation. Basic, formal education begins at Primary School level which, in the Republic of South Africa, has been declared as compulsory for all children who have no mental or physical disability; even in these cases, special schools are being provided; these schools are not included in this study.

7.1 Because of the intended full intake of school going children and later thinning out, the accepted proportion in South African schools is, three Primary Schools to one Secondary School, all of equal numerical pupil capacity.

7.2 Because of the past policy of segregation and insufficient funding, the provision of school buildings for Black pupils in the established and projected townships to more acceptably cater for the neglected Black student population, the present democratic policy of integration will require much capital, and an efficient liaison mechanism to back up a well researched and uniformly applied system, to deal with the almost impossible task of timeously providing sufficient school buildings for the entire school

going population, scientifically projecting the ultimate number of teaching institutions required growing needs.

7.3 Recent changes in the school delivery system include the risk that the accumulated body of experience - both good and bad - will be lost. This study records many years' experience.

8. THE METHODOLOGY EMPLOYED

8.1 The author, having defined the subproblems and formulated the relevant hypotheses, has set about systematically to prove the hypotheses. The proofs of the hypotheses are all substantiated by physical evidence and at least three thousand (3 000) school sites throughout the Republic of South Africa.

8.2 In the process of proving the hypotheses, the author explains why, in school buildings on a large scale, the value of standardisation cannot be overemphasised. The importance of the "brief", the need for an efficient system and procedure and the value of professional contract administration is also emphasised to prove their value in the employment of a relative small and efficient professional personnel.

CHAPTER II - THE DATA, THEIR TREATMENT AND INTERPRETATION

1. THE DATA

1.1 The data for this research are of two kinds: primary data and secondary data.

1.1.1 The primary data. The scaled down norms (to comply with the South African Government's instruction to minimise expenditure) which have been used for the purpose of concentrating on cost effective design, constitute one type of primary data. The development of standard Primary and Secondary School buildings, constitute another type of primary data. The system of briefing and administrative procedure prescribed for private professional consultants constitutes another form of primary data. Random case studies produced an important type of primary data.

1.1.2 The secondary data. The published studies and texts, and the unpublished dissertations and those dealing with liaison communication and school planning constituted one form of appointment, "site handing over forms" and other standard or quasi-standard procedural forms and instructions constituted another type of secondary data.

1.1.3 The criteria for admissibility of the data. Only authenticated designs and documentation of actual projects have been used in this study, and can be found in the files of the Department of Education and the various Provinces to which they have been despatched, in terms of the process of Provincialisation of the Department of Education. Case studies may be unidentifiable with actual places and names but have been based on fact. The only speculation resorted to is in possible projections of future developments.

2. THE TREATMENT

2.1 The relevant data have all been carefully selected, compartmented and categorised and referred to in the handling of the sub-problems.

3. THE INTERPRETATION

3.1 The data collected and accumulated over the past fifteen (15) years have all been categorised, and been used to test the hypotheses with a view to proving or

disproving and subsequent conclusions. The data have proved to be most valuable in as much as all of the data used are substantially backed by physical, tangible and functioning documentation and structures. The detailed interpretations and comparisons will be referred to under the relevant sub-headings in their appropriate chapters.

CHAPTER III - REVIEW OF RELATED LITERATURE

1. INTRODUCTION

1.1 This chapter deals primarily with the literature referred to in order to strengthen the case for the necessary changes to be effected and policy to be formulated and adopted in the relatively new Directorate: Buildings, in order to accommodate a Professional Services Subdirectorate.

1.2 As will be evident in this thesis, the practical experience gained by the author during the research for his masters degree, "A study of the liaison mechanism between architects in the Private Sector and the TPA in relation to the design of and additions to primary schools", proved to be of inestimable value in the development of a successful and well balanced Professional Services team.

1.2 The subject of liaison between professional parties is not new or unexplored, and consequently much knowledge on the subject and relating to the subject, was found in the literature, but nothing specific relating to crisis management such as exists at present for the relief of inadequate physical school facilities.

2. ROLE THEORY

2.1 With "The liaison mechanism between architects in the DET and architects in the Private Sector when related to the design of schools" one is concerned with the fulfilment of different roles by separate architects concerned with a common purpose. It is important, therefore, that the concept of "a role" be described.

> "Role theory is a new field of study; and although it has not yet been widely recognised, it shares with more mature fields of behavioural science the fact that it possesses an identifiable domain of study, perspective and language; and that it has a body of knowledge, some rudiments of theory, and characteristic methods of inquiry". (Biddle & Thomas, 1966, p. 17)

2.2 Whilst the word "theory" is often associated with the various fields of natural science, Halpin (1966, p. 12) points out that the natural scientist has no monopoly on the concept. It has been observed that the notion of role theory has also been used by amongst others, sociologists, psychologists, anthropologists and educators, as a

way of describing human behaviour. Walters (1978, p. 15) states:

> "In role theory the person as the broadly conceived unit of action and interaction is paramount".

2.3 Since school systems are Government Agencies, it was necessary to understand all the ramifications involved in a contract between the administrative hierarchy of the school systems and a selected consultant architectural firm. In South Africa, as in most countries, educational systems are legal entities established by the State to promote educational growth of the communities which they serve. Peculiar to South Africa, this responsibility has been delegated to each province separately to be promoted in accordance with definite guidelines dictated by the State.

2.3.1 Each province has the relative freedom and total responsibility to establish its own unique system. In South Africa, except for a relatively small number, the schools are State owned and controlled. The DET is solely responsible for the establishment and drawing up of the necessary "Schedules of accommodation requirement" for their various types of schools and is referred to as the Client Department.

2.3.2 It is the responsibility of the DET to design (to the approval of the top management), prepare the necessary documentation to call for tenders and to supervise the erection of school buildings with due regard to all aspects of economics, function and efficiency. To this end, the DET nominates and appoints the various professional consultants required to carry out this function. The point to be made here is that all consultants employed are thus extensions of the DET internal professional bodies and not directly involved with the DET's Head Office.

2.3.3 As a result of this system the DET has an architectural sub-directorate responsible for the design, preparation of contract documents, and supervision of the erection of school buildings. For the quality control of construction projects and maintenance of buildings and plant, the DET divided the Republic into eight regions.

2.3.4 Each region is under the control of a Regional Chief Director who was directly responsible to the Director-General as far as discipline and administration was concerned. Unless the Director: Building Services decides otherwise, the supervision and execution of the building contract devolve on the Regional Chief Works Inspections who was authorised to issue variation orders, subject to the approval of the Deputy Director: Architectural Services.

2.3.5 When the consultant architect is given supervision (in most cases) always on a formal contract he acted as an extension of the Architectural Services Department of the DET. All this resulted in the particular Region's Control Architect of the DET, at head office, having to liaise with the consultant architect in the Private Sector, as well as the liaison officer between the architect in the Private Sector, the Regional Offices, the contractor and the Director General.

2.3.6 One of the more serious problems in the relationships between and among the Educational planners at Head Office, the Circuit Inspectors and Area Managers, the Regional Technical Inspectorate, the Control Architect of DET (liaison officer), the DET administrative section and the consultant professionals in the private sector (including the private sector architect/ principal agent), was the failure "to identify the proper role each entity must have and then act accordingly".

2.3.7 This was satisfactorily resolved by the DD/AS (Deputy Director: Architectural Services) visiting each region individually, lecturing the technical section thoroughly on their role specifically, as well as introducing a now well known and accepted, uniform briefing in the presence of the Relative Region's Professional Representative of the entire professional team, and on numerous occasions mass briefing of numerous teams of consultants on various projects. This being feasible only because of the standardisation of procedures.

3. ROLE EXPECTATIONS AND BEHAVIOUR

3.1 Getzels, Lipham and Campbell (1968, p. 61) have defined role in terms of incumbent expectations and concluded:

> "A role has certain normative rights and duties,
> which we may call expectations. When the role incumbent puts these rights and duties into effect, he is said to be performing in his role. The expectations define what the actor, whoever he may be, should or should not do under various circumstances while occupying that particular role in the social system".

Because the architects in the Private Sector, commissioned by the DET to render professional services with regard to school buildings, invariably do so with the exclusion of their inputs with regard to standard design, it is interesting to observe in the related literature how they will be influenced to vary the quality of their services in relation to the fragmentation or commitment of their services. This

phenomenon was only experienced in the beginning until the professions understood and invariably accepted the value of standardisation as related to crisis management in crisis situations.

3.2 Getzels, Lipham and Campbell (1968, p. 61) have also related the importance of institutional expectations and individual need-dispositions to assist in furthering the understanding of the relationships between institutional behaviour and individual behaviour. In this respect they advocate:

> "To understand the specific behaviour and social interaction of particular role incumbents, it is not enough to know the nature of the roles and expectations ... although to be sure, their behaviour cannot be understood apart from these. We must also know the nature of the individuals inhabiting the roles and their modes of perceiving and reacting to the expectations. That is, in addition to the normative or nomothetic aspects of social behaviour, we must consider the personal or idiographic aspects. We must, in short, attempt to integrate the individual or psychological level of analysis".

3.3 It is false to assume that consensus exists among the various role descriptions normally attributed to position holders. Gross, Mason and McEachern (1958, p. 72-74) claim that empirical data do not support a consensus postulate for role expectations. Each human being has a unique personality, and for this reason, roles will be performed by people who will exhibit considerable variation not only in their own performance, but in their perceptions of their role expectations. No matter how carefully a role is prescribed, there will be differences in its enactments. Recognising the dynamic aspects of those perceptions and behaviours, Ittleson and Cantril (1954, p. 1-32) contended that we are constantly perceiving simply because it is an inseparable and necessary part of everything we do, and perceiving never occurs independent of some other activity.

3.4 Getzels, Lipham and Campbell (1968, p. 72-74) extended this concept to include that, as transactional style in which they focused on the need "for moving toward one style under one set of circumstances". They further refined this idea by saying "The handling of administrative relationships must be considered as much an art as a science".

In different situations, what appears to be appropriate behaviour, is not limited to the

situation itself, but to the situation as it is perceived, defined, experienced and interpreted. Role, therefore, as is defined, involves behaviour which the individual perceives to be appropriate in terms of the demands and expectations of the situations perceived.

With regard to role behaviour, Katz and Kahn (1966, p. 174) agree that:

> "Generally, role behaviour refers to the recurring actions of an individual, appropriately interrelated with the repetitive activities of the others so as to yield a predictable outcome. The set of interdependent behaviour comprise a social system or sub-system, a stable collective pattern in which people play their parts."

While the related literature contains a variety of definitions, "a careful review of the definitions revealed, however, that there is one nearly universal common denominator, namely, that the concept pertains to the behaviours of particular persons" Biddle and Thomas (1966, p. 29). In this research, further reference is made to the roles of the leading actors.

3.5 Interaction between architects in the Private Sector and architects as officials of the DET is an essential area of relationships to be clearly understood.

3.5.1 Architects do not receive any specialised training in School Design during their formal university course. The ultimate design of a school building for Blacks is dictated by the methodology of the DET. In the Republic, most Primary Schools are State owned, staffed and administered and therefore the entire process of design and construction is determined by current State policy. The architects of the DET were each seconded to a specific Region (section) where they were expected to specialise during their term of office in the specific section. It follows, therefore, that a project architect in the Architectural Services Section should be a specialist in this field and as such, negotiates directly with the planning officials of the DET, the only client department. It should follow, and is in fact so, that the commissioned architect in the Private Sector is wholly dependent on the control architect in the DET for his briefing and guidance in the preparation of his documentation and subsequent contract administration.

5.2 To quote Maire (1965, p. 11) -

> "A public school system is a social system which has
> as its organizational goal the education of children. The achievement of this

> goal requires the cooperative efforts of a number of individuals, each executing varying duties and responsibilities in a complex network of role relationships within the Institution. One individual involved in this network of role relationships is the architect engaged to provide leadership in one aspect of a school plan development program".

To this must, in our case, be added: "and another individual involved is the project or liaison architect of the DET". Clearly then, the position is simply that there are two architects involved; both, it is assumed, have received training to the same level of standards in architecture in general, as related to design, documentation and contractual supervision abilities, the awareness of professional team leadership and the art of architectural communication; only the control architect of the DET, it is assumed, has the specialised knowledge of school design to the acceptable standards of the DET. The point is that we are not concerned with a teacher-pupil relationship, but an interaction between two highly-qualified professional men where the architect from the DET is limited in his participation in a project owing to his simultaneous involvement with a number of school projects and the architect in the Private Sector is entirely dependent on his colleague in the DET for briefing regarding the accommodation schedule, the restrictions and limitations in his design, his role in the team and the minimum standards to which he must comply. This relationship must be clearly understood by all parties concerned and must be so stated even at the expense of monotonous repetition since only the clear definition and understanding of each other's role can lead to a successful execution of a project. Role was conceived by Linton (1936, p. 114) to be the dynamic aspect of status, which he clarified by saying:

> "The individual is socially assigned to a status and occupies it with relation to other statuses. When he puts his rights and duties which constitute the status into effect, he is performing a role. Role and status are inseparable, and the distinction between them is of only academic interest".

3.5.3 Between the two architects we are involved with the concept of role interdependency, which is also treated by role theorists. Newcomb (1950, p. 85) has stated - "the role prescribed for any position is necessarily defined in relation to the roles of other people". Getzels (1958, p. 155) has further emphasized this concept -

> "Roles are interdependent in that each role derives its meaning from other

> related roles in the institution. In a sense, a role is a prescription not only for the given role incumbent, but also for the incumbents of other roles within the organization, so that in a hierarchial setting the expectations of one role may to some extent also form the sanctions for a second interlocking role ... It is this quality of a coherent interactive unit which makes it possible for us to conceive of an institution as having a characteristic function".

3.5.4 It is now obvious that emphasis had to be placed on the ordering of roles in such a manner that individuals would better understand this organisational function, and at the same time, the DET would benefit. Guba and Bidwell (1957, p. 1) have recognised the need for role assignment, and sum it up by stating that, "within an institution the system of roles should be so organized that the behaviours attached to each role are mutually consistent and are maximally productive of the goals of the enterprise."

4. THE DUTIES OF THE ARCHITECT

4.1 White (1969, p. 16-23) an educationist, devotes eight pages to the duties of an architect. It is gratifying to read that an educationist in concluding his findings quotes Boles (1965, p. 126) as stating that:

> "The naivete of some school board members and some administrators as to what constitutes architectural service seems almost unbelievable".

4.2 Over the years various bodies, institutions and researchers have attempted to define the role and duties of the architect. Engelhardt (1934, p. 229-32), an educationist, contacted sixteen architectural firms in the United States of America, requesting statements concerning the architectural services actually performed. From the eleven replies which he received, he formulated seventy-two duties and grouped them into the following seven steps:

(1) Initial interviews and surveys;
(2) Preparation of material and information;
(3) Preliminary plans and specifications;
(4) Preparation of Working Drawings;
(5) Award of contracts;
(6) Construction of the building;
(7) Maintenance.

4.3 Sumption and Landes (1957, p. 9) discussed four major roles in which the architect must be competent, listing them in the following order: coordinator, designer, administrative and building supervisor. "In fact, his job is not completed until the building is accepted by the owners".

4.3.1 It was the practise of the DET to place the responsibility for supervision of school building contracts firmly in the hands of the Regional Offices, and this was queried when studies have shown that supervision is essential to an architect's commission. Supervision is considered of such importance that even architects should give it more prominent and detailed attention so as to remain always above reproach since this is known to be a weakness. For example, Thiesen (1934, p. 169) pointed out that many cities have been keenly disappointed in their reliance upon the architect to furnish complete supervision and went on to comment:

> "Why architects who will not render satisfactory supervisory service should be chosen is a matter of conjecture. It is indicative of carelessness on the part of boards of education in not ascertaining fully the candidate's past record. A successful architect must be more than a designer. Too many boards take it for granted that satisfactory construction will follow satisfactory planning".

4.4 Although there may have been some uncertainty in the administrative hierarchy of the DET it can be argued that there was an uncertainty in the minds of the architects in the DET with regard to the accepted duties of an architect. It seems that there appeared to be merit in the desirability of a contract between the architect in the Private Sector and the DET, in which all the legal ramifications are clearly defined and agreement reached by both contractual parties which, inter alia, must clearly define the duties of the commissioned architect in the Private Sector. White (1968, p. 34-35) summarises:

> "... Writers agreed on the general duties of the architect. However, there was not agreement concerning all of the extra duties for which the architect should receive extra compensation.
>
> There was consensus among the writers concerning the importance of a written contract. They indicated that the contract document should be a written representation of the meeting of the minds of the contracting parties. Misunderstandings have arisen between architects and school boards over the interpretation of the written contract. In some instances the contract was

an inadequate representation of mutual responsibilities. In other cases, the wording of the contract document was couched in technical language which the layman misinterpreted".

5. SUMMARY

5.1 The purpose of this chapter was to search for and refer to the findings of researchers in the field of human relations in general and the roles and interaction of professional architects in particular, specifically when related to the provision of school buildings. There is no doubt that any liaison mechanism is dependent for its successful function, primarily on the clear definition of the roles of the incumbents coupled with the incumbent's absolute understanding of the role allocated to him and the factors influencing his interaction with the other incumbents of the organisation.

PART II

CHAPTER IV - THE PRE-1983 SITUATION

1. INTRODUCTION

1.1 This chapter deals with the first subproblem, "to investigate the pre-1983 approach towards the provision of school buildings for the Blacks in South Africa".

1.1.1 From the time of the establishment of the Department of Education and Training, late in 1979 under Act 90/1979 up until January 1983, the Directorate: Buildings functioned without any technical professional staff, but with only four senior works inspectors at Head Office and a Technical section at each region (nine throughout the entire Republic of South Africa) all inherited from the previous Department of Bantu Administration and the local Administration Boards. The local Administration Boards were employed by the Department of Bantu Administration to erect school buildings.

1.1.2 When the author was appointed as Deputy Director: Building Standards in January 1983 (after waiting twelve months to receive his appointment), he was faced with the situation of serving under a purely administrative Director (fortunately a very efficient administrator) ably assisted by two very senior works inspectors through whose assistance and efforts a qualified architect was appointed as their new head with the task of organising and building an efficient Professional Services section.

1.1.3 To the author, graduating from a fully established Professional Services section in the TPA, the situation did appear to be somewhat chaotic. On the positive side, it was a unique situation for the author, to put into practice the subject of his thesis for his masters degree, namely "A study of the liaison mechanism between architects in the private sector and the TPA in relation to the design of and additions to primary schools", eventually published in May 1983.

2. THE SUBDIRECTORATE: BUILDING STANDARDS

2.1 In January 1983, the author, previously a Principal Architect with The Transvaal Department of Works: Schools Section, was promoted to the newly created post of Deputy Director: Building Standards in the Directorate: Buildings, of The Department of Education and Training.

2.1.1 At this stage, most of the schools for Blacks had been built by the "Administration Boards" many of them to a standard pattern as shown in figure 1.

2.1.2 On most of the schools, consultants had been appointed and some were being completed by the two remaining "Building Teams", one in the Transvaal and one in the Eastern Cape. Both of these "Teams" were closed down within the same year 1983.

2.1.3 Only a few "full schools" were under construction at the time and mostly in the Cape. What was being built, was a large number of "Four by Four's" throughout the Republic. A "Four by Four" was a "standard" block of four classrooms. This would, in theory, accommodate one hundred and sixty (160) pupils but, in practice, anything ranging from this figure to two hundred pupils. The sad thing about this exercise was that, on not one site were the toilet facilities increased (see figure 2).

3. SLOW DELIVERY

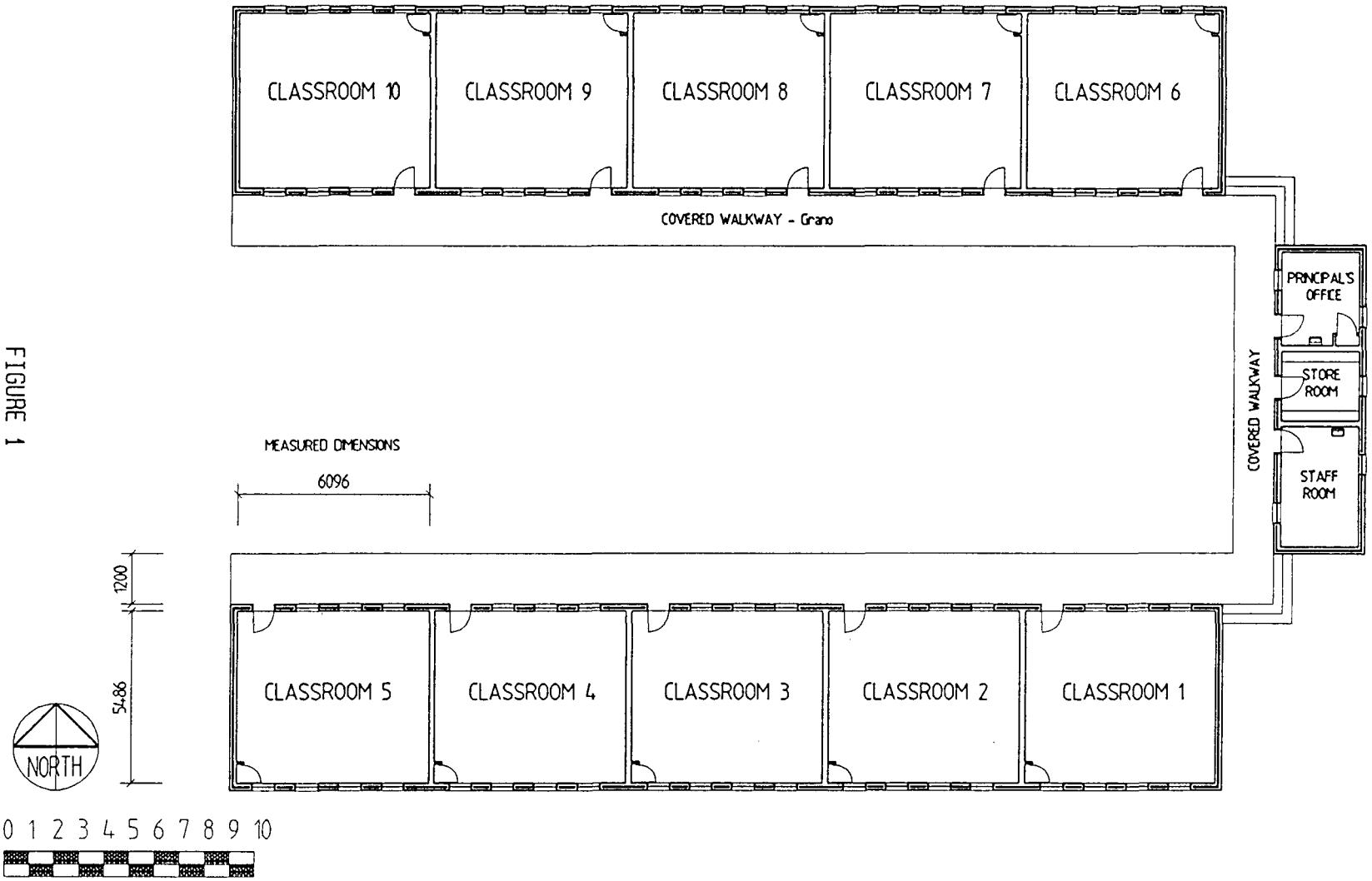
3.1 Fortunately during this period the DET were still gaining momentum on a trial and error basis and since the annual budget did not exceed R80M the relatively slow delivery of the various school building projects was not as obvious to the non-professional personnel as it was to the author, an experienced qualified architect.

3.1.1 To the author, well versed in the building of schools and used to a well trained technical staff in the Regions, it was obvious that the delivery area would require serious and careful attention.

4. ABSENCE OF STANDARDS

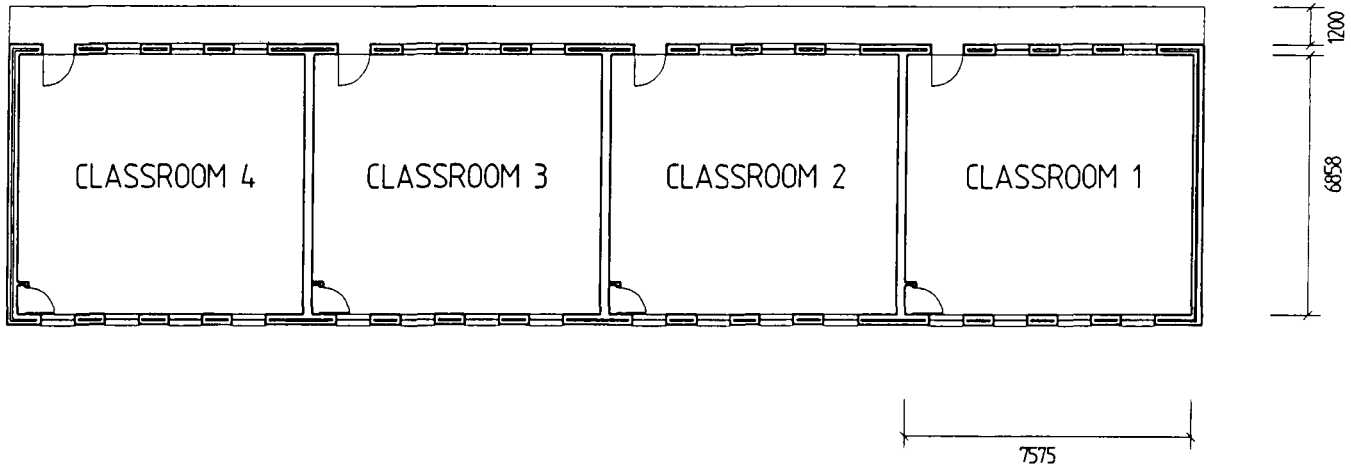
4.1 None of the hitherto school buildings were designed to any particular module of standard except that it was common cause that a classroom had to be at least fifty square metres and a general purpose classroom, seventy five square metres. The author, already a converted modular design architect completely sold on standardisation, was more than overjoyed to find this wonderful opportunity to apply his knowledge and expertise of modular design and standardisation. The author was to waste no time in exploiting this situation.

FIGURE 1



OLD "ADMINISTRATION BOARD" SCHOOLS - Plan

FIGURE 2



SCALE 1:200

OLD "FOUR BY FOURS"

5. CHAOTIC PROCESS

5.1 The prevailing process of selecting consultants on a "my friend" basis and leaving them to their own devices on the one hand and on the other hand building schools and hostels with the aid of state employed artisans forming various building teams under the supervision of senior building inspectors simply amazed the author. This chaotic process would have to, and did, change.

6. NO STORAGE AND RETRIEVAL

6.1 The drawings and other documentation were left in the private consultants' protocol, leaving no records to refer to. The only document the author found was one badly treated transparency of a typical four classroom block and one drawing of a "pit latrine" toilet block. This was to be a blessing in the introduction, from scratch, of a simple but effective storing and retrieval system. In a later chapter the total success of a unique plan registry is explained in detail. This achievement contributed very largely to the total success of the Professional Technical Services component.

7. PERSONNEL AND OUTPUT

7.1 With the absence of professional personnel, it was to be expected that the documentation output would be slow, clumsy and inadequate.

7.1.1 This was a unique opportunity to systematically introduce and promote a small but efficient professional services component to cope with what the author saw clearly at this point would have to successfully cope with a budget that would escalate rapidly from R80M to at least R1000M annually. The author's perception proved correct to the extent that in the years 1993 to 1995 the budget touched R1000M annually. This workload was successfully handled with the minimum of staff using the system introduced by the author.

7.1.2 Fortunately, the two senior inspectors of works were the first to realise that the then Department was only functioning on an ad hoc basis heading for disaster.

7.1.3 It was these two senior works inspectors that agitated for an architect as Deputy Director: Building Standards to create a much needed professional services component.

8. THERMAL PERFORMANCE, ENERGY EFFICIENCY AND DAY LIGHTING

8.1 These aspects, being foreign to the functionaries pre-1983, were not specifically considered in anyway whatsoever. It appears that all that was of importance was to place the ten classroom unit in the most convenient siting and, any additions that followed, were treated likewise.

9. SUMMARY

9.1 It was fortunate for the DET that they did wisely consider the appointment of an architect as Deputy Director: Building Standards. The fact that the candidates were interviewed in January of 1982 and the author only appointed in January of 1983 did not deter the author from appreciating the unique opportunity that could only come once in a life time and realising the full potential of this opportunity the author did successfully set about realising a life long ambition. The tardy appointment to the post of Deputy Director: Building Standards can be ascribed to the fact that the upper echelon in the authorities did not appreciate the urgency of the situation coupled with the fact that the Director: Buildings at that time was non-technical, recently appointed to a department whose function was entirely foreign to him. It must also be pointed out that the school building function was then only recently taken over from the Provincial Administrations, themselves being the primary culprits in causing the inadequate approach to what was to become in later years a highly sensitive and controversial area of extreme disadvantage.

10. CONCLUSION

10.1 Although it was reasonably far from reaching a crisis situation, the thorough investigation did prove the first hypothesis: "that the pre-1983 approach towards providing school buildings for the Black population in South Africa was inadequate".

PART III

CHAPTER V - STANDARDISATION

1. INTRODUCTION TO CHAPTERS V, VI, VII AND VIII

1.1 The following four chapters deal with the second subproblem "to investigate standardisation with regard to the various types of teaching institutions", with particular reference to teaching institutions for the Blacks in South Africa.

2. THE CASE FOR STANDARDISATION

2.1 Standardisation, as referred to in this thesis, is to accept only that which is made to conform to set standards. In this study, standardisation will refer to the conformity to standards, not only in sizes but also in design relationships of modules.

2.2 The rigid requirements, restrictions and limitations laid down by the predetermined schedules of accommodation for all teaching institutions dictated by the "Space and Cost Norms" for all Government buildings, introduced by the Government, under the auspices of the State Treasury Department, establish and invited a strong case for the standard design of all teaching institutions in general and Primary and Secondary schools in particular.

2.3 It is more important to erect schools of a tried and proven design than to experiment with designs by various private architects, not all having the same knowledge of educational requirements. This is best summed up by Cameron (1965, p. 7) who stated :

> "Technological and Scientifical (sic) advances during the past several decades have resulted in an increasing emphasis on improving the quality of education. The American people are awakening to the fact of quality education and it is especially so in small schools with few pupils. It is also recognised that safe, comfortable, healthful, attractive and well-equipped school facilities play an important role in a modern education programme."

2.4 As an invaluable aid to the Private Architect, the issue of standard plans and drawings is particularly useful since architects in the private sector are not necessarily school specialists, with the knowledge of the accepted norms of the various elements

and units in a school building. By the very act, therefore of supplying the Private Architects with the standard drawings, and issuing instruction for the strict adherence to the details, the DET is assured of the provision of accepted standards. This eliminates all possibilities of misunderstanding or ambiguity.

2.5 In favour of the use of standard plans and details, developed since the last World War, mention must be made of the American, William Caudill (1954, p. 16-17), who stated that:

> "Historians might say that 1950 brought a new light to educational architecture - a new movement based on the needs of the pupil (whether or not 1950 goes down in the history books as a turning point toward improvement of school building, it can certainly be said that 1950 represents a year in history when for the first time a large majority of architects and educators throughout the entire nation got together to try to solve their common problems). Many conferences were held where the average architect and the average educator participated; consequently the average school building began to approach the quality of more **advanced prototypes** ..." [author's emphasis]

2.5.1 Standardisation must not be confined to the design alone, but must run like a golden thread through all the facets of an Architectural Services component. During the years of service with the TPA, the author's visit to TPA Works Department plans-registry was sufficient to convince any reasonable person of the evidence pointing to the absence of a uniform system to be followed by the Private Architect. This had resulted in the absence of uniformity in the preparation of the working drawings. It is quite apparent that this could have been eliminated by the successful application of effective liaison between the Architects of the TPA and those of the Private Sector, coupled with a uniform approach towards the "standards expectations" amongst the architects of the TPA. The common factors found were briefly :

(i) lack of uniformity of drawing sheet sizes with discrepancies, often even in a single set;
(ii) lack of uniformity of drawing sheet layout;
(iii) inconsistencies in the application of drawing and folio numbers;
(iv) undated drawings;
(v) drawings often without scales;
(vi) poor quality drawing paper;
(vii) unindexed sets of drawings;

2.5.2 The demand for a high standard as well as for uniformity of working drawings and documentation restricts the Architect to the exact usage of standard documentation and instructions issued at the briefing and subsequent consultations.

2.6 In the case of a school building, all these problems are taken care of in as much as the Private Architect is given a complete set of transparencies, or software, of the standard working drawings, on A1 sheets which he has to adapt to the contours of the site to the approved configuration of the complex. This leaves him with the preparation of the site plan and the one or two detailed sheets that may be required for the individual covered ways. For this purpose the Private Architect is given the necessary amount of blank sheets with the accepted logos printed there on.

2.7 Rigidity of detail and design.

2.7.1 Approximately 50% of the Architects insisted in the beginning that the Private Architect should be given more freedom of design. This may be true for buildings that are not as highly specialised as those that have such a profound effect on the future of the nation from an educational point of view.

2.7.2 Cocking, (1963, p. 75) observed that the economies gained in the United States of America through creative and imaginative design in school-building construction existed in only about five percent of the buildings currently being built. However, he pointed out that:

> "Our greatest hope lies in the five percent of excellent buildings we have designed and constructed. They demonstrated that if educators and architects employed the best competence available, we would continue to advance and improve ..."

2.8 In the design and documentation of new Primary Schools, alterations and/or additions to Primary Schools, the one single restriction that the Private Architect is faced with is the application of and adherence to standardisation. However, once the Private Architect understands the value of standardisation as applied to Primary and Secondary Schools, backed with research and experience, which is constantly being looked at with a view to improvement, he will realise that it is not static but dynamic to the extent that the "powers that be" are open to suggested improvements. The Private Architect can turn it into an exciting experience or, of course, he can look past all of this and accept it merely as another "job" to provide him with a living.

2.9 The authority that the Private Architect is given as an appointed Principal Agent, commissioned to execute the Architectural Services of a school for the DET, varies only from a normal commission in the Private Sector in as much as he is to function as an extension of the architects' section of the DET as opposed to the direct involvement with the "owner". The satisfaction that the Private Architect will enjoy from this delegated authority depends entirely upon his ability to accept and follow the guidance of the Liaison Architect, who will effectively lead his colleague by seeing to it that he is supplied with the correct information.

3. THE ESTABLISHED BASIS

3.1 When, in 1976, the author was placed in control of all Primary Schools in the old Transvaal Province, he immediately set about standardising all elements of the primary school "standard design" which had been in use since 1971.

3.1.1 The author was dissatisfied with the differing modules used in the various blocks and obtained permission from the Director of Works, to use the service of a selected Architectural firm, ably assisted by selected members of the Works Department Drawing Office.

3.1.2 The purpose of the exercise was to examine the current standard primary school drawings, which, since 1971 had served a very good purpose, with a view to updating the documentation, as well as bringing the initial costs down to an acceptable minimum.

3.1.3 The author delivered a comprehensive report on this exercise to prove how, in October 1979, two competitive tenders were received with the school designed to the new updated modules, confirmed that the author's hypotheses were correct, having achieved both, successful updating and reduced costs. This report is attached as Appendix "A", and should first be studied before proceeding any further.

3.1.4 In the year 1981, using the same consultant team to eliminate all the obvious errors surfacing in the 1979 "Waterkloof Glen Primary School", the Primary School was built in Mayville (The Mayville Primary School), being completed before the author was promoted to The Department of Education and Training which school complex was highly successful (see figure 3) and, to this day, is used as the basic standard primary school.

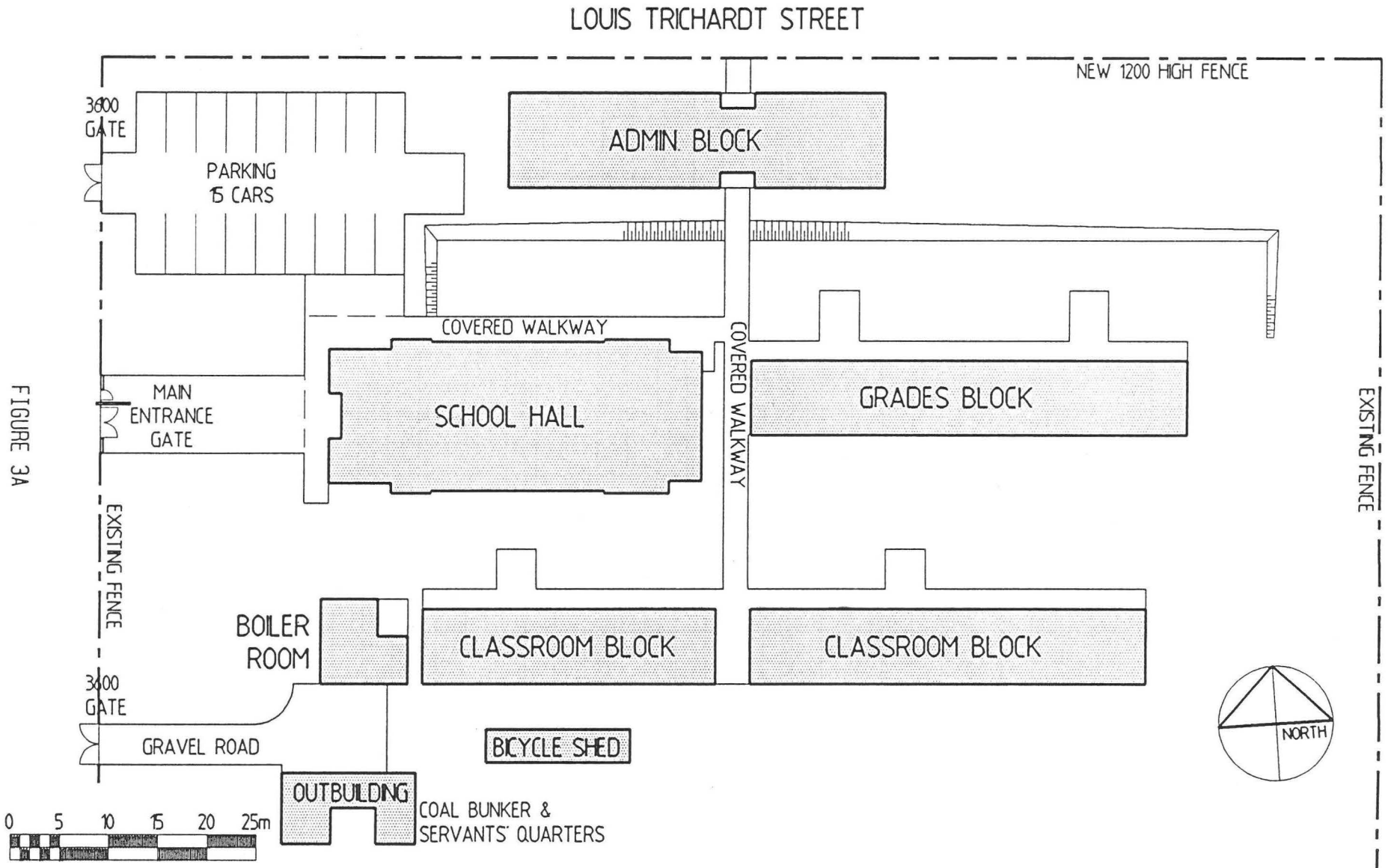
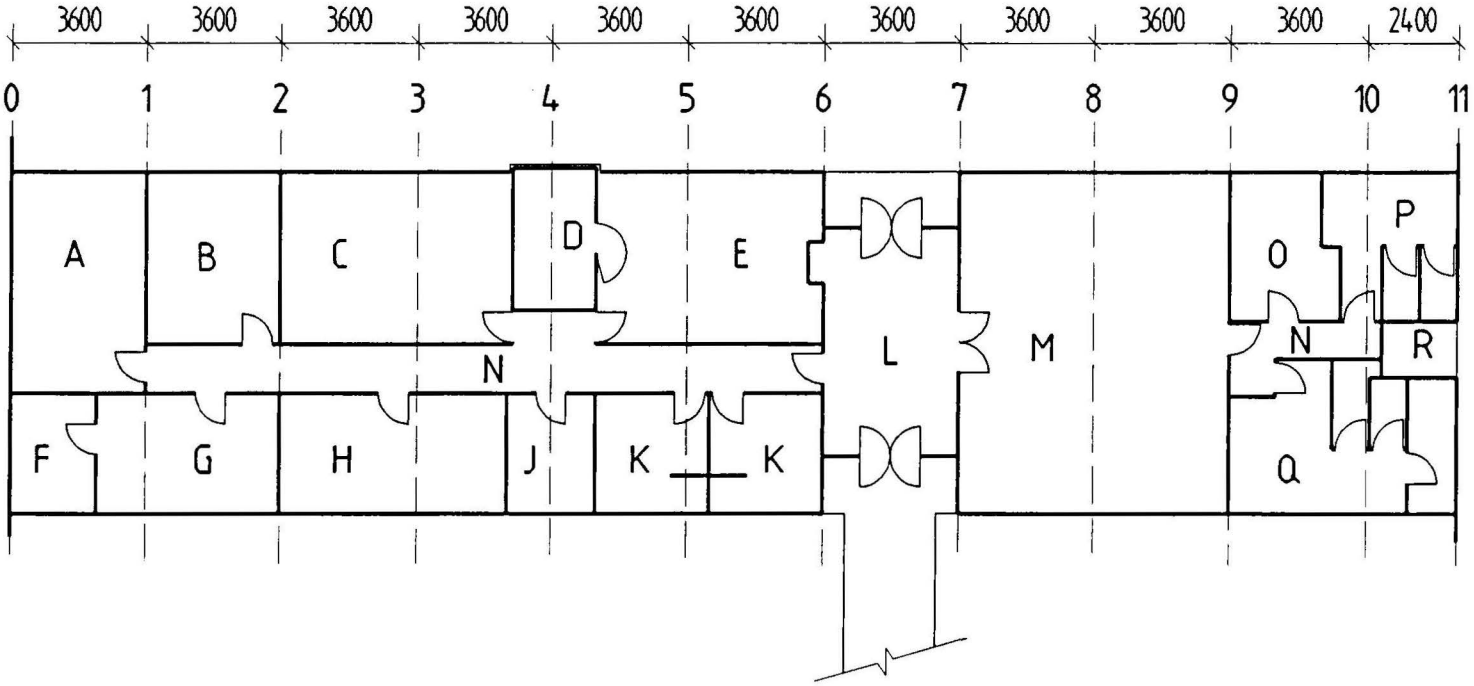


FIGURE 3A

MAYVILLE PRIMARY SCHOOL - Site Layout



LEGEND:

A - HEADS OF DEPARTMENTS
B - VICE-HEAD
C - HEAD
D - STRONGROOM
E - GENERAL OFFICE
F - PRINT STORE
G - PRINT ROOM
H - BOOK STORE
J - STATIONERY STORE
K - SICK ROOM
L - ENTRANCE HALL
M - PERSONNEL ROOM
N - PASSAGE
O - KITCHEN
P - GENTS TOILETS
Q - LADIES TOILETS
R - SHAFT

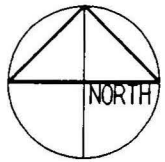
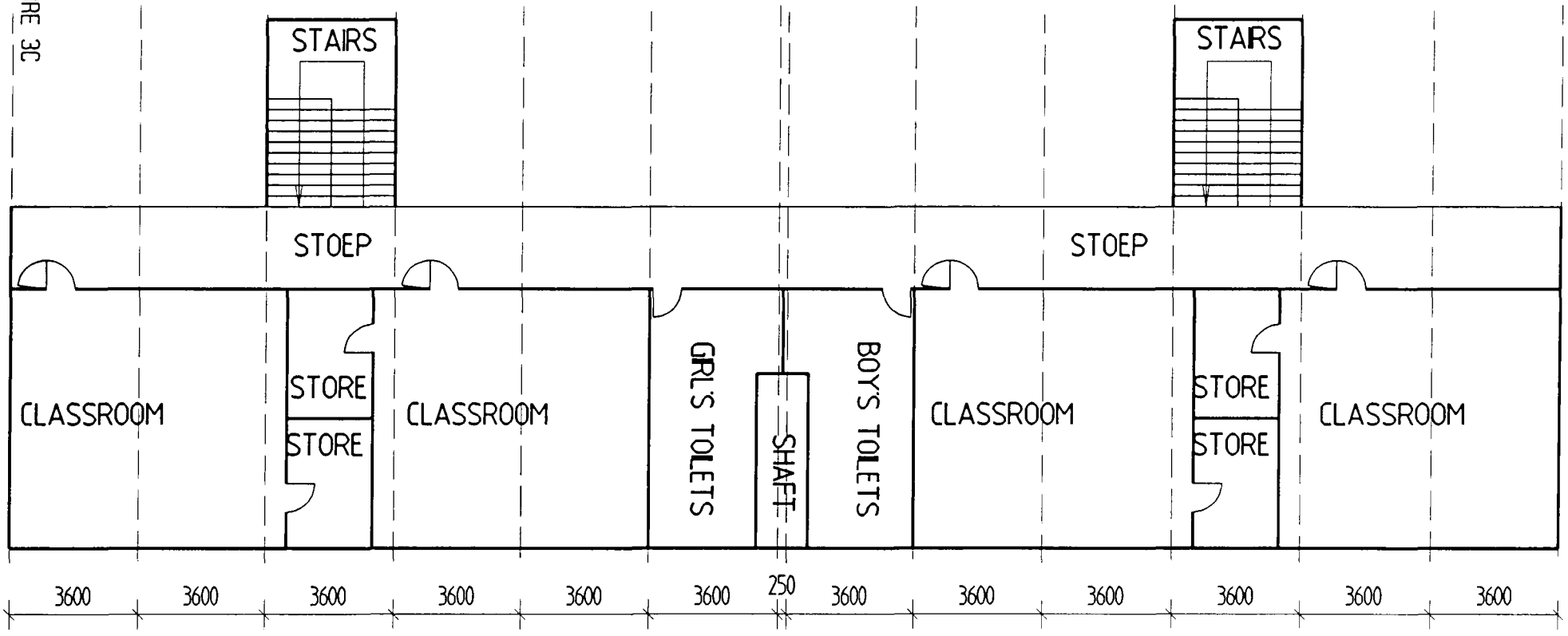


FIGURE 3B

SCALE 1:200

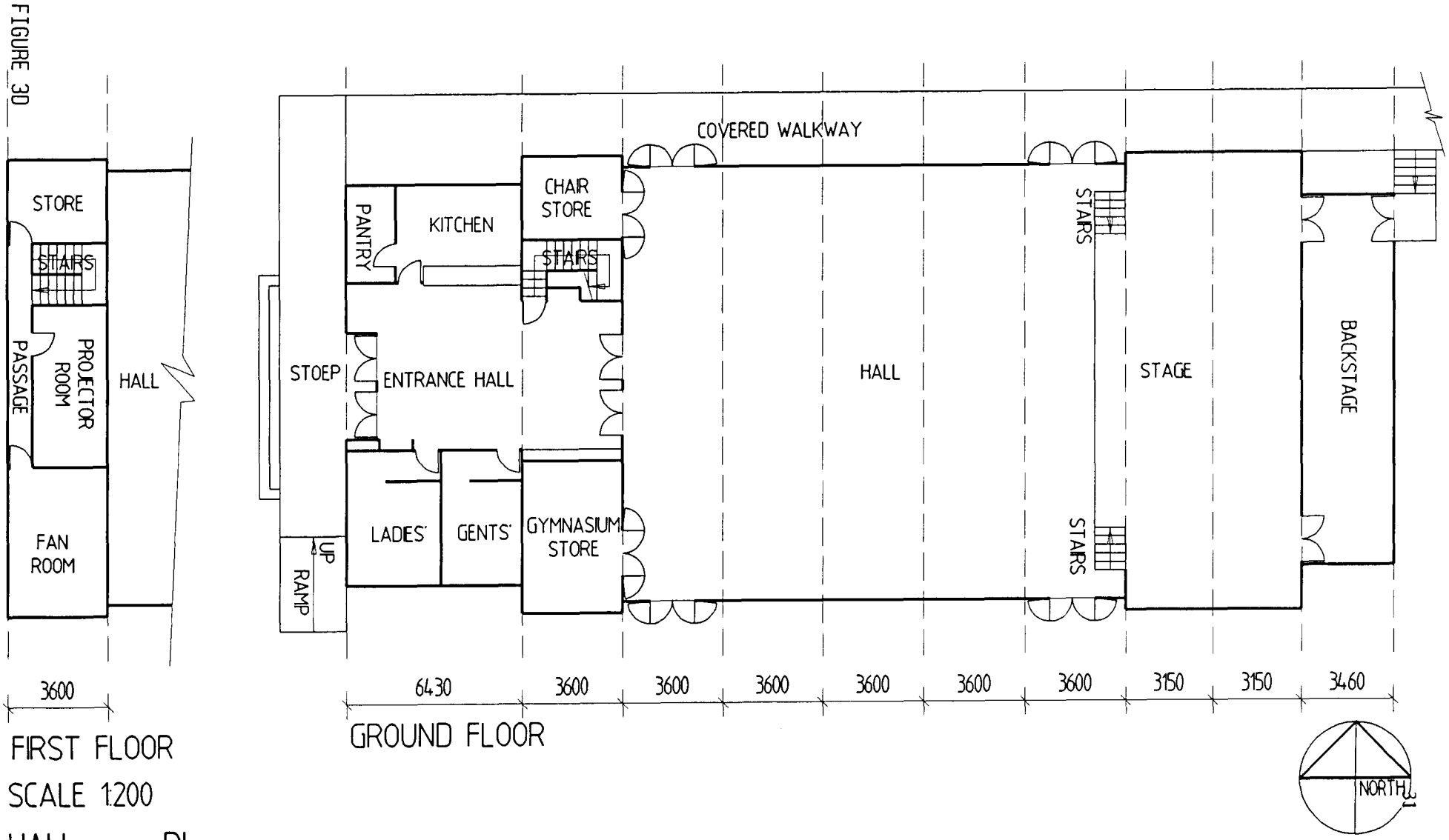
ADMINISTRATION BLOCK - Plan

FIGURE 3C



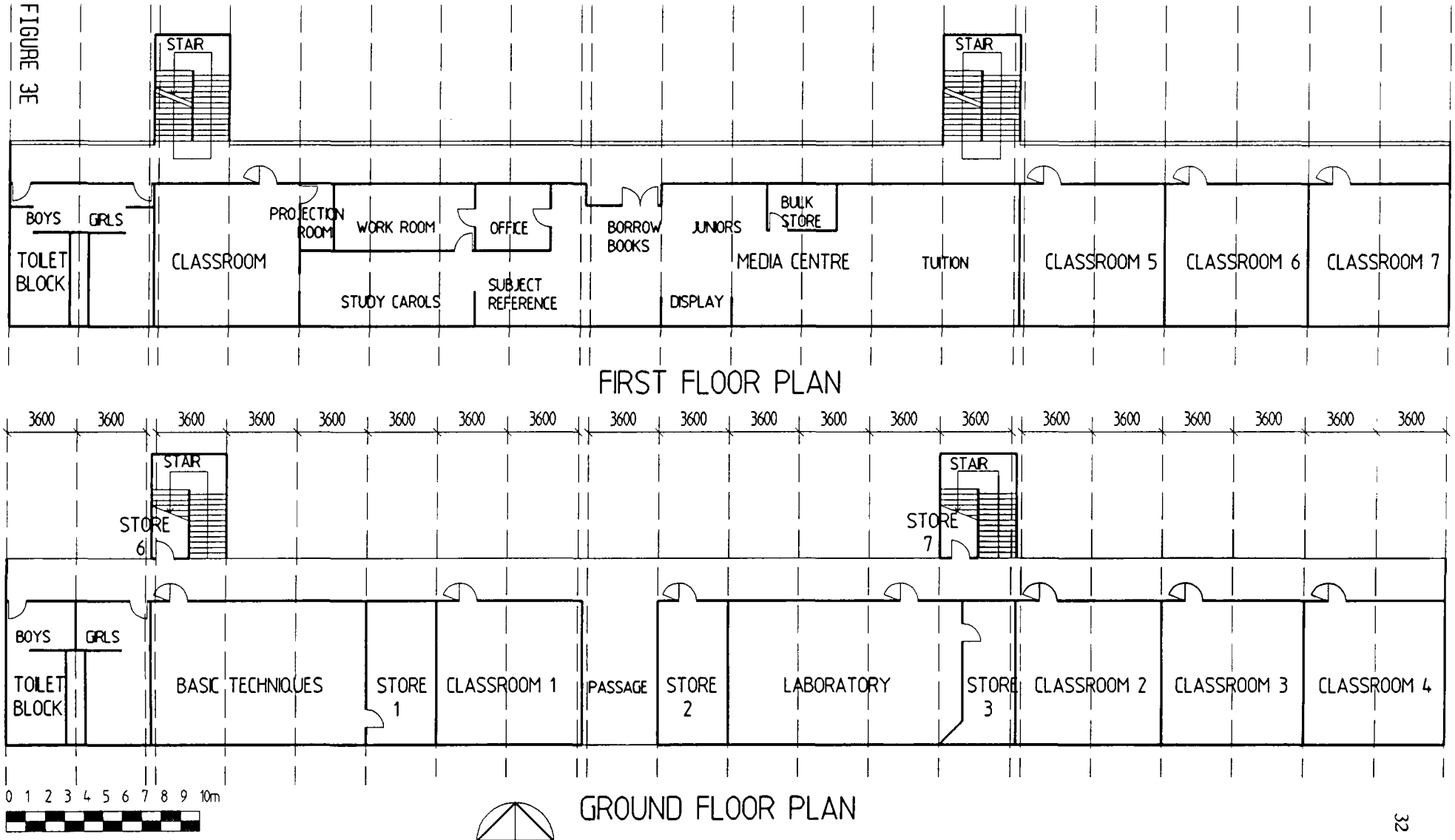
CLASSROOM BLOCK - Ground, First and Second Floor Plans

FIGURE 30



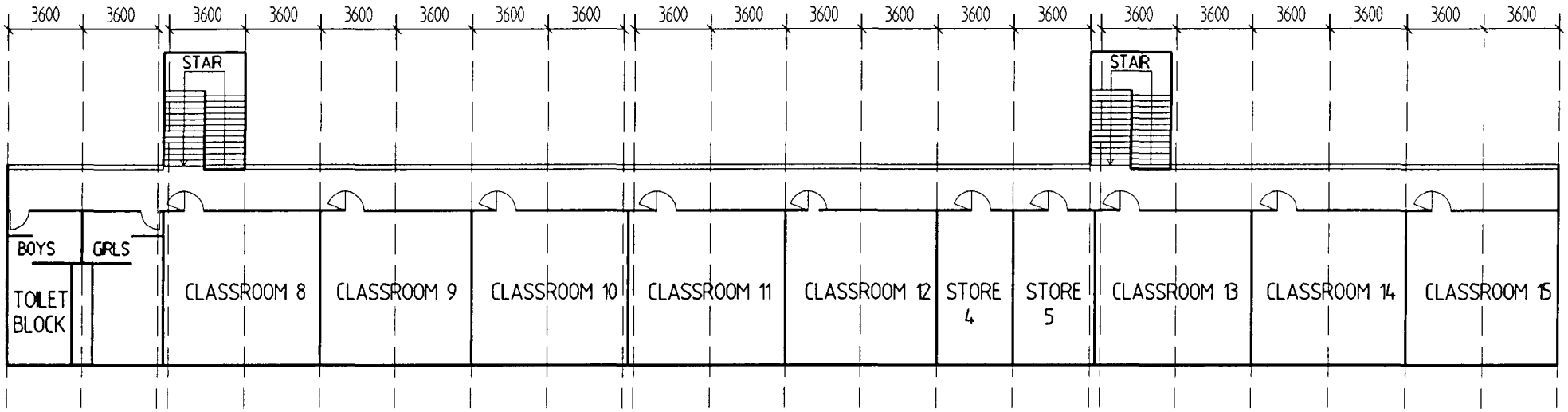
HALL - Plan

FIGURE 3E

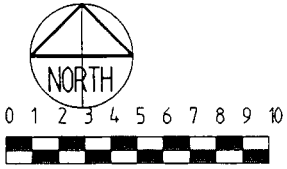


CLASSROOM BLOCK - Plan

FIGURE 3EE



SECOND FLOOR PLAN



CLASSROOM BLOCK - Plan

3.2 The author took this experience, with developed theories, with him to the Department of Education and Training, to use this school as the basis for the design of primary and secondary schools for the DET in the years that followed.

3.2.1 The first break came with the urgent requirement of a ten classroom primary school in Magaliesberg, still known as the Magaliesberg Primary School. See figures 4, 5 and 6, showing the initial accommodation provided and the subsequent development, all on a standard unit basis.

3.2.2 The considerations involved, and the development of the units required in a standard primary and secondary school, were all to be based on the 3 600 module keeping all assignable areas not only within the "Norms" but also to absolute "pupil comfort".

4. STANDARD CLASSROOM

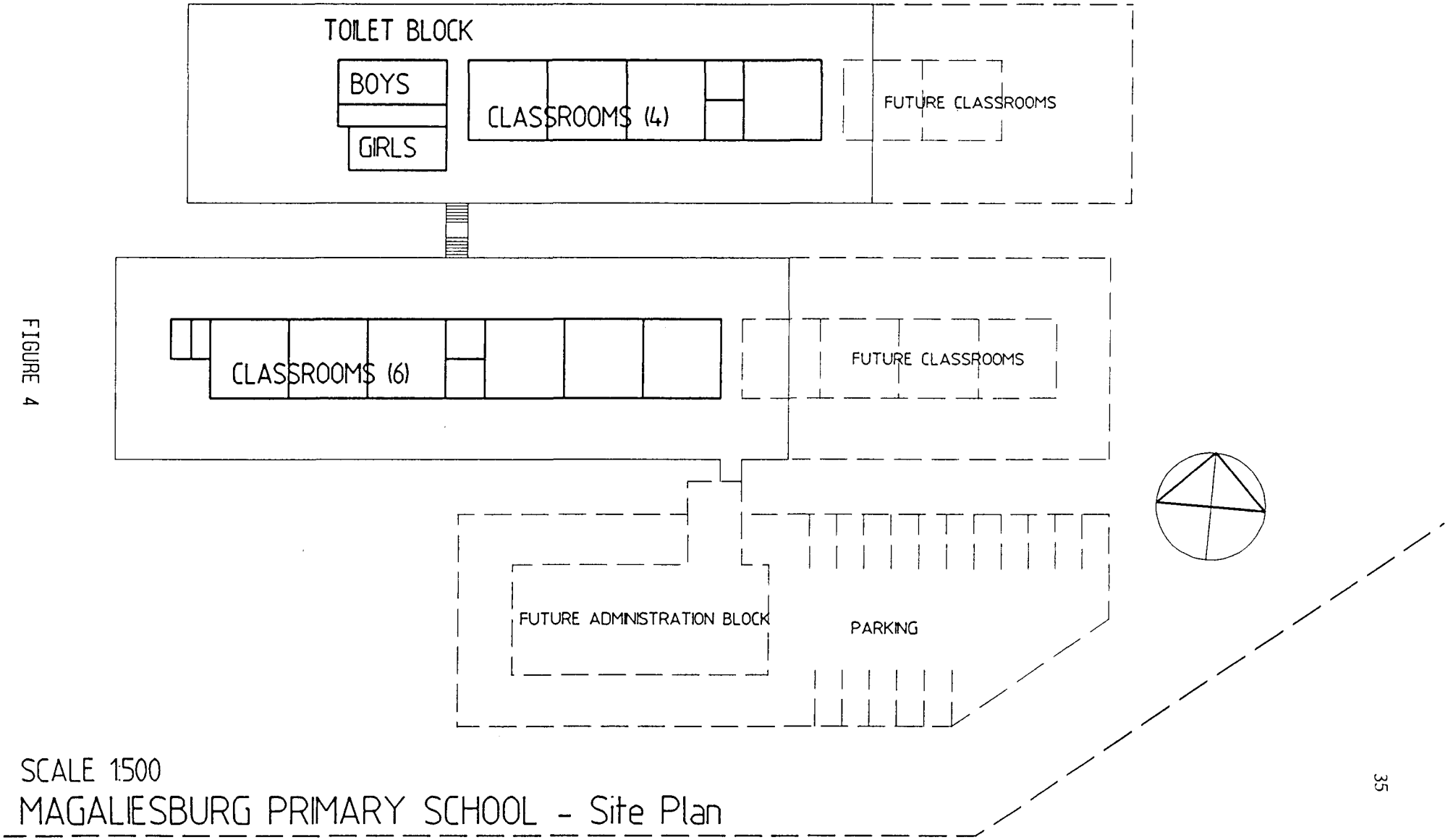
4.1 Before one can consider the design of any structure one must determine what factors will influence the approach to the design and start off with the most important factor. In the design of a school, it is the author's opinion that the most important factor to be considered is the pupils welfare. This being so, the logical place to start, is with the teaching areas in general and the classroom in particular.

4.2 The educators decided on a pupil ratio of thirty five pupils to one teacher for primary schools and thirty pupils to one teacher for secondary schools. To allow for some legitimate overcrowding, it was decided to plan a standard classroom to accommodate forty (40) pupils.

4.3 Since the module of 3 600mm had already been established as the most suitable and cost effective, this automatically determined the length (or depth) of a classroom to be two modules, arriving at 7 200mm centre to centre of columns or walls. Having previously established that the minimum width of a concrete column would be the thickness of a one-brick wall (220mm). This would determine the inside measurement of the length of the classroom as 6 980mm and for easy reference say 7 000mm.

4.3.1 To determine the width of the classroom, it was necessary to establish what width would allow sufficient rows of desks to accommodate forty pupils. This was found to be 7 000mm (figure 7). This gave a total floor area of forty nine (49) square metres as against the "Norm" assignable fifty (50) square metres.

FIGURE 4



SCALE 1:500

MAGALIESBURG PRIMARY SCHOOL - Site Plan

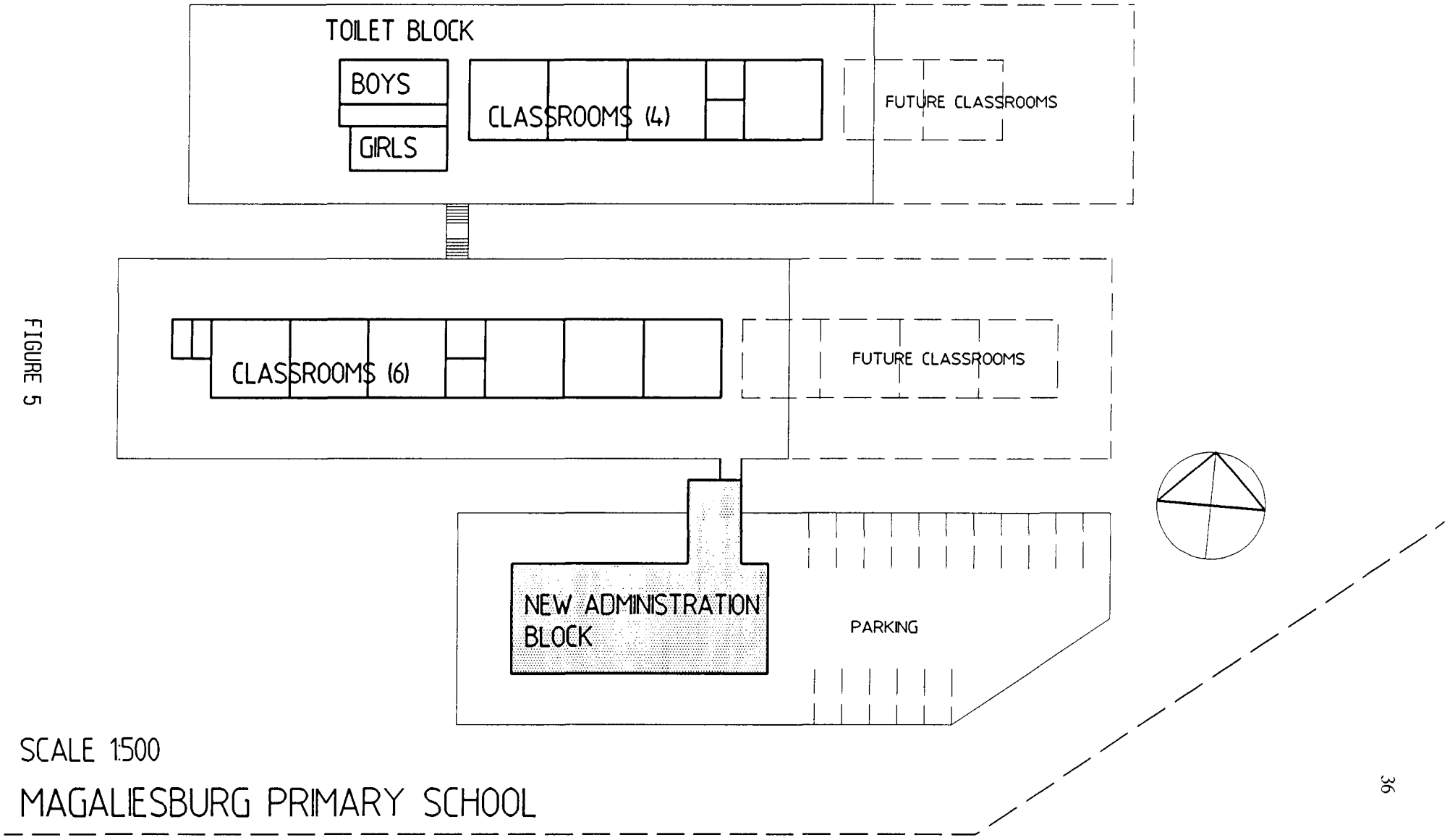


FIGURE 5

SCALE 1:500

MAGALIESBURG PRIMARY SCHOOL

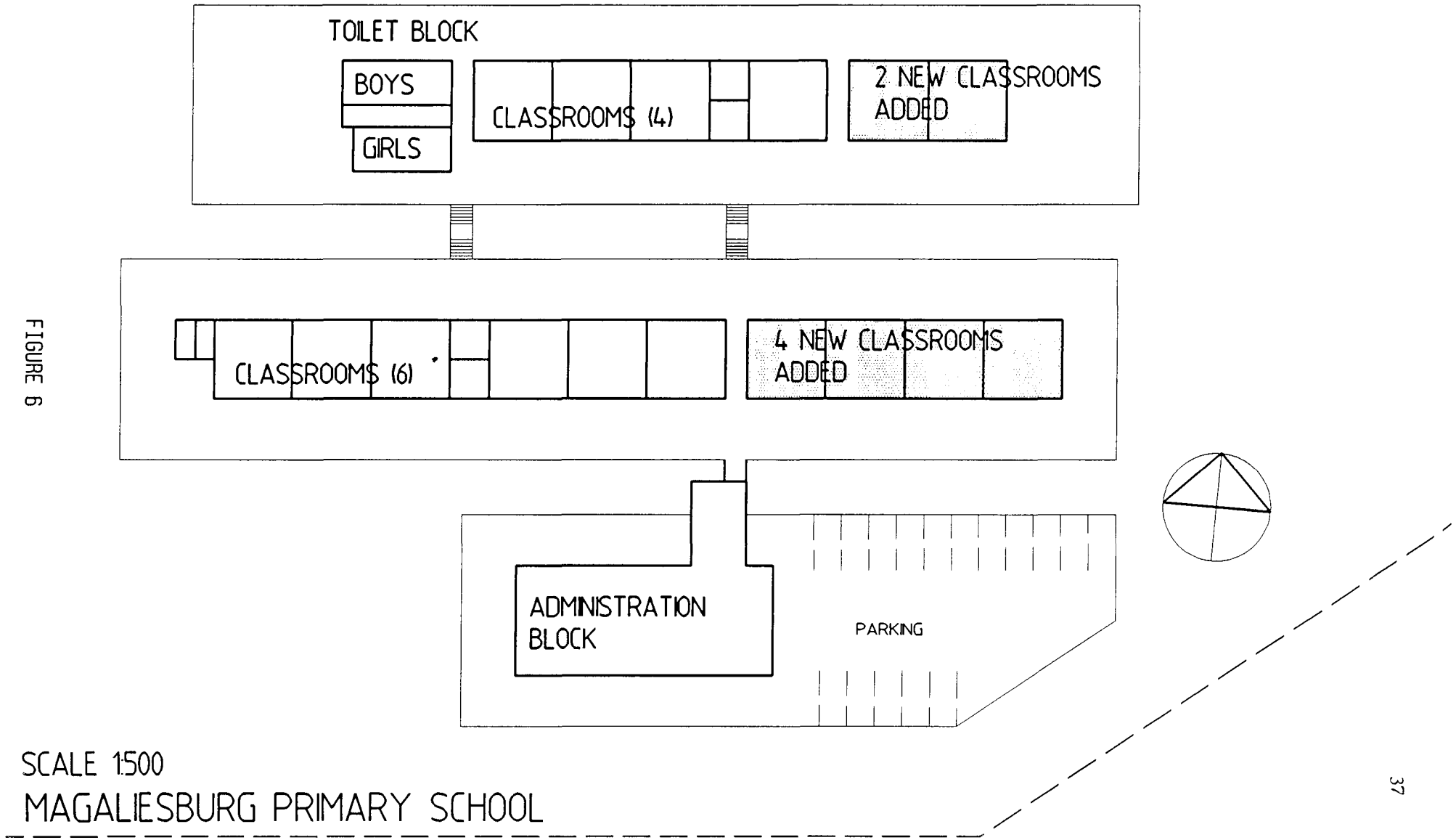
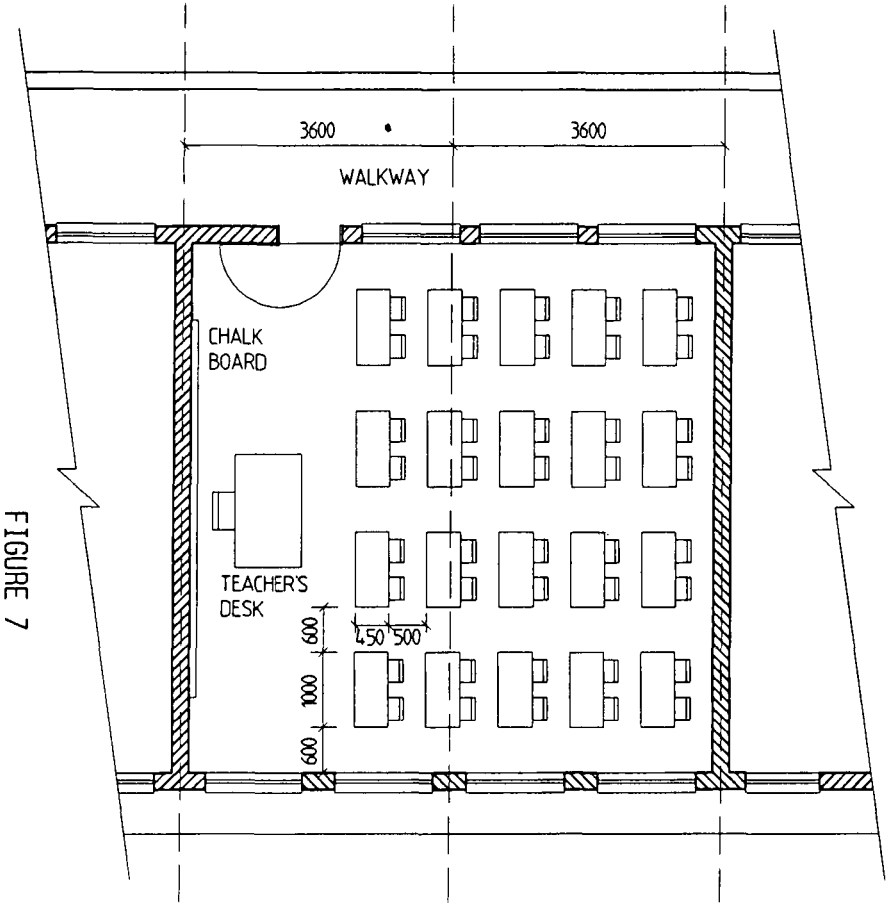


FIGURE 6

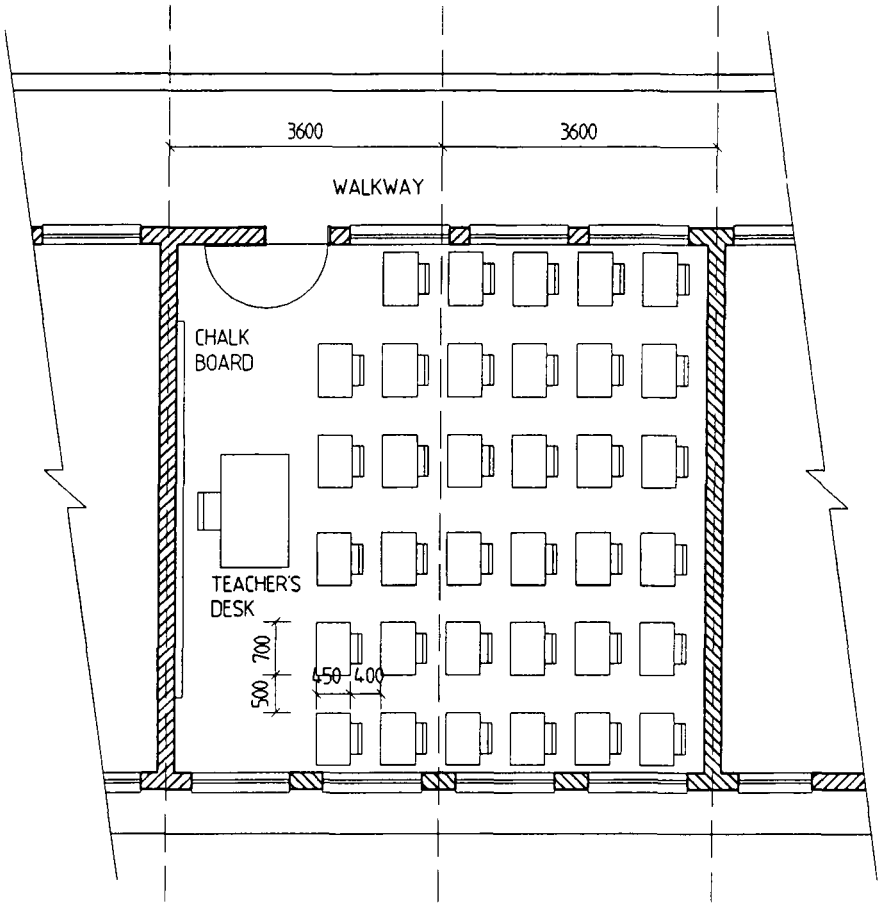
SCALE 1:500

MAGALIESBURG PRIMARY SCHOOL

FIGURE 7



PRIMARY SCHOOL: Seating 40 pupils



SECONDARY SCHOOL: Seating 35 pupils

SCALE 1:100

STANDARD CLASSROOMS SHOWING DESKS IN ROWS

4.3.2 The next consideration was the undercover corridors connecting the classrooms. The old width of 1 200mm was found to be inadequate to permit two children to pass each other, both carrying school bookcases. The width required was closer to between 1 800mm and 2 000mm. The Standard Building Regulations (SBR) stipulated that all roof trusses with a span greater than 9 000mm must be designed by a Professional Registered Engineer. Under 9 000mm, it is permitted to follow the tabulated configuration of a roof truss as published in the SBR. It was obvious then, that the intelligent solution would be to confine the dimension between the inside of the far classroom wall and the inside of the parapet wall to the corridor to, as close to 9 000mm as possible. Thus, rounded off, the inside measurement of the width of the corridor was resolved at 1 800mm.

4.3.3 Because of the possible adverse effect of the sun's rays on the chalk board, it was decided that the chalk board would always be on the Western wall, and the Eastern wall would have full length pinning boards 1 200mm in depth. The entrance door would be on the same side as the chalk board for obvious reasons.

4.4 Lighting, both natural and artificial, probably has the most profound effect on the pupils comfort, with the resultant minimum effort to apply maximum concentration. After much trial and error, it was found that the best results were achieved by, not only having the same height from window cill to window head in each of the "external walls", but also that the natural lighting to be not less than 25% of the total floor area of the classroom, as opposed to the 10% required by the National Building Regulations (NBR).

4.4.1 To avoid unnecessary damage to the walls when moving the desks, the internal walls would be in face bricks up to window cill height and plastered above. The plastered areas and the ceilings were to be painted white, to provide maximum lighting in the classroom. This provided a comfortable teaching area.

4.4.2 This area and finish was acceptable to both primary and secondary standard classroom requirements.

5. GENERAL PURPOSE CLASSROOM

5.1 Except for the "Arts and Crafts" teaching area and, when required, the "Junior Library", the General Purpose (GP) Classroom applies specifically to the Secondary

School. As the resume implies, the GP classroom is a classroom area for all other purposes, than for a standard classroom area specifically designed for the "Norm" pupil-teacher ratio.

5.1.1 The General Purposes Classroom is provided for the instruction in Typing (special equipment), Geography (specialised aids), General Science (a compulsory subject up to standard eight, thus with few specialised teachers these will be large classes), Home Economics (specialised equipment) and any other specialised subject such as Technical Drawing et cetera, as well as for written examination purposes. Refer to figures 8 to 10.

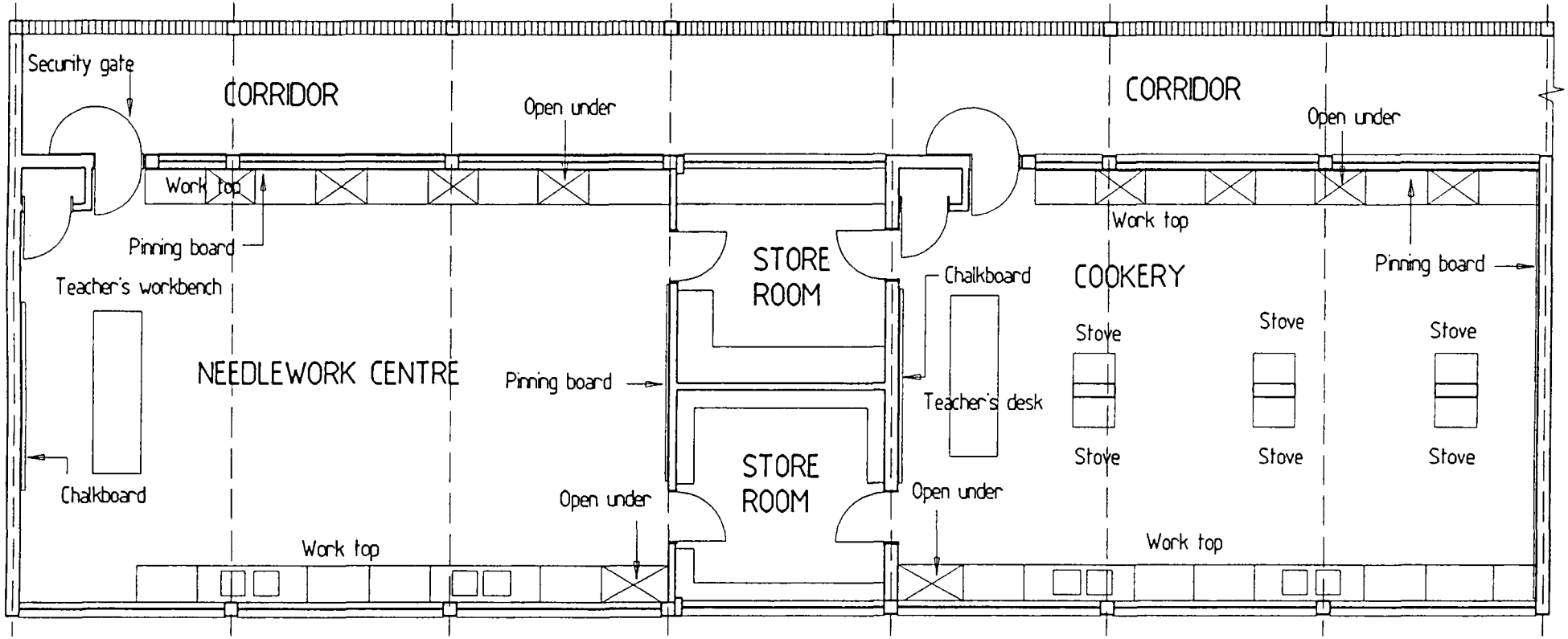
5.2 Prior to rational standardisation, these teaching areas were twice the size of a standard classroom (old large standard) never fully occupied and with a low percentage usage factor. The low usage factor's solution is dealt with, in detail, later.

5.2.1 Travelling countrywide and making a complete study of the exact usage factor and percentage occupation, (at least twelve different schools throughout the Republic), selecting schools with an involvement of eight hundred pupils and above, it was interesting to note that, in this area, there was a particular wastage of space as well as a lower usage factor than was allowed for, probably due to the unscientific approach towards correct curricula assessment and the needs to satisfy a particular curriculum.

5.2.2 From actual physical count, it was established beyond doubt that a GP classroom need not occupy a space more than fifty percent greater than the standard classroom. The answer was simple arithmetic. A GP classroom need only be three modules in length and the same width as a standard classroom.

5.2.3 The door, chalk board and pinning board positions would be the same as for the standard classroom with the fenestration and internal wall finishes being determined with the same criteria as for the standard classroom.

FIGURE 8



SCALE 1:100

HOME ECONOMICS : SECONDARY SCHOOL - Plan

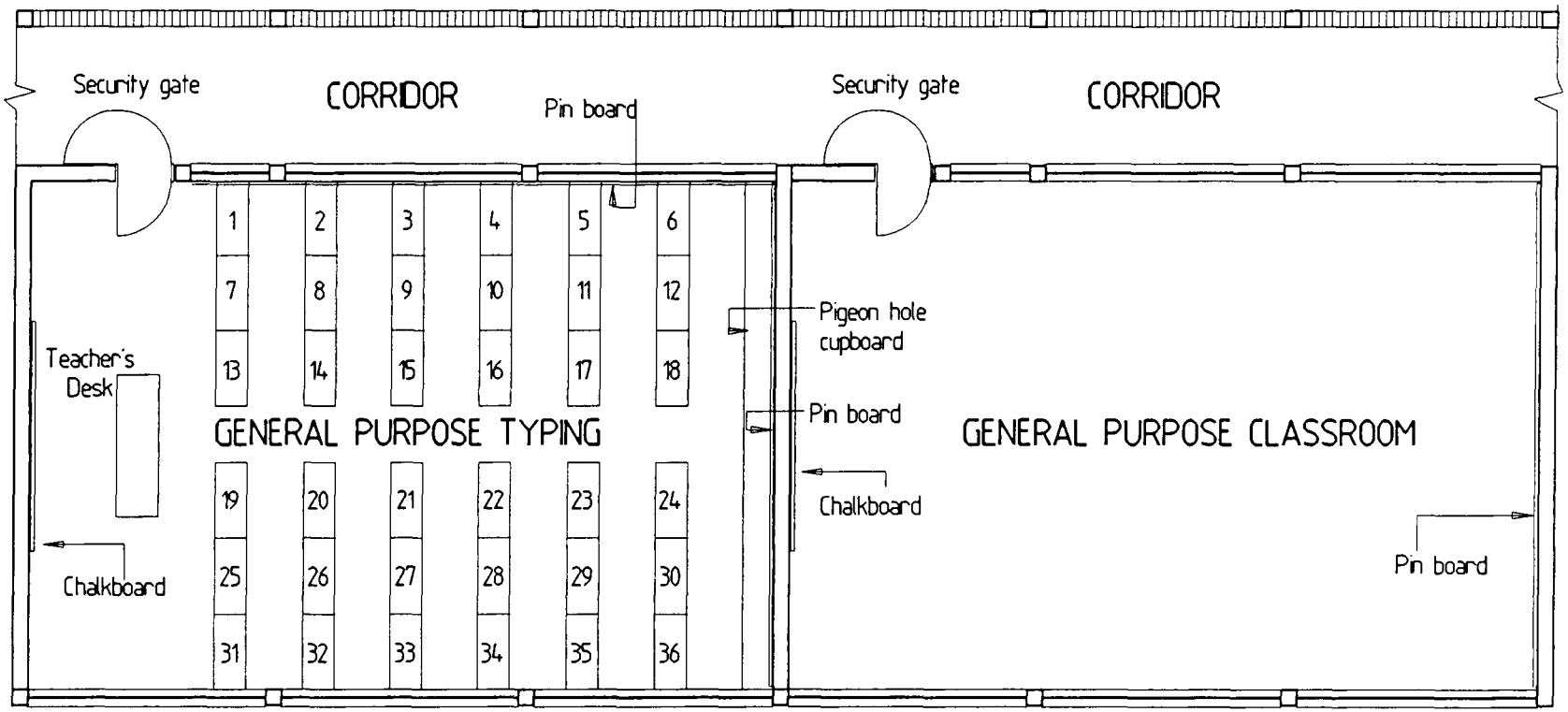
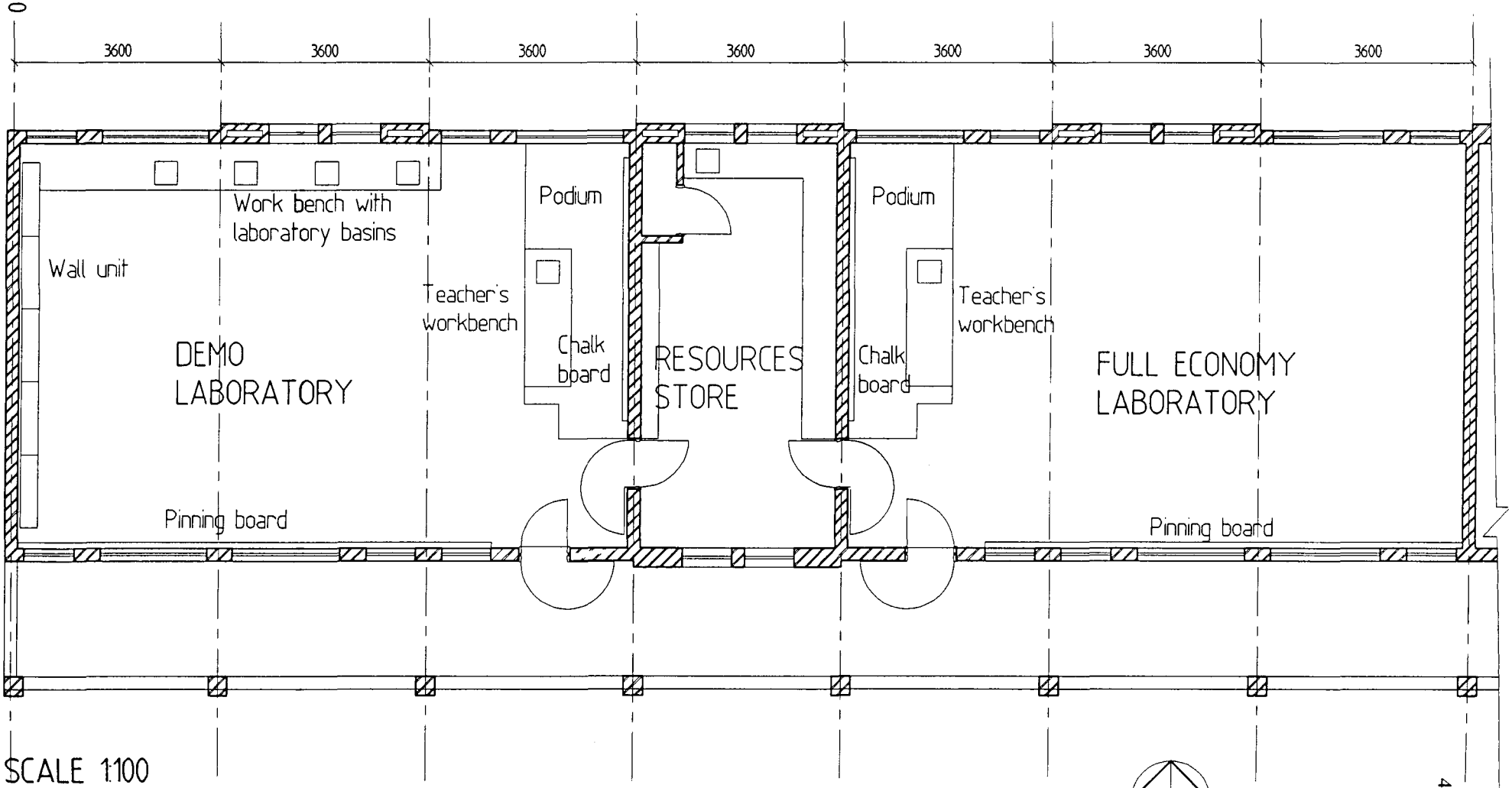


FIGURE 9

SCALE 1:100

GENERAL PURPOSE CLASSROOMS: SECONDARY SCHOOL - Plan

FIGURE 10



DEMO LABORATORY AND FULL ECONOMY LABORATORY - Plan

43

6. LABORATORIES

6.1 During the same time, whilst studying the GP classrooms, great care was taken to evaluate the usage and occupancy factors relating to laboratories in general. The study produced unbelievable results not only with respect to the ignorance of the correct usage of these teaching areas but of the extremely low percentage occupancy. In more than one instance, the author encountered a maximum of six students sitting around the teachers table.

6.1.1 Obviously the laboratories in their design and number required, needed serious and urgent attention. In this chapter, the study will be confined to the optimum size only and to what degree a laboratory requires a resources storage area.

6.2 The analysis of the facts produced from the study revealed that the laboratory, in most instances could be the same size as a standard classroom and in other instances possibly twenty five percent larger. It was evident, however, that the interest shown in the various sciences could increase slightly, persuading the subject advisors that the laboratory need never be larger than a GP classroom, not as elaborately fitted out as previously envisaged, and need only share, with an adjacent laboratory a resources store of maximum twenty five square metres (one module).

6.2.1 After various trials, the final "demo lab" was decided on as detailed in figure 10, which is more successful, economical and user friendly. The savings effected could now be used to provide one additional standard classroom.

7. THE ADMINISTRATION BLOCK

7.1 Except for a few secondary schools in the Cape Region, the author was amazed to find that very little or no consideration had been given to a well designed functional administration block. It was generally found that the Principal had a small office, sparsely furnished with a secretary and storeroom in a small adjacent area, with possibly a small stationery store. The schools were, in fact, a complex of classrooms only with minimum accommodation for the Principal and small staff and primitive toilets. This whole situation tempted the author, undaunted, to address a large audience of senior officers, and having the audacity to proclaim "... gentlemen, up to now we have only built classrooms. From now onwards, it is my intention to build schools ..." This statement was received in absolute silence. The criticism the author

received in later years explained this polite silence.

7.2 Having built administration blocks for schools for Whites in the old Transvaal, the author stood his ground and won the day convincing the authorities and educators that the administration of the school for Whites was no different to that for Blacks and that the same calibre of administration block would be provided for all new schools and added to existing schools, to transform a classroom complex into a school.

7.2.1 After producing various designs both for primary and secondary schools and building a fair number, it was decided, after two years. that the administration block for both primary and secondary schools, should have the same components with the only difference being that the staff room for secondary schools would be larger than those for primary schools. See figure 11.

7.2.2 A further concession was that, logically, in front of the administration block there would be open parking provided for sixteen motor vehicles in the case of secondary schools and twelve motor vehicles in the case of primary schools. See figure 12.

8. HEADS OF DEPARTMENTS

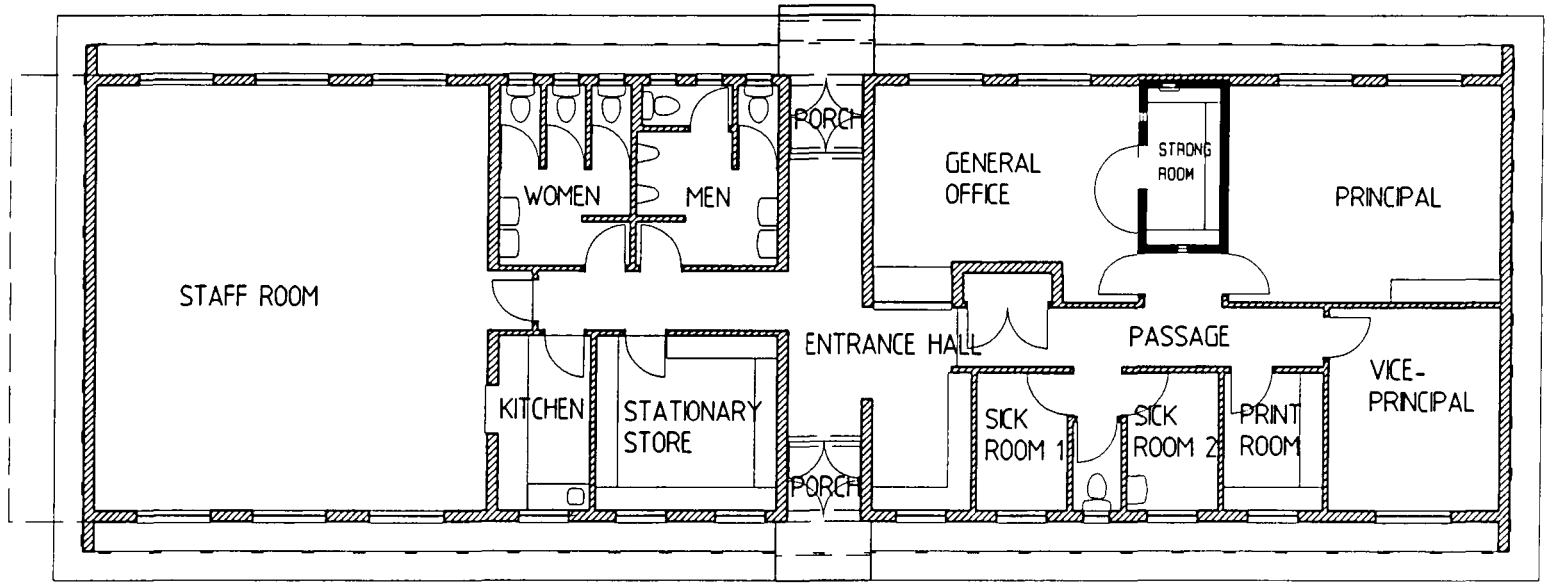
8.1 The Heads of Departments are senior teaching personnel each controlling the activities of the regulation number of teachers, supervising the work and the discipline of the teachers and their pupils. This was a component which the author did not encounter in the primary schools for Whites in the old Transvaal, but soon understood their function and requirements.

8.1.1 The Head of Department (HOD) is a senior teacher requiring a private office and being able to supervise six teachers, all in a total area of twenty five (25) square metres (one module).

8.1.2 The most successful way to do this, would be to provide an office with an adjacent area where the six teachers, during their off periods, could sit and work, marking exercise books et cetera. It did not require a genius to design the unit as illustrated in figure 13.

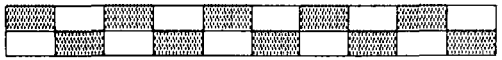
8.1.3 The strategic distribution of these units throughout a school complex is evident in figures 17, 29, 30A & B, 31 and 32A, B & C.

FIGURE 11



Staff room in Secondary Schools is extended by 1000mm in length

0 1 2 3 4 5 6 7 8 9 10m



ADMINISTRATION BLOCK: PRIMARY AND SECONDARY SCHOOLS - Plan

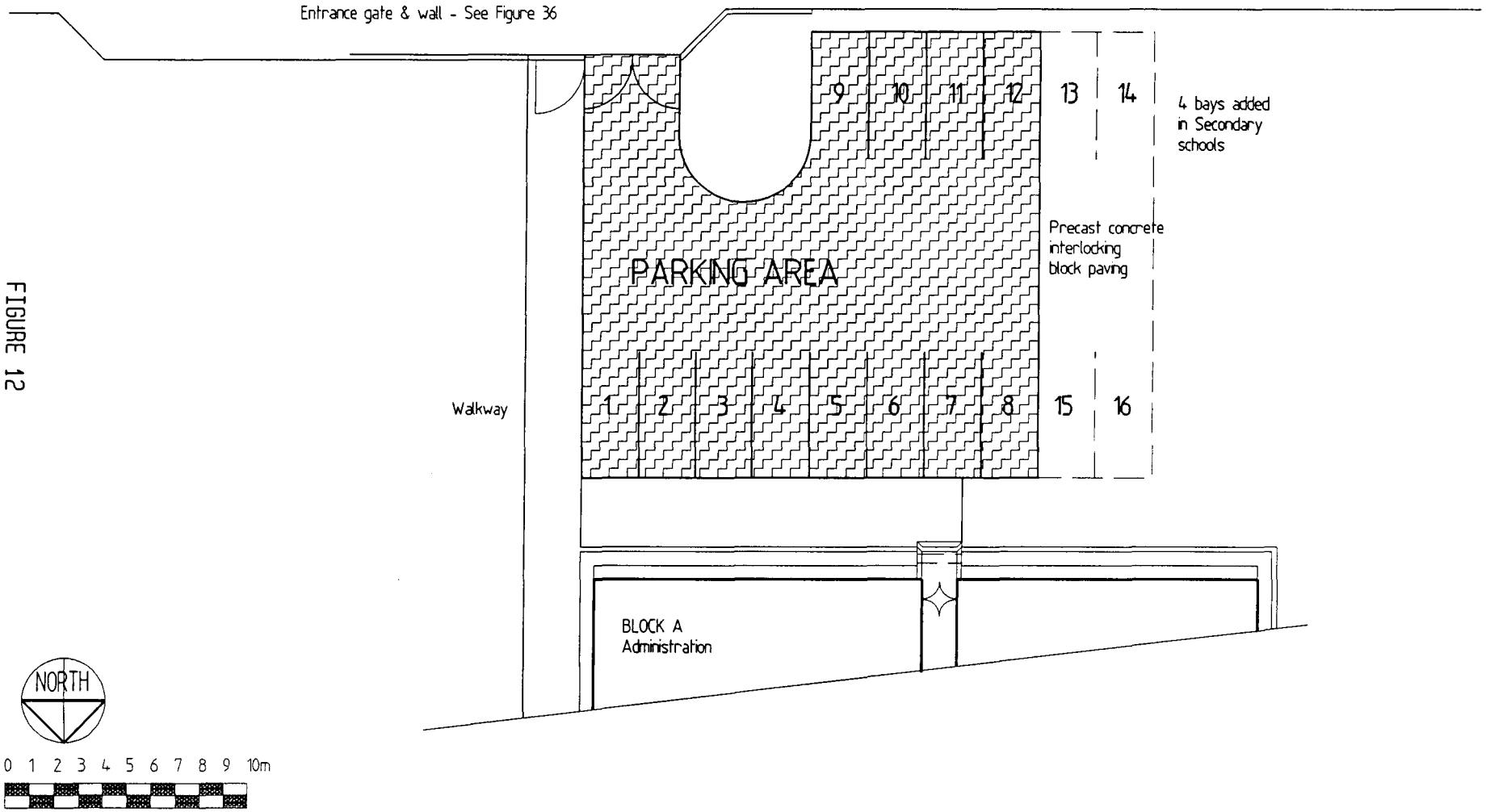
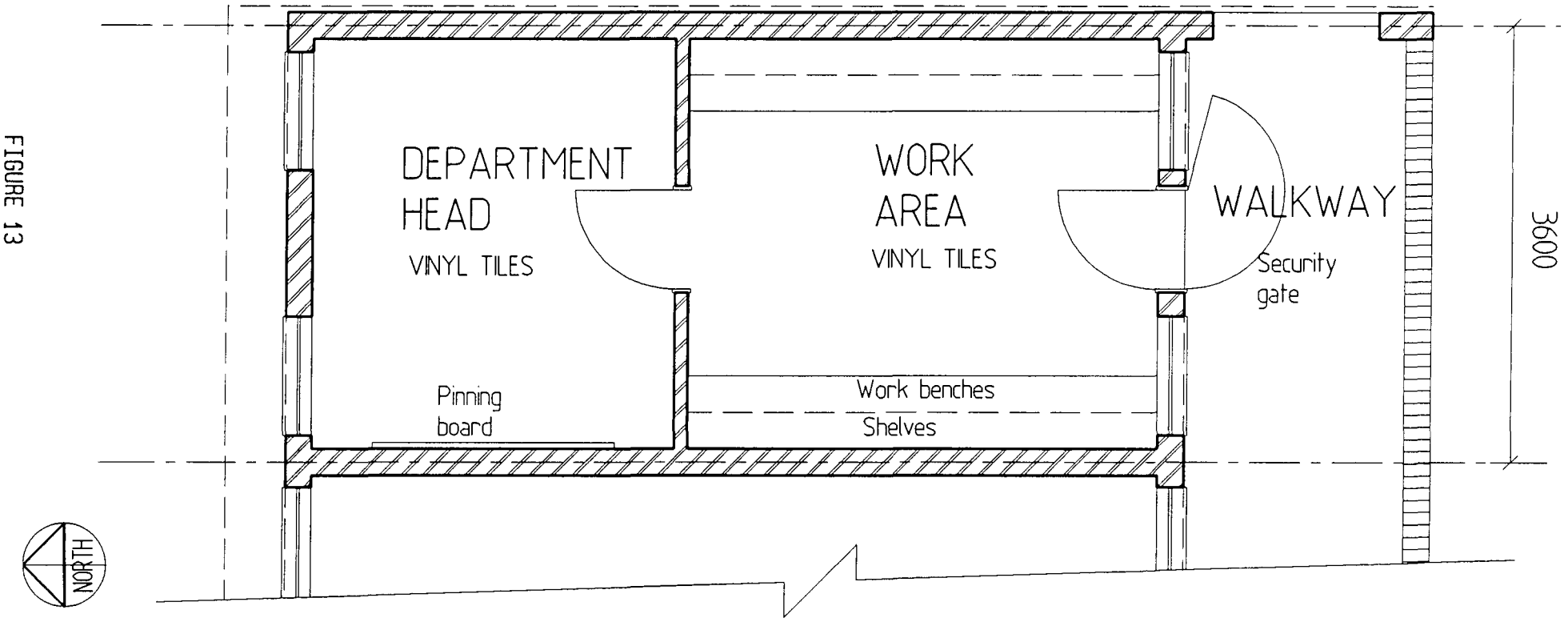


FIGURE 12

PARKING AREA: Primary and Secondary Schools - Plan

FIGURE 13



SCALE 1:50

HEAD OF DEPARTMENT - Plan

9. SERVICE BLOCK

9.1 A service block for any school is not only essential but because of the strict budget limitation for the employment of cleaners and equipment, it is probably one of the simplest forms of standard building component to design which will be applicable to any school.

9.1.1 Because of the difference in sizes of the two types of schools, primary and secondary, the accent on each will differ. In the primary school this component forms part of one of the standard classroom blocks. In the secondary school, the service block is an independent, free standing block also containing the gym store and tuck shop, as well as having linked to it a woodworking centre, when the schools curriculum calls for this.

9.1.2 The primary school service "block" component is comprised only of a garden store with a "roll up" door to facilitate a mobile grass cutting unit if the school can afford it, and also toilet and ablution facilities for the groundsmen and labourers as can be seen in figure 14.

9.1.3 As can be seen from figure 15 the secondary school service block is always a free standing block situated in a position where the tuck shop can also easily serve the sports fields, when they have been provided. It can also be used in an extended form to accommodate a wood-working centre on the one end. Should the school require additional accommodation it can be provided as an extension on the opposite side.

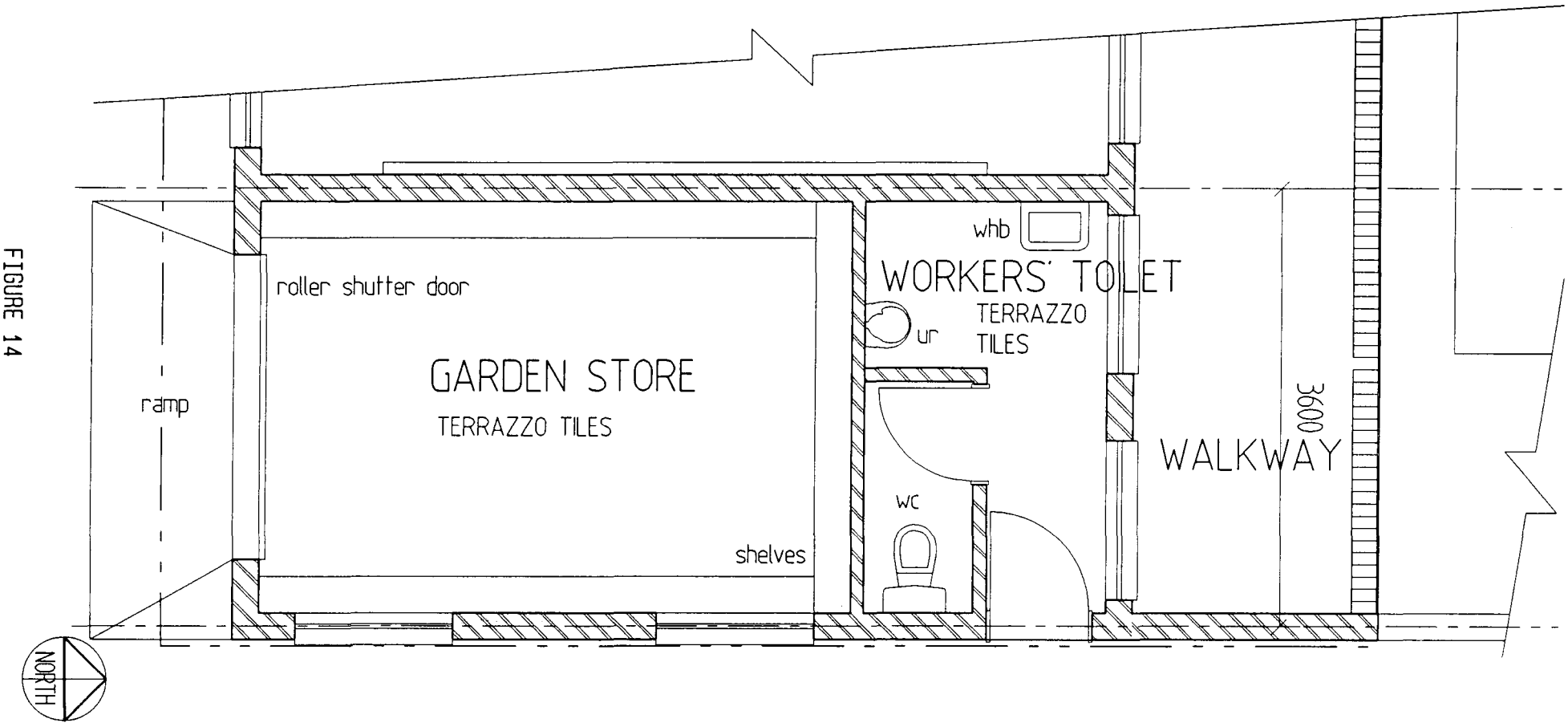
9.1.4 In the type "E" or "F" first phase secondary school, this is not the case. As can be seen from figure 16 it is a completely separate entity, with more than sufficient open space adjacent to the tuck shop to provide ample covered space for pupils patronising the tuck shop.

8.1.5 Figure 17 shows clearly how the final phase secondary school types "E" and "F" can be extended to a full blooded secondary school.

10. GENERAL STORES

10.1 Like water in South Africa, general storage space at any school is always at a premium, yet desperately necessary. The problem was to find a solution applicable

FIGURE 14



SCALE 1:50

SERVICE BLOCK: PRIMARY SCHOOL - Plan

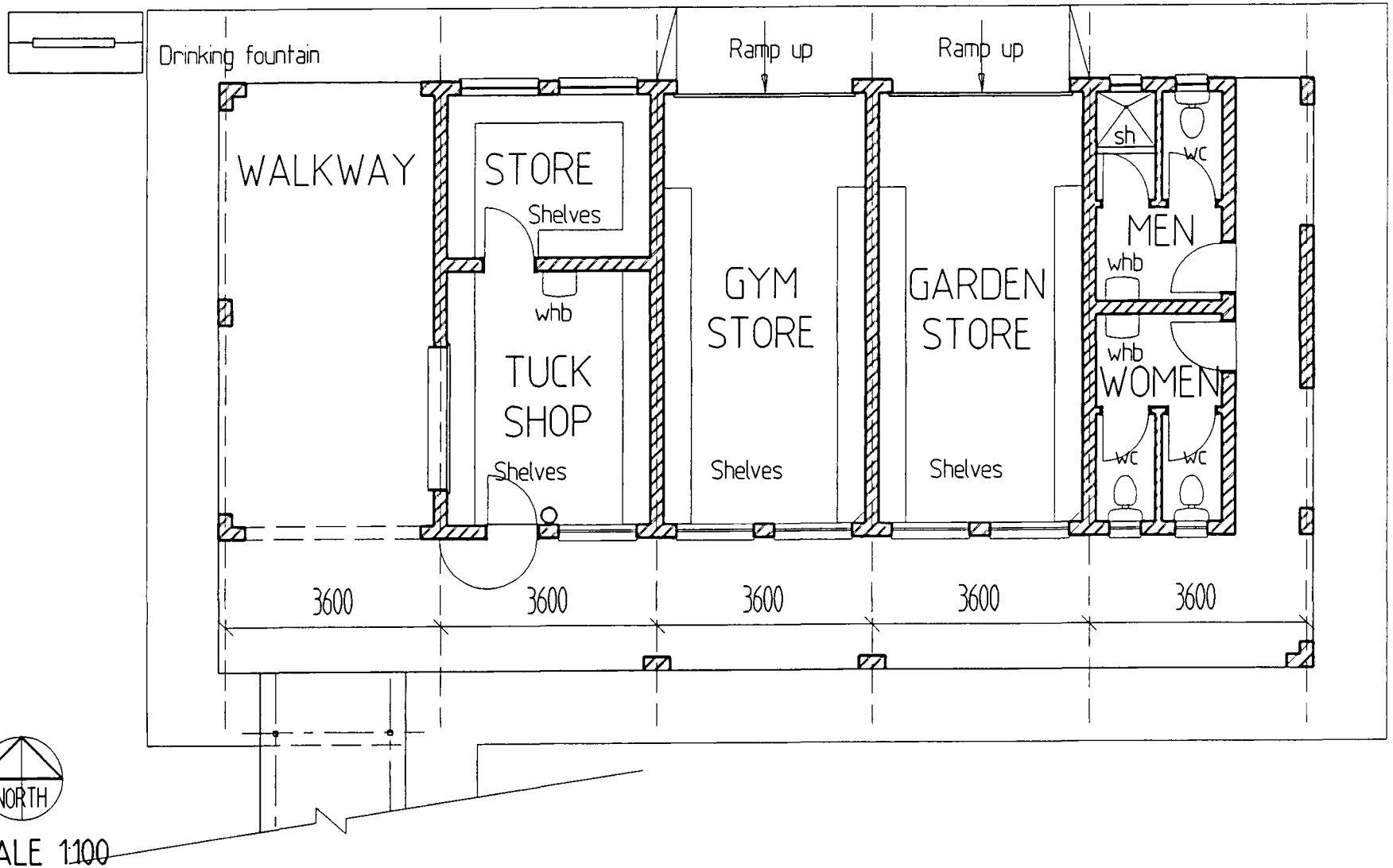
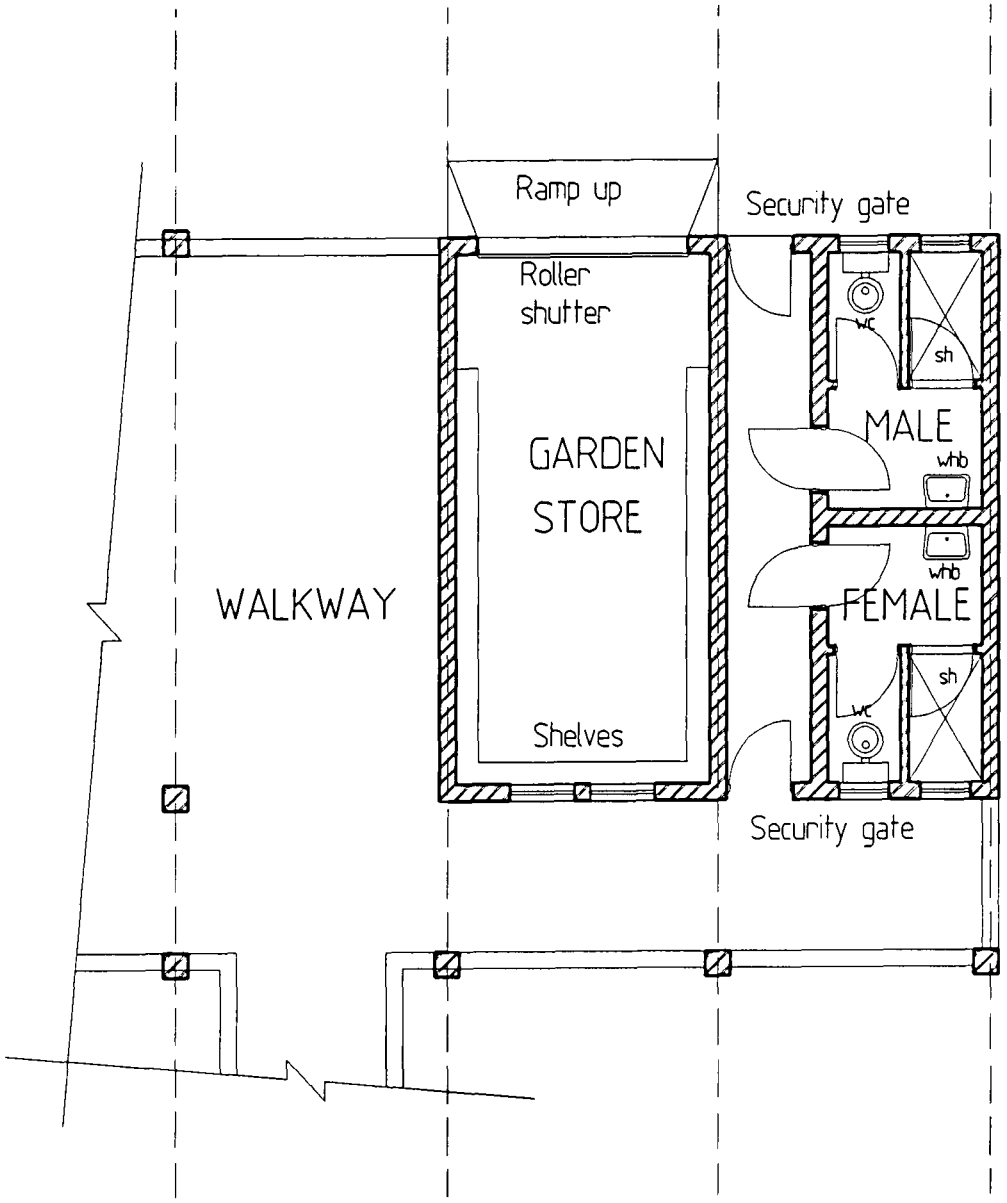


FIGURE 15

SCALE 1:100

SERVICE BLOCK (BLOCK D): SECONDARY SCHOOLS - Plan

FIGURE 16



SCALE 1:100

SERVICE BLOCK: SECONDARY SCHOOL TYPES E & F - Plan

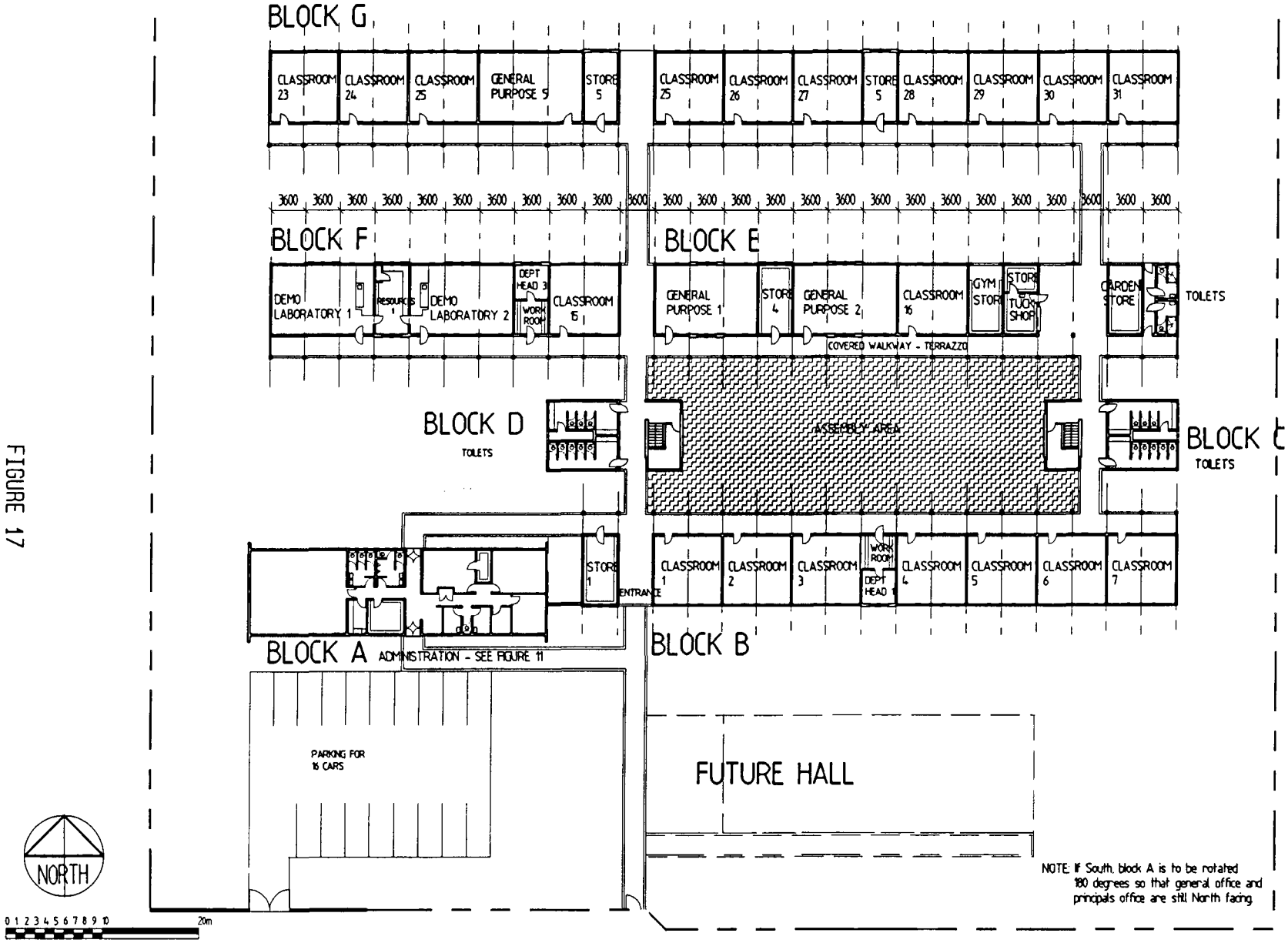


FIGURE 17

STANDARD SECONDARY SCHOOL - TYPE F. FINAL STAGE : Ground Floor Plan

to any teaching institution as a standard or standards with the minimum of variation.

10.2 After much discussion and research, five different types were decided upon with all but one, being contained in a single module in order not to unnecessarily complicate a complete school configuration.

10.2.1 The first general store to be determined was the store/s for cleaners materials. In the case of the primary school, it was decided that the most convenient area was in the general store of the service component (figure 14). The secondary schools presented little difficulty in locating an area for cleaning materials and equipment. Since all secondary schools require at least two staircases, the obvious solution was to utilise the area under the staircase landing and first flight as a store for the cleaners as shown in figure 18.

10.2.2 The second general store to be considered was a typical general store in the full sense of the word, to be utilised for specialised equipment used for teaching aids, or any other use that the school Principal decides on. This is in the shape of a single module fitted out with adequate shelving with small burglar proofed windows to each "external wall", a solid framed ledge braced and battened door, fitted with a four lever mortice lock, opening inwards and a robust metal grille gate, opening out, all as detailed in figure 19.

10.2.3 The third general store is known as a resources store, fully fitted out with rust resisting materials, to adequately store all the expensive equipment and chemicals et cetera, used for demonstrating experiments. A single module was too large in area for one laboratory but, since all secondary schools are provided with at least two laboratories, the resources store is housed in a single module, placed between two laboratories, with access from both laboratories. The resources store would also have small burglar barred windows in each "external wall", a suitable ventilator and the doors to the two adjoining laboratories would be provided with an additional robust metal grille gate. Should the curriculum require an odd number of laboratories, then the odd laboratory would be served by a single full module resources store, taking the precaution to place one of the GP classrooms on the opposite side, should a further laboratory be required at a later stage. Refer to figure 20.

10.2.4 The fourth general store to be provided was for the storage of setwork text books to be issued to certain pupils at predetermined times on predetermined days. Since

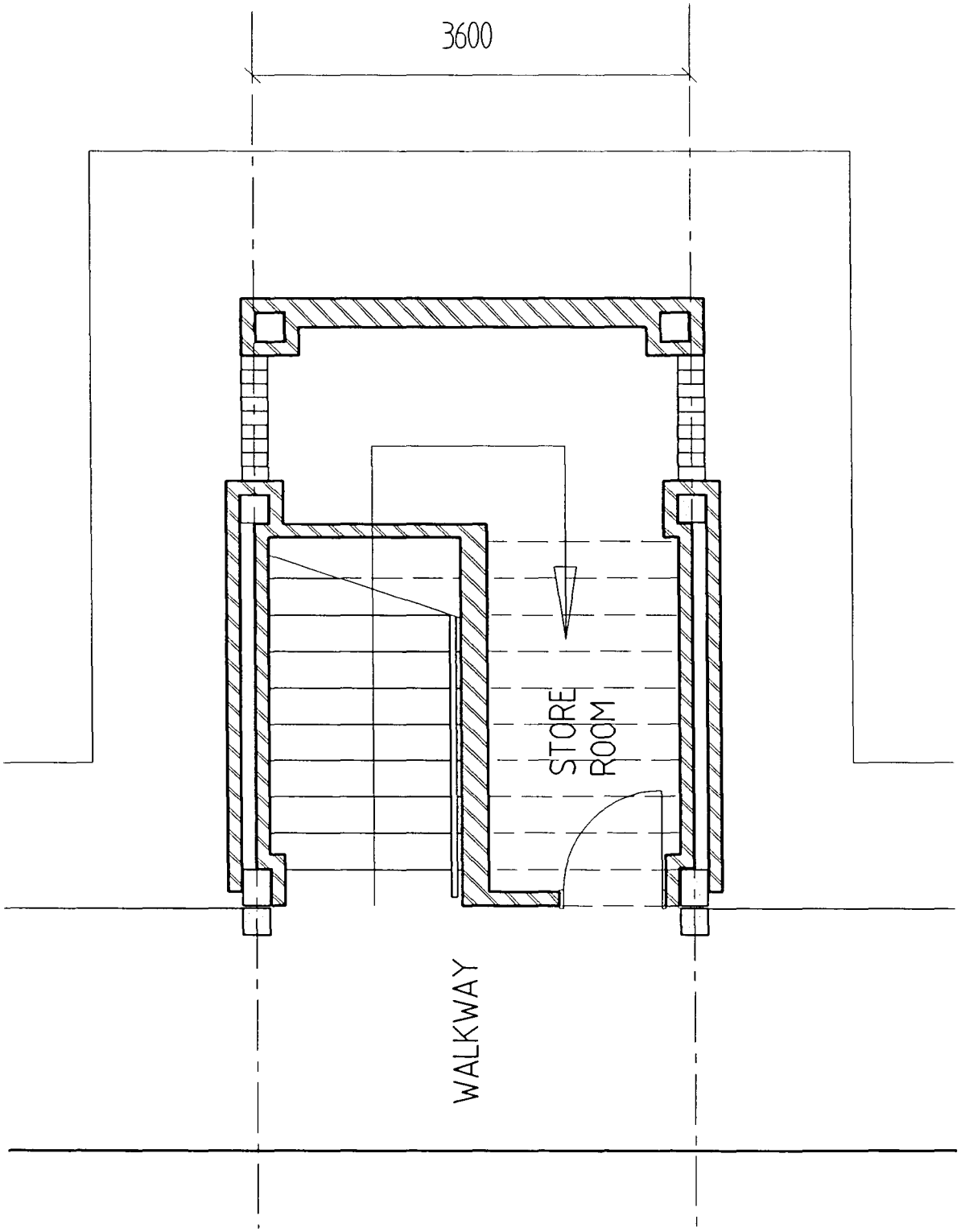
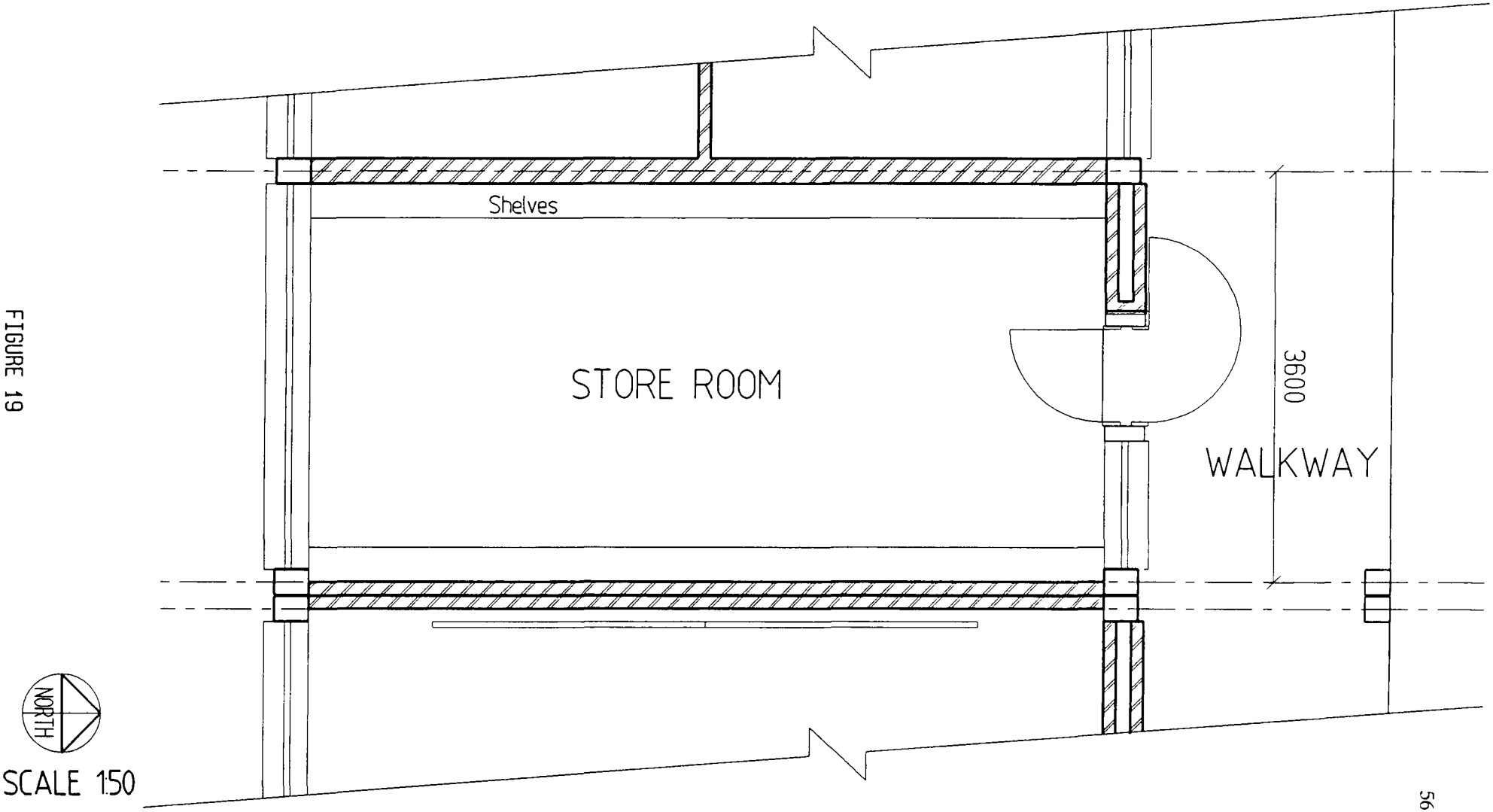


FIGURE 18

FIGURE 19



SCALE 1:50

STANDARD STORE ROOM - Plan

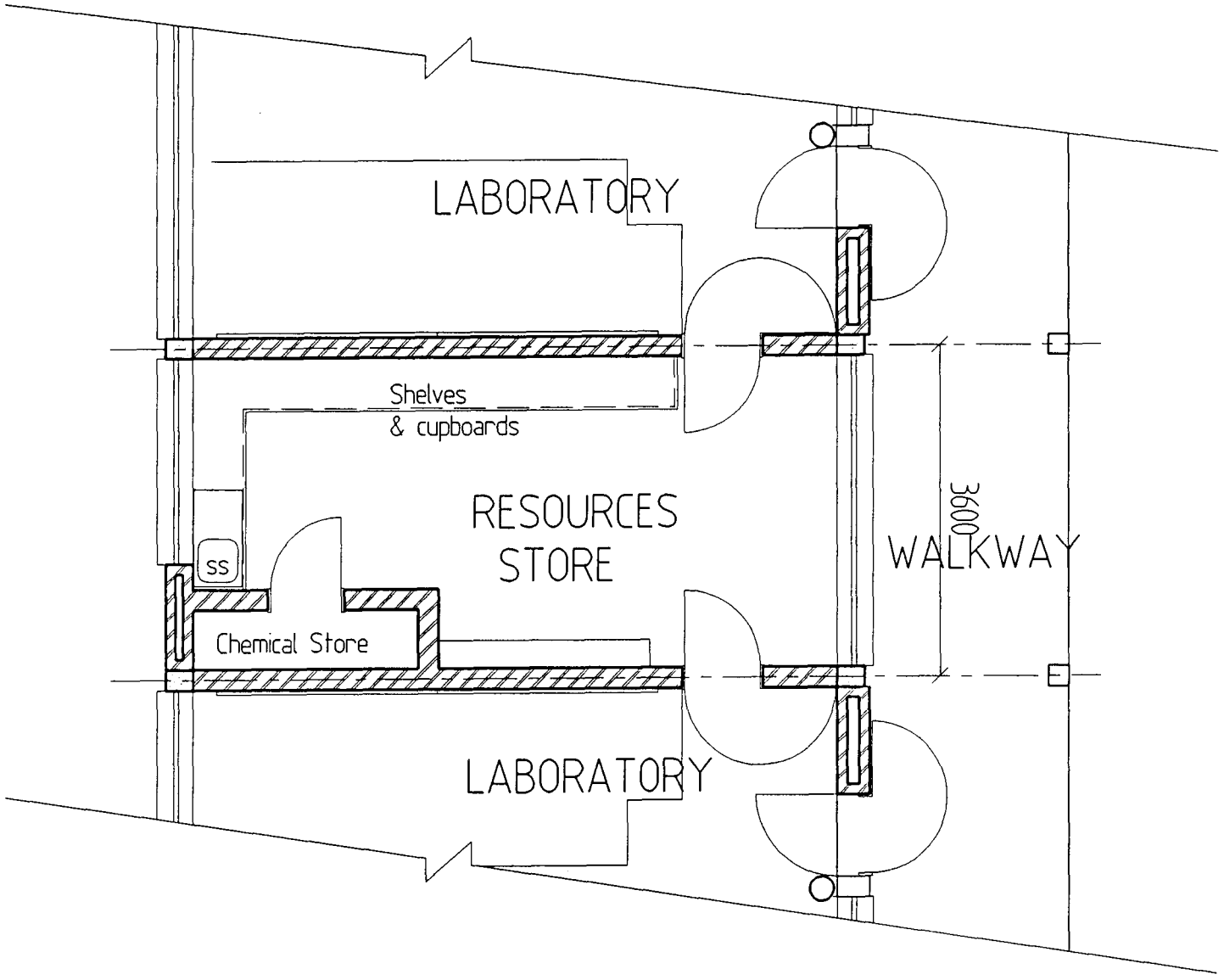


FIGURE 20

SCALE 1:50

RESOURCES STORE - Plan

this "book store" was for issuing text books in batches, it is provided with a steel roller shutter door at counter height, a serving counter and generously fitted out with appropriate shelving. This store, as for all the others, is adequately burglar proofed. Because the issues are not daily, but only on demand, it was agreed that the person in control would be the Librarian, and this being the case, it was correct to attach this unit to the Media Centre. Refer to figure 21.

10.2.5 The fifth general store being required only when the curriculum provided for a Home Economics component which is comprised of a GP cookery classroom and a GP needlework classroom. Once again the storeroom for each sub component of the Home Economics Centre, requires only half a module in area making the solution resolved by using one module placed between the cookery and needlework classes, and dividing the area in two equal units, with the access to each from the relevant component. It was brought to the author's attention that, with the shortage of trained specialised teachers it is often necessary to have both sub sections under the control of one teacher as well as the fact that, should the one teacher not be available then, again, one teacher would control both classes, which could run simultaneously. It will therefore be observed from figure 17 that both stores each have access from both teaching areas. The stores are adequately equipped for the storage of students uncompleted tasks, as well as ingredients for intended cookery tasks and/or specialised equipment. The stores and Home Economics units are all burglar proofed as in the case of laboratories.

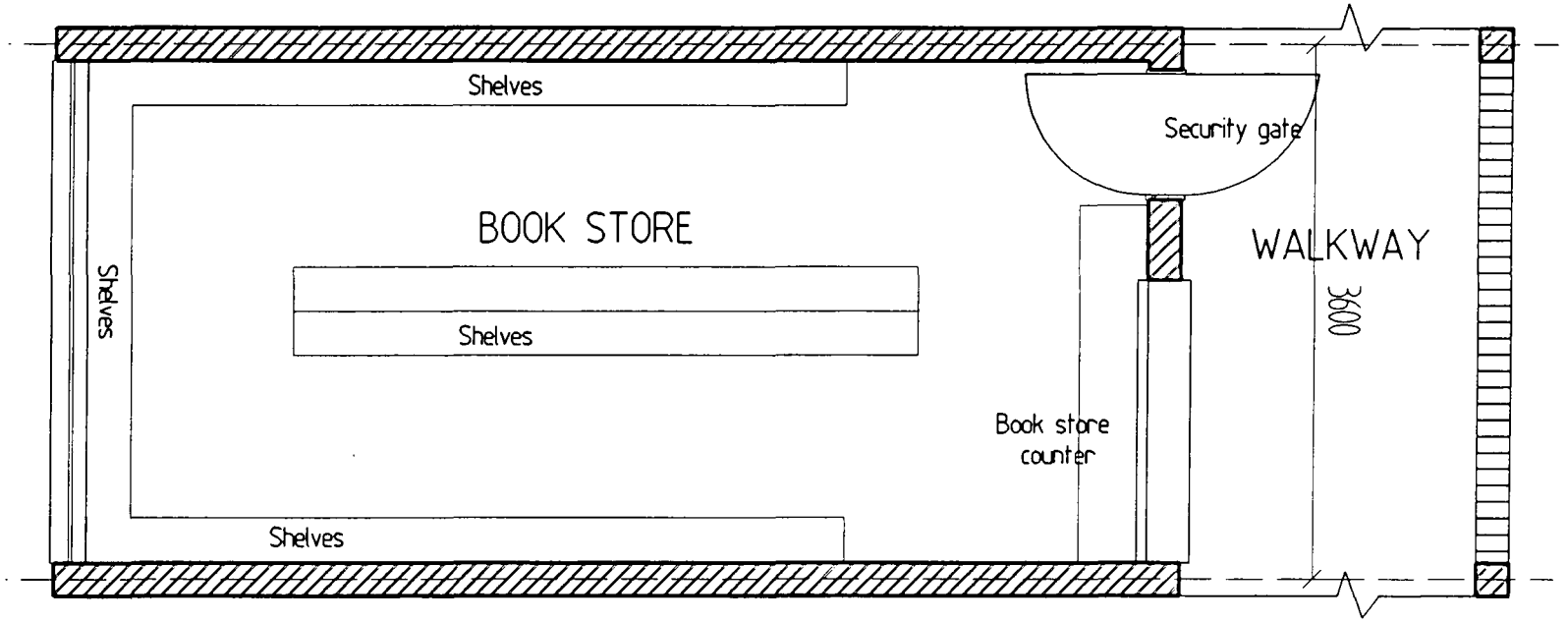
10.2.6 The store areas in the Administration block are dealt with separately under paragraph 7.

11. MEDIA CENTRE

11.1 For what the DET provides, and then only in the secondary schools, the term "Media Centre", is somewhat misleading when this component is compared with what the TPA included in their primary schools. Figure 22 gives a clear insight as to what was considered as a minimum standard for a "Media Centre" for both primary schools and secondary schools, which the author designed and standardised during his period of service with the TPA.

11.1.1 Because of, primarily, the critical shortage of classrooms for the Black school going children, both, then and now, and the consequent shortage of funds, the "Media

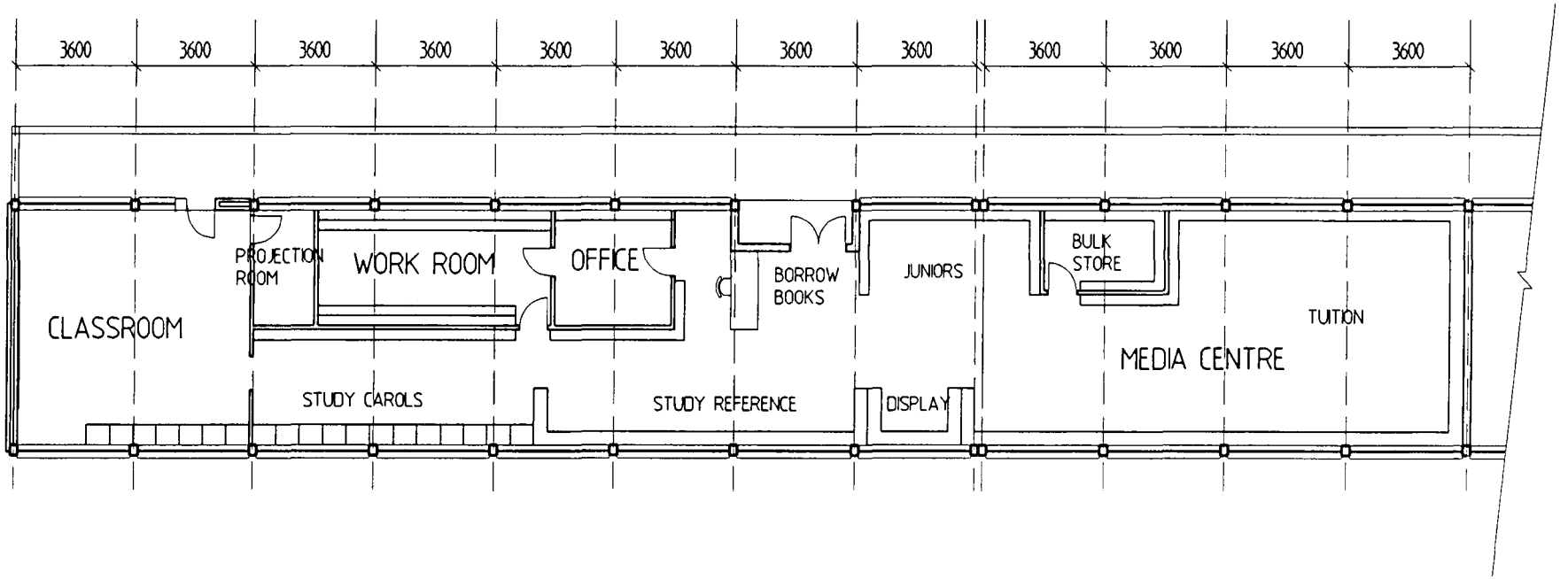
FIGURE 21



SCALE 1:50

BOOK STORE (At Media Centre) - Plan

FIGURE 22



NORTH

SCALE 1:200

TPA MEDIA CENTRE (Six classrooms) - Plan

09

Centre" has been reduced in size and function, to an effective library plus.

11.1.2 It must also be understood that the books that a school library must keep in stock to be used by the pupils, solely for educational purposes are, not only expensive but beyond the budget totally, with regard to a primary school for Blacks and barely within the budget for a secondary school.

11.1.3 The "Media Centre" provided in the secondary schools can best be described as "a nice to have' in its entirety, fully equipped, and "a must have" from a space point of view, to become fully stocked with books and audio-visual equipment. With their present budget, and unless sponsored by a body or bodies in the private sector, this can take up to ten years.

11.1.4 In order to economise on supervising personnel, it was found prudent to add the audio-visual store" as an adjunct to the library with an interleading door (the only access) to the library's workroom. This would permit the control of any audio-visual equipment to be the responsibility of the librarian. By the same token, the text book issue store is placed close enough to the library, so that the librarian can attend to the issue and control of text books since this is not an every day occurrence. This is clearly illustrated in figure 23.

11.2 In the main body of the library, space has been allocated to a reading area for study and reference. This area can also be used as a classroom area for instruction, explaining to the pupils, how a library functions in a school.

11.3 The Entrance Foyer may appear to be generous, but it should be explained that there are three tiers of shelving provided in this area for the pupils to deposit their school cases, prior to entering the library, to reduce the temptation of unauthorised removal of books or equipment from the library.

11.4 There is no doubt in the authors mind that, in the near future as well as when the budget permits, a far more elaborate "Media Centre" will have to be provided, as a free standing entity to allow the young pupils to make use of the rapidly improving learning technology so that, at an early age, they may be able to become au fait with the use of all the newly developing learning aids.

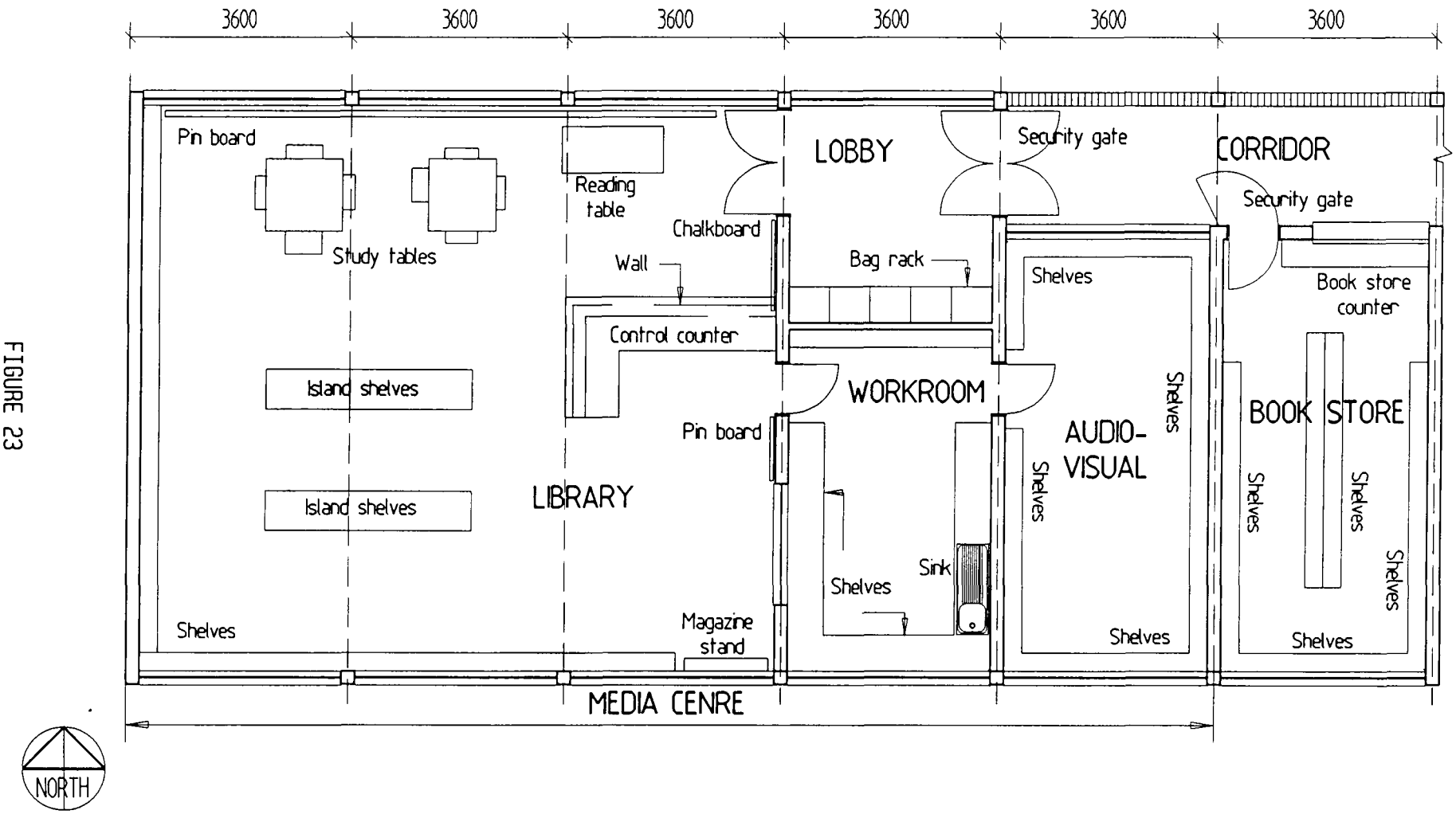


FIGURE 23

SCALE 1:100

MEDIA CENTRE (DET) - Plan

12. ASSEMBLY HALL

12.1 Once again, as in the case with an elaborate Media Centre, Assembly Halls are not provided initially for primary and secondary schools. As a compromise a large, paved, open area is provided for student assembly, at the start of the school day, and at any other such time as may be required.

12.2 All, or most schools for Whites in the Transvaal have been provided with Assembly Halls, albeit that a large number of schools were only provided with assembly halls on a "second time around" basis in the 1960's. During the author's period of service with the DET he had been instrumental in providing several schools for Blacks (all secondary schools) with the same standard Assembly Hall that he designed and built for White schools in the Transvaal. These were only built after special authority had been obtained from the Minister of Education.

12.3 Although not provided for, in the initial contract, the appointed consultants were instructed to design for the provision of an Assembly Hall at a later date, when funds could be raised.

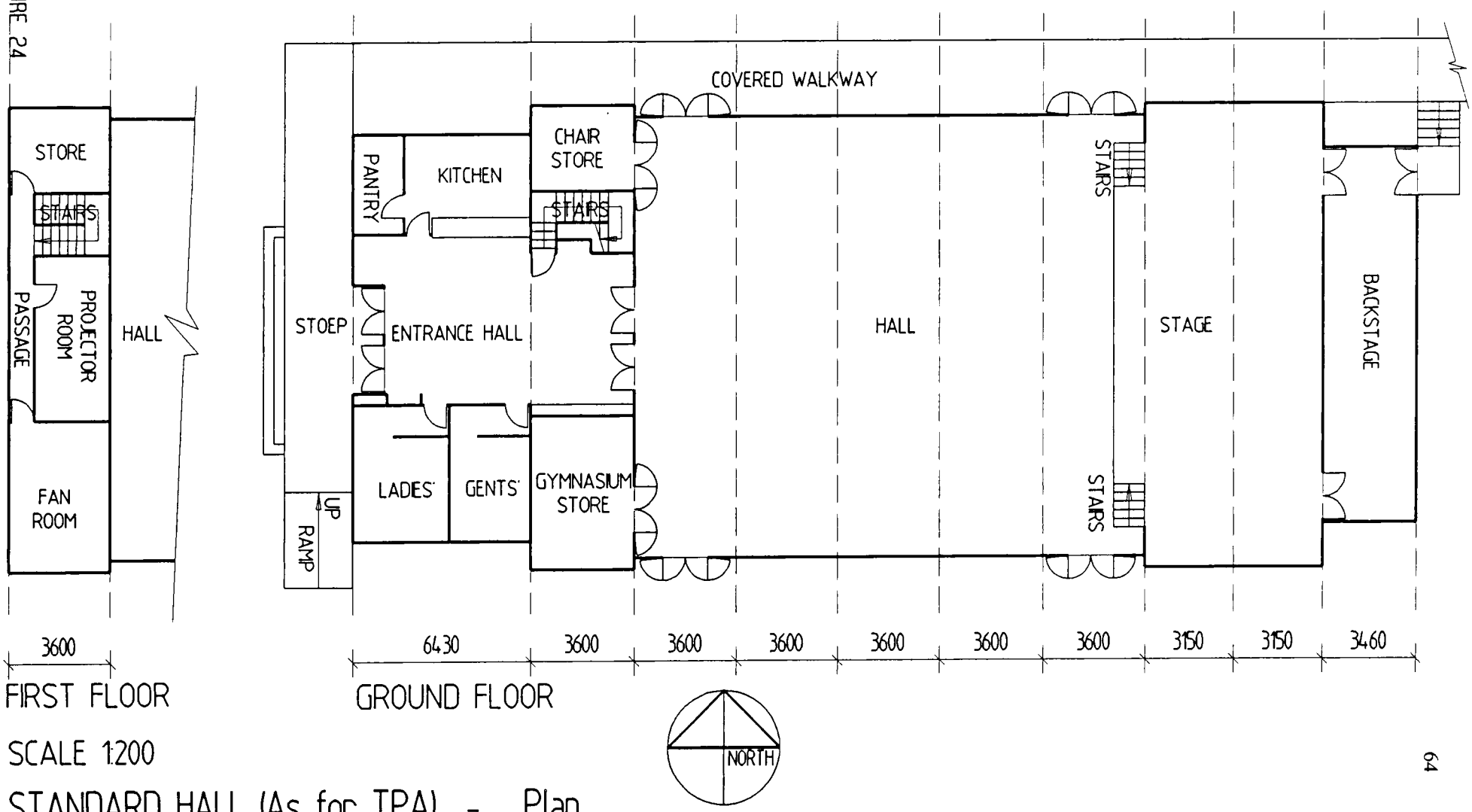
12.4 The Assembly Hall is designed to accommodate approximately one thousand pupils standing and approximately four hundred and fifty people seated with a generous stage and entrance foyer. See figure 24.

13. CARETAKERS COTTAGE

13.1 The Caretakers Cottage, partially due to lack of funds and to a lesser extent, due to abuse in the form of illegal occupancy, was also axed from the schools complex from about 1987 onwards. The feeling was that, should the school be in a position to budget for a caretaker, the caretaker could receive a housing allowance to occupy a moderate home close to the school buildings.

13.2 As can be seen from figure 25, the Caretakers Cottage, of sixty square metres, was quite a comfortable cottage and as such is a reasonable costs item. Recently, some eight Caretakers Cottages have been authorised in the Eastern Cape area, each costing in the vicinity of two hundred thousand rand (R 200 000,00).

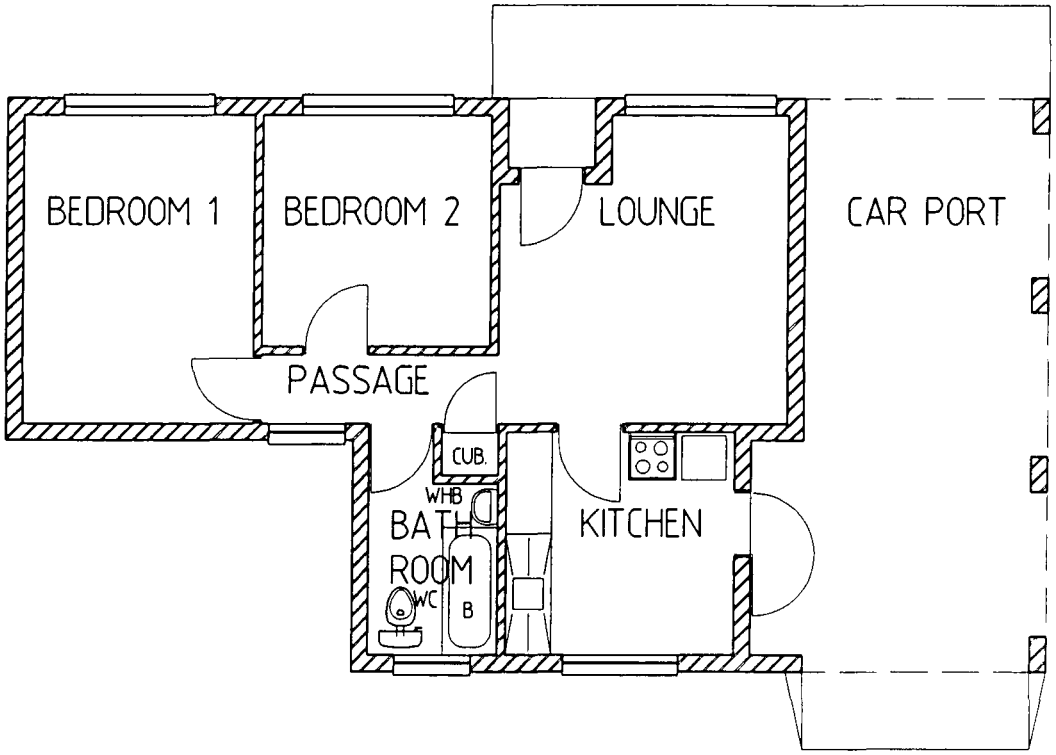
FIGURE 24



SCALE 1:200

STANDARD HALL (As for TPA) - Plan

FIGURE 25



NORTH

SCALE 1:100

CARETAKER'S COTTAGE - Plan

13.3 As the security factor becomes less important, it is the author's opinion that Caretakers Cottages, on site, for normal primary and secondary schools, will be taken off the schedule of accommodation.

14. OPEN AIR ASSEMBLY AREAS

14.1 Even although a school may be blessed with an Assembly Hall, an open air, formal assembly area, is absolutely essential to promote the formal, healthy beginning to a school day, thus instilling both pride and discipline in the pupils, painlessly.

14.2 Because the schools administration and development funds are severely limited, it is essential to provide a well constructed and paved area for assembly, in a strategically accepted position, and large enough to accommodate the entire school enrolment in a single gathering.

14.3 Obviously, the Assembly Area is to be suitable for many purposes such as, presentations, special visiting guests, Principal's weekly announcements, et cetera. For this reason it should be in such a position, that, at the head, the respective dignitaries are under cover. See figure 26. It can also double as a useful gathering or playing area during the school's short breaks.

15. ENTRANCE GATES

15.1 In the beginning it was expected to fence only the entire area with 1 800mm high security fencing, providing a double and single gate at the entrance with, either a single or double "escape" gate in a safe position. Any professional with any experience of metal piping gates and barbed wire with "flatrap" of 500mm top and bottom, will know just how unsightly this becomes in a very short time.

15.2 The school was given a "high security area" appearance with no aesthetics whatsoever, and the only remaining area to display the schools name and designation, being on some blank wall or on a purposely erected length of boarding, supported by the necessary amount of metal pole uprights. This was the accepted norm!

15.3 On a particular visit to a new school completed in the Eastern Cape, in 1987, it was horrifying to realise that this really beautiful, aesthetically imposing, face brick school was made to look shabby by the uninspiring security fence surrounding the

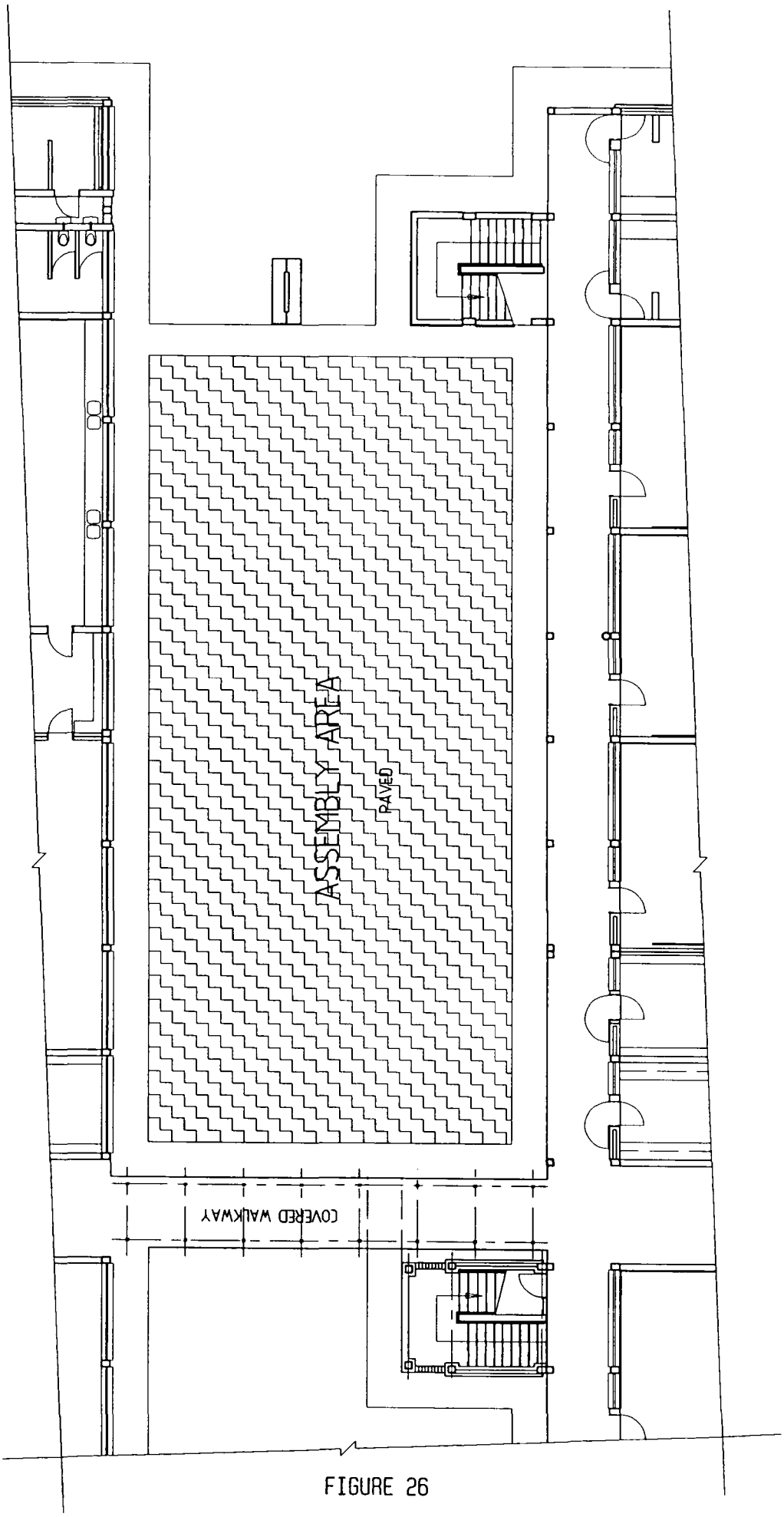


FIGURE 26

SCALE 1:200

OPEN AREA ASSEMBLY AREA (To Type D) - Plan

site, forcing it to cry out to the world, "Black School"!!

15.4 This was so disturbing to the author, in sharp contrast to the primary schools he had built in the Transvaal, that an immediate instruction to all consultants engaged on a school building, either in the design stage or in the construction stage to allow for a 1 800mm high face brick wall flanking the entrances, with the school's name fixed to the wall in accepted lettering and in a dignified manner. As an illustration of what was expected and what is being erected, refer to figure 27.

16. SPORTS FIELDS

16.1 Sports fields were never included in the building contract for two very good reasons. The first reason being the critical shortage of funds and the second being that Sports fields and the construction thereof, is a specialised undertaking, which must exclude this from the straight forward building contract.

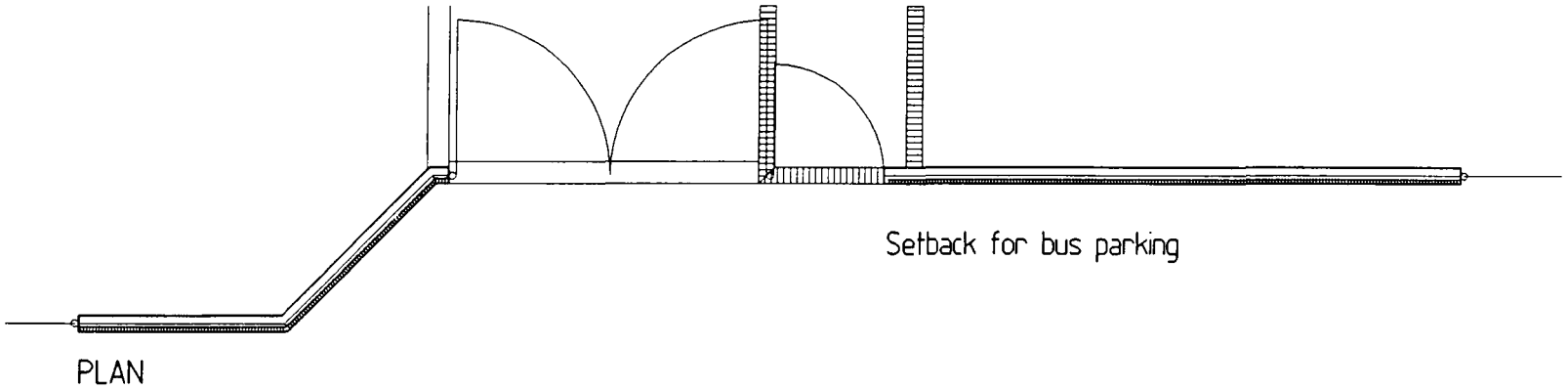
16.2 Even though the sports fields are not provided physically, the architect and civil engineers were to plan for their inclusion during the sketch design action and actually show the positioning on a site plan, to ensure that, at a later stage, the standard sports fields can be developed on the site. Should the site be reasonably flat and not too rocky, then some form of grading was done to provide, at least, a soccer field and/or netball field. See figure 28 for a typical lay-out.

17. THE USE OF STANDARDISATION

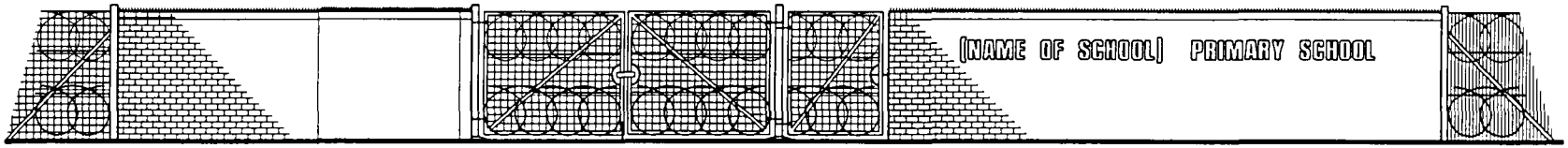
17.1 Since the author had successfully standardised primary schools in the TPA and has always been of the opinion that all types of similar functional public buildings can be standardised, it was inevitable that standardisation in primary and secondary schools would be pursued. This was not without resistance from the private sector, especially the architects, who insisted that, to design each school as a separate unique entity, is the most successful. See Appendix "B".

17.1.1 Since the entire development of standardisation will be analyzed and discussed at length in a later chapter V, the reference to standardisation here will be restricted to its effect on the activities and performance of the Professional Services in the Department. Important it is, to mention at this stage, the profound effect that standardisation had, not only on the efficiency of the successful performance of the

FIGURE 27



PLAN

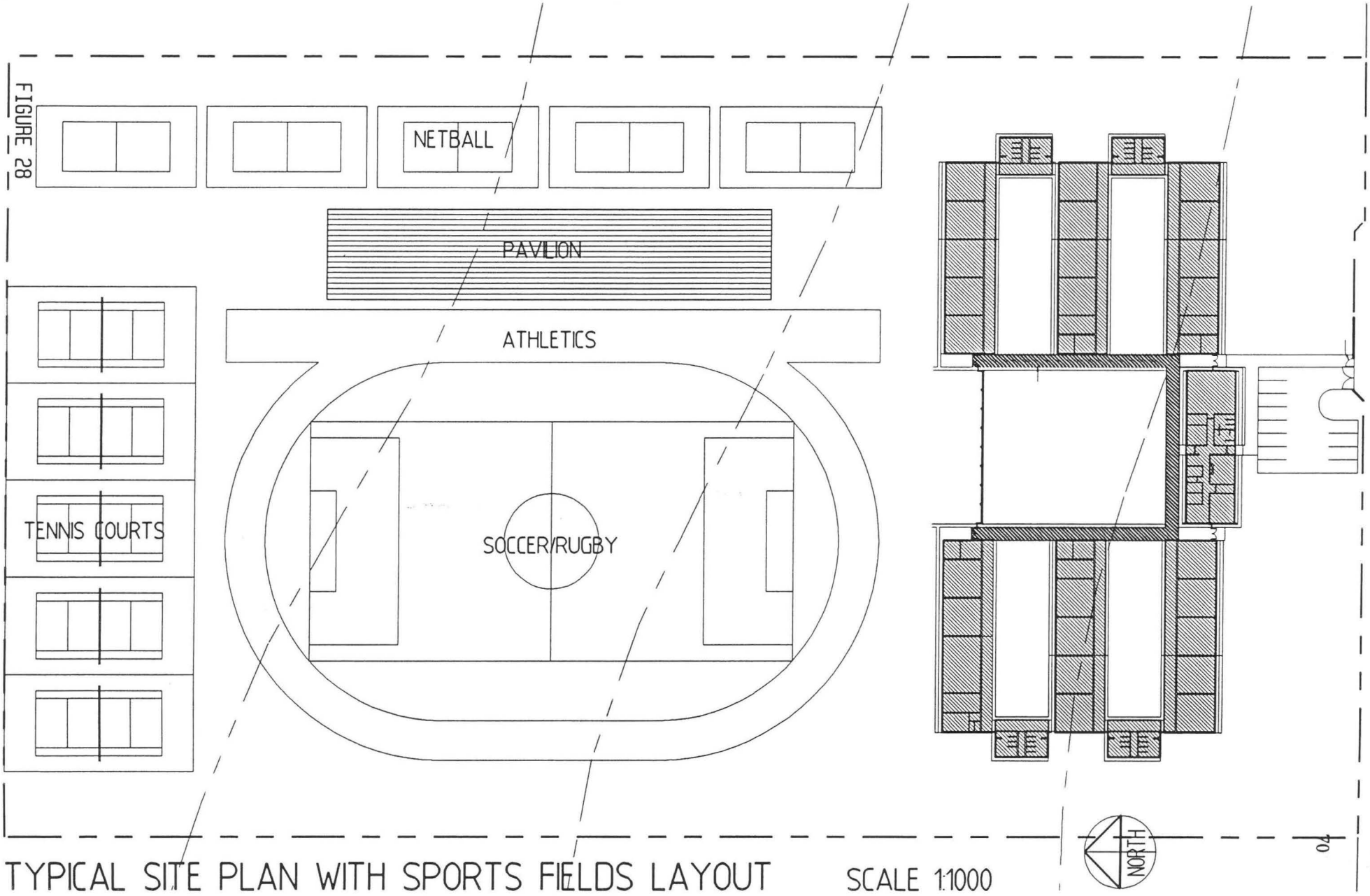


ELEVATION

SCALE 1:100

ENTRANCE WALL AND GATE

FIGURE 28



TYPICAL SITE PLAN WITH SPORTS FIELDS LAYOUT SCALE 1:1000

Professional Services team of the Department, but also the uniformity of the high standard of documentation and site administration that was achieved by most of the consultant teams, on most of the projects in the entire Republic of South Africa.

17.2 Each Liaison Architect, Quantity Surveyor and Engineer would, under the system (to be dealt with later), have between forty (40) and one hundred (100) projects under their control simultaneously. How could they cope successfully?

17.2.1 The exercise would be to look at, in depth, that part of their duties that is, or can be, most time consuming. One does not have to be a genius to figure this one out. One of the most important functions of a professional control officer is to ensure that the documentation, prepared by the consultants under their control, not only is of the high standard required but that it contains the minimum possible amount of errors!

17.2.2 Every practising professional is fully aware of just how time consuming it can be to continuously and thoroughly check the documentation of an employed member of the staff. With this available knowledge it is not difficult to come to the conclusion that one control professional cannot possibly cope with even ten (10) consultants' sets of documentation in the short space of time given to ensure that there is no serious delay in the final completion of a full set of documents with the minimum amount of errors.

17.2.3 Like all problems, this problem too, carried the seed of its own solution. The solution, obviously, would be to reduce the time for checking documentation down to an absolute minimum without reducing the required standard of documentation.

17.2.4 Before the solution is described, it must be clearly understood that we are looking at a budget that grew, in geometrical progression, from eighty million Rand (R80M) in 1983 to three hundred and forty million Rand (R340M) in 1987-1989 and then in a more rapid progression, to one billion Rand (R1G) over the three years 1993 to end of 1995, with a professional staff increase of The Deputy Director: Building Standards and one Deputy Director of each, Architecture, Quantity Surveying and Engineering Services, plus four architects, four Engineers and seven Quantity Surveyors with each sub-directorate coping with over six hundred projects!

17.3 With the progress of standardisation from 1984 to 1986, it was then in a state that one could say that, except for final adjustments to detail and various arrangements

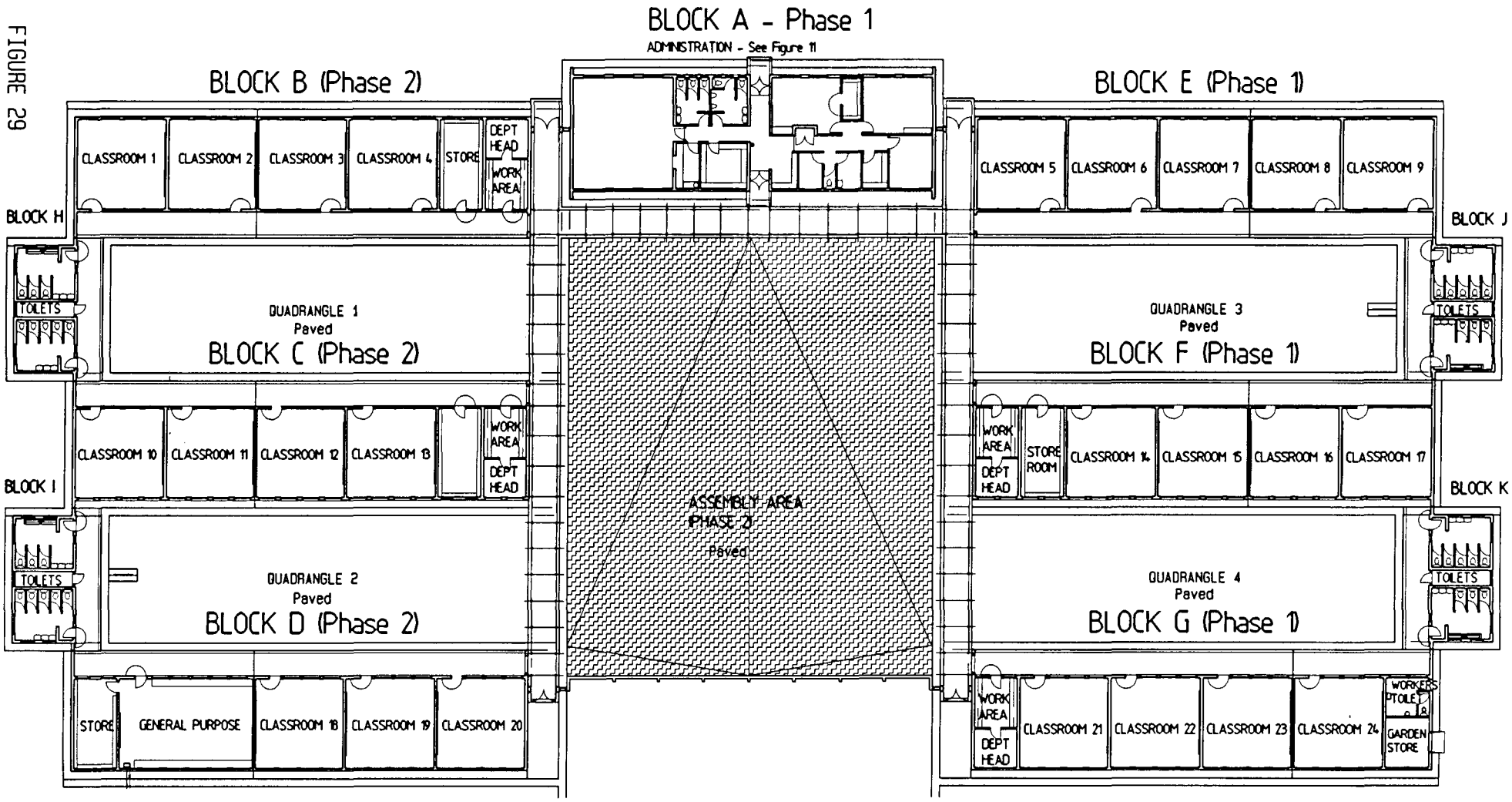
of blocks, standardisation was then at a stage where standard drawing sheets of layouts and standards were far enough advanced so that for any project, a full set of documentation that it needed, would have only a few sheets of drawings (maximum, five) to be checked on each project. This was a definite proposition and one could almost say, "mission accomplished". See figures 29 to 34 for the final set of standard details and layouts, which layouts easily lend themselves to a large variety of configurations.

17.4 With the use of standardisation and successfully proving that with the relatively small staff referred to in paragraph 17.2.4, easily coping with an annual budget of one billion Rand (R1G), and capable of accepting twice the workload, the value of the role of standardisation cannot be over emphasised.

17.5 The final amount of documentation being undertaken in 1994 and 1995 has, at the time of writing been successfully completed with documentation of projects to the value of, at least seven hundred million Rand (R700M) waiting to go out to tender in the nine Provinces of the New South Africa, and the projects under construction, controlled by the present ex-DET building component, steadily nearing completion, with some fifty seven projects to be completed by the end of July 1996.

17.6 It must be emphasised and clearly understood, that, at no time, was the intention to save on professional fees, even although this was the case. In the years 1993, 1994 and 1995 there was a saving of R12M (Twelve million rand) per annum on professional fees. The primary reason for standardisation was, in fact, to effectively shorten the time between briefing and handing over of site to the contractor, and at the same time, effectively employing the minimum number of highly specialised, well trained and experienced professional staff. There is no doubt in the minds of all the concerned top echelon of the DET Administration, that their Building Services Component is second to none in the entire Republic. Their factual achievements are sufficient proof of this.

FIGURE 29



STANDARD PRIMARY SCHOOL LAYOUT - TYPE A

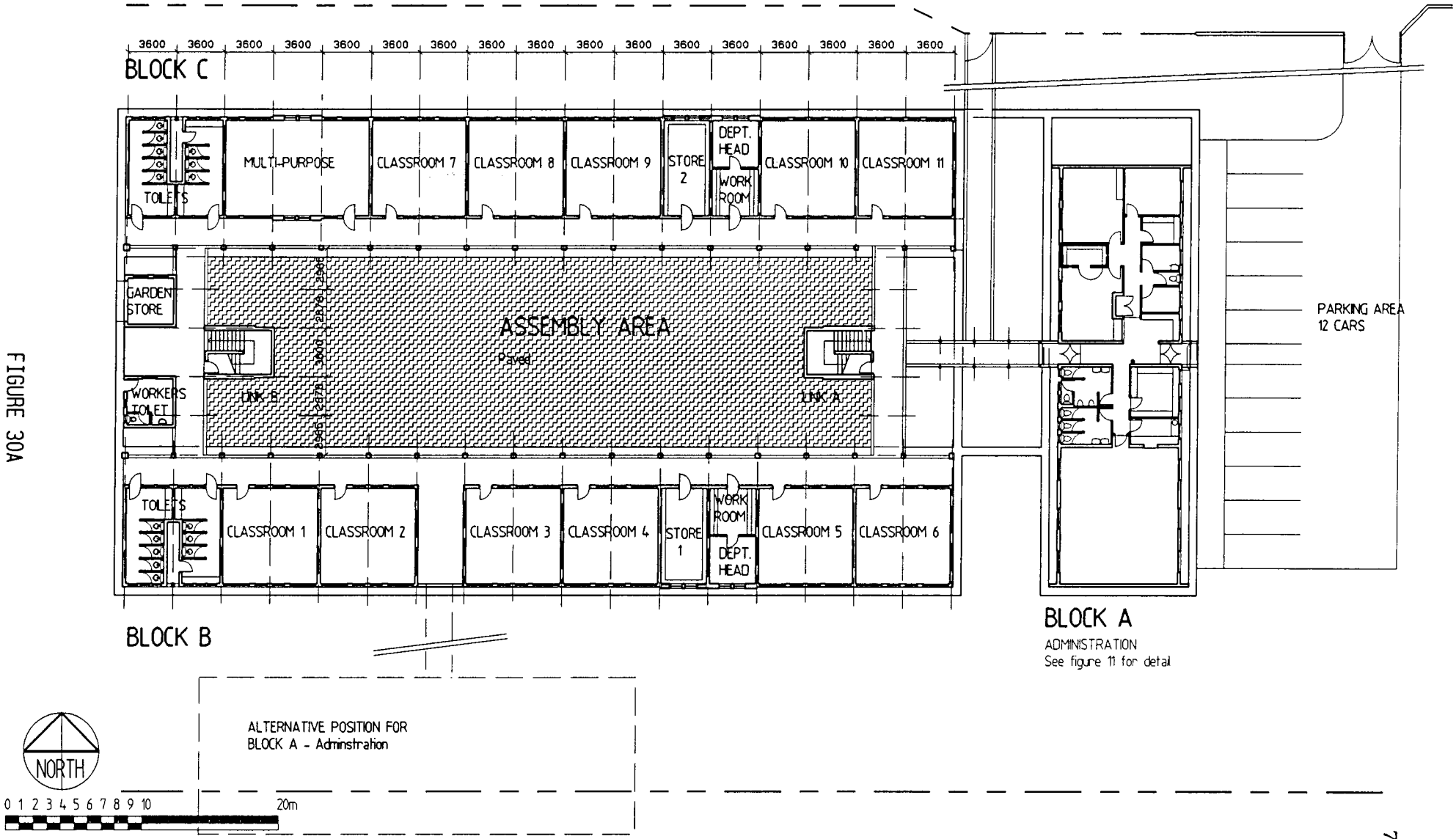
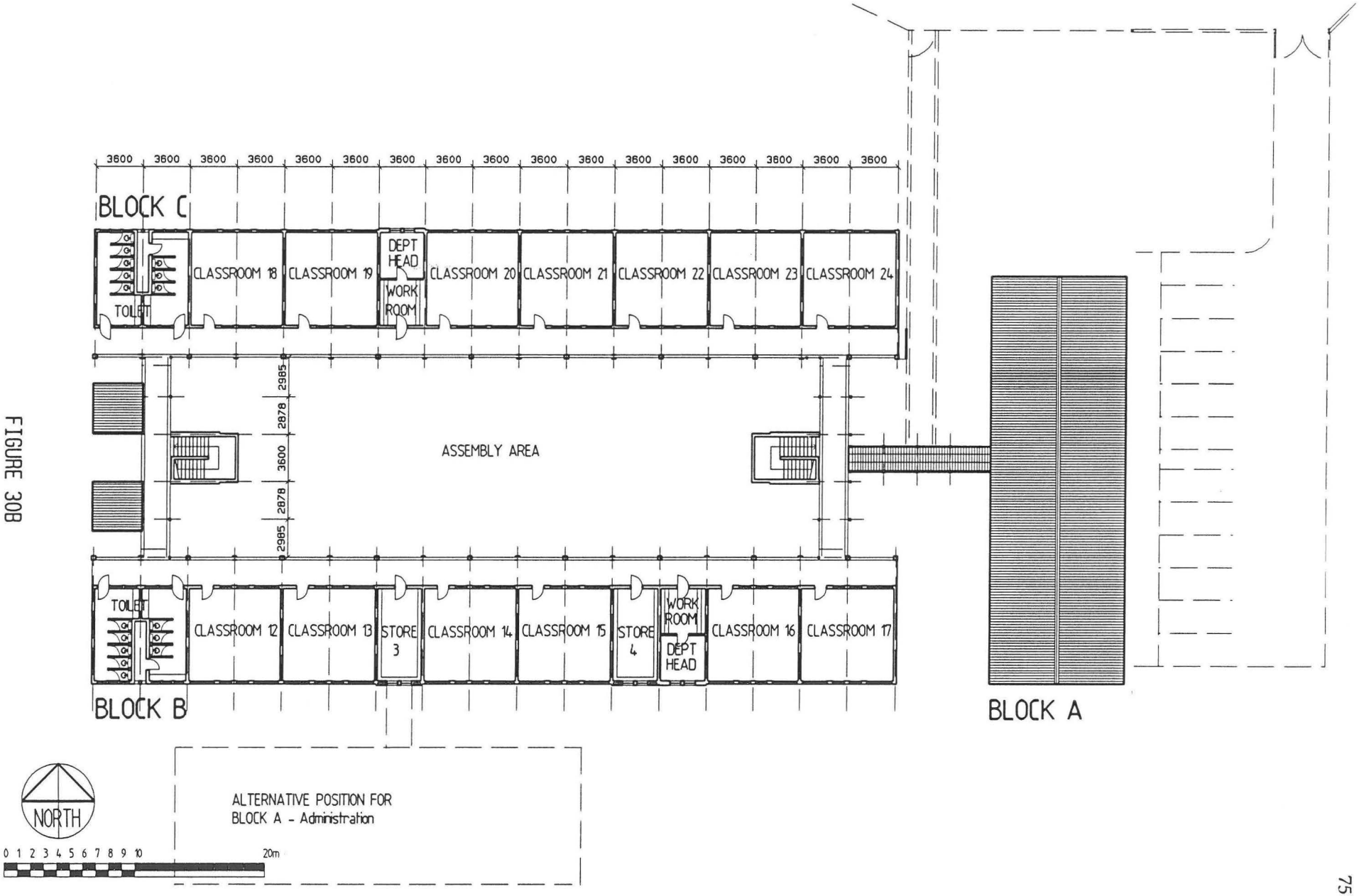


FIGURE 30A

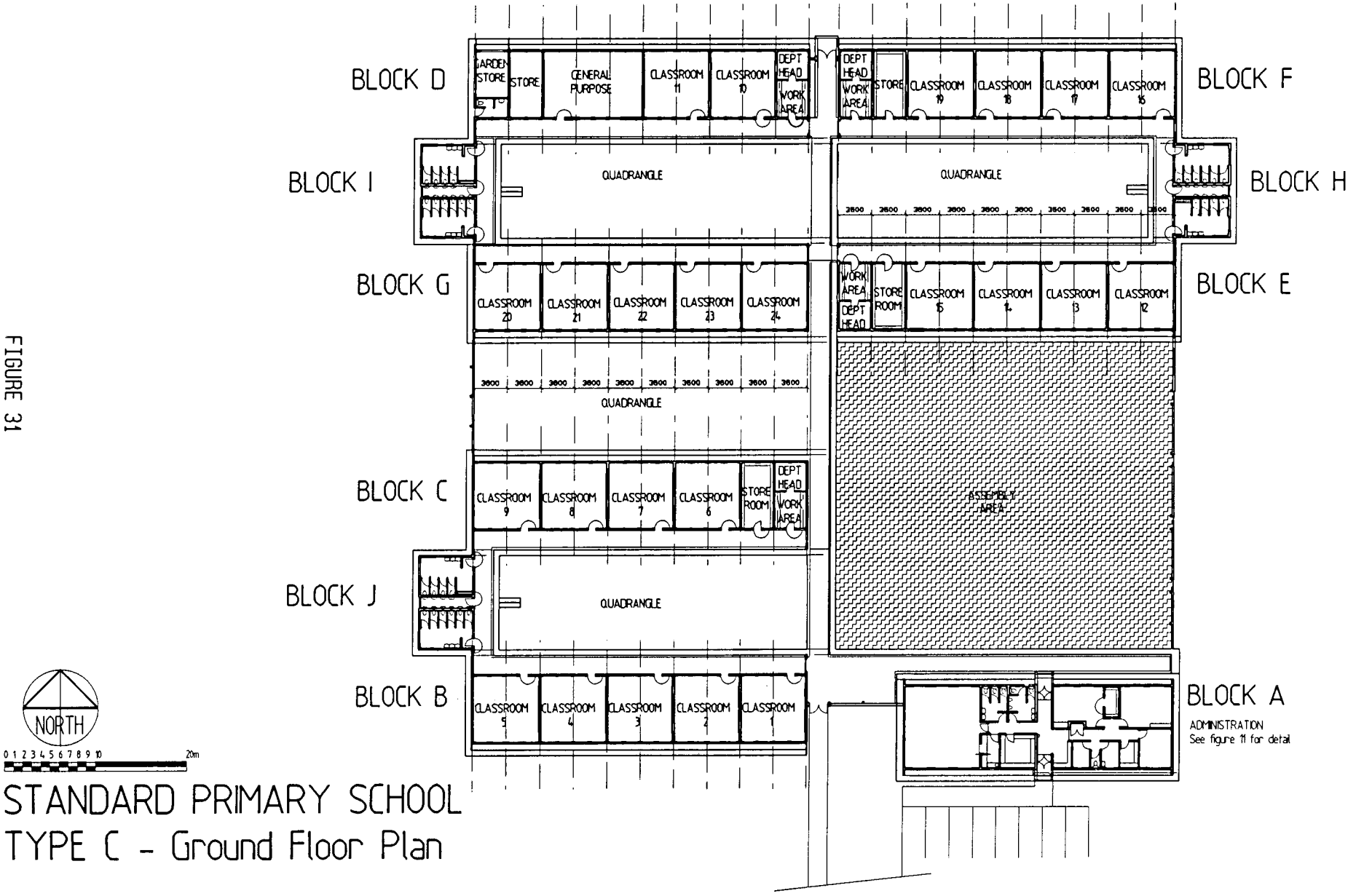
STANDARD PRIMARY SCHOOL - TYPE B : Ground Floor Plan

FIGURE 30B



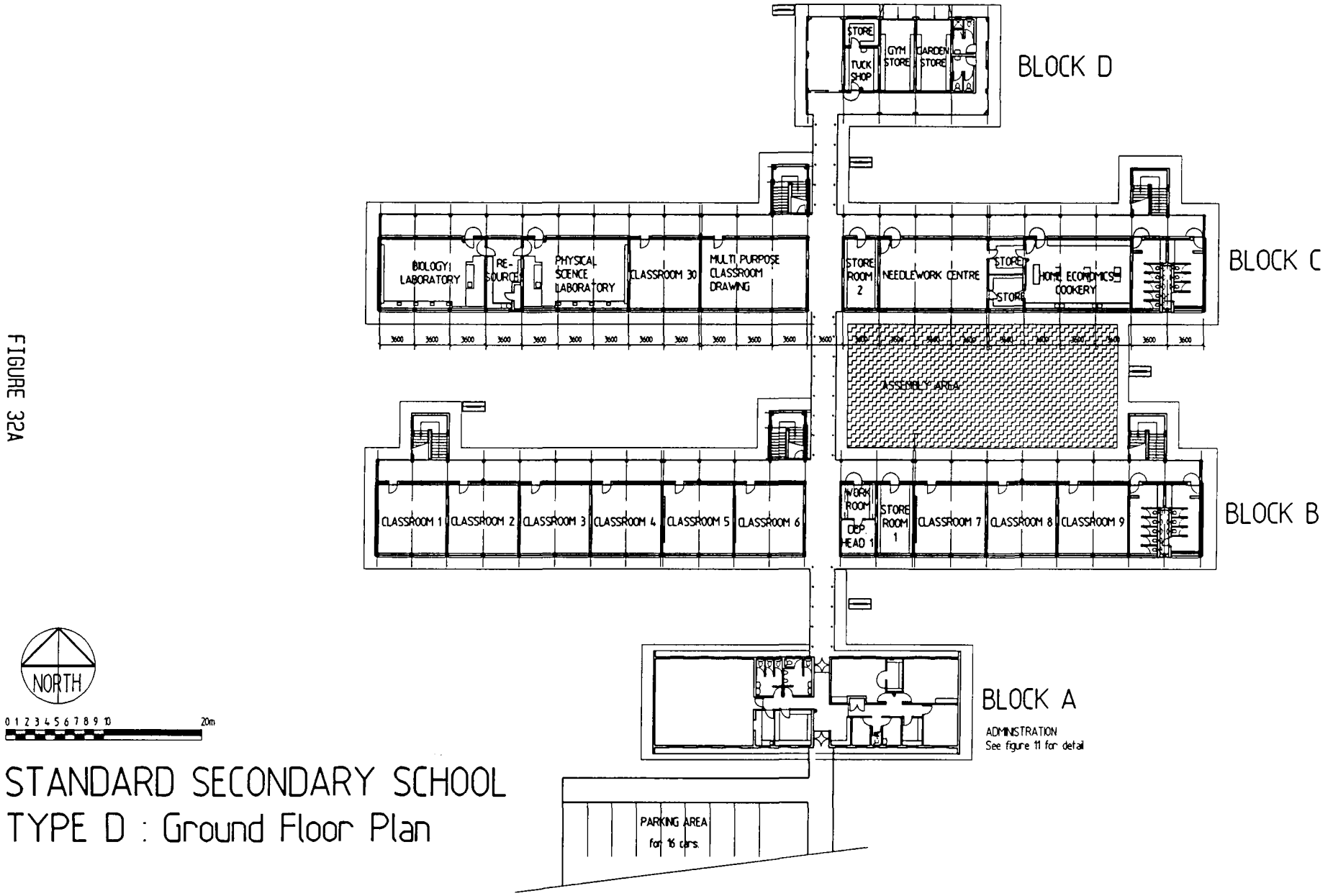
STANDARD PRIMARY SCHOOL - TYPE B : First Floor Plan

FIGURE 31



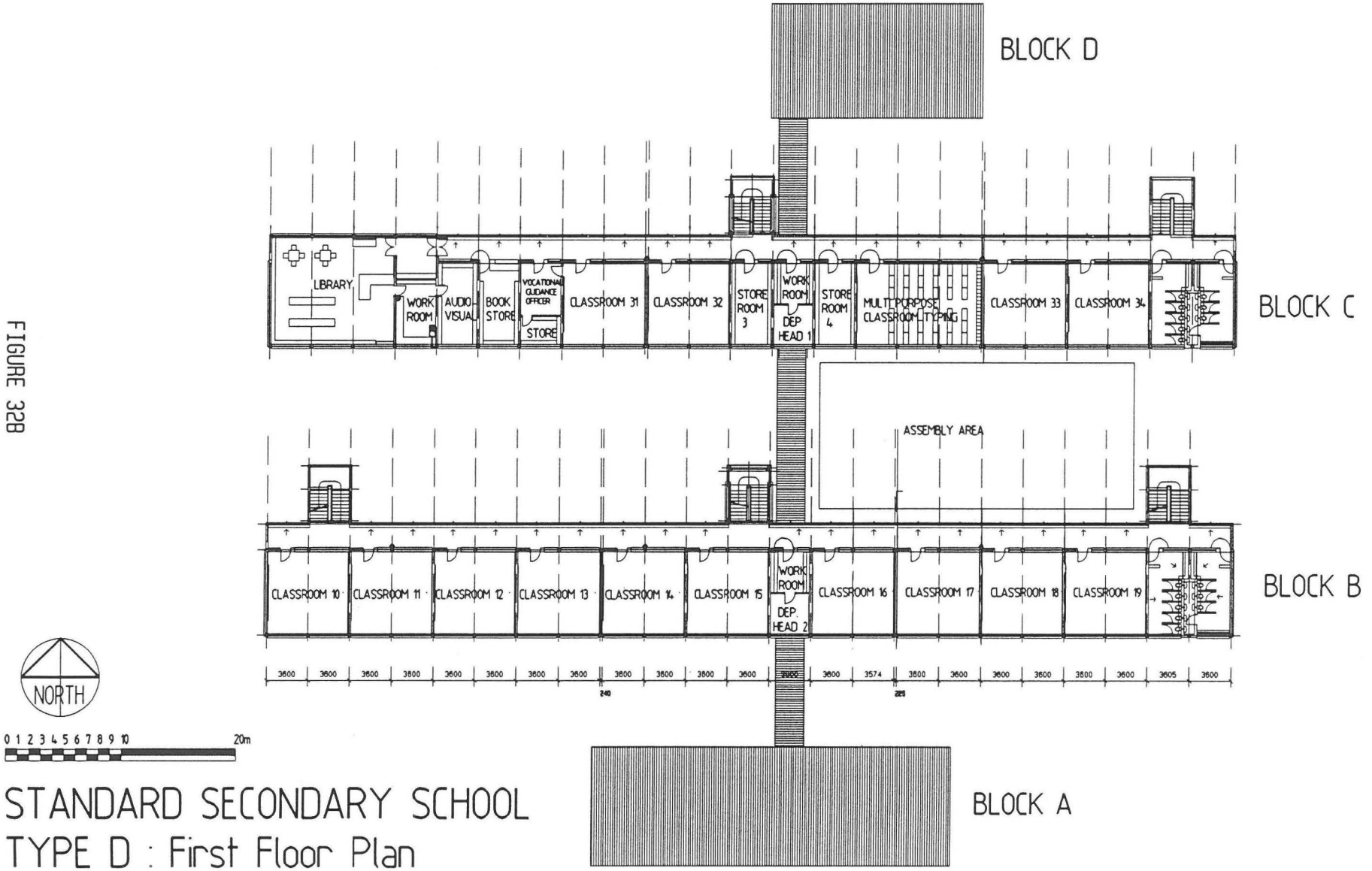
STANDARD PRIMARY SCHOOL
TYPE C - Ground Floor Plan

FIGURE 32A



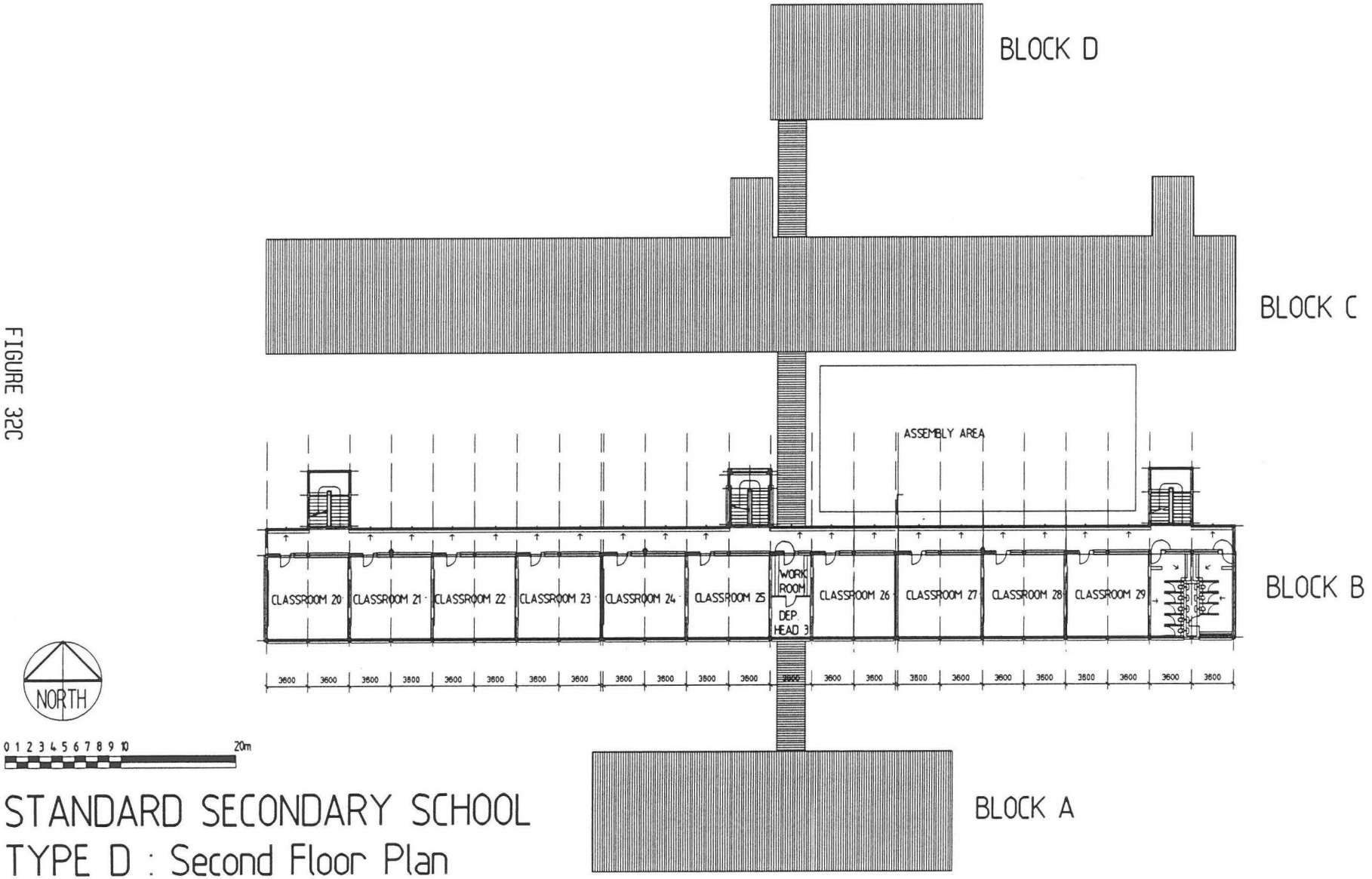
STANDARD SECONDARY SCHOOL
TYPE D : Ground Floor Plan

FIGURE 32B



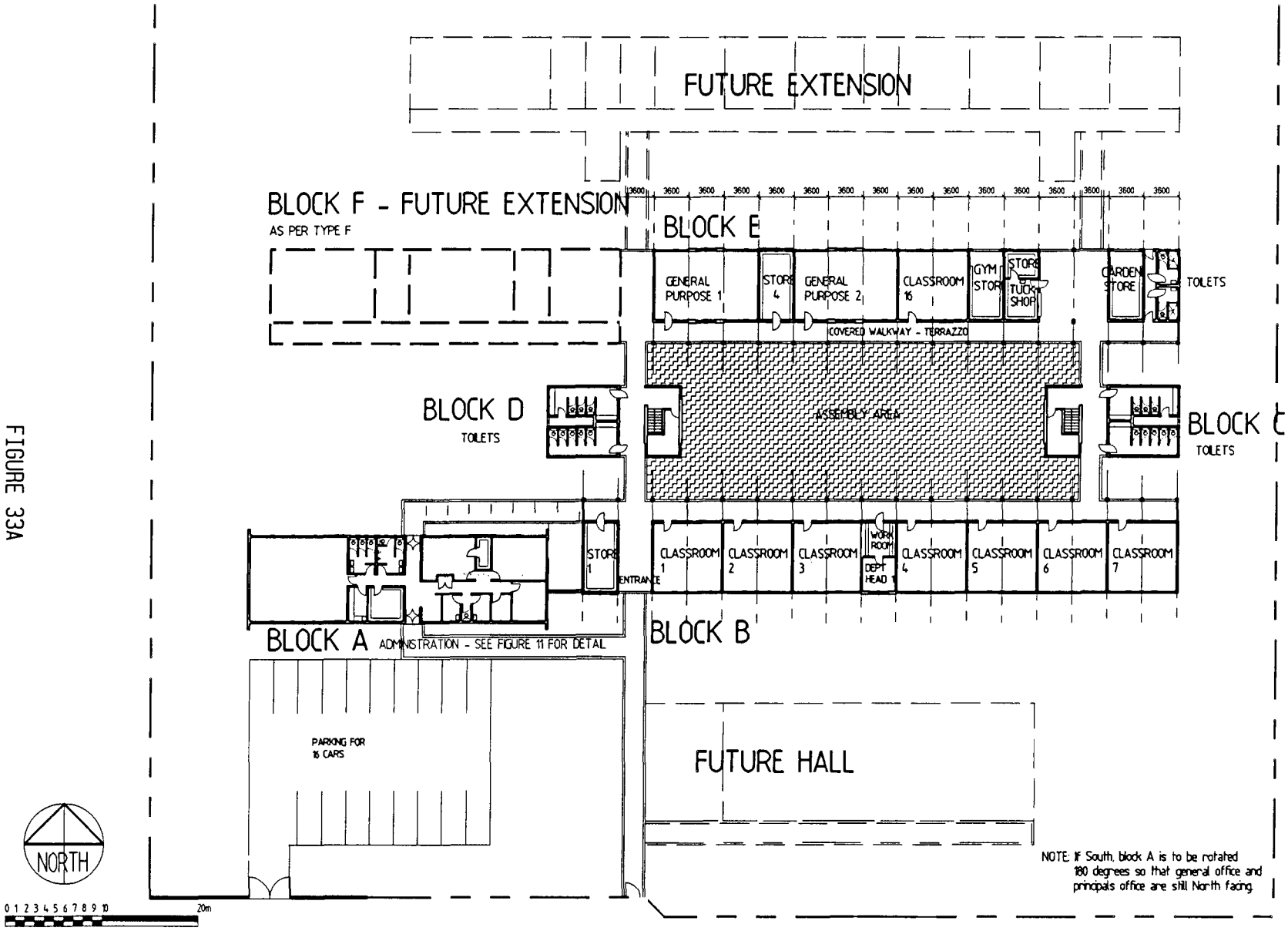
STANDARD SECONDARY SCHOOL
TYPE D : First Floor Plan

FIGURE 32C



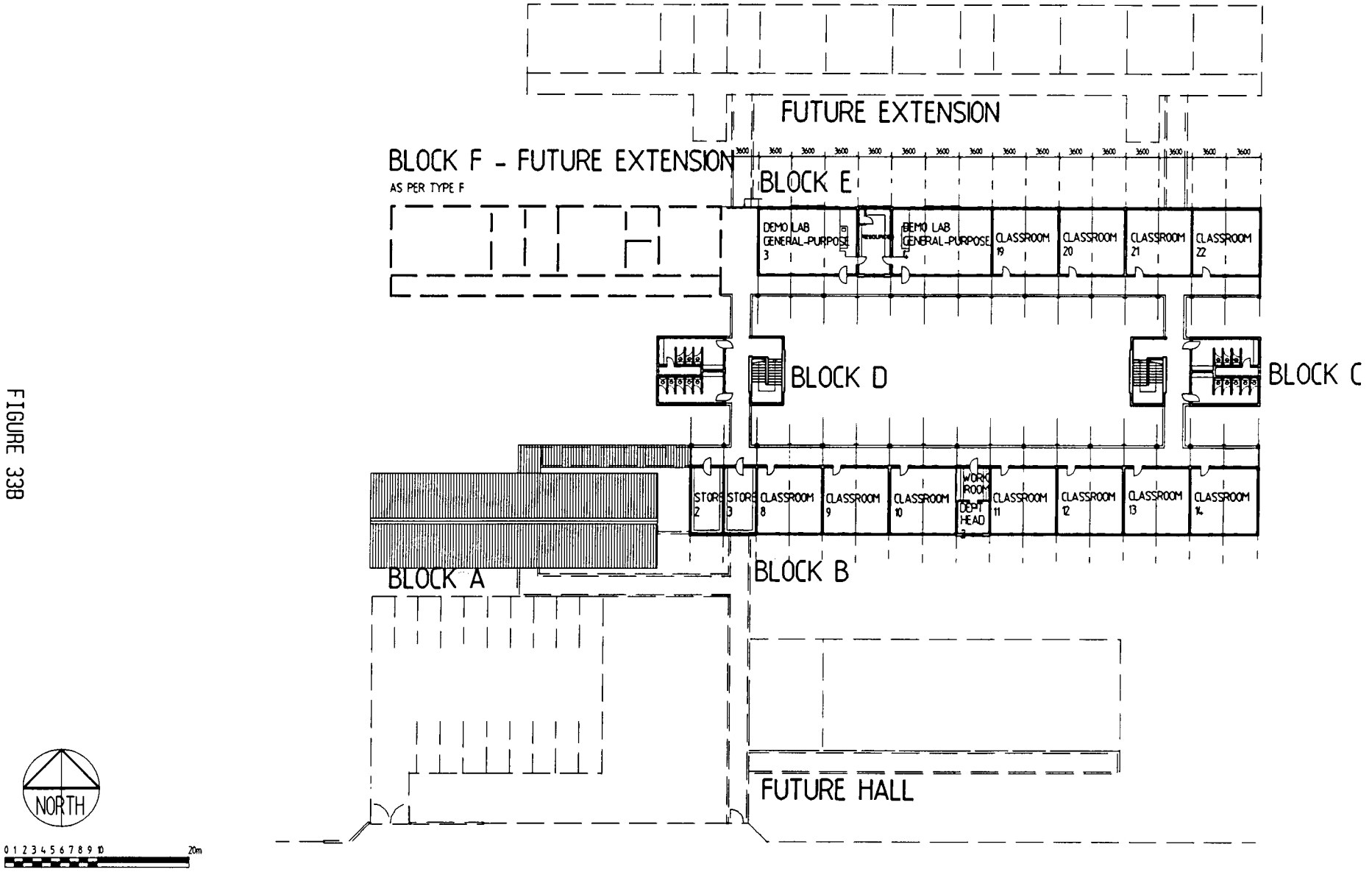
STANDARD SECONDARY SCHOOL
TYPE D : Second Floor Plan

FIGURE 33A



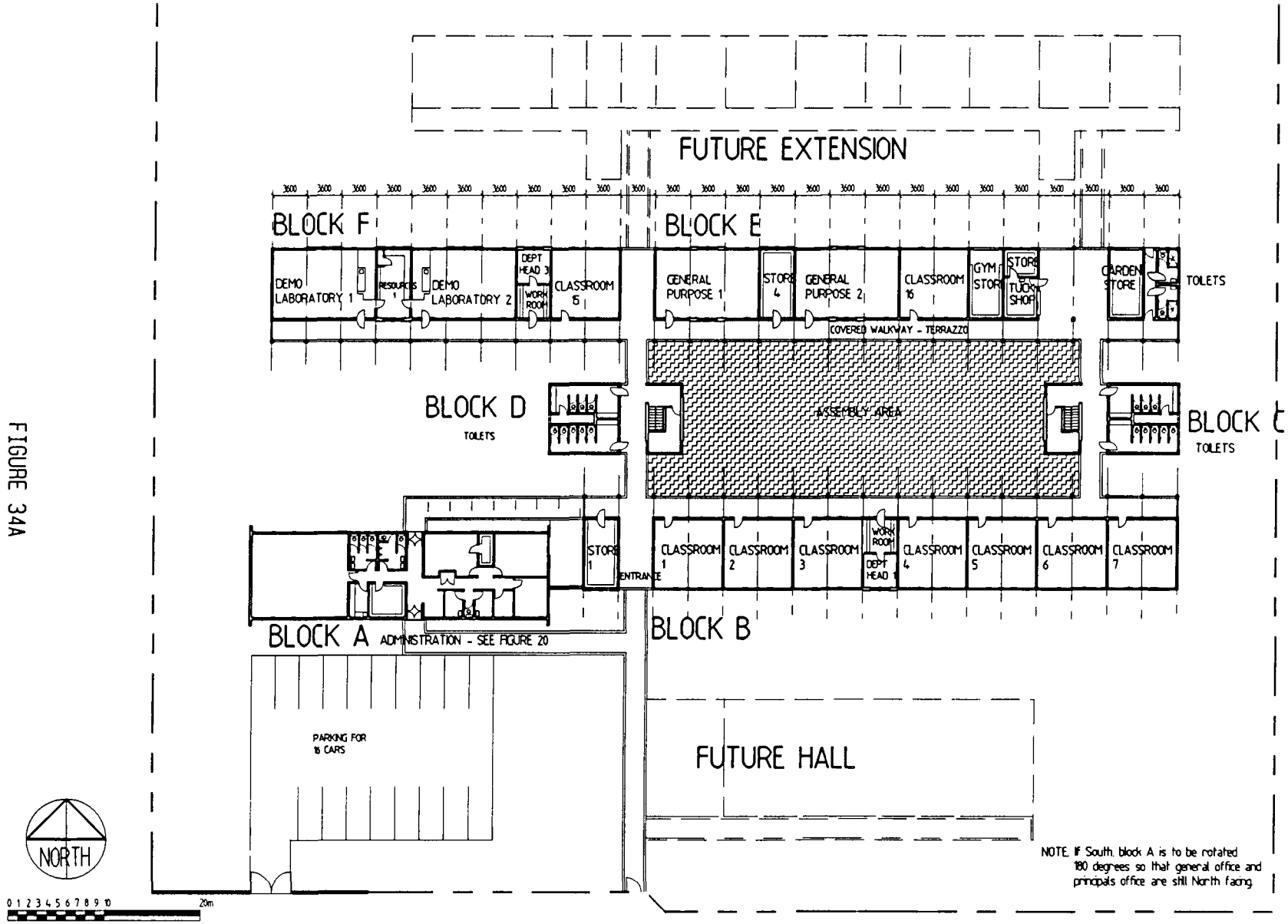
STANDARD SECONDARY SCHOOL - TYPE E : Ground Floor Plan

FIGURE 33B



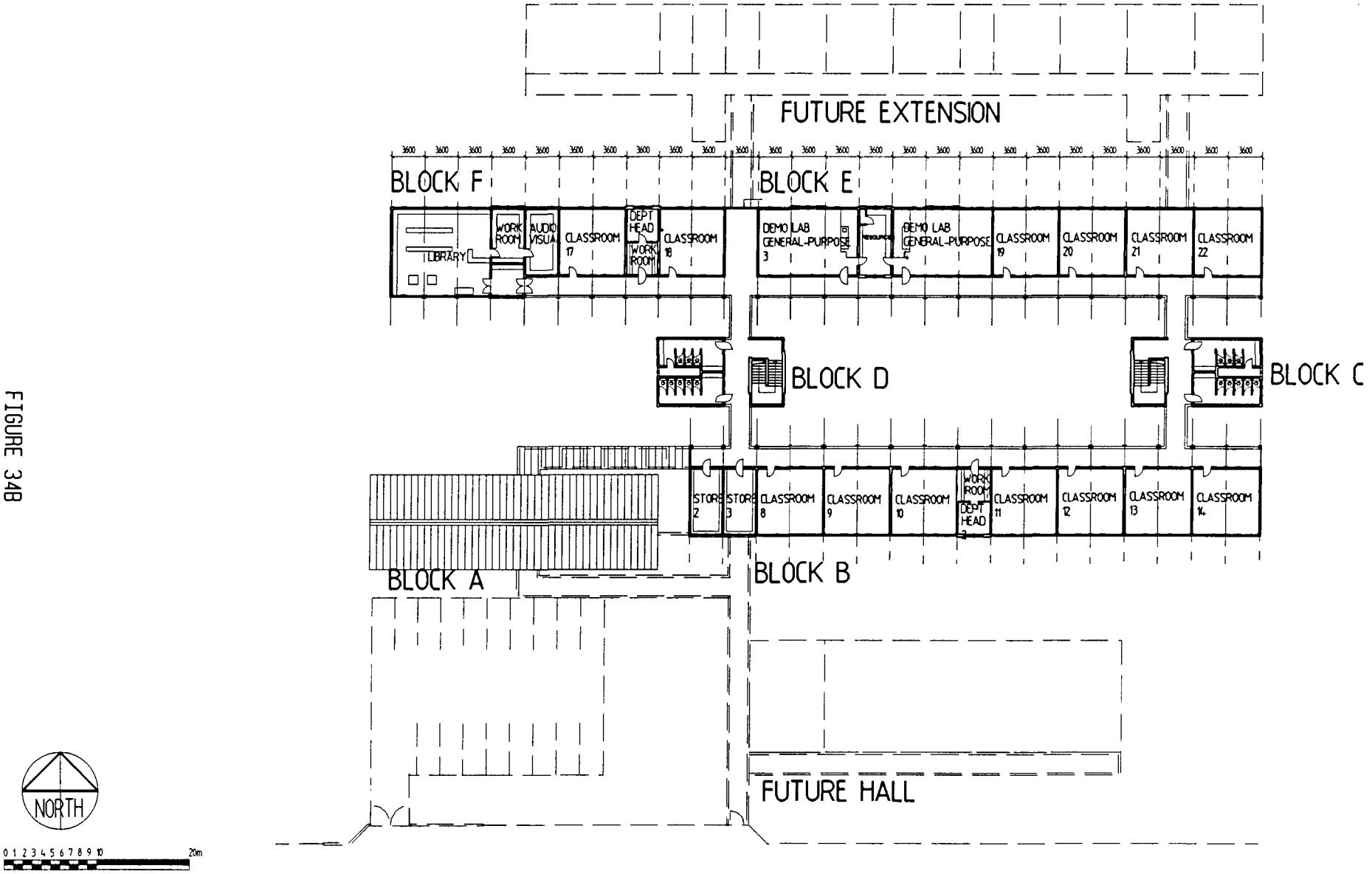
STANDARD SECONDARY SCHOOL - TYPE E : First Floor Plan

FIGURE 34A



STANDARD SECONDARY SCHOOL - TYPE F : Ground Floor Plan

FIGURE 34B



STANDARD SECONDARY SCHOOL - TYPE F : First Floor Plan

CHAPTER VI - THE PRIMARY SCHOOL

1. THE RATIO TO SECONDARY SCHOOLS

1.1 It is important to know, and interesting to understand, how the "Physical Resource Planners" decided on just how many primary and secondary school buildings must be built to provide for the primary and secondary school-going pupils in a normal Black township.

1.2 In their wisdom, the Educators, Planners and Subject Advisors have decided on, both a full primary and secondary school, are to be designed and built to accommodate 960 pupils each. (The reasoning behind this has never been explained to, or understood by the author). The schools for Whites, in the Transvaal, have been designed and built to accommodate 750 pupils. The reasoning behind this, is that the number of teachers required for this number of pupils, is the optimum number of personnel that can be successfully managed by a single Principal and vice-Principal.

1.3 Considering the average size of a Black family unit, the Educators' Planners have decided that, one primary school should be provided for every three hundred and fifty (350) residential erven.

1.3.1 The Educators calculations with regards to the percentage school leavers after completing primary school education, and requiring full or partial secondary school education, brings them to the conclusion that, one full secondary school should be built for every three primary schools planned. Up to this point, this theory in not strictly correct, since most secondary and primary schools, are between twenty percent (20%) and thirty percent (30%) overcrowded. It would appear then, that the ratio of primary to secondary schools may be correct, but that the number of residential erven supposedly warranting one primary school is, for the moment, way out of line.

2. THE ORIGINAL BASIC STANDARD PRIMARY SCHOOL

2.1 In all fairness, reference must be made to the finally accepted primary school that was developed for the TPA in 1981 and is still being used. The accommodation may appear to be lavish, but those were prosperous days. What is important to note is the consistency of the standard module of 3 600mm.

2.1.1 This module has an interesting background and history and will be best understood by the author's paper written for the Director of Works: TPA, to prove a point of cost effectiveness, and this is detailed in Appendix "C".

2.1.2 This standard primary school design was used right up until the absorption of the TPA, and in all cases with acceptable success. It is true that the configuration has been criticised by a few academics, but not really improved upon for a future general standard.

2.2 This standard design of the TPA is earlier explained with figure 3. The reason for this presentation, is to illustrate the extent of the effect on the influences surrounding the formulation of the present day standard primary schools that, were and are being built in the black townships.

2.3 It must be mentioned here that, although the first design of schools for Blacks is not as spacious, the internal and external finishes are no more inferior than those in the White areas. This was a factor that brought the author under severe criticism from his superiors but did not deter the will to persist, and what a blessing that has turned out to be.

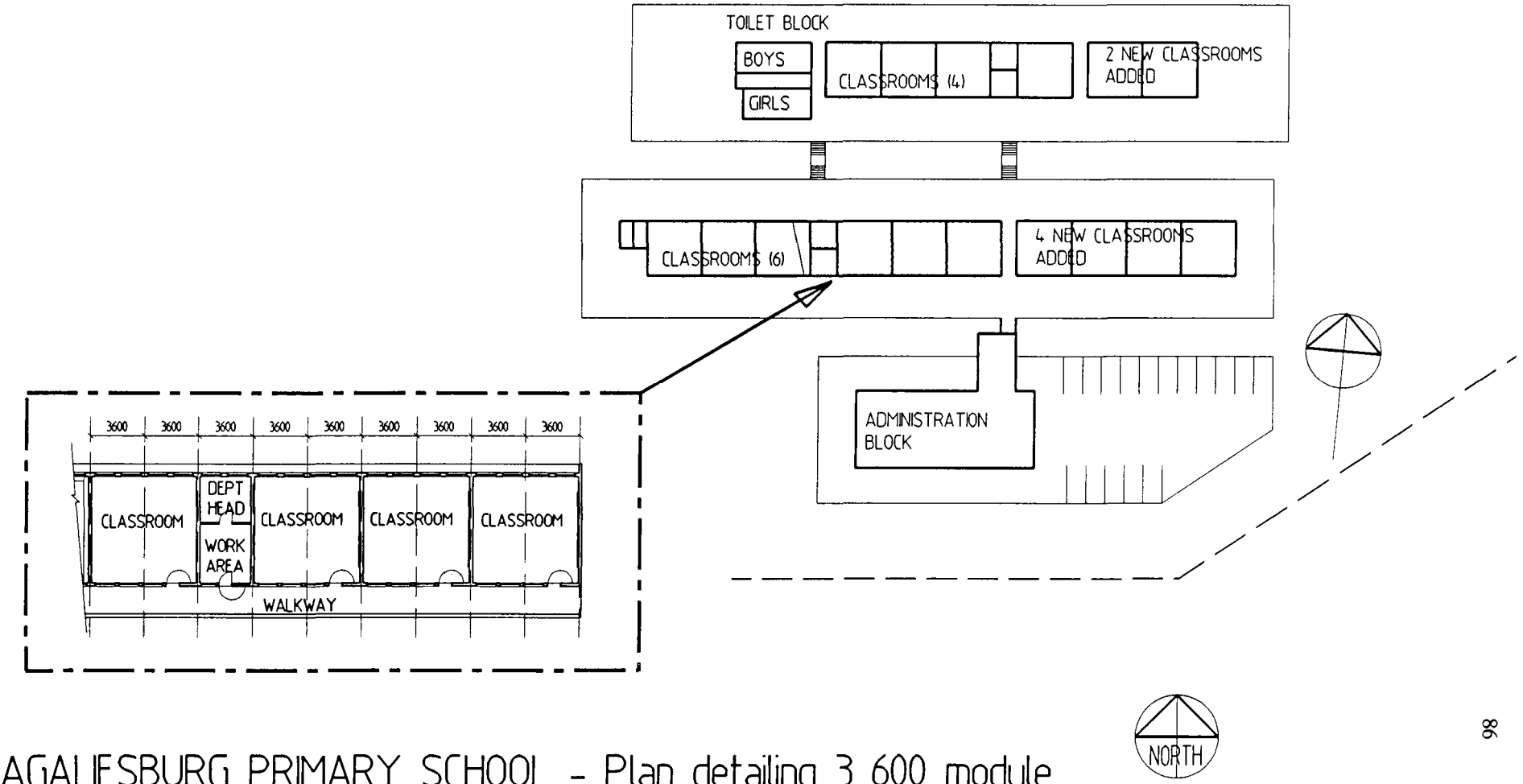
2.3.1 A school building is, in the architectural mind of the author, "A machine for the sole purpose of educating", and the more efficient the machine is, the easier and more satisfying is it to EDUCATE, and **Education** is the name of the nation's **winning game.**

3. THE FIRST APPLICATION

3.1 The Magaliesberg Primary School. This school has been mentioned previously as the introduction to standardisation or, preferably the fortunate opportunity to break away from the old approach.

3.1.2 The success that was achieved in this small school was, as is illustrated in figure 35, the now well known, 3 600mm module determining the dimensions and area of the new standard classroom with it generous natural lighting, the wider access corridor, the introduction of ceilings, and generally improved finishes.

FIGURE 35



MAGALIESBURG PRIMARY SCHOOL - Plan detailing 3 600 module

3.1.3 Figure 5 shows the addition of a, now obsolete, administration block shortly after completion of the classrooms. One further step forward.

3.1.4 Figures 5 and 6 indicate the further extensions in an orderly manner, made possible by the original approach with correct attention to desired orientation and circulation.

3.2 In all future additions and alterations or upgrading, careful attention has been given to present and future needs, with regard to circulation, natural lighting, orientation, where possible and preplanning with a view to orderly progress towards a full primary school.

3.3 Figure 36 shows the first application of the TPA standard primary school, scaled down only in the accommodation schedule to meet the needs within the budget of the DET. This was a massive step forward when related to the pre-1983, schools approach.

3.3.1 For these primary schools, built in Sebokeng, Vereeniging, the same team of consultants were permitted to be used by the author, as were used in the initial standard primary school for the TPA.

3.4 Numerous primary schools of similar design as illustrated in figure 36 were built, mostly on a repeat basis, in the Eastern Cape, the Orange Free State and the Transvaal.

3.5 The Khayelitsha Township in the Western Cape developed so fast (There are presently forty eight schools in this township, established in 1987) that, a solution in the form of a single storey, was also looked at to encourage labour intensive operations.

3.5.1 Figure 37 shows the first attempt very successfully executed, built by McCarthy's in their system, to good effect.

3.5.2 Figure 38 shows the attempt by the drawing office at a "quadrangle" type single storey in the six months after the author's official retirement and neither under his direction nor with his approval.

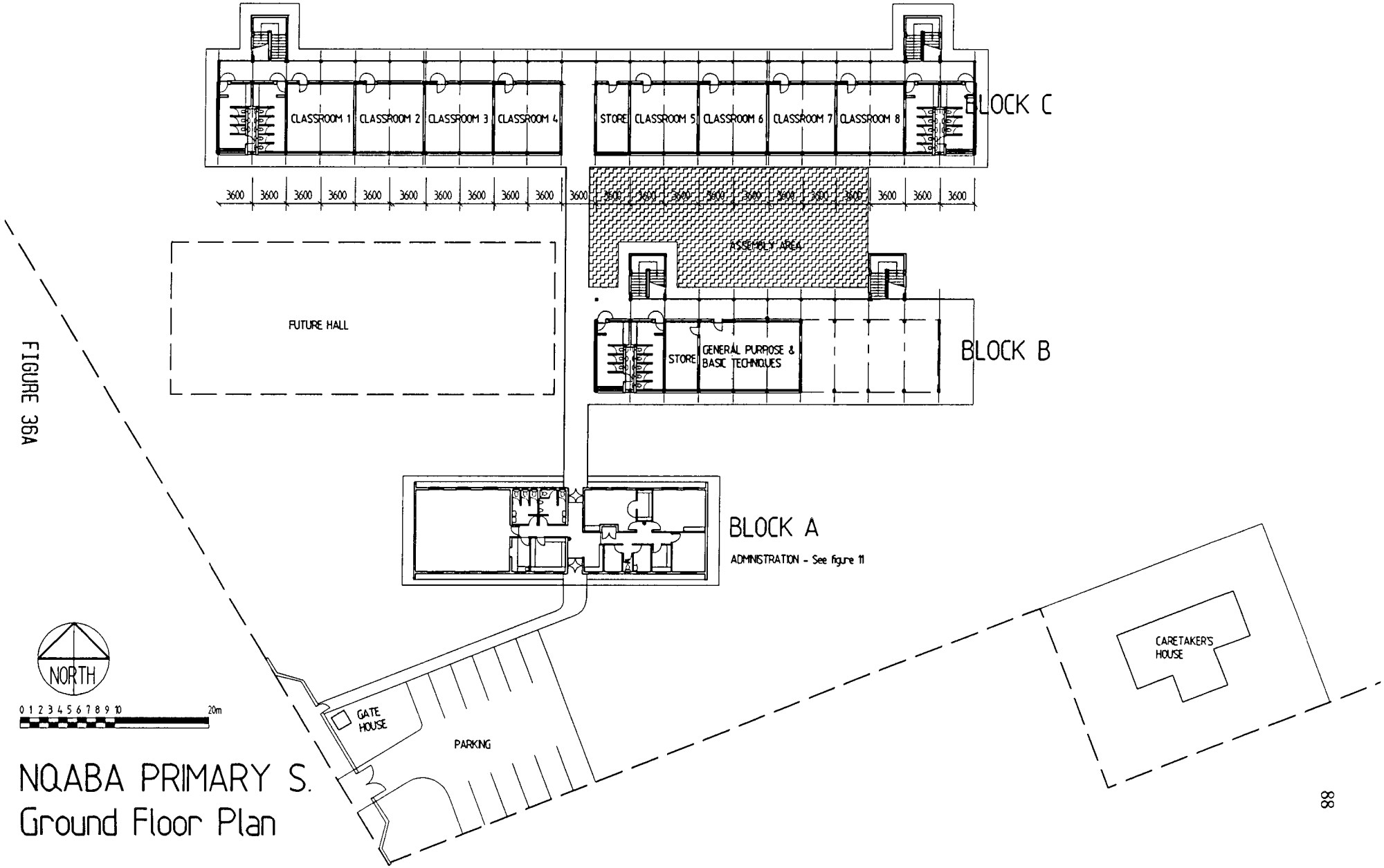


FIGURE 36A

NQABA PRIMARY S.
Ground Floor Plan

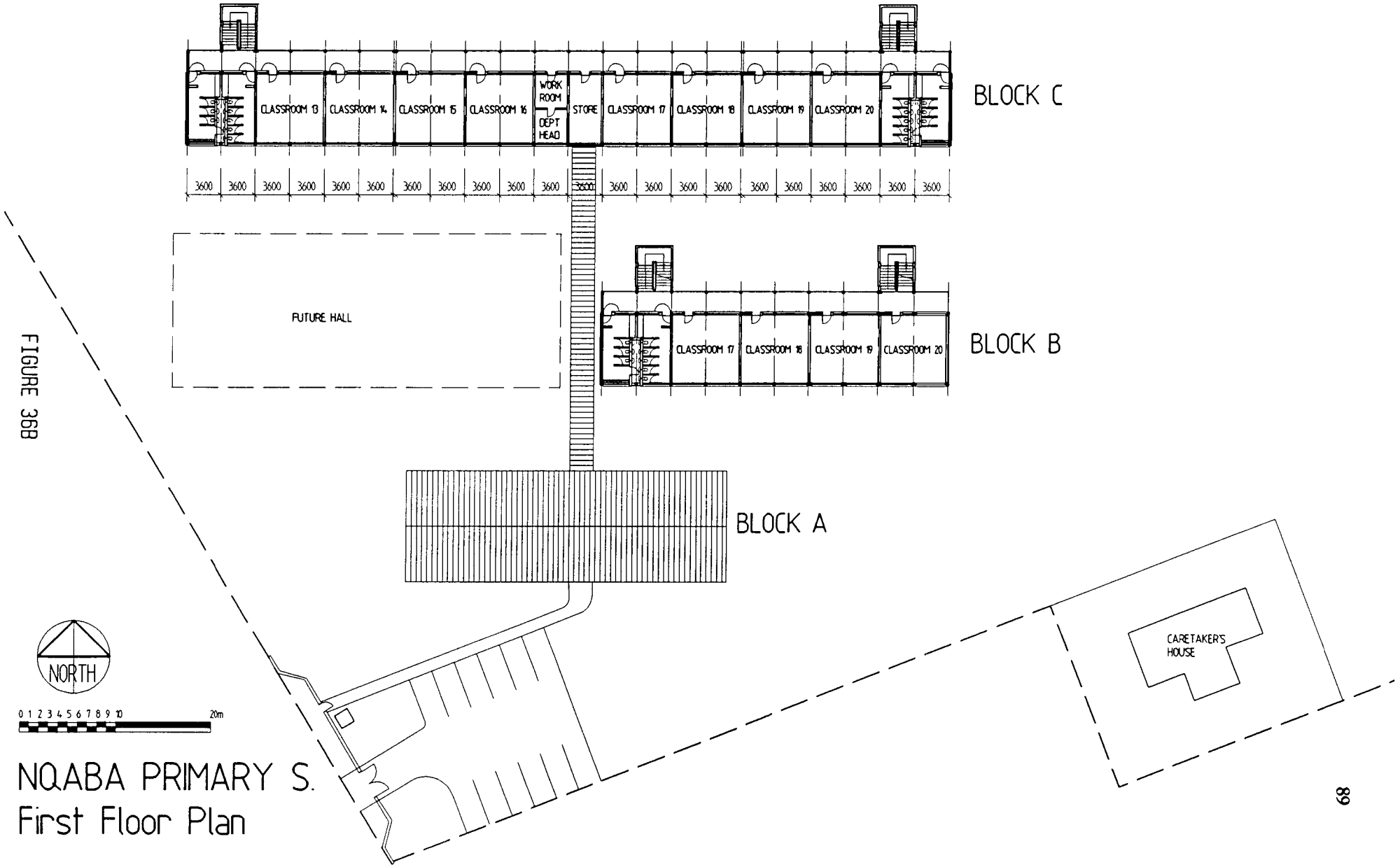


FIGURE 36B

NQABA PRIMARY S.
First Floor Plan

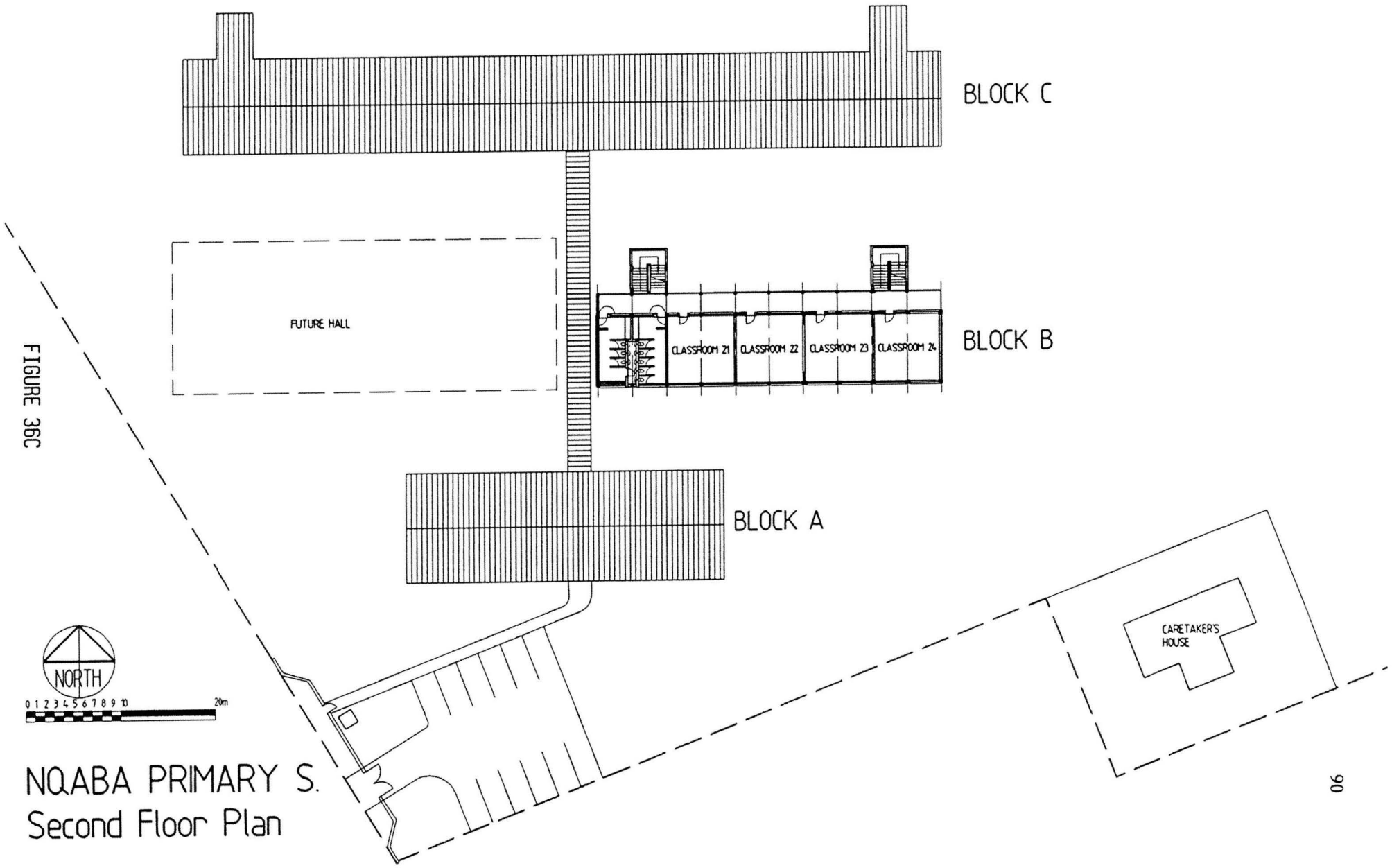
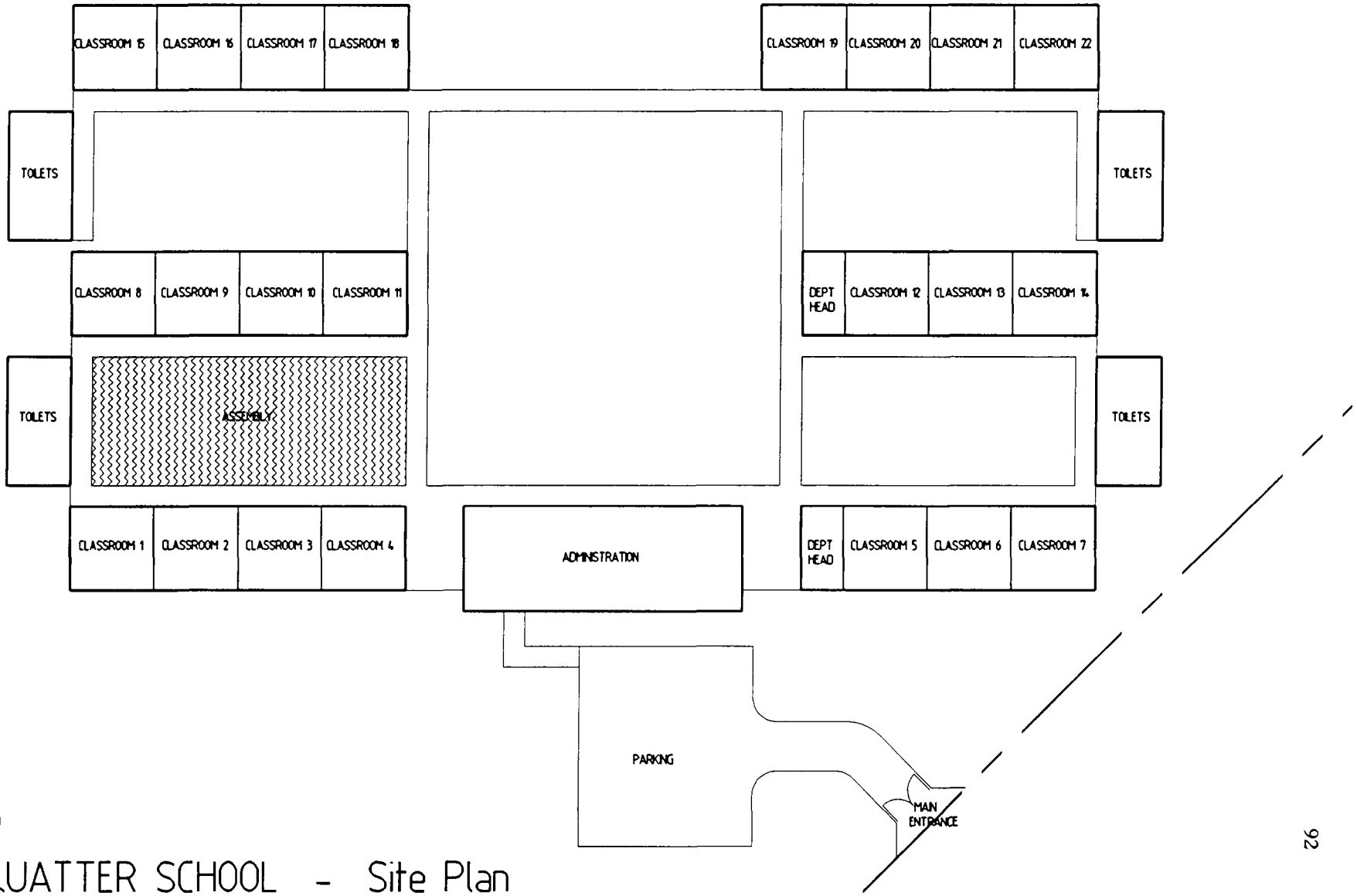


FIGURE 37

SCALE 1:500

SHLANGU PALU PRIMARY SCHOOL - Plan

FIGURE 38



SCALE 1:500

FIRST SQUATTER SCHOOL - Site Plan

4. THE NEED FOR A SINGLE STOREY

4.1 The need for labour intensive design had, by 1991, become, not only necessary, but had to be coupled with cost effectiveness. The cost effective factor had already been dealt with beyond reasonable doubt and will be dealt with in paragraph 5.

4.1.1 In 1991, the author, not only was no longer in control of the Architectural Services (having being retired in November 1989), but had also relinquished the Cape Region to a newly appointed Control Architect, directly responsible, now, to the newly appointed Deputy Director: Architectural Services.

4.2 At this time, the squatters had become a serious problem at Crossroads, Khayelitsha and Langa, in the Western Cape. Coupled with the additional accommodation needs due to the influx of the school-going children of the squatters, the position was aggravated by the unemployment factor amongst the squatters.

4.2.1 To try and cope with both situations, "the powers that be" unknown to the author, invented the worst of creations, known as "squatter schools". This almost was as damaging as the created word "APARTHEID". Figure 38 illustrates this type of school clearly.

4.2.2 When, in September 1991, after the then Minister of the Department of Education and Training, publicly announced in the media, that four primary and four secondary schools would be provided in this area, early in the ensuing year, there was panic at Head Office as to how this could be defused.

4.2.3 Because of his previous experience and extensive knowledge of mass briefing and crisis management, the author was sent down to Cape Town to try and arrange for the speedy construction of these schools in the limited time promised. This was the first time that the author encountered the documentation of these "squatter schools". The secondary schools documentation were, fortunately, of the existing standard secondary school types.

4.2.4 The entire exercise will not be dealt with, in detail. Suffice it to say that all of the four primary schools were ready for occupation by the end of January 1992 and all four secondary schools' main classroom blocks (29 classrooms each) could be isolated and put to use by the end of January 1992, and all were completed by mid-

June 1992. (Each valued then, at R5,5M.)

4.2.5 The documentation having being done departmentally, the author had to have one team of consultants appointed (one in each discipline, Architecture, Quantity Surveying and Engineering) to administer all four primary schools with a few adjustments to bring them up to a more acceptable standard as shown in figure 39.

4.3 This lead to the author seeking authority and obtaining this authority to immediately set about re-designing this single storey primary school into an acceptable design, based on the quadrangle principle, without loss of accommodation circulation or effectiveness.

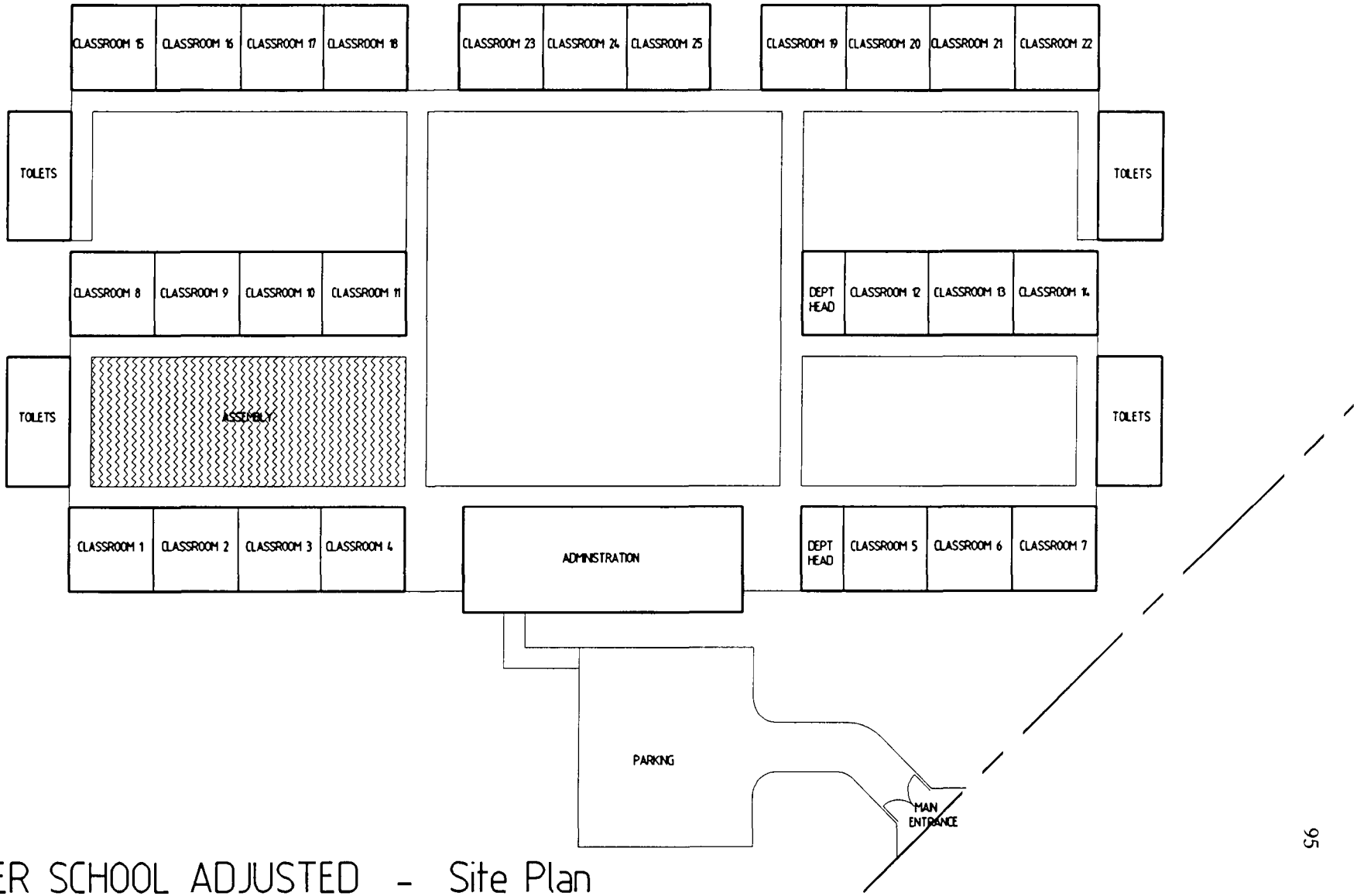
4.3.1 At this time, throughout the Republic, many appointments had been made for primary and secondary schools. The secondary school standard drawings were almost complete and ready for issue but the primary schools in the single storey form were not.

4.3.2 Amongst the appointed architects, one firm highly specialised in CAD (Computer Aided Drawing), were appointed for two primary schools in their area. The author seized the opportunity to have their two primary schools prepared in the standard format, and suspended the rest until the standard drawings could be issued to all other consultants, complete in every detail.

4.3.3 This may, in the beginning, appeared to have delayed documentation in the Republic unnecessarily. This proved to be wrong since, when the standard primary school was ready for issue, complete with software, where it could be used, within three weeks all the primary schools in the process of documentation, were ready for tender purposes. (There were approximately twenty projects involved.)

4.3.4 Because of standardisation and mass briefing, between September 1991 and October 1992, coupled with the fact that consultants could be commissioned on a "repeat basis", the state was saved, unintentionally, R12M (twelve million rand) in consultants fees whilst, Rand per hour, the consultants were doing well indeed, and the Department's Professional component, easily coped with the checking of documentation. In fact, the Department boasts the finest and most professional documentation of all the Government Departments, not to mention the subsequent site administration.

FIGURE 39



SCALE 1:500

SQUATTER SCHOOL ADJUSTED - Site Plan

4.4 This single storey standard primary school design has proved so successful that, in all the rural areas, as well as many urban areas, it is preferred to the multi-storey standard primary school, except where prestige may well be a dominant factor, for what it is worth.

5. THE GENERAL PURPOSE ROOM

5.1 The GP classroom and store combined, which has been added to the primary school, differs from any GP classroom in the secondary school, in as much as it has been introduced for the instruction in the general handicrafts, with the storeroom attached and interleading, for the storage of pupils tasks or projects, in the process of completion or construction.

5.2 In the 1930's right up until the 1960's, in schools for Whites in smaller rural areas and suburbs in urban areas, there were two such units at a selected school, one for general woodwork and one for general metal work, referred to as manual training. Because of the low usage factor, it was considered prudent to provide these instruction GP classrooms to only one selected school in an area, with the pupils in the surrounding schools allotted periods for instruction at this one selected school. This system worked well.

5.3 This is merely mentioned here for possible consideration for providing low usage factor specialised areas of instruction both from a specialised equipment point of view as well as scarce, specialised instructors.

6. THE PRESENT FINAL SCHEDULE OF ACCOMMODATION

6.1 Although the Educators, correctly, strongly differentiate between Junior Primary and Senior Primary schooling, the physical planning component has not insisted on different classroom accommodation and facilities. Therefore, sadly, the primary school buildings design makes no distinction and merely caters for "X" pupils hoping that the school administrators will attend to the necessary separation, blockwise, in each individual school.

6.2 When the budget permits, then probably, consideration will be given to providing the additional facilities required by the Junior Primary pupils. After all said and done, Junior Primary Teachers receive longer and more intensive training than Senior

Primary Teachers.

6.3 When the present final schedule of accommodation for a standard primary school was decided on, it was quite clear that only the absolute essentials that are required, would be provided initially, and with the aid of modular design and standardisation, the remaining essential components could be added at a later date, either by the State, donation or parents' own efforts. Certainly, it must come.

6.4 It is then, therefore correct to consider the essential components first, and then the additional components in order of priority, all as given to us, the designers, by the Educators' Planning Department. It is essential to understand always that the Architects do not decide on the Schedule of Accommodation, except for non-assignable areas such as, toilets and ablutions, circulation areas, site development and security, as well as comfort provision, such as, natural lighting, artificial lighting, ventilation, power supply (both electrical and mechanical), drainage, water supply and colour scheme comfort.

6.4.1 A start must be made with the size of the site and services. The area of the primary school site should not be less than 2,8ha with fifty percent of its perimeter adjoining a road/s, preferably not a main arterial road, and be serviced with all of the utilities such as, sewage disposal, adequate water supply and pressure, and electrical power supply, not forgetting a telephone service point. An added advantage would be that the site be close to an established passenger bus route.

6.4.2 The next to consider, are the physical building components required listed as follows:

(i) Full Administration Block as per figure 11.

(ii) Twenty Four (24) Standard Classrooms as per figure 7.

(iii) Four (4) Head of Department Offices as per figure 13.
satisfactorily dispersed throughout the complex to ensure correct supervision and discipline.

(iv) Three (3) general stores of 25 sq. metres each, dispersed throughout building complex as figure 19.

(v) One (1) GP classroom of 75 sq. metres with adjoining interleading store of 25 sq. metres as figure 40.

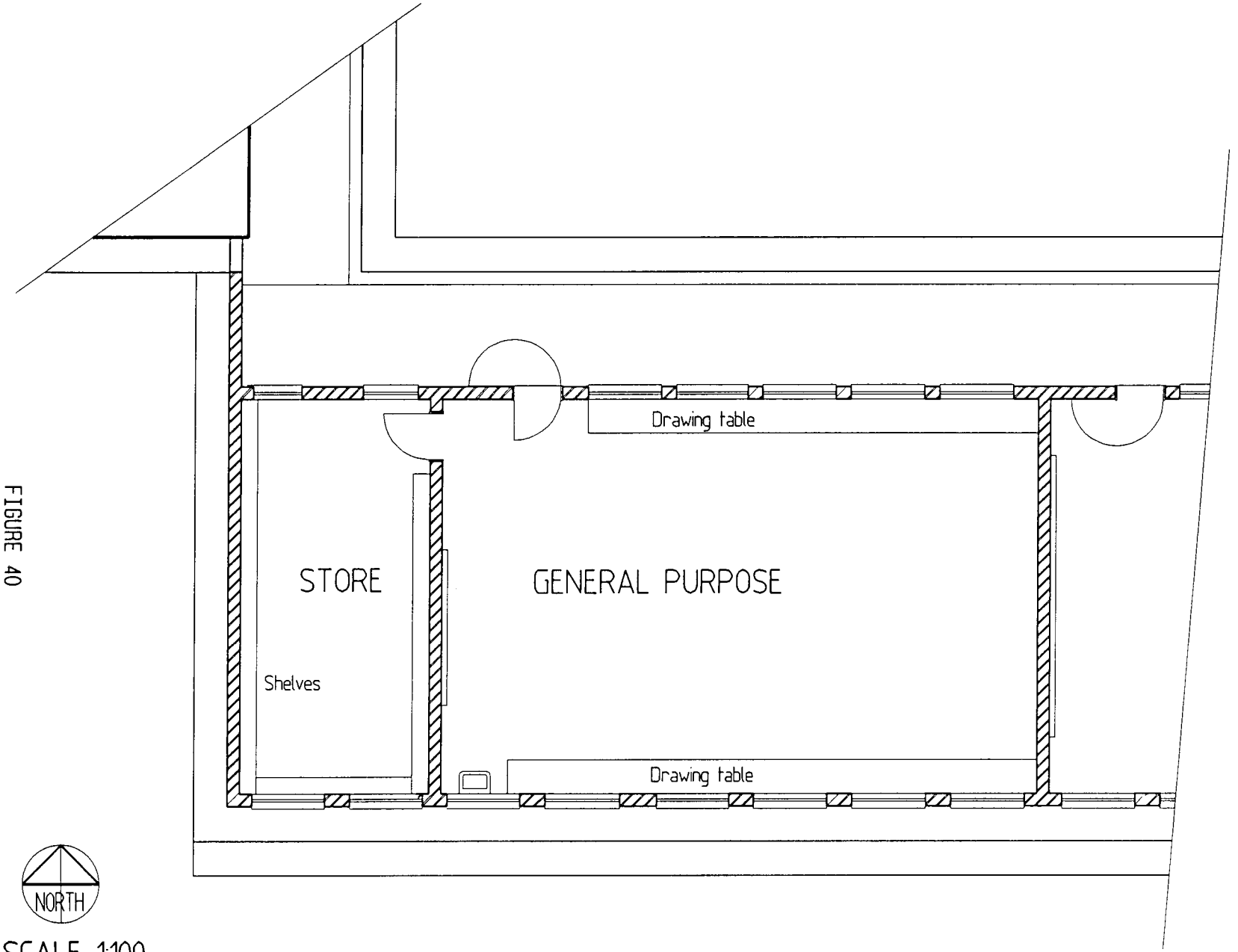


FIGURE 40

SCALE 1:100

PRIMARY SCHOOL GENERAL PURPOSE AND INTERLEADING STORE - Plan

(vi) One (1) Garden store with labourers toilets attached contained in one module, as per figure 14 always at the furthest point away from the Admin. Block.

(vii) Sufficient pupil toilet facilities to conform to, not less than the requirements as promulgated in the National Building Regulations (NBR).

(viii) Covered access corridors in front of all classroom units and covered walkways of adequate width, linking the Admin. Block to all classroom units and each classroom unit linked to the toilet blocks, all under cover.

(ix) A paved open assembly area to accommodate a minimum of one thousand pupils standing in organised rows and adjoining an under cover link to the Administration Block.

6.4.3 Apart from the specific site works required for each project relating to the individual site conditions, the amount of site development is restricted to the absolute minimum without unreasonable restraints being forced on the efficient functioning of the school administration from an educational point of view.

6.4.4 The permitted site development, at present, is limited to the following:

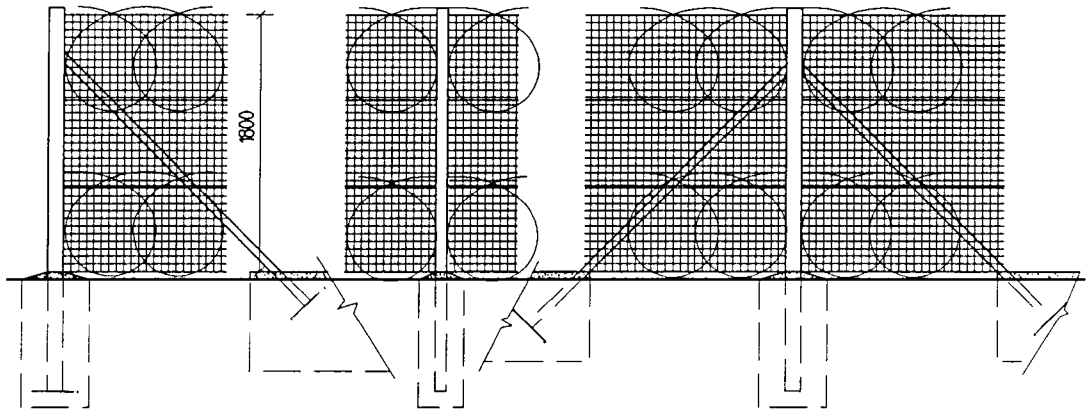
(i) An effective double and single entrance gate to the school contained in a reasonably dignified face brick wall of 1 800mm metres height, long enough to contain the schools' name in metal lettering, sufficiently set back from the boundary to permit the off loading of pupils from a public transportation bus. See figure 27.

(ii) Immediately beyond the entrance, a paved driveway leading to a paved open parking area for twelve (12) motor cars. Officially, this parking is meant for official visitors. The paved parking area is to be contained within an area with mountable kerbing to its perimeter. See figure 12.

(iii) The entire site is fenced off with 1 800mm high security fencing similar to that illustrated in figure 41. At a strategic point in the perimeter fencing, a single (large) leaf escape gate is provided.

(iv) The site is left cleared of all rubble, wild scrubs and growth, retaining all forms of trees that are in a healthy state, to remain untouched, where possible.

FIGURE 41



SCALE 1:50

SHORT LENGTHS OF STANDARD SECURITY FENCES

7. THE CONFIGURATIONS

7.1 Since the "Magaliesberg Primary School" advent, in 1983, the introduction of the adapted TPA standard Primary School, The Khayelitsha experiment, many so-called standard configurations were adapted, ending in a final decision, for the DET, in 1993, officially confirmed, by the delegated authority, in May of 1994. In view of this fact, and to avoid confusion, the author will deal with each area, or phase, in chronological order.

7.2 Because of its important historical value, the author considers the "Magaliesberg Primary School" as, without a doubt, phase one or, to be more correct, the beginning of the era of the mature approach towards standardised configurations for Primary Schools in the black townships. Definitely, the "Administration Boards" attempts are to be ignored, since they were never repeated after the year 1983 (see chapter 3, paragraph 1.1.1). In fact, the majority of these "schools" have been, either destroyed, replaced or unrecognisably upgraded.

7.3 Phase two, would be the introduction of the full TPA standard Primary School, adapted to the given requirements, at that stage, for the full DET Primary School. After many consultations with the Educators and Educational planners, and meetings with the appointed consultants in all the required disciplines, the "Sebokeng" configuration was arrived at, and successfully applied throughout the Republic, except the Homelands and Independent States, up until the author's official compulsory retirement at the end of November 1989. Refer to figure 42. It is mentioned again that, because of the author's expertise and his sincere desire to carry on with his "mission in life" he was re-appointed to lead the Architectural Services component from 1 January 1994 until the time of writing.

7.4 Phase three, can be referred to as the "quest for improved cost affectivity" or even the "Competition Stage". Still not satisfied with the standard configuration and finishes being used at the time, the top management of the DET, in their wisdom, decided that four different teams of consultants be appointed to design and have built, their interpretation of the standard schedule of accommodation in four different townships in the old Transvaal. They were built within reasonable distance of each other to ensure a fair cost comparison.

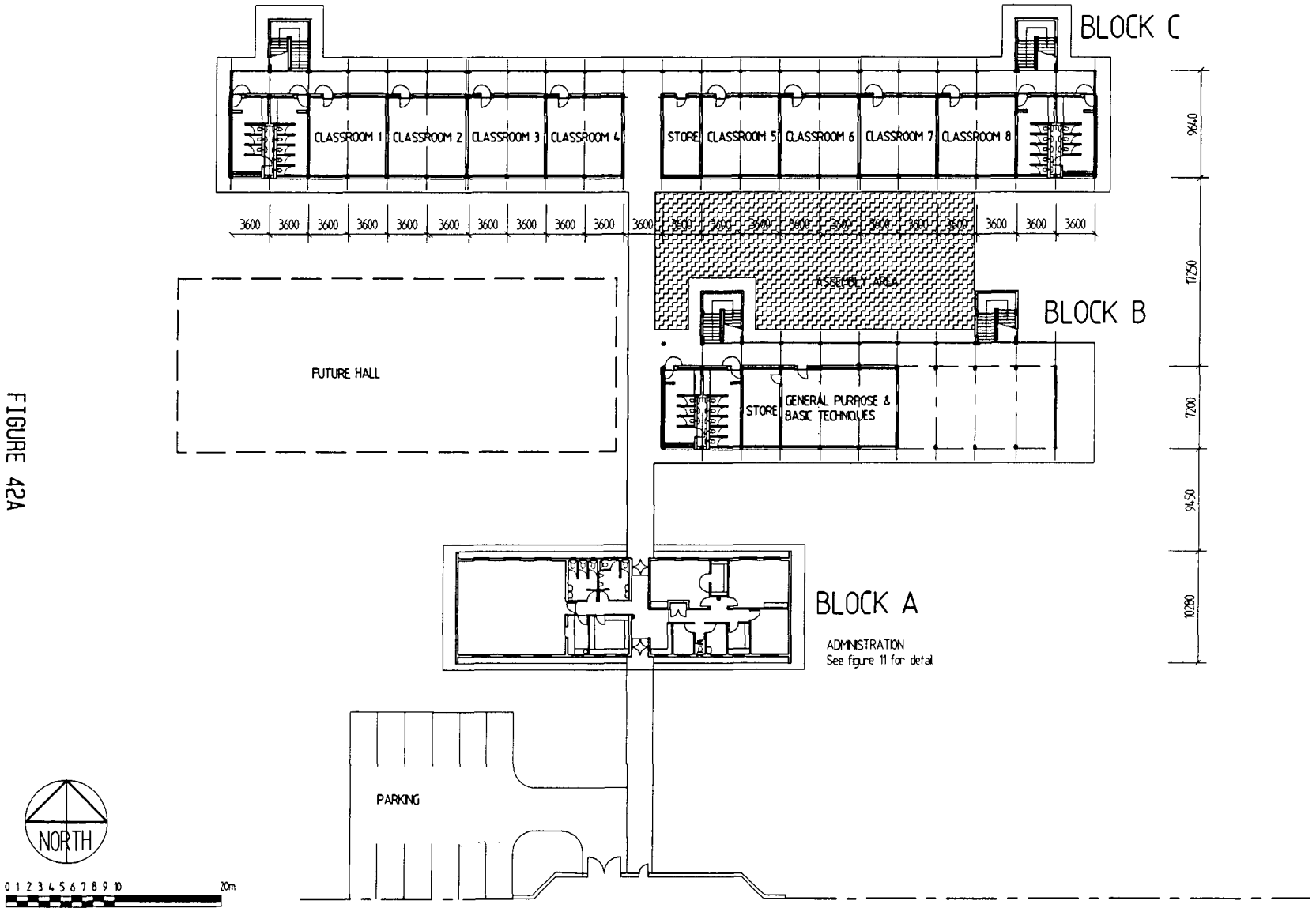


FIGURE 42A

SEBOKENG PRIMARY SCHOOL: Ground Floor Plan

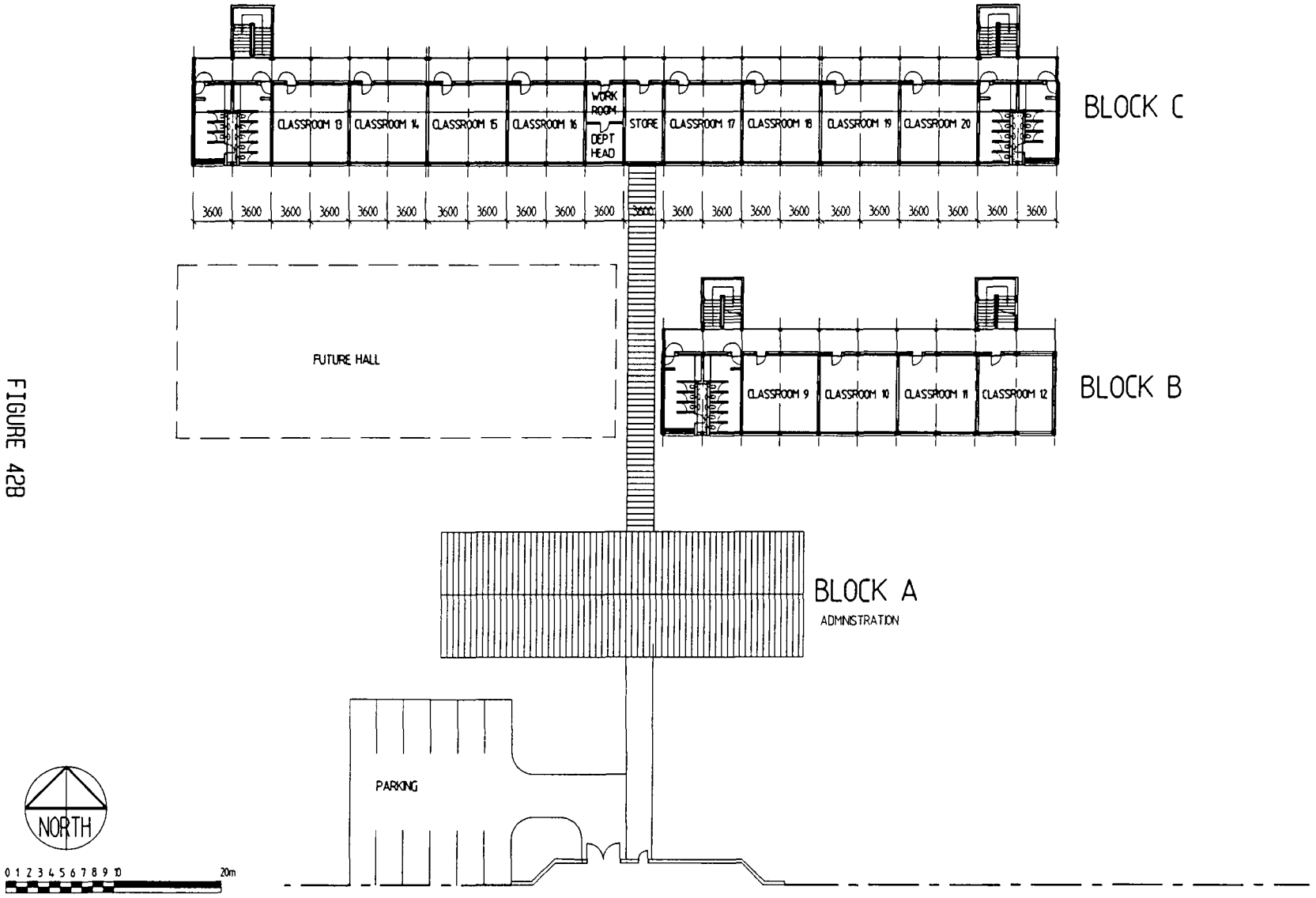
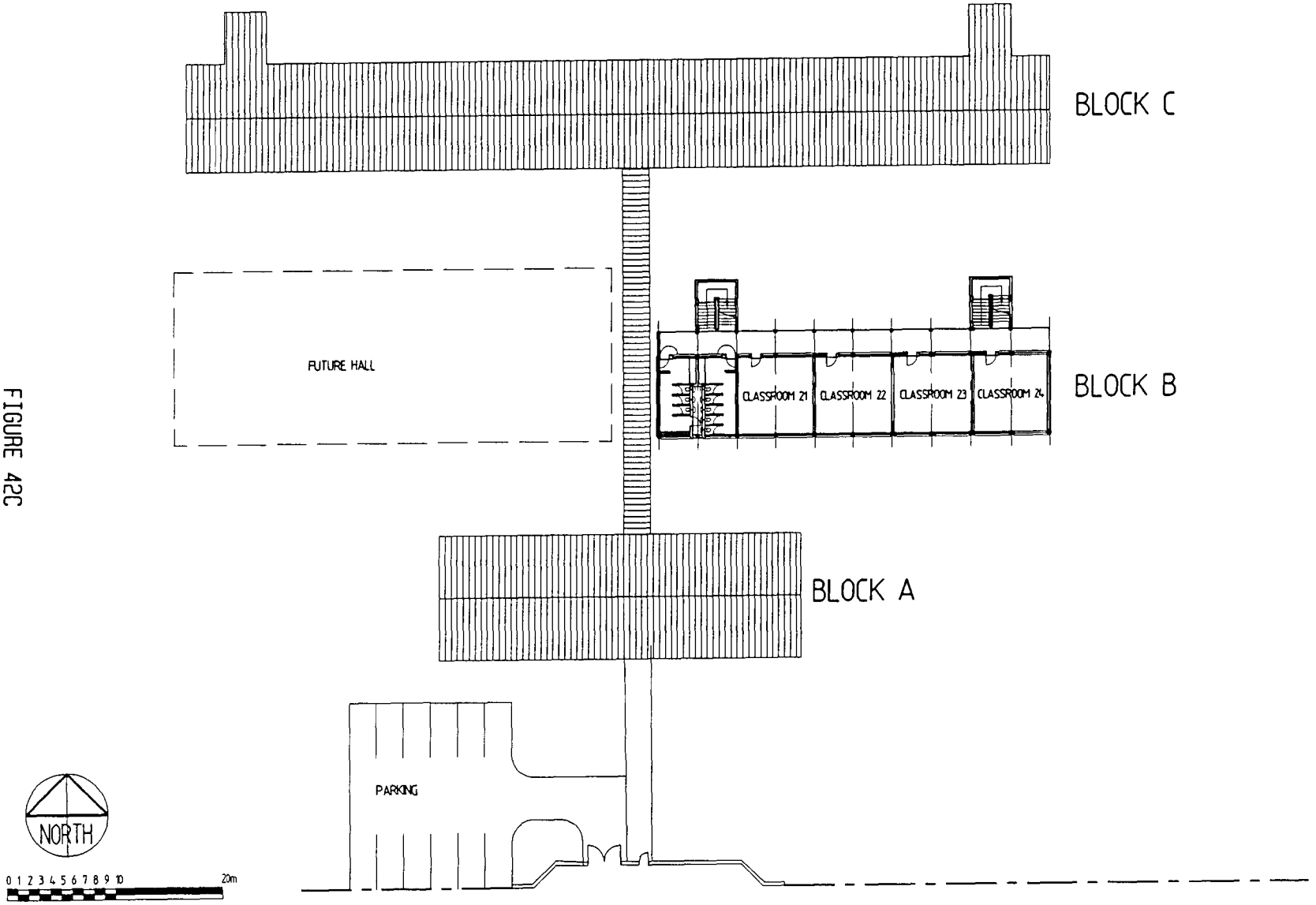


FIGURE 42B

SEBOKENG PRIMARY SCHOOL: First Floor Plan

FIGURE 42C



SEBOKENG PRIMARY SCHOOL: Second Floor Plan

7.4.1 The four teams were duly appointed, briefed and given their individual sites in four different townships. The sketch designs were submitted and finally approved as per figures 43 to 46. The author was not involved in the entire experiment.

7.4.2 Full documentation was then prepared and the projects put out to tender. Except for figure 46 produced by the C.S.I.R., there were no real surprises and fortunately no exorbitant prices. However, there were so many items omitted and a few flaws that had to be rectified, in the end, so that no real cost or other effectiveness was achieved.

7.4.3 The final test was that no request was forthcoming to repeat any of these schools, except for figure 43, which was repeated only once in the same area. What was achieved, was definite proof that the present day configuration and (good) finishes, were, in fact, cost effective and still being accepted by the communities.

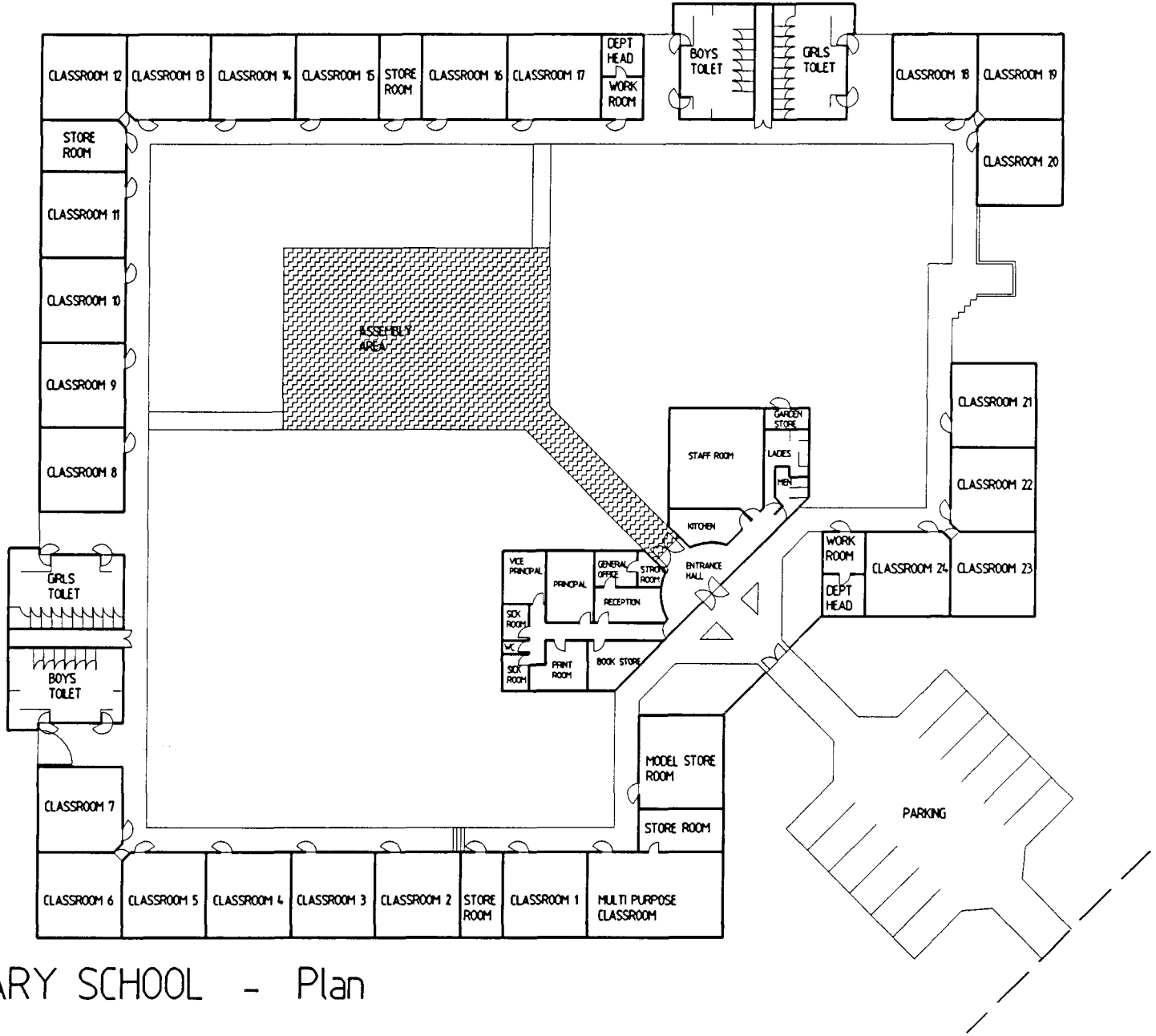
7.4.4 The "Competition Experiment" must never be written off, or considered fruitless expenditure. The lessons learnt were well worthwhile and contributed to even further refinement, in detail, to the then present day standard configuration and finishes.

7.5 Although not strictly in chronological order, the author must refer to the "Khayelitsha Crisis" as a "one off" phase four.

7.5.1 Khayelitsha is a township hurriedly developed in 1986, to cope with the uncontrollable influx of Blacks to the Western Cape. This township was developed on a barren sandy site approximately twelve kilometres north of Cape Town, flattened by an army of the heaviest earth moving equipment available in the vicinity. The first two Primary Schools built, were built using an Industrial Design Method, which was well modulated to construct according to the modular design illustrated in figure 37.

7.5.2 Although a number of schools, to the design discussed in paragraph 7.3, were continually being erected, there was a further surge in influx which prompted the Department, in 1992, to employ the drawing office staff, under guidance of the Cape Region Control Architect, to design four types of primary schools to be put out to tender to the "System Buildings Industry" in the Cape, with special state Tender Board approval. These drawings were for guidance with a brief minimum specification with the onus on the tenderer, to submit his tender with a complete

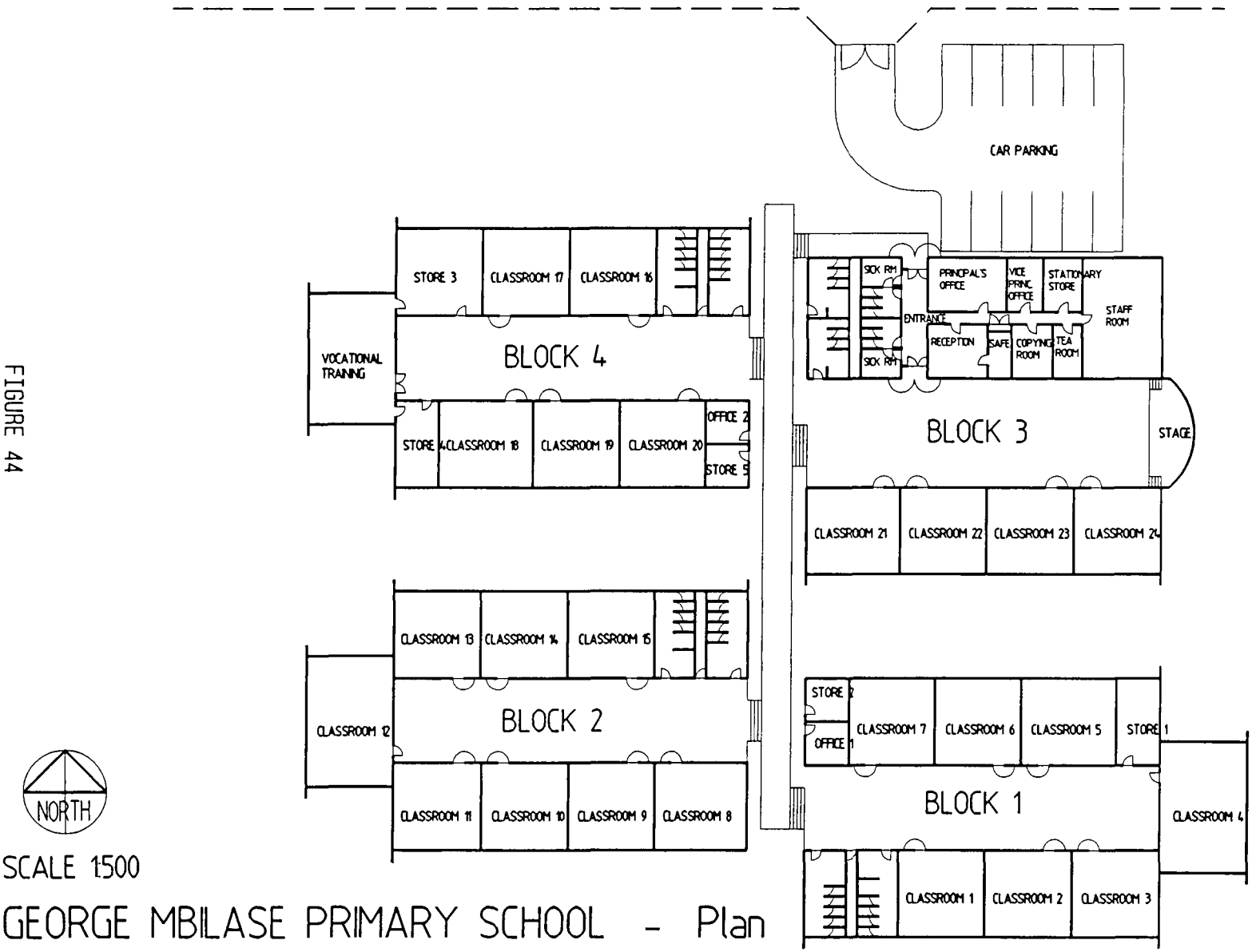
FIGURE 43



SCALE 1:500

KHAYELIHLE PRIMARY SCHOOL - Plan

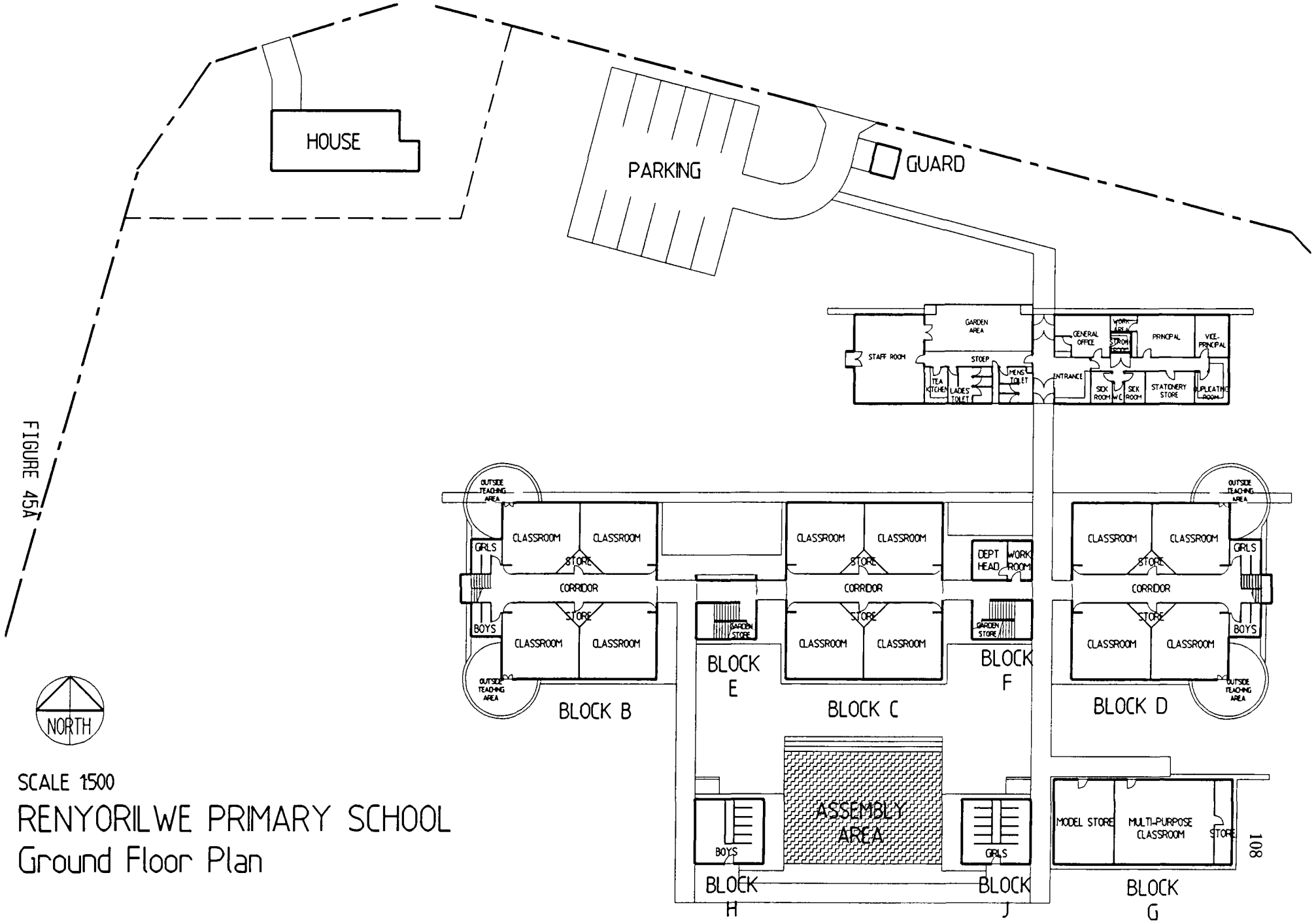
FIGURE 44



SCALE 1:500

GEORGE MBILASE PRIMARY SCHOOL - Plan

FIGURE 45A



SCALE 1:500

RENYORILWE PRIMARY SCHOOL
Ground Floor Plan

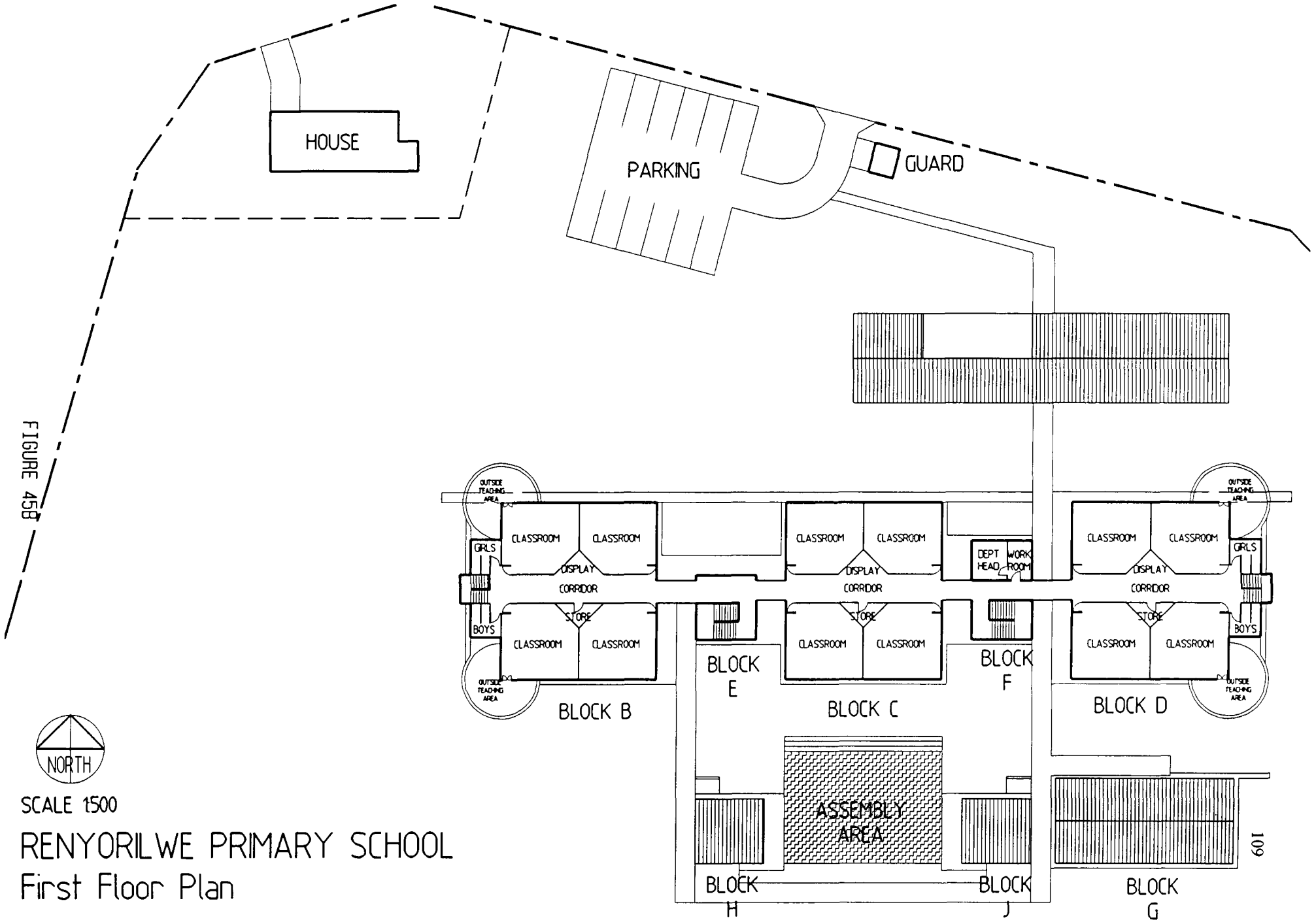


FIGURE 45B

SCALE 1500

RENYORILWE PRIMARY SCHOOL
First Floor Plan

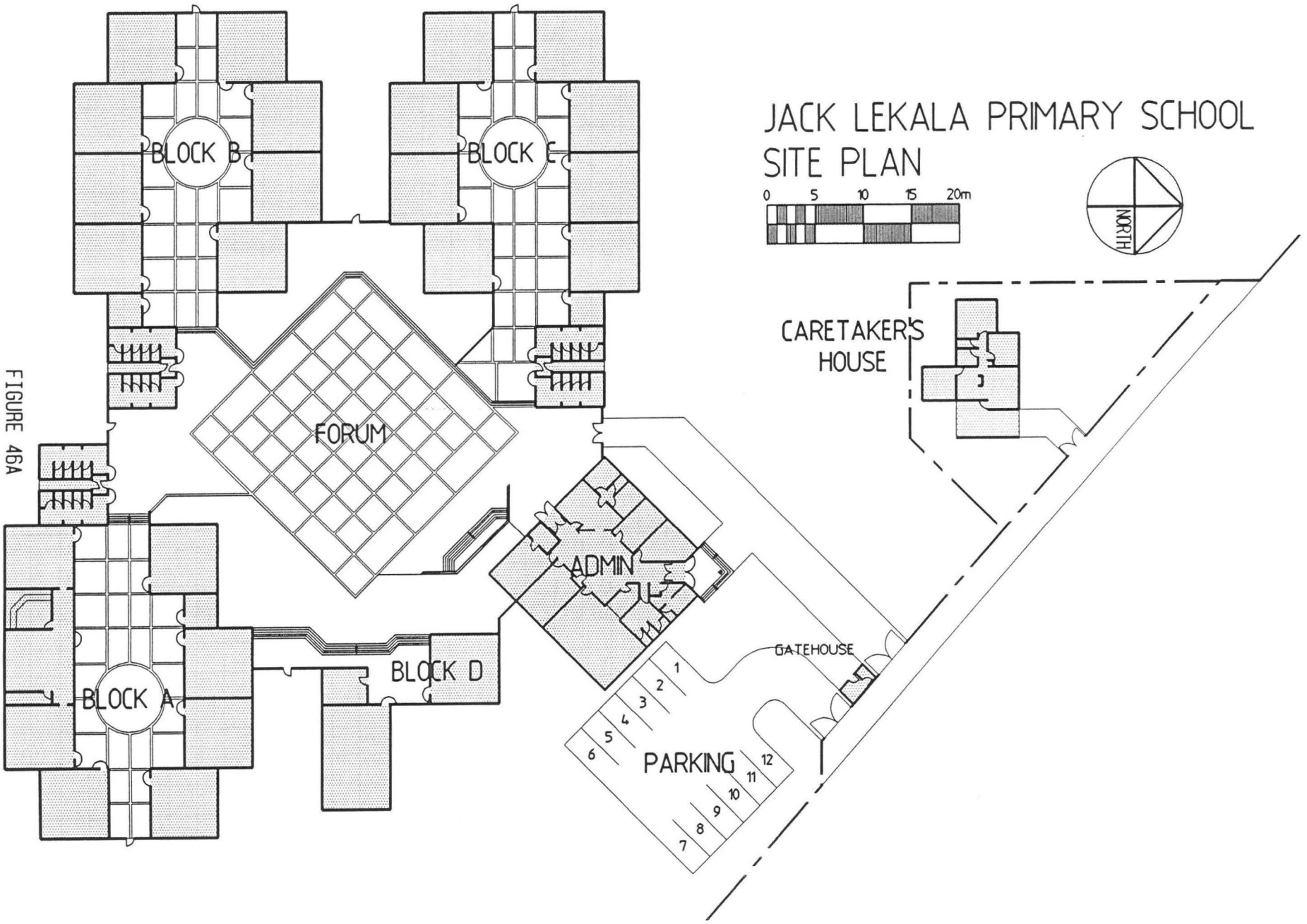


FIGURE 46A

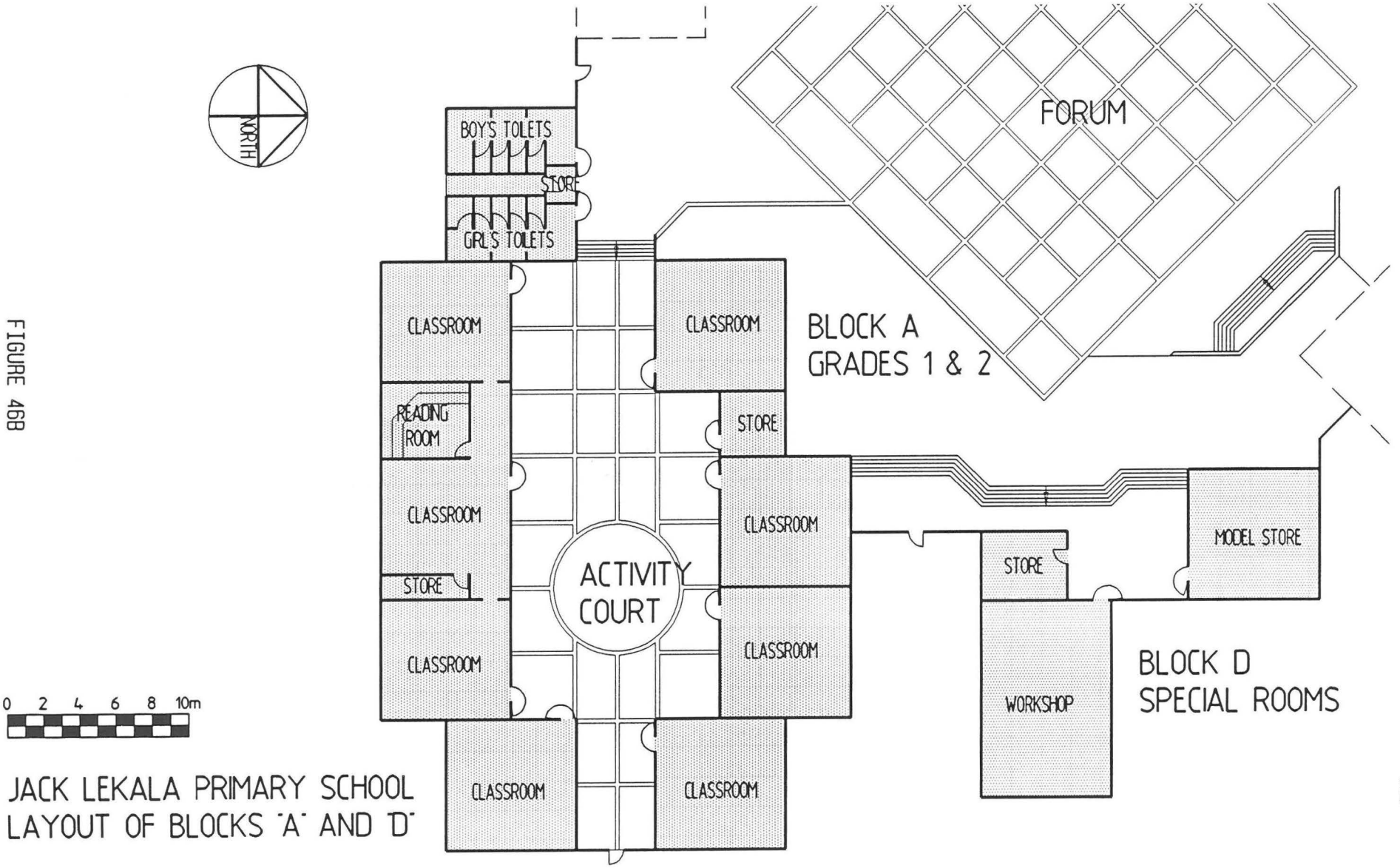
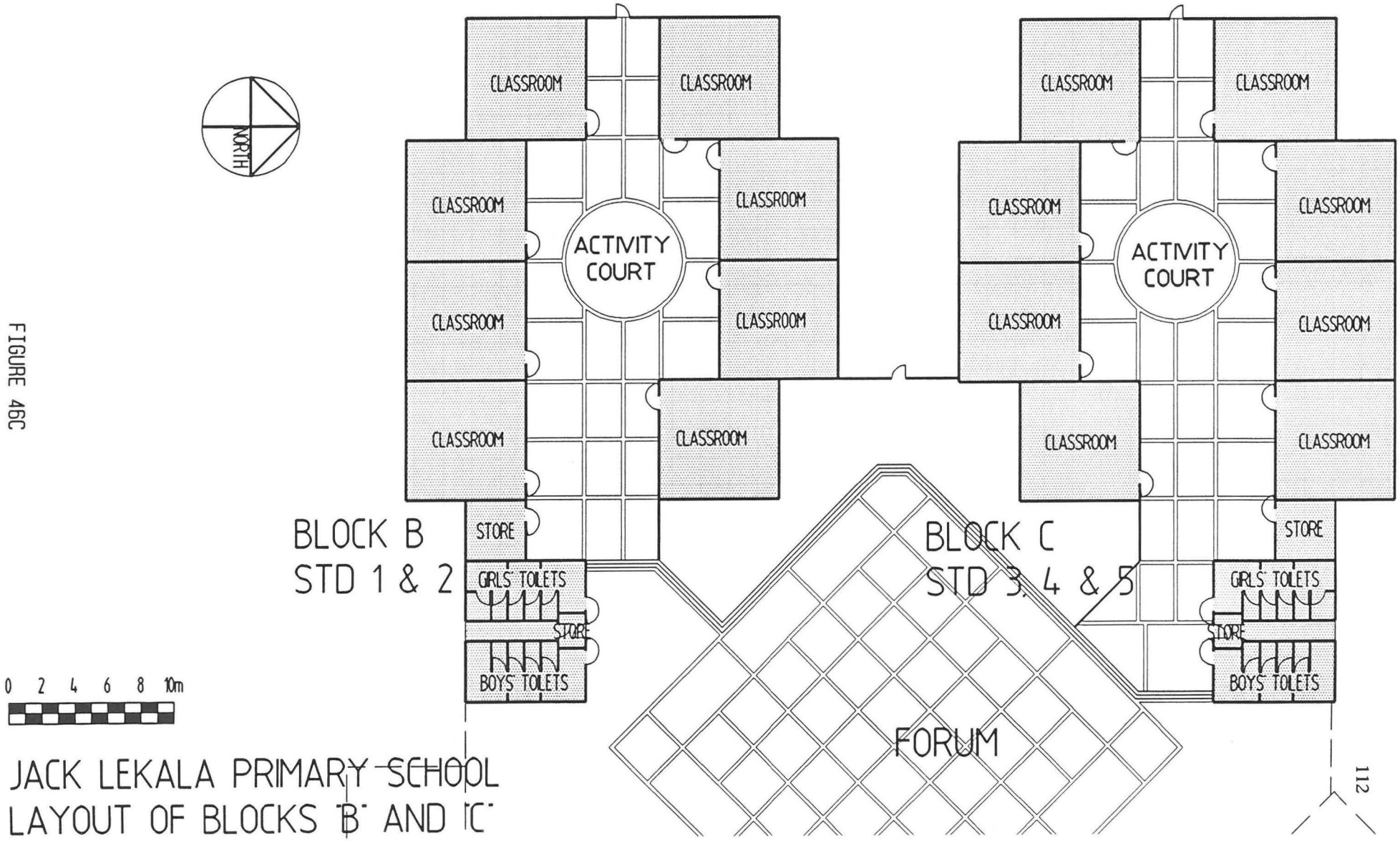


FIGURE 49B

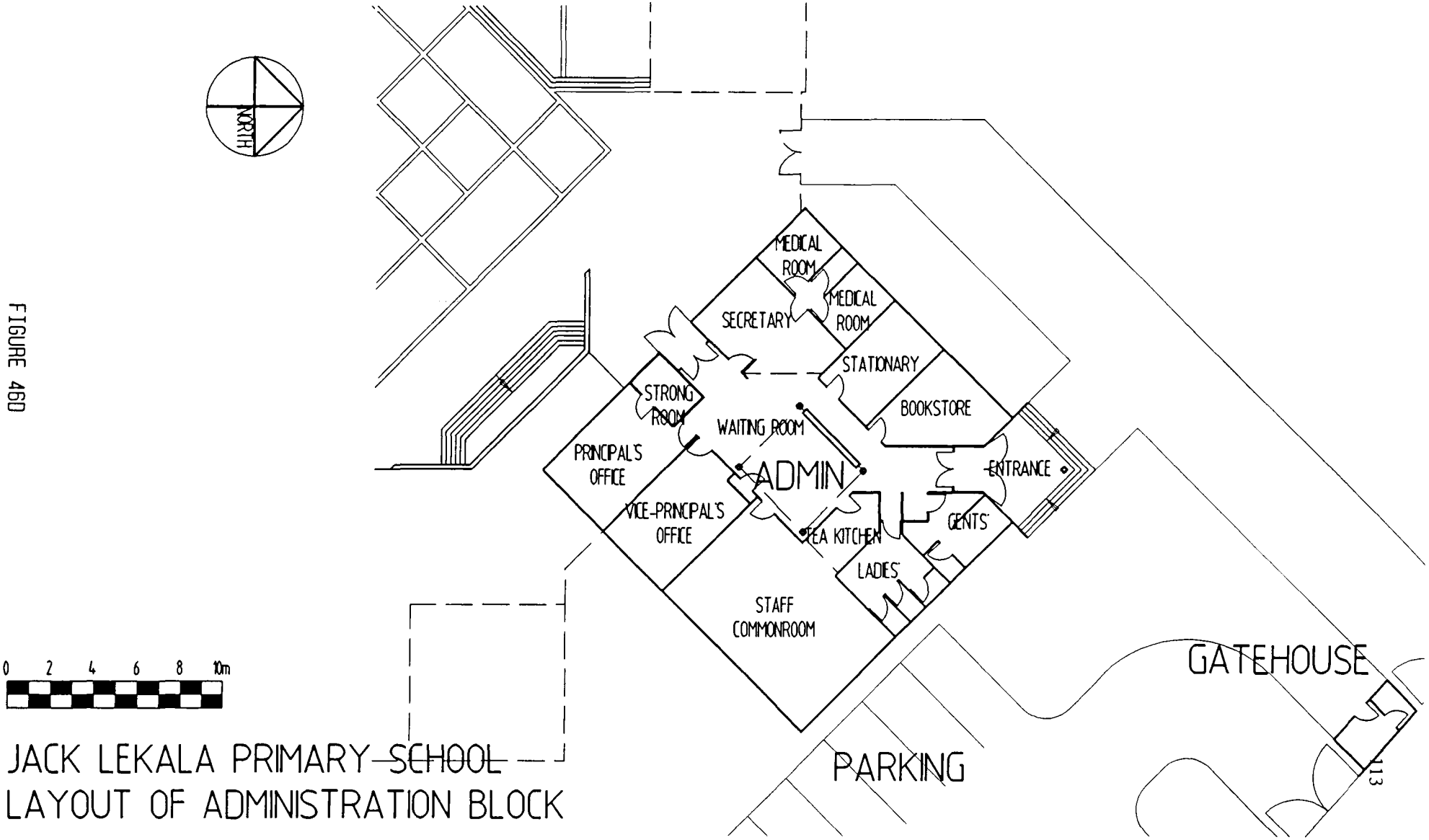
JACK LEKALA PRIMARY SCHOOL
LAYOUT OF BLOCKS "A" AND "D"

FIGURE 46C



JACK LEKALA PRIMARY SCHOOL
LAYOUT OF BLOCKS "B" AND "C"

FIGURE 46D



JACK LEKALA PRIMARY SCHOOL
LAYOUT OF ADMINISTRATION BLOCK

specification, detailing his offer, to form the basis of a "contract".

7.5.3 Some twenty Primary Schools were built under this system and to this configuration, before the practice was stopped and will remain interesting history.

7.6 In 1993, the author was again sent to Cape Town on a crisis mission, to erect four Primary Schools. To the author's horror, he found out that the intended schools were to be of the same configuration as the "squatter schools" because the "quadrangle" atmosphere was preferred by the Educators and Community, as illustrated in figure 38. This could be referred to as the quadrangle era or phase.

7.6.1 This prompted the author to design the present day accepted "quadrangle" configuration, which the Educators received with appreciation, since it was evident to them that this configuration could easily be built in two acceptable and practical phases, as illustrated in figure 29.

7.6.2 This configuration not only supports labour intensiveness, but is also suitable for a small contractor to skilfully handle, by the use of efficient subcontractors.

7.6.3 In the beginning, only the large assembly area was paved, but it is now standard practice to pave all four the quadrangles as well. The two factors, one, the difficulty for the school to maintain planted grass, and two, the placing of drinking fountains in each quadrangle, prompted the permanent, and most practical solution, of paving these areas.

7.6.4 The occasional encounter with narrow sites caused the new configuration, as an alternative, as illustrated in figure 30. Logically this reduced the number of toilet blocks from four to three. To compensate for the reduction in toilet facilities, two W.C.'s (one male and one female) were added to each block. Although this meant a few less W.C.'s in total, the total facilities provided still satisfy the requirements of the NBR. Regardless of the size of the site, the author is of the opinion that, this variation compared to the first configuration, is aesthetically and practically, a more acceptable configuration. This is merely the author's opinion, still maintaining that both are equally cost effective and acceptable.

7.7 On an extremely narrow, almost impractical, but the only available site for a school building in the Cape, Langa area, by still retaining one large quadrangle, but being

forced to accept a North and South facing orientation, a most acceptable solution was found. Complete security was made possible by closing off the two open ends with a double storey toilet block and staircase at each end. This also satisfied the toilet requirements completely. The only disadvantage really, was the unbearable cacophony in this quadrangle during the pupils lunch breaks and even, to a much lesser degree, at assembly time, before being brought to order. The usage of this configuration on later projects was subject to an increase of two metres in width to the paved quadrangle. The provision of drinking fountains was limited to two only, one at each end. Not really serious but somewhat inconvenient.

7.7.1 Where the site did permit this, the Administration Block was placed in front of the Northern block as shown on figure 31. Somehow this did seem to give the school added dignity. This may only be just in the mind of the author.

7.8 At the time of writing, these were the only types of Primary Schools accepted and permitted by the Educators. Strangely enough, these configurations are invariably acceptable to most communities.

8. LOAD-BEARING BRICKWORK CONFIGURATION

8.1 To offer even more labour intensive opportunities and at the same time giving the smaller contractor, with limited expertise and plant, an opportunity to comfortably tender on a multi-storey school building project, the author was instructed to explore this avenue with a view to producing a feasible solution.

8.1.1 After careful consideration and calculations, it was agreed to and accepted that a load-bearing brickwork structure, not exceeding two floors, would be an ideal solution.

8.2 The configuration for a Primary School on an extremely narrow site, as discussed in paragraph 7.7., would be ideally suited for this purpose. An immediate investigation by all disciplines concerned, using only DET personnel at Head Office, was undertaken and the configuration found to be feasible.

8.2.1 When, within economical transport distance from some firms specialising in prestressed reinforced concrete slabs, the 7 000mm span across the width of the classroom blocks is an economical proposition for the use of this system, and

preferably casting the access corridors in-situ, would eliminate the possibility of cracking at the thresholds, as well as the lifting or loosening of the precast terrazzo tiles on these access corridors.

8.2.2 A further advantage over single storey, is the savings on foundations and roof covering, in spite of the added costs of the reinforced floor slab over the costs of a surface bed on compacted hard core filling.

8.2.3 At the time of writing, approximately eight of these Primary Schools are in the process of construction, proving both economical and totally acceptable. See figure 31, showing the adjusted fenestration to permit the strength in the external walls affected.

9. THE NEED FOR PHASING

9.1 In 1991, the Regions were allocated certain funds for minor works, and being permitted to call for tenders locally, for expenditure not exceeding five hundred thousand rand, with the condition that all planning and documentation would be carried out at Head Office. This was to ensure, not only that the standards were adhered to, but also that the Plans Registry would continue to file a complete record of all new building work.

9.1.1 The very fact that there were, by this time, complete details of each unit block making up a full standard Primary School prompted the Regions, and one Region in particular, to abuse this delegated authority by building as many classrooms as possible, in one contract, without providing any ablution or toilet facilities, as well as fragmenting the Primary School up, into at times, as many as six phases, the last of which would be the toilet block and the Administration block.

9.1.2 This, of course, was most unsatisfactory and unacceptable. When this was discovered, the Educators at Head Office realised that this state of affairs must not continue and requested solutions.

9.2 This was a wonderful opportunity to solve more than just the one problem. From day one, the author was distressed by the fact that, in the past, all schools were not provided with administration facilities. With an indisputable motivation, well

concealed as a personal issue, this lack would now become past history.

9.2.1 Figure 6 illustrates clearly how the Admin. block would always be included in phase one. Phase one was then decided on to include; The Admin. Block, being Block "A" plus blocks "B", "C", "D", "J" and "K" as well as the complete fencing, the entrance walling and gates, as well as the paved parking area. Obviously the quadrangles "1" and "2" would be paved and complete as detailed. It will be observed that the garden store and labourers ablutions are purposely included in phase one.

9.2.2 Not only was it decided that there would be only two phases, but that phase two should follow within two years after completion of phase one.

9.2.3 As can be observed from figure 29 phase two, completing the primary school buildings, consists of block "E", "F", "G", "H" and "I" including paved quadrangle "3" and "4" complete in all detail, plus the paved, main assembly area.

9.3 This was not only a sensible decision but popular and well received by the communities, very certainly making it quite clear to the communities that, although the available budget would be thinly spread, it would not be in such a way as to ignore their dignity.

10. POSSIBLE FRAGMENTATION OF UNITS

10.1 The introduction of the "RDP" by the new South Africa and the new "Government of National Unity" insisting on the full application of the "RDP", all avenues had to be explored for the exploitation of the "RDP".

10.2 The focus is directed at the argument that Education in South Africa has, to a large extent, been denied to the underprivileged majority of the school-going children. This would have to come under intensive scrutiny in order to find a satisfactory and acceptable remedy. The National Budget, therefore, must continue to give Education in general and the provision of school buildings, in particular, a high priority. This is what it is doing.

10.3 Primary School Buildings must be an obvious target since, neither phase one or two, exceed R2m for the complete erection and is, furthermore, split up into easily

manageable units. It must be pointed out, as a matter of important perception, that it is not only the provision of the physical needs of a school that will limit the budget but the maintenance of the school buildings, and the permanently ongoing costs of administering the schools, that must be carefully considered before determining and finalising any annual budget.

10.3.1 It is the cost of annual maintenance, that demands absolute cost effectiveness in providing the school buildings and, a very big plus, the fact that it is fatal to let savings on finishes and other so called, lesser essentials, to become an obsession, and were warned that this had happened, all too frequently in the past.

10.4 It would be foolish to even try and argue against the fact that a Primary School, especially phase one, can be used in the RDP, and to good effect if the approach is correct.

10.4.1 Consider phase one. Blocks "A", "B", "C" and "D" can each be undertaken by separate entrepreneurs as well as blocks "J" and "K" combined, by an individual entrepreneur, with all the entrepreneurs under the control and guidance of a single project manager or management body, which would also be responsible for the initial "setting out" of the buildings and the relevant outstanding "site works".

10.4.2 This is a very logical approach. The author has already suggested this in various quarters and remains convinced that it can be successfully applied.

CHAPTER VII - THE SECONDARY SCHOOL

1. THE EFFECT OF THE CURRICULUM

1.1 Unlike primary school education, in which all schools follow one set curriculum, secondary schools can offer a wide variety of "packets" to the students who wish to follow different courses in their post matriculation or Junior Certificate (Std. 8) years.

1.2 The secondary schools choice of curricula is decided upon by the local schools governing bodies, taking into account the particular requirements, at the time of building, of the students in the immediate vicinity or, in the case of an undeveloped township, the local educational area management will analyze the expected type of influx and decide accordingly.

1.3 The choice of "packets" to be offered and the projected curriculum and estimated student choice has a very definite effect on the types and numbers of the specialist teaching areas.

1.4 There are various schools of thought, amongst the architects in particular, and a few educators, as to what approach should be taken in the design of a secondary school. Only two main schools of thought will be discussed in this study.

1.4.1 The first school of thought to be discussed, can be referred to as "The Curriculum Approach". In this approach the designers (architects in association with educators) require to be advised about the different "packets" offered, the curricula to be followed and the estimated percentage usage of all the required specialist areas.

1.4.2 With this information, the architect in collaboration with the educators and the elected Principal, will proceed to design the school in such a manner as to permit the easy flow of students, and teachers where applicable, to move from teaching area to teaching area in the shortest possible time and with minimum inconvenience.

1.4.3 It is obvious that this approach will create the necessity for each new secondary school to be individually designed with the inputs of all concerned, except the students, at that particular time. It is clear that the elected Principal will have the most prominent effect on the positioning of the teaching areas since it is his task to

formulate the schools roster each year which, in itself must be influenced by student influx and choice of "packet".

1.4.4 Clearly, this approach will always be time consuming and subject to the accommodation of quite a few unpredictable variables such as, percentage usage, shift and change, change in student "packet" choice with changing times, change in community requirements in all the attendant fields and most of all, the inevitable change of Principal and teaching personnel with an entirely different approach to roster formulation and adaptation.

1.4.5 One of the disadvantages has already been discussed in chapter V, paragraph 2.7.2, with the extract from Cocking (1963, p. 75). The second most important disadvantage in the present South African scene where, because of the backlog in school buildings provision and the urgent need to take education to the, hitherto, underprivileged majority, time is of the essence.

1.5 The second major school of thought is, the analyses of the various areas that go to make up a secondary school complex, regardless of curricula, and try to group them in separate entities. This is the approach opted for by the DET Professional Services Component from the very outset, since it was evident at that time in 1983 that, not only would time be of the essence, but also that calculated crisis management was imminent.

1.5.1 This would be known as the "Grouping Approach" as adopted by the DET, and will be discussed, in detail, in this study, also mentioning, where prudent, the source and weight of the criticisms over the years.

1.5.2 In spite of the adverse criticisms, considered only for the very few positive suggestions, it is the considered opinion and a proven fact that, at this point in history, the crisis at hand and the limited budget as well as the assistance of a relatively small group of dedicated professionals, the DET Directorate: Building Services, achieved remarkable success.

2. THE FIRST SECONDARY SCHOOL

2.1 The first secondary school visited in 1983 was the ITEMBILIHLE Secondary School in New Brighton, Port Elizabeth. This school building was nearing completion but

at that late stage the then Minister of Education and Training agreed to provide this school with an assembly hall, capable of staging school concerts and plays on a small and simple scale, and to seat approximately five hundred people.

2.1.1 No school hall had previously been built for DET, so it was accepted as possible to use the tried and proven school assembly hall as provided for in TED schools in the old Transvaal. Naturally, documentation was immediately available as illustrated in figure 47. This assembly hall was built on the site (figure 24) complete in all its detail, and the Department even provided all stage and other curtaining, by including a substantial provisional sum in the documentation. Subsequently, some six such halls were built on various school sites in the Cape and Transvaal Provinces for the DET.

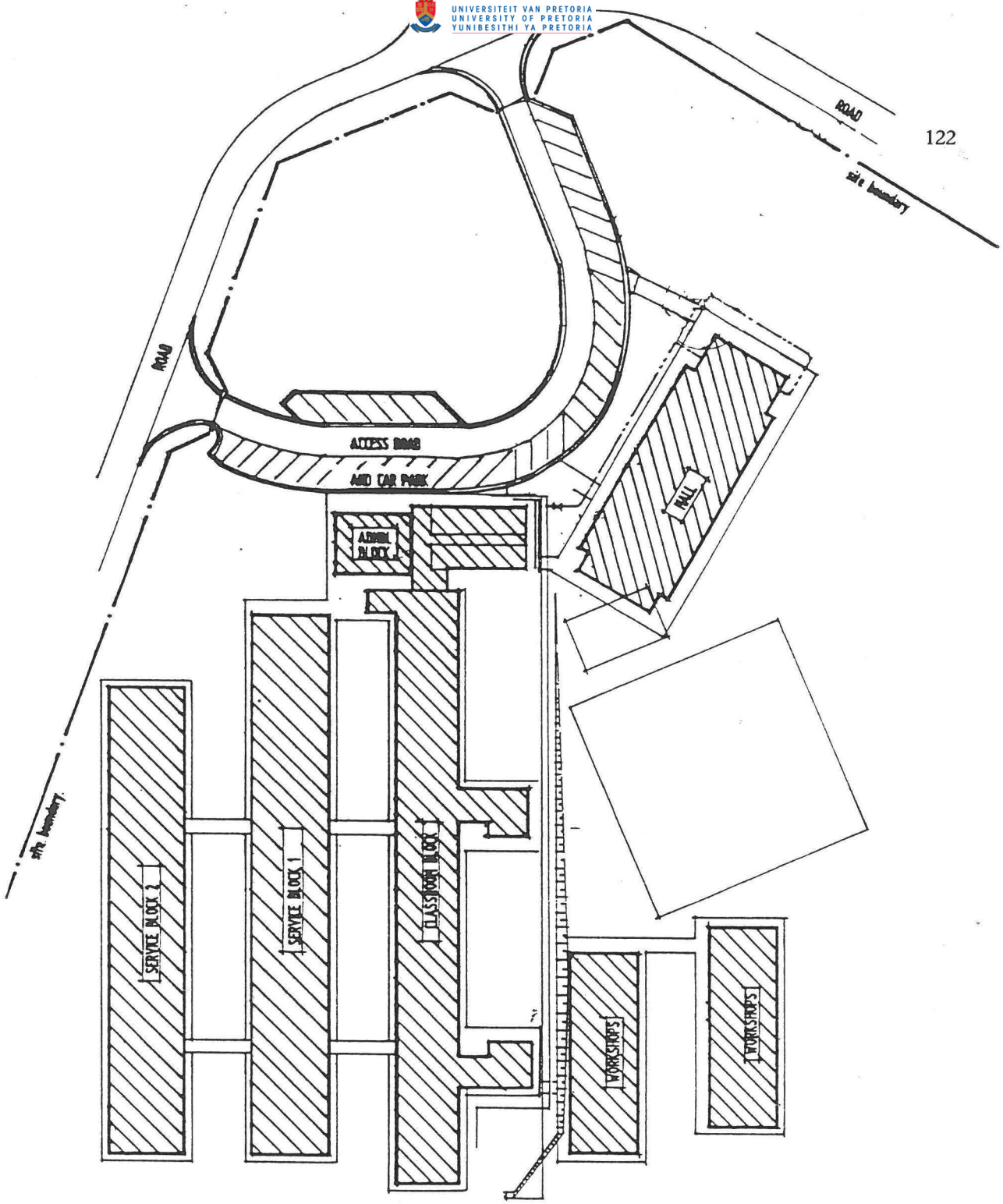
2.2 The school design and practical implications were carefully studied to obtain a "feel' for the direction to be followed in the new designs. Figure 47, illustrates how the school was designed and built.

2.2.1 In all fairness, the school building did impress from the point of view of the standard of finishes and accommodation provided. This design did give the new professional team a sound basis from which to develop, in subsequent stages, a successful standard secondary school being subject to a few experimental changes and adaptations.

2.3 The exercise was to analyze this school design absolutely objectively, with a view to standardisation without detracting from the effectiveness, from an educational point of view.

2.3.1 Although a secondary school is far more complex than a primary school, the principle of dividing the sections (blocks) into separate units of like areas was still the correct and logical approach.

2.3.2 Because of the necessity to, not only shorten the design and documentation time frame, but to commission many teams simultaneously in all parts of the Republic. The object would be to endeavour to have as many schools built and occupied in the shortest possible time, always within the restraints of the budget. This had to be achieved without lowering the standard of finishes and accommodation requirements and without fear of immediate complaints or opposition. We would be heading for a disastrous repercussion, if we fail to satisfy the various communities' expectations.



SITE LAYOUT PLAN : CLASSROOM BLOCKS, WORKSHOPS, ADMINISTRATION AND HALL

ITEMBELIHLE SECONDARY SCHOOL : NEW BRIGHTON, PORT ELIZABETH

NORTH

SCALE 1:500

FIGURE 47

harlech-jones architects

P O Box 5838, Walmer 6070. Tel 515571 (041).Fax 515999 (041).
Co. Reg No. 9602384/07

2.3.3 Ignoring the political issue and facing facts pragmatically, the obvious solution to the problem was to immediately set about working on acceptable standardisation whilst also improving, the hitherto, unacceptably low standard of finishes and inferior approach towards building "schools" and not just classrooms.

3. TOWARDS STANDARDISATION

3.1 Having successfully standardised the primary school, it would now be a simple matter to follow the same process, reduce the experimental buildings down to a minimum, analyze the "like areas" and treat the entire exercise as an architect would approach a competition.

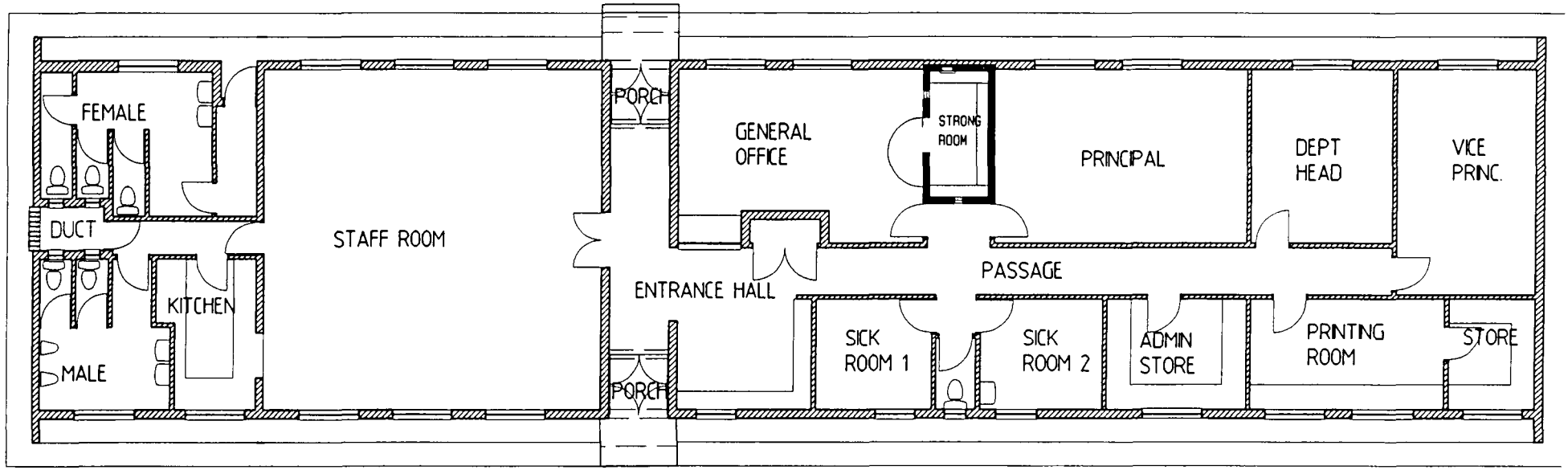
3.2 The initial analysis was made and, for a start, the following sub-divisions were arrived at:

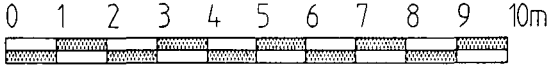
(i) Administration Block
(ii) Library and Audio-visual unit
(iii) The Assembly Hall
(iv) Normal Teaching areas
(v) Specialist instruction areas
(vi) Student support and Services Block
(vii) Site Development

These units must be discussed in a little more detail, to throw light onto the present final secondary school configurations.

3.2.1 **The Administration Block**. The administration block was taken through several stages of development to accommodate the cost effective requirements as well as the basic accommodation requirements. Figure 48 illustrates the very first interpretation of the desired accommodation schedule, based very much on the lines on the TPA secondary school administration block for White schools. Figure 49, illustrates the adaptation to accommodate the requirements of a "Day and Night school". The "Day school" being a normal secondary school and the "Night school" being for Adult Education, using the same classroom facilities but under the direction and administration of separate Principals and Teaching Personnel. Figure 50 shows the first attempt at rationalisation and Figure 11 illustrates the finally accepted administration block which is exactly similar to that of the Primary School except for the size of the "Staff Room". The Secondary School, obviously being the larger of the two.

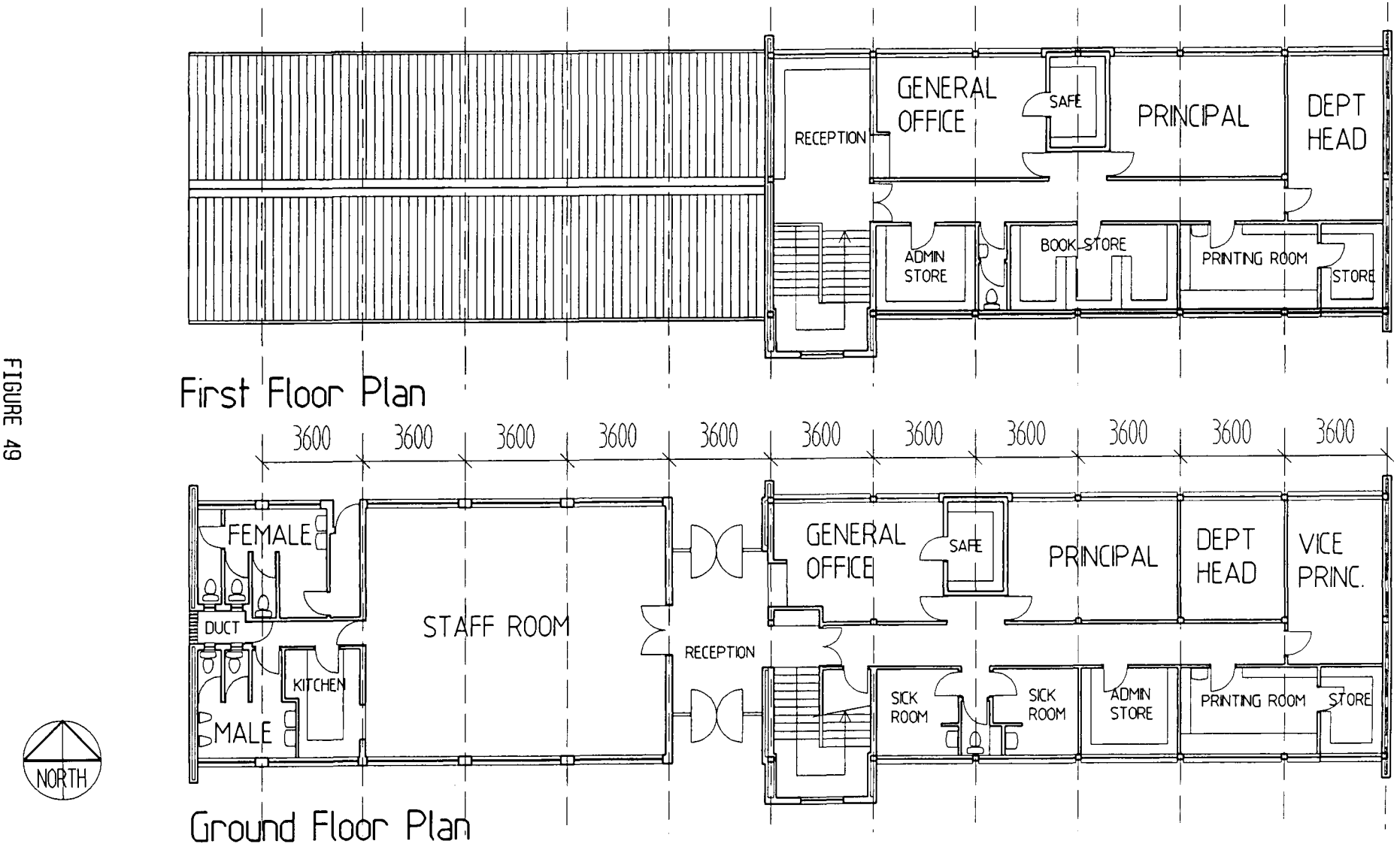
FIGURE 48





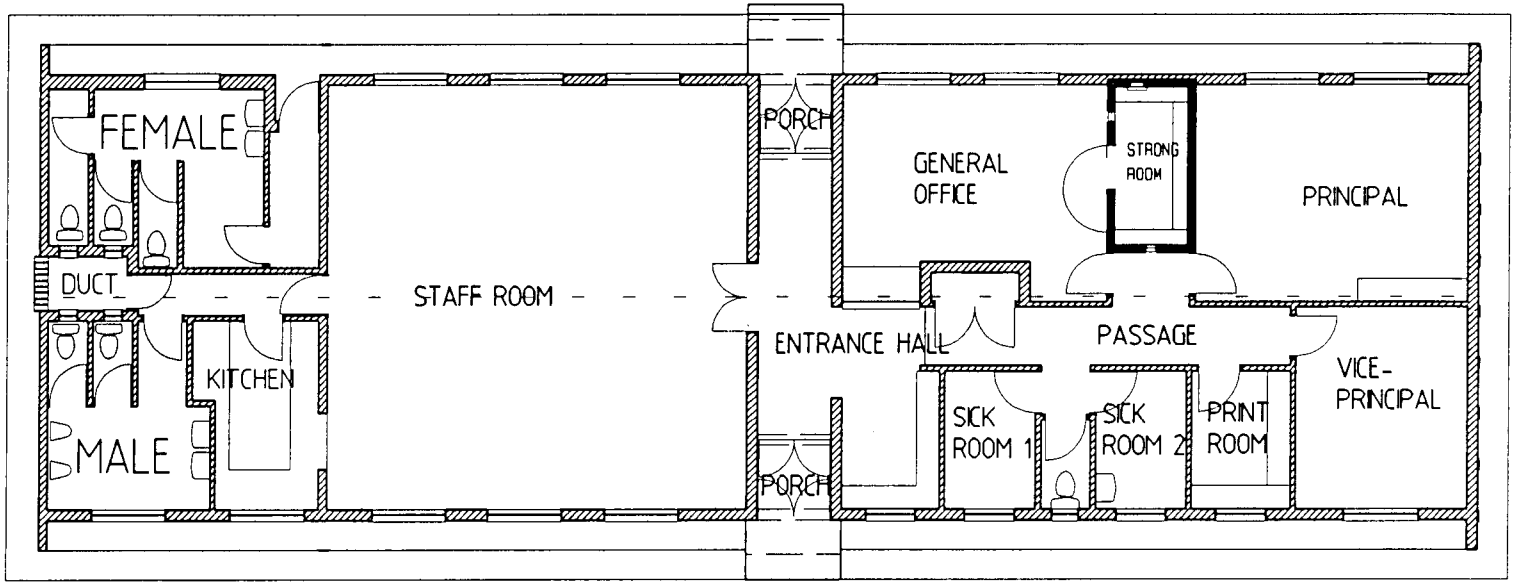
VERY FIRST SECONDARY SCHOOL ADMINISTRATION BLOCK

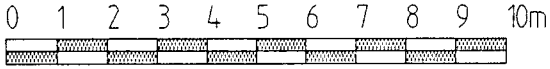
FIGURE 49



STANDARD DAY & NIGHT ADMINISTRATION BLOCK SCALE 1:200

FIGURE 50





ADMINISTRATION BLOCK WITH TOILETS AT END

3.2.2 The Library and Audio-visual Unit. Because of the need for quiet and the need for queuing space at the book issue store, it was thought best to isolate the entire unit as illustrated in figure 51, placing the unit between the administration block and the first classroom block. In this way it would also create a useful space for the future assembly hall as illustrated. However, the low utilization factor, the relatively high costs of the free standing block, and the need to shorten the distance between the administration block and the service block gave cause for concern. The instruction was to find ways and means of including this entire unit into one of the classroom blocks, with the suggestion that the library could be housed in the same space as a GP classroom. Architecturally and from a practical point of view, 7 000mm width was found not good enough for the library. As illustrated in figure 23, the solution was to place the library at the one end of the specialist classroom block, always on the top floor in order to eliminate all intermediate columns. Although, in time, a full media centre must be provided, this solution to the library, audio-visual unit, functions very well indeed, without appearing to be a compromise.

3.2.3 The Assembly Hall. Although an assembly hall has been provided at a few secondary schools and may only be provided with Ministerial approval, it is still considered as a "nice to have" and, for economic reasons only, not a "must have". Nevertheless, it will always be an integral part of a complete secondary school, and, for this reason, space must be allocated for the provision of an assembly hall on the site. Since the library was free standing with a wide covered walkway passing in the front of the entrance foyer, it was obvious that the correct placing of the assembly hall, would be on the opposite side of this walkway, which would become a covered entrance link, as illustrated in figure 52. This illustration also depicts the hall design, which is an exact replica of that provided at the white secondary schools in the old Transvaal.

3.2.4 Normal teaching areas. A normal teaching area is the description given to a standard classroom of fifty square metres as illustrated in figure 7. It was clearly understood that a full size secondary school would never be provided with less than thirty two ordinary classrooms. After due consideration, it was found prudent to place a three storey classroom block, immediately after the administration block of the length, for practical reasons, not exceeding twenty four modules. To be included in this block would be as many ordinary classrooms as possible with the inclusion of the required amount of general stores, Heads of Department units and sufficient toilets to cope with the expected number of pupils. Figure 53, illustrates the final

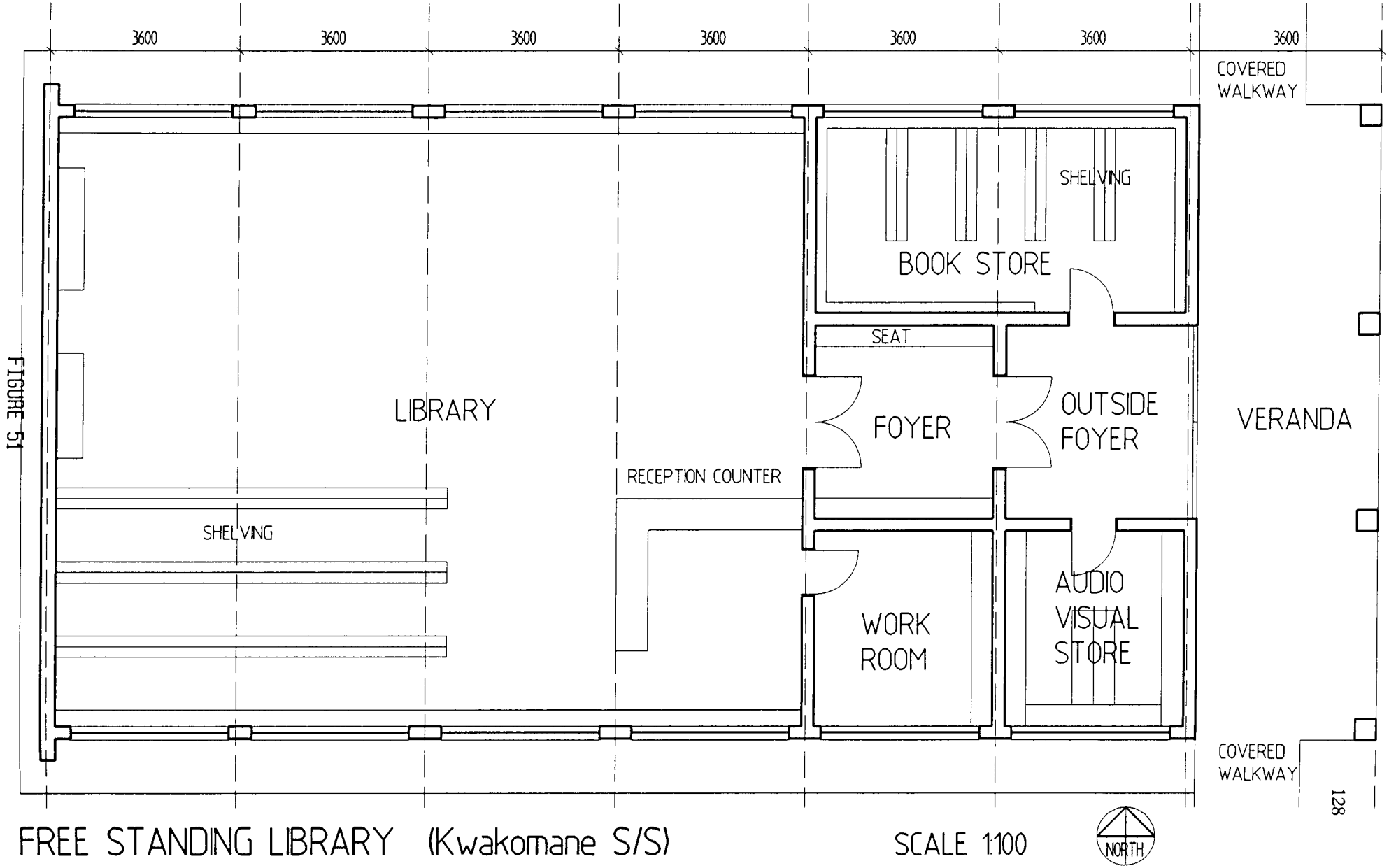
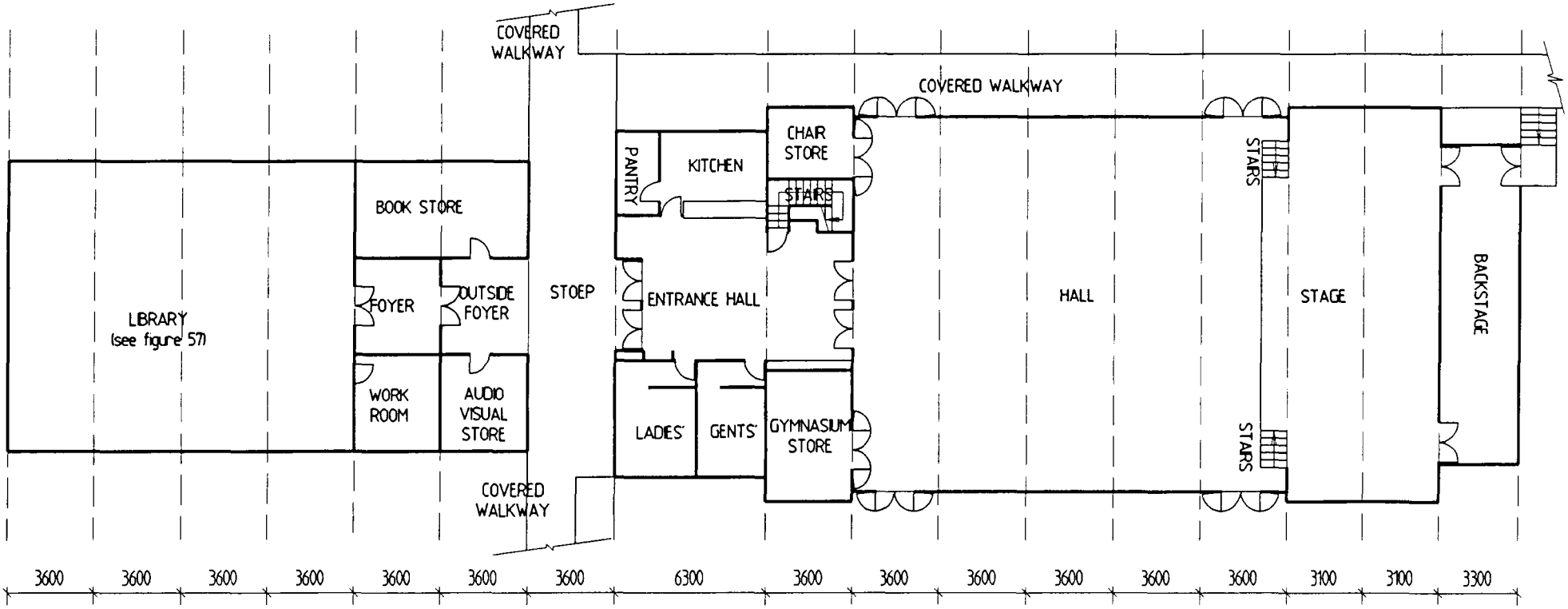


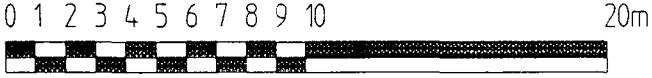
FIGURE 51

FREE STANDING LIBRARY (Kwakomane S/S)

SCALE 1:100

FIGURE 52





COMBINATION LIBRARY AND HALL LAYOUT

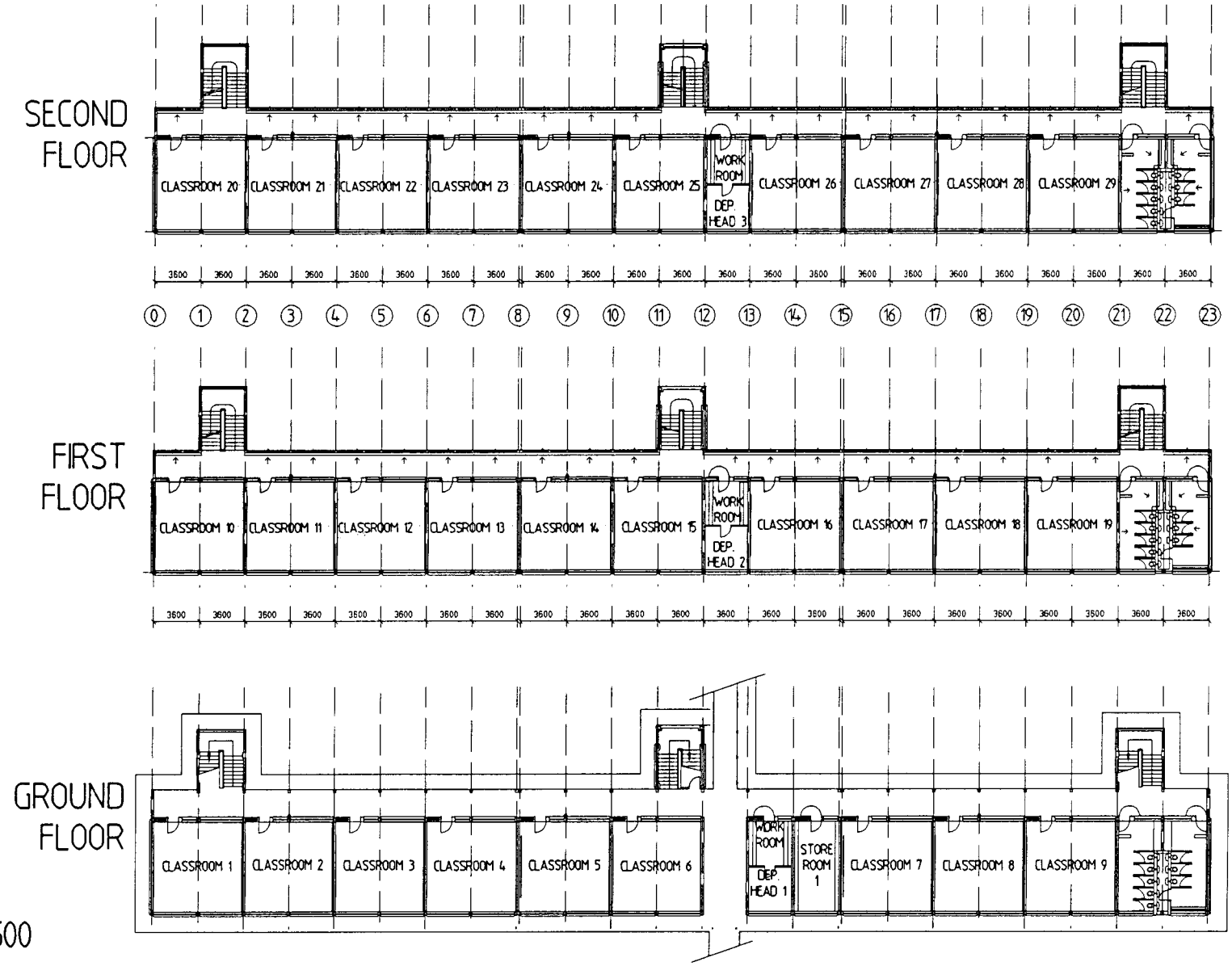


FIGURE 53

SCALE 1:500

BLOCK "B" SHOWING MODULES

composition contained within twenty three modules, providing twenty nine classrooms, three Heads of Department units, one general store, one standard toilet block on each floor, the necessary access corridors serviced by three staircases, (one closed and two open) each with a cleaners cupboard under the staircase landings. In all configurations this classroom block, to be known as block "B", would remain unaltered.

3.2.5 **Specialist instruction areas**. These areas are those in use for specialised subjects such as, Typing, Cookery, Needlework, Technical Drawing, Physical Science, Career Guidance, Various Laboratory subjects and also Library instruction.

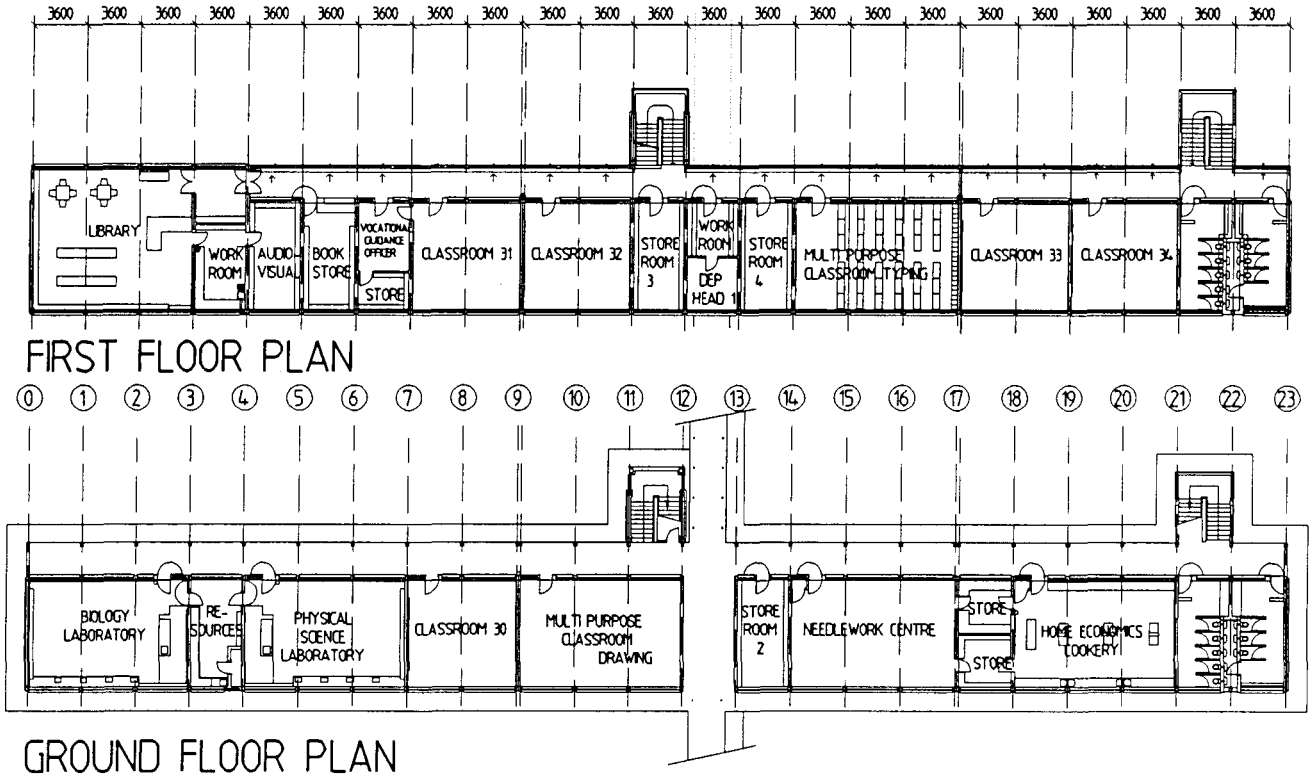
3.2.6 Most of these subjects are included in differing curricula and, as such, must be treated as the variables in the final accommodation schedule of any particular school. To determine which of these variables must be provided in any one particular secondary school after the curriculum, "packets offered" and intended number of pupils have been decided upon, the component "Physical Resources Planning" of the Chief Directorate: Planning (Educators) must run a "norms analysis" which results in determining the complete schedule of accommodation for a given secondary school.

3.2.7 It is a logical conclusion to accept that all, where possible, of these specialist units must be provided for in a single block. The Architectural Services proceeded to investigate this, as well as, bearing in mind that, with only twenty nine classrooms in the three storey block "B", five more ordinary classrooms will have to be provided for. A full secondary school which, had already been determined would make up for a total of thirty four ordinary classrooms. Even basing, the pupils to teacher ratio, on a generous thirty, there should never be more than thirty four ordinary classrooms required, but more than likely, thirty two would suffice.

3.2.8 Starting with the Library, Audio-visual and Book Issue unit, fixed permanently at the one end of the top storey of a double storey block with the same number of modules as block "B", the exercise was very simple indeed.

3.2.9 With the fixed unit described in paragraph 3.2.8, using one classroom to interlead with the Vocational Guidance officer and placing suitably the remaining four classrooms, the rest was routine. As illustrated in figure 54, by so placing the remaining three general stores, and one Head of Department, space was left for at

FIGURE 54



NORTH

SCALE 1:500

BLOCK "C" SHOWING MODULES

least five GP instruction areas and two specialised stores. This configuration will satisfy most secondary school types. Should additional special instructional space/s be required, these will be added to the Service Block as illustrated in figure 15.

3.2.10 The value of this approach to the configuration of a given secondary school can only result, if and when necessary, in the adjustment to block "C", with the possible addition of units to the Service Block.

3.2.11 With this standardisation approach, the maximum time required from briefing to tendering, is three months. With the use of an existing set of documents that suit the particular requirements this time frame, has often been reduced to four weeks. This has very often been of great assistance during many unexpected crises.

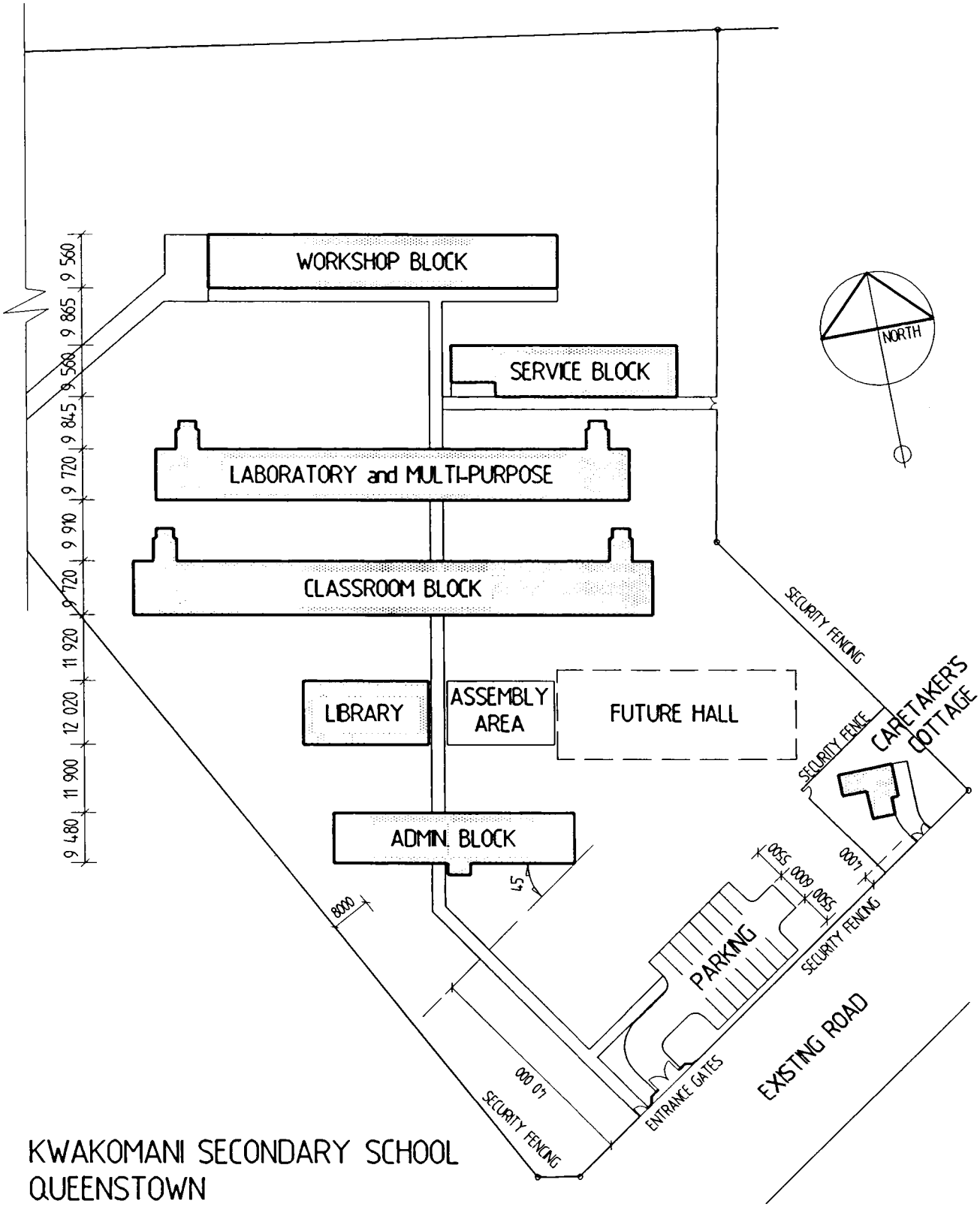
4. THE PROTOTYPE

4.1 It was the "Kwakomani Secondary School" which fate decreed the first school which the author had the opportunity to design in 1984, and put his theory to the test. To add to the completeness of the test and the success of the underlying theory described in the whole of paragraph 3, this secondary school was not only a "Day and Night" school, but also a full "Comprehensive School". A Comprehensive School, is a Secondary School with workshops attached for the elementary training as a prelude to, as well as a supplement to, an apprenticeship in a recognised trade.

4.2 Figure 55, clearly illustrates the successful application of the theory of grouping like areas to form an effective teaching complex. It is from this very configuration designed and built as illustrated, that progress was made to the present day accepted configuration.

4.3 The success of this prototype will be demonstrated in the systematic developments and logical changes and adaptations leading to the configuration commonly referred to as "The type "D" secondary school".

4.3.1 This school was repeated exactly as is, in the nearby town, Stutterheim. With its seven GP instruction areas, special woodworking centrum, workshop block and free standing Library unit, the Department, to this day, has not, again, built such a large secondary school. The buildings are not white elephants and did serve a valuable purpose as a functional base from which to progress to smaller, in overall area only,



KWAKOMANI SECONDARY SCHOOL
QUEENSTOWN

SITE PLAN Scale 1 : 1000

FIGURE 55

but equally effective secondary schools to this day.

4.3.2 These designs were not accepted without criticism. The main criticism being that they were luxurious and should be more austere. For years, the author ignored the "luxury" criticism, often disheartening. It is ironic that today, in the "emancipated South Africa", these tongues have been stilled. The only just criticism, and that came from the author, is that the complex was far too large for even the most senior Principal to successfully control and administer. This was recognised and administratively solved.

4.3.3 It is as well, at this stage to discuss each unit, separately to illustrate the logical changes brought about that lead to the latest accepted schedules of accommodation and configurations.

5. THE ADMINISTRATION BLOCK

There is no doubt that the "Kwakomani" Administration Block was too elaborate for its day, and possibly providing this elaborate administration block at that stage of the Black township development, was somewhat embarrassing to the user. It is comforting to have seen the adaptation to this sudden elaboration, to move forward successfully, so that, today it is fully and functionally utilised.

5.1 The stages will be described rather than fully illustrated. The "Day and Night" usage has been phased out, thus the emphasis will be placed on the single storey "Day" school Administration Block as illustrated in figure 48.

5.2 The most important development to follow is from figure 48 to figure 49, which illustrates a more rationalised size unit. The final development is, when some of the end users felt that the toilet facilities should not be approached through the staff room. This lead to two final changes, the re-locating of the toilet facilities and the narrowing of the entrance hall, all as illustrated in figure 11. This design has one definite advantage, that of an open ended staff room, which will easily permit of its enlargement at some later stage.

5.3 It must be mentioned that the Administration (Admin) Block has been purposely designed with the Entrance Hall permitting access from both sides, in order to eliminate the necessity ever of having to mirror this unit.

6. THE MEDIA CENTRE

6.1 The free standing unit as illustrated in figure 51, did not have a long history for various reasons. The main reason being that

(i) It created an undesirably long distance between the admin. block and the main body of the school.

(ii) It had a low usage factor

(iii) Because of the restrictive budget, it was far too large, requiring at least ten years to stock with suitable books and

(iv) the high cost factor definitely ruled it out, as a free standing unit when, in 1987, the economic purge began in earnest.

6.2 As previously discussed, the Library, Audio-visual and Text Book Issue store was moved, as a unit, in a single action, to the end of an upper floor in the specialist multi-storey block, or at the end of a unit in a single storey complex as illustrated in figure 23.

7. THE LABORATORIES

7.1 Prior to 1983 there not only were too many laboratories built but, it appeared to be that there was a definite lack of communication between the Subject Advisers at Head Office and the end users at the schools.

7.1.1 On a study tour, it was found that the purely academic Subject Advisers insisted, not only on many different types of laboratories, but all, far too elaborately equipped and furnished, even to the extent of requiring a centrally placed gas supply store, complying with the Industrial Act. Where gas bottles were requisitioned (some principals did not even know, or even advised, where and how to obtain gas) very little of this gas was used for experiments.

7.2 Figure 56 illustrates the extent of the elaboration of fittings, bearing in mind that few classes exceeded ten pupils, in number. The first positive step was to reduce the number provided in each school, from some five in a few instances, to the bare minimum of two in other rare instances.

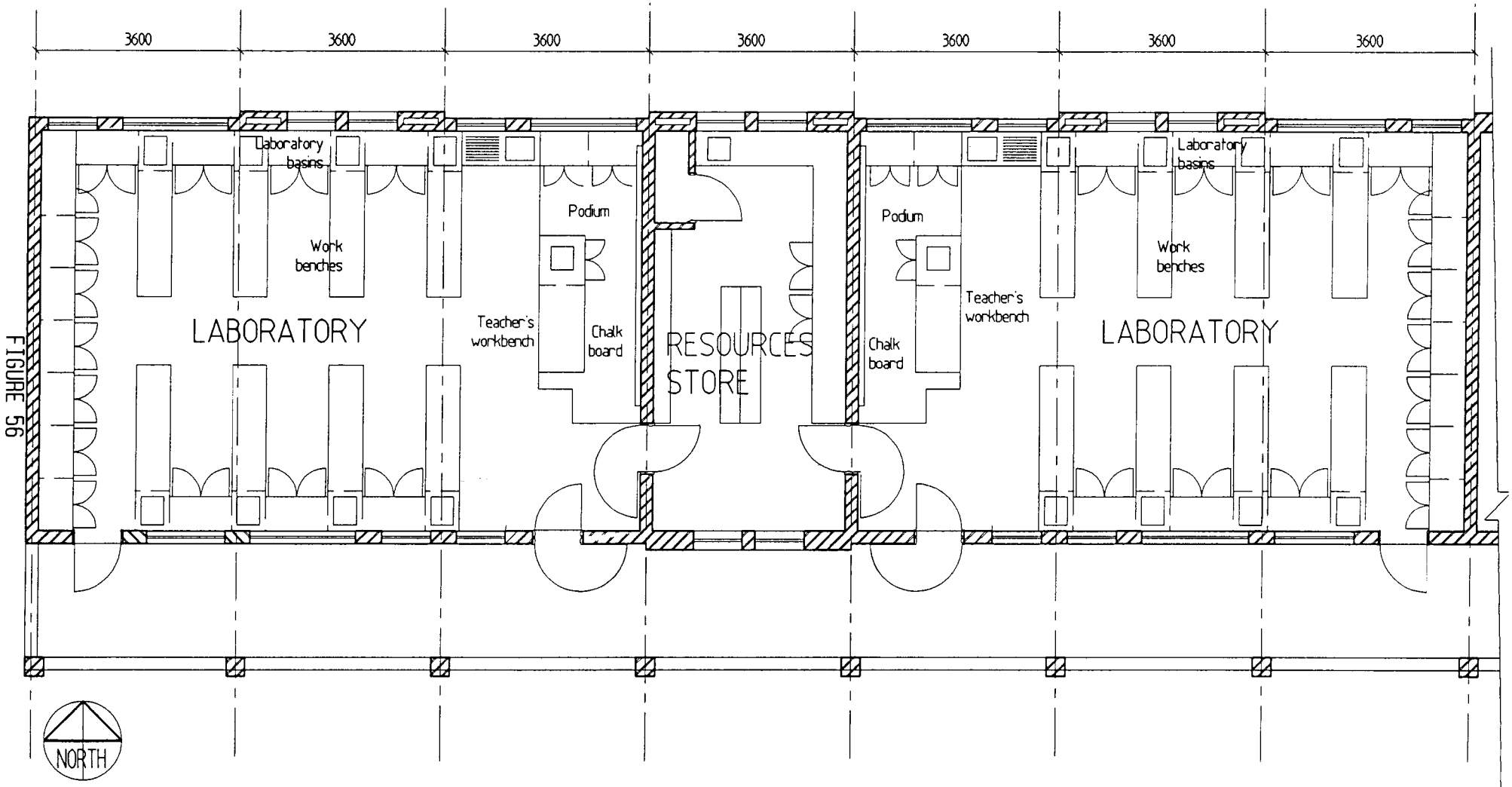


FIGURE 56

SCALE 1:100

ORIGINAL FULLY EQUIPT LABORATORIES

7.3 Figure 10, illustrates another step forward, in reducing the amount of fittings without affecting the standard of tuition.

7.4 Figure 10, also illustrates the ultimate in economy where all laboratories provided would only be "Demo labs".

7.5 After a few isolated complaints, the economy laboratories as illustrated were agitated for, with the result that, at the time of writing, both "Demo labs" and "economy labs" are provided with a severe restriction on the number provided. This is sensible, since, when both funds and increased usage dictate, then these laboratories can easily be upgraded.

8. NORMS AND THE SCHEDULE OF ACCOMMODATION

8.1 The "Space and Cost Norms" as applied in 1983, although not yet mandatory for secondary schools, was adhered to strictly, each school being given to a private consultant to apply the "The Norms analysis" from which a schedule of accommodation is processed.

8.1.1 In 1987, a thorough investigation by the Physical Resources Planners, was undertaken to trim where possible. From this investigation, a software program was developed. This program introduced the correct data of curriculum, percentage usage and number of pupils expected. These data were processed and gave the answer in the form of a "Schedule of Accommodation" in user friendly proforma format as illustrated in Appendix "L".

8.2 No briefing of consultants or attempts at designing is undertaken until this signed "Schedule of Accommodation" plus the "P.T.O", Permission to Occupy (site) is received from the Physical Resources Planning unit. This is the only final authority to proceed with design and documentation.

9. THE FINAL TYPE "D"

9.1 The only recognised multi-storey, multi-specialised block, configuration that is accepted, at this point in time, is known as the "Type D" secondary school as illustrated in figure 32. With "Block C" being the block to adapt for the variables and, if and when there is an overflow, this is added to the open end of "Block D".

10. THE NEED FOR PHASING AND THE TYPE "F"

10.1 In 1993, the need for phasing, not only primary schools, but secondary schools as well, became an urgent and important consideration. This was so, not because smaller schools were becoming necessary, but because it became necessary to try and make a substantial start on more secondary schools than what the budget was catering for full secondary schools. These are to be upgraded to full secondary schools as soon as financially possible.

10.2 Although one attempt was made to phase the "Type D" secondary school as figure 57 illustrates, it was not really a proposition unless the completion (final stage) followed almost immediately. An acceptable and practical alternative just had to be found, and in the shortest possible time.

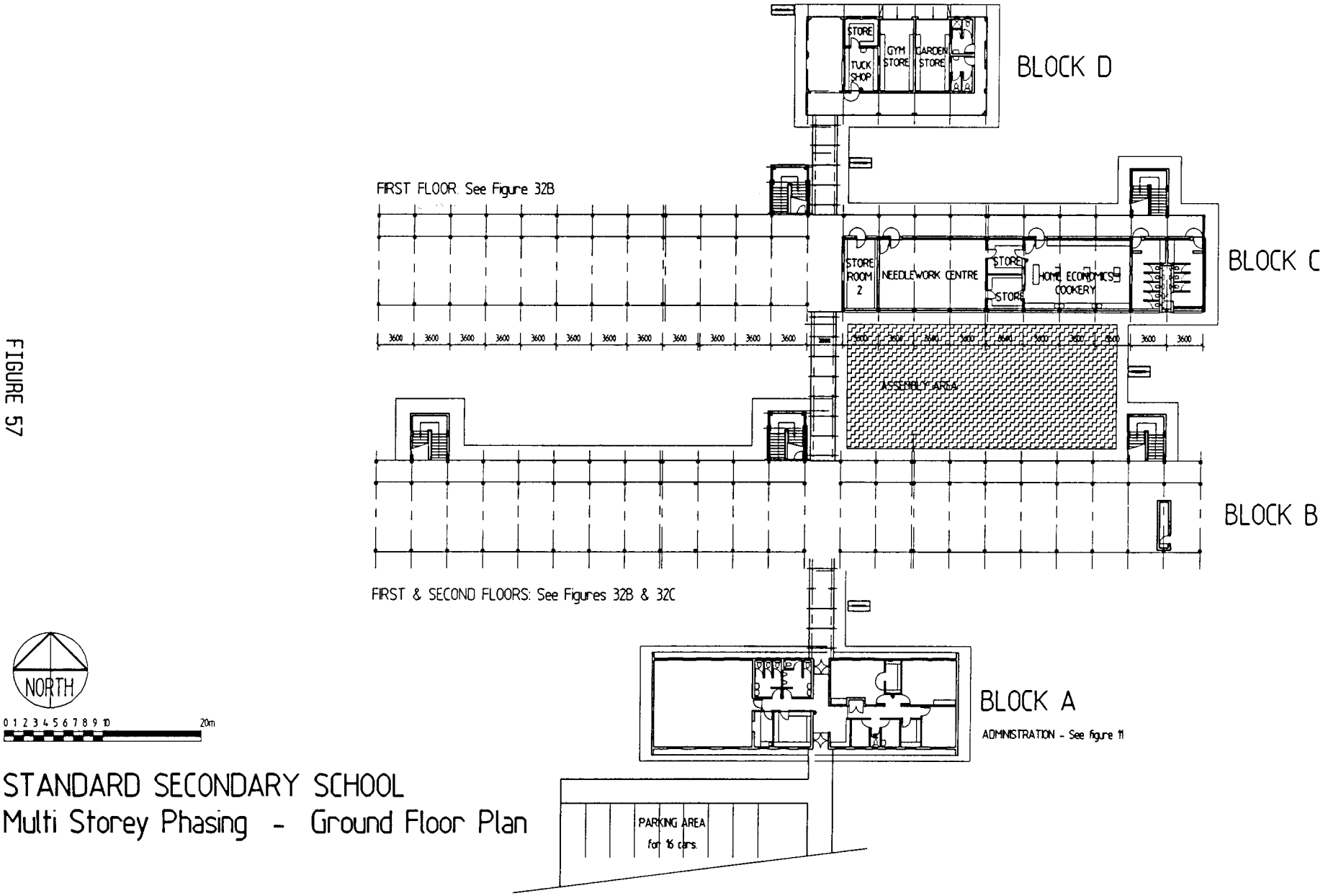
10.3 The intelligent approach was to look at the double storey, load bearing brickwork, primary school, already tried and proven, to find a lead.

10.3.1 Staying on the 3 600 module and placing the admin. block on the one end of the classroom block but not attached to it directly, a solution almost jumped at us. It meant again, that the one block would be best utilised solely for the accommodation of ordinary classrooms and two Heads of Department only.

10.4 Figure 34, illustrates the phase one, Type "F" secondary school, so named because it consisted of blocks "A", "B", "C", "D", "E" and "F", limiting this phase to, twenty two ordinary classrooms, six GP classrooms, four Heads of Department (full complement), four general storerooms (full complement), two special stores (full complement), the complete library, audio-visual and book issue unit, the full service unit and the complete Administration Block with the connecting link, between blocks "E" and "F", to whatever accommodation would be required to complete this school, in this future extensions block.

10.4.1 If the number of expected pupils will probably not be in excess of seven hundred and fifty (Most unusual and only when the secondary school starts with an intake of standards six to eight initially), then block "F" can be omitted (to be added within two years of completion) and this trimmed phase "F" is known as Type "E", as illustrated in figure 34.

FIGURE 57



STANDARD SECONDARY SCHOOL
Multi Storey Phasing - Ground Floor Plan

10.5 The entire structure has been designed for load bearing brickwork for the sake of cost effectivity as well as creating the possibility of such a structure to be put out to tender along the lines of the "RDP" policy.

10.6 The improved security aspect of the Type "E" or "F" secondary school, at this time of excessive violence and consequent vandalism, has made the choice of this configuration somewhat more popular than anticipated.

11. SITE DEVELOPMENT

11.1 Except for indicating on the sketch design, site plan, the feasibility of developing sports facilities when funds permit, playing fields are purposely excluded at the school building stage. However, if the nature of the site permits, then a small amount of grubbing up and bulldozing is permitted.

11.2 Entrance paving and a paved open parking area for sixteen official motor vehicles is provided with mountable kerbing on the perimeter.

11.3 The position of the future assembly hall is also to be considered at the sketch design stage, and clearly indicated as an integral part of the planning, hopefully to be added with donated funds.

11.4 A dignified face brick wall at the entrance, plus respectable robust gates are also provided, with the school's name elegantly displayed, in approved and acceptable applied lettering, all as illustrated in figure 27.

12. TEACHER TRAINING IN SECONDARY SCHOOLS

12.1 As early as the beginning of 1988, it was realised that, although teacher training amongst the Blacks was important and urgent because of the tremendous backlog, caution had to be exercised in the provision of too many Colleges of Education, many of which would become redundant within a decade or even shorter period of time.

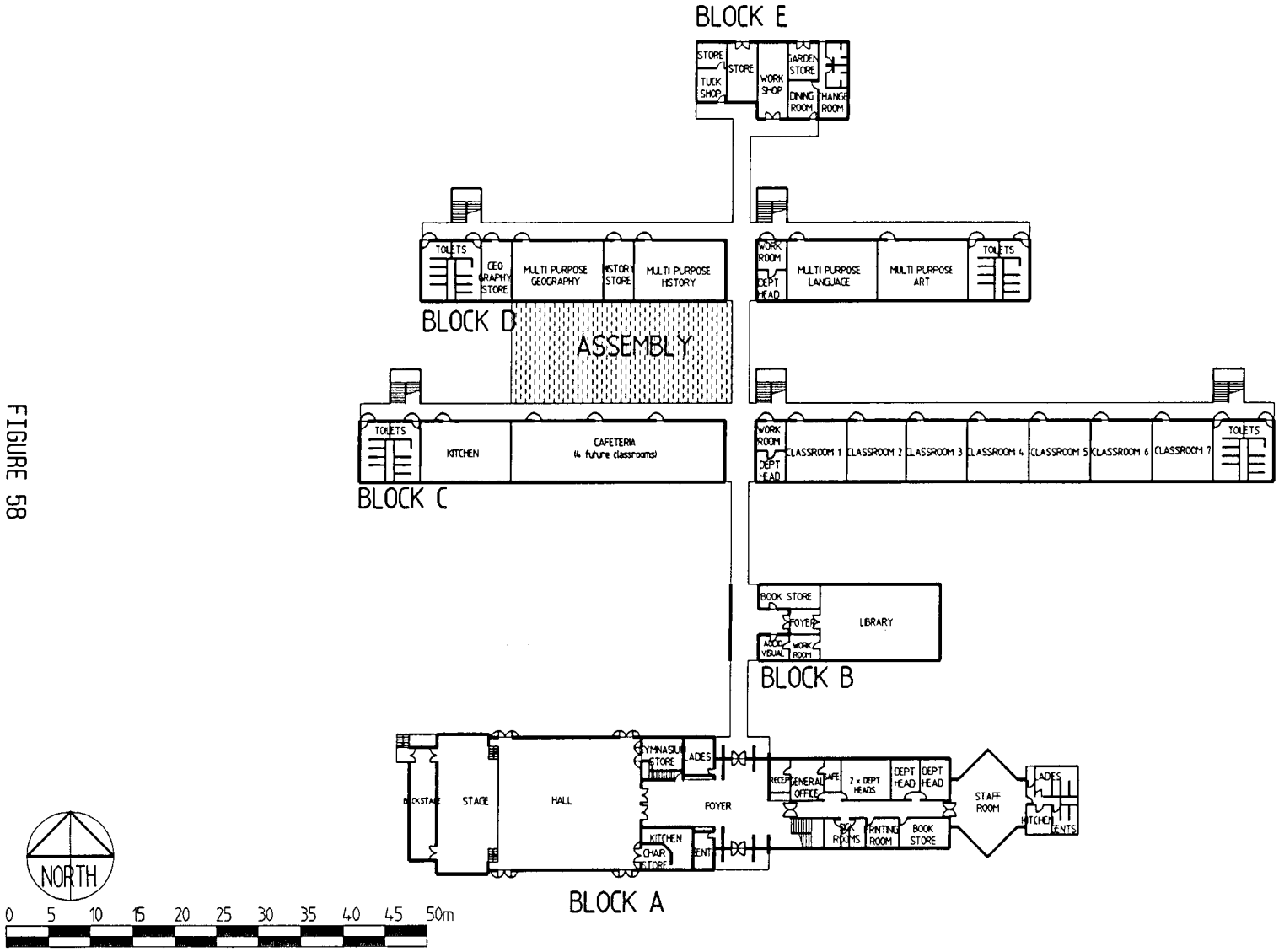
12.2 The obvious solution would be, to upgrade a secondary school design and configuration in such a manner, that would permit the building to revert back to a secondary school, without the complex containing excessive units or features and at

minimum cost.

12.3 Because it was decided that an assembly hall is a must for a Teachers Training College, the Architectural Services Section realised that this was an excellent opportunity to combine a standard Administration Block with an Assembly Hall, neatly separated by a common Entrance Foyer, and since a Teachers Training College catered for between four hundred and six hundred students only, a large portion of the ground floor of block "C" could be utilised for the necessary cafeteria and SRC offices.

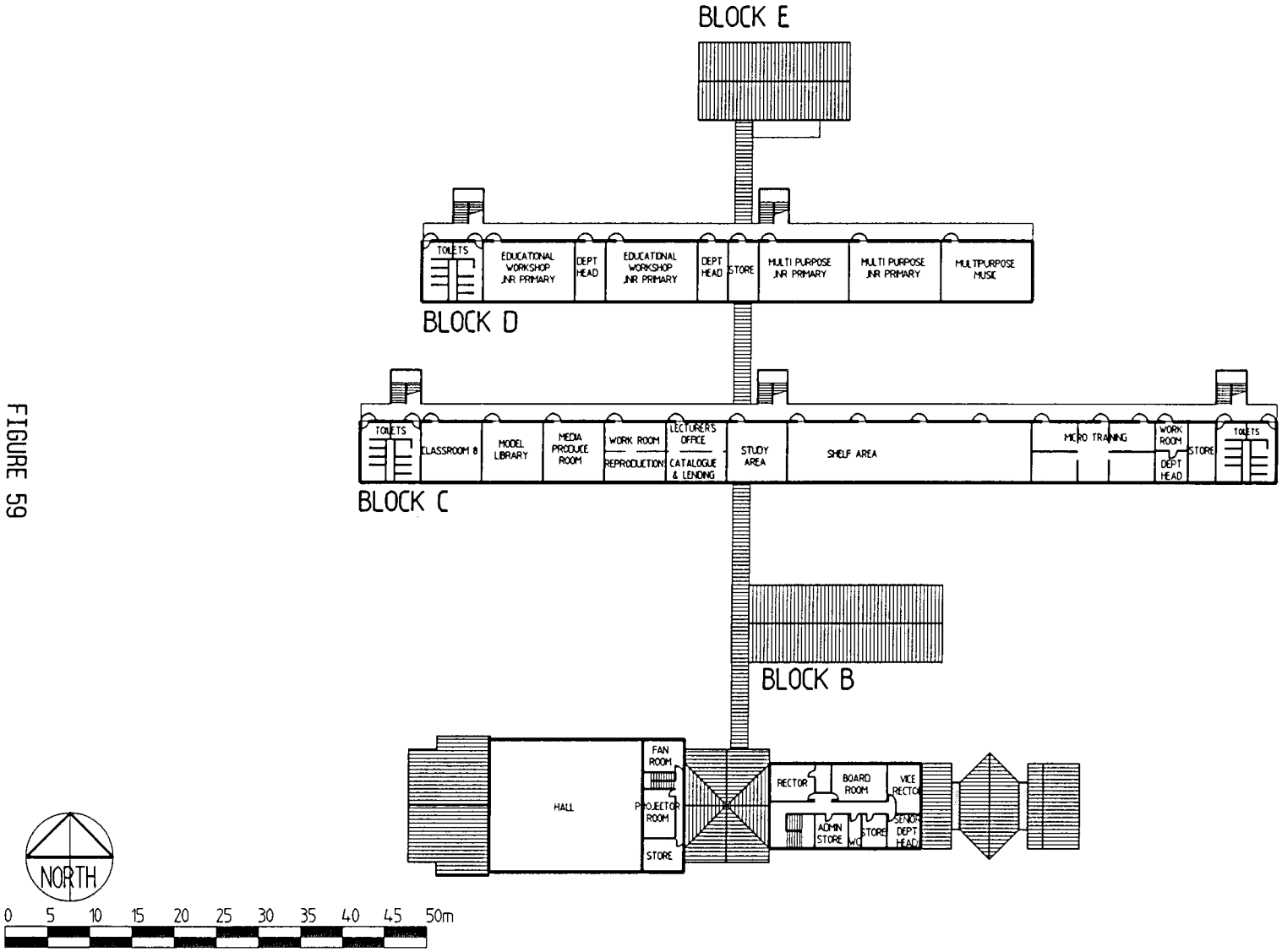
12.4 Figures 58 to 59 clearly illustrates the success of the exercise, and at the time of writing, six such colleges are nearing completion with a high success rating.

FIGURE 58



SENIOR SECONDARY COLLEGE OF EDUCATION - Ground Floor Plan

FIGURE 59



SENIOR SECONDARY COLLEGE OF EDUCATION - First Floor Plan

CHAPTER VIII - THE NEED FOR STANDARD PREPRIMARY AND AFTERCARE UNITS

1. TRAINING OF PREPRIMARY TEACHERS

1.1 Although the DET made no real provision for Preprimary education or aftercare units, except for one Preprimary Teachers Training unit at Sebokeng College of Education (see figure 60), the subject must be reviewed to illustrate the importance of both of these aspects and their relevance, as a sound basis to Education in general and Primary Education, in particular.

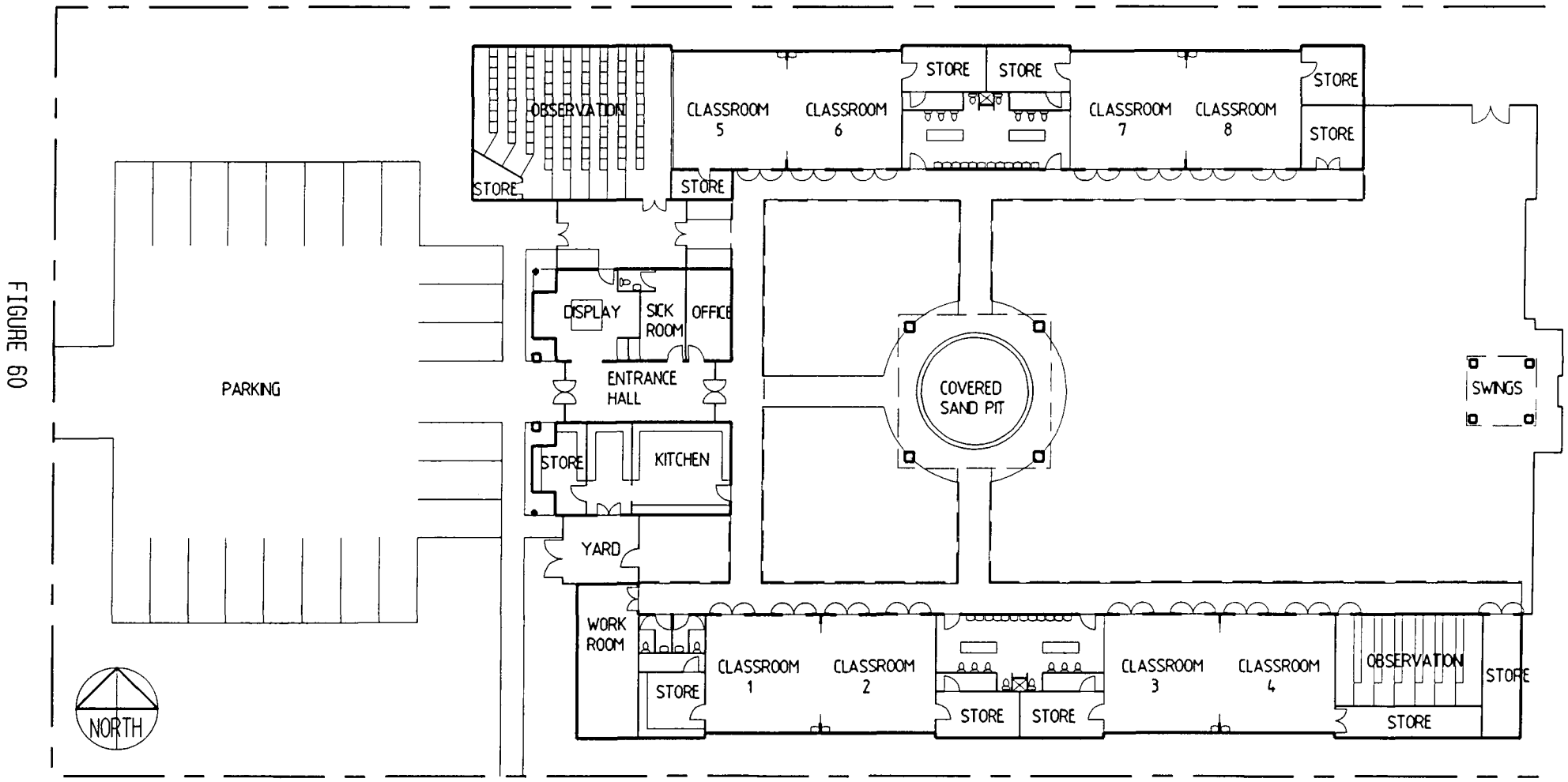
1.2 At this stage of South Africa's development, the consensus of opinion of the DET Physical Resource Planners is that, of the two, the preprimary facilities are more important than the aftercare facilities, but only in a priority rating since, for various reasons, both are almost equally important. For the steps forward that the Country wishes to take, both of these facilities are vitally important and will have to be looked at in depth.

2. PREPRIMARY TEACHERS TRAINING FACILITIES

2.1 With the high percentage of illiteracy amongst the parents of the underprivileged school-going children (who are in the majority), and the correspondingly high birthrate, these children do not mature emotionally early enough, or at all, to be sent to the normal primary school at the mandatory age of six years. With the democratic laws permitting children of all races and creeds entry to any State aided Public School, this can be, and is in fact, an embarrassing setback for these, otherwise normal and healthy, but emotionally immature young children. This fact must be a major factor towards inhibiting serious negative complexes.

2.2 It is most encouraging that at the Sebokeng College of Education, a well equipped and full scale Preprimary Teachers Training unit has been added to the campus, being fully operative for the past six years. At the time of writing, it is not certain exactly how many candidates have graduated in this field of study, but it is assumed that there have been at least two hundred teachers that have specialised in this field of study.

FIGURE 60



0 1 2 3 4 5 6 7 8 9 10 20m

SEBOKENG COLLEGE OF EDUCATION PREPRIMARY UNIT - Layout

2.3 The need to promote this field of study is, at this point, of primary concern since the type of person who will successfully apply this acquired learning is not merely "made" through a learning curve. These must be dedicated persons and, strangely enough, by virtue of the nature of the dedication required, invariably these persons are of the female sex, with a sound understanding of child psychology.

3. EMOTIONAL MATURITY

3.1 Sadly, according to the majority of the primary school principals the author had been in touch with, insufficient official attention is paid to a child's emotional maturity before entering the child for its "ab initio" school training in a formal primary school. This emotional maturity in the child is even more important as an essential pre-requisite to formal schooling than the mandatory requirement of a matriculation exemption certificate for a student to enter for a university training, in any of its faculties.

3.2 This emotional maturity can normally be reached during a thorough preprimary training period for a length of time to be determined by the attendant clinical psychologists. For many children, especially those from a family where both parents work out, it is even just as important that the child be sent to a "full day creche" or a "mornings only creche" if the mother has "half day" employment. This will greatly assist the child to readily adapt to being a part of a large unit of children, not in the same family circle. The Jewish Kibbutz System in Israel is a very good example of success along these lines which was pointed out to the author by clinical psychologists attached to the Icholov Municipal Hospital in Tel Aviv, Israel, whilst on a study tour.

4. TRANSITIONAL ADJUSTMENT THERAPY

4.1 Looking at the situation from an entirely educational point of view, totally ignoring the political cause, it is essential to carefully look at the effect of present day violence on the adolescent youth of present day South Africa. If we, in South Africa, are to fully succeed in the mission of reconciliation and socio-economic advance, then every effort must be put into the full exploitation of the dormant potential within every able minded (and bodied) present day youth and adolescent.

4.2 This may mean that from a school buildings point of view, consideration should be

given to, either therapeutic centres for "Transitional Adjustment Therapy" or large General Purpose classrooms to various schools, fully equipped with audio-visual equipment, in order to permit trained Clinical Psychologists to provide specially prepared therapy courses for those in need.

5. CRECHE PROVISIONING

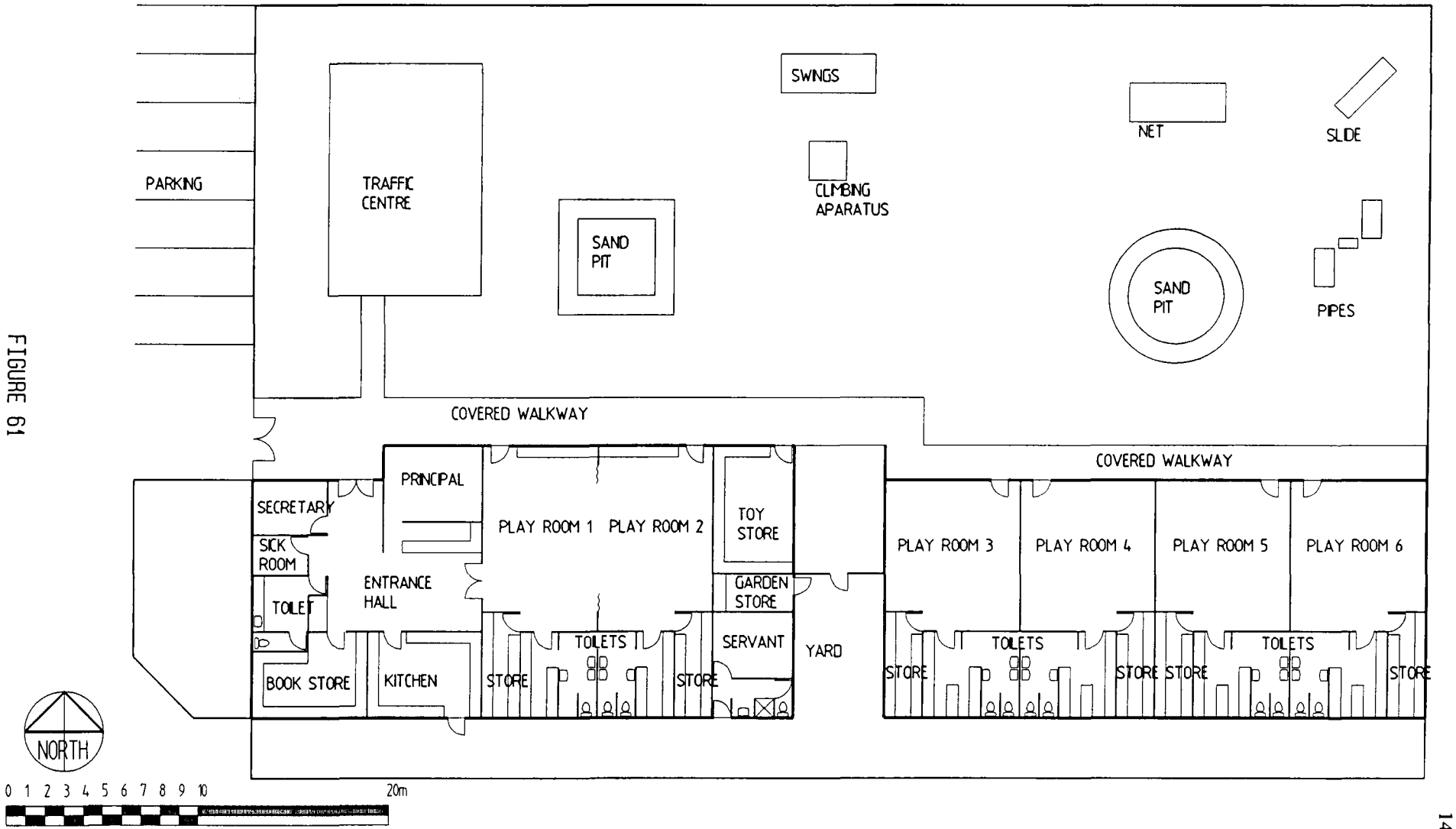
5.1 Partly because the Blacks have formed the majority of the underprivileged, partly because of the budget restrictions, and mainly because formal schooling in the Black townships continually are faced with an impossible backlog, aggravated by the rapid and uncontrollable urbanisation, no thought has been given to the provision of creches. In any modern day civilised society, the provision of creches staffed with trained personnel is as essential as vitamin B is in one's system.

5.2 Figure 61 illustrates an acceptable creche design, to which many have been built in the old TPA (designed by the author) mostly administered by the old Transvaal Education Department and others by private church organisation. These creches were all to the Department of Health Standards, and functioned exceptionally well. Being staffed by the old TED, they only admitted children of the pre-school age, and for the mornings only.

5.2.1 The buildings, designed for one hundred and twenty (120) pre-school children, are ideally suited as "full day" Kindergartens and can be used as such in Black townships, only requiring sites of 60 metres X 40 metres. Easily accommodated on a primary school site, this should be considered.

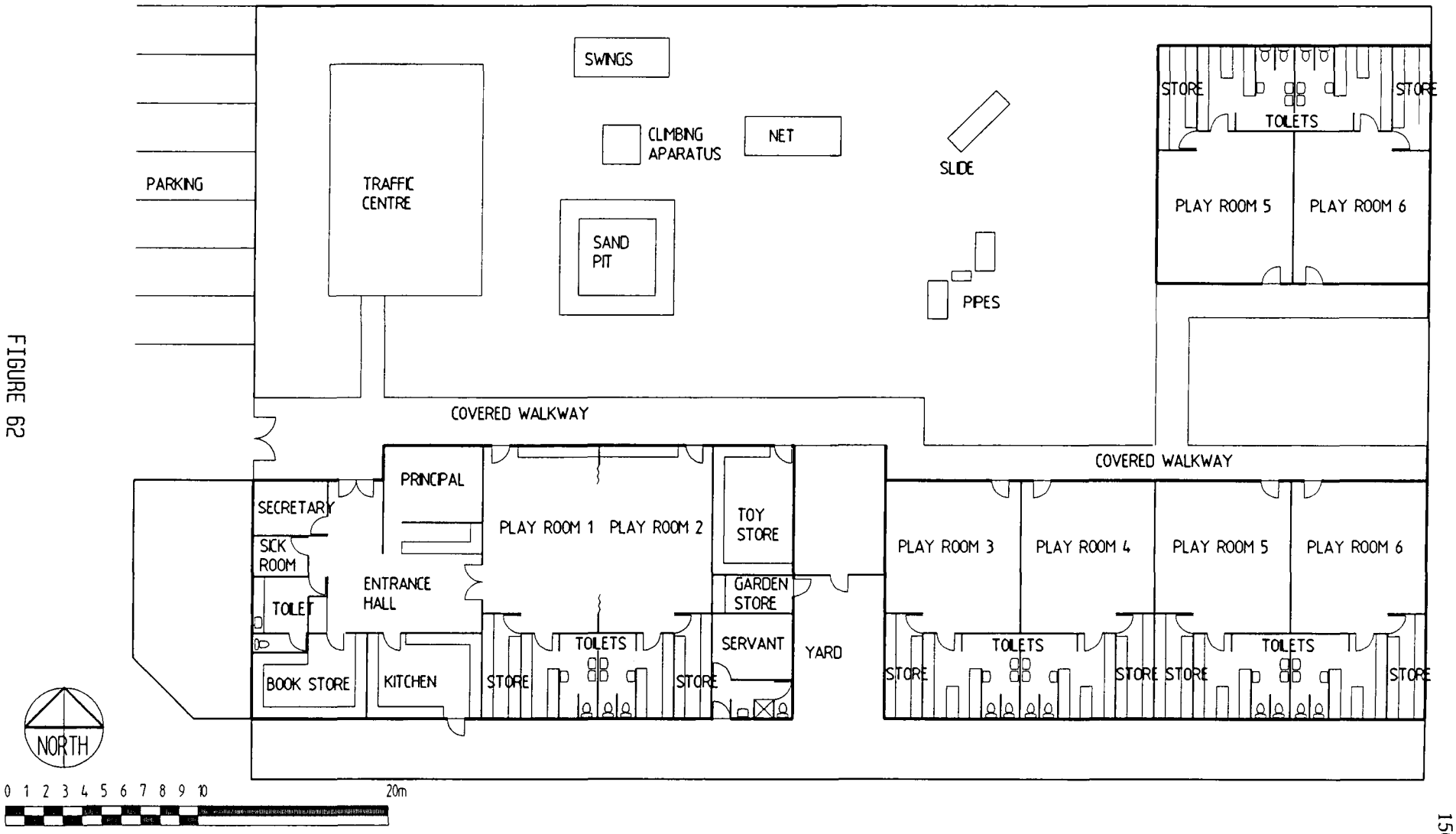
5.3 As illustrated in figure 62, this standard creche with two additional classrooms, could very simply be converted into a creche/ Preprimary/ Aftercare unit and serve the purpose admirably. The creche section could, with correct planning, easily be monitored to permit the exodus of children of "half day working mothers" after the morning session, to make provision for the preprimary children to move into this area, so vacated sufficiently to accommodate them. The vacated preprimary area could then, in the afternoon session, accommodate the primary school pupils requiring aftercare. This is a definite practical solution to more than one facility housed in one complex.

FIGURE 61



TPA CRECHE - Layout

FIGURE 62



TPA NURSERY SCHOOL (2 Classrooms added) - Layout

6. EARLY AFTERCARE PROVISION

6.1 With the increasing number of children from underprivileged families (some without parents or families) now being encouraged (compelled where possible) to enrol for formal schooling at the mandatory age for normal children. It has become increasingly important (almost at crisis level) to care for these children in more ways than just learning/ schooling.

6.2 The Government has already introduced, and is implementing a "school feeding system" for all primary school children, consisting of two slices of wholewheat bread and five hundred millilitres of full cream milk daily. This will have to be maintained for many years to come. Only time and circumstances will determine the length of this period.

6.2.1 As in the years following the 1931 depression, the Government-of-the-day, will also have to consider the re-introduction of the "Soup Kitchens" to assist in the necessary additional nutritional needs for, already, many qualifying children. The Greek philosophy of "A sound mind in a sound body" will always be the rule, and we not only wish to build an educated nation, but also a dominantly healthy nation. It is a fact that cannot be ignored or wished away, that there are literally thousands of underprivileged children who have no "real home" to retreat to after school hours.

6.2.2 Where a standard Créche (figure 61) is provided on the same site as a primary school, then this Créche's kitchen can quite easily be adapted, with an external serving hatch, to cope with the feeding service.

6.3 Since many of these underprivileged school-going children come from "homes" where the parents are still illiterate, although willing, they, from an early age, will not be able to enjoy and benefit from the normal parental guidance that their fellow pupils have access to. This is a serious vacuum in the life of any junior primary school pupil, and can adversely affect the educational progress in the overall South African Nation.

6.3.1 To combat this failing or shortcoming, it cannot be disputed that, for many years to come, the Government will seriously have to consider, plan for, and introduce facilities at primary schools for aftercare schooling from grade I up to standard 5, at least. This may entail additional, educationally trained personnel. This, from a

design and building point of view, is no serious hurdle.

6.3.2 One visualises the additional trained personnel, to be on a part time (afternoon) basis only, and could even be recruited from the full time personnel. However, staffing is an educational matter and it is only the accommodation of the additional personnel that concerns the Architectural Services. The additional classroom accommodation, if deemed necessary, will be a simple exercise.

6.4 The point to be made is that, with the tendency towards both parents working full time, or even where one works part time only, to increase the Country's effective productivity, which will include a higher percentage of secondary school pupils and matriculants, aftercare provided for by the State will have to be considered and at State expense, at that, since those mostly in need of this will mainly be from the underprivileged group. This challenge must be met if we, as a Nation, are to succeed. The present day emphasis on "RDP" and affirmative action (AA) with particular reference to equal opportunities for females automatically implies the increasing need for working mothers.

7. POSSIBLE COMBINATION OF CRECHE AND AFTERCARE UNITS

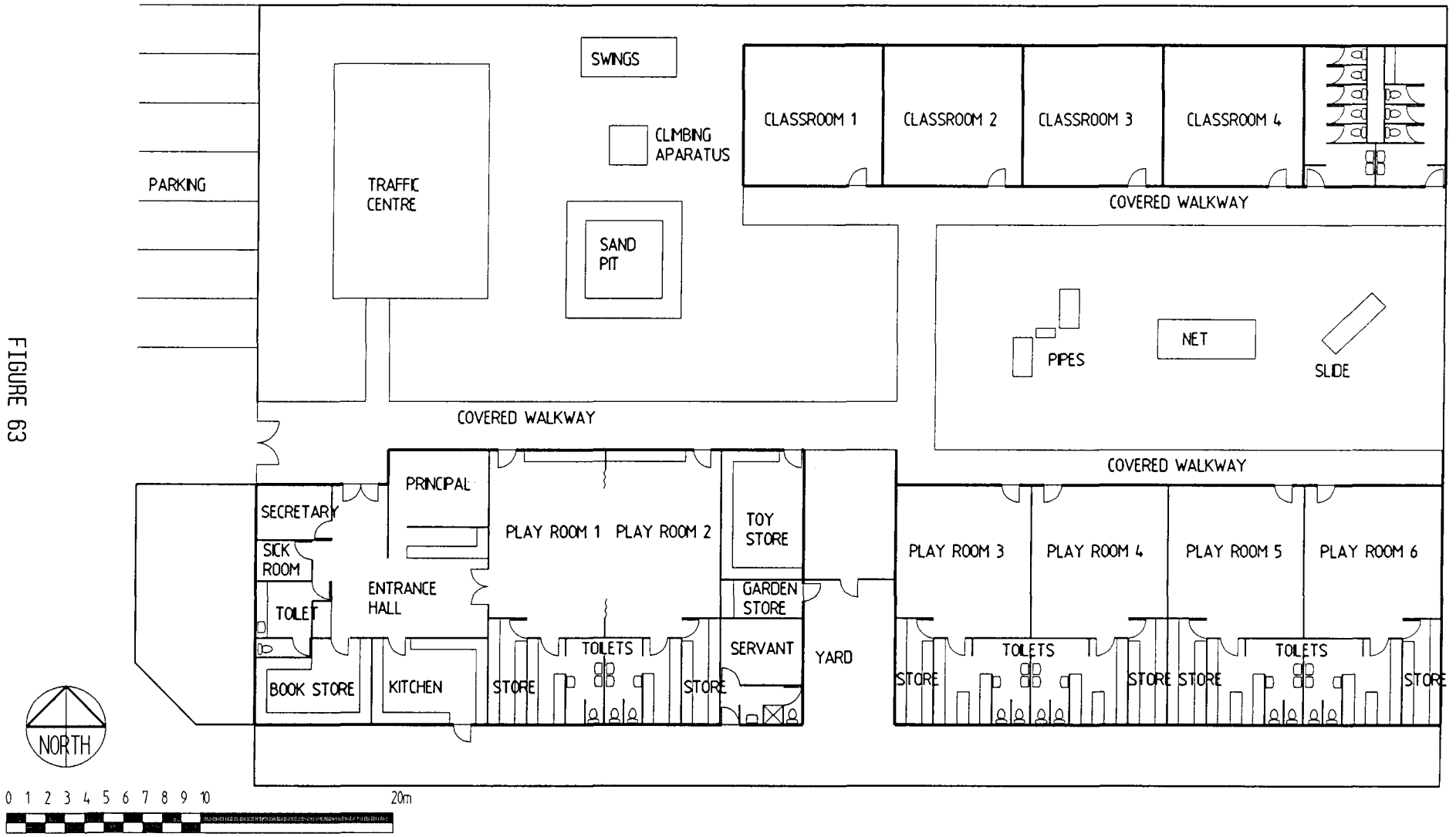
7.1 Because of the urgency of providing for both facilities that of infant care (pre-school) and that of after school care, starting at the earliest possible age, it would be absolutely irresponsible not to touch on this subject, since it is an important part of primary and secondary education.

7.2 As illustrated in figure 63, and previously referred to, the possibility of combining a "full day" Creche/ Kindergarten and a "Schools Aftercare Unit" for primary school pupils, is not a pipe dream, but a distinctly practical proposition and must be considered.

7.3 It is so, that the Kindergarten personnel do not have the same training or educational qualifications, but this need not be a deterrent to the suggested combination of facilities in one complex, under the control or direction of a single figure, be it Principal/ Director/ Manager or whatever other suitable name.

7.4 Figures 61 to 63, illustrate various combinations for the complex that, for simplicity, can be referred to as a "Juvenile Care Unit" which may be built and administered by

FIGURE 63



TPA NURSERY SCHOOL AS AFTER CARE UNIT - Layout

the State, or built by the State and administered by the welfare organisation, under a subsidy system or even built and administered by some welfare or church organisation under a generous subsidy system.

7.4.1 The necessity of a generous subsidy, under strict control and subject to rigid audit, is absolutely essential, so as to benefit those mostly in need of these facilities, namely underprivileged families. The details of such a subsidised scheme is squarely a State socio-political matter and will not require a genius to formulate.

8. FOOD FOR THOUGHT

8.1 Although the Architectural input for the need for preprimary and aftercare units is not a complex issue but rather a stimulative challenge, the socio-political input is by far the greater and more important. The subject has been dealt with in this study, although not in depth, because it is considered to be a vitally important aspect towards the South African State to successfully grow, from a developing country into a vibrant Super Power, "benign please", in the shortest possible time. If the Israelis could do it, so can we.

9. SUMMARY CHAPTERS V, VI, VII AND VIII

9.1 Collins English Dictionary defines standard as: "*n*.1. accepted example of something against which others are judged, 2.degree, 3.flag, 4.weight or measure to which others must conform, 5.post, 6.SA school or form grade, - *a*.7.usual, regular, 8.average, 9.of recognised authority, competence, 10.accepted as correct - standardise vt. regulate by **standard**." In this thesis, standardisation is to accept that which is made to conform to set standards, not only in sizes, but also in design relationships of modules.

9.2 The success of repetition through standardisation is clearly evident in the many similar schools built throughout South Africa and is adequate proof of the second hypothesis "that standardisation was successful", and will continue to be so as long as the provision of new schools in South Africa is a crisis situation.

9.3 It is not coincidence that standardisation and the effects thereof forms the bulk of this thesis, since standardisation in all facets of the system was the cornerstone of the very successful Building Component and not confined to the Architectural Services

only.

10. CONCLUSION

10.1 In the previous four chapters it became evident that when dealing with the volume of school buildings required for Black people, it is only simple logic that the most cost effective method of dealing with a situation is to investigate the possibility of standardisation. The successful cost effective designs of the various types of schools proves the value of standardisation.

10.2 Standardisation coupled with the increasing volume in the delivery of new schools has resulted in a spin off into allied industries involved in the obvious standardisation of components and items such as 1 200mm wide prestressed floor slabs, school desks and chairs for both primary and secondary schools, blackboards, steel windows and pressed metal door frames, building bricks, ceiling panels, doors, laboratory fittings, sanitary ware and as many more items as the imagination can conjure up.

PART IV

CHAPTER IX - GENERAL PROCEDURES

1. INTRODUCTION TO CHAPTERS IX, X, XI AND XII

1.1 The following four chapters deal with the third subproblem, "to investigate the process of design, documentation, inviting tenders and site administration", with reference to the professional services component and their motivated application of a well constructed system.

1.2 This chapter will be written in the pluperfect tense to make it clear by stating the facts before the DET became the Department of Education, that is, before 1996. The decision to build a new school building for Blacks had rested squarely with the DET. It had also been the responsibility of the DET to furnish the Directorate: Building Service with a detailed schedule of accommodation of the desired project, as well as the projected time table as related to the budget. Whilst a detailed explanation of the origin of a project is not required, it is advisable for the purpose of this study to have some background knowledge of the process.

1.3 The initial source of the origin of a project had rested in the DET's eight Regional Chief Directorate's Planning Section. One of the duties of the regional offices had been to continually monitor and assess the growth potential of the various residential areas in their regions with a view to establishing the need for new school buildings or alterations and additions or upgrading to existing school buildings. A further duty of the Regions had been to establish the need, arising from any relevant policy factor, for alterations and additions to existing buildings either of a permanent or temporary nature. These statistics had been collectively fed back to the Central Planning Department at the Head Office of the DET, whose function it had been to determine the priorities of the various requirements on a National basis and within the limitations of the budget.

1.4 The Planning Section of the DET had endeavoured to plan for their building requirements for at least two years ahead and supply the Building Services Directorate with a detailed list of projects accompanied by the detailed schedule of accommodation for each project, including an approximated estimate of costs for each project. The DET would have checked this list against the approved Capital

Works programme before recommending for appointment the consultants in the Private Sector who would have comprised the professional team.

Mention must be made here that this had been the normal procedure, yet there had been two further procedures, namely:

(a) building work arising out of an emergency situation to be dealt with as a capital works, and

(b) building work arising out of maintenance as a minor works (less than R20 000) or destruction of property due to fire, hail and storm damage, vandalising, et cetera;

these were very seldom of such a nature that they warranted the employment of a professional team and could have been dealt with by the specific region's technical component, with the able assistance of the Architectural Services' Drawing Office Staff.

1.5 The essential fact that arises is, that the Educationalist had been responsible for the "Where and what" and the Directorate: Building Services for the "How".

2. THE SELECTION OF THE CONSULTANT ARCHITECT

2.1 As far as the Directorate: Building Services, had been concerned, the architect for the project was the Control Architect of the Sub Directorate: Architectural Services, whose prerogative it had been to either elect to render the Architectural Services departmentally or to request the appointment of a consultant architect as an extension to the architectural services of the Directorate: Building Services. Thus it must be made clear that the commissioned architect had been, in the first instance, answerable directly to the Deputy Director: Architectural Services. It must be pointed out, however, that only in the case of small projects, not really warranting the full time services of a consultant architect, were the architectural services undertaken departmentally.

2.2 For each project that had been approved by the Director General of the DET, the Sub Directorate: Architectural Services had been required to request, in writing, to the Sub Directorate: Project Preparations, for the appointment of a consultant architect from the Private Sector.

2.2.1 This request was submitted to the Sub Directorate: Project Preparations. This Sub

Directorate controlled and selected the panel of registered architects and all other related disciplines, practising in the Republic of South Africa, who had signified their preparedness to accept commissions from the DET. There had been a prescribed procedure for any of these practising disciplines to have their names placed on the panel, having updated their registrations annually. With regard to the Architects there had been mandatory factors governing the recommendation of an architect, namely

(a) he had to be a registered architect;

(b) through the correct channels have had his name on the panel;

(c) had been in good standing with the Architectural Services Section;

(d) had been in close proximity to the location of the project (especially in rural areas);

(e) was prepared to have given priority to the commission offered, and

(f) selected by the Director from an approved panel on a geographical and rotation basis.

2.2.2 Using an approved and transparent system, every effort had been made to strictly maintain an impartial system of rotation. The recommendations were submitted to the Director General of the DET for approval, who had reserved the right to query or alter any of the nominations for any valid reason. There had been no political appointments. A list of appointments from 1983 to 1994 will be found in Appendix "D".

3. THE APPOINTMENT OF THE CONSULTANT ARCHITECT

3.1 Immediately after approval had been received from the Director General, the architect had been informed, by letter, of his intended appointment which he had either to accept or decline (see Appendix "D"). Although informal, this did consummate a contract. The information that this renewed letter contained, had at a prearranged time and date, been followed up by a comprehensive briefing (dealt with in a later chapter) during which the following aspects had been dealt with:

(i) The exact location of the project

(ii) The projected cost and detailed scope

(iii) Expected date for submitting sketch designs for approval

(iv) Extent of professional services and basis for remuneration

(v) Architect's role in the professional team

(vi) Restrictional framework applicable to sketch designs

(vii) The strict administrative procedure to be followed with regard to

the site and contract administration.

3.1.1 The brief and briefing session is discussed, in detail, in a later chapter, but it should be mentioned here that neither "handbook" or "guide book" although desirable, had not yet existed but, from the beginning of the author's term of office, no project had been given to any consultant without the entire professional team having been elaborately briefed in detail. This had served as an expansion of the inferred contract.

3.1.2 After retirement, and immediate re-appointment on a lower rank, as was customary, the author did prepare a "Briefing Resume" which he handed out to the consultants, for future reference, and then only at the conclusion of a comprehensive briefing session, often to quite a number of consultant teams briefed in one session.

4. CONTRACTUAL AGREEMENT

4.1 The related literature consulted, all stated quite strongly that there should have been some form of contractual agreement between the owners and the architect. This research has shown that not only had this been desirable, but that it is essential and that the contract document could have eliminated a great deal of contentious points if clearly stated. It is correct that the appointment of an architect should have been based on a sound footing because the architect, who had previously had been considered a master builder and an artist, had now become a business man as well. (Bannister, 1954, p. 17)

4.1.1 One of the most important single decisions the DET had taken in planning a school building programme had been the selection of an architect as the leader, and the balance of the professional team. For the purpose of this study, the major concern in selecting an architect had laid in the legal consensus of understanding between the DET and the architect in the Private Sector, with regard to offer and acceptance of the commission. (The two major ingredients of a contract). It was important to have had affirmative answers to questions such as:

Had the architect and the DET in fact agreed upon the duties, responsibilities and authority of each to the other?

Had this agreement clearly been delineated in a contract?

Had this contract been written or verbal?

Had there been, in fact, a contract in terms of the legal definition?

4.2 The Value of a Written Contract is an undisputed fact. McGinnis (1956, p. 107) stated that:

> "To secure the optimum in educational planning and economy of construction from their architects, school districts have found it profitable to devise contracts which would accomplish the realisation of their objectives".

4.2.1 It would appear that in the United States of America there is more concern with regard to architect-owner agreement than in the Republic of South Africa. The National Council on Schoolhouse Construction U.S.A. (1964, p. 17-18) points out that "a formal written agreement that is legally binding is the only satisfactory means of protecting both the owner and the architect". The American Association of School Administrators indicated that one of the values of a written contract is that it "... defines the scope of the architect's work and the method of payment and ... protects both parties from unlikely, but still possible contingencies". Sumption and Landes (1957, p. 14) stated that a contract ensures a clear understanding by both parties as to the services to be performed and the terms of remuneration.

4.2.2 McGinnis (1956, p. 2) stressed the necessity for a written contract by pointing out that:

> "... a carefully prepared contract ... between the school board and the architect provides a means for outlining and defining ... relationships as well as providing a legal basis for the performance of the architect's professional services and the payment therefore ..."

4.2.3 It is interesting to note on the other hand, that the American Association of School Administrators cautiously indicated that when a good job in selecting an architect has been done, the critical importance of an air tight contract between a board of education (in the Republic of South Africa, the DET) and an architect had been less vital than when a haphazard selection process had been followed simultaneously pointing out, that no authority should have employed an architect without having based his service on a carefully worded contract. It is interesting to note that the American Institute of Architects have a standard contract form, which includes:

> "The basic obligations of an owner-architect agreement are that the architect agrees to furnish professional services to an owner, and that the owner agrees to make payments or other compensation to the architect in exchange for such services. Thus a clear statement of the architect's services and of

the compensation to be paid in return for these services are the fundamental parts of any owner-architect agreement".

4.3 Inadequacies in Contract Documents must be carefully guarded against. A review of the literature clearly indicated that certain inadequacies existed in American Contract Documents. The essence of the inadequacies was summed up by McGinnis (1956, p. 58, p. 28) when he stated that he found that school administrators and architects often felt that the contract by which they were bound was inadequate and warned that:

> "Ambiguous in meaning, lack of clarity in phrasing, omitting essential elements, and prevalence of generalities rather than specific direction, are all characteristics of contracts which may lead to misunderstandings and possibly court action".

In South Africa the Institute of South African Architects does have a service contract, but is more suitable to the Private Sector than the Public Sector.

4.4 The Contents of Contracts should be clearly defined and all encompassing as referred to by Edwards (1955, p. 200) who listed the five prerequisites common to all simple contracts as:

> "(1) Legal capacity on the part of the contracting parties;
> (2) mutual assent of the contracting parties to the terms of the contract, or what is commonly known as a 'meeting of the minds';
> (3) a valid consideration;
> (4) rights and liabilities sufficiently defined to be enforceable; and
> (5) an agreement of such a nature as not to be prohibited by the statutes or the common law".

4.5 Conditions of Employment for architects performing architectural services as practitioners for the DET, had been put to paper, but had not been as all encompassing as is legally preferred. It had become obsolete and should have been revised. After careful study and objective legal considerations, it could hardly have been considered to be a contract document or a successful guide or handbook and had deserved further investigation. (See Appendices). However, read together with the Architects Private Act of 1970, it had been accepted by the consultant architects in the spirit of it's intention.

5. THE ROLE OF THE LIAISON ARCHITECT

5.1 For the purpose of this study, the architect in the DET would have been considered to be the DET's liaison architect, functioning primarily as the liaison architect, having been the common entity in the interaction between the DET, Architectural Services, the architect in the Private Sector and the Planning Department of the DET. When this had been fully understood, and it had to be understood, especially by the liaison architect himself; it then had become clear that the liaison architect had to act in two separate and distinct roles, namely:

(a) as a specialist in the field of School Architecture guiding and supervising the commissioned architect in the Private Sector during the various stages of the architectural services he has been commissioned to render as well as to advise him on matters pertaining to procedures as required by the Directorate: Building Services, and

(b) as a specialist in the field of School Design to correctly interpret the schedules of accommodation for each specific project prepared by the Directorate Physical Planning, and to convey this successfully to the private architect for his implementation as well as commanding the required knowledge of the procedures to be followed between the two Directorates.

6. THE LIAISON ARCHITECT'S DUAL ROLE

6.1 In this instance, his role had required of him to be an administrative professional (technical) with the ability to execute his duties always in an objective and impartial manner, allowing no room for subjectivity.

6.2 Whilst all architects receive formal training in architecture, the architects in the DET had not been required to undergo formal training in Public Administration, but had been expected to learn the administration required purely by example and doing, by trial and error. This had appeared to be a weakness since, when a purely administrative problem had arisen, for example when briefing on site, it had appeared that should the accommodation schedule have been inadequate, or ambiguous, the departmental liaison architect could have taken an unacceptable decision. The author recommended that some form of Public Administration training had been necessary.

6.3 In the Questionnaire used to question architects in the Public Sector for the author whilst still in the employ of the Transvaal Provincial Administration, it had been interesting to note their attitude in the reply to the question which requested whether they thought that their briefing of the appointed architects had been complete. The majority of the authors colleagues had given the impression that they had done their best by conveying the requirements to the consultant architect and that in any case the private architect had been paid to have found out what he had needed to know in order to have complied with his instructions. The Private Architects on the other hand, in their replies to the questions in the Questionnaire, had indicated that all of the relevant information should have been volunteered by the TPA. The author fully concurred and had vigorously set about the task of enforcing it as a prerequisite and reality. It remained a major factor.

6.4 A solution to the successful fulfilment of the liaison architect's role would have been

(a) careful selection of the liaison architect,

(b) some form of training in the Public Administration, and

(c) very definitely, a well compiled guide or handbook to have ensured thorough and uniform liaison.

7. THE ROLE OF THE PRIVATE ARCHITECT

7.1 For the purpose of this study, the commissioned architect in the Private Sector will be referred to as the Private Architect. It must be accepted that the Private Architect had been appointed to function as a professional extension of the DET, Architectural Section, and under the supervision and guidance of the Liaison Architect, but certainly not to the extent of employer-employee relationship. The guidance and contractual monitoring had been restricted to the specialised school design and construction experience as well as the administrative procedure laid down by the DET. The criteria then had been that the Private Architect had unambiguously to be made fully aware of his **specific role** and the role expectations of the complimentary professional members of the team when, in that particular case, the architect had been the leader of the team.

7.1.1 In planning an educational facility it had been the architect who translated the educational specifications into the design that had made sound construction possible. He had been part of a planning team, in fact, the leader of this team. Because of his specialised knowledge in such areas as acoustics, lighting, colour, heating and

ventilation, and other special requirements, the architect would ordinarily have been a valuable source of help. Edgar L. Morphet, in **Education Organisation and Administration**, (1968, A-67, p. 63) stated: "...schoolmen confronted with the need for new plants are facing the most difficult problem of their careers - difficult because the results may be more affected by their knowledge and vision, than in any recent period". The selection of the architect had therefore been a critical and vital decision to have been made.

7.2 The method that had been used by the DET for selecting an architect had merit in as much as it had been based on rotation coupled with proximity to the site location, but one had been inclined to advocate that this could have been coupled to the comparative selection method. In this procedure, the architect had been chosen from a group of architects, who had submitted for consideration, information and reference concerning their qualifications. In the Republic of South Africa, the right to call oneself an architect had been protected by the Architects Act of 1970, which had stipulated the requirements to be complied with before any person could have practised as an architect.

7.3 The American Institute of Architects had offered the following five questions representing appropriate areas of exploration:

i. Did the architect under consideration, have the experience necessary for the work at hand?

ii. Did he have the technical knowledge needed to control the design of the highly complex structure and equipment of a modern building, of space or costs?

iii. Did he have executive ability and the force to maintain an appropriate level of performance?

iv. Had he successfully done work of like character from which his ability to properly serve the owner could have been inferred?

v. Did he have such honesty and incorruptibility as was essential to the owner's safety?

7.4 The service which an architect renders to the DET had been confined to the normal subdivision of -

(a) preparation of sketch designs;

(b) preparation of working drawings and contract documents,

(c) calling for tenders and

(d) administration of the building contract,

Depending upon the position of the project on the priority list, and the availability of funds, there could have been a considerable lapse of time between stages (b) and (c) although every effort had been made, in the preplanning stage, to minimise this delay, since it had been a well known fact that this did have an adverse effect on the affected community, as well as the motivation and initiative of the professional consultants.

CHAPTER X - THE BRIEF

1. THE ESSENTIALS OF THE BRIEF

1.1 The intention of this chapter is not to teach briefing but rather to emphasise the value and importance of a comprehensive brief. For more detail in briefing as a subject, the following two text books are recommended namely, "Architect's Handbook for Chief Briefing" issued by Butterworth Architecture Management Guides, and "Participation in Building Design and Management" by David Kernohan, John Gray, John Daish with Duncan Joiner.

1.2 It is vitally important to impress upon the team of consultants, who the leader of the team is, and what is expected of the team by the Department. In normal private practice, there is no doubt in the architect's mind that he is the leader of the team and as such he must co-ordinate the contributions of the related professional disciplines. In keeping with the demands of his expanded role, the architect has indeed become a "man of many parts" as is aptly illustrated by Strevell and Burke (1959, p. 68) when they say:

> "One considers the architect as a designer and engineer, an artist and planner, but he also must be an administrator and coordinator, a legal and financial expert, a supervisor and safety engineer. He should be adept at public relations and a shrewd business executive both in managing his own office and the affairs of the district which employs him."

1.2.1 It is equally important that the complementary members of the professional team have no illusions about their role, to eliminate the tendency to sail gaily ahead on their own. Investigation into case histories has shown that the existence and use of a clearly defined set of procedures and role definitions will eliminate these tendencies to a large extent and thus promote sound administration on the site. Murray and Kluckhohn, (1953, p. 19) identified roles as:

> "... the need to become and remain an accepted and respected, differentiated and integrated part of a congenial functioning group, the collective purpose of which are congruent with the individual's ideals."

1.2.2 What is most important is that all the members of the team should know

(i) Where the site is and the extent thereof

(ii) What the scope of the project is

(iii) What their inputs are to be

(iv) The exact procedures that must be followed

(v) The restrictions and limitations

1.3 These aspects will be dealt with in this chronological order as set out in 1.2.2 supra.

1.3.1 A briefing session is always held in the town/city where the Regional Offices are situated, in the Region under whose jurisdiction the project/s fall/s. If only one or two projects are handled, then the briefing session is held in the conference room of the Regional Offices. If however, many projects are to be dealt with (the author has already briefed for twenty seven projects in one session), then a suitable venue is decided on with a PA system when available. This may appear to be impossible, but, as later explained, the "system" copes with this admirably. The delegates to the briefing session (one person of each discipline on the project) are, at the outset informed of the exact location of the township in which each project is located. The Principal Agents (in control) and their colleagues are instructed to meet with the Region's Technical representatives, after the briefing session, to arrange a date for a visit to the site for preliminary observations and recording of data. The Control Architect for the Region always chairs the meeting with the following Departmental officials in attendance:

(i) The Control Architect (Chairman)

(ii) The Control Professional of each discipline from Head Office

(iii) The Regions Chief Works Inspections

(iv) The Regions Works Inspectors involved in each project, and

(v) one are two delegates from each community in which a project/s is located are also invited to attend. (Optional)

1.3.2 **The scope of the project**. The exclusive use of standardisation (the one singular aspect of the success of "the system") ensures the speedy dispensing of each project by dealing with each project separately and in a predetermined order, introducing the team each time. The process is not time consuming since the description of the scope of each project takes no longer than thirty seconds.

1.3.3 **The input of each team** collectively, is then explained, in detail, quite simply and expeditiously, since the inputs of each discipline is always the same and varies only under which category the project falls. The categories being

(i) Alterations and additions

(ii) Renovations and Repairs

(iii) New school buildings

Once again, standardisation simplifies the entire proceedings without reducing the effectiveness.

1.3.4 **Procedure to design**

During the briefing session, the Principal Agent is provided with an A3 booklet containing various types of configurations for primary and secondary schools which is referred to, whether the brief is for a new school or additions to an existing school. After the briefing session, which for the past six years has been a "mass briefing session", the Principal Agent arranges a suitable date with the Regional Inspectorate to be taken to the site, so that a survey can be completed, to enable the Principal Agent to prepare a "line drawing" suggesting his team's solution to the problem. This "suggested solution" is faxed through to his Control Architect at Head Office who will scrutinise the suggestion with a view to ascertaining whether or not the Consultants have understood the briefing. This process may be repeated until the Liaison Architect is satisfied that the Private Architect can now safely proceed with his first sketch design. This to avoid waste of time. In some instances, the Liaison Architect will, himself, sketch the siting and fax it through to the Private Architect.

1.3.4 **The exact procedures** that are to be followed, from first site inspection, to sketch design submission and their approval, to the parallel completion of working drawings and tender documentation, to advertising and inviting tenders, to tender evaluation for consideration by the Tender Committee to appointing the successful tenderer, to site handing over to the contractor, to site administration and finally to first and final delivery of the project. Appendix "E" explains this in more detail and purposely not discussed here since it is self explanatory. What is important to understand is that strict uniformity of, and adherence to the prescribed procedures, is meticulously and firmly enforced throughout all the Regions in the entire Republic. This is another important and essential ingredient for the smooth and effective operation of all the components at Head Office, Directorate: Building Services, without which its contractual exactitude would not be possible.

1.3.5 **The restrictions and limitations** imposed upon the consultants from the private sector, are carefully, unambiguously, and in detail explained to all the consultants at the briefing session. Although they all act as "Agents" and subject to the "Law of

Agency", it is essential to impress upon each individual exactly what their legal restrictions and limitations are, in order to avoid the possibility of any of their actions placing the Department under embarrassing and costly commitments. Basically, it requires from the Department, at the very outset, to make it unambiguously clear to all the appointed consultants exactly which delegated authorities rest with them and which do not. This is not only to promote smooth administration but also to avoid any possibility of the Department to have to enter into litigation, to recover any costs or liabilities, from any consultant, resulting from an irresponsible action on their part, even though they may be well intended.

2. THE BRIEF AND THE DET SYSTEM

2.1 It can safely be claimed that, the smooth running and effective operation of the entire Directorate: Building Services (and well oiled it is), resulting in the shortest lapse of time between briefing and completed documentation, and subsequent uniform progress towards speedy delivery of the majority of the projects is achieved, basically, by the thorough and unique system of initial briefing of consultants in the private sector. This success level has not yet been equalled by any other similar Government Department.

2.2 The entire system as it operated at the time of writing, was developed from a short paper written by the author, entitled "Chronological Order of Steps Involved in a Building Project from Conception to Completion" (see Annexure "F") submitted to the Directorate: Building Services, in 1985, discussed at regular weekly meetings, improved upon, refined and adapted to result in, what the author believes to be undisputedly, the most efficient Building Services Component of all the Government Departments in The Republic of South Africa. Such a pity that this must be "put out to pasture".

3. THE SECOND BRIEFING

3.1 Because of the unavoidable lapse of time between the initial briefing session and the date of invitation for tenders, it has been found advisable, and profitable, to hold a further briefing session. This session is confined to firstly, evaluation of tenders in order to speed up the tender allocation process as well as obtain sufficient substantial evidence, to satisfy the State Tender Board, should it be necessary to successfully motivate the lowest, or even more than one as not acceptable. Secondly, to touch on

the important salient points of Contract Administration.

3.2 The first section of the "second briefing" (before the tea break), can be fully illustrated by reading Appendix "G". It is suggested that this be studied before reading any further.

3.3 The second section of the "second briefing" is concentrated on the handing over of site procedure and the importance of, not only the correct procedure, but also how critical the prescribed time frame (in the conditions of contract) is, as related to the prompt processing of variation orders and applications for extension of time. Both of these aspects have a definite financial implication when, if not correctly processed and/or evaluated, can, and often do, result in serious audit queries and investigations. Nobody likes a query from the Auditor-General.

3.3.1 In 1993, this whole issue of, below par, site administration, with five hundred projects in progress, became, to the Department, a minor Crisis situation. The author took the initiative and, accompanied by the Head Office, Chief Works Inspections, travelled to each of the eight Regions to lecture all the engaged consultants, on the important aspects of site administration. Accent was placed on just how seriously the maladministration adversely affected the smooth functioning of the Directorate: Building Services. Appendix "H", illustrates, briefly on the points raised during these lectures.

3.4 Whilst a thorough brief does not necessarily guarantee a perfectly smooth running project, from appointment of consultants to final delivery of the buildings, the D.E.T.'s Directorate: Building Services, has proved beyond a shadow of doubt, that it is vitally essential to all role players to be thoroughly briefed, in order to eliminate as many snags as possible.

3.5 In the beginning, the Principal Agent was instructed to take minutes of the briefing and submit copies to each of his team colleagues, as well as submitting one copy to Head Office for filing and reference purposes. This was to ensure that the brief was clearly understood. A good example of one such set of minutes, is illustrated in Appendix "I".

3.6 When the Architectural Services personnel was increased in 1993 and more Control Architects were engaged and allocated Regions, the author was instructed to coach

these new Control Architects in the science of briefing, to ensure uniformity and continuity. At this stage, the author found it prudent to produce a "Briefing Resume" to ensure uniformity in the Regions under his control. This proved to be so successful that permission was obtained for all the Control Architects to make use of this Resume. This prompted the elaboration of this "Resume" to include guide lines for all of the other disciplines, with the proviso that each member of the team would receive a copy, and so eliminate the need for the Principal Agent to take minutes. This "Resume" is appended in its entirety as Appendix "E". It must be stressed that the briefing session was not reduced to the verbatim reading of this document, but remained conducted as a two hour lecture supplemented with the Resume.

3.7 In spite of the introduction of the valuable "Briefing Resume", the second briefing was not discontinued, and still remains an important prelude to the contract administration.

4. THE CONTRACT DOCUMENT

4.1 Appendix "J", being an exact copy of the "Conditions of Contract" is also bound into the tender documents as a precaution against receiving conditionally qualified tenders.

4.2 This is a reasonably "user friendly" legal document making the contract administration quite simple, both for the Contractor as well as the Supervisory Professional Consultant Body. For both parties, the secret lies in the reading and studying of this document prior to the commencement of Tendering and actual Contract Administration.

4.3 The absolute necessity and subsequent value of this exercise cannot be over emphasised. The author, over the past fifteen years, has witnessed so many bankruptcies, forced cancellation of contract and other forms of litigation, mostly brought about by the absolute ignorance of the "Conditions of Contract" with all its limitations and restrictions, easily complied with to avoid litigation, that, from sheer experience forced upon him, has become somewhat of an expert in this field.

4.4 Contracts are not to be seen as a burden to harass the Contractor, or as an instrument to favour the Employer. The Contents of Contracts should be clearly defined and all encompassing, as referred to by Edwards (1955, p. 200) who listed the five prerequisites common to all simple contracts as:

"(1) Legal capacity on the part of the contracting parties; (2) mutual assent of the contracting parties to the terms of the contract, or what is commonly known as a 'meeting of the minds'; (3) a valid consideration; (4) rights and liabilities sufficient definite to be enforceable; and (5) an agreement of such a nature as not to be prohibited by the statutes or the common law".

5. THE FIRST SITE VISIT

5.1 During the first briefing session, the Principal Agent is instructed to ensure that the entire consultant team is to be present at the first site meeting arranged with the Regional Technical Representative.

5.2 It is further emphasised that the sole purpose of this site meeting is to make thorough observations and note all the relevant factors that may influence the design and provision of all the elements comprising the project. Particular attention is given to those that influence or form part of the variables contained in the brief. Amongst others, the following aspects are to be observed and noted:

(i) The size and shape of the site
(ii) The surrounding roads and domestic even, either present, obvious or planned
(iii) All the access restrictions
(iv) The presence or absence of boundary pegs
(v) The possible threat by squatters
(vi) The presence of utility services and availability
(vii) The actual and potential development of the area and
(viii) any dangerous aspects or potential hazards.

5.3 It was a pleasure to experience the zeal and determination, with few exceptions, of all the disciplines, to start the project with absolute dedication to success, having clearly accepted that they were involved with a State building, to be provided with taxpayers funds, and not just another school for Blacks.

CHAPTER XI - DOCUMENTATION

1. THE NEED FOR PERFECTION

1.1 The documentation prepared is basically, the language used to firstly, enlighten the client as to what to expect in the finished project. Secondly to convey to the contractor and his tradesmen the "what" and "how" to produce the envisaged and intended product, and thirdly, to form the basis of a binding contract document between "Owner/Client" and "Contractor".

1.2 The more explicit the language and the easier interpreted the less likelihood of misinterpretation, and certainly a reduced tendency to error other than human error. For this very reason it is important that the documentation/ language, is as near to perfect as is humanly possible.

1.3 Knowing this fact only too well, the Professional Services component of the DET have, since their inception, demanded the highest standard of documentation possible and have succeeded to the extent that they boast the highest standard of any other, similar related, Government Department.

2. STANDARDISATION OF DOCUMENTATION

2.1 The quest for perfection in documentation is greatly assisted by the introduction of standardisation, with the result that standardisation runs through the Departments documentation like a silver thread, giving it a distinct stamp of "authority".

2.2 The extent of standardisation is not confined to documentation only. Every activity in the Directorate: Building Services, is initiated and processed by the use of an approved, user friendly, proforma. The majority of these proformas have been introduced and compiled/designed by the Architectural Services Component.

2.3 The use of proformas in every department, for the purpose of processing data and activities of an administrative nature, may, on first impression, sound like a paper war of red tape, and act as a brake on all activities. Not so! The very act of introducing proformas, especially route forms on the outside cover, introduces discipline immediately, with the resultant creation of routine reduced to the shortest form of uniform processing.

2.4 The introduction of standardisation in the administrative section, enables any authorised person requisitioning a file, quite simply to identify the type of file required, as well as an easy and fast search process to find the required data.

2.5 Keeping the drawing sheets sizes standard, as well as the standard method introduced for the drawing numbers to relate exactly to the registration number of a school (this number is never duplicated, country-wide, or ever re-allocated) has made it possible to trace a complete set of original working drawings, of all disciplines, within minutes in the plans registry, provided the "B." number is given. The name of the school is less important than the "B." number, during the search process of any particular file or drawing. This unique system of identification, coupled with standardisation, has become one of the prime factors in promoting efficiency and smooth operation of all the activities in the Directorate: Building Services.

2.6 Because of this system, a complete set of guides and specimen proformas is issued to the Principal Agent, at the time of the first briefing. The list of these documents and proformas is completely set out and illustrated in Appendix "K".

2.7 The value of standardisation of procedures and documentation is clearly demonstrated by the well known (country wide) efficiency of every component in the Directorate: Building Services, and even more evident in the simplicity of adaptation of the various standard school building elements in arriving at a logical configuration of the entire complex.

2.8 Succinctly described, **standardisation** is synonymous with **efficiency** and **speed** of operation.

3. COPYRIGHT

3.1 Because it is so easy to become a victim of the "International Law of Copyright", the author deemed it necessary to include a short paragraph to explain just how the DET saw fit to apply this protection to its school buildings designs and documentation.

3.2 Because the DET's Directorate: Building Services operated mainly on a "repeat of documentation" basis, it was necessary to claim copyright protection on all its school buildings, designs either for full schools or individual components thereof.

3.3 To this end, not only did the Department provide, gratis, all drawing paper sheets, but also insisted that, on every drawing sheet, be it for sketch designs, working drawings or any other purpose, a standard clause was incorporated that the copyright devolves upon and remains the property of the Government of South Africa.

3.4 It must be understood that, clearly, the intention of adding this protective and barring clause, was not to be able to litigate against any person or body, but to safeguard being litigated against. The Department will only consider it as a compliment if any person or body wishes, on their own accord, to build school buildings exactly as those being built by the Department.

4. COMPUTER AIDED DRAWING (CAD)

4.1 Because the D.E.T. insists on all documentation being presented to the highest standard, it only welcomed the correct application of CAD. In fact, the Department sponsored all its drawing office personnel to complete the CAD course offered by the Technicons, also providing each individual with their own computer, loaded with an accepted CAD programme as well as acquiring a high standard plotter.

4.2 This intelligent move, made it possible to record all the Departments standard designs and details on software, carefully filed.

4.3 This method of compiling and storing standard designs and working drawings with all the details, has made it an extremely simple matter to update these documents immediately as improvements or changes in policy become evident. Obviously, this is a great advantage.

4.4 Although the Department favours the use of CAD, it has not and will not, make it mandatory for any professional firm to have to prepare their documentation exclusively using CAD. The primary prerequisite will always remain, a high, professional standard of documentation.

4.5 This detail is dealt with in the briefing and contained in the "Briefing Resume". However, it should be stressed here again that, no working drawings or other tender documentation is to be commenced until the Structural/ Civil Engineer produces a contour plan. It is most important that, having completed the soil investigation, he will propose the most cost-effective method of foundations and all of these actions

to be approved of, in writing, by the Head Office Control Engineer.

4.6 The further sequence of procedure for documentation, is adequately dealt with in the "Briefing Resume" included as Appendix "E", and need not be repeated here.

5. STORAGE

5.1 As discussed earlier, all original drawings are permanently held in storage at Head Office. This fact, with all its advantages is one of the main pillars of success of the efficiency and "well-oiled" smooth running of the Professional Services component of the Directorate: Building Services.

5.2 Since 1983, the Plans Registry, has increased from one horizontal plan filing cabinet to forty eight horizontal plan filing cabinets, of varying capacity storing in excess of eight hundred and fifty thousand drawing sheets.

5.3 To cope with the increased demand for "plan reproduction" the Department acquired an additional printing machine in 1986, at a cost of approximately half a million rand, fully computerised to reproduce any drawing including making transparencies from a printed sheet on opaque paper.

5.4 The compulsory storage and most efficient filing system as detailed earlier, is yet another main pillar of success. To be able, within minutes, to locate a complete set of drawings of a particular project amongst eight hundred and fifty thousand drawings, involving some three thousand schools, when only the "B." number is needed as a reference, is surely a feat to be justly proud of, apart from the fact the it is one of the main factors contributing to efficient overall administration and good management.

6. AS BUILT DRAWINGS

6.1 Regardless of how efficient the filing system may be, no plans registry is fully functional if the drawings so filed are not a true reflection of the actual buildings on site.

6.2 For this reason, and as early as the first briefing session, all the disciplines are warned that no final payment of professional fees will be made until, not only are all

the drawings complete in number and safely filed in the Departments Plans Registry, but that the necessary drawing sheets have been requested, by hand or courier, for final updating, and returned by hand or courier, with a certificate certifying that the drawings now represent a true reflection of what has actually been built and accepted.

6.3 It has always been an interesting phenomenon to observe, that, invariably it is the site plan that has to be updated, and we all should know that, it is an accurate site plan that is most important to refer to, when any future development, of any nature, is to be undertaken.

6.4 The Department has no objections to providing the consultants with paper prints of their documentation, gratis, if they request them, or at their own cost, permit the consultants to make transparencies for their own records.

CHAPTER XII - TENDER EVALUATION AND CONTRACT ADMINISTRATION

1. RECEIPT OF TENDER DOCUMENTS

1.1 Tenders always close at 11:00 on Wednesdays, at the State Tender Board in Pretoria. Immediately after 11:00 all the tenders, for whatever service has been advertised as closing on a particular Wednesday, are opened in public, read out aloud, in no specific order, but, at least in similar service batches. They are then all stamped and signed as validated. The present agreed period of validity, is sixty days.

1.2 The D.E.T. Building Services receive the validated tenders anytime between the following Thursday to Monday afternoon, where they are all technically validated and sorted, per project, in numerically (money wise) ascending order.

1.3 The tenders are then copied and either sent by fax, or if the Principal Agent is close enough and is prepared to, collect personally, to the relevant Principal Agents. They evaluate each tender carefully and in accordance with the regulations and conditions as advised during the brief.

2. PLANNING THE EXERCISE

2.1 The Principal Agent has been advised to, carefully plan his procedure, so that he can set about the task and complete the exercise in the shortest possible time, totally ignoring the period of validity as if it did not exist, fully realising that, time is always of the essence.

2.2 Only after formulating a carefully prepared programme does the Principal Agent, systematically proceed to collect all the data required.

2.3 If the Principal Agent is sharp and intelligent, he would have made it his business to be represented at the opening of tenders, to list all the tenderers who may have tendered on other building projects so that he can share the load of "data collection" with one or more of his colleagues.

3. COLLECTING DATA

3.1 A lecture given by the author (Appendix "G"), made it quite clear to the consultants

just how important it is for them to collect substantiated data on each tenderer, especially so, when the lowest or a few of the lowest tenderers are suspect.

3.2 It is pointless and serves no purpose for the Principal Agent to, subjectively advise against a tenderer and, should he be appointed, to say "I told you so!". He must produce substantial evidence to satisfy the State Tender Board that they can safely reject the suspect tenderer. It must be emphasised that Public funds are involved and, as such, every precaution must be taken to be absolutely impartial, objective, with substantiated evidence before any tender is rejected.

3.3 The process of ascertaining the tenderer's banking credentials is only painful and laborious, if the evaluator approaches the tenderer's bankers (as supplied in the tender documents) directly. It is far simpler and more trustworthy, to utilise the services offered by the evaluator's bankers, to obtain the necessary credit rating of the tenderer. Naturally, there is a fee charged for this service, which the Department will gladly refund on production of proof of payment.

3.3.1 An accurate bank assessment of the tenderer is invaluable and often is a factor that can decide the fate of a tenderer's offer. Experience has taught that, in many cases, this information easily discloses, either collusion or downright dishonesty. The Tender Committee's records show many cases where the tenderers only have a savings account, and, on a few occasions, no banking account at all!

3.4 Over the past two years, it has been standard practice to add a question in the tender documents, asking if, should the tenderer be successful, will his bankers be prepared to consider supplying the required ten percent guarantee? (or any other recognised financial institution). On record, it can be shown that many awarded tenderers have had to be cancelled, due to the fact that the successful tenderer has been unable to raise a guarantee, not only within the stipulated twenty one days, but not at all! There is a penalty for this default, but then, fewer tenderers are reading the tender documents carefully.

4. EVALUATION AND MOTIVATION

4.1 The speed of disposing of the recommendation or rejection of a tender, by the Departmental Tender Committee, is directly related to the efficiency and thoroughness of the Principal Agent's own evaluation and motivation of his

recommendation. It can mean the difference between the tender process flowing smoothly or the necessity of obtaining extension of validity from all the tenderers.

4.1.1 Having to obtain an extension of validity from the tenderers, may well be advantageous to some tenderers, but although, not only is it a poor reflection on the Department, is most definitely always a source of irritation to the community who, in all cases, have been patiently waiting for the service.

4.2 To avoid undue delay, all evaluations and motivations are checked by the Department's Quantity Surveyors component who, in their turn add their valuable comments. In very doubtful cases, even at this stage, the documentation can be returned to the Principal Agent for additional information. An unnecessary and irritating delay.

5. SUBMISSION OF FINDINGS

5.1 The State Tender Board has its regulations so designed that, should there be no doubt as to the validity and acceptability of the bona fide lowest tenderer, then the Departments Tender Committee, with delegated authority to an appointed quorum, chaired by the Director: Building Services may, without reference to the STB appoint the lowest tenderer.

5.2 Should there be valid grounds, however, not to appoint the lowest tenderer but rather the second, third or fourth et cetera, or not appoint one at all, then this decision rests squarely in the discretion of the State Tender Board, for obvious reasons, and must be referred to them.

5.3 Should the decision have to be taken by the STB solely, then all of the tender documents in question together with all the relevant findings must be re-submitted to the STB for consideration, evaluation and a final decision, which decision is conveyed directly to the successful tenderer, with a letter of confirmation posted to the Department's Tender Committee.

5.3.1 Regardless from which source the successful tenderer receives the letter confirming acceptance of and appointment to the contract, it is the date on this letter which is accepted as the contract commencement date. This fact is clearly spelt out in the tender documents, as well as the period to be given for the completion of the

contract.

5.3.2 This fact cannot be over emphasised, since not only does this date often become critical for various reasons, but it is also coupled to the fact that all statutory holidays including the mandatory "Builders Holiday" are included in the specified, agreed and accepted contract period.

6. SIGNING OF CONTRACT

6.1 Subject to common law, the offer of the defined service and the formal acceptance thereof does in fact, consummate a contract. It is obvious however, that where the offer is made up of a multitude of items representing itemised, material, labour and material plus labour units, each individually priced and extended, and all or any of these subject to a variation order, without vitiating the contract, it is essential to enter into and sign a formal contract.

6.2 The "contract documents" comprise all the documentation issued to each tenderer, plus, naturally a few drawings indicating the exact location and the physical scope of the project. All of the drawings, amongst other complete detailed drawings were used to measure and compile the "Bills of Quantities" including the "Electrical Bills of Quantities". Naturally, since these detailed prices are confidential and remain the exclusive property of the tenderer, the tenderer submits only the documents verifying that the tenderer accepts all the "Conditions of Tender" et cetera, for which the tenderer tenders, are all inclusive prices as detailed in the "Tender Documents".

6.3 Before the formal contract can be signed, however, the "Conditions of Tender" stipulate that, within twenty one days of acceptance of the tender, the tender is to submit

(i) An acceptable performance guarantee equal to ten percent of the offered contract sum, either in cash or in the form of an acceptable surety and

(ii) a complete priced "Bills of Quantities" to be checked and approved as acceptable by the consultant Quantity Surveyor. Any obvious errors, either arithmetical or clearly subject to abuse, are to be altered and agreed to by the tenderer. No such alterations may and must not alter the original tender price, but all itemised prices when extended and totalled must add up to exactly the original tender amount.

6.3.1 The two mandatory conditions must be strictly conformed to within the stipulated time frame, before the formal contract can be signed. Should the tenderer fail to comply with both these conditions within the stipulated twenty one days, then after invoking the "*Audi Alterem Partem*" rule, by giving the tenderer fourteen days extension, the contract can be cancelled.

6.3.2 The penalty for such a default by the tenderer is that the State can claim, in cash, the difference between the tenderers contract price and the contract price of the next lowest acceptable tenderer.

6.3.3 However, should all things be equal and all the conditions are complied with, the formal tender, exempt from revenue tax, can now be signed.

6.4 The signing of the contract is strictly a legal formality which can take place at any acceptable venue, but definitely not on site. Site handing over is a function all on its own. The Contractor plus two, legally acceptable, witnesses, after lodging his company's authority for him to sign, will proceed to sign the contract in the stipulated manner.

6.4.1 The signed documents are firstly copied in sufficient number only to provide one priced "Bill of Quantities" for the contractor and one for the Consultant Quantity Surveyor. The signed documents are then forwarded, under registered cover, to the Department for signature by the Director General, or his delegate, at his leisure, before being safely stored for future reference.

7. HANDING OVER OF SITE

7.1 There may be two specific "Handing Over of Site" functions, and often are, depending on the wishes of the community. The one, and legally required, is known as the "formal" site hand over, and the other, when required by the community is known as the "ceremonial" site hand over, which is often quite a pompous affair, which one can well understand, specially when it is a new school, desperately required, having been on the waiting list for years.

7.1.1 In any case, the formal "site hand over" must take place first, and, according to conditions of tender and contract, this action must take place within fourteen days of the signing of the contract or if the contractor has complied with both mandatory

conditions for signing of the contract, then, within fourteen days of the date on which the last of the two conditions were complied with. Should the Department, through the Principal Agent, not comply, then the contractor will be entitled to claim for an extension of time.

7.1.2 The procedure for handing over of the site to the contractor is a formal procedure clearly detailed in the "Briefing Resume" and strictly conforming to the proforma minutes. The following persons must be present at the "formal site handing over" namely

(i) The Contractor and his foreman or site manager

(ii) The Principal Agent with his full complement of consultant colleagues and

(iii) Representatives of the Regions Technical Component

The following actions must also take place, namely

(i) The Contractor must be supplied with four complete sets of drawings.

(ii) The boundary pegs must be located and clearly pointed out to the Contractor.

(iii) The two "datums" placed by the Civil/ Structural Engineer must be pointed out.

(iv) The position of the school buildings, the position for the materials on site and the position of the Contractors sheds must be established.

(v) The location of all the services must be pointed out to the contractor and

(vi) the day and time of the next formal site meeting is to be agreed upon, as well as the subsequent formal site meetings.

Finally a "site handing over certificate" duly signed is presented to the contractor with a certified copy sent to the Director: Building Services.

7.2 Should there be a ceremonial "site handing over", it can take on any form and is left entirely to the discretion of the Chief Director: Regional Services and the chairman of the community's local schools committee in consultation with the Headmaster. As the name suggests, it is a dignified ceremony, the importance of which must never be underestimated. It is wise to present the chief dignitary who will, no doubt, deliver a speech and perform a "sod turning ceremony" with a ceremonial spade.

This must be negotiated with the Contractor who, by this time, has become a very important figure. The entire day is always set aside for this ceremony.

8. SITE ADMINISTRATION

8.1 Effective and firmly controlled site administration is indisputably the most important phase from inception to final delivery, of any building project. This is so much so, that it is difficult to find the correct adjective to describe the importance of, and influence on the finished project. This is achieved by effectively administering the site administration, commonly referred to as "supervision". It is not strange then, that twenty five percent of an Architect's fee is allowed for supervision and site administration.

8.1.1 Without a doubt, in the system devised and successfully employed by the DET's professional services component, almost all of the accent is placed on the Principal Agent's ability to efficiently administer the contract on site, since all activities prior to arriving on site for construction purposes are carefully monitored by the Control disciplines of the Directorate: Building Services. The noticeable weakness in site administrative expertise amongst the Architectural Profession, could lead them to eventually lose this privilege to more qualified project leaders of other disciplines in the future.

8.1.2 The author feels so strongly about this subject that he can only strongly concur when (Thiesen 1934, p. 169) pointed out that many cities have been keenly disappointed in their reliance upon the architect to furnish complete supervision and went on to comment:

> "Why architects who will not render satisfactory supervisory service should be chosen is a matter of conjecture. It is indicative of carelessness on the part of boards of education in not ascertaining fully the candidate's past record. A successful architect must be more than a designer. Too many boards take it for granted that satisfactory construction will follow satisfactory planning."

8.2 During both briefing sessions, a definite point is made of the fact, that it is important for all role players to have a clear perception of the common goal. That is to successfully produce an acceptable school building complex. The Principal Agent is instructed, at the site handing over meeting, to impress upon all the role players

present, the need for harmonious relationships between all concerned from the very beginning to final delivery. To quote Crabtree (1964, p. 149):

> "... in order to meet the definition of 'economy' in school buildings it is essential to have a harmonious, close-working relationship between educators, building committee and architect."

8.3 Although it is not the responsibility of the Principal Agent, he is advised to impress upon the contractor, on the very first meeting, to study the "Conditions of Contract" very carefully, with special reference to due performance. Also the implications of variation orders and the contractor's sole responsibility in the application for "extension of time" which is an absolute concession, to be applied for strictly in terms of the "Conditions of Contract". If done in the right spirit, the creation of the correct perception in the contractor's mind will save endless delays and unnecessary administrative problems.

8.4 The entire consultants team are left strictly on their own resources on site, being ably assisted by the Region's Technical staff, with regard to quality control and procedural guidance. The Head Office Professional team will not interfere on site or attend site meetings unless specifically called to solve a particular problem. It is vitally important never to undermine the authority of the professional consultants on site. It is for this very purpose that the briefing sessions are so thorough and comprehensive.

8.5 It is the complete reliance of the private sector's professional expertise on site that has contributed to the success of the Directorate: Building Services, Professional component, which, in this way, can be kept down to a minimum, efficient, qualified and motivated personnel.

9. FIRST DELIVERY

9.1 "First Delivery" is the term used to define the successful completion of the construction of the building complex, hopefully on time. The exact procedure to be followed is discussed, in detail, during the briefing session and need not be repeated here.

9.2 What is important to emphasise is that, contractually, this ends the activities of the main contract, although there is always a consequential obligation by the contractor to complete the few (not more than five) items found to need attention, as well as

attend to patent defects that may occur during the three months "retention period". Even latent defects could possible surface during this period.

9.2.1 At this stage, the retention moneys are reduced to two and a half percent of the contract price, this amount being held in case of default by the contractor to attend to "defects" when instructed to, thus financially making it possible for the Director General to have these defects attended to, at his own discretion and debit the costs directly to the contractor.

9.3 It is normal, at this stage, for the Director General to invoke his prerogative by releasing the performance guarantee. He may well do so, at an earlier stage should he see fit to do so, and he may well withhold this release, should there be a valid reason to do so.

9.4 On occasion, specially in the case of a complete new school, the "First Delivery" action is accentuated by handing over the keys of the school to the Principal and wishing him well. Except for rare occasions, the Principal and his staff wait until all the school furniture and equipment have arrived and been installed, as well as the school children having done as much site "gardening" as possible, before a dignitary is invited to officially open the school. This is indeed, always an apt time to celebrate, and a proud moment, not only for the school community, but for the DET as well.

10. FINAL DELIVERY

10.1 Only on rare occasions does final delivery follow first delivery in exactly three months time. Usually it takes somewhat longer to force the contractor to attend to the few outstanding items. However, the school is functioning, the community is happy, the Principal is aggravated, but the situation is seldom serious.

10.2 On occasion the Department is forced to carry out extensive "retention items", when the community have become impatient at the contractor's undue delay and have simply occupied the incomplete premises without warning, and to remove them would always be almost suicide. This forces the Department to prematurely take first delivery having "permitted" beneficial occupation.

10.3 Usually, with the co-operation of the school children and community this can be an advantage, since it contractually and legally permits the Department to step in and

speedily complete the service, always hoping that sufficient funds have been withheld to carry out this exercise.

10.4 Latent defects are rarely encountered and always dealt with on merit and with caution. Not often can the original contractors be found to be in a position to finance these possible defects. Another good reason for effective site administration.

11. SUMMARY OF CHAPTERS IX, X, XI AND XII

11.1 In the previous four chapters the third hypothesis "that the subdirectorate established a well planned system to streamline the entire process of rendering satisfactory professional services", is proved beyond doubt and even stands out with a mammoth step forward when related to the pre-1983 disorder and chaos.

11.2 It must be emphasised that it was not difficult to introduce and establish the system since it did not replace an existing system but succeeded in instituting order where chaos was the order of the day. What was important though was that the system introduced was scientifically and well planned based on the experience gained by the author in the research undertaken for his dissertation "A study of the liaison mechanism between architects in the private sector and the TPA in relation to the design of and additions to primary schools", submitted as fulfilment of part of the requirements for the degree of Master of Architecture in the Faculty of Mathematics and Science, University of Pretoria, and accepted in May 1983.

12 CONCLUSION

12.1 When establishing a well planned, successful system in any sphere of activity it must lead to, not only a well motivated personnel, but also the enthusiastic participation of all consultants in the private sector. The success of this system is evident in the thousands of projects in South Africa that were efficiently administered and brought to useful fruition.

PART V

CHAPTER XIII - EFFICIENT STORING AND RETRIEVAL

1. INTRODUCTION

1.1 In this chapter the author deals with the fourth subproblem "to investigate the storage and retrieval system of documentation", and not only sets out to prove the need for such a system but also that the success of such a system depends largely on the simplicity of the system, making it user friendly to the most junior clerk who need only have average intelligence and the ability to read and write.

2. THE VALUE OF ACCURATE FORESIGHT

2.1 Having experienced the chaotic state of affairs in the plans registry and being part of it for eight years during his service in the TPA, the author was determined not to allow a similar situation to arise in the yet to be established plans registry in the DET.

2.2 The DET: Buildings Directorate were not to be blamed when in January 1983, the only drawing that was available was a dilapidated transparency of a four classroom block commonly referred to as a "four by four" (see figure 2). The Directorate: Buildings had only been functioning since 1981 and were still finding its feet.

2.3 When the author arrived on the scene as Deputy Director: Building Standards (later Professional Services) to find the situation as it was and having come from the TPA where thousands of drawings were poorly registered with a cumbersome retrieval "method", it was not difficult for the author to fully realise the potential growth.

2.4 It was obvious that, with the enormous backlog of schools for the Blacks and the planned endeavour to reduce this backlog, the Directorate: Buildings would expand to become the largest component of building schools and all other learning institutions for the Blacks in South Africa. This it did indeed.

2.5 From previous experience the author was fully aware of the fact that in order to create and maintain a successful storing and retrieval system it would be necessary to establish an efficient drawing office first to supervise and maintain the various

activities necessary to establish a new plans registry with an enormous growth potential.

2.6 The author compiled an establishment program illustrated with the relevant organogram and submitted this for approval of his envisaged effective professional services component. At the top of the priority list was the Drawing Office and Plans Registry to established immediately and simultaneously.

2.7 With the blessing of the authorities this was approved and immediately set in motion order under calculated guidance. The whole of the professional services component did grow into a successful and extremely efficient unit.

3. THE DRAWING OFFICE

3.1 An efficient and well qualified drawing office is such an essential and important component of any professional discipline related to the building industry, that the author decided to give the priority to the establishment of a well organised drawing office staffed with the various grades of Industrial Technicians/Architectural. Architectural was decided upon since the bulk of their input would be architectural and the small amount, and low level of draughting work required by the other disciplines, can easily be handled by intelligent architectural draughtsmen. It is always intelligent to establish the drawing office first, before developing an efficient professional services component, especially when the professional services are being undertaken by selected private sector consultants under the guidance and supervision of a senior professional person in the Department in general and the Directorate: Buildings in particular.

3.2 The first step was to obtain approval for the establishment of a multi-disciplinary professional services component including the drawing office and plans registry personnel under the supervision of the Deputy Director: Building Standards.

3.2.1 A fully motivated submission was made and subsequently approved for the following establishment:

Deputy Director: Building Services	(1)
Architects	(3)
Quantity Surveyors	(3)
Engineers	(3)

Control Industrial Technician	(1)
Chief Industrial Technician	(1)
Industrial Technicians	(4)
Learner Industrial Technicians	(3)
Senior Administrative Clerks	(2)
Operators (For plan reproduction and filing)	(2)
TOTAL	23

3.3 In October of 1983, the author obtained, on transfer and promotion the services of a Chief Industrial Technician/ Architectural, from the TPA Works Department to assume control of the Drawing Office, as Control Industrial Technician. This was a sound move, since the new head of the drawing office was a person who had not only worked under the author, but also knew and understood the methods of the author, processing a sound working knowledge of the progress towards standardisation of schools.

3.3.1 The Control Industrial Technician (CIT) was thoroughly briefed on the need to recruit suitably qualified Industrial Technicians and students (learners) who were prepared to undergo training at the Technikon, with the aid of bursaries provided for by the Department.

3.3.2 By 1985 the drawing office was staffed by seven qualified Industrial Technicians at various levels of seniority and, as a well motivated team, were more than qualified to function at the desired level, even being able to produce documentation which was either extremely urgent, or of such a nature not to justify the full-time services of consultants from the private sector.

3.3.3 Their invaluable contribution towards the completion of fully documented standard secondary, primary and farm schools will be dealt with in a later chapter. Suffice it to say, at this stage, the drawing office component was one which would do credit to any well established firm of practising architects.

3.4 The Chief Draughtsman was thoroughly briefed and trained in the exact method and procedure the author intended adopting for the Plans Registry. This too was destined to grow and become a very efficient Plans Registry indeed operating on a unique system.

4. THE PLANS REGISTRY

4.1 The success of the Plans Registry is the one other component of the Professional Services that the auditor is exceptionally proud of, since it is a perfect example of learning from past mistakes, either one's own or someone else. As the Negro singer put it "You gotta eliminate the negative and accentuate the positive", and in this instance it was more a case of eliminating the negative with regard to the chaos pertaining in the Plans Registry at the TPA Works Department, and all because nobody ever thought of putting it on a smooth course right in the beginning. Not only is it almost impossible to trace a complete set of drawings for a project but more than fifty per cent of these drawings are either with the consultants or lost to posterity when the consulting firms no longer exist.

4.2 Being new in the Department and apprehensive of falling into the same dilemma as the TPA, the author spent sleepless nights trying to arrive at the solution to the problem of, not only filing the drawings effectively, but also to find a complete set of working drawings of all the disciplines in the shortest possible time, as well as the system being "user friendly" enough to enable the most junior of filing clerks to master the system in the shortest possible time, and with the least amount of pain. For some weeks this remained a challenge to the author who now found himself the victim of his own criticism, until he discovered that every school for Blacks under the jurisdiction of the DET had first to be registered when it was given a number with the prefix "A" followed by five numerical digits. This number was never duplicated or re-issued, being a permanent number issued to schools on registration, in chronological order, without distinguishing one Region from the other except for a distinctive singular numerical digit attached to the main body with a hyphen. The main numerical body runs in perfect chronological order, applicable to the entire Republic, issued at the date of registration at Head Office regardless of which Region it was situated in! This fact contained the seed of the solution to the entire registration problem.

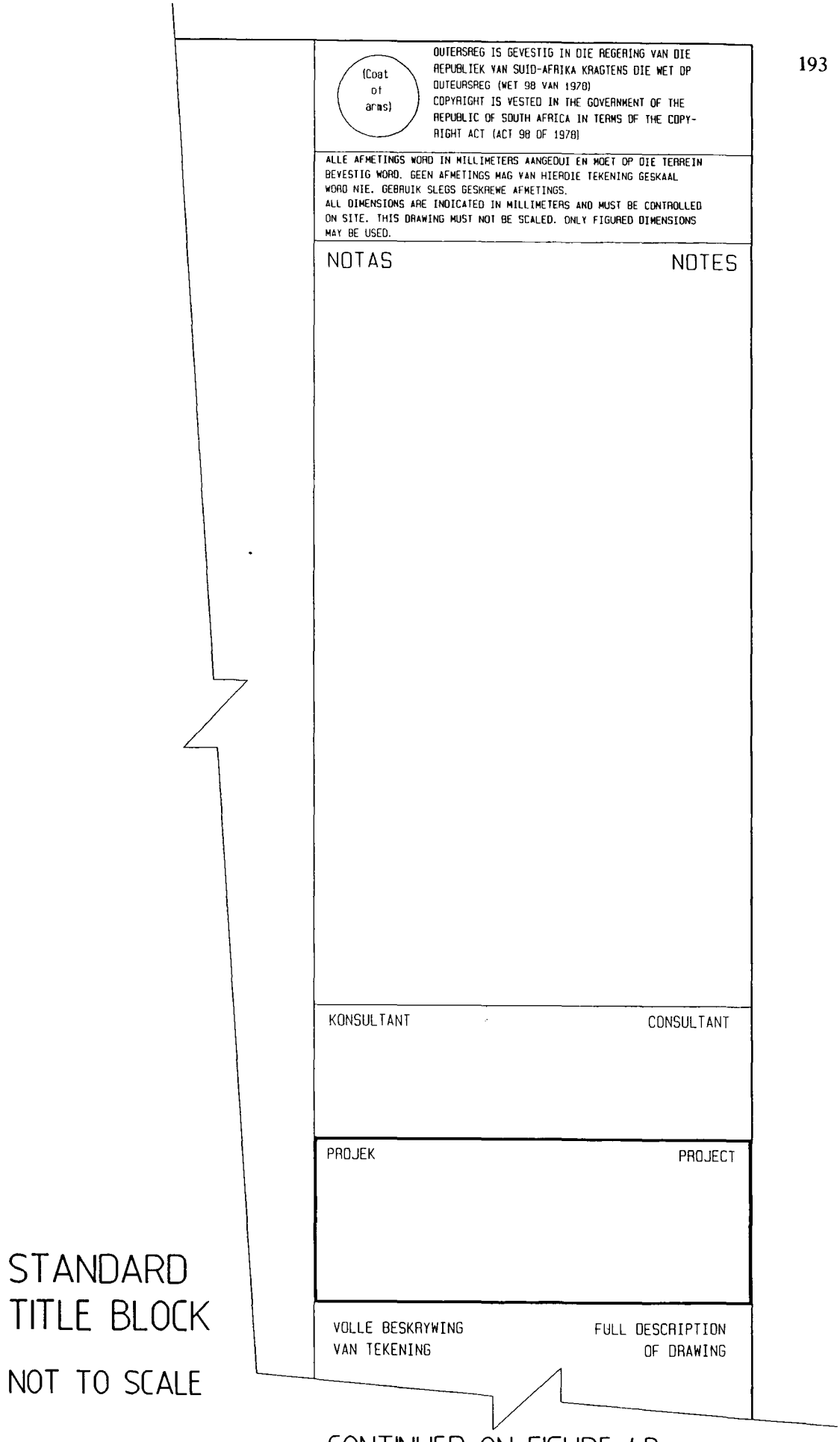
4.3 The Directorate: Buildings, used the same registration number for their files substituting the prefix "A" with the prefix "B" not to confuse these files with the Head Office Administration files. The file number suffixes separated from the main body number with a slash, the suffix denoting a specific discipline. For example, the B. number without a suffix, would be the pure administrative file before any construction work was undertaken, and also to contain documents of a purely general

administrative nature and the B. number with the suffix .../1 would be the file containing all documentation pertaining to a building contract, building construction only and .../2 would be mechanical construction and so on.

4.4 It was perfectly obvious that the logical thing to do with the drawings, of all disciplines, would be to allocate the drawing number being exactly the same as that of the schools registration number (with the prefix "B"), introducing a slash number to indicate the sequence of the drawing in the full set, and an alphabetic letter as a suffix to distinguish one discipline from the other. Simple yet ingenious! The end result was that, within the Directorate: Buildings, a particular school was referred to by its B. number in preference to its, sometimes almost unpronounceable African name, and the filing of the drawings (All strictly limited to A1 size) became not only a simple procedure but kept all the disciplines together, simplified the indexing (being kept both alphabetically and numerically) and the most junior of junior filing clerks could find any set of drawings within minutes, in spite of the fact that the number of drawings filed has grown from only one drawing to eight hundred thousand drawings!

4.5 Another important decision was to standardise the drawing sheets, by insisting on all drawings to be done only on A1 sheets. This not only facilitated efficient standardisation in the Plans Registry, simplifying all aspects of the various activities undertaken by the Plans Registry, but also ensured that the usage of these drawings on site was simplified in all aspects.

4.5.1 To ensure that the uniformity of drawing sheets would be rigidly maintained, the author instructed the Drawing Office, by now a formidable component, to design a standard sheet complete with title block, (see fig 64) call for tenders and order sufficient stock to supply all appointed consultants with all their requirements. To supply these sheets, without receiving payment from the consultants, State Treasury's permission had to be obtained through a convincing motivation. This not only did not present a problem, but lead to a firm policy of maintaining that the copyright of all the drawings be vested in The Government of South Africa, and that all the original drawings be submitted to the Department before being signed as approved, and on approval remained the property of the Department and permanently stored in the plans registry.

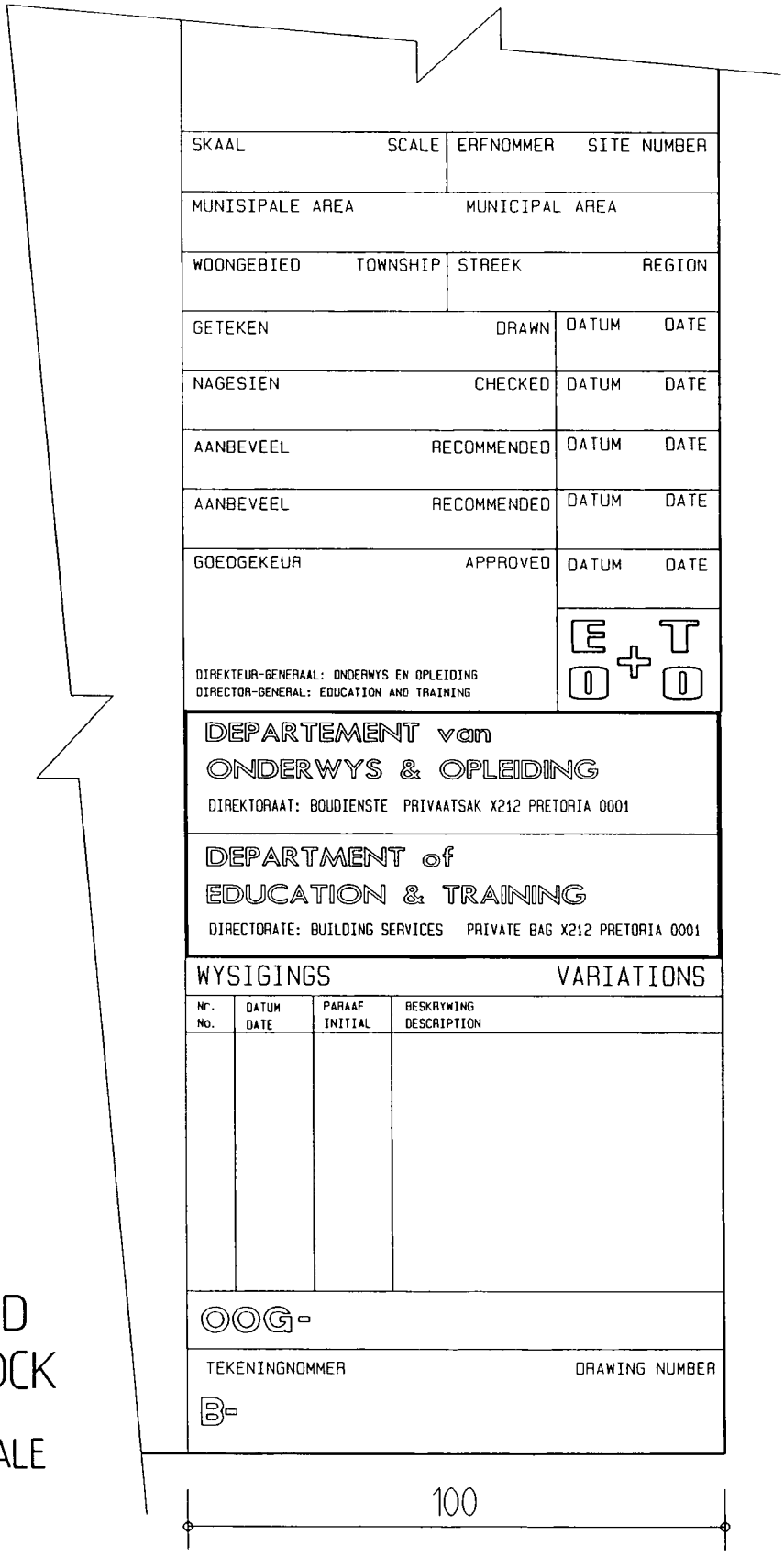


STANDARD TITLE BLOCK

NOT TO SCALE

FIGURE 64A

CONTINUED ON FIGURE 4A



STANDARD
TITLE BLOCK

NOT TO SCALE

FIGURE 64B

4.5.2 This assured the safe keeping of all documentation, forcing the Department to make and issue all paper, or other prints required. This not only ensured proper and careful distribution, but also an enormous financial saving, since the Department acquired the most modern printing machines (two) to cope with the load and, in this way became highly competitive with the private sector as far as the reproduction of documentation was concerned.

4.5.3 The question may be asked, "Operating Republic wide, surely the original documentation could and did become lost in transit?". The answer is, that, throughout all the years and to date, with the use of the courier system, not one of the eight hundred thousand drawings has ever been lost or delayed in transit. The rule was strictly applied that under no circumstance would any original documentation be conveyed by post, not even registered post. The original documentation would only be conveyed by recognised courier or by hand.

4.6 The most valuable aspect of this efficient Plans Registry and the policy of filing all drawings with the DET has the tremendous advantage in the fact that all projects emanating from the DET since January 1983 have the complete documentation records available in the Plans Registry with the added bonus that, by just signalling the B. number to the filing clerks these documents can be retrieved within minutes.

4.6.1 Where only additions and/or alterations formed the brief, the consultant architect was instructed to survey the site and produce complete "as built" drawings of the existing structure.

4.7 With the demise of the DET it was a relatively simple matter to accurately and carefully extract the documents for each Province, rolled and neatly packed in specially ordered cardboard boxes for delivery to or collection by each specific Province.

4.7.1 As sad as this process is to the author, it is with pride that the author can claim that, to the bitter end, the success of "the system" prevailed.

5. SUMMARY

5.1 This chapter illustrated that the fourth hypothesis "that the subdirectorate established a successful storing and retrieval system for documentation", is not only a proven

fact, but that this, as is standardisation, can also be described as yet another cornerstone of the total success of the Directorate: Buildings and the Subdirectorate: Professional Services in particular.

6. CONCLUSION

6.1 This chapter underlines the fact that, unless any Professional Services component does not have an efficient storing and retrieval system, it will fail in other areas as well.

PART VI

CHAPTER XIV - PROFESSIONAL SERVICES

1. INTRODUCTION

1.1 In this chapter the author deals with the fifth subproblem "to investigate the output of personnel" endeavouring to prove that the a scientifically constructed and established system justifies the effectiveness of a relatively small professional component to manage successfully any budget fluctuation between medium (R300M per annum) to optimistic (R1000M per annum) with equal ease.

2. THE DUTY SHEET

2.1 It became clear to the author that although, in his wisdom, the Director: Buildings, envisaged a senior professional person, preferably an architect, to establish and produce building standards for the contemplated future school buildings programme, what really was required was the establishment of a Sub Directorate: Professional Services.

2.2 Up until this point, the private consultants were guided by the two Control Inspectors of Works at Head Office, both well qualified, capable and experienced technical personnel with many years of experience in the building industry, with special reference to Government buildings and the procedure followed by most other Government Works Departments.

2.2.1 It was, in fact, these two inspectors in particular who showed spontaneous appreciation of the fact that there now was an experienced Schools Architect to take over the role of liaison between the Department and the consultants in the private sector. They even expressed their request that such a person be engaged, to more professionally lead and guide the entire Technical Staff at Head Office as well as those of the eight Regional Offices, who, until this time resorted under the control and guidance of the most Senior Inspectors of Works at Head Office.

2.2.2 The "Drawing Office" was staffed by three lady tracers, none of whom were really being employed productively and the only "drawing" that the author could locate was an old, very used, transparency of a standard "Four by Four". The remaining

existing school drawings were still filed in the offices of the private consultants. These were eventually traced and recovered.

2.2.3 After many lengthy discussions with the then Director, to establish what exactly was expected from the newly appointed Deputy Director: Building Standards, the author came to the conclusion that the duties were not crystal clear in the mind of the Director, but he was very definitely hoping for some tangible form of building standards for schools for Blacks, in exactly what form, he was not too sure.

2.2.4 At this crucial point, the author had almost completed his thesis, "A study of the liaison mechanism between architects in the Private Sector and the TPA in relation to the design of and additions to primary schools", registered with the University of Pretoria, for the degree of Master of Architecture in the Faculty of Mathematics and Science. (The author graduated in June 1983). Instead of frustration, the author saw a unique opportunity of building an effective, if not the finest Professional Services Section, with all its components, being able to start from almost zero, and being able to apply all the theories proven in the thesis referred to, so tailor - made for the exercise. The task that now lay ahead was to search for or create an opening to justify a move in this direction.

3. THE GOLDEN OPPORTUNITY

3.1 The timely "opening" presented itself in March 1983 in the form of a small crisis created by the notice from a farmer, who had recently acquired a farm in the Magaliesberg district, on which a small school had been erected as a "farm school", by the previous owner. The new owner could, and did signify his intention not to renew the arrangement with the DET, adding the condition that the pupils had to be accommodated in alternative premises by the end of that school year!

3.2 The Director called the author in to enquire whether or not he could orchestrate the necessary consultants to provide the timeous completion of documentation to ensure a small school of ten classrooms, a small administration section and the necessary ablutions to be ready for occupation at the beginning of the new school year in 1984! The decision was immediate and reassuring. Yes, it can be done provided that the author could design the small school and select the consultants? Agreed, with reservations.

3.2.1 A suitable site was offered in close proximity to the existing school, adjacent to an ESKOM relay station, (that solved the electrical power problem) and the possibility of connecting to the sewer system in the adjoining ESKOM property, as well as obtaining an adequate water supply from two existing boreholes.

3.2.2 Although almost ten years out of practice, the author, with the help of one of the Head Office electrical inspectors, personally visited the site to produce a complete contour survey and establish the feasibility of the project. Now for the documentation, and the rest!

4. THE WAY FORWARD

4.1 The author seized the opportunity to adapt the already proven standard primary school, which he had successfully developed and physically had erected, on numerous sites in the Transvaal whilst employed as "O/C" primary schools for the TPA Works Department. See figure 65. The Director had no hesitation in accepting the design. Standardisation was quietly born to the DET but had several years to go.

4.2 The Director was relatively new in the post although a very experienced Public Service Administrator, and as such, he not only indicated his approval of the professional and methodical approach, but also demonstrated sufficient confidence in his new "prodigy" by even suggesting the author immediately proceed to select the consultants in the various disciplines, produce the documentation, call for tenders in accordance with the State Tender Board regulations and establish a contractor on site in the shortest possible time.

4.3 Selecting the appropriate consultants and producing the documentation within three weeks presented no problem since, all that was required was to select the team which had produced the most professional set of similar documentation in a record time for the author, whilst serving in the TPA Department of Works.

4.4 As in a typical fairy tale, this project was not only successfully completed on time but it served to demonstrate, not only the value of standardisation but also the necessity of a thorough brief (refer chapter X) that always proves its value in creating the required team effort and smooth liaison between the role players, both in the private and public sectors.

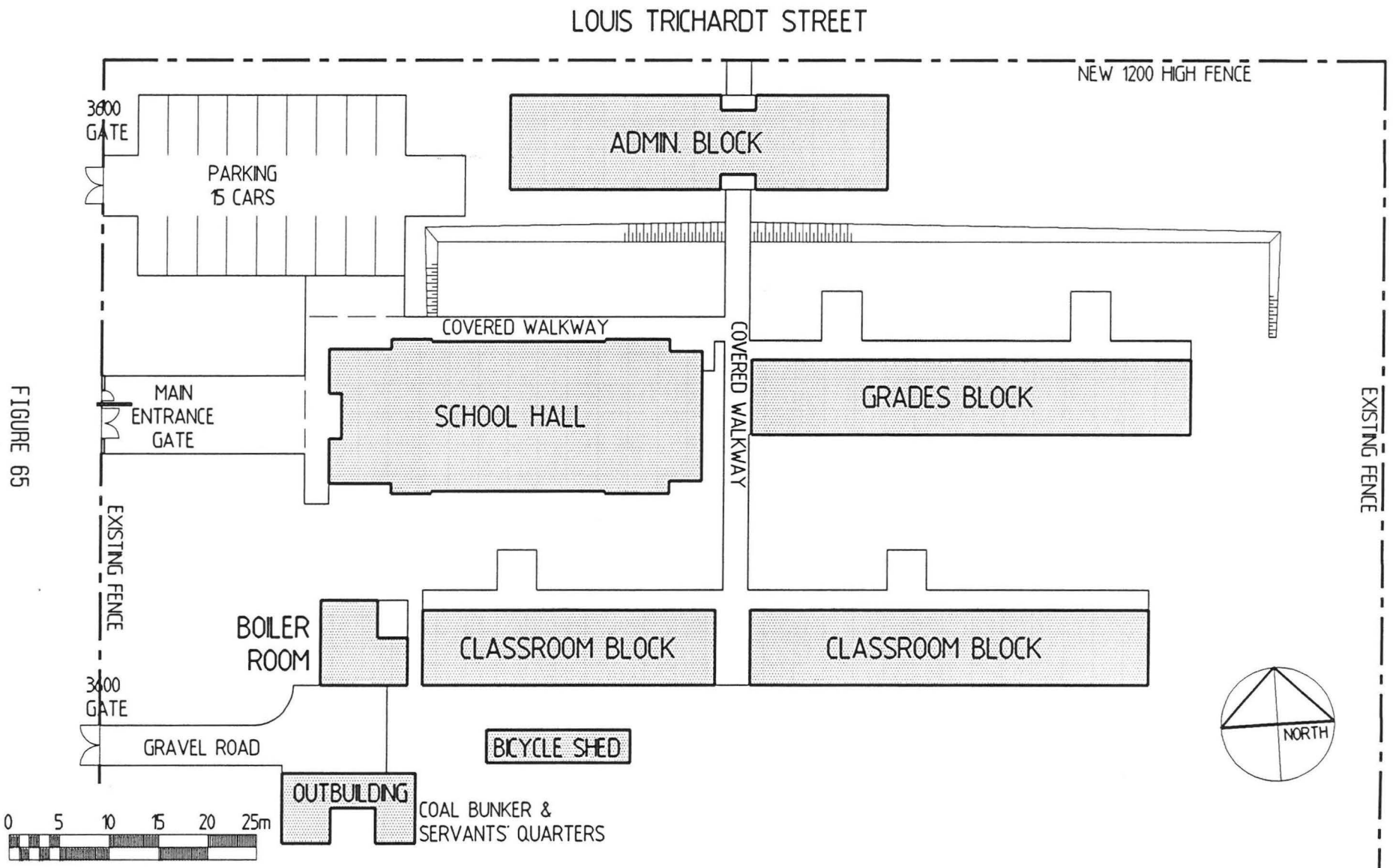


FIGURE 65

MAYVILLE PRIMARY SCHOOL - Site Layout

200

4.5 In retrospect, this was truly the singular event that induced the author to create a professional services section equally, if not better than, any other public sector professional services section. The field ahead was virgin and every opportunity for the author to avoid all the obvious and apparent weaknesses experienced during his eight years with the TPA, and implement the improvements so blandly necessary yet, within the TPA, too late to rectify.

4.5.1 The success of an efficient system requiring a minimum of personnel has been achieved far beyond the authors wildest dreams and imagination, and with the phasing out of this section due to the New South Africa's principle of provincialisation, it can only be said, with just pride "Here is a perfect system, either to be used as is, or be improved upon".

5. THE SPECIALISED PROFESSIONAL TEAM

5.1 At the time of joining the DET, the author was thrilled to find that, sketch designs and documentation were well advanced, for the proposed Garankuwa Training Hospital, designed for two thousand beds, to serve as a training hospital for the Medunsa Medical School for Blacks. This hospital was under the auspices of the DET since it was a teaching institution for Blacks.

5.1.1 Two firms of each discipline, Architecture, Quantity Surveying, Civil/ Structural Engineering, Electrical and Mechanical Engineering were appointed to form the consortium to be known as "Garankuwa Hospital Consortium", with the consortium of architects appointed as the Principal Agents.

5.1.2 When the author joined the Department, the Nurses and Doctors quarters, the Energy block and a large portion of the site works were in progress. The main hospital buildings for two thousand beds, the Oncology and Psychiatric components were still in an advanced stage of sketch designs which had yet to be finalised.

5.1.3 For the first three years (1975-1977), of the authors term of office with the TPA, he was attached to the "Hospitals Section" of the Architectural Services, before being appointed as officer in control of Primary Schools in the Transvaal, therefore finding himself as control professional officer supervising the progress and services of the consortium did not come as an unknown field of study, on the contrary, the author found the challenge exciting.

5.2 In October/ November of 1983, the author was delegated to accompany the members of the consortium on a overseas tour of four weeks doing intensive research of hospital designs in Israel, Switzerland, Sweden, Germany, United States of America and England.

5.2.1 It was tough going, hard work and very interesting and instructive. The spin-off that was most important to the author, was being able to be in such a close relationship with the multi-disciplinary consortium for a period of four weeks. At the end of the four weeks the author was in a position to formulate a concrete plan, as to exactly how he would build and lead the specialised professional team/ component, which would function primarily to guide and control all the appointed consultants in the various disciplines, strictly in accordance with an efficient procedure that the author was to develop with the germ of the solution already firmly implanted in his mind.

5.3 With the establishment approved, the drawing office now under control and forging ahead to full fruition, the drawing office was given the responsibility of supervising the plans registry and plan reproduction component. This permitted full concentration to be given to the growth and establishment of the professional component.

5.3.1 Although, at this point in time, the annual budget for the schools building programme was close to eighty million rand (R80M), it became more and more obvious after touring the Republic and visiting many black townships, that this was only the tip of the iceberg, and that, in an endeavour to satisfy the growing demand for schools and classrooms, as well as reducing the backlog, the only system to employ, would be to use the entire complement of the building construction related practising professional consultants in the Republic as an extension to the Department's professional component.

5.3.2 This would mean that, for each building project, a separate team of consultants would be appointed, on a geographic and transparent rotation basis, consisting of individual consulting firms of as many disciplines as would be required for the project. The discipline involved in the greater division of the project was appointed as the Principal Agent. The duty of the Principal Agent then, as the title implies, would be to correlate the joint inputs required by the other disciplines, to ensure the systematic compilation of the entire documentation required prior to tender procedure, as well as the coordinated effort of all the disciplines during the contract period, up until the final project is successfully handed over to the Department.

5.3.3 Under the supervision and co-ordination of the Deputy director: Building Standards, each member of the professional services component would be responsible for the consultants team member's performance in his discipline in the Region allocated to him, ensuring that the high standards demanded would be met and the prescribed procedures followed.

5.3.4 To achieve this ambitious goal, the author realised that he would have to clearly define the internal procedures to be followed as well as develop the most efficient procedure that the consultants would have to adhere to. All this is discussed in more detail in later chapters.

5.4 The decision that faced the author now was how and when to introduce the actual "bodies" into their respective posts? It was decided to advertise the posts of Architect, Quantity Surveyor and Structural/ Civil Engineer immediately with the intention of appointing only senior applicants with both private and public sector experience. At this stage the Electrical work was still being executed on a Nominated sub-contractor basis, under the guidance of a, then, experienced team of Senior Electrical Inspectors. For the time being this could continue, dispensing with the services of a Departmental Electrical Engineer, but definitely employing the services of an Electrical Engineering consultant on each project.

5.4.1 In July of 1984, the first of the applicants was appointed in the person of an Architect in his early fifties with experience both in private practice and in the public sector. Shortly after this, the Civil/ Structural Engineer was appointed in the Person of an Engineer in his late fifties also with experience in private practice and in the public sector. By the end of 1984 an experienced Quantity Surveyor in his early fifties was also appointed and, once again, with extensive experience in private practice as well as in the public sector. The Professional Services component was now in business!

5.4.2 Apart from insisting on, and ensuring a high standard of documentation, the Professional Services component, backed with years of valuable experience would now concentrate on standardisation, under the leadership of the author who had already introduced the TPA standard primary school, which he designed. The Department, exerted strong pressure insisting the buildings were luxurious, see figure 5. This did not deter the Professional Services component, which forged ahead to establish standardisation in design, documentation and procedures with respect to all

Primary and Secondary schools, even extending this to additions where practicable.

6. MANAGEMENT

6.1 A short reference to management is made, since it has a direct bearing on the introduction of any successful system and this chapter really is intended for a brief journey through the history of the successful Professional Services system within the efficient Directorate: Building Services.

6.2 It is common cause that management begins with oneself and, should a system be introduced that can be managed simply but efficiently, one must only take an in depth look at oneself or one who smoothly and effectively does manage himself. Where is this leading to? Simply this; The author was dedicated to providing a Professional Services system that would answer all the needs that were due to arise within an efficient Directorate: Building Services. An efficient system is synonymous with good management and good management in providing many schools under crisis conditions means strictly disciplined standardisation of accepted norms, and that is exactly what has been achieved.

7. THE SEEDS OF A SYSTEM

7.1 Even before promotion to the DET to establish a Professional Section, the dissertation "A study of the liaison mechanism between architects in the private sector and the TPA in relation to the design of and additions to primary schools" by George Candiotes, was submitted in fulfilment of part of the requirements for the degree of Master of Architecture in the Faculty of Mathematics and Science, University of Pretoria, and accepted in May 1983.

7.2 This dissertation successfully highlighted all the shortcomings in the Architectural Section of the Department of Works of the TPA, after almost eight years of frustration, in building primary schools within the confines of a system that sadly lacked professionalism. The intention was to try and persuade the authorities to bring about changes in order to make the system more acceptable to the private sector's professional element.

7.3 Not all was bad or poor. The idea of standardisation was more than acceptable and was improved upon to produce the standard primary school accepted to this day, and

which formed the basis of the present standard primary and secondary schools of the DET. Yet another valuable division of the TPA Department of Works, was the administrative section referred to as "Service Control". A brilliant system to be further exploited in the DET Directorate: Building Services.

8. THE FULFILMENT OF AN AMBITION

8.1 To look at a system, criticise it, have the courage to write a thesis on it, and then, as if part of a much larger plan, to actually be afforded the opportunity to put all this theory into practice, is more than just a dream. Before actually taking up the new post as Deputy Director: Building Standards there was no knowledge of the distinct possibility of establishing a Professional Services component, from the ground, with obvious necessity for standardisation to meet the imminent crisis. What a joy.

8.2 Caution, had to be the watchword or else this wonderful opportunity would be blown. Fortunately, as discussed earlier, the "Magaliesberg Primary School" event took place early enough in 1983 (the first year), to permit the introduction of standardisation. Standardisation, in principle, did not have to be sold, it was more than welcomed. What did have to be worked on, and hard, was the acceptable design. As previously discussed, this venture was also successful. At least from the authors point of view.

8.3 After returning from the study tour in Oct/Nov 1983, the concentration was centred on how the full Professional component should function, and at what ultimate strength. Before this could be determined, it was necessary to consider a flow diagram based on the chronological order of events of a particular project. This flow had to be agreed upon by all the Deputy Directors in order to establish the work load that could be handled by one set of disciplines in the professional services component.

8.4 By the middle of 1984, the author had a very good idea of what the ultimate work load would be. The question to answer was how to divide the projected ultimate load. It did not take long to realise that the logical division of work would be to divide the Regions by the largest practical common denominator. This would require further research and reasonably accurate projections.

8.5 At this stage the budget was approximately R80m/year for the entire Republic

(excluding the Homelands and Independent States), divided into eight Regions, as mentioned earlier. There was no doubt that the annual budget for capital works would progressively increase. For the present (1984) the author decided it prudent to handle the workload alone in order to both, gauge the amount of work on projections, as well as try to establish some form of standardisation as early as possible. This would turn out to be the correct decision albeit strenuous.

8.6 The bulk of the capital works, at this stage, was in the Cape area permitting the introduction of "mass briefing" on a small experimental scale. The success of this exercise was a large contributing factor towards planning the growth and possible optimum of the professional staff required, as well as developing the "system" to be successfully introduced.

8.7 Because of the author's intense interest in schools and how they should function, he would always be in the field, to continue assimilating knowledge and passing it on to his personnel. This fact alone contributed towards a "schools knowledgeable" small, but effective personnel. It would have been foolhardy to function merely as an executive manager and not continually be involved in the "nuts and bolts" of providing school buildings. It was imperative to fully understand the need for, and function of every component required in a functional school, be it primary, secondary or tertiary. Having set this goal and satisfying every bit of the yen to learn, a comprehensive perception of the practical functions of components in all learning institutions was mastered in twelve months. This knowledge was to be simply passed on, in as much detail as they would require, to the acquired professional personnel. In this way, every member of the professional services team, would be trained, in the shortest possible time, in their specific relevant field. This approach was most successful resulting in "experts in school buildings" guiding fully trained general practitioners in the private sector to function efficiently on any one given project. This was to become the major factor in the professional services component, successfully coping with the annual budget, which, in the years 1993, 1994 and 1995 touched the R1bn (one billion rand) with a total complement of sixteen professional members including all the related disciplines.

8.8 Basically each professional member was allocated two regions (in the end) with the Quantity Surveyors requiring additional staff to cope with "final accounts" and the "norms analysis" where required. The annual routine very briefly can now be looked at, during one of the busy years.

8.8.1 The Physical Planning Section (Educators), at Head Office being advised of the projected budget, some time in March, are then in a position to determine the "cut-off point" in the previously determined priority list, arranged chronologically with a cumulative total, to simplify the process. Political influences in various regions are also taken into account.

8.8.2 This list is officially handed over to the Directorate: Building Services, complete with schedules of accommodation and detailed scope of each project. This is carefully sorted into Regions in preparation for the next step.

8.8.3 The sub-Directorate: Project Preparations, are the first to deal with the priority list to check the correctness of the details provided for each project and to clear the project for appointment of the relevant consultants required (in consultation with the Professional Services component). This sub-directorate is equipped with a fully computerised programme to select consultants on a geographic and transparent rotation basis, controlled by a points system.

8.8.4 The lists of recommended consultants (fully motivated) is now submitted to the Deputy Director General: Services, for approval with alterations, if so desired. These approved nominations are returned for formal appointment of all the relevant consultants.

8.8.5 At this stage, the Professional Services component is supplied with copies of each nomination, already signed by the relevant "Control Discipline", for the next step.

8.8.6 Assuming, in all instances, the Principal Agent of each project, is the Architect, then each Control Architect is to collate all his projects in his Regions to, without undue delay, arrange for the briefings in the minimum of selected venues. It is always endeavoured to complete all the "briefings" for the year by the end of May, at the latest, to allow for completed documentation by the end of August. The success rate is usually in the vicinity of eighty percent. The remaining twenty percent being held up due to many different reasons, for example, soil test complications, unavailability of site occupation because of squatters, site pegs unavailable or do not agree with site details, et cetera. This overrun is not serious and is compensated for in more than one administrative procedure.

8.8.7 The last step, as far as this chapter is concerned, is the actual briefing and

consequent submission and approval of sketch designs (refer chapter X "The brief").

9. PROVINCIALISATION

9.1 The decision, after the elections in 1994, Provincialism of all Educational matters under the control of one Ministerial Department of Education has necessitated the demise of this highly efficient Directorate: Building Services, which, at the time of writing is being phased out in stages, as each new Province establishes the necessary infrastructure.

9.2 The fact that the Directorate: Building Services was established and developed along scientific lines to become known amongst the professional fraternity in the private sector, as well as the building industry, as a highly efficient and "well oiled organisation" has made it a simple matter to systematically hand over these particular functions, as and when each Province signifies their preparedness to do so. To date, the Directorate: Building Services has no major problems in handing over.

9.3 It is hoped, and advised, that the officers involved with the provision of school buildings in the Provinces, will study the system that has so successfully been employed, with a view to improving where necessary, or, at the very least, equalling the performance rating.

10. SUMMARY

10.1 In this chapter the author explained that the fifth hypothesis "that the subdirectorate obtained good personnel output by employing only the minimum of specialists in the professional disciplines" was successfully achieved by the intelligent use of extensive standardisation and the introduction of a smooth operating system being born out of the thorough research of the TPA system using the strong factors and avoiding the pitfalls in the not so successful areas.

11. CONCLUSION

11.1 Apart from proving the fifth hypothesis to be successfully achieved, it is important to note that the criteria of the success was to choose staff correctly, train them to become specialists and above all to motivate the entire personnel to believe in the system.

PART VII

CHAPTER XV - FURTHER RELATED STUDIES

1. INTRODUCTION

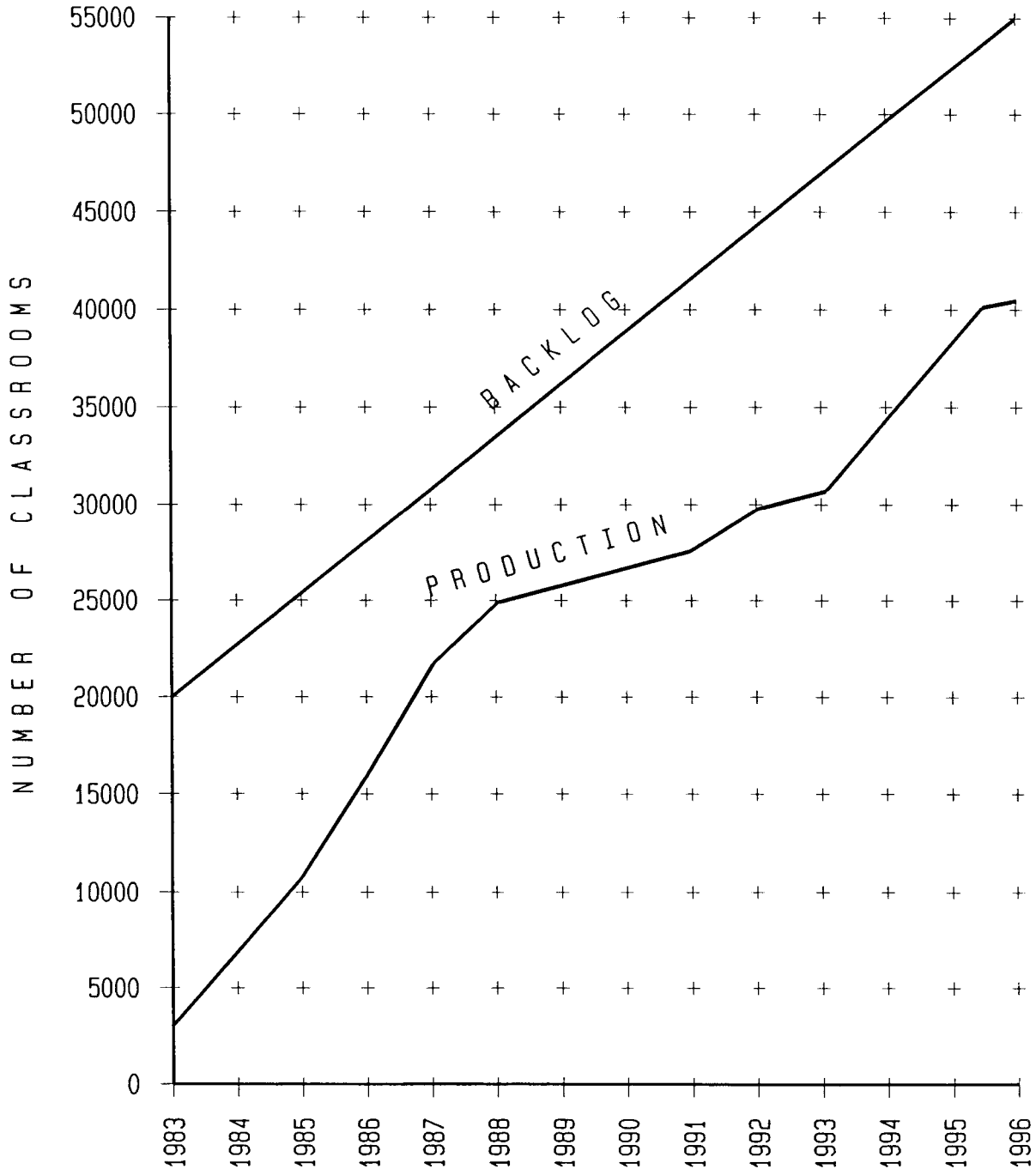
1.1 In this chapter the author is taking the opportunity to express his opinion on a few matters close to his heart. Although not positively associated with the subproblems and hypotheses, the subjects touched on do have a bearing on the unique experience of taking a leading role in a very successful exercise and which system many of the professional colleagues in the whole of South Africa will recall with, hopefully, some little nostalgia.

2. THE STATUS QUO

2.1 With the introduction of Provincialisation of the Department of Education and the, as yet, not finally defined powers that will devolve upon the Provinces, it is difficult to give a positive assessment of the present status quo with regards to the building of new school buildings, or even upgrading, for that matter. There is no general pattern, as yet, that appears to show a positive growth of system in any of the provinces.

2.2 What is certain, however, is that the shortage of school accommodation is here to stay with us for many years yet. It is disturbing, therefore, to observe that there is no positive move towards real action or uniformity of approach to the situation. What is painfully evident is, that the only real building activity taking place now (May 1996) is the finishing off of projects commenced in late 1994 and early 1995. Bluntly put, this means that, each day, the backlog is growing at an alarming rate. See figure 66.

2.3 Some Black children have been absorbed by vacancies in the old "White schools" but this is barely of token relief. Very definitely, the inactivity, or inadequate activity, will slowly develop into a full scale crisis. Being both a political and economical problem, it would be unwise here, to attempt to put forward a permanent solution. At best, it can only be strongly advised that a neutral and pragmatic approach be found.



GRAPH INDICATING THE ATTEMPT TO REDUCE THE BACKLOG OF CLASSROOMS

(SOURCE: DET ANNUAL REPORTS)

FIGURE 66

3. TRANSITION FROM CENTRAL TO PROVINCIALISATION

3.1 The temptation, in some Provinces, is to reason that, since building schools is purely a building construction matter it must, naturally become a Public Works Department function. This is a myth and should be exploded!

3.2 The buildings that the Government, be it Central or Provincial, either build or hire, can be grouped in three distinct categories, namely:

(i) Specialised and many in number,

(ii) Specialised and less in number and

(iii) non-specialised.

The Client or End User, differ significantly in all categories except for Schools and Hospitals in the specialised category.

3.3 Clearly, school buildings are not only specialised and many in number, but demand special and urgent attention because of the enormous backlog (in 1996 a total of 55 000 classrooms country wide) and the vital role that education plays in the development and stability of any nation. To form some clearer picture of the number of schools at present and the relative shortage, let us consider a few statistics. In the old Transvaal alone there are over eight hundred old "white" primary schools, and in the Republic, excluding the old Homelands and old Independent States, there are almost nine thousand schools in the black townships. This represents sixty percent only of the actual requirements in these areas, to satisfy the present demand! Bear in mind that South Africa still has a positive population growth rate, although with improved education this tendency may slowly gravitate towards zero.

3.4 It is, or should be, abundantly clear that, school buildings of whatever nature should be the singular responsibility of one Directorate: Building Services. The statement holds true whether the building of schools is completely controlled by the Central Government or whether each province will be responsible for its own. The only difference should be the size of the directorate. If it is going to be Provincial, then it should be sensible, and time and cost saving for all the directorates to function on a standard "system". The standard school buildings may (and probably will) differ in "design" but, what is impertinent is to let the "system" be uniformly applied. After all, Education per se, is intended to conform to one uniform policy.

3.5 The decision of whether or not to provincialise providing school buildings is not a concern for this study. The only fact that must be faced is that with nine provinces, each with its own directorate, it would be unrealistic to expect each directorate to be only one ninth the size of a singular central directorate. Certainly each of the nine directorates should be compact and efficient.

4. THE ATTITUDE TOWARDS STANDARDISATION

4.1 For some inexplicable reason, in most areas, standardisation seems to be coupled to permitting low cost rather than cost effective products. This is strange since, all, or at least ninety five percent of the school buildings erected and upgrading executed has, since January 1983, been of a high material standard.

4.2 Shielded behind the cloak of "the desire to build a one off" school, many architects have found different reasons to condemn the building of the present standard schools being continued. Strangely enough, the communities are not really complaining at all. What the communities are complaining about is, the lack of sufficient classroom accommodation, trained school teachers and reasonable sports facilities.

4.3 The lack of understanding of the value of standardisation under present day circumstances, is forcing those put in command of the newly constituted professional services teams, to succumb to the suggestion to move away from the old standards, at the risk of "inventing the wheel all over again". And yet, at the time of writing, The Province of Gauteng has recognised the danger of trying to manage with an incomplete infrastructure, and, until this is attained they have left the task to the ex DET component, at least to get the projects going. The result is that, Gauteng is the only province really making any headway in the provision of school buildings at present.

4.4 The ex DET component, very depleted, is doing all they can to assist Gauteng in establishing their building services infrastructure and will continue to do so.

5. A LOOK INTO THE FUTURE

5.1 To try and be clairvoyant would be to tread on very dangerous ground indeed. No, the brief attempt will be positive although, like all good advice, will tend towards the impossibly drastic methods to be employed.

5.2 There is a definite limit to which the costs of components of a school can be effectively reduced in rands/square metre. Accept this! There is a proven optimum number of pupils which one teacher can effectively control and teach. Accept this! There is a proven minimum standard of building finishes acceptable to the communities. The building should be intended to have a life span of at least 100 years. Accept this! There is a definite minimum amount of capital needed per annum to satisfy the demand. Accept this! Unless these criteria are met, we are doomed to fail!

5.3 Accept all the criteria and prepare to attack the problem as one would prepare for a major military exercise, with live bullets. The "army" must first be thoroughly trained before the "enemy/target" can be successfully engaged.

5.4 The advice is; Stop the bus in all Provinces. Take stock calmly, of exactly what the state/status is of your school buildings component, if one exists! Then, with positive determination, act as follows:

(i) Decide on a definite "system" to be followed or, at least employ and expert to clearly define an acceptable, hopefully proven "system" or an amalgamation of "systems". Not a single step further until this has been accomplished.

(ii) Carefully select and appoint all the key figures and in their turn, select and appoint the minimum, experienced beyond doubt, hard core of assistant personnel.

(iii) Take at least two to three months consolidating this basic unit, allowing them sufficient time to prepare whatever standard forms and proformas are required to effect the smooth operation of the selected and, perhaps, by now, modified "system".

(iv) After one or two "dummy runs" move into action since your "army" should now be well prepared to take on the task ahead.

6. CONCLUSION

6.1 Sound advice: Never send an untrained and/or unprepared "task force" in, to win an issue or succeed in an ideal. The result is predictably, always failure.

CHAPTER XVI - SUMMARY, CONCLUSION AND RECOMMENDATIONS

1. INTRODUCTION

1.1 This chapter is confined to a summary of the study and to conclusion based on the findings, backed by factual evidence and experience, with a view to ensuring that these valuable data are recorded for posterity. The facts of this study not only contribute towards good architectural application but can be referred to for the development of an efficient Building Services component in any relative Government Department or large development and project management institution.

2. THE HYPOTHESES

2.1 Chapter I paragraph 3.1 details the first hypothesis. The actual physical evidence of a large number of schools built by the "Administration Boards" prior to 1983, is shocking evidence of the short sighted and unimaginative approach to school buildings for the Blacks from as early as the first buildings "charitably" built for Blacks. There was evidence, however, that even from 1981 some effort was initiated to try and improve matters but on much too small and inadequate scale. This had to become a major factor in the culminating satisfaction amongst the Blacks in 1995. Unfortunately, the stark reality was only given its correct priority after the birth of the new South Africa.

2.2 Chapter I, paragraph 3.2 details the second hypothesis and fully expounded in chapters V, VI, VII and VIII. There is no doubt that, when the intention is to complete many projects of like functions under urgent and crisis circumstances and conditions, then the obvious method of approach, is total standardisation. If the challenge of putting in excess of three billion rands worth of buildings into construction phase during the years 1992-1995 was not executed with the exclusive use of standardisation, the entire exercise would have failed. As predicted, the workload during these years was successfully handled and should be tripled and repeated.

2.3 Chapter I, paragraph 3.3 details the third hypothesis, explained and substantiated in chapters IX, X, XI and XII. The system of handling school building projects on a large scale with minimum effort and maximum efficiency is the undisputed claim by the Directorate: Building Services, that the system they employed was the finest in

the Country and the newly established Provinces would do well to emulate this system. Its very simplicity makes it so successful.

2.4 Chapter I, paragraph 3.4 details the claim of the fourth hypothesis and chapter XIII, paragraph 4 explains without doubt how the plans registry was established and grew to an enormous registry with the potential of almost infinite expansion. The relatively simple and efficient manner in which the plans registry has been compartmentalised so as to effectively assist in the transition to Provincialisation, is sufficient proof of its methodical growth. Correctly applied, the Provinces should have no difficulty in relocating the system in relation to their specific requirements.

2.5 Chapter I, paragraph 3.5 claims that it is not necessary to employ an "army" of professional personnel to cope with the load, when using standardisation and a scientifically proved "system". This is dealt with fully in chapter XIV, paragraphs 5 and 6. The principle of utilising the entire, building construction related, professional practising disciplines in the Republic, as an extension of the Departments Professional Services, cannot be faulted. To have a full professional team within short travelling distance from a project site needs no elaboration in commending such an approach. The double advantage is that firstly, the Department's component remains compact and highly specialised in the field of school buildings and, secondly, trained professionals for the duration of a project only, is a normally acceptable modus operandi.

3. SUMMARY OF THE STUDY

3.1 Chapter I, paragraph 7 succinctly explains the need for the study. The study does not represent a hypothetical research, but is the result of a careful and detailed research resulting in the practical application of the merits of the research, spread over a period of almost twenty years. Everything stated or claimed in the study is substantiated with practical results in the form of successfully functioning school buildings throughout the Republic of South Africa, administered through the successful application of a soundly developed scientific system. The primary object of undertaking this study and recording the results was undertaken in the hope that the newly established Provincial Education Departments would study the systems carefully, alter and/or improve where it suits them and carries on with the urgent need to provide efficient and acceptable school buildings for the "New South Africa". If this study then, only achieves sixty percent success, it would have been well worth

the concerted effort applied.

4. RECOMMENDATIONS

4.1 With the advent of Provincialisation the recommendations are addressed to the Education Departments of all the New Provinces.

4.2 The establishment of an independent "schools building component" in each Province is vitally essential, the logic of which has been discussed in chapter XIV, paragraphs 3, 4 and 5, in their entirety. What must be stressed, is that time is of the essence and, in this regard, the Provinces appear to be "dragging their feet", the reason for this appears mainly inexperienced "Chiefs" in most instances, and in all instances no real "Indians".

4.3 The backlog in the provision of school buildings and the critical urgency of education of the masses, is so sensitive and of such a high priority that it should not be slowed down by using, this necessity as a tool for the promotion of the "RDP". RDP is not decried, but an appeal is made to promote this idealogy through any other avenue or avenues.

4.4 Not only the requirements of school-going children must receive top priority in the Governments budget and motivated application, but also serious efforts must, and can be, introduced to further "Adult Education". The Country cannot afford to leave the present illiterate, underprivileged adults in a totally illiterate state. At least provide the facilities for the neglected adults to be taught the "three R's".

4.5 With the proven success of standardisation in school buildings and the definite present and foreseeable future needs for an intensive school buildings programme throughout South Africa, it seems only prudent to bring pressure to bear on the building and allied trades components. The 3600 module gives a clean fraction with all the denominators 1, 2, 3, 4, 6, 9, 12, 18 and 36 which is more than sufficient scope for the standardisation of most modules. To quote a few examples; ceiling boards, building boards and precast flooring have already converted to 1 200 module. Similarly all school windows, doors and door frames have already been standardised.

4.6 Although strictly applied wherever possible since 1983, thermal performance/ natural day lighting should be investigated more intensely with a view to maximum

classroom comfort as well as the conversion to electrical power from solar heating and the use of solar heating for space heating during the winter months.

4.7 The principles of long life, loose planning fit, low maintenance and low energy should be upheld and formalised more rigorously.

4.8 The provision of school buildings in the previously Independent States and Homelands should be studied methodically and independently

5. CONCLUDING STATEMENT

5.1 This study, designed to define the ingredients of a near perfect system to deal with the provision of urgently needed school buildings, has been undertaken in an honest attempt at, from an Educational point of view, a contribution towards the development and growth of the hitherto underprivileged section of the population. It is also aimed at the final realisation of a powerful homogeneous nation. This study represents careful examination and research into school buildings between the years 1966 to 1995, with particular emphasis on the schools in black townships throughout the Republic, from January 1983 up to December 1995. The will to become a prosperous and enterprising nation is not, in itself sufficient. It will require the sustained effort to educate each individual to the individual's highest potential. Obviously we need more, well constructed effective school buildings. The foundations have been laid, now build.

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LIST OF APPENDICES

APPENDIX A:

1. Paper to Director of Works TPA
2. Report to Minister of Education and Development Aid

STANDARD PRIMARY SCHOOL

A brief description of the methods employed and the results obtained during the process of revision and up-dating of the outdated Standard Primary School design

by

GEORGE CANDIOTES

(Principal Architect)

Presented in fulfilment of the request by the Transvaal Education Department and instructed thereto

by

MR M.K. ANDERSON

(Chief Architect)

P.W. DU PLESSIS - DIRECTOR
TRANSVAAL DEPARTMENT OF WORKS
TRANSVAAL PROVINCIAL ADMINISTRATION

DECEMBER 1980

I. THE PROBLEM AND ITS SETTING

A. THE STATEMENT OF THE PROBLEM

The purpose of the exercise was to examine the current standard primary school drawings, which, since 1971 have served a very good purpose, with a view to up-dating the documentation, as well as bringing the cost down to an acceptable minimum.

B. THE SUBPROBLEMS

Subproblem 1: The technological advances and the changes in the TED's requirements has resulted in an initial issue of at least sixty variation orders.

Subproblem 2: The different regions are solving various problems in different ways, and also creating problems.

Subproblem 3: There does not seem to be enough control over the final costs.

C. THE HYPOTHESES

Basically the exercise was to uncover anomalies, if any, and then to eliminate redundancies all with a view to a recognised

standard throughout the whole of the Transvaal:

Hypothesis 1: The various teaching areas could be reduced with a view to decreasing the total floor area of the primary school.

Hypothesis 2: Each region had its own idiosyncrasies and aided by the necessity for variation orders as

dictated by changing circumstances over the years were introducing their own innovations, each on a unilateral basis.

Hypothesis 3: The total costs of a primary school could be effectively reduced by the judicial reduction in size of the various teaching areas and circulation space after a thorough investigation of the prevailing facts.

D. THE DELIMITATIONS

The study would not attempt to assess the merits or demerits of the TED teaching methods, class size limits or specialists teaching areas, but to concentrate on the maximum efficiency of each teaching area and other areas usage.

E. ASSUMPTIONS

The first assumption. The first assumption is that the need for State-owned and directed primary school will continue.

The second assumption. The second assumption is that the increasing need for new primary schools will continue.

The third assumption. The third assumption is that the need to add to or alter primary school buildings either to increase their capacity or up-date the buildings in line with progress, will continue.

The fourth assumption. The fourth assumption is that a fully adaptable standard primary school building is desirable and possible.

The fifth assumption. The fifth assumption is that the educational system will always be dynamic and that the school building should allow for easy and scientific modifications.

II. THE DATA, THEIR TREATMENT, AND THEIR INTERPRETATION

A. THE DATA

The data required for this exercise were of two kinds: Primary data and secondary data. Briefly as follows:

The primary data. The responses to the question put to each of the Regional Representatives were one type of primary data. The responses to the questions put to headmasters chosen at random was another type of primary data and the information obtained from the planning officers of the TED was yet another form of primary data.

The secondary data. The published studies and texts dealing with instruction media and up-to-date construction systems, basically constituted the secondary data.

B. THE CRITERIA FOR ADMISSIBILITY OF THE DATA

Only authenticated variation motivations and unbiased answers to questions were admitted. The connected interests of the persons concerned and their relative levels of qualification played the most important role in the admissibility of the data. All cost references to suggestions were firstly authenticated before being considered for admission.

C. THE RESEARCH METHODOLOGY

Basically, the research methodology consisted of the classification of data into three separate categories namely:

1. Published reports on instruction media and construction methods.

2. Responses to questions put to inspectors in

our regional offices.

3. Responses to questions put to selected school headmasters.

THE MEANS OF OBTAINING THE DATA

Interviews were arranged with the various firms dealing in instruction media and careful comparisons made. In all matters relating to areas where most variation orders arose from constructional variants, data was obtained from the technical services division explaining all the various alternatives.

Personal interviews were arranged with all of our Regional Representatives, officers of the planning section of the TED and a few selected headmasters to obtain their answers to pertinent and leading questions.

THE TREATMENT OF THE DATA

After approximately three months of interviewing, the answers to the questions put were screened for impartiality and correctness, and then added up for similarities and divergencies, to arrive at the accepted norms for the solutions apparent.

D. THE TREATMENT OF THE PROBLEM

1. The very first consideration given was to establish an acceptable and <u>uniform</u> module on which to base the new concept, since the old standard design was based on a 3,700 module for the hall, 3,950 module for the class-room block, 4,000 module for the grades block and no module at all for the administrative block??

   The question to answer now, was what would be an acceptable module to suit all the disciplines concerned?

   Since three of the blocks would be reinformed concrete framed structures, it seemed prudent to

examine the structural limits first. Examination showed that for a clean-span of approx 7,000 m, being the width of a class-room, avoiding transverse beams and using a hollow-tile floor slab, the most economically effective column spacing was in the neighbourhood of 3,500 meters. From an architectural point of view, it is always helpful to use a module which can be divided by both two and three without resulting in panels with clumsy figures or fractions. This left us with the choice of 3,000 meters; 3,600 meters and 4,200 meters! Faced with the choice of these three modules the first choice would appear to be 3,000 meters. But over the entire length of a standard class-room block this would be extravagant so, and thank goodness, the choice was for 3,600 meters and thus **this module** was applied to **every** structure in the complex. This choice proved very apt as we will gradually learn.

2. SIZES OF TEACHING AREAS

The smallest critical area is the class-room and it therefore became immediately obvious that the correct approach would be to relate all other areas (teaching) directly to the class-room. This was an important exercise. It was not difficult to arrive at the basic size of a class-room as one can obviously see. It had either to be two modules of 3.600 meters square, or the module would have to be changed to allow for a class-room to be two modules square!! The empirical test that followed, was surprising, in as much as it showed that, if we had started with the class-room desk and it's surrounding area, as a module, we would, in any case, have arrived at 7,200 meters square for a classroom for thirty children!!!

Our good fortune just would not run on us because, when we empirically set out the minimum requirements for the Laboratory, Basic Techniques and Library, not only did we find that they would be designed in full multiples of a class-room but that they could each be perfectly contained in exactly the space occupied by

two class-rooms!! This was not the end of the design phenomena. Allowing for a throughway on the ground floor to be playing fields and three Store-rooms each of one module width we found that, except for the grades-rooms, and applying the principle that store-rooms to class-rooms were redundant, the entire class-room block now required a total of 48 modules, exactly divisible by three to retain, perfectly the three story block!! A combined, although physically separated, boys' and girls' toilet block of two modules per floor gave us a class-room block of 18 modules per floor, and to further economise on area, we had moved the stairs to the outside, on the opposite side of the corridor. This resulted in a class-room block 17,740 meters shorter than the old class-room block and 143 square meters less in area per floor, or a reduction in area of 17,5 per cent!! This is shown on annexure "E".

With the grades-block we were just as fortunate. A grades-room has to be slightly larger than a class-room for reasons that are irrelevant here, and a grades-room requires a store room as well. On investigation, we found that we could reduce the store-room size so that we could subdivide a central strip within a module strip to serve two adjacent grades-rooms as can be seen in annexure "B". Once again, by placing the stairs on the outside and using five modules to a two grades-rooms complex we shortened the block by 12,510 metres and in area by 113 square metres per floor, or a total of 19,5 per cent!! as can be seen in annexure "B".

3. DESIGN CRITERIA

Basically, there was not very much wrong with the old design. In fact it had served it purpose very well indeed. The author of the original concept of five basic elements of Administration block, Hall, Class-room, Grades block and Outbuildings had already very neatly split the school up into natural zones. The various blocks were drawn up by different draughtsmen

and so differences crept in. As can be expected alterations were introduced to each with the changing constructional and educational systems.

At this stage, a Primary School still consisted of the following:

(a) Standard Administrative Block
(b) Standard Hall
(c) Library
(d) Laboratory
(e) Basic Techniques Class-room
(f) 16 Standard Class-rooms
(g) 8 Standard Grades-rooms
(h) 3 Store-rooms
(i) Necessary toilets
(j) Servants Quarters
(k) Boiler-room, where necessary

However, before the final standard Primary School had bee arrived at, some educational changes were effected, as we will see later after the comparisons have been made with the standards applying at the time.

Having completed our survey and classifying our data, it was now the time to re-design accordingly, which we did. The writer took each block separately and performed the necessary surgery as follows:

(a) **Firstly** by obtaining approval to apply the structural module of 3,600 meters throughout as a design module.

(b) **The Administrative Block.**

The first thing was to remove the unused and therefore unnecessary stoeps and verandas, straighten the roof line for economy and put the entire building on a modular grid of 3,600 meters, as can be seen on appendix "G". Secondly the latest accommodation requirements were studied and introduced resulting in the final design. Thirdly this was submitted for approval by TED and the Department Planning Committee, so that this block, at

least, could be introduced immediately as no complicated reinforcing drawings were required. To date, some ten such blocks are already in use.

(c) **The Senior Block** (Previously referred to as the Class-room Block)

The first thing that was done, was to remove the two staircases and place them, freestanding and on the opposite side of the covered corridor. The second step was to introduce the modular grid of 3,600 meters. This can be clearly seen on annexure "E".

At this stage, only eighteen modules per floor, and three floors (as previously) were required to replace the current standard class-room block without reducing the number of teaching areas.

As mentioned previously, this resulted in a nett reduction in floor area of 17,5 per cent.

At this stage it was felt that all areas were now neater and more efficient.

(d) **The Junior Block** (previously referred to as the Grades Block)

As was the case with the Senior Block, the stairs were placed on the opposite side of the covered corridor and the modular grid introduced. At this stage, the current old Grades Block and the new Grades Block were each housed in two floors and as can be seen on annexure "B" and as previously mentioned, this resulted in a nett savings in floor area of 19,5 per cent!!

(e) **The Hall**

As can be seen on annexure "F" there was no resultant difference in area. The only difference were to the stage design and the front of the Hall, where attention was given to more functional and thus more efficient planning.

(f) **Outbuildings**

Because of the new requirements for servants of both sexes the outbuildings were somewhat larger, as can be seen on annexure "H". What we did to improve the design was to separate the Boiler-room from the Servants Quarters, since they were not necessarily to be linked and, in the specified areas, the Boiler-room and Central heating is omitted.

(g) **Structural Considerations**

The two blocks (Senior and Junior) are long and must be made to be adaptable to a sloping site as well as being able to be built in part, when a school smaller than the standard is to be build, ALWAYS bearing in mind that it MUST be able to be expanded or adapted.

The Junior Block has a central expansion joint, making it easily adaptable under any circumstance, both vertically and horizontally.

The Senior Block we are proud of indeed, since we feel that it is the absolute in versatility. It consists, horizontally of the toilet block and three structurally identical sections, (units) separated by three expansion joints, as can be seen on annexure "C". We should never build less then a toilet section plus section "B" and "C" in a horizontal direction. Therefore, if we do have to slide the sections, vertically, then the Media Centre, which can be seen on annexure "E", being in the "middle" floor, will automatically then be all on one level and the Basic Techniques, if needs be, always on the ground floor with the Laboratory on a floor above the Media Centre.

(h) **New Personnel Provision Scale**

When we were advised of a total of eighteen class-rooms and ten grades-rooms, the writer convinced TED to consider the class-room attach to, as an integral part of the Media Centre, to be counted as a class-

room. They agreed to the following schedule for a Primary School (as at present)

(i) Administrative Block (Standard)
(ii) Standard Hall
(iii) Standard Outbuildings
(iv) New Media Centre (including class-rooms)
(v) Standard Laboratory
(vi) Standard Basic Techniques
(vii) Seventeen Class-rooms
(viii) Ten Grades-rooms
(ix) Four Store-rooms
(x) Sufficient Toilets

This was easily achieved by altering the **grades block only** by adding one more floor (now three floors, similar to the Class-room Block) and on the second floor to provide two additional grades-rooms and two additional class-rooms plus one store-room.

This block would now also accommodate the Standard One's. Thus, in keeping with the educational training of junior primary (grades I and II plus standard I) and senior primary (standard II to V) the blocks now coincided with, and were labelled **Junior** and **Senior** blocks.

(j) **Finishes**

The finishes were investigated and the necessary changes made to effect economy without loss of aesthetics. We feel that a very good balance has been achieved here. This is on-going and can change as technology improves.

4. COST COMPARISON

We were now ready to prepare working drawings for the up-dated and revised design for a standard primary school. As a beginning it was decided to appoint a private form of Architects under the supervision of the writer, to prepare a new set of working drawings for the new Primary School for Waterkloof Glen.

This was duly done to comply with the then schedule of accommodation and tenders called for. Very fortunately, the new primary school for Hennopspark, using the current standard drawings went out to tender at the same time, and as fortune would have it, both schools were to confirm to the same schedule of accommodation for a full 750 school, and were both to be build in the Pretoria area with the same closing date for the receipt of tenders. So, on Friday 5 October 1979 the tenders for both schools were opened in public with the following results:

LAERSKOOL HENNOPSPARK

1.	J.R.M. Boukonstruksie (Edms) Bpk	R 887 958.00
2.	Bankonstrukto (Edms) Bpk	R 895 566.00
3.	Vic Moore (Pty) Ltd	R 897 450.00
4.	K.H. Schutte & Co (Tvl) (Pty) Ltd	R 914 919.00
5.	C. Rogers & E. Buchel (Pty) Ltd	R 945 000.00
6.	J.C. Dunbor & Sons (Pty) Ltd	R 952 376.00

Tender for R 887 958.00 of J.R.M. Boukonstruksie (Edms) Bpk accepted.

WATERKLOOF GLEN PRIMARY SCHOOL

1.	Alexander Grant Construction (Pty) Ltd	R 687 430.00
2.	B.D. Bouwer (Edms) Bpk	R 728 000.00
3.	J.R.M. Boukonstruksie (Edms) Bpk	R 731 757.00
4.	Vic Moore (Pty) Ltd	R 744 450.00
5.	O & M Konstruksie (Edms) Bpk	R 745 500.00
6.	K.H. Schutte & Co (Tvl) (Pty) Ltd	R 758 184.00
7.	J.D. Venhoeve (Pty) Ltd	R 790 000.00
8.	C. Rogers & R. Buchel (Pty) Ltd	R 795 000.00
9.	J.C. Dunbor & Sons (Pty) Ltd	R 798 136.00

Tender for R 728 000.00 of B.D. Bouwer (Edms) Bpk accepted.

As can be seen, virtually all the same contractors tendered for both schools. Thus we do not have an hypothesis here, but factual comparison.

As can be seen, the new standard design came in at R 160 000.00 lower than the old standard design. Taking the highest figure as a basis, then this shows a saving of 18% per school, and the Transvaal Provincial Administration buildings an average of fifteen new Primary Schools per year, which represents a saving of R2,4m per year at the value of the rand in 1979!!

5. NEW SCHEDULE OF ACCOMMODATION

During the course of construction of these two schools (Hennopspark and Waterkloof Glen) the new "Media Centre" was introduced and, in the case of Waterkloof Glen Primary, the additional two class-rooms have been build as well. (The additional two grades-rooms were documented for but not executed owing to a general shortage of funds). However, should the school have been completely up-dated to provide the new "Media Centre" (three times larger than the old library), a total of seventeen class-rooms and ten grades-rooms plus the rest of the standing accommodation, the extra funds required would have been R 139 000.00, which is R 21 000.00 less than the difference between the cost of the school for Waterkloof Glen and the school for Hennopspark!!!

In other words, we have proved that, by the application of judicious "surgery" and scientific revision to an already successful design, we are now able to provide the new standard Primary School with an increase number of teaching areas, at a cost less than the old Primary School!!!

The exercise has been successful.

E. THE RESULTS

Hypothesis 1: After careful and thorough research (this can be the subject of a separate report) ALL the teaching areas were successfully reduced in size without adversely affecting the teaching efficiency. In fact, we think the school now functions more efficiently.

The total floor area of the Primary School has been relatively reduced.

Hypothesis 2: The idiosyncrasies of the various Regional offices have been carefully looked at and compared. Only the common deviations and those with merit have

been retained. The Regional offices have been requested not to introduce changes to the new design without prior approval, since an accepted variation will immediately be universally accepted and incorporated into the new design. It is yet too early to report conclusively on this aspect, but it is anticipated that with the co-operation of the Regional Representative a rigid standard will prevail.

To date, the amount of variation orders on the Waterkloof Glen Primary School contract is an absolute minimum and mostly confined to the introduction of the new "Media Centre" and additional teaching areas.

Hypothesis 3: We are fortunately in a position to back our statement up with facts and figures to prove that the cost of a Primary school has been reduced by at least 18%, which is well worth the effort that has been expended.

SUMMARY OF RESULTS

The writer was instructed to take a look at the current Primary School and up-date the design to eliminate all the standing variation orders, place all the building units on a uniform module and produce, with the help of our Drawing Office Staff, a new uniform and complete set of working drawings that can be adapted.

This has been achieved to the extent that we now have a complete set of working drawings, in afrikaans and that the Junior Block is still to be up-dated, in the sense that the new third floor must be added.

There is a critical staff shortage in the drawing office, but we hope, in time, to produce the English set and up-date the Junior

Block in the Afrikaans set. Until this is done we are successfully using the Afrikaans set with the private Architects altering the Junior Block to comply with the latest approved and accepted sketch design.

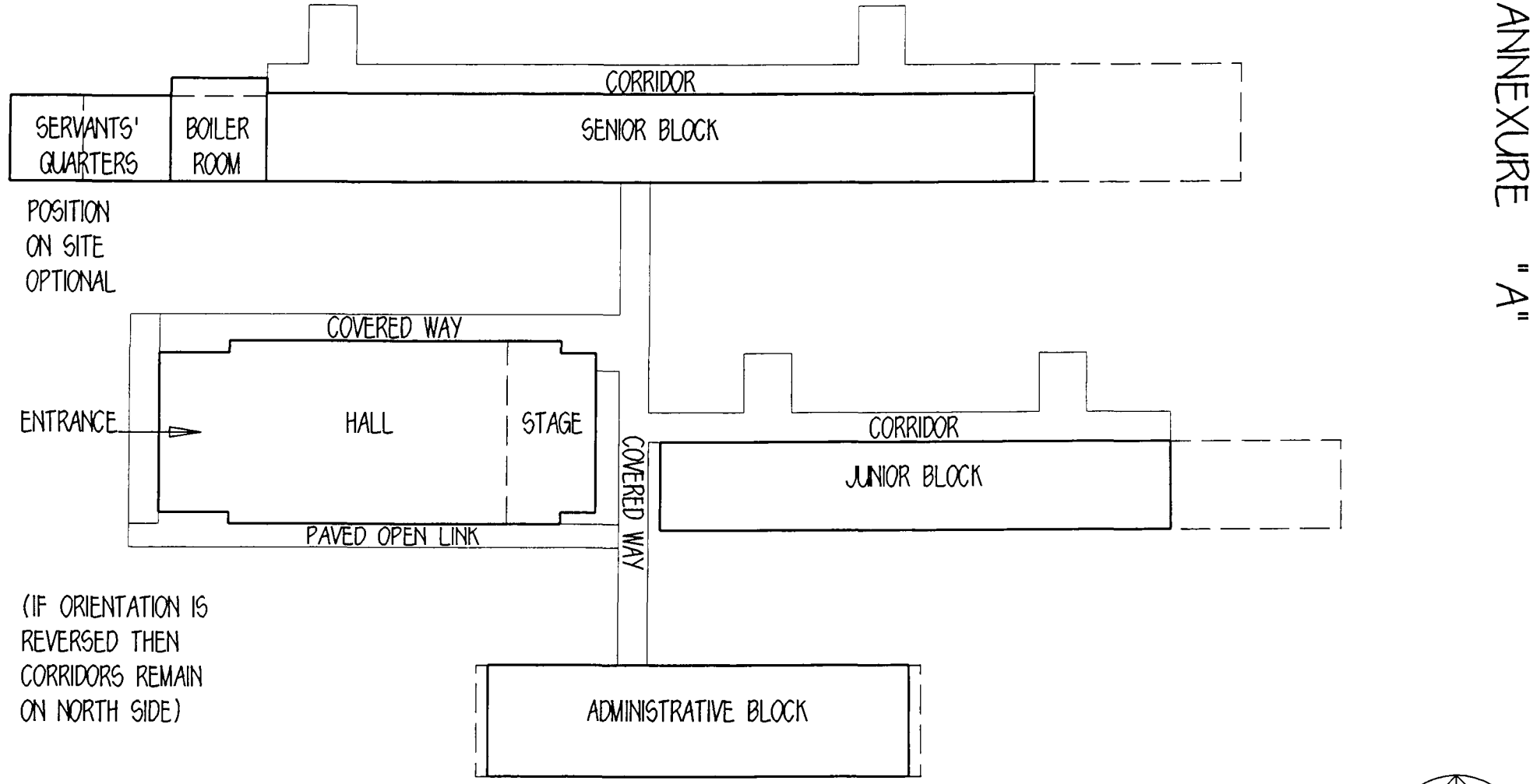
The latest set of working drawings has been approved by the Department of Education, as well as the Departmental Planning Committee and Permanent Planning Committee.

At the present time, the entire Standard Primary School is being investigated by the "Norms Committee" and we are quite confident that it will stand up to the tests. We are also confident that the present design is as flexible as we can make it and will form the basis for a Standard Primary School building for many years to come.

The new revised and complete standard Primary School is to be build in Mayville (Pretoria) in 1981 at a cost of R 1 225 500.00, by the same contractors building the Waterkloof Glen Primary School. This tender price was R 150 000.00 LOWER than the priced estimate!!

GEORGE CANDIOTES (P.A.)

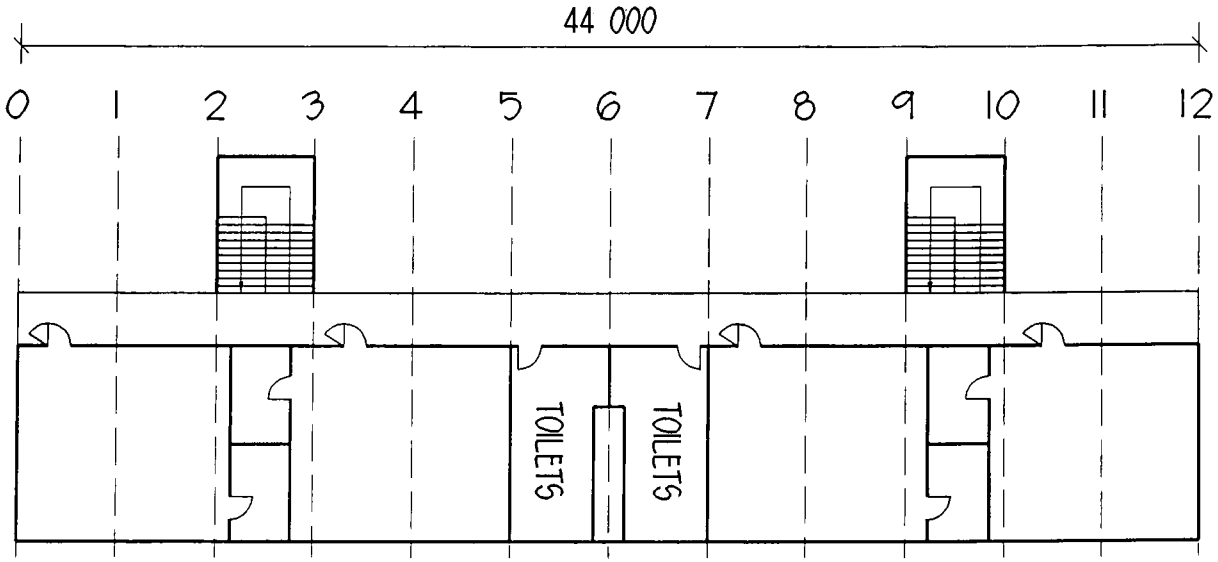
ANNEXURE "A"

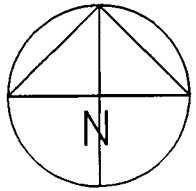


SITE PLAN

PREVIOUS BUILDINGS IN DOTTED LINE

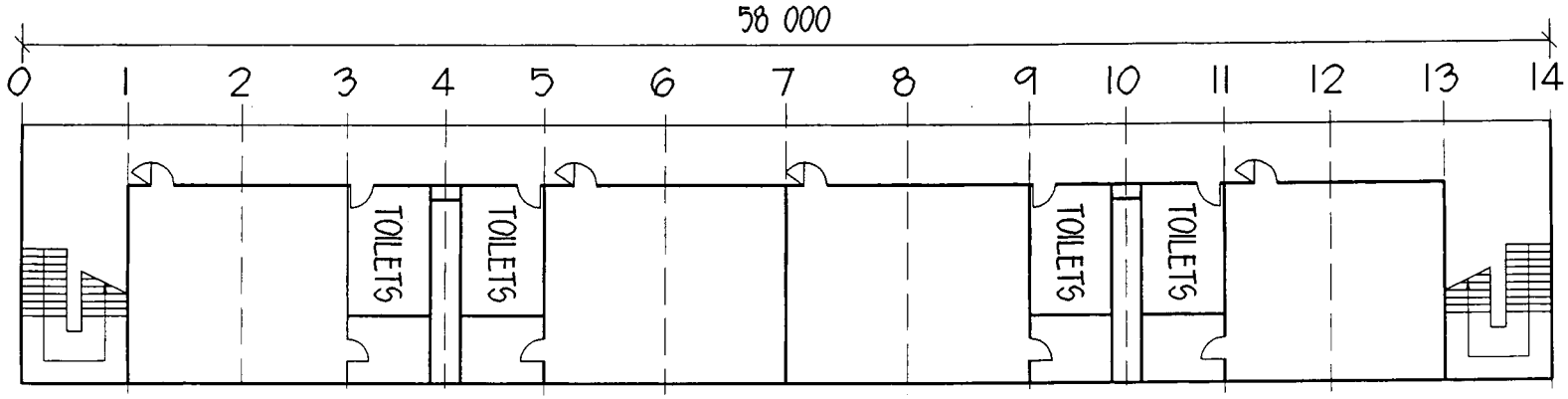
ANNEXURE "B"





NEW JUNIOR BLOCK

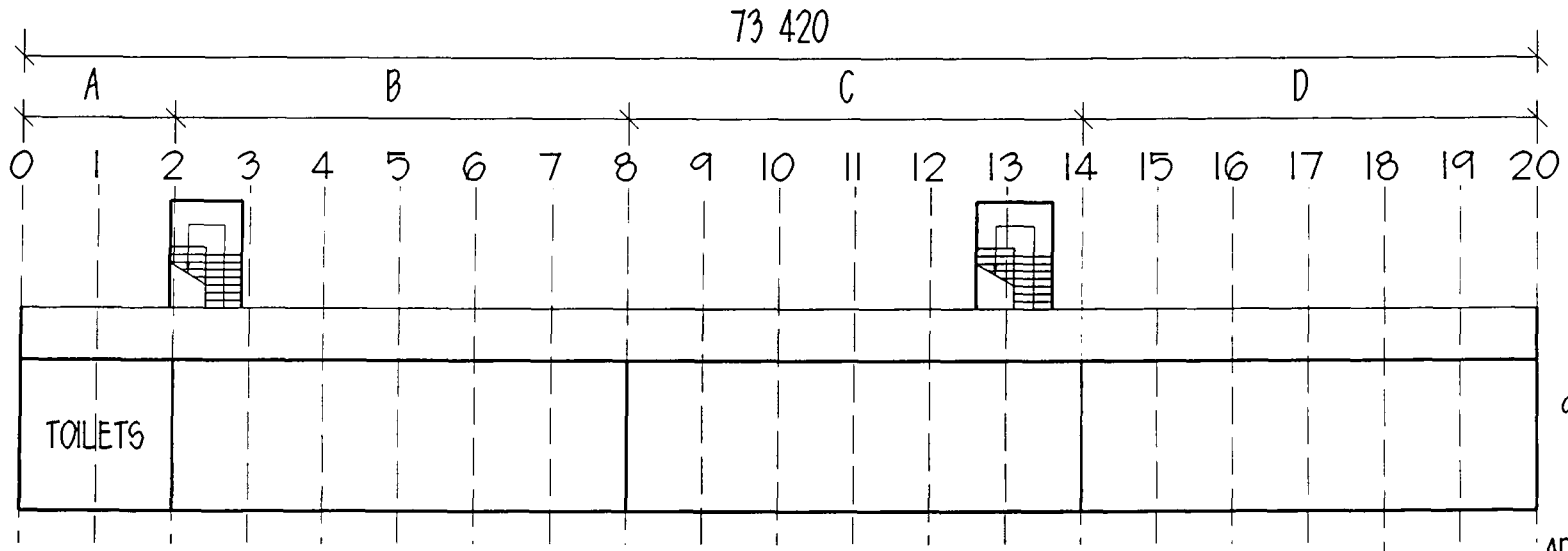
THREE FLOORS (THIRD FLOOR TO COMPLY TO THE NEW PERSONNEL PROVISION SCALE)
AREA PER FLOOR : 467 m2

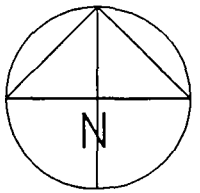


OLD GRADES BLOCK

TWO FLOORS
AREA PER FLOOR : 580 m2

ANNEXURE "C"



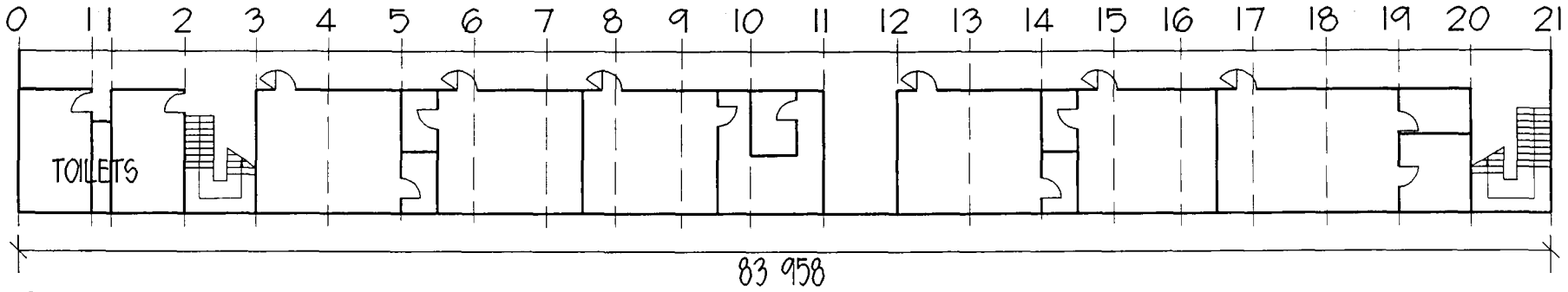


ADDED PER FLOOR TO ACCOMMODAT ENLARGEMENT OF LIBRARY TO THE MEDIA CENTRE

ORIGINAL SAVING IN LENGTH PER FLOOR : 17 740mm

NEW SENIOR BLOCK

THREE FLOORS
AREA PER FLOOR : 747 m2 (MINUS D19 AND D20 : 647m2)



OLD CLASSROOM BLOCK

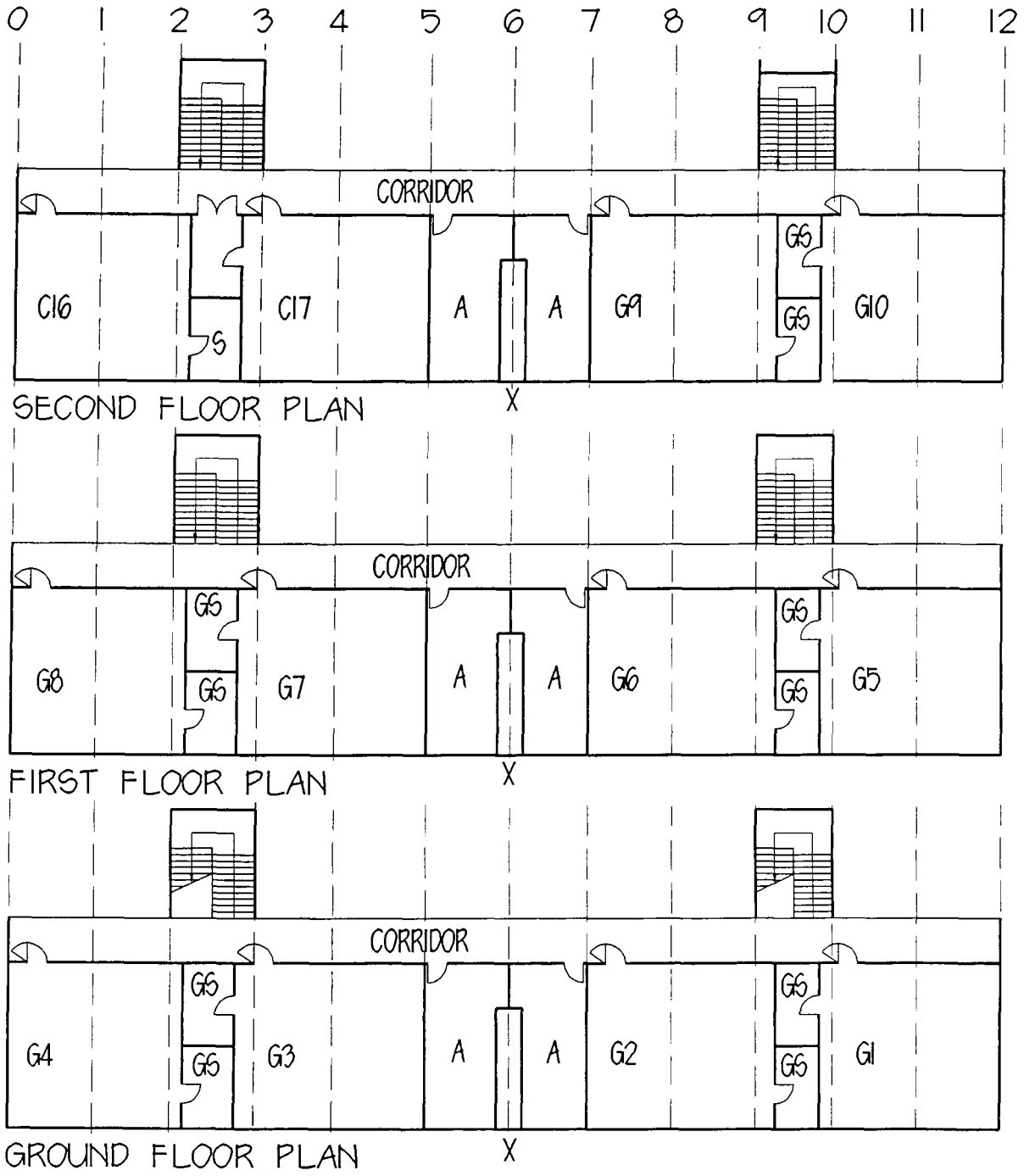
THREE FLOORS
AREA PER FLOOR : 817 m2

NEW JUNIOR BLOCK

LEGEND

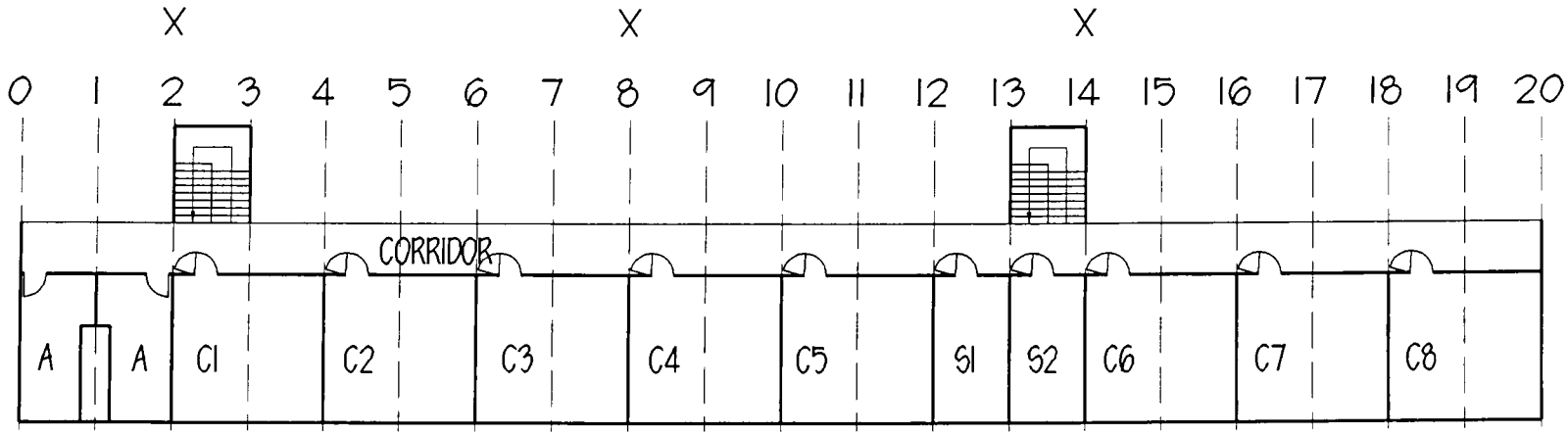
A - TOILET BLOCK
C - CLASSROOM
G - GRADESROOM
GS- GRADESROOM STORE
S - STOREROOM
X - EXPANSION JOINT

N

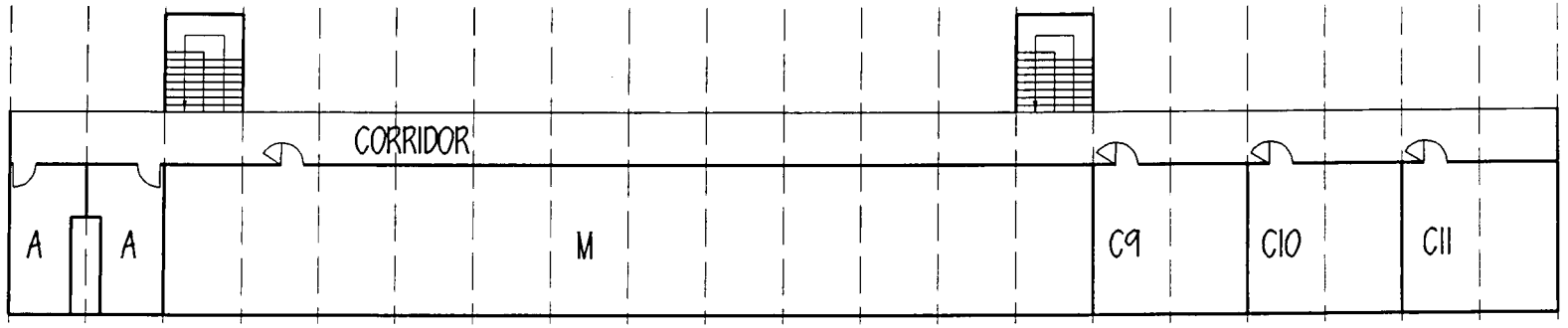


ANNEXURE "D"

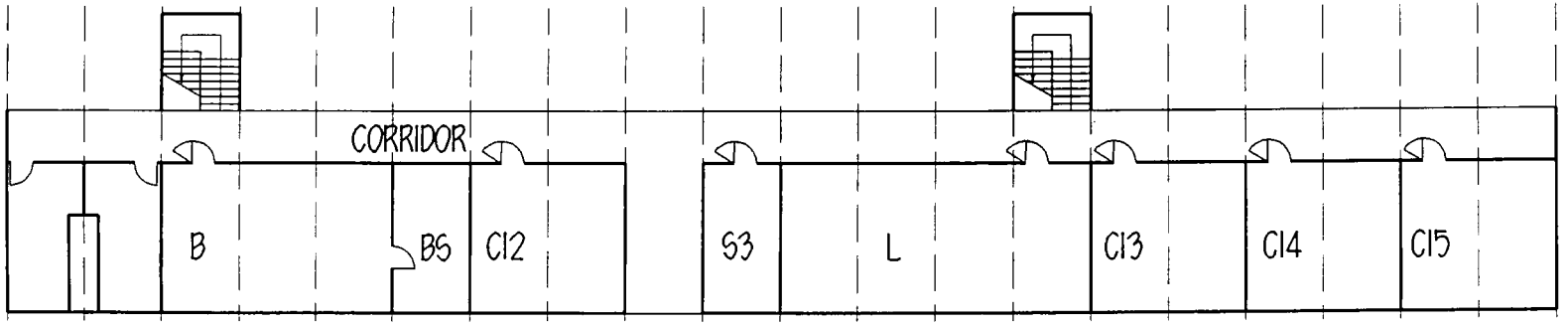
ANNEXURE "E"



SECOND FLOOR PLAN



GROUND FLOOR PLAN

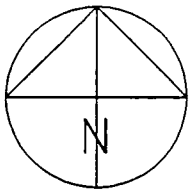


GROUND FLOOR PLAN

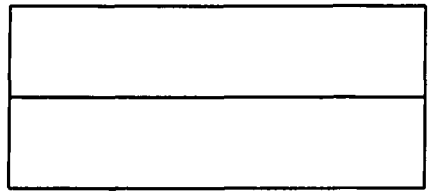
NEW SENIOR BLOCK (CLASSROOMS 16 AND 17 IN JUNIOR BLOCK)

LEGEND:

A -TOILET BLOCK
B -BASIC TECHNIQUES
BS-BASIC TECHNIQUE STORE
C -CLASSROOM
L -LABORATORY
M -MEDIA CENTRE
X -EXPANSION JOINT

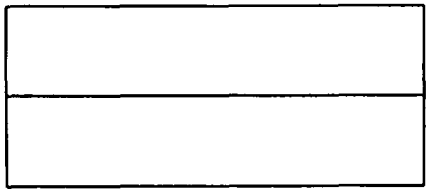


ANNEXURE "F"

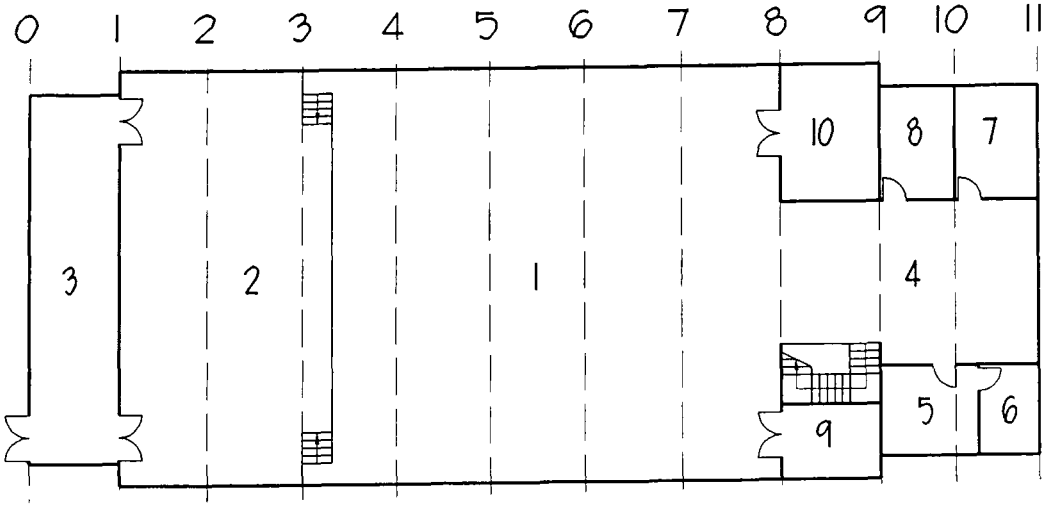


NEW HALL
FIRST FLOOR PLAN

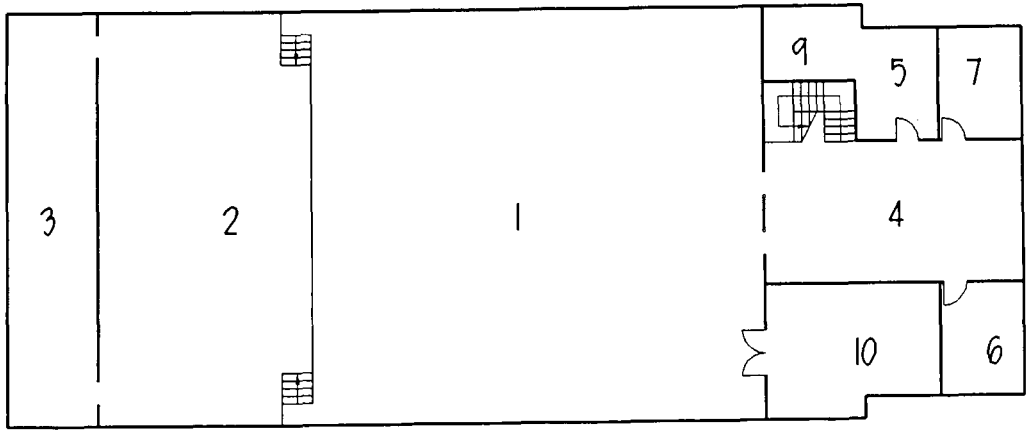
LEGEND :
1 - HALL
2 - STAGE
3 - BACK-STAGE
4 - ENTRANCE HALL
5 - KITCHEN
6 - PANTRY
7 - LADIES
8 - GENTS
9 - CHAIR STORE
10- GYM STORE



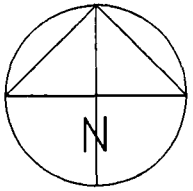
OLD HALL
FIRST FLOOR PLAN

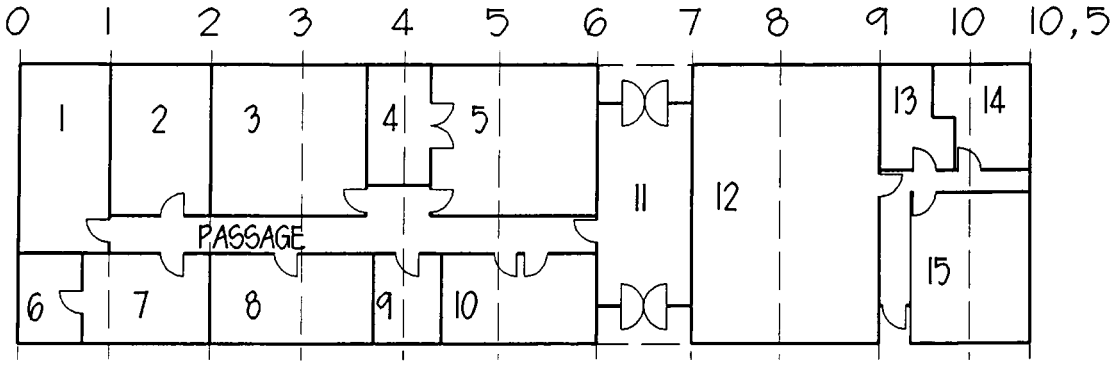


NEW HALL
FIRST FLOOR PLAN
AREA PER FLOOR : 645 m2

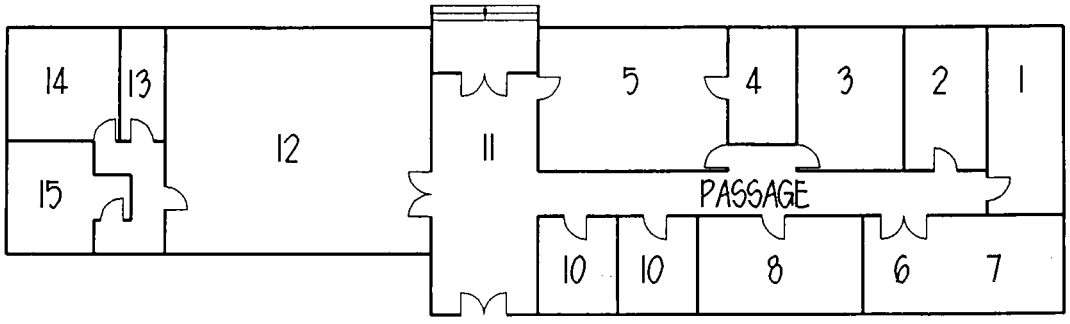


OLD HALL
GROUND FLOOR PLAN
AREA PER FLOOR : 645 m2





NEW ADMINISTRATION BLOCK
AREA PER FLOOR : 408 m2

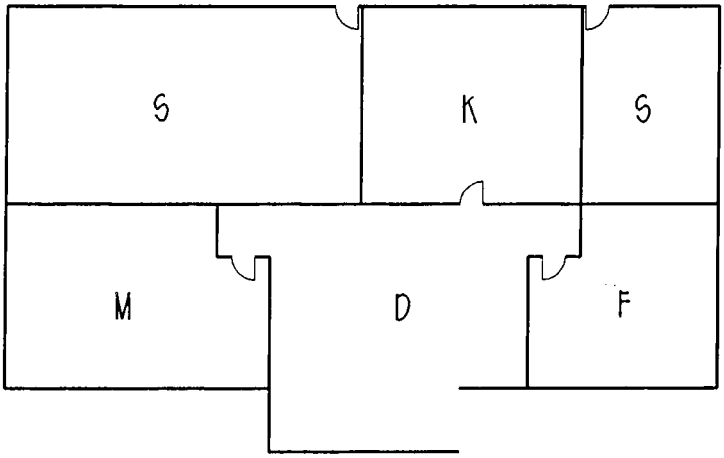


OLD ADMINISTRATION BLOCK
AREA PER FLOOR : 400 m2

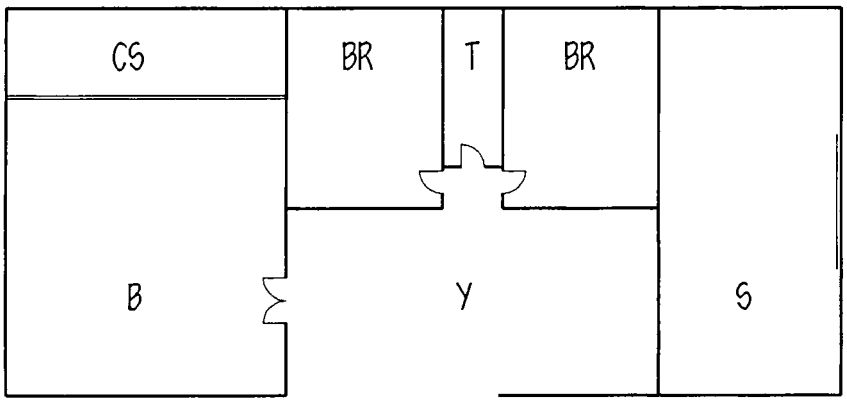
ANNEXURE "G"

LEGEND:

1 - HEADS OF DEPARTMENTS
2 - VICE-PRINCIPAL
3 - PRINCIPAL
4 - STRONGROOM
5 - GENERAL OFFICE
6 - RONEO STORE
7 - RONEO ROOM
8 - BOOK STORE
9 - STATIONERY STORE
10- SICKROOM
11- ENTRANCE HALL
12- STAFFROOM
13- KITCHEN
14- GENTS
15- LADIES

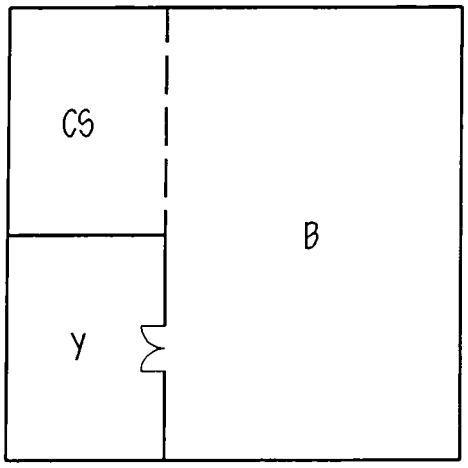


NEW QUARTERS FOR BLACKS
AREA PER FLOOR : 170 m2



OLD BUILDINGS
AREA PER FLOOR : 115 m2

ANNEXURE "H"

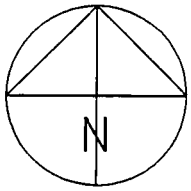


NEW BOILER ROOM

AREA PER FLOOR : 105 m2

LEGEND:

B - BOILER
BR- BEDROOM
CS- COAL STORE
D - DINING AREA
F - FEMALE CHANGE AND TOILET
K - KITCHEN
M - MALE CHANGE AND TOILET
Y - YARD



AN INVESTIGATION INTO FEASIBLE AND ACCEPTABLE METHODS OF REDUCING BUILDING COSTS OF PRIMARY AND SECONDARY SCHOOLS FOR BLACKS IN THE REPUBLIC OF SOUTH AFRICA

A. THE PROBLEM AND IT'S SETTING

1. THE STATEMENT OF THE PROBLEM

1.1 The purpose of this investigation is to examine the present methods of construction and finishes used in the erection of primary and secondary schools for Blacks in the Republic of South Africa with a view towards proposing alternative methods which will assist in reducing building costs without unduly affecting the satisfactory functioning of the schools or proving them unacceptable to the end user.

2. THE SUB-PROBLEMS

2.1 The first sub-problem is to receive guidance from the Minister as to the approach towards parity of standards of building provided for Whites and Blacks. How is this to be obtained? For example upgrading of facilities for Blacks or reducing standards of facilities for Whites?

2.2 The second sub-problem is that the Minister should provide the guidelines as to the relationship between erection costs and maintenance costs (i.e. a building erected at low initial cost could result in crippling maintenance costs in the future).

2.3 The third sub-problem is that the necessary guidelines towards the provision of sports facilities.

2.4 The fourth sub-problem is the non-rationalisation of school sizes at present making it almost impossible to design standard schools with special reference to secondary schools and standardisation is one of the most essential ingredients towards reducing global costs.

3. THE HYPOTHESES

Basically this investigation attempts to uncover the shortcomings, if any, of the present building construction methods, the differentiation between rural and urban schools so that feasible alternatives to minimise costs of construction can be submitted for consideration and approval.

3.1 The first hypothesis is that, in accordance with State policy there should be absolute parity with regards to facilities to be provided for the Whites and Blacks in all future school buildings.

3.2 The second hypothesis is that it is sound practice to minimise maintenance in all public buildings so that the ratio of Capital Works to maintenance of existing structures is always kept well in favour of Capital Works.

3.3 The third hypothesis is that sports facilities are absolutely essential, but need not necessarily be provided simultaneously with the school building; what is important, however, is that the site must be large enough to accommodate the sports facilities.

3.4 The fourth hypothesis is that of timeous and intermediate sizes of school buildings, as related to the pupil as a unit measure, must be firmly established by the educationalist,

to enable the designers to produce limited acceptable sets of school building designs.

4. ASSUMPTIONS

4.1 The first assumption is that the backlog and need for State owned and directed schools in the Republic of South Africa has reached crisis proportions and will continue for an unforeseeable time.

4.2 The second assumption is that the funds available for building new schools and upgrading existing schools is disproportionately limited.

4.3 The third assumption is that whatever downgrading is applied to the proposed new school buildings must be acceptable to the end user.

4.4 The fourth assumption is that sport facilities serving all schools is an absolute essential.

4.5 The fifth assumption is that the need for the State to employ architects, engineers and quantity surveyors to assist in the provision of school buildings, both as consultants and employees will continue.

4.6 The sixth assumption is that the construction methods to be employed in the provision of new school buildings cannot be limited to the "conventional methods" and must comply with the "SANSO" norms as if they are already mandatory.

5. THE NEED FOR THE INVESTIGATION

One of the primary functions of the Public Sector is to provide adequate facilities for the successful

education of the Nation. The State is now faced with the enormous task of providing facilities for an ever increasing and migratory black population, including a backlog, that it is essential to make the best use of the available funds without impairing the

efficiency required of the educationist as well as providing facilities not only acceptable to the end user but that will also not damage the image of the State in the eyes of the Western world.

B. THE DATA

1.1 The data for this investigation are of two kinds: practical physical requirements and educational requirements.

1.1.1 The practical physical requirements will be obtained by comparing the newest form of facilities provided with the outdated form to find an acceptable norm.

1.1.2 The educational requirements will be obtained by direct liaison with the physical planners of the Education Departments.

C. DELIMITATIONS

The investigation is confined to Secondary and Primary Schools for Blacks only in the Urban and Rural areas of the Republic of South Africa and will take into account only those primary and secondary factors influencing the costs of erection of school buildings and the subsequent maintenance of these buildings.

D. PROCEDURES

1. PARITY OF FACILITIES

Some doubt exists in the minds of the investigators as to

the State's intention of their statement that there is to be parity in the provision of school facilities for all sections of the pupil population regardless of colour or creed. The investigators must be unambiguously instructed in this matter.

Does parity, or intended parity, apply only to teaching aids and facilities or does it also include school buildings? It would appear that parity in school buildings is not only expected by the Black school-going population and their parents, but that there is a distinct resistance in many areas to the provision of temporary or "prefabricated" classrooms as apposed to the White population, where it is accepted as a temporary measure until a permanent structure is provided. Our investigations show that there is a greater tendency towards vandalism in the case of buildings below standard compared to those provided for the Whites than at those tending towards parity. It is essential that the Minister must give, publicly accepted guidance as to whether the present standard of school buildings for Whites is to be lowered or if those for Blacks is to be upgraded.

2. ACCEPTABLE STANDARDS OF FINISHES

The investigating committee has come to the conclusion that no further reduction in areas of the existing facilities is either possible or desirable and that the only means of effecting a reduction in the costs of school buildings is:

(a) To review the present finishes provided and substitute alternatives as well as absolute basics and to do this, a cost analysis has been made to illustrate the percentage differences in costs of:

(i) Present finishes in schools being built by the Department of Education and Training.

(ii) Suggested alternative finishes with remarks as to the maintenance implications; and

(iii) The absolute minimum finishes that can be offered with an attendant high maintenance factor, and

(b) To review the present methods of construction which can be altered successfully in various parts of the Republic of South Africa.
See figures "1", "2" and "3".

A firm decision by the authorities backed by a signed instruction as to what finishes are to be adhered to is absolutely essential at an early date to enable the Designers to complete their standard unit designs.

3. THE PROVISION OF SPORTS FACILITIES

Whilst this does not have a direct bearing on the costs of school buildings it does influence the cost of the provision of "facilities in its broader sense.

An inspection of the majority of school complexes shows the total, or almost total, neglect of sports facilities and to complicate matters, the areas of school sites being provided does not permit the provision of adequate sports facilities. In Urban areas, the private developers are trying to force upon us 1,5 hectares for Primary Schools and 2,5 hectares for Secondary Schools. The investigators have unanimously agreed that to provide adequate sports facilities, a minimum of 3,5 hectares is necessary for a Primary School and a minimum of 6 hectares is necessary fora Secondary School and never should a Primary School share facilities with a Secondary School or even be build close to each other.

It is an accepted fact that the provision of sports facilities is absolutely essential to promote a healthy attitude towards education, to quote "A sound mind in a healthy body".

The provision of sports facilities need not be provided simultaneously with the school buildings both should follow shortly after this and enough site area must be provided to

accommodate these facilities.

4. PRIMARY AND SECONDARY SCHOOL SIZES

4.1 STANDARDISATION

Cocking, (1963, p. 75) observed that economics gained in the United States of America through creative and imaginative design in school building construction

existed in only about five per cent of the buildings currently being build. However he pointed out that: "Our greatest hope lies in the five per cent of excellent buildings we have designed and constructed. They demonstrate that if educators and architects employed the best competence available, we would continue to advance and improve..."

Each building offers new problems and requires a new and better solution than any we now have. It is the joint responsibility of architects and educators to accept this challenge and to find a better educational and architectural solution for each one.

4.1.1 During the past three years the Department of Education has evolved the basis of a standard configuration for both Primary and Secondary Schools, the latter in their various study directions. What is required, is for the educators to give to the designers the specific requirements of limited types of school buildings for a standard number of pupils.

At present, the nearest to a standard number of pupils is a Primary School for one thousand pupils (far too many). As for a Secondary School, they vary greatly in not only the number of pupils, but also for the curriculae offered? An almost impossible situation.

It is more important to erect school buildings

of a proven design than to experiment with designs by private architects not all having the same knowledge of educational requirements. It is essential to standardise efficient school buildings of an acceptable size than rather approach each school building unscientifically. This is best summed up by Cameron (1965, p.7) who stated:

"Technological and scientific advances during past have resulted in an increasing emphasis on improving the quality of education. The

American people are awakening to the fact of quality education and it is especially so in small school with few pupils. It is also been recognised that safe, comfortable, healthy, attractive and well-equipped school facilities play an important role in a modern education programme".

4.2 TYPES AND OPTIMUM SIZES OF SCHOOL BUILDINGS

It is a proven fact that to continually repeat standardised buildings has several advantages:

(i) Reduced time in preparation of documentation, therefore

(ii) A savings in escalation.

(iii) Reduced professional fees since overall professional fees for repetition work is at least 40% less than for full professional fees. This represents a reduction of 5,2% of the overall cost of a building.

(iv) Reduction in time from conception of a school building to final occupation of at least six months.

(v) Contractors become familiar with the exact

type of the required building with all it's implications cost-wise so that this, in time, results in keen and sharp tendering.

It is therefore advantages and wise to standardise, within the "SANSO NORMS", the types of school buildings and variations thereof.

4.2.1 PRIMARY SCHOOLS

At present, the Department of Education has standardised on a school building of twenty four classrooms, one administration building and one Caretakers cottage and labels it as a

school building for one thousand pupils. Twenty four classrooms of 50 sq m each, should each accommodate between thirty and thirty-five pupils (the optimum that one Teacher can successfully cope with) and this adds up to seven hundred and fifty pupils. This size of school is internationally recognised as the absolute maximum for one Principal to successfully control when account is also taken of the number of teachers and administrative staff required. This investigating committee is therefore agreed that is should be suggested very strongly to Educational Authorities to build permanent school buildings for a maximum of 750 pupils, providing temporary classroom accommodation for the overflow until the overflow is sufficient to start a new school, possibly 350 in the case of Primary Schools or 550 with the school so planned and designed to easily add to so that it reaches the full standard required for a complete 750 school.

However, a complete 750 Primary School does not only consist of an administrative block, a Caretakers cottage and twenty-four classrooms. There should be a few more elements as at present being provided at White Schools, such

as:

(i) A Junior Laboratory.

(ii) A Community Hall.

(iii) A small reference library; and

(iv) A "Basic techniques" teaching area.

The designers of the standard school must be advised of the **total** requirement of a Primary School and what is the intention of authorities to provide in phase 1, phase 2 and possibly stages 3 and 4 so that the basic standard building can be so designed.

Further, the calculation of the area and cost limitations should be based on the **total** building with permission to exceed the norms at certain phases so that the final infrastructure can be provided at that stage.

4.2.2 SECONDARY SCHOOLS

At present as well as in the past, the Department of Education and Training are building Technical High Schools and Secondary Schools, the latter for various curriculae and study directions with varying student flows for a pupil involvement varying from 500 to 1 200 (in some cases even more) requiring therefore, an independent "Norms analysis" and accommodation schedule for each school at an approximate cost of R300 each time. This not only results in an undue time-lag but also incurs additional expenses.

I view of the foregoing, the investigating committee would suggest to the Educational Authorities to limit Secondary Schools to a maximum of 750 pupils with a possible

intermediatory of 500 as well as standardise, or rather limit the types of schools to four or five, for example the following most often encountered:

(i) Technical High School

(ii) Academic Secondary Schools (Maybe more than one type)

(iii) Comprehensive High Schools (Technical)

(iv) Commercial High Schools

(v) Hotel Training Schools

(vi) Specials

If this can be done, it will require only a "one time" analysis and accommodation schedule. Phase 1, 2 and 3 or up to 4 can be a domestic arrangement, provided that with the final completion of the "full" school building the area and cost norms will not be exceeded. It is obvious that if a 500 pupil school is in phase 1, the element such as the Administration building, the Library, the Caretakers cottage, the Assembly Hall, the Service Block and the site works and fencing as well as the sports facilities cannot be proportionately reduced and still function in practise.

E. CONCLUSION

The present costs of providing school building facilities can be effectively reduced whilst taking care not to increase the maintenance load and the following suggestions given serious thought.

1. Positive guidance must be given to the

designers, at as early a date as possible as to the official policy with regard to parity between the various Race groups.

2. When deciding on the permissable finishes to the school buildings, careful consideration must be given to the maintenance factor.

3. The official policy of providing sports facilities at schools and to what extent.

4. Standardisation will be a great factor towards stabilising costs of school buildings. Not only standardisation of finishes but also of designs for a limited number of types of school buildings as well as the optimum sizes, expressed in units of pupils, of all school buildings.

At present the Department of Education and Training is successfully building, to a tried and acceptable, configuration of units and blocks.

Where the community is amenable to Industrialised buildings and the necessity for speed of providing school facilities, then the use of Industrial buildings must not be overlooked provided that the various firms tender against each other and not as an alternative to conventional building methods.

APPENDIX B:

Standardisation of school buildings

STANDARDISATION OF SCHOOL BUILDINGS

A. THE PROBLEM AND ITS SETTING

1. THE STATEMENT OF THE PROBLEM

1.1 The purpose of this exercise is to examine the existing standard plans with a view to replacing them, updating them or supplementing them in order to eliminate contradictions and inadequacies so that the process of documentation and execution of service contracts can be speeded up.

2. THE SUBPROBLEMS

2.1 The first subproblem is to investigate just what the extent of the existing standardisation is.

2.2 The second subproblem is to persuade the Planning Section to provide a comprehensive set of schedules of accommodation for the schools to be standardised.

2.3 The third subproblem is to determine the sizes and internal detail requirements of all the various elements.

2.4 The fourth subproblem is to determine the maximum number of blocks per standard school.

2.5 The fifth subproblem is to determine the ideal unit size of ideal number of elements within the standard blocks.

2.6 The sixth subproblem is to establish the ideal configuration of the standard blocks on an ideal site with permissible deviations from the standard school types.

2.7 The seventh subproblem is to receive formal approval, at the highest level, to all the standard plans and subsequent specific configurations.

2.8 The eighth subproblem is to prepare documentation for contractual purposes of all standard elements, units, blocks and possible configurations in such a manner that they can be used either individually or collectively.

3. THE DELIMITATIONS

3.1 This exercise will be confined to the following schools in the R.S.A. (for black).
- Primary schools
- Secondary schools
- Comprehensive secondary schools
- Technical colleges

3.2 This exercise will include the documentation of individual units that need to be erected separately at existing schools that need to be upgraded.

3.3 This exercise will include the design of complete schools in the various categories with all present and projected units (including assembly halls, media centres, junior laboratories etc.), but the documentation only of currently supplied units and units to be provided in the near future.

4. THE NEED FOR THE EXERCISE

4.1 The existing standard drawings, such as they are, appear to be completely inadequate in all respects, having served their purpose in an era now virtually ended.

4.2 The absence of standardisation permits unsatisfactory planning in most instances and invariably through the expression of individual Regional Directors, Circuit Inspectors, Technical Instructors, School Committees and even, on occasion, School Principals.

4.3 The implementation of standardisation will provide a sound basis for accurate building construction estimates, resulting in the vital statistics for an effective budget and cash flow control.

4.4 The implementation of standardisation will markedly shorten the time required for planning and documentation thus permitting a minimum time lapse between conception and materialisation of a project.

4.5 The repetitive nature of a school lends itself ideally to standardisation.

4.6 The use of standardisation ensures the continued application of the most effective planning resulting from concentrated design effort involving all relevant descriptions with the added advantage of concurrent inclusion of the adapted required resulting from improved or advanced technology and educational methodology.

4.7 The continued use of standardisation will eliminate all dissatisfaction arising out of the natural tendency for teachers and parents to compare school buildings.

4.8 Although quite unintentional but yet a factor, the use of standardisation requires less professional service input in the preparation of documentation resulting on a lesser outlay of professional fees and although this represents only approximately six or seven percent of the building costs, these funds can be directed to some other useful purpose.

B. THE DATA AND ITS TREATMENT

1. THE DATA

1.1 The data for this exercise is of two kinds: primary and secondary.

1.1.1 The primary data. The accommodation schedules as compiled and provided by the Educational and Planning Section. The area and cost norms as set out by the "Norms Committee". The replies to question put to the officials in the Planning Section of the Department of Education and Training.

1.1.2 The secondary data. The "standard drawings" currently in use as seen by the Subject Advisors and Regional Directors.

1.1.3 The criteria for admissibility of the data. Only official data emanating from the Planning Section and conforming to the area and cost norms will be acceptable. Only deviations and modifications resulting from technical considerations or authorised by the Director-General will be acceptable.

2. THE TREATMENT

2.1 The data received from the Planning Section, the Subject Advisors and trough individual research will be documented for submission to and approval by the Departmental Planning Committee. (The Departmental Planning Committee [DPC] has yet to be approved of and commissioned - see details later.)

C. GENERAL PROCEDURES AND RELATED TIME SCHEDULES

1. THE ORIGIN OF A PROJECT

1.1 The decision to provide school building accommodation and the nature of the projects rests squarely with Educational Planning Section of the Department of Education and Training.

2. THE SEQUENCE OF PROJECT STANDARDISATION

2.1 The primary school is not complicated and the school with the least amount of elements which automatically puts it at first choice for consideration and preparation of documentation.

2.1.1 With regard to the Primary School, good progress has already been made with respect to a general configuration and block composition, but before further progress can be made, the following information is required:

a) Optimum number of pupils per classroom;
b) number of classrooms required for a primary school indicating the optimum number of pupils to be a standard school;
c) projected additional elements required for a primary school to be added at a late stage eg. Basic Techniques, Media Centre, Junior Laboratory, Store rooms;
d) projected additional units to be added at a later stage eg. Assembly Hall (size?);
e) to summarise then; a complete schedule of accommodation for the envisaged, final, complete (full) school.

2.1.2 After official receipt of the final schedule of accommodation the sketch design for the Primary School in ideal configuration can be submitted for approval by the DPC within two weeks. The working drawings can be completed within three months after approval of the sketch designs And "The Bills of Quantities" three months after the receipt of the working drawings. It would appear thus, that provided the approval of the sketch designs is not unduly delayed, the completed documentation of the

contract documents for the Primary School can be ready six months after the approval of the sketch designs.

2.1.3 It is safe to say, then, the standard primary school can be fully documented within nine months after the approval of the sketch designs, in such a manner that any form of adaptation will be possible.

2.2 The secondary school is complex and has far more elements than the primary school and with the diversity of subjects and because of the differential study system, the secondary school has more then one combination of classrooms, multi purpose classrooms, laboratoria, centres and workshops. The Planning Section will have to provide not only a detailed list of all the elements that are required for the full spectrum of secondary schools, but will also have to indicate the number and composition of combinations.

2.2.1 For the secondary schools, the first step will be to design each element individually yet each one as part of the same whole before the various types can be grouped into an ideal configuration.

2.2.2 The design of and submission for approval of these elements can be undertaken concurrently with the preparation of the "working drawings" for the primary school. Depending on the success of the discussions with the Subject Advisors, who must maintain realism. These details can also be approved of in time to start serious designing and configurations of the Secondary School.

2.2.3 Since there can be many delays, it is difficult, at this stage, to accurately assess the degree of progress on the secondary school project, but certainly, by the end of 1984 the sketch designs should be well advanced, if not finalised.

2.2.4 Before all the actual school buildings have been finalised for the secondary schools, there should well be finality on the Administration Block, the Caretaker's Quarters, the Factotum and Labourers' Quarters and possibly the Library or Media Centre.

2.3 The planning of the comprehensive secondary schools should follow the planning of the secondary schools, since the only real difference in elements will be the Workshops (a major item) and the Technical Subjects area.

2.4 The standardisation of technical centra and technical colleges (in that sequence) will be last on the programme.

2.5 At this early stage, it would be fair to state that by the end of 1985 the documentation of all the variations could be completed.

3. THE SIZES OF THE PROJECTED SCHOOLS

3.1 The size of a normal full school (Primary or Secondary) has, up to date, been pegged as being for 1000 pupils. The decision to build schools for 1000 pupils has possibly been influenced by the magnitude of the backlog in schools generally. Now is the vital time to definitely decide or an ideal or optimum size of a school when related to the maximum number of teachers and clerical staff that can be successfully controlled and administered by one school principal and the accepted norm of 30-35 pupils to one school teacher.

3.1.1 To accommodate any overflow to the optimum scientifically decided upon, consideration can be given to building a permanent structure to house the optimum number of pupils and provide temporary classrooms to cope with the overflow until the backlog is reduced to annual influx only.

3.2 The decided optimum number of school children will have an influence on the size of the Administration Block, the Assembly Hall, Toilets, number of Classrooms, Tuck shop and all other service and teaching areas.

4. VARIOUS SCHOOL SIZES

4.1 Apart from primary schools, secondary schools, comprehensive secondary schools, technical centra and technical colleges, guidance must be given as to the various sizes of schools that will be considered initially if a full school is not warranted always with a view to upgrading a school until it is full standard size.

5. STANDARD ELEMENTS

5.1 Before a design is attempted, it is essential to reach agreement with the Subject Advisors as to the size and detail of the various elements such as, Classrooms - Junior and Senior, Laboratoria, General Purpose rooms, Centra (Domestic Science, House Craft etc.), Libraries or Media Centra and all other teaching areas which must conform in area and cost to the standard norms laid down.

6. IDEAL CONFIGURATIONS

6.1 In all types of complexes, it is essential to have an ideal configuration approved with prescribed deviation limits.

7. AUTHORISED APPROVAL

7.1 A standing committee (DPC) with Ministerial authority is essential to approve all the elements, units and other facets of the standardised complexes. Without this authority, standardisation is meaningless.

7.2 Function of Standing Committee (DPC). The function of the Departmental planning Committee is to consider, and if satisfied, approve all sketch designs for standard plans, individual new schools as to configuration and sitting, additions and alterations to existing schools.

7.2.1 No new school buildings or additions and alterations to existing school buildings must be permitted without the prior approval of the sketch plans submitted to the DPC.

7.2.2 In all cases, the Regional Directors will be given the opportunity to scrutinise the sketch designs and submit written comments on the sketch designs before submission to the DPC.

7.2.3 The decision of the DPC will be final and binding.

7.2.4 No alterations to the approved sketch designs will be permitted without resubmission to and approval by the DPC.

7.3 Composition of Departmental Planning Committee (DPC)

It is suggested that the DPC should include the following members:

(i) Chairman appointed by the DG from the ranks of the Planning Section;
(ii) Primary Education representative from the planning section;
(iii) Secondary Education representative from the planning section;
(iv) Technical Education representative from the planning section;
(v) Director: Buildings, from the Building Section;
(vi) Deputy Director: Bldg Standards, from the Building Section;
(vii) Architect from the Building Section;
(viii) Engineer: Civil, from the Building Section;
(ix) Elected member: Financial Control;
(x) Committee Clerk from either Planning or Building Section, preferably from Building section.

7.3.1 Function of DPC

7.3.1.1 The DPC should meet as regularly as the conditions warrant (not less than fortnightly) to assess building sketch designs for all forms of buildings whether new buildings or additions and alterations and approve the sketch designs per se or with written provisos or amendments, before any documentation for a building contract is commenced.

7.3.1.2 The decision of the DPC must be final and binding with the right to reconsider should an amendment design be submitted.

7.3.1.3 The Director: Buildings, will scrutinise all building sketch designs before submission to the DPC for consideration. It follows thus that all sketch designs must be submitted to the DPC via the Director: Buildings, only, for considerations.

7.3.1.4 The sketch designs submitted to the DPC for approval must be accompanied by written comments from -

(i) Relevant Regional Director;
(ii) Planning Section;
(iii) Building Section.

7.3.1.5 One, stamped and signed, approved set of paper prints of sketch designs of each project must be filed in the plans registry of the Building Section and one similar set must be given to the Education Planning Section.

7.3.1.6 In the subsequent preparation of contract documents, the only minor deviations permitted from the approved sketch designs, will be for technical reasons only.

7.3.1.7 The DPC will be properly constituted with records and minutes diligently kept, always functioning under the authority of and responsible to the DG.

APPENDIX C:

Standard letter of appointment

REPUBLIC OF SOUTH AFRICA • REPUBLIEK VAN SUID-AFRIKA

Department of Education
Departement van Onderwys

Ref: 19/1/6/

Enquiries: Nic Felix
Directorate Building Services
Thutong Building

Tel: (012) 312-6467
Fax: (012) 326-7215

Ex DET Component
Private Bag X212
PRETORIA
0001

Sir/Gentlemen

ARCHITECTURAL SERVICES: KWA NOBUHLE TECHNICAL COLLEGE IN THE KWA NOBUHLE TOWNSHIP OF UITENHAGE: ADDITIONS OF 10 CLASSROOMS

1. You are hereby invited to perform the above-mentioned architectural services.

2. The required services embrace briefly the following:

   2.1 Positioning of predesigned sketch designs and configuration on selected site.

   2.2 Applying issued details and existing working drawings to the approved layout and adapting same if instructed thereto. The principal agent is responsible that all the other disciplines are timeously furnished with drawings in order to produce their insets.

   2.3 Collating the insets of all disciplines to produce tender and contract documents by the specified date.

   2.4 Full supervision of the service in accordance with the standard procedure outlined at time of briefing.

   2.5 Act as principal agent and you will be responsible to the Department for the whole project, and for the due performance of your professional team colleagues.

   2.6 As principal agent it is expected of you to involve/consult the community as far as the site plan/layout is concerned and to keep the community informed of the progress being made throughout the project.

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3. Documentation in favour of this project must be compiled in English.

4. Sketchplans must be submitted within two weeks after date of briefing,and tender and contract documentation six weeks after date of briefing.

5. Professional fees shall be calculated in accordance with the minimum tariff of fees as set out under Section 7 (3) (b) of the Architect Act, 1970 (Act 35 of 1970), with one exception that;

   5.1 80% of 4,5% of the Quantity Surveyor's estimate or the norm cost limit (whatever be the lowest) be paid after approval of working drawings; and

   5.2 4,5% less previous payments, be paid on the lowest or acceptable tenderamount.

   5.3 Adaptation of standard drawings will be remunerated on a time charge base and new design (if you are requested likewise) on a percentage base.

6. For recoverable expenses kindly refer to Annexure A.

7. Should you consider it necessary to make use of the services of specialists, full datails, together with estimated costs, must be submitted to the liaisen officer at Head Office for consideration. Unless prior approval is obtained, claims for payments/disbursements cannot be considered.

8. Copyright of the plans will be vested in the Government of the Republic of South Africa in accordance with the Act on Copyright, 1978 (Act 98 of 1978)

9. Your other team members are:

   Quantity Surveyors:
   Botha Shelver Inc
   UITENHAGE Tel: 041-991 0188

   Civil/Structural Engineers:
   Louw Strydom & Partners
   PORT ELIZABETH Tel: 041-521 155

   Electrical Engineer:
   C A du Toit & Partners
   Port Elizabeth Tel: 041-557 559

   Please confirm their acceptance, which they will confirm in writing.

10. Faxed confirmation of your acceptance of this offer must reach the Department within two days of date of this letter.

11. For further architectural information, kindly contact Mr J R Pretorius on the code (012) telephone 312 6415/6. All correspondence should be directed to Head Office. /If matters or items are also applicable on the Region, copies of such correspondence should also be directed to the office of the Regional Chief Director of Education and Training.

12. You will not be called for to sign a formal agreement, but this letter, together with your unqualified written acceptance of the offer herein made to you, will constitute an agreement between you and the Department for the proper completion of the work to the satisfaction of the Department. The Department reserves the right to cancel this appointment at any time by means of a written notice.

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13. Please take note that the attached bar chart (if applicable) forms part of your conditions of appointment and that non-compliance with critical programme dates may be held against you. It is therefore important that you consider the acceptance of this invitation carefully. If, for any reason whatsoever, you are unable to accept this invitation, your non-acceptance will not have a negative effect on your firm's relative priority on the Department's panel or influence future nominations of the firm.

Yours faithfully,

ACTING DIRECTOR-GENERAL: EDUCATION AND TRAINING

APPENDIX D:

1. List of appointed Architects
2. Panel of Architects in South Africa
3. Cost effective secondary schools

DEPARTMENT OF EDUCATION AND TRAINING

PANEL OF ARCHITECTS

*** Indicates those firms which received appointment/s**

	NAME OF FIRM	NAME OF TOWN
*	A PAPAGEORGEIOU	ALBERTON
*	BEN PEELS	VANDERBIJLPARK
	KNOOP ARCHITECT	CAPE TOWN
	W HORNE & HOFMEYER	BLOEMFONTEIN
*	A W LOTTER ARCHITECTS	WATERKLOOF
	ACG ARCHITECTS	ROGGEBAAI
	ARC ARCHITECTS	PARKLANDS
*	ABE VAN HUYSSTEEN ARCHITECTS	WITBANK
*	ADAM F SNOPEK ARCHITECTS CC	SAXONWOLD
	AFRICA ASSOCIATED ARCHITECTS CC	CAPE TOWN
	AFRITECH	HARRISMITH
	AFRITECH	NEWCASTLE
*	AITCHISON & RUSSOUW	WELKOM
*	ALAN AMOILS	JOHANNESBURG
	ALBERTH SCHULTZ ARCHITECTS	PORT ELIZABETH
*	ALBRECHT HERHOLDT ARCHITECTS	PORT ELIZABETH
	ALDRIDGE VOSLOO ARCHITECTS	PORT ELIZABETH
*	ALLAN KNOW HOO	KIMBERLEY
	ALEC HAGERMAN & BOTHA	PRETORIA
	ALLAN MARAIS ASSOC. INC	STELLENBOSCH
	ALLEN ARCHITECT	DURBAN NORTH
	ALMEIDA VILJOEN ARCHITECTS	PRETORIA
	AMANDA KATZ ARCHITECTS	CAPE TOWN
	ALWYN J LUBBE & ASSOC.	DURBAN

*	ANDERSSEN VISSER CC ARCHITECTS	PRETORIA
	ANDRE VERCUEIL & BUYS CC	KNYSNA
	ANDRE VERCUEIL & BUYS CC	MOSSEL BAY
*	ANDRE WESSELS & HELM	WELKOM
*	ANDRE DU PREEZ ARCHITECT	PRETORIA
*	ANDRIES D GREYLING ARCHITECTS	BETHLEHEM
	ANTHONY HART ARCHITECT	DURBAN NORTH
*	ANTON HUISKENS ARCHITECT	UITENHAGE
	ARCDESIGN RMA	WESTVILLE
	ARCHIE NORVAL ARCHITECTS	SOMERSET WEST
	ARCHIMEDIA ARCHITECTS	MIDRAND
	ARCHIMEDIA ARCHITECTS	PERSEQUOR PARK
*	ARCHITECT'S PRACTISE COEN PRETORIUS	BETHLEHEM
*	ARCHITECT'S PRAC. JOHANN VAN ROOYEN	KLERKSDORP
*	ARCHITECT'S PRAC. PIETER ROSSOUW CC	PRETORIA
	ARCHS. ALBERT UYS & FARRENKOTHEN	GEORGE
	ARCHS. PRAC. JOHN BEUKES & DELAREY	NOORDSTAND
	ARCHITECTS REYNIER COEN	NEWTON PARK
*	ARCHITRIUM ARCHITECTS INC	CAPE TOWN
	ARCHITRIUM ARCHITECTS INC	SOMERSET WEST
	ARCHPLAN	BLOUBERG STRAND
	ARCHPLAN	HILLCREST
	ARCHPLAN	RUSTENBURG
*	ARCMEN INC ARCHITECTS	CAPE TOWN
	ARCOTEK	PINETOWN
	ARTEK 4	DURBAN
	ARTEK 4	MARGATE
	AUSTEN PIKE & REILLY	RONDEBOSCH
*	AZIZ TAYOB PARTNERSHIP INC	LAUDIUM

*	BAU ARCHITECTS	VEREENIGING
*	BSA ARCHITECTS CC	BELLVILLE
	BARRY DOEL ASSOCIATES	VLAEBERG
	BARRY J CLARK	DURBAN
	BARRY J HEIMAN & S KRUSS	CAPE TOWN
	BARTCH VAN BILJON	CAPE TOWN
*	BARTCH VAN HEERDEN VISSER & PARTNER	HARRISMITH
	BARTCH VAN HEERDEN VISSER & PARTNER	LADYSMITH
	BARTCH VAN HEERDEN VISSER & PARTNER	QUEENSTOWN
*	BASIE VAN RENSBURG	ALKANTRANT
	BAUHAUS & ASSOCIATES	CAPE TOWN
*	BAUHAUS & ASSOCIATES	WATERFRONT
	BENNIE & COOMES ARCHITECTS	EAST LONDON
*	BENTEL ABRAMSON & PARTNERS (PTY) LTD	HOUGHTON
*	BENTUM ARCHITECTS	PRETORIA
*	BLACKIE SWART	NEW MUCKLENEUK
*	BLEOM WILSENACH & DU PLESSIS	KROONSTAD
*	BLOM FABEL & SCHWELLNUS	SOUTHDALE
	BOOGERTMAN KRIGE & BLIGNAUT (BKB)	HENNOPSMEER
*	BOTHA & JOOSTE	HENNOPSMEER
*	BOTHA JOOSTE & MOULDER	LENASIA
*	BOTHA MENTZ ARCHITECTS	MENLO PARK
*	BOTHA PARTNERSHIP	VANDERBIJLPARK
*	BRANDT SNYMAN SPRUYT CRAFFORD CC	BRONKHORSTSPRUIT
*	BRANDT SNYMAN SPRUYT CRAFFORD CC	PRETORIA
*	BRIAN MUGGERIDGE ARCHITECTS	PORT ELIZABETH
*	BRIAN WATSON ASSOCIATES INC	VINCENT
	BRIAN SERVANT PARTNERSHIP	SOUTHERNWOOD
*	BRIDGE MORUM VINCENT	SOUTHERNWOOD

*	BRINK STOKES MARAIS & MOOLMAN	GEORGE
*	BRINK STOKES MARAIS & MOOLMAN	MOSSEL BAY
	BRINK STOKES MARAIS & MOOLMAN	LYNNWOOD RIGE
	BRINK STOKES MARAIS & MOOLMAN	UPINGTON
	BRINKMAN VAN ROOYEN BROWNE SUTTON	SOUTHERNWOOD
*	BRINKMAN VAN ROOYEN BROWNE SUTTON	PORT ELIZABETH
*	BROODRYK BESSENGER & ASSOCIATES	VREDENBURG
*	BRUCE TORR ASSOCIATES	NEWCASTLE
	BUCHANAN ASSOCIATES ARCHITECTS	CAPE TOWN
*	BURGER & MALAN	BLOEMFONTEIN
	C H TINY DU TOIT ARCHITECTS CC	FAERIE GLEN
	C LYALL ENGELS ARCHITECTS	HERMANUS
*	C VAN HOOF ARCHITECT	BRYANSTON
*	C VAN DER WESTHUIZEN	BLOEMFONTEIN
*	CHT ARCHITECTS	NORTHWAY
	CAMPBELL BERNSTEIN & IRVING	OVERPORT
	CAMPBELL BERNSTEIN & IRVING	EMPANGENI
*	CARTER-BROWN & BAILLON	DURBAN
*	CARTER-BROWN & BAILLON	PIETERMARITZBURG
	CASS PAREL & ASSOCIATES	GLENWOOD
*	CASSIM DOCRAT ARCHITECTS	CROWN MINES
*	CASSIM KADWA	QUALBERT
	CASSIM KADWA	CUMBERWOOD
*	CEDRIC HANNAY ARCHITECTS CC	MIDDELBURG
	CELLIERS PRETORIUS ARCHITECTS	DANHOF
	CELLIERS PRETORIUS ARCHITECTS	LINDEN
	CELLIERS PRETORIUS ARCHITECTS	MENLO PARK
	CELLIERS PRETORIUS ARCHITECTS	WITRIVIER
*	CHICK BARTHOLOMEW & POOLE	DURBAN

	CHRIS SWALES ARCHITECTS	SELBORNE
*	CHRISTOPHER COWLEY & ASSOCIATES	PORT ELIZABETH
*	CHRISTOPHER COWLEY & CRONJE	UITENHAGE
	CLARK & THOMAS ARCHITECTS	BEREA
	CLAUDE BERMANN ARCHITECT	STELLENBOSCH
*	COETZEE LUBBE ARCHITECTS INC	BLOEMFONTEIN
*	COETZEE STEYN KRUGER & OELSEN	BLOEMFONTEIN
	COETZEE STEYN KRUGER & OOSTHUIZEN	MURRAYFIELD
*	COETZEE STEYN KRUGER & OOSTHUIZEN	RICHARDS BAY
*	COLIN GLASSPOOL & ASSOCIATES	NEWCASTLE
	COLOMBO & CLARKE ARCHITECTS	VLAEBERG
	CONIDARIS WINBERG & GRESHOFF ARCHS.	CAPE TOWN
	VAN NIEKERK BOSHOFF & PARNTERS	POTCHEFSTROOM
	CONRADIE ARCHITECTS	POTCHEFSTROOM
*	COOPER ARCHITECTS	UMHLANGA ROCKS
*	COOTE & CLARKSON	LADYSMITH
*	COOTE & CLARKSON	VRYHEID
*	CORRIE ROUX VAN RENSBURG ARCHITECTS	BLOEMFONTEIN
*	COX DARBY GIBBON	AUCKLEN PARK
	CRAFFORD & CRAFFORD ARCHITECTS	MENLO PARK
	CYRIL KRUGER & ASSOCIATES CC	NORTHCLIFF
	CYRIL LEVY ASSOCIATES CC	RANDBURG
	CYRIL SCHLOSBERG ARCHITECT	NORWOOD
*	D A BAILLIE & NEETHLING	WESTDENE
*	D C JAMES ARCHITECTS	DURBAN
*	D I O'BRIEN	SPRINGS
	D M DE GERSIGNY	ESTCOURT
	DBM DESIGN CC	LOUIS TRICHARDT
	DHA ARCHITECTS	DURBAN

*	DLV INC (TRANSVAAL)	ARCADIA
	DANEEL SMIT & PARTNERS	DURBAN
*	DANEEL SMIT & PARTNERS	BROOKLYN
	DANIE PIENAAR ARCHITECT	SPRINGS
*	DANIE STYDOM	SPRINGS
	DANIE VAN LOGGERENBERG ARCHS. CC	GREENACRES - PE
	DAVID LIEBERMAN ARCHITECTS	KELVIN
*	DAYABHAI SCHREUDER ARCHITECTS	BRIXTON
*	DE BEER FARHAM DU TOIT & OLWAGE	POTGIETERSRUS
	DE HAAN ARCHITECT	DURBAN
	DE HAAN ARCHITECTS	DURBAN
	DE VILLIERS BRINK ARCHITECTS	BLOEMFONTEIN
	DENNIS ELLIOT & ASSOCIATES	NEWLANDS - CT
	DENNIS MOSS PARTNERSHIP INC	STELLENBOSCH
*	DEREK A MULLER	WELKOM
	DICK CRANE ARCHITECT	STELLENBOSCH
*	DIRK BRINK & PARTNERS	BETHLEHEM
	DIRK BRINK & PARTNERS	BLOEMFONTEIN
*	DIRK BRINK & PARTNERS	WELKOM
	DOLLAR MURRAY ARCHITECTS	PRETORIA
	DORNONVILLE DE LA COUR & HUGO ARCHS.	CAPE TOWN
	DOUGLAS & SMIT ARCHITECTS	DURBAN
	DOUGLAS & SMIT ARCHITECTS	PORT SHEPSTONE
*	DRISKEL & ASSOCIATES	BLOEMFONTIEN
	DRISKEL & ASSOCIATES	RUSTENBURG
	DRIVER & WEBBER CC	EAST LONDON
*	DU TOIT KENNEALY DU TOIT CC	RANDBURG
*	DU TOIT DE VILLIERS & THEUNISSEN JA	PAARL
*	EM ALBERT & ASSOCIATES INC	CAPE TOWN

	EHK ARCHITECTS	KRUGERSDORP
*	EHK ARCHITECTS	RANDBURG
*	EHK ARCHITECTS	WELKOM
*	EATON ROUX & WOLMARANS	PORT ELIZABETH
	EDGE HARPER HOOK CUNNINGHAM & SIEBE	ROGGEBAAI - CT
*	EDGE HARPER HOOK CUNNINGHAM & SIEBE	GEORGE
	EDGE HARPER HOOK CUNNINGHAM & SIEBE	OUDTSHOORN
	EDWARD VLEMINCKX ARCHITECTS CC	PIETERSBURG
	EFTYCHIS	BROOKLYN
	EKHAYA ARCHITECTS	VLAEBERG - CT
	ELLENS & WHITFIELD ARCHITECTS	DURBAN
	EMMETT & EMMETT ARCHITECTS CC	DURBAN
	ENGELBRECHT & BESTER ARCHITECTS	BELLVILLE
	ERASMUS FAIRBAIRN ARCHITECTS	AUCKLAND PARK
*	ERASMUS RUSHMERE REID	PORT ELIZABETH
	ERIK VOIGT ARCHITECTS	PORT ELIZABETH
	ERROL J GERSCH	GARDENS CT
*	ESBACH & ESBACH	PORT ELIZABETH
	ETIENNE BRUWER ASSOCIATES	DURBAN NORTH
	ETTIENNE D POLEY ARCHITECT	BLOEMFONTEIN
	EVANGELOS AUGOUSTATOS & PARTNER	PORT ELIZABETH
*	EVERT KAPP ARCHITECTS	BLOEMFONTEIN
	EWALD PLEKKER ARCHITECTS	BALLITO
*	F D THERON ARCHITECTS	KENTON-ON-SEA
*	FGG ARCHITECTS	DURBAN
*	FGG ARCHITECTS	PIETERMARITZBURG
	FALKON BARNARD ARCHITECTS	WESTVILLE
*	FAWKES DOVE KERR & ASSOCIATES	EAST LONDON
	FAWKES DOVE KERR & ASSOCIATES	BISHO

*	FLINT & LEAR ARCHITECTS	PORT ELIZABETH
	FLORIS SMITH & MEYER PIENAAR CC	SAXONWOLD - JHB
	FORSYTH & PARTNERS	CAPE TOWN
	FRANS JOUBERT & ASSOCIATES	PRETORIA
	FRED DE KOCK & PARTNERS INC	STELLENBOSCH
	FREDERICK C COLBRECHCT & ASS	ESHOWE
	FRENCKEN ASSOCIATES ARCHITECTS	DURBAN
	FRIDJHON FULFORD & PARTNERS	DURBAN
	FRITZ STEYN ARCHITECTS	EAST RAND
	G & F ARCHITECTURE CC	PORT ELIZABETH
*	G A ADLER & JONES INC	PORT ELIZABETH
	G M KAHN & ASSOCIATES	DURBAN
	GABRIEL FAGAN	CAPE TOWN
*	GAIL HODGSON ARCHITECTS	RUSTENBURG
*	GARY DREYER ARCHITECTS	EAST LONDON
*	GAVIN MC LACHLAN ARCHITECTS	PORT ELIZABETH
*	GELDENHUYS & JOOSTE ARCHITECTS	VANDERBIJLPARK
*	GEORGE CANDIOTES	BEDFORDVIEW
*	GERD OCKERT	DURBAN
*	GEYER LUBBE & PARTNERS	KIMBERLEY
*	GOLDBLATT YUILL & PARTNERS	BLOEMFONTEIN
*	GOLDBLATT YUILL & PARTNERS	KIMBERLEY
*	GOLDBLATT YUILL & PARTNERS	KURUMAN
	GOLDBLATT YUILL & PARTNERS	MMABATHO
	GOODBRAND ARCHITECTS	CRAMERVIEW
	GORDON OLIVIER & ASSOCIATES	RICHARDS BAY
	GOURLAY MOORE & ASSOCIATES	DURBAN
*	GOUWS LANDALE & PARTNERS	PORT ELIZABETH
	GRAFF SADUR ASSOCIATES CC	SANTON

	GRAHAM F EDKINS ARCHITECT	IRENE
	GRANVILLE & ASSOCIATES	LADYSMITH
*	GRAPHORN & PARTNERS	SUNNYSIDE
	GROENEWALD ARCHITECTS CC	CAPE TOWN
	GROENEWALD ARCHITECTS CC	GEORGE
	GUIDO DE BEER ARCHITECTS	RANDBURG
*	GUILLAM-SCOTT VAN ROOYEN OLIVIER	CAPE TOWN
*	HC DALLE VEDOVE	ORANGE GROVE - JHB
	HF VERMEULEN VD WESTHUIZEN & FARREL	OVERPORT DURBAN
	HF VERMEULEN VD WESTHUIZEN & FARREL	DANHOF - BLF
	HF VERMEULEN VD WESTHUIZEN & FARREL	KLEINMOND
	H GRIEG FORSYTH	CAPE TOWN
	H J NEL	WESTVILLE
*	H L SNOW & ASSOCIATES	MELVILLE - JHB
	H PELLIONS CONSULTING ARCHS. CC	PARKVIEW - JHB
*	H VAN KERKEN ARCHITECT	WATERKLOOF - PTA
	H VAN DER WALT & PARTNERS	BLOEMFONTEIN
*	HAASBROEK ARCHITECTS	DANHOF - BLF
	HAMMAN & BRINK ARCHITECTS	PAARL
*	HANS BEETGE ARCHITECTS	LOUIS TRICHARDT
*	HANS KOORTS & HATTINGH	BLOEMFONTEIN
*	HARLECH-JONES TREASURE ARCHS. CC	PORT ELIZABETH
*	HARLECH-JONES TREASURE ARCHS. CC	UITENHAGE
*	HAROON O JOOSUB ARCHITECTS	FERREIRASTOWN
	HARRY BURGER ARCHITECT	GEORGE
*	HARTMAN VD WALT & VERMOOTEN	ALKANTRAND
	HAVINGA VAN STRATEN CC	RUSTENBURG
	HEINRICH GERSTNER HARDING ARCHS.	ROGGEBAAI
	HEINRICH MULDER & ASS	PORT ELIZABETH

*	CHRIS VERMEULEN & WHITEHEAD ARCHS.	MENLO PARK
	COETZEE CAMPBELL & ASSOCIATES	SOMERSET WEST
*	HENK BAKKER ARCH. & TOWN PLANNER	PRETORIA
	HENNIE LAMBRECHTS ARCHITECTS	BLOEMFONTEIN
*	HENRY PAINE ARCHITECT CC	GREENSIDE
*	HENRY SNYMAN PARTNERSHIP	KLERKSDORP
*	HERSON ASSOCIATES	ROODEPOORT
	HOLM JORDAAN HOLM	MMABATHO
	HOLM JORDAAN HOLM	PRETORIA
*	HOSKIN & ENGLISH ARCHITECTS	GRAHAMSTOWN
*	HOUSEHAM HENDERSON MOTEANE ARCHS.	BLOEMFONTEIN
	HRABAR & HRABAR ARCHITECTS CC	PLETTENBURG BAY
*	HUGHES BRYAN BIRSS	PIETERMARITZBURG
*	IAN NAPIER	KNYSNA
	IAN STANILAND ARCHITECTS	CAPE TOWN
*	ING JACKSON AND DALRYMPIE ARCHITECT	EMPANGENI
*	INTEGRATED DESIGN CONSULTANTS	DURBAN NORTH
	INTEGRATED DESIGN CONSULTANTS	UMTATA
*	INTERARC ARCHITECTS INC	DURBAN
	INTERARC ARCHITECTS INC	EMPANGENI
	INTERPLAN ARCHITECTS (PTY) LTD	BELLVILLE
	INTERPLAN ARCHITECTS (PTY) LTD	KAAPSTAD
*	INTERPLAN ARCHITECTS (PTY) LTD	PIETERMARITZBURG
*	INTERPLAN ARCHITECTS (PTY) LTD	PORT ELIZABETH
	INTERPLAN ARCHITECTS (PTY) LTD	CENTURION
*	IRVINE F FRANKS	SANDRINGHAM
	ISAACS FELDMAN & ASSOCIATES	CAPE TOWN
	ISIDORE SHIFRIN ARCHITECTS	CAPE TOWN
*	ISMAIL CASSIMJEE	CUMBERWOOD - PMB

*	IVAN B SIVE & MOFFAT CC	PRETORIA
*	J ANDREW JOOSTE	PRETORIA
*	J C DE K WITTHUHN & MAREE	BLOEMFONTEIN
*	J J STEYN & ASSOCIATES	BLOEMFONTEIN
	JOH ARCHITECTS	BREDASDORP
*	JON ARCHITECTS	KIMBERLEY
*	JON ARCHITECTS	PIETERMARITZBURG
	JON ARCHITECTS	PRETORIA
	JAAP VAN LILLIE ARCHITECT	GEORGE
*	JAN CUSTERS & ASSOCIATES	JOHANNESBURG
*	JAN KOUDSTAAL ARCHITECT	PRETORIA
*	JAN RAS ARCHITECTS GROUP CC	BLOEMFONTEIN
*	JAN WILKENS ARCHITECT	BLOEMFONTEIN
	JEFF STACEY & ASSOCIATES	YEOVILLE - JHB
	JOCHEM MARS ARCHITECT	STELLENBOSCH
*	JOHN & CORRIS BARNARD ARCHITECTS	PORT ELIZABETH
	JOHAN ACKERMAN ASSOCIATES	CAPE TOWN
	JOHAN DUVENHAGE ARCHITECT	MESSINA
	JOHAN KOEKEMOER ARCHITECT	BLOEMFONTEIN
	JOHAN P MENTZ ARCHITECTS	PRETORIA
*	JOHANN SMITH MARINIER & ASSOCIATES	PIETERMARITZBURG
*	JOHN DRY ARCHITECTS CC	PRETORIA
	JOHN DRY ARCHITECTS CC	MENLO PARK
	JOHN EDGAR CHARTERED ARCHITECT	LADYBRAND
*	JOHN KINGSLEY-HALL	EAST LONDON
*	JOHN ORPEN	KNYSNA
	JOHN ROYAL ARCHITECTS	DURBAN
	JOHN ROYAL ARCHITECTS CC	PINETOWN
*	JOHN W WILKINS ARCHITECT	WESTVILLE

*	JONES & McWILLIAMS & GROSS	PORT ELIZABETH
	JONKER & BARNES	CAPE TOWN
*	JORDAAN HARTWIG STEYN LEROUX	CAPE TOWN
	JOSHUA & JOSHUA ARCHITECTS (PTY) LTD	ATHLONE - CT
*	JURIE DE WIT & CILLIERS ARCHS. CC	BETHLEHEM
*	K NAGER ARCHITECT	LAUDIUM
	KMH ARCHITECTS	CAPE TOWN
*	KWP ARCHITECTS	KEMPTON PARK
*	KWP ARCHITECTS	PRETORIA
*	KWP ARCHITECTS	SECUNDA
	KASS & WATKINGS	WINKELSPRUIT
	KEITH MacMULLEN	CRAMERVIEW
	KEN PARKER	PORT SHEPSTONE
	KERRY BROOKSBANK ARCHITECT	JOHANNESBURG
	KESLER & VAN HEERDEN	CAPE TOWN
*	KLEIN & LOUW ARCHITECTS	CAPE TOWN
*	KOCK & DITTRICH INC	JOHANNESBURG
	KOOBLAL & STEYN ARCHITECTS	UMDLOTI
	KOTLOWITZ ADLER ARCHITECTS	CAPE TOWN
	KRYNAUW CHAIT VAN RIJSWIJK ARCHS.	CAPE TOWN
	KPER LEVIN GEORGE ARCHITECTS	CAPE TOWN
*	LOUIS GROVE ARCHITECTS	PIETERMARITZBURG
	LAUBSCHER VISSER MALAN ARCHITECTS	ALBERTON
*	LAUBSCHER VISSER MALAN ARCHITECTS	BRITS
*	LAUBSCHER VISSER MALAN ARCHITECTS	MIDRAND
	LAUBSCHER VISSER MALAN ARCHITECTS	BRAAMFONTEIN
*	LE ROUX ROBB & PARTNERS	BLOEMFONTEIN
*	LEACH & VAN DER WALT	NEWCASTLE
*	LEN DAWSON & ASSOCIATES	NELSPRUIT

*	LEN JOUBERT ARCHITECTS CC	NORTHMEAD BENONI
*	LEON VENTER ARCHITECTS' TRUST	BETHAL
	LEON VLOK ARCHITECT	MENLO PARK - PTA
*	LESLIE SIMON	HOUGHTON - JHB
	LINACRE DAVIS & HINSCH	CAPE TOWN
	LIONEL EDWARDS ARCHITECTS	ROGGEBAAI - CT
*	LOMBARD ASSOCIATES INC	BLOEMFONTEIN
*	LONDT KNIGHT FIEGGEN & MOORS	GRAHAMSTOWN
*	LONDT KNIGHT FIEGGEN & MOORS	PORT ELIZABETH
	LOU VAN COPPENHAGEN ARCHITECTS	MENLO PARK
	LOUIS BOSHOFF ARCHITECTS	ARCADIA
	LOUIS KAROL ARCHITECTS	FORESHORE - CT
	LOUIS KAROL ARCHITECTS	JOHANNESBURG
	LOUIS PEENS ARCHITECTS	PARKLANDS - JHB
	LOUIS TOM JORDAAN ASSOCIATION	CLAREMONT - CT
	LOVELL PUGH & PARTNERS	BEDFORDVIEW
*	LUBBE GEYER & PARTNERS	UPINGTON
*	M A GAFOOR ARCHITECT	DURBAN
*	M A GOONDIWALA & ASSOCIATES	AZAADVILLE
*	URBAN EDGE GAUTENG (PTY) LTD	BRYANSTON
	MAB ARCHITECTS	OVERPORT - DBN
	MAB ARCHITECTS	PARKLANDS - JHB
	MEG ARCHITECTS	PIETERSBURG
	MEG ARCHITECTS	PRETORIA
	MHV ARCHITECTS & PLANNERS	CAPE TOWN
	MHV ARCHITECTS & PLANNERS	MONUMENT PARK
*	MV3 ARCHITECTS	PRETORIA
*	MV3 ARCHITECTS	SANDTON
	MVTR	CAPE TOWN

	MacKENZIE MOLYNEUX ARCHITECTS	VLAEBERG
*	MALCOLM BURGER	VINCENT
	MALCOLM F FRASER	SEDFEFIELD
*	MALCOLM WILLIS ARCHITECTS	ERMELO
	MALHERBE RUST ARCHITECTS	PAARL
*	MARAIS DU PLESSIS & MENTZ CC	BROOKLYN PTA
	MARI NEL ARCHITECT	PARKVIEW - JHB
	MARKEWICZ ENGLISH & ASSOCIATES	OVERPORT - DBN
	MATLAPLAN ARCHITECTS CC	LYNNWOOD RIDGE
	McCAFFERY WILKINSON & LITTLE	DURBAN
*	MvNAMARA & LINSLEY ARCHITECTS	GRAHAMSTOWN JHB
	MELVILLE VON BROEMBSEN	SAXONWOLD - JHB
*	MEREDITH WOODS JOHNSON & SCHRADER	PORT ELIZABETH
	MERINDA VAN DER WESTHUIZEN ARCH.	KNYSNA
	MESSARIS WAPENAAR CONSULTING ARCH.	RANDBURG
	MICHAEL J DOEPEL ARCHITECT	BENONI
*	MICHAEL M PAYNE & ASSOCIATES	WITBANK
	MICHAEL THOMAS	SANDTON - JHB
	MICHALE HACK & STAPLETON CC	MENLO PARK
	MIKE RAVENSCROFT ARCHITECT	CONSTANTIA
	MIKE VAN DER MERWE ARCHITECT	SUNNYSIDE
	MINAAR & MINAAR	WATERKLOOF - JHB
	MINZE STEEN & ASSOCIATES	GARDENVIEW - JHB
	MITCHELL DU PLESSIS ASSOCIATES INC.	ROGGEBAAI
	MOFFAT WHITLOCK ARCHITECTS CC	GRAAFF REINET
	MOFFAT WHITLOCK ARCHITECTS CC	GREENACRES - PE
	MOLEKE BAREND ASSOCIATES	RANDBURG
	MOORE BAKER & ASSOCIATES	QUEENSWOOD - PTA
*	MUHAMMED MAYET ARCHITECTS	JOHANNESBURG

*	MULLER & NEUMEISTER	HARRISMITH
*	MULLER & NEUMEISTER	VRYHEID
	MULLINS ASSOCIATES	MAYVILLE - DBN
*	MULTIDIMENSIONAL AASSOCIATES CC	EXCOM
*	MYLES PUGH SHERLOCK MURRAY	PINETOWN
	N B CONCHAR ARCHITECT	VLAEBERG - CT
*	N L HEIMAN & ASSOCIATES	VEREENIGING
*	NAREN MISTRAY ARCHITECTS CC	LENASIA
*	NATIE VAN DEN BERG	SUNNYSIDE - PTA
*	NATUS & CECILLIA VAN RENGSBURG	NELSPRUIT
*	NAUDE & BOUMA	STELLENBOSCH
	NAUDE BOUMA VAN DER WOLF	BELLVILLE
*	NEIL HAYES-HILL ARCHITECT	OVERPORT - DBN
	NEILL WILSON ARCHITECT	HERMANUS
*	NEL WILREKER PARTNERSHIP	AUCKLAND PARK - JHB
	NEO DIMENSIONS ARCHITECTS	HENNOPSMEER
	HIEMANN & SWART ARCHITECTS CC	TZANEEN
	NORMAN CALITZ LLEWELLYN VAN WYK	CAPE TOWN
	NORMAN CHICKEN	TULBAGH
	NOEL BISHOP ARCHITECT	DURBANVILLE
	OAC ARCHITECTS & ASSOCIATES	PRETORIA
	OSGLO ARCHITECTS (PTY) LTD	LOUIS TRICHARDT
	OSGLO ARCHITECTS (PTY) LTD	PRETORIA
*	OSGLO ARCHITECTS (PTY) LTD	SASOLBURG
	OSGLO ARCHITECTS (PTY) LTD	TZANEEN
*	OSGLO ARCHITECTS (PTY) LTD	VEREENIGING
	OSMOND LANGE ARCHITECTS (PTY) LTD	CLAREMONT
*	OSMOND LANGE ARCHITECTS (PTY) LTD	EAST LONDON
	OSMOND LANGE ARCHITECTS (PTY) LTD	MAFIKENG

	OSMOND LANGE ARCHITECTS (PTY) LTD	PIETERSBURG
	OSMOND LANGE ARCHITECTS (PTY) LTD	WALMER - PE
	OSMOND LANGE ARCHITECTS (PTY) LTD	PARKLANDS - JHB
	OSMOND LANGE ARCHITECTS (PTY) LTD	UMTATA
*	P VAN DER RIET INGELYF	BENONI
	PALEDI MORRISON VOLAVSEK	GALLO MAN OR
	PANAGIS PETALAS ARCHITECTS	WALMER - PE
*	PARTNERSHIP HANS HENDRIKSE	NEWCASTLE
*	PAT GOING ARCHITECTS CC	GRAHAMSTOWN
*	PAT LAVERY ARCHITECT	STUTTERHEIM
	PATON TAYLOR ASSOCIATES INC	DURBAN
	PAUL J DU PLESSIS & VAN WYK	ARCADIA - PTA
*	PAUL LARKIN ARCHITECTS	QUEENSTOWN
	PEARSE ANEK HAHN	BRYANSTON
*	PEISER GROBBELAAR & RODGER CC	SUNNYSIDE
*	PELLEGRINI ASSOCIATES ARCHITECTS	UMHLANGA ROCKS
	PENTAGRAPH (PTY) LTD	SUNNINGHILL
	PERCY M ELK ASSOCIATES	CYRILDENE - JHB
	PHILIP KRUSE ARCHITECTS	MENLO PARK
*	PHILLIP VAN HUYSSTEEN ARCHITECT	PINEGOWRIE
*	PIET BADENHORST ARCHITECTS	WELKOM
*	PIET LOUW MARTIN KRUGER ARCHITECTS	VLAEBERG
*	PIETER GERTENBACH ARCHITECTS	GILLETS - DBN
*	PIETERSEN VAN RENSBURG	EMPANGENI
	PIETERSEN VAN RENSBURG	GLENWOOD - DBN
	PORTAL PARTNERSHIP INC	PARKLANDS - JHB
	QUADTRISIR	HALFWAY HOUSE
	QUADTRISIR	SUNNYSIDE
*	QUINTON DE BEER	SINOVILLE - PTA

*	RABIE & PARTNERS	MENLO PARK - PTA
*	RABIN INC	MUIZENBERG
	RADOMSKY & GONCALVES	JOHNNESBURG
	RALEIGH KEATING ARCHITECTS	SOUTHERWOOD - E.L
*	REMMERS ARCHITECTS	HALFWAY HOUSE
	REMMERS ARCHITECTS	PRETORIA
	RENIER ROOS ARCHITECTS	ELLISRAS
	RESEARCH & ARCHITECTURAL PROJECTS	GLENWOOD - DBN
	REVEL FOX & PARTNERS CC	CAPE TOWN
	RICHARD HONIKMAN ARCHITECTS CC	CAPE TOWN
	RICHARDSON & MORRIS	KNYSNA
	RICHTER & MALAN INC	ARCADIA
*	RICHTER & MALAN INC	WITBANK
*	ROBBERT J W BRUSSE ARCHITECTS	BELLAIR - DBN
	ROBERT JOHNSON ARCHITECT & ASSOCS.	DURBAN
*	ROBERT MARKS ARCHITECT	GARDEN VIEW - JHB
	ROBINS & BASSON ARCHITECTS CC	YEOVILLE - JHB
	ROD PALMER ARCHITECT	CAPE TOWN
*	RONALD GUY ARCHITECT	RUSTENBURG
*	ROUGIER CROXON & SWIATEK	PINETOWN
	ROY HARDIE	WESTVILLE
	RUMSEY FISCHER ASSOCIATES	PORT ELIZABETH
	RUMSEY FISCHER ASSOCIATES	UITENHAGE
	SAM PEILLISSIER ARCHITECTS	SLOAN PARK
	SREL DE BRUIIN ARCHITECT	BLOEMFONTEIN
*	SCHALK VORSTER NAUDE ARCHITECTS	SANDTON
*	SCHALK LE ROUX UYS GREYLING ARCHS.	NORTHMEAD
	SCHALK LE ROUX UYS GREYLING ARCHS.	MENLO PARK
	SCHIMPFLE PLAN	CAPITAL PARK - PTA

*	SCHMIDT HICKS & V.D WALT ARCHITECTS	UITENHAGE
	SCHROEDER IRVING ARCHITECTS	ALKANTRANT
*	SCHULENBURG & DE VILLIERS	SUNNYSIDE
	SEEDAT ARCHITECTS	OVERPORT - DBN
*	SEITTER BOYD ARCHITECTS	DURBAN
*	SELBY SHIBA ARCHITECT	JOUBERT PARK
*	SIEGFRIED SCHMIDT HICKS V.D WALT	PORT ELIZABETH
	SIMONS & FOURIE	BELLVILLE
*	SIMONS & LEE ARCHITECTS	SASOLBURG
	SIMPSON HEUGH ROBERTSON & BAKER	PORT ELIZABETH
	SKORDIS ASSOCIATES ARCHITECTS	OVERPORT
	SLABBERT & LOUBSER	MENLO PARK
	SMALE & PARTNERS (TRANSKEI) INC	UMTATA
*	SMALE & PARTNERS INC	VINCENT - E.L.
	SMIT & FISHER ARCHITECTS	GRASKOP
*	SMIT & FISHER ARCHITECTS	KEMPTON PARK
*	SMIT & FISHER ARCHITECTS	GROENKLOOF
*	SMIT & FISHER ARCHITECTS	PAARL
	SMUTS & DE KOCK INCORPORATED	GEORGE
	STAFFORD ASSOCIATE ARCHITECTS	DURBAN
*	STAUCH VORSTER	CAPE TOWN
	STAUCH VORSTER	DURBAN
	STAUCH VORSTER	JOHANNESBURG
*	STAUCH VORSTER	PORT ELIZABETH
	STAUCH VORSTER	PRETORIA
	STEPHAN WEYERS ARCHITECT	WELGEMOED
*	STUCKE HARRISON ARCHITECTS	CAPE TOWN
*	STUCKE HARRISON ARCHITECTS	PIETERMARITZBURG
	STUCKE HARRISON ARCHITECTS	SANDTON

*	STUDIO 3 ARCHITECTS CC	LYNNWOOD - PTA
	STURROCK FOALE & ROBERTSON	PAARL
	SUDHIER MAGAN	WYNBERG
	SUNDELOWITZ & ASSOCIATES	SENDERWOOD
*	SYLVIA SHPSHAK ARCHITECT	HIGHLANDS NORTH
*	TALJAARD CARTER ARCHITECTS	HOUGHTON
	TALJAARD CARTER ARCHITECTS	PIETERSBURG
	TALJAARD CARTER ARCHITECTS	SUNNYSIDE
*	TALJAARD CARTER ARCHITECTS	RANDBURG
*	TALJAARD CARTER ARCHITECTS	PIETERMARITZBURG
	TALJAARD CARTER ARCHITECTS	ALBERTON
*	TASKER & SCHUMAN ARCHITECTS	NELSPUIT
	TASKER & SCHUMAN ARCHITECTS	MEER EN SEER - JHB
*	TAYLOR & TAYLOR WITH I.F FRANKS	CRAIGHALL - JHB
*	TAYLOR V. RENSBURG V.D SPUY VISSER	SOMMERSET WEST
	TAYLOR V. RENSBURG V.D SPUY VISSER	STELLENBOSCH
*	TECTURA ARHICTECTS	SUNNYSIDE - PTA
	TELFORD ARCHITECTS	BRYANSTON
	TEMPEL & NIEUWOUDT ARCHITECTS	PIETERSBURG
*	TENNANT & TENNANT CC	PIETERMARITZBURG
*	THE BASIL POWELL PARTNERSHIP	SANDTON
*	THE COOK LIPSCHITZ PARTERSHIP	MELLVILLE - JHB
*	THE GLAM PARTNERSHIP	RICHARDS BAY
*	THE ROODT PARTNERSHIP CC	BLOEMFONTEIN
*	THEUNISSEN JANKOWITZ SA INC	BLOEMFONTEIN
	THEUNISSEN JANKOWITZ SA INC	DURBAN
*	THEUNISSEN JANKOWITZ SA INC	HARRISMITH
*	THEUNISSEN JANKOWITZ SA INC	LADYSMITH
	THEUNISSEN JANKOWITZ SA INC	MARGATE

*	THEUNISSEN JANKOWITZ SA INC	NELSPRUIT
	THEUNISSEN JANKOWITZ SA INC	POTCHEFSTROOM
	THEUNISSEN JANKOWITZ SA INC	SUNNYSIDE
	THEUNISSEN JANKOWITZ SA INC	RICHARDS BAY
	THEUNISSEN JANKOWITZ SA INC	SLOANE PARK
*	THIEL WEYERS & THIEL	KLERKSDORP
	THOMAS C FALCK ARCHITECTS	WORCESTER
*	TOBIE VAN WYK	SINOVILLE
	TOM HATTINGH ARCHITECTS	NELSPRUIT
	TREVOR LLOYD EVANS	PRETORIA
	TREVOR N BAILLIE ENFALT ASSOCIATES	GARDENVIEW - JHB
*	TREVOR WEST CHARTERED ARCHITECTS	KING WILLIAM'S TOWN
	TRIBELHORN DOVETON HOLTZHAUSEN	BELLVILLE
	UWE POTTER ARCHITECT	DURBAN
	VHH ASSOCIATES INC	BRAAMFONTEIN - JHB
	VNL ARCHITECTS	MONTAGU
	VNL ARCHITECTS	WORCESTER
	VAN BILJON & VISSER ARCHITECTS	BELLVILLE
	VAN HEERDEN & ASSOCIATES	WESTVILLE
*	VAN RENSBURG CLAASSENS & ROOS INC	SUNNYSIDE
	VAN RIET & MANSVELT	BELLVILLE
*	VAM ROUENDAL & BOSMAN	LICHTENBURG
	VAN ZYL AND DER WALT ARCHITECTS	MALMESBURY
	VAN DER MERWE HONNIBAL SWIEGERS CC	BOKSBURG
*	VAN DER MERWE HONNIBAL SWIEGERS CC	SUNNYSIDE
	VAN DER SPUY & ASSOCIATES INC	CAPE TOWN
*	VERMOOTEN DU PLOOY & OOSTHUIZEN	ALKANTRANT
*	VERMOOTEN DU PLOOY & OOSTHUIZEN	WITBANK
*	VERNON T VINCENT ARCHITECT	PORT ELIZABETH

*	VICTOR PETERSON & PARTNERS ARCHS.	NORTHMEAD
*	VIKRAM DESAI ARCHITECTS CC	JOHANNESBURG
*	VINCENT & HENDRIKS	ARCADIA
	VISSER ANDERSSEN CC ARCHITECTS	TZANEEN
	VITO COPPOLA AND ASSOCIATES	DURBAN
	VLOOTHUIS & NEL CC	SOMERSET WEST
*	VOS & ASSOCIATES	EAST LONDON
	W F MOLL & WIGGETT CC	GROENKLOOF
*	W J TWEMLOW & ASSOCIATES	VEREENIGING
*	W KASSIER ARCHITECT	UMVOTI
*	WALLY VAN ROOYEN CLOETE	KLERKSDORP
	WALTER RODGER NORMAN LAKE (PTY) LTD	SUNNYSIDE
*	WARREN SIMPSON & PARTNERS	CAPE TOWN
	WASFIE JASSIEM ARCHITECTS & ASSCS.	SALT RIVER - CT
*	WATERSON WEYER ROON	GRAAFF REINET
	WATERSON WEYER ROON	BROOKLYN
	WESSELS & SAMUEL	CAPE TOWN
*	WESSELS & SAMUEL	KROONSTAD
*	WESSELS ALBERTYN DU TOIT ARCHS CC	PAARL
*	WHITEHEAD RUMMEL & PARTNERS	PORT ELIZABETH
	WIID & LUTZ IN ASSOCIATION	CAPE TOWN
*	WILHELM SADIE & PHEILIX	WORCESTER
	WILHELM SADIE & PHEILIX	MALMESBURY
*	WILKENSON & ASSOCIATES ARCHITECTS	BLOEMFONTEIN
*	WILLEM COETZEE	SUNNYSIDE
	WILLEM DU PLESSIS & PARTNERS	MENLO PARK
	WILLIAM MORRIS ASSOCIATES	MELVIILE
	WILLIAMS & PEARCE	RONDEBOSCH
*	WILSENACH BLOEM & DU PLESSIS	SUNNYSIDE

*	WIM PHIELIX & SADIE ARCHITECTS	KROONSTAD
	WIM SWART & PARTNERS CC	HATFIELD
*	WINSTON KING	KIMBERLEY
	WINTERBACH PRETORIUS WHITE	SUNNYSIDE
*	WINTERBACH PRETORIUS WHITE	VLAEBERG
	WINTERBACH PRETORIUS WHITE	ARCADIA - E.L.
*	WINTERBACH PRETORIUS WHITE	HOUGHTON
	WINTERBACH PRETORIUS WHITE	KING WILLIAM'S TOWN
	WINTERBACH PRETORIUS WHITE	PIETERSBURG
*	WINTERBACH PRETORIUS WHITE	QUEENSTOWN
	WINTERBACH PRETORIUS WHITE	MEERENSEE
*	WINTERBACH PRETORIUS WHITE	VANDERBIJLPARK
	WINTERBACH PRETORIUS WHITE	DURBAN
	WYNAND SMIT ARCHITECT	PRETORIA
	YASUF ABDULLAH ARCHITECT	CAPE TOWN
	YEAMAN & DUNN ARCHITECTS	RANDBURG
*	ZAI INC	DURBAN
	ZAI INC	MELMOTH
*	ALBONICO & SACK	GRANT PARK
*	RIDWAAN VALLY ARCHITECT	LAUDIUM
*	LINDA MVUSI	JOHANNESBURG
*	AHMED SABAR BHAM	VREDENDORP

GAUTENG Dept. of Ed.

LIST OF PROJECTS AND CONSULTANT ARCHITECTS
AS AT JANUARY 1997

GAUTENG DEPARTMENT OF EDUCATION
PROJECTS IN PROGRESS 1997

PANEL OF CONSULTANT ARCHITECTS COMMISSIONED

SCHOOL	CONSULTANT ARCHITECT
Altmont S/S	Philip van Huysteen
Amogelang S/S	John Dry
Bona S/S	Paresh Kumar Ambelal
Bopa-Senatla	Shilpakala Architects
Boschkop P/S	Brandt Snyman Spruyt
Dawn Park S/S	Muhammed Mayet
Day By Day P/S	Botha & Jooste
Dinokaneng S/S	Ben Peels
Dube P/S	Naren Mistry
Elite P/S	Botha Partnership
Entshonolanga P/S	Smit & Fisher
Filadelfia S/S	Smit & Fisher
Finetown P/S	Farhaad Areff
Emasangweni P/S	Theunissen Jankowitz
Fontanus S/S	Jankes & Associates
Funukukhanya P/S	Len Joubert
Iphahamiseng P/S	Danie Strydom
Isidingo T/C	Pieter van der Riet
Jabulile S/S	B A U Architects
Katleho Impumelemo S/S	OSGLO Architects
Kgadime Matsepe S/S	John Dry
Kgolagano P/S	Len Joubert
Kgoro Ya Thuto S/S	Danie Strydom
Khutsong P/S No.3	Dayabhai Schreuder
Kutlwano S/S	Len Joubert
Kwa-Mahlobo S/S	Haroon Josub
Kwa-Thema P/S	Danie Strydom
Lakeside S/S	Botha Partnership
Lazarus Nhlapo T/C	KWP Architects
Lethulwazi S/S	Taljaard Carter

SCHOOL	CONSULTANT ARCHITECT
Makonyama P/S	Ridwaan Vally
Maloanta P/S	Ahmed Sabar Bham
Manzini P/S	Selby Shiba
Masizani P/S	Tobie van Wyk
Mohaladitoe S/S	W P W Architects
Mokgome S/S	Botha & Jooste
Mopholoshi S/S	Ben Peels
Moshate S/S	Geldenhuys & Jooste
Mzomhle S/S	Schalk Vorster Naude
Namedi S/S	Cassim Docrat
Nomini P/S	Botha Partnership
Nellmapius P/S	Aziz Tayob Partnership
Phafogang S/S	Philip van Huysteen
Phahamang P/S	Ben Peels
Phandimfundo S/S	Len Joubert
Qhaqholla P/S	Danie Strydom
Ramahlala P/S	Kishore Nagar
Realogile S/S	C van Hoof
Rebonwe P/S	K W P Architects
Refalletse P/S	OSGLO Architects
Rekgutile	OSGLO Architects
Reshogofaditswe S/S	Plan Architects
Rethabiseng P/S	Brandt Snyman Spruyt
Ruta Setjaba S/S	N L Heiman
Sakhile P/S	Danie Strydom
Sehopotso S/S	W P W Architects
Semphato P/S	H van Kerken
Soshanguve T/C	Willem Coetzee
Swartkop Valley F/S	J Herson
Tarlton F/S	J Herson
Theta S/S	Vikram Desai
Thara Bollo S/S	Botha Partnership
Thusa-Setjaba P/S	Geldenhuis & Jooste
Thutusekani P/S	Albonico & Sack

Thuto-Lehakwe S/S	E H K Architects
SCHOOL	CONSULTANT ARCHITECT
Thuto Matlala T/C	H van Kerken
Tiyelani S/S	Blackie Swart
Tlamoha T/C	Danie Strydom
Tlitsetsong S/S	A A Papageorgiou
Tsepana P/S	Botha Partnership
Tsoaranang P/S	W P W Architects
Tsumbedzo P/S	M Mayet
Umqhele S/S	K W P Architects
Usizo T/C	iCAP Architects
Windmill Park P/S	Linda Mvusi
Zamukhanyo P/S	Len Joubert
Zimisele S/S	Danie Strydom

SEVENTY SIX PROJECTS AS AT JANUARY 1997

1.4 The cost estimates indicated in this cost comparison is based on the following:

1.4.1	Motswela:	Working drawings received from the Department on 15 March 1990.
1.4.2	School 1:	Line drawings and specifications received from Stauch Vorster Architects on 9 March 1990.
1.4.3	School 2:	Line drawings and specifications received from Botha & Jooste Architects on 6 March 1990.
1.4.4	School 3:	Line drawings and specifications received from Kemp Wegelin and Partners Architects on 15 February 1990.
1.4.5	School 4:	Line drawings and specifications received from Theunissen Jankovitz Architects on 7 March 1990.

1.5 No alternative design was received for the Caretakers' Cottage and Gate House. The appropriate figures were therefore derived from Motswela and applied unaltered to the four schools. The same was applied to the following specialist services where an estimate of services for Motswela was utilised for the four schools:

- Intercom and electrical installation
- Gas installation
- Laboratory equipment.

1.6 In light of the fact that the cost estimates of the four schools were based on line drawings an amount of 10% of the estimated cost was allowed as design development. Exception was made in the case of school 3, where only 2,5% was allowed, as more detail was available at the time of the cost estimate.

1.7 The respective cost estimates do not make provision for:

1.7.1	Exceptional soil conditions. This implies the consistent application of strip foundations.
1.7.2	General site work
1.7.3	Site services
1.7.4	Sports fields
1.7.5	Loose furniture and equipment.

2. CONSTRUCTION, FINISHES, ETC.

2.1 Motswela

This school consists mainly of "standard" design as approved by the Department. Single storey blocks consist of concrete strip foundations and brick walls. Double and three storey blocks consist of a reinforced concrete structure with a hollow block construction and brick fill.

All the blocks have galvanised corrugated iron roof cladding on a timber roof construction. External finishes consist of face brick. Internal finishes are face brick, plaster and paint, with glazed wall tiling in the toilets, as well as fibre cement and gypsum board ceilings. Floor finishes vary.

2.2 School 1:

Alternative A
The single storey blocks consist of concrete strip foundations and brick walls. The double storey blocks consist a of reinforced concrete structure with hollow block construction and brick fill. The brick-work of the first floor level supports the roof construction.

All the blocks have galvanised IBR roof sheeting on a pre-fabricated timber roof structure, with semi face brick finish externally and the classrooms internally have flat jointed brick work finish. The rest of the buildings have standard plaster and paint finish with glazed tiling in the toilets. Gypsum board ceilings are consistently specified internally and fibre cement ceiling boards at roof overhangs.

Vinyl tiling is specified internally, and terrazzo tiles, granolithic and wood trowelled concrete finish were chosen for external floor finishes.

Alternative B
The construction and finishes are similar to Alternative A, with the exception that all the blocks are single storey.

2.3 School 2

The single storey blocks consist of concrete strip foundations and brick walls. The double and three storey blocks consist of a reinforced concrete structure with hollow block construction and brick fill.

All the blocks have corrugated roof sheeting with "Chromadek" finishing, on pre-fabricated timber roof construction. External finishes consist of face brick. Internal finishes are face brick, plaster and paint, with glazed wall tiling in the toilets. Gypsum board ceilings are consistently specified internally, and fibre cement ceiling boards at roof overhangs.

Vinyl tiling is consistently specified for floor finishes, with wood trowelled concrete in specific areas.

2.4 School 3

The single storey blocks consist of concrete strip foundations and brick walls. The double and three storey blocks consist of a reinforced concrete structure with hollow block construction and brick fill.

All the blocks have galvanised corrugated iron roof cladding on a timber roof construction. External finishes consist of face brick. Internal finishes are face brick, plaster and paint, with glazed wall tiling in the toilets, as well as fibre cement and gypsum board ceilings. Floor finishes consist of vinyl tiling, with power floated concrete in certain areas.

2.5 School 4

Alternative A
The single storey blocks consist of concrete strip foundations and brick walls. The double and three storey blocks consist of a reinforced concrete structure with hollow block construction and brick fill.

All the blocks have galvanised corrugated iron roof cladding on a timber roof construction. External finishes consist of face brick. Internal finishes are face brick, plaster and paint, with white glazed wall tiling in the toilets, as well as fibre cement and gypsum board ceilings. Floor finishes generally consist of vinyl tiling and mechanically floated concrete, with unglazed ceramic tiles in the toilets.

Alternative B
The specifications are similar to that of Alternative B, with the exception that a steel structure frame is utilized.

3. ANALYSIS

It is possible to gather a range of deductions from the cost comparison (Annexure A), but only the following summarised analysis is brought to attention:

The estimated tender amount of the single storey solution (School 1, Alternative B) is R400 000 less than that of Motswela. School 2, a multi storey solution, effects a saving of approximately R330 000 on the expected cost estimate of Motswela as at 28 February 1990.

Although nearly all the elements of School 1 Alternative B as well as School 2 are estimated lower than that of Motswela, it is evident that, apart from savings effected by reduction in square meterage, cost savings can be achieved by way of treatment of the following elements of a secondary school:

- Structural frame work
- External walls etc.
- Floor finishes.

4. SUMMARY

With the design information currently available, we are of the opinion that if the Department finds the variation in the "standard specifications" as well as the scaling down of the gross square meterage to its approval and still functional, approximately the same savings can be achieved, as in the four schools, on Motswela.

Further cost savings could be possible through the process of refinement of the line drawings into sketch plans.

5. COST COMPARISON - ANNEXURE A

6. DRAWINGS - ANNEXURE B

APPENDIX E:

Resumé of briefing session

RESUMÉ OF BRIEFING SESSION

INDEX

THE CHRONOLOGICAL ORDER OF ACTIONS AND ACTIVITIES INVOLVED IN THE PREPARATION OF DOCUMENTATION FOR AND EXECUTION OF A BUILDING PROJECT FROM THE OFFER OF A COMMISSION TO THE FINAL DELIVERY OF A BUILDING PROJECT, EITHER NEW OR ALTERATIONS AND ADDITIONS

This is not intended to be an official manual. A manual will, in due course be prepared by the Department and issued at the appropriate time. This document is intended to explain, in writing, more succinctly those activities and actions which may not have been clearly understood during the briefing session. It is a written reference to ensure a clearer understanding and more efficient execution of services to be rendered. Please feel free to contact the control architect to explain in more detail however trivial your query may seem to you.

1. INITIAL APPOINTMENT FOR THE COMMISSION

1.1 You will receive a written copy of a commission in which letter the project will be described as best as possible and, in most cases accompanied by a "bar chart" to give you some idea of the time scale and scope of the project. The fee structure will be governed, in some form or other by the Institute's Private Act or in the case of the Quantity Surveyors and Engineers, by statute which will be explained in greater detail by your particular "Control" Architect, Quantity Surveyor or Engineer at Head Office.

1.2 Your letter of acceptance does, in fact, consummate a "contract" binding within the parameters of the "offer" and accepted Professional Practice.

1.3 The Principal Agent may, at this stage, contact the Deputy Director: Works Inspection, of the particular Region to possibly view the site prior to the briefing. No further positive action is to be taken at this stage.

2. BRIEFING

2.1 Your Control Architect at Head Office will. when a date is known, contact you to advise you of a venue and time for the briefing session to explain, in detail, the procedures you are to follow and the actions to be taken at certain

stipulated times, from the date of the briefing until the buildings are finally completed and final delivery is taken of the project. It will be your duty to instruct all the other members of your team to ensure that all will be present at the briefing.

2.2 The briefing session will be time consuming although important and the Principal Agent is expected to take necessary notes at this meeting, of important actions to be taken and critical dates to be recorded.

2.3 Please understand that the "briefing" is definitely not intended to be viewed as an extension of the consultants professional training! It is intended to make known the Department's particular procedural requirements and minimum expectations.

3. DOCUMENTATION AND CONTRACTUAL PROCEDURES

The procedures are to be carefully studied with special attention being given to the timing of vital actions.

3.1 IMMEDIATE ACTIONS BY VARIOUS DISCIPLINES

3.1.1 Principal Agent (Architect, Engineer or Quantity Surveyor)

Immediately after the briefing the Principal Agent is to call an urgent meeting of his team members to reconcile an acceptable bar chart relating to documentation since the early completion of tender documentation is, with the tremendous task that lies ahead in providing educational facilities for all Black children, a top priority. No excuse from any of the disciplines will be tolerated and any unnecessary delay by any one discipline can very easily result in this discipline's removal from the Department's panel. No amount of delay on the part of the Department, appearing to be "dragging" their feet with regard to putting the project out to tender for reasons beyond their control, (and very often the direct result of late completion of documentation) can at any time be explained

by any discipline for not making "time of the essence". The Department acts, always, on availability of funds and these funds can come from more than one source. In this regard, consultants are requested to consider the following suggestions:

3.1.1.1 With the standardisation of details and configurations, there is no risk involved, should the Quantity Surveyor begin to "measure" as soon as the Architect can start "feeding" him with drawings. I do realise that the Quantity Surveyor prefers to measure in "trade sequence" which means he would like to measure the excavations and foundations first, which will require the Struc/Civil Engineer to treat this with priority and in any case, with the modern "word processors" the Quantity Surveyor can, with little inconvenience, re-schedule this. Not ideal but possible and proactive.

3.1.1.2 The structural Engineer can very definitely expedite the soil investigation and, in collaboration with his Control Engineer, decide on the foundation design and get on with the information for the Quantity Surveyor. With regard to the superstructure this is standard. The standard sections must not be deviated from and "flush soffits" must be adhered to, to allow for future flexibility of re-design of the classroom lay-outs. All beams, except ring beams, are to be contained within the hollow-tile slab construction or solid concrete slab if this proves, in any particular area to be more economical. (We do know that "beam and slab" is more economical but this does not allow for flexibility in classroom configuration). Apart from concrete sizes, the Quantity Surveyor requires the mass of the steel and not the bending schedules unless they are abnormal.

3.1.1.3 The Electrical Consultant must be supplied with sepias of the Site Plan, the configuration lay-out and the 1:100's as soon as possible which will enable him to complete his documentation easily at the same time (if not before) as the Quantity Surveyor.

3.1.1.4 Except for the Quantity Surveyor, there is no reason why all the other disciplines cannot complete their documentation simultaneously!

3.1.2 Struc/Civil Engineer (See also annexure "A")

Without further ado, the Structure/Civil Engineer is to immediately investigate the existence of, or possible supply of all "Civil" services as well as provide essential "Civil" services as listed.

3.1.2.1 If not already available, the Struc/Civil Engineer is to prepare a "one half metre" contour drawing of the site to a scale of 1:500 for the use of the Architect to accurately position the proposed buildings. This is to be executed as a Civil Engineering service since Land Surveyors services and/or scale of fees will not be entertained.

3.1.2.2 The Struc/Civil Engineer is to establish whether or not the site can be reasonably defined with or without the presence of boundary pegs. The accurate placement of the boundary pegs, by a qualified and registered Government Land Surveyor will be undertaken just prior the official handing over of the site to the appointed contractor since the Struc/Civil Engineer will be responsible for the accurate placement of the boundary fencing (not the design thereof since boundary fencing is a standard item). The Land Surveyor will be instructed thereto by the Struc/Civil Engineer, his fees paid by the Struc/Civil Engineer and claimed from the Department as a valid re-imbursement.

3.1.2.3 The Struc/Civil Engineer is to establish the present state of the water supply, determining whether or not it is suitable for the intended service and also as certain where on the boundary a water connection will be given as well as the cost of such a connection. A 50mm diameter connection and supply line is required.

3.1.2.4 The Struc/Civil Engineer will similarly investigate

the available means of sewage disposal and if by means of drawing off from a conservancy tank, the frequency of removal and costs. If water-borne sewage is or will be available, then establish the boundary connection point, the invert level and connection costs of services. The Department does have conservancy tank standard details. If required, please obtain them from our Drawing Office.

3.1.2.5 The Struc/Civil Engineer will place (cast) two substantially and conveniently placed concrete reference points. The main reference point to be fixed by co-ordinates, either with reference to the local or Cadastral grid. The second to be a "level datum or bench mark" referring to the cadastral map or his own prepared contour drawing.

3.1.2.6 Where a flood line is of importance, then to establish the relevant 50 year flood line.

3.1.2.7 The Struc.Civil Engineer will also indicate to the Architect his superficial assessment of the soil conditions. A detailed soil investigation will be carried out as speedily as possible.

3.1.2.8 The Struc/Civil Engineer will also observe and establish any possible storm water complications, implications and disposal thereof.

3.1.3 Electrical Engineer (See also annexure "B")

Without any further ado, the Electrical Engineer will investigate the following:

3.1.3.1 The availability of Electrical power supply, at the boundary of the site, the suitability thereof and costs of connection fees.

3.1.3.2 A secondary school (with workshop) can require up to 125 KVA, (without workshops) can require up to 75 KVA and a primary school can require up to 50 KVA.

3.1.3.3 Should there be no electricity supply at present, and there is a possibility of a future supply, the building are to be provided with all the necessary conduits and DB boards to contain the future electrical requirements.

3.1.3.4 In the absence of Electrical power supply, the Electrical Engineer is to establish from the local authority when such a power supply is anticipated and report accordingly.

3.1.4 The Quantity Surveyor (See also annexure "C")

At this stage, the Quantity Surveyors actions will be restricted to observing the building conditions in the vicinity and establishing to what extent there may be any form of abnormal conditions likely to affect site works or excavations. (For preliminary costing)

3.2 DRAWINGS AND SCALES

3.2.1 All drawings are to be done on the standard A1 drawing sheets supplied by the Department with the standard title block on the right-hand side or exact facsimiles thereof. The Department's plan filing system is geared to take only A1 size drawings filed in vertical hanging cabinets and therefore no other size drawing sheets are permitted.

3.2.2 Structural Engineers re-enforcing bending schedules are to be presented on special drawing sheets supplied by the Department for this purpose.

3.2.3 Where standard drawings are supplied, the signatures and O.O.G. numbers on these sheets are not to be erased. (O.O.G. numbers are for departmental reference purposes)

3.2.4 Supplies of blank drawing sheets can be obtained from the Department's drawing office. All that is necessary is to telephone tel. no: (012) 312 6408/9 and order the required number of drawing sheets to be supplied, either by post or to be fetched.

3.2.5 DRAWING NUMBERS: SKETCH DESIGNS

The service number (B. No) allocated to a particular project will form the basis of all drawing numbers for this particular project with various prefixes or suffixes. As an example for the following paragraphs, we will assume that the B. No. is B.12345.

3.2.5.1 Architects sketch designs will be numbered B.12345/A1; B.12345/A2 etc. for the initial set of sketch designs, and the sketch designs will be repeated until approved continuing with the numbers B.12345/B1 to whatever and then B.12345/C1 to whatever, until we may even reach the sequence B.12345/AA1 to whatever etc. The first drawing will ALWAYS be the site plan.

3.2.6 DRAWING NUMBERS: WORKING DRAWINGS

Again, the service number (B. No) will form the basis of all drawing numbers as is the case with the Sketch Designs.

3.2.6.1 The Architects Working Drawings will be numbered as follows:

(i) Index to drawing numbers, B...../00
(ii) 1:500 Site plan, B...../0
(iii) 1:200 Configuration lay-out, B...../01
(iv) Starting with the 1:100 of the first block and then continuing as the Architect wishes, B...../02; B...../03 etc.

3.2.6.2 The Architects internal water supply drawing numbers will be (on a sepia of the original) the original drawing number with the suffix "W", for example B...../02W.

3.2.6.3 The Architects drainage drawings numbers will be (on the sepia of the original) the original number with the suffix "D", for example B...../02D.

3.2.6.4 From the foregoing, you will observe that, until advised to the contrary, the Architect will be responsible for all internal water supply drawings and all drainage and sewage drawings up to the manhole commencing the sewage run to the sewage connection point of the township sewage system or up to the conservancy tank.

3.2.6.5 The Electrical Engineers Working drawings will, to a great extent, be done on transparencies of the Architects Working drawings (supplied to him before the drawing becomes too cluttered up with data not needed for the electrical service) with the original drawing number (of the Architect) followed with the suffix "E", for example B...../02E, supplemented with his own specific drawings for which he will be allocated a number by his Architect and again followed with the suffix "E", for example B...../0201E, or whatever.

3.2.6.6 The Electrical Engineers lay-out drawings are required by the Department to be prepared on the 1:100 scale drawings and not smaller. (See also annexure "B")

3.2.6.7 The Struc/Civil Engineers drawings will be numbered in his own sequence of drawings independent of the Architect all beginning with the prefix "S" and as in the case of the Architect the drawings will be numbered as follows:

(i) Index to drawings numbers, B...../S00
(ii) 1:500 Site plan, B...../S0
(iii) 1:200 Configuration key plan, B...../S01
(IV) Starting with the first block and following in the sequence best suited to the Engineer and the occasion, B...../S02; B...../S03 etc. (See also annexure "A")

3.2.6.8 The Struc/Civil Engineer will be, until further notice, responsible for the sewage disposal line or the conservancy tank (for which the Engineer is also

responsible).

3.2.7 Scales to be used will always be in "pure" metric scales namely; 1:1, 1:2, 1:5, 1:10, 1:20, 1:50, 1:100, 1:200, 1:500 etc. (Some of the standard drawings do have 1:25 details. These are to be accepted but not repeated on further drawings.)

3.2.7.1 The Site plan will always be drawn to a scale of 1:500 and preferably an inset of 1:1000 or larger locality plan or, if the site plan is too large to be presented on the A1 sheet to a scale of 1:500, then only the portion containing the building complex will be shown to the scale of 1:500 with an inset of 1:1000 (or smaller if necessary).

3.2.7.2 Although the configuration drawing is shown to a scale of 1:200, the working lay-out drawings are to be drawn to a scale of, not less than 1:100 with the necessary details to larger scales.

3.2.7.3 Sketch Design building plan lay-outs and elevations are to be drawn to a scale of not less than 1:200.

3.2.7.4 The door and window elevations in the door and window schedules are to be drawn to a scale of not less than 1:50.

3.3 SKETCH DESIGNS

After receiving the relevant site details and schedule of accommodation (either in the form of a standard design or a written brief) the Architect is now in a position to proceed with the sketch designs, always within the parameters set and in close collaboration with his professional colleagues.

In the case of Minor Works (additions, alterations and renovations) the architect is first to receive a complete, written description (duly signed) of the services pointed out and requested by the Regional Deputy Director: Works-

Inspections before proceeding with the sketch designs with a copy of these instructions submitted with the sketch designs, to the region who will forward the recommended sketch designs to Head Office for final approval.

3.3.1 The Architect will present his Sketch Designs in the scale previously described and numbered as previously described, making sure that the details in the title block are correctly included, for example:

(i) The details of the Consultant Architect is to be completely entered in the block provided (it is surprising how often this is done).

(ii) Make sure of the projects name and it's location and enter the details clearly and correctly in the block provided for this.

(iii) The details of the drawing clearly defined (Sketch Design - Elevation etc.)

(iv) The erf number (if known or obtainable)

(v) The Township

(vi) The Region (establish the exact designation of the region from your Control Architects.)

(vii) The block "drawn by" means the person or the firm responsible.

(viii) The block "checked" always requires the full signature of one of the Principals of the Consultant body.

(ix) The blocks "recommended" and "approved" are for the Department's use only.

(x) The "OOG" block is also for the use of the Department only and NOTHING in this block is to be erased.

(xi) Enter the drawing number correctly. A large letter

"B" is already in position for you.

(xii) When using standard drawings issued to you (transparencies) please do not erase any of the signatures or OOG numbers in the title block.

3.3.2 Should the Architect be unsure or hesitant about the acceptability of his Sketch Design, he must first contact his Control Architect who may wish to inspect the site or examine a faxed copy of the Architects line drawing to correctly guide him in the final preparation of his first sketch design. At no stage is the Architect to deviate from the accommodation requirement set out in the initial brief.

3.3.3 The Architect will issue the Region with two sets of paper prints of the initial sketch design which will be used during the "Community Involvement". This action will be initiated by the Regional Deputy Director: Works-Inspections, who will advise the Architect as to the procedure to be followed to obtain the signatures of these sketch designs before forwarding BOTH SETS to Head Office for approval. The delegation of authority to approve all sketch designs rests with the Director: Building Services, at Head Office.

3.3.4 Because this process can be time consuming the Architect will, at the same time as in paragraph 3.3.3 post (by express post) an additional two sets of paper prints of the sketch designs to his Control Architect for premature assessment.

3.3.5 On receipt of the sketch design, the Control Architect will either (a) request a re-design as advised or (b) show slight amendments in red or (c) accept the design as submitted. In the case of (a) the Architect will, without delay submit the suggested re-design DIRECTLY to his Control Architect for processing. In the case of (b) and (c) the Control Architect will recommend the Sketch Designs to the Director for approval.

3.3.6 On approval, the Control Architect will advise the Consultant Architect that the Sketch Designs have been

approved either with or without minor amendments. The Control Architect will, to expedite matters immediately advise the Consultant Architect per telephone or fax and follow this up with a formal letter. On either action (whichever is the first) the whole team will move into action.

3.3.7 The very first action is that of the Struc/Civil Engineer who will, in a manner approved by his Control Engineer proceed with the soil investigation to establish the most economic foundation format, the accent being on "the most economical". The pre-requisite to economical design is as important in the Public Sector, if not more so. The results of the soil investigation MUST, in absolute detail be submitted to Head Office in writing in a Scientific format for filing and, if necessary, comment. (See also annexure "A")

3.3.8 In the shortest possible time, the entire team is to meet to re-schedule the documentation bar chart, submit this to the Control Architect and proceed with Working drawings and final documentation.

3.4 WORKING DRAWINGS

Just a few guidelines with the preparation of working drawings and tender documentation. Since the inception of the Professional Services section of the Building Services Directorate, we boast that we have successfully encouraged the Private Sector to provide us with the most professional, complete and effective documentation for our building projects and we intend keeping it this way since it is a well known fact that the more complete and effective the documentation is, the more efficient will the contract administration be and obviously, in the end a soundly completed project. After all, we are professional. (No pencil drawings are acceptable)

3.4.1 With the Principal Agent at the Helm and directing the entire operation with all the team members now actively employed in the speedy and accurate completion of the

working drawings and documentation, there should be no need for any one member to be kept waiting with the possible exception of the Quantity Surveyor.

3.4.2 All the disciplines are to keep their Control Counterparts at Head Office up to date at regular intervals since they have to report to a monitoring committee every fortnight and not one of us want to render a negative report on any of our projects.

3.4.3 All the members of the team are to have any doubtful issues immediately cleared up through their Control Counterparts. The Department does not view any delay lightly and will not easily tolerate the deadlines not being met. It must be impressed upon all Consultants that the Department has a loaded programme and cannot afford unnecessary adjustments to it's cash flow and least of all non-adherence to their budget because of documentation break down.

3.4.4 When the working drawings are in progress, the Principal Agent is to make it a top priority in "feeding the Quantity Surveyor, as soon as is possible, with information to allow him to proceed with his Bills of Quantities at a steady pace and be able to complete his work in as short as possible a time after the Architects and Engineers Working Drawings are completed. It is the architect's responsibility to ensure that the Bills of Quantities and drawing are consistent.

3.4.5 On completion of their Working drawings the various disciplines are to submit <u>one</u> complete set of paper prints to their Control Counterparts at Head Office for scrutiny. The Struc/Civil and Electrical Engineers will require certification from the Architect that he has co-ordinated their drawings and is satisfied that they do not clash with the intended final building project.

3.4.6 These scrutinised and corrected prints will be returned, by express post again, to the Architect and Engineers to enable them to correct the originals which, when completed in all detail, send these originals, <u>PER COURIER</u>, to Head Office for signature and safe keeping. All original

drawings are either sent to or fetched from Head Office by hand or per COURIER, with no exception. This is to ensure the safety, in all aspects, of these documents.

3.4.7 It must be mentioned here that, unless otherwise arranged by Head Office, all prints for formal use will be made by Head Office.

3.4.8 In view of the foregoing, the Principal Agent is to ensure that the Department's Drawing Office proceeds to organise the despatch of six sets of Contract Drawings to the Principal Agent section, immediately the Principal Agent receives written notification that a successful tenderer has been awarded the contract. THIS IS IMPORTANT to ensure the complete handing over of site to the contractor when all other conditions have been complied with.

3.5 TENDER DOCUMENTATION AND PROCEDURE

The tender documents referred to are the Quantity Surveyor's Bills of Quantities and the Electrical Engineers Bills of Quantities and drawings where necessary either in a combined contract or in separate contracts where the Electrical Contractor may be a nominated sub-contractor.

3.5.1 In a combined contract, the Quantity Surveyor's Bills of Quantities will be labelled and referred to as PART "A' and the Electrical Engineers Bills of Quantities as PART "B" and one OE tender number given. Both parts "A" and "B" to be bound into one document.

3.5.2 Where the Electrical Contractor is to be a nominated sub-contractor, there will be two contracts advertised with two separate tender numbers.

3.5.3 After the draft documents have been approved the Quantity Surveyors and Electrical Consultant are to send two sets of their tender documents to Head Office and await further instructions.

3.5.4 During all of the foregoing procedures, the Principal Agent

is to be diligently kept informed.

3.5.5 When the Department has received the approved and completed documentation and is ready to put the project out to tender, the Department will advise the Principal Agent to advertise the project for tender purposes providing him with all the necessary dates such as, advertising date, site inspection date for prospective tenderers and closing date.

3.5.6 The tenders will always be submitted to the Tender Board and opened in public with the necessary witnesses. After tenders are received and opened, the project will now enter into the post-tender stage and contract administration.

4. CONTRACT ADMINISTRATION

When the letter of acceptance of the tenderers offer is posted, a contract is deemed to have been consummated and all the conditions of tender came into force activating the following actions and procedures before and after the site is officially handed over to the newly appointed contractor.

4.1 PRE-SITE HANDOVER

Certain conditions of tender must be complied with before the site can be officially handed over to the Contractor. It must be pointed out here, that the official contractual commencement date is the date of the Tender Boards letter of acceptance addressed to the successful tenderer. Where there are no complications and the tender documents do not have to be referred back to the Tender Board for a decision, the letter of appointment will emanate from the Department and the Building Services Directorate:, in particular. The Principal Agent must ascertain whether or not there be no mistake about the correct date entered in the official form of contract. This is vitally important. (Read the relevant clauses in the "Conditions of Contract")

4.1.1 In the letter of acceptance to the successful tenderer, he is instructed to, within a stipulated period produce and submit an acceptable surety as well as submit his priced Bills of Quantities to the Quantity Surveyor for checking and adjustment all in accordance with recognised and accepted building practice. To this end, the Quantity Surveyor will ensure that the successful tenderer receives two blank copies of the Bills of Quantities in operation, meaning both PARTS "A" and "B" if they apply. Obviously, the Electrical Bills of Quantities must be checked by the Electrical Consultant.

4.1.2 Although both actions are urgently important, the surety receives priority since the contract cannot be signed until the surety is lodged and approved.

4.1.3 After the acceptance and approval of the surety, the Principal Agent will call for the corrected and adjusted priced Bills of Quantities and duly attend to the signing of the contract in his office in the accepted manner and in the presence of the required witnesses. Where applicable the Principal Agent is to ensure and receive the necessary resolution authorising the signatory on the part of the contracting firm to the contract document.

4.1.4 Before the signed contract documents are forwarded to the Department for the Director-general's co-signature, the Quantity Surveyor will have five copies of the priced Bills of Quantities, duly signed by the contractor, made and distributed as follows: -

(i) One copy for the Contractor;

(ii) One copy for the Departments Quantity Surveying Services;

(iii) One copy for the Consultant Quantity Surveyor; and

(iv) Two blank copies for the contractor.

4.1.6 Having previously arranged for and received six complete sets of paper prints on site, of all the relevant working

drawings, the Principal Agent can now arrange for a suitable date acceptable to the Regions Technical Services, the Contractor, the Principal Agent and all the other members of his team for the site hand-over. It is the prerogative of the Regional Director to make this a ceremonial issue, or arrange a separate ceremonial "sod turning" ceremony.

4.2 HANDING OVER OF SITE TO THE CONTRACTOR

The handing over of the site is to be performed and registered according to the site handing over "proforma" with the Regions Technical Services chairing the meeting initially and during the routine to hand the meeting over to the Principal Agent, who will from then onwards always be in complete control at the site meetings. At the official handing over of the site to the contractor, the Principal Agent is to attend to certain mandatory items.

4.2.1 The Principal Agent will point out all the boundary beacons to the contractor having previously ensured that these pegs have either been found and not disturbed or, in the absence of the presence of any boundary pegs having requested the Struc/Civil Engineer to instruct a Registered Land Surveyor to establish and place the necessary beacons very shortly before the site handing over.

4.2.2 The Principal Agent will, together with the Regional Technical staff point out to the contractor which portion of the site he is to occupy and where the best position will be for the site office to be placed.

4.2.3 The Principal Agent will ensure that the Contractor provides the first of the A4 triplicate books and instruct the contract to have this "site book" safely kept on the site under care and responsibility of the site foreman. Every visit to the site, instructions given by the relevant disciplines, recommendations by the Regional Technical staff to the Principal Agent are to be duly entered into this "site book". It will, in fact, contain a detailed record of all activities on the site and visitors thereto.

All persons visiting the site for whatever purpose will make an entry in the visitors book to be provided and it will be the responsibility of the site foreman to ensure that this is done. When a page is filled, then whoever must take the next entry will move the carbon papers and proceed to make the entries. At a convenient time the only person authorised to remove the two lose copies is the Principal Agent who will:

(a) Make photostats of the original and distribute copies to his team members as well as attach copies to TWO sets of the monthly official site meeting.

(b) Give the carbon copy to the Regional Technical Representative; and

(c) The second, fixed carbon copy, will remain in the book on the site.

4.2.3.1 With the submission to Head Office of the required copies of the formal monthly site meeting, the Principal Agent will attach copies of the pages of the site instruction book completed during the month to two sets of the site meeting's minutes.

4.2.4 The Principal Agent will point out to the contractor where the two square meter sample face brick wall is to be built which, when acceptable, will serve as the only acceptable face brick work during the course of construction and will remain in position until shortly after first delivery is taken.

4.2.5 The Principal Agent will discuss with his team members, the contractor and the Regional Technical Staff to determine an acceptable day of the week and week of the month for the "official site meetings" to take place. It will be during this "official site meeting" that the Quantity Surveyor will asses the value of the work done and materials on site to prepare the monthly progress payment certificate.

4.2.5.1 This progress payment certificate duly signed and with the Quantity Surveyors detailed break down

attached must be faxed to Head Office without delay to ensure payment to the contractor within the stipulated twenty one days.

4.2.6 A minimum of two site meetings per month is required by the Department, but only the minutes (on the proforma supplied) of the "official site meeting" is required to be posted to Head Office as well as copies distributed as follows:

(i) Six copies to Head Office, to be addressed to the Deputy Director: Works Administration who will distribute as required.

(ii) Two copies to the Regional Deputy Director: Works Inspections.

(iii) The necessary copies to the permanent members of the "official site meeting"; and

(iv) One copy filed in chronological order on the site for ready reference by any authorised person.

4.2.7 The Principal Agent will distribute the six complete sets of prints of the contract drawings as follows:

(i) Four sets to the contractor,
(ii) One set to the Regional Technical Staff; and
(iii) One set to be split amongst the relevant consultant disciplines.

4.2.7.1 Should the Contractor require additional copies of the drawings, he is to place the order with the Principal Agent paying the current price set by the Department. The Principal Agent will order these prints from the Department's Drawing Office, Tel: (012) 312 6408/9, and the costs will be deducted from the Principal Agent's professional fees.

4.2.8 Having done all this, the Principal Agent will complete the standard "Handing over of site" form, in duplicate which the contractor must sign verifying that he has received all the necessary documents and acknowledge having had the

boundary pegs pointed out to him. This properly completed form must be posted to Head Office without delay.

5. SITE AND CONTRACT ADMINISTRATION (SUPERVISION)

5.1 The role of the Region's Technical Services must never be underestimated. The entire team will be well advised to rely heavily on the expertise and knowledge of local conditions that the Region's Technical Services have acquired. The Region's Technical Services are there to assist the professional consultant team in adhering to the Departments policies and set procedures as well as with the sensitive issue of quality control. Whilst it is the Region's specific duty to ensure that the Department receives the best possible quality of labour and materials, the Principal Agent and his team will be held RESPONSIBLE for this facet of the service.

5.2 SITE INSPECTION

As previously mentioned, throughout the contract period, the Department expects a MINIMUM of two site visits (inspections) per month. The main meeting, known as the formal site meeting, is the absolutely mandatory meeting at which ALL the disciplines and involved contractual parties MUST be present and which meeting minutes, set out in the standard format, will be recorded and distributed as previously mentioned. Separately one copy must be posted to the Control Architect.

The second compulsory intermediate meeting is referred to as the "Technical Meeting" and, as the name implies, will be concerned, primarily, with Technical matters.

5.2.1 Obviously, only two site visits per month throughout the contract period, is not going to suffice. The various disciplines will be required to visit the site as and when, in the normal course of events, a visit is deemed necessary and is not to be viewed as an "extra ordinary visit" such as inspecting before "backfill", prior to casting concrete,

bona fide problems experienced by the contractor etc. There can be no claim for additional fees for a necessary visit to the site, under standard building practice procedure, by any of the consultant disciplines.

5.2.2 Before any backfill to foundations, the Quantity Surveyor is mandatory obliged to record all the necessary details of excavation before signifying to the Architect that he is satisfied that the "backfill" can now proceed. For safety reasons, this is to be undertaken as early as possible.

5.2.3 Similarly, the Struc/Civil Engineer is responsible for the testing of all sewage drains for levels and pressure tests etc. and recording all the relevant depths timeously.

5.3 VARIATION ORDERS

It cannot be over emphasised that

(a) Variation orders must be limited to an absolute minimum and confined to unambiguous realities; and

(b) No Variation Order may be executed before written approval has been obtained under the authority of the Director: Building Services.

5.3.1 All variation orders are to be clearly defined on the standard format issued. Only one item per variation order form. Obviously the omission of an item and the "add back" where applicable must be on one form under one separate item number or part "A" or "B" of the same item number. Every intended variation (unpriced) is to be accompanied by the required "motivation form" properly completed and priced on the standard form. The motivation is to be completed and comply with the Oxford Dictionary definition of the word "MOTIVATION".

5.3.2 The Quantity Surveyor will enter the reasonable accurate estimate of all measured items, on the motivation form, all subject to re-measurement on completion of the contract.

5.3.3 Should an intended variation order refer to a non-scheduled item, then this variation order's costs must be substantiated by a WRITTEN cost implication offered by the contractor and this offer AND acceptance by the Department is to the carefully filed by the Quantity Surveyor to eliminate all dispute at the "final account" stage.

5.3.4 Last but not least, ALL variation orders are to be issued and processed at the time of the eventuality and NOT accumulated for any later date. This will not be tolerated and should this occur it will severely jeopardise the consultant Principal Agent's good standing with the Department.

5.4 EXTENSION OF TIME TO THE CONTRACT PERIOD

The Department views any application for extension of time to the contract period in a very serious light since it has an adverse effect on the Departments cash flow and the Departments credibility with the community as well as, often, serious financial implications, and MUST ALWAYS BE TREATED SERIOUSLY AND URGENTLY by the Principal Agent. STUDY THE "CONDITIONS OF CONTRACT" CAREFULLY.

5.4.1 Extension of time is a contractual concession always in favour of the contractor and before it can be entertained, the conditions of contract require that:

(a) The contractor must make written application for consideration of any extension of time (minutes are not considered are written application) within the contractual prescribed time limit.

(b) Application for extension of time is a legal contractual claim by the contractor and the law prescribes that the claim must be in terms of any one or more particular conditions of contract. Therefore the contractor must state clearly under which clause/s the claim is founded AND submit sufficient evidence to substantiate the claim.

5.4.2 The Principal Agent must, therefore consider all PROPER claims for extension of time, THOROUGHLY investigate and evaluate the said claim before submitting it to Head Office for approval or rejection.

5.4.3 The onus is squarely on part of the contractor to provide all admissible evidence, making sure that the evidence is fully substantiated.

5.4.4 All applications for extensions of time must be considered separately, per incident and submitted to Head Office for consideration without delay. The actions of the Principal Agent and thoroughness of investigation and evaluation will have a direct influence on the future rating of the Principal Agent.

5.4.5 The decision relating to the fate of any application for extension of time rests with the Director-general or his delegated authority. Needless to say, any adverse decision by the Director-general is subject to dispute by the contractor through the channels described in the conditions of contract.

5.5 SUPERVISION IN GENERAL

This document will not attempt, in detail, to instruct the Principal Agent or other members of the professional team just how they are to supervise a contract for correctness to detail and quality control but the Department will certainly be critical as to the success or failure of the professional team to exercise acceptable control over all contractual proceedings. Make full use of the Regional's Technical component and your professional colleagues at Head Office.

5.6 FIRST DELIVERY

"First Delivery" is very much a contract stage, is vitally important and has very definite repercussions. It is therefore necessary for the Principal Agent to handle this

phase with caution, correctness and professional attention.

5.6.1 It will be considered the Principal Agent's responsibility to guide the contractor firmly and correctly before accepting a request by the contractor for "first delivery" of the project in whole or in part as it may suit the Department.

5.6.2 To assist the contractor, the Principal Agent is expected, only when absolutely certain, to issue the contractor with a short unambiguous and irrevocable "snag list" so that the contractor can, with reasonable certainty offer the project for "first delivery". It will assist if the contractor will do so in writing.

5.6.3 No Variation Orders can be issued or applications for extensions of time entertained AFTER the "First Delivery" date.

5.6.4 During the Inspection process for the attempted "first delivery", the full professional team MUST be present as well as a representative of the Region's Technical component.

5.6.5 The "snag list" will be taken as a guide with not more that five items being permitted before "first delivery" is taken on the prescribed form provided, or aborted, with the contractor being responsible for all costs involved in any future attempts.

5.7 RETENTION PERIOD

After first delivery is taken the period in whole or in part now officially enters the prescribed "Retention Period".

5.7.1 The retention period is NOT a period of "wait and see" but a period in which all defects that become apparent will be attended to by the contractor immediately on instruction, or should the contractor fail to attend to the defect within a reasonable period of time then the Principal

Agent, in terms of the contract, have the items attended to, to the account of the contractor.

5.8 FINAL DELIVERY

After the retention period and with no visible defects outstanding, the Principal Agent will, on the prescribed form, take "final delivery" and be fully responsible for the contractual correctness of the proceedings and satisfactory contractual state of the entire project.

5.9 PROGRESS PAYMENTS

As previously mentioned, a progress payment certificate is to be issued once a month shortly after the official site inspection meeting. To ensure that the contractor is paid within the contractual 21 days after date of issue, the signed progress payment certificate and Quantity Surveyor's detailed breakdown are to be faxed to the Building Services Directorate: prior to posting by speed post. The fax must be marked: for attention Finances.

5.10 FINAL ACCOUNT

The Department expects that the final account be finalised and lodged with Head Office for approval, not later than three months after final delivery has been taken.

6. CONTACT POINTS AT HEAD OFFICE

6.1 For the supply of blank drawing sheets, prints or required details, forward the receiving drawings, prints or originals:

THE CHIEF DRAUGHTSMAN IN CHARGE OF THE DRAWING OFFICE:

TEL: (012) 312 6408/9 (temporary)

6.2 For all technical and professional enquiries and guidance, contact your particular discipline "Control Officer" as indicated on "annexure D" which will be revised from time to time.

6.2.1 Architect
6.2.2 Quantity Surveyor
6.2.3 Struc/Civil Engineer
6.2.4 Electrical Engineer

6.3 For urgent fax communication, the Building Services Directorate: has it's own fax service:
TEL: (012) 326 7215 (temporary)

6.4 For enquiries with regards progress payments or progress of professional fees payments:
Mrs. E. Kriek
TEL: (012) 312 6452 (temporary)

7. PROFESSIONAL FEES (See also annexure "E")

In spite of what your letter of appointment may try to convey, you are advised to obtain absolute clarity i.r.o. professional fees applicable for the particular "Control Officer" at Head Office.

7.1 You are instructed **not** to combine your professional fees account with your refundable disbursements account. These must be kept entirely separate.

7.2 On all your account claims, make sure that on all claim forms (letters, invoices etc) the following items of information are clearly shown:

(a) Your own firms name, postal address and registration number to which payment must be posted.

(b) The B.number of the project; and

(c) The project name and brief description.

7.3 With the professional fees, until supervision starts ALWAYS show the total fees due to date (adding both hourly based fees and percentage based fees) very clearly and unambiguously and then minus the fees paid up to date. This makes it easy to check.

7.4 With the claims for refundable disbursements, please render this monthly and NEVER include previously claimed items (unlike the professional fees account).

7.5 The rates for recoverable disbursements do alter from time to time, please make sure that your information is up to date.

7.6 Although there is no contractual specified time scale in which professional fee accounts will be paid, every precaution and effort is taken not to delay payment. Obviously, the more correct an account is rendered the speedier the settlement will be.

8. CONCLUSION

You are urged to treat every project as one in which team effort is essential and your Head Office counterparts are very real partners in this team. Feel free to enquire whenever you are unsure, regardless of how trivial the enquiry may seem to you. We, at Head Office are just as keen as what you are to see that a project is successfully handled.

ANNEXURE "A"

DEPARTMENT OF EDUCATION AND TRAINING

DIRECTORATE BUILDING SERVICES

GUIDELINES FOR CONSULTING STRUCTURAL/CIVIL ENGINEERS IN RESPECT OF PROFESSIONAL SERVICES

updated : 03-02-94

The Department expects proper co-operation between all disciplines during all stages of the project from handover of the site to the project closeout. It is therefore imperative that the following guidelines for Civil/Structural Engineers be strictly adhered to. The Architect who acts as the Chief Agent should also be acquainted with these guidelines.

A bar chart showing the time schedule has been prepared by the Department and this forms part of the conditions of the appointment. If the times in the schedule cannot be adhered to then the consultant must notify the Department's Engineer timeously and must advise the revised date of the activity on the schedule. The importance of this pro-active action cannot be overemphasized.

1. SITE SURVEY AND PLAN

1.1 The Consulting Engineer will be responsible for the site survey and arrangements in respect thereof and for the drafting of a site plan, which must be submitted to the Architect as soon as possible.

1.2 The site plan must contain the following information:-

1.2.1 0,5m contours.

1.2.2 All buildings and servitutes of electrical power, communication cables, sewer lines, potable water, fire water and storm water.

1.2.3 Sewer connection point. Invert level to be indicated.

1.2.4 Water connection point.

1.2.5 Storm water connection point (if applicable).

1.2.6 1 in 50 year flood lines (where applicable). It must be established at the local authority whether they have determined 1:50yr. flood lines for the applicable water course. If not, the matter must be discussed with the Department's Engineer.

1.3 Information with regard to site boundary pegs must be obtained from the Region. If no pegs are available the Consulting Engineer will obtain the services of a Land Surveyor who will place and survey the pegs as soon as

possible. The Land Surveyor's fee must be paid by the Consulting Engineer who will then be reimbursed by the Department.

1.3.1 At least two separate reference pegs must be available on each site and these pegs must be encased in concrete. The pegs must be clearly marked by means of a plate also embedded in the concrete.

1.3.2 The information hard stamped on the plate should give the peg number, co-ordinate and elevation of the peg.

1.4 The site plan must be drawn to a scale of 1:500 on a A1 sheet.
Drawing sheets may be obtained from the Department (contact Mr. André Pretorius at Tel: 012-312 6408)

1.5 To obtain information regarding the site the Consultant Engineer will consult the Department's Control Works Inspector of the applicable region.

1.6 The Consulting Engineer must establish the connection fees from the local authority and must pass this information on to the Consulting Quantity Surveyor for inclusion in the Bill of Quantities.

2. GEOTECHNICAL INVESTIGATION AND REPORT

2.1 The Architect will transmit copies of the line drawings to the Consulting Engineers as soon as these drawings have been approved. The Consulting Engineer must then liaise with the Department's Engineer with regard to his proposals for the geotechnical investigation of the site.

2.2 Once approval has been obtained the geotechnical investigation may proceed.

2.3 In the event that a more detailed investigation is required this matter must be discussed with the Department's Engineer before this investigation is undertaken. If a Consulting Engineer engages the services of a specialist without the prior approval of the Department, then the cost thereof will be for the account of the Consulting Engineer and he will not be reimbursed by the Department.

2.4 The geotechnical report must be transmitted directly to the Department's Engineer and must include recommendations re the method of foundation.

3. DESIGN OF STRUCTURES

3.1 The structural design can only be finalised once the geotechnical report is finalised and approved by the Department and must be within the scope as requested by the Department's Engineer.
Before the Consulting Engineer proceeds with working drawings he must submit, either by letter or line drawings, a proposal detailing the type of structure eg. in-situ or precast slabs etc. Concrete structures must be prepared and numbered as set out in 7. below. The following notes should appear on drawing no.B.../S1:-

3.2.1 Concrete work will be done in accordance with the applicable departmental specifications and SABS 1200 G.

3.2.2 Concrete cover will be:-

3.2.2.1 Foundations	*mm
3.2.2.2 Longitudinal bars in columns	*mm
3.2.2.3 Longitudinal bars in beams	*mm

3.2.2.4 Slabs, walls and ribbs *mm

*** To be specified by the engineer.**

3.2.3 Reinforcement must be kept in place by means of approved spacers. If concrete blocks are used as spacers these should be of the same strength and density as the concrete being cast.

3.3 A complete index of all structural and services drawings as well as a key plan must also appear on drawing no.B.../S1. The key plan must also appear on the other relevant drawings.

4. DESIGN OF CIVIL SERVICES

4.1 WATER RETICULATION

No allowance will be made for Fire Water in the network. Only PVC or HDPE pipes, class 10 or higher, will be utilized in the network. The Department currently prefer HDPE pipes. If the water pressure is so low that a reservoir is considered necessary then a pressure test must be done over a period of 24 hours. The results of this pressure test must be submitted to the Department's Engineer. A decision on the necessity of the reservoir will then be made.

If a reservoir is required the capacity will be 30kl.

4.2 SEWER RETICULATION

Vitrified Clay Pipes with "VITRO" sleeves must be specified. The use of any other type of pipe may be considered for special circumstances and must first be approved by the Department's Engineer.

4.2.1 A design figure of 30 litres per child per day must be used.

4.2.2 The Department has standardized on 150 mm pipes and these must be laid to a grade of not less than 1:120.

5. CO-ORDINATES

5.1 The position of earthworks terraces, roads, buildings services and fences will be co-ordinated either on L.O. or a local grid.

6. LIAISON WITH THE DEPARTMENT

6.1 The Consulting Engineer should liaise with the Department's Engineer that deals with the region in which the school is situated. The following telephone numbers are applicable, namely:

R Haupfleisch; Cape & Diamondfields regions (012) 312 6421

G van der Meulen; Natal, Johannesburg & N.Transvaal regions (012) 312 6471

P Oberholzer; Highveld, Orange Vaal & Orange Free State regions (012) 312 6411

H van Wamelen; Deputy-Director: Engineering Services (012) 312 6422

6.2 The Consulting Engineer may write to the Department's

Engineer at any stage but must send a copy of a letter to the Architect.

6.3 Faxes must be send to (012) 326 7215 and must be marked for the attention of the applicable engineer by name.

7. DRAWINGS

7.1 Once the design work and all the drawings have been completed the Consulting Engineer must transmit a complete set of paper copies of the drawings to the Department's Engineer for approval. These paper prints may be reduced to A2 format to save costs if this facility is available to the consultant. A complete set of calculations and a copy of the Architect's letter confirming that he has checked the drawings must also be submitted with the drawings.
Apart from the names and signatures on all other applicable lines of the title block, all working drawings must also be signed by a Professional Engineer on the first "recommended" line of the title block and his Pr.Eng. title and registration number must appear next to the signature. Drawings not signed by a Professional Engineer will not be accepted.

7.2 Structural drawings must be numbered: B..../S1,S2,S3, etc. for new schools and B..../S1/94,S2/94,S3/94, etc. for additions to existing schools for which drawings have been prepared previously. The figure "94" in the number indicates the year in which the drawings are drawn. An index of all drawings, a key plan and general notes should appear on drawing no. B..../S1.

7.3 Civil Services drawings must be numbered: B..../S1D,S2D,S3D, etc. for existing school as explained above. Drawing no. B..../S1D will be the site lay-out drawing. The index of drawings must be put on drawing B.../S1D if there are no structural drawings.

7.4 Sport field drawings must be numbered: B..../S1SG,S2SG,S3SG, etc. for new schools and B..../S1SG/94,S2SG/94,S3SG/94, etc. for existing schools as explained above.

7.5 The name, address and telephone number of the Consulting Engineer must appear on all drawings.

7.6 The paper prints will be returned to the consultant with the comments of the Department written in red on the drawings. The consultant must incorporate these comments on his drawings and then submit the originals of the drawings for approval together with the marked-up prints. The originals must be transmitted by courier and may not be mailed.

7.7 A "Checklist for Drawings" compiled for the use of the Department's Engineer is attached for your information.

7.8 When the drawings have been prepared on CAD then the consultant must also submit a copy of the drawings on floppy disc.

8. SPORTS FIELDS

8.1 Sports fields will be planned by the Consulting Engineer in conjunction with the Department's Engineer. The numbering of drawings will be as specified in 7.4. All sports fields will be executed by means of a separate contract.

9. CONSTRUCTION OF STRUCTURES

9.1 The Consulting Engineer must contact the Department's Engineer at an early stage of the construction of the structures to make an appointment for a joint site inspection. The structures must be less than 10 % complete at the time of this inspection. If the Consulting Engineer is of the opinion that an inspection at another stage of the construction would be more applicable he must recommend some to the Department. The Department's Engineer will decide if an inspection is feasible with in his program and will combine this site visit with visits to other projects wherever possible. The Consulting Engineer must make all the local arrangements for the site inspection.

9.2 The Consulting Engineer must advise the Department's Engineer timeously of the date on which the first handover will take place to allow the Department's Engineer to make arrangements to attend this handover if he wishes.

10. VARIATION ORDERS

10.1 No Variation Orders may be drafted or issued without the prior written approval of the Department. All requests for V.O.'s must be properly motivated and must include a cost and time estimate. V.O.'s must be submitted by the Principal Agent on the Departmental forms available for this purpose.
(This is applicable to all structural and civil works inclusive of sports fields.)

11. PROFESSIONAL FEE ACCOUNTS

11.1 Only one copy (original) of an account must be submitted. The "B" number as well as the Consulting Engineer's (19/1/6/3/...) appointment number must appear on each statement. Reimbursable costs must be according to the Department's tariffs as set out in "Annexure A" issued to the consultant with his appointment. In the case of transport costs the make and engine capacity (cc) must be shown.

11.2 Professional fee's will be paid in accordance with the Engineering Profession of S.A. Act (Act 114 of 1990) as amended.

11.3 SITE SURVEY AND GEOTECHNICAL INVESTIGATION.
The site survey and site plan preparation as well as the geotechnical investigation and report will be paid for on a time and cost basis. This excludes work paid for under the "normal services" of preliminary design stage. The hours and kilometres must be motivated and the time and travel log sheets must be submitted with this motivation.

11.4 STRUCTURAL AND CIVIL WORK (BUILDING PROJECTS).
11.4.1 Fee's for the Structural and Civil work will be paid as "normal services" in accordance of Act 114 of 1990 and in strict accordance with the policy laid down by the Department of Education and Training. No interim payment will be made until all drawings, calculations and

geotechnical reports for a project have been submitted and approved. At this stage 85% of the fee can be paid if it is based on the cost estimate done by the appointed Quantity Surveyor for the project.

11.4.2 If a cost estimate of the Quantity Surveyor is not available the Consulting Engineer can make his own cost estimate and in this case 60% of the fee will be paid.

11.5 CIVIL WORK (EXCLUDING BUILDING PROJECTS).

11.5.1 No interim payment will be made until all drawings have been approved by the Department's Engineer. Payment will be as in 11.4.1 accept that 75% of the fee can be claimed.

ANNEXURE "B"

DEPARTMENT OF EDUCATION AND TRAINING

DIRECTORATE BUILDING SERVICES

GUIDELINES FOR ELECTRICAL ENGINEERS IN RESPECT OF PROFESSIONAL SERVICES

updated : 09-05-94

The Department expects proper co-operation between all disciplines during all stages of the project from handover of the site to project closeout. It is therefor imperative that the following guidelines for Electrical Engineers be strictly adhered to. The Architect who acts as the Chief Agent should be acquainted with these guidelines.

A bar chart showing the time schedule has been prepared by the Department and this forms part of the conditions of the appointment. If the times in the schedule cannot be adhered to then the consultant must notify the Department's Engineer timeously and advise the revised date of the activity on the schedule. The importance of this pro-active action cannot be overemphasized.

1. APPOINTMENT

a. In the letter of appointment a brief description of the building details is given. Although every effort will be made to identify the scope of the professional service required, the Consulting Engineer shall ensure that he is clear as to his terms of reference.

b. On acceptance of his appointment he should contact his Contact Engineer: Directorate Building Services, to clarify any doubt that may exist in his mind.

c. The extend of this appointment is the complete design and supervision of the service as well as any other additional service to complete this project in it's entirety.

2. ELECTRICAL SERVICE CONNECTION

a. This aspect must receive urgent attention and must be resolved preferably before any design work is to be done. The quotation that is obtained from the supply authority must be faxed immediately to this Directorate for the approval there of. When this quotation is approved preliminary design must start immediately. A provisional amount must be allowed for in the Bill of

Quantities for the service connection and must be updated at tender stage.

b. Standard Electrical Services connections are as follow:
   i) Primary School - 50 KVA
   ii) Secondary School - 100 to 150 KVA
   iii) FARM SCHOOL - Service Connection must be supplied and paid for by the farmer, thus no provisional amount in this instance. The supply from the boundary to the school when power is available shall form part of the contract.
   iv) Colleges, Special Institutions, etc. will be determined when Architects drawings are approved.

3. DOCUMENTATION AND DRAWINGS

a. All correspondence, document and drawings must be marked with the relevant B number for the project.

b. In the case of special secondary schools and trade school, colleges, etc. the Electrical Consulting Engineer shall establish as early as possible whether the service of a Mechanical or Electronic Engineer is required for the workshop ventilation, dust extraction, computer rooms, intercom and public address system etc. Where the additional facilities are to be provided, he must notify the Electrical Engineer at Head Office.

c. The preliminary design of the project should be commenced as early as possible and be completed once the Architects design is approved.

d. The Architect is to provide a set of sepia drawing (uncluttered), building lay-out drawings (1-100 scale), site lay-out drawings (1-500 scale). The drawings must be A1 size and no drawings will be accepted that has any building detail on the electrical drawings and must be numbered from B.../1E (Site lay-out), onwards. All electrical drawings must be signed by the Engineer together with his registered number.

e. In order to get the most effective but economic scheme the Department has adopted a special standard of lay-outs in Primary and Secondary Schools and it is imperative that the consultant became fully conversant with this design aspect. Consult your contact person on your letter of appointment to obtain the standardised document and drawing lay-out.

f. After completion of concept documents only one set completed documents and paper drawings must be send to Head Office (contact person) for approval.

   A set of drawings (paper prints) must be send to the Chief Agent (Architect) for co-ordination purposes and a copy of the Architects letter must accompany the concept document. This is to ensure that the electrical design does not clash with other services. Any alterations requested by the Architect should be referred to the control person as soon as possible.

g. As most contracts now have the electrical specifications incorporated as "Part B" of the building specification the Electrical Engineer will only be required to give the Q.S the estimate cost of

the services (not a Priced Bill).

h. All drawings, documents and Bills of Quantities must be approved by Head Office: Building Services. Electrical staff before being issued for tender purposes.

i. NB: During the design stage the Engineer must send a fax before every second Wednesday of the month to indicate the progress of his design with target dates for completion.

4. TENDER STAGE

a. The Department will print the necessary amount of drawings on A3 size for tender purposes as well as 7 sets of A1 size drawings that are to be kept for construction purposes by the Engineer.

b. The Engineer will fix the marked up document, make the necessary amount of documents, add one set of drawing to each document and hand them all to his Q.S.

c. The Q.S will add the "Part B" electrical to his document and do the distribution to the various offices.

d. The adjudication of the electrical portion will not be required (in the case of inclusive contracts.)

e. Once the priced Bill of Contracts has been obtained from the successful tenderer the Q.S must hand the electrical "Part B" to the Electrical Engineer for scrutinising. The Engineer must make sure that the necessary registration form, list of materials etc. are filled in as well as the Bill of Quantities for corrections. If there are any discrepancy the Engineer must contact the builder to rectify the document before the document are to be signed and site hand-over can take place.

f. When the Electrical Engineer is satisfied that the document is correct he should hand it back to Q.S. After the documents have been signed, the Q.S must provide copies of the priced documents and the Electrical Engineer must make sure that he receives one as well as his contact person at Head Office.

5. CONSTRUCTION STAGE

a. The Engineer will visit the site twice a month accept on first and final delivery. Any other special site visits must be motivated and approved by Head Office before commencing.

b. The Engineer will assist the Q.S with payment certificates (progress of electrical work ect.) and will not have to issue electrical payment certificates.

c. If any variation orders occur make sure the format of issuing variations is according to the standard guideline that is in possession of the Chief Agent.

The electrical variations must be numbered (example) variation No.5 (1E), No.6 (2E), etc.

6. PROFESSIONAL FEES

a. All fees will be based on a percentage basis according to the clause applicable on your letter of appointment.
b. There will be no time basis paid accept where there is written approval therefore from the Departmental Engineer.
c. Recoverable expenses must be claimed according to the Department's latest revised recoverable expenses list.
d. All documentation etc. must be send to the Department by speed mail and not by couriers accept original sepia drawings or in being requested so by the Department.
e. The Department has a standard format for submission of professional fees and this format must be used when fees are claimed.

Finally it is a condition of your appointment that you work closely with the rest of your project team. Ensure that the Chief Agent is aware of your existence and ensure that you are kept informed of all the progress and meetings regarding this project. Find out what the target dates are for each phase and stick to it.

ANNEXURE "C"

BRIEFING SESSION – CONSULTANT QUANTITY SURVEYORS

NOTE: A copy of this document is handed over to the consultant quantity surveyor after the briefing session for his information.

1. CAPITAL WORKS

1.1 General information

Name of project: _____

Town/ area: _____

B –number: _____

Name and telephone number of firm:

_____

Contact person at firm:_____

Contact person and telephone number of Departmental Quantity Surveyor:

_____

The letters of appointment are handed out to the consultants and they are given the opportunity to decide if they are capable of completing the documentation in the time as indicated on the attached bar chart, in view of the fact that it forms part of the conditions of appointment.

1.2 Standard documentation

The following standard documentation and departmental guidelines are handed to the consultants - please confirm acceptance by marking the following when received:

* Standard bills of quantities for primary schools (coast/ inland)
* Notes to tenderers
* Preliminaries
* Conditions of Contract (00/ET 61)
* Form of tender (00/ET 60)
* Site inspection certificate (00/ET 26)
* Guarantee for service contract (00G - 002E)
* Addendum A,B,C,D and E

The "Specifications of materials and methods used" (00G - 001A/E) is available on request.

ANNEXURE "C"

Departmental guidelines:

* Compiling bills of quantities
* Requirements regarding final accounts
* Guidelines for estimate and cost norms
* Notes on and examples of consultant fee accounts
* Disbursements

1.3 Compilation of documentation

Documentation is to be compiled according to Departmental guidelines.

Where standard bills of quantities are made available to consultants, the foundations and site works are to be remeasured in relation to the particular conditions. It still, though, remain the responsibility of the consultant to compare the correctness of the standard documentation with that of the working drawings.

Documentation is divided in two parts, A and B. Part B being the electrical installation is the responsibility of the electrical consultant.

Approved drawings (one set) will be made available to the consultant by the Department. In case an additional set is required it can be obtained from Mr A Pretorius,
tel (012) 312 6408.

The Departmental contact person is to be contacted if any uncertainty is experienced.

Standard bills of quantities (inland) is available on Micro QS and the bills of quantities (coastal) on Micro QS as well as Quansept. Most of the other documentation is available on Word Perfect.

Enquiries are to be made with the consultant structural engineer regarding the soil report which, if available, is to be included in the bills of quantities.

1.4 Estimates

Estimates are to be drafted according to the format as indicated.

Estimates on sketch plans phase are to be submitted within two weeks of the receipt of the sketch plans.

Estimates on working drawing stage are to be submitted within two weeks of the receipt of the working drawings. Any deviations from previous estimates are to be indicated.

Priced bills of quantities are to be submitted prior to closing of tenders. Any deviations from previous estimates are to be indicated.

In the case of urgent projects or where use was made of standard documentation, the time factor might be of such a nature that only one estimate with a priced bill of quantity estimate is required.

Norms reconciliation are carried out in the case of tertiary institutions (colleges) according to the format as indicated.

1.5 Tender phase

After the concept bills of quantities were submitted to the departmental quantity surveyor, it will be checked and any mistakes, corrections etc. will be brought to the attention of the consultant.

The contract period is assessed in corroboration with the departmental quantity surveyor.

Penalties are established according to departmental sliding scales (as per standard guide lines).

Site inspection dates are established in collaboration with the regional office and brought to the attention of the team of consultants.

The departmental quantity surveyor will supply the consultants with the following information:

a) Tender (OE) number
b) Date on which the bills of quantities must be ready
c) Closing date of tender
d) Quantity of lists to be reproduced

The consultant quantity surveyor is to arrange the reproduction of part B (electrical documents) with the electrical consultant. It is the responsibility of the consultant quantity surveyor to join parts A and B with rubber band or string and deliver it timeously to Head office and the region.

1.6 Evaluation of tenders

The consultant quantity surveyor is to assist the consultant architect in the evaluation of the tenders, especially in terms of the financial aspects such as the comparison of the tender amounts with the estimate, the financial capability of the contractor, etc.

As soon as the tender has been awarded the consultant quantity surveyor is to obtain the priced bills of quantities (parts A and B) from the appointed contractor. Part B is handed to the electrical consultant and part A is examined for correctness and possible adjustment of tariffs. Part B is then obtained from the electrical consultant and the amount for electrical work is then verified in terms of the final summary in part A.

The consultant is to make the necessary reproductions of the priced bills of quantities and distribute it as required (including the signed contract documents).

The consultant is to acquire the construction guarantee from the contractor and hand it to Mr P C Kok, R615, Thutong Building.

1.7 Contract administration

The consultant quantity surveyor is responsible for all the cost control conditions of the project.

Recommendations for payment certificates is executed monthly (the Department does not prescribe a specific format, but the format of the Society of South African Quantity Surveyors is recommended).

A monthly financial report indicating the cash flow and progress is to be submitted to the departmental quantity surveyor. An example can be obtained from the Department.

All proposed variations are to be estimated by the consultant. Variations to a maximum of R100 000,00 or 5% of the contract amount (which ever is the lesser) can be approved by the principal agent, after which written approval is to be obtained from the Deputy Director: Works inspection for any further variations.

Norm reconciliations are required for variations to tertiary institutions.

It is expected of the consultants to attend all site meetings. Permission must be obtained for any other site visits from the Regional office.

Note must be taken of the conditions of contract, especially those relating to the reduction in retention after first and final delivery.

1.8 Final accounts

Final accounts must be drafted according to departmental guidelines and are to be kept updated during the course of the contract.

The departmental quantity surveyor is to be kept updated of the financial implications of variation orders by way of monthly financial reports.

The completed final account is to be handed to the contractor for comment and inspection before the end of the maintenance period according to the conditions of contract.

As soon as the contractor accepts the final account it is to be submitted to the Department for perusal. Under no circumstances may the contractor sign the final account before the Department has examined it.

The departmental quantity surveyor examines the final account and contacts the consultant in the case of any mistakes. As soon as any enquiries have been concluded the final account is handed to the contractor for signing.

The sighed, final statement, together with the statement of indemnity is submitted to the Department. Subsequent to the signing by authorised persons of the Department, the final payment certificate can be submitted to the Department.

1.9 Professional fee accounts

Fee accounts are to be marked for the attention of the departmental quantity surveyor and should obtain the following information:

a) Name of firm
b) B-number of project
c) Name of service

Fees are calculated according to the latest, approved fee scales in use at the time of the drafting of the bills of quantities.

Separate accounts are to be submitted for each service. Only the original account should be submitted (no copies).

Where standard bills of quantities are used, service B is settled on an hourly basis for the adjustment of foundations and site works. Services A,C and D are settled according to the fee scale.

Interim payments are permitted for service C. An interim payment of 50% will be approved for service D with the receipt of an acceptable concept final account and the balance as soon as the finale account has been completed.

2. ACTING AS PRINCIPAL AGENT (WHEN APPLICABLE)

In the event of the appointment of the consultant quantity surveyor as principal agent, his duties will, apart from the general as outlined above, consist of the following:

2.1 Receive orders from the Department and distribute it to the other consultants. Drawings, if required, can be obtained from the departmental drawing office.

2.2 Coordination of all consultants' work. In case the principal agent is of the opinion that consultants are to be appointed for disciplines that have not been provided for by the Department, a written application must be made. If the Department approves the application, applicable firms will be appointed from the departmental panel of consultants and the principal agent will be notified accordingly.

2.3 Updating of planning programme.

2.4 Organize and coordinate site meetings and inspections.

2.5 Communication with representatives of the Department - from the region as well as the users of the existing buildings.

2.6 Administration and supervision of the contract according to the Conditions of Contract, with authority to issue written instructions. Guide lines regarding the issue of variation orders are obtainable from Mr G Aggenbach, Deputy Director: Works Inspection at tel. (012) 312 6427.

2.7 Submission of monthly reports and minutes.

2.8 Issuing of monthly payment certificates as well as first and final delivery certificates.

ANNEXURE "C"

3. INFORMAL TENDERS (MINOR WORKS)

3.1 Informal tenders are applied where services smaller than R500 000 is controlled by the Region through delegation.

3.2 In the case of an estimate being less than R500 000, but more than R470 000, the Region is advised to transfer the service to capital works.

3.3 According to regulations as established by the Department of Finance, all contract prices of R500 000 or less are fixed, regardless the contract period involved. No price adjustments are furthermore permitted in contracts periods of 6 months or less, regardless the contract amount involved.

3.4 The tender form to be used is 00/ET 62.

3.5 Information concerning advertising, the amount of copies of documentation, tender number, site inspection dates, etc. are obtainable from the Region.

3.6 During the execution of the contract the service is controlled by the Region and all reports, etc. are to be submitted there. Professional fee accounts are still settled by Head office and are to be submitted to the departmental quantity surveyor.

3.7 After the final account has been drafted and in principal agreed to by the contractor, it is to be submitted to the Region, where it will be examined for mathematical correctness as well as aspects such as variation orders, extension of time, etc. The Region then hands the final account to the Departmental quantity surveyor who will examine it regarding quantity surveying principals, departmental guide lines and Treasury instructions. The final account will subsequently be handed back to the Region for signing.

APPENDIX F:

1. Chronological order of steps involved in a building project from conception to completion
2. Office routine and etiquette

CHRONOLOGICAL ORDER OF STEPS INVOLVED IN A BUILDING PROJECT FROM CONCEPTION TO COMPLETION

The following suggestions of the critical path that a building project should follow is based on studied fact, hypotheses, postulates and exigencies of the Department of Education and Training. It was presented for discussion at a series of meetings and after discussion and minor alterations was found suitable as a basis for procedures to be adopted.

A. THE ORIGIN OF A PROJECT

1. The TOTAL projected requirement schedule to the present population and projected population growth should be accurately determined by the Educationist and in more detail, by the Planning Department of the Department of Education and Training.

2. A priority list of buildings required projected over, at least five years should be decided upon and compiled by the Planning Department.

3. Since the budget system is based on an annual requirement, the provision of buildings should be projected over, at least TWO years to enable the Building Branch to plan for, and provide tender documentation at least one year ahead.

4. It follows then, that the planning and documentation of buildings to be added to the Department's commitments at the beginning of the financial year, or any other required time, should be initiated and commenced at least nine months prior to these dates. When related to the financial year, the commencement of documentation will then, fortunately, coincide with the submission of the main budget in Parliament.

B. CHRONOLOGICAL PROGRESS OF STAGES OF IMPLEMENTATION OF DECISION AND COMMENCEMENT OF A BUILDING PROJECT

1. On receipt of the priority list of buildings envisaged for the ensuing two years planning and documentation, the Director: Buildings requested the professional heads to recommend the consultants envisaged, per discipline, for each individual service with possibly two alternatives. From this list, plus his own recommendations, the Director will submit, entirely at his own discretion, a list to the Director-General for approval.

   1.1 At the same time as para. 1, or sooner if possible, the services concerned should be sent for "norms-analysis" sufficient to permit a brief to the appointed consultants.

2. When the Director: Buildings receives from the Director-General, the approved list of consultants, the consultants must be advised of their intended appointment by way, in fact, of a letter of appointment.

2.1 The letter of appointment to the consultant should not merely offer the appointment for the service in the particular discipline but should also state clearly and unambiguously the extent of the service and exactly what the Department will expect him to supply and conform to.

3. As soon as possible after the despatch of the letters of appointments a roster should be drawn up for the systematic handing over of the sites to the consultants. The drawing up of the roster, in conjunction with the professional heads and the consultants concerned should be done by a senior clerk, allocated by the Director, to perform this function.

4. Site handing over to consultants and preparation of Sketch Designs.

4.1 At the official handing over of the site to the consultants, the following should be present:

i) Consultant Architect - Leader of the team and chief agent of the Department.
ii) Consultant Engineer/s
iii) Consultant Quantity Surveyor
iv) Departments Liaison Architect
v) Departments Liaison Engineer
vi) Regional Director or delegated representative
vii) Regional Senior Technical Official
viii) School Principal (where applicable)
ix) School Committee Chairman

4.2 The consultants will be briefed as to the exact nature and requirements of the proposed building schedule and also be informed of the fact that the consultant architect is the leader of the professional team and has been appointed as the Departments Chief Agent on the project.

4.3 On site, the consultants will be given general guide lines relating to the solution of the design problem within the Departments limitations. After careful consideration, a date will be set for submission of:

(a) Preliminary sketch designs prepared in consultation with the Regional Director relating to the zoning and orientation of the buildings.

(b) Subsequent discussion of preliminary sketch designs with the Department Liaison Architect for preparation of final sketch designs.

(c) Submission of final sketch designs to the Director: Buildings for consideration and approval, preferably by a "Departmental Planning Committee" with delegated authority of the Director-General.

4.3.1 The DPC approved plans, if not or, in any case, as requested by the Regional Director for comment.

4.5 On final approval on sketch designs, the consultant architect is advised of this fact and simultaneously be given a date by which all disciplines concerned will complete their documentation as required by the Quantity Surveyor to start measuring. This entire programme must be agreed to in writing, by all the disciplines involved.

4.5.1 The Departmental Q.S. must, at the same time, reach an agreement with the consultant Q.S. as to the time required to prepare the Bills of Quantities and Tender documents.

4.5.2 The consultant Q.S. will also be advised that during the course of the preparation of the working drawings he will be expected to assist the consultant architect in keeping the building costs within the specified cost-norms.

5. Preparation of Documentation

5.1 On receiving instructions to proceed with the working drawings in a manner previously conveyed to all consultants, the consultant architect will arrange a meeting with all the relevant disciplines consultants with a view to setting up a rigid programme documentation.

5.2 During pre-determined stages the consultant architect will discuss the physical progress with the Departments liaison architect, to ensure the smooth running of the preparation of working drawings.

5.2.1 The task of co-ordinating all the services of the various disciplines will rest entirely with the Consultant Architect.

5.3 On completion of all the working drawings by the relevant disciplines and after scrutiny by the Technical section these drawings must first be approved by the Director: Buildings before being sent to the departmental Q.S.

5.4 The departmental Q.S. will receive ALL the various working drawings from the separate disciplines, making sure that he receives them on or before the predetermined programmed date. To this end, he will be assisted by the "contracts clerk" allocated by the Director: Buildings.

5.4.1 After satisfying that all the documents required for the preparation of the Bills of Quantities are in his possession and are in order, he will call in the consultant Q.S. for final briefing on the preparation of the Bills of Quantities.

5.5 When the consultant Q.S. hands in the draft Bills of Quantities for checking, the departmental Q.S. will arrange with relevant contracts section for the tender date and tender numbers. The advertising date must allow for the timeous completion of all the tender documents.

5.5.1 Simultaneously the tender documents for the Electrical, Mechanical and Civil disciplines must be processed.

5.6 On receipt of the final Bills of Quantities satisfying himself that the "Tender Documents" are in order, the departmental Q.S. will provide the Tender Section and relevant Regional Headquarters with sufficient copies of the tender documents to successfully call for tenders.

6. Calling for Tenders and Acceptance

The calling for tenders and final acceptance of a tender will be the responsibility of the relevant section appointed by the Director.

6.1 The submitted bona fide tenders will be received by the Tender or Contracts Section via the State Tender Board or any other authorised body.

6.2 The Tender Section will submit the tenders to the departmental Q.S. for analysis, investigation and recommendation to the Tender Committee who, in turn, will recommend to the State Tender Board.

6.3 The successful tenderer will now be advised by the State Tender Board with a copy to the Department of Education and Training.

7. Handing over of site to Contractor

7.1 When the Building Section is advised by the State Tender Board of their decision, the Contract Section will act as follows:

i) Confirm the acceptance with the successful tenderer and instruct him to furnish a satisfactory guarantee as soon as possible and immediately hand in his priced Bills of Quantities for checking, to and be the consultant Q.S.

ii) Advise the Drawing Office so that they may arrange for the necessary sets of contract drawings to be printed and filed for availability when the site is handed over to the contractor.

iii) Advise the co-ordinating consulting architect and instruct him to expedite the handing in by the successful tenderer of the priced Bills of Quantities for checking and his surety for scrutiny and acceptance prior to the handing over of the site.

iv) Advise the consultant Q.S. so that he may likewise assist in (iii).

v) Advise the relevant Regional Director for his information and records.

vi) Advise the departmental Q.S. so that he may check the corrections and collate the Contract Documents for dispatch to the consultant architect for signature of the contract by the successful tenderer.

7.2 On being advised of the successful tender the consultant architect must expedite the preliminaries and have the contract signed and witnessed by the successful tenderer for submission to the Building Branch's Contract Section for signature by the second

contracting party.

7.3 After signing of the contract the consulting architect must arrange a suitable date for the handling over of the site to the successful tenderer making sure that the following are present at the handing over of the site:

i) Contractor
ii) Consultant Architect
iii) Consultant Quantity Surveyor
iv) Consultant Engineers
v) Regional Director or delegate
vi) Regional Inspector (Technical)
vii) Principal of School (where applicable)
viii) Chairman of the School Committee

7.4 The last two important duties of the consulting architect at the "handing over of site" meeting are:

(a) Completing the "handing over of site" form and having them signed by both the Contractor and Consulting Architect, duly dated and distributed to Head Office, and a copy to the Regional Director, as well as the minutes of thee meeting which should be the first site meeting.

(b) Arranging for the next site meeting schedule and site inspection, as well as determining the pattern of future site meetings.

C. ADMINISTRATION OF A BUILDING PROJECT

The administration of the building project under the leadership and direction of the consulting architect will be conducted in a similar manner as in normal building practice procedure. In this case, the consulting architect will act as the Department of Education and Training chief agent on the site, assisted in his duties by the Department's Inspectorate.

1. Co-ordination

The consulting architect will be responsible for the co-ordination of the services of all the professional disciplines and, in all matters pertaining to the administration of the contract, the members of the professional team will work through the consultant architect.

2. The Site Meeting

The consulting architect will arrange for , and chair regular "site meetings" to discuss all matters pertaining to the smooth running of the contract and take the necessary action/s when and where required to ensure and even enforce smooth running, dovetailing of trades, exercising of quality control and strict adherence to the documentation. The "site meetings" should not be less than four-weekly. Present at all "site meetings" should be.

i) Consultant Architect
ii) Consultant Quantity Surveyor
iii) Consultant Engineers (when required)
iv) Contractor or Foreman or both
v) Sub. Contractors (as required)
vi) Department's Inspector
vii) any other persons specifically required and requested to be present.

The "Site Meeting" is to be conducted in an orderly manner with proper minutes being kept as per pro-forma and recorded. Two copies of the minutes of the "Site Meeting" are to be forwarded to the given contract point at the Head Office at the Building Branch of the Department of Education and Training.

3. The Site Inspection

At regular intervals and between "Site Meetings" or as is expedient, the consultant architect and/or the Department's Inspectorate will visit the site to ensure continuity of the works to carry out quality control and to take "on-the-spot" decisions to resolve any urgent problems.

4. The Site Book

The Contractor will provide, on site, a TRIPLICATE book numbered in series, with the necessary carbon paper, in which will be recorded the names and dates of all persons visiting the site and the instructions given (if any) or any "ad hoc" decisions taken. These entries are to be signed and dated by the responsible person in the party. The original is to be filed in the offices of the consultant architect, the second copy in the offices of the Regional Director and the third copy is to remain in the book. A second/ third/ etc. ... book is to be substituted timeously in order to ensure continuity. The "Book" is to be kept in a safe place, on the site and will, in the end, provide a complete independent history of the site

proceedings.

5. Variation Orders

The use of variation orders must be kept to an absolute minimum and it must always be borne in mind that the number of variation orders issued is in direct proportion to the efficiency of the documentation. Strictly speaking, no variation order is to be issued without prior consent from Head Office, It is an accepted fact that the issue of a variation order will preside the approval by Head Office. This will only be permitted when the financial implications are not serious and when a delay can be costly. The architect is to make the variation order out, in quintriplet (or as otherwise instructed) on copy is to be priced (estimate) in pencil by the consultant Q.S. (for control purposes). The set of variation orders is to be accompanied by a separate motivation sheet and posted, urgently, to Building Branch, Head Office. When approved, the V.O.'s will be routed to the departmental Q.S. for distribution.

6. Payment Certificates

As contractually agreed upon with the Contractor, progress payments will be made monthly and all is in accordance with the pro-forma certificate, (or, until one is printed, in collaboration with the departmental head) in quadruplicate (or as otherwise directed). The consultant architect will immediately dispatch one copy to the Regional Office for payment and further distribution of the copies.

7. Disputes with the Contractor

Should there be any disputes between the Contractor and the Consultant Architect, which the Consultant Architect is unable to resolve, the matter must be reported to the Director-General for his further action.

8. Disputes with the Inspectorate

Should there be any difference between the Inspectorate and the Consultant Architect, which cannot be mutually resolved, the matter must be referred to the Director: Buildings for arbitration.

9. Programming

It will be the responsibility of the consultant

architect to see to it that the contractor maintains the necessary tempo, in order to complete the contract within the scheduled contract period making due allowance for any legitimate delays, such delays being entered in the site book. With each payment certificates the consultant Q.S. is to provide the Department via the project architect with an updated projected cash flow right up to the end of the project with sub-totals for each financial year. The consultant architect is to take any remedial action necessary in an earnest endeavour to have the contract completed on due date.

10. Increased Supervision

Towards the end of a contract, it is often necessary and advisable for the supervision architect to shorten the periods between site meetings in order to motivate the contractor into a timeous completion.

D. TAKING POSSESSION OF A BUILDING

At the eventual completion, by the contractor of a project, the building/s will be taken over according to a laid down procedure.

1. Notice of Completion

When all parties concerned agree that the project is nearing completion a preliminary date will be set for and inspection to permit what is known as "first delivery". This inspection will take place only when it is obvious that the final inspection will not produce more than approximately ten (10) items that need attention.

2. First Delivery

At the pre-determined date for an inspection to permit of a "first delivery" the full complement of supervisory personnel, plus the contractor and his entourage will carefully proceed to inspect all the buildings, making a note of any items that are unsatisfactory. Should the list of items be acceptable, them a "first delivery" can be effected. If not, then a later date must be determined and this process repeated until a "first delivery" can be effected. It is from this date that the contractor's maintenance period (usually three months) will run and that beneficial occupation can be taken. At this stage, the retention will be reduced to 5% of the contract sum.

3. Final Delivery

At a point in time not less than three months after the "first delivery" an inspection will be made to determine whether or not under the contract there are any outstanding items. When this point is reached, the final delivery can be agreed upon and the contractor can, thereafter only be held responsible for LATENT DEFECTS.

OFFICE ROUTINE AND ETIQUETTE

INDEX

MAY 1993

COMPILED BY G CANDIOTES FOR READY REFERENCE BY SUB-DIRECTORATE:
ARCHITECTURAL SERVICES (TO BE UPDATED AS REQUIRED)

GUIDELINES TO SIMPLE OFFICE ROUTINE AND ETIQUETTE

1. PUNCTUALITY

It is each persons individual responsibility to adhere strictly to the flexi-time one has chosen. As responsible professional adults, we are not subjected to the "signing on" and "signing off" in an official register and yet it should always be born in mind that,

(a) arriving late is always considered a greater breach of discipline and punctuality as that of leaving early;

(b) working late NEVER compensates for arriving late and, to a lesser extent, vice versa;

(c) it is considered common courtesy to inform the "Chief's" secretary, timeously if one is going to be excessively late; and finally

(d) it is a standing regulation that arriving after 10:00 requires a day's leave.

2. OFFICE ABSENCE

It is considered good office manners, to say the least, to advise the "Chief's" secretary as to the length one expects to be "out of office" during the day or days, normal visits to the toilet excepted.

3. ACCOUNTS

3.1 Check all accounts for professional fees and disbursements to be clearly headed with,

(a) The firm's name and postal address, to which the payment cheque is to be forwarded.

(b) The project's B. number and name, brief description of service.

ONE set of paper prints to the relative Control Architect.

4.3.2 The Control Architect will examine the drawings and mark them up for correction before returning them to the consultant architect to correct the originals.

4.3.3 On completing the corrections, the consultant architect will return the marked-up prints together with the corrected originals, to the Control Architect by COURIER.

4.3.4 On receipt of the corrected originals the Control Architect will compare these with his marked-up prints to ensure proper execution by the consultant architect before recommending them and submitting the originals to the DD/AS for final approval under cover of the standard "application for approval" form.

4.3.5 After satisfying himself that the original drawings are acceptable, the DD/AS will sign the drawings as approved and return the drawings with the signed form to the Control Architect via his secretary, who will first ensure that the date of approval is entered in the register as was done with the sketch designs. This procedure must never be by-passed.

4.4 FINAL WORKING DRAWINGS

4.4.1 On receipt of the approved drawings and form, the Control Architect will write the necessary letters for distribution and instructions, according to the present distribution list and then, under cover of a memo, take or route the original drawings to the Drawing Office.

4.4.2 On receipt of the original drawings, the Drawing Office will forward two sets of prints to the consultant Quantity Surveyor and file the original drawings.

4.4.3 When the contract for the project is eventually awarded (or undoubtedly to be awarded), the Drawing Office will ensure that the Principal Agent receives SIX sets of ALL the relevant drawings for distribution on handing over the site, with notification of such action having been taken posted to the relevant Region.

4.5 SPECIAL SCHOOLS

The Department offers a 95% subsidy for the erection of Special School buildings for handicapped children (the blind, deaf, deaf and dumb, spastic, retarded children etc) who's care and training is undertaken by one or other benevolent organisation. To ensure that funds are not wasted on these projects, the funds are controlled by the Director: Extraordinary Education, and are subject to certain requirements and procedures.

4.5.1 Because of the wide field to be served, the Department considers each application on merit and only allocates limited funds to each project annually until the specialised buildings are completed. To this end, the projects are subjected to a predefined route and also solicit the aid of the Directorate: Building Services; sub-directorate: Architectural Services.

4.5.1.1 The "Master Plan", in diagrammatical form will be sent to the DD/AS for comments, who will refer it to the particular Regions Control Architect for comments. Bear in mind that there are no "norms" controlling special schools. Our primary function is to ensure that a practical and economical approach is adopted by the consultant architect in his presentation of the scheme. With the necessary comments the scheme will be returned to the Directorate: Extraordinary Education.

4.5.1.2 In due course the Working Drawings will be received for the first phase and once again be referred, via the normal channels, to the Control Architect for perusal, primarily to ensure economy in approach without detracting from the true function. It must be mentioned here, very strongly, that the DD/AS's professional assistants do not pretend to be experts in these specific designs but are relied upon exclusively to maintain the balance between function and economy of construction.

4.5.1.3 The professional fees accounts will also be referred to the DD/AS for correctness and certification. The DD/AS will, in his turn, refer these accounts to the

relevant Control Architect. There is an understanding that the private consultants will only be paid fees based on the amount of the current phase. This is so arranged in order to have as much of the funds available as possible, for building purposes during each phase, until the project is completed.

4.5.1.4 The calling for tenders and appointment of contractors does not fall under the jurisdiction of the State Tender Board. The Consultant Architect has a relatively free hand which in fact places a burden on the Control Architect who is, whilst not held legally responsible, expected to ensure that there is no indication of any form of malpractice.

4.5.1.5 These projects are, for filing purposes, given "XB" members as distinct from the "B" members allocated to our official schools upon registration.

4.5.1.6 From the foregoing it will become evident that the DD/AS and his professional team are relied upon as "professional referees" and "adjudicators" to assist the Directorate: Extraordinary Education in the control of State funds allocated to the provision of these special schools.

5.4.1.7 Unlike the official Departmental Schools, we are not expected to monitor the execution and supervision of these projects by way of controlling minutes, variation orders, etc., but will be called upon to express professional opinions and render professional assistance when requested to do so.

5. VARIATION ORDERS/ EXTENSION OF TIME/ TENDER EVALUATION

These documents will be handled and processed by the Controlling Architect all in accordance with the D/DLB circular as amended from time to time.

5.1 All three of these documents will be routed to the relevant Control Architect for examination and forwarding to the next official or discipline who must render an urgent inset.

5.1.1 In the case of Variation Orders (V.O.'s) the compiled V.O. with it's separate motivation form will be posted/ faxed from the Principal Agent to the relevant Control Architect who will first, either call for the B..../1 file or fetch it from Registry to examine the documents for logic and correctness before certifying or adding his comments or both, attach the circulation sheet to the front of the set of documents, attach them all to the outside of the file cover, secure with a rubber band and route to the next official, and make sure to follow up.

5.1.2 The same procedure applies to the application for extension of time.

5.1.3 In the case of "Tender Evaluation" the sets of documents will be despatched to the Control Quantity Surveyor, immediately after receipt from the Principal Agent with the circulation form already attached. These documents are subject to a short validity period and must therefore be scrutinised and recommended with absolute urgency so that the tenders can be dealt with without delay. Route to the final destination as soon as possible.

6. OFFICIAL TRANSPORT ARRANGEMENTS FOR TRAVEL BY AIR/ ROAD

6.1 TRAVEL BY ROAD ONLY

If one has to make an official trip by road, then one must complete the form 00/ET 5 sections A and B.1, have it signed by the appropriate authority (the Director: Building Services or his delegated authority) and arrange directly with Mrs. Hindley at extension 5261, taking the form (or sending by messenger) over to room 421M, 48 hours notice if possible, so that all the documents will be available when required. The form must be taken up to DD/PA, room 701D first, so that he may record details. You must also complete form 00/ET 234 being the itinerary for the specific period (being your actual authority for travelling during the specific time).

On returning from your trip you will be required to complete a memo to the Director on the specified form containing a brief report on your trip.

6.2 TRAVEL BY AIR AND ROAD

Once again form 00/ET 5 must be completed, but, in this case the DD/AS's secretary will do it for you if you give her the details of your intended arrangements. Proceed as follow: -

6.2.1 Make a detailed flight itinerary indicating clearly the date/s on which you wish to travel by air from point A to point B and return from point B to A or to travel onwards from point B to C etc., and finally from the last point back to point A.

6.2.2 Indicate at which destination you will require a motor vehicle without a driver, and if at more than one point of itinerary, add and annexure.

6.2.3 Indicate where and when you may require a taxi (e.g. from your home to the airport, bus terminus or back on returning or from one of the points in your itinerary to a required destination e.g. airport to GG or GG to airport).

6.2.4 Give this detailed itinerary to DD/AS's secretary and she will do the necessary, conferring with you until it is acceptable.

6.2.5 On your return you are to staple your spent air ticket to a duplicate of your S + T claim. You will also be required to complete an itinerary report on the prescribed form for D/DBL.

6.3 S + T CLAIMS

On returning from any trip on which you have incurred transport and subsistence expenses, you are to claim for these on Form Code 1106 in full detail (see DD/PA circular in this regard). This should be done monthly since these statistics are also required for other purposes, such as budgeting and programme 1 reports.

6.3.1 On the top left-hand side of Form Code 1106 you are expected to show the detailed break-down of your claim specifying various incurred expenditures, inserting always

the "major account" code as 610309 and the particular minor account or item codes as follows: -

Subsistence	: 0176
Parking	: 0176
Tollgate Fees	: 0176
GG-Busdriven	: 0176
Private Transport	: 0212
Public Transport	: 0227
Official Telephone Calls	: 0250
Taxi (Bus) Contractors	: 0246

7. PHOTOSTATS

For your convenience, official photostats of official documents are made on the fifth floor. To have photostatic work done, you have two options:

7.1 You may take the photostatic work up to room 516 to have it done and wait for it; or

7.2 You may complete form 00/ET 16 and together with the documents to be photostatted, place them in the special cover provided and either take it up to room 516 and leave it there, or place it in your "out" basket and wait for its return.

7.3 This privilege is not to be abused.

8. TELEFACSIMILIES

A receiving and sending fax service is provided and is situated on the fifth floor room 516 number 326 7215.

8.1 You are encouraged to send a fax rather than resort to a long telephone call. Only where this is practical of course.

8.2 There is a simple procedure involved. After compiling your message, you are to complete form 00/ET 22 authorised at assistant director level or higher rank, attach your message to this with a paper clip and not a staple, and

take it to room 516 for despatch.

8.3 You will, in due course, receive confirmation of the time and return of the physical contents of your faxed message.

8.4 There is only one fax machine for "in" and "out" transmission, so please be patient.

9. REMOVING STATE PROPERTY FROM THE BUILDING

To remove any item of state property from the building, permission is required from the Head of the Section. To obtain this you are to fill in the form provided before removing the property, have the form completed (receipt) on returning the property and deliver the completed form to room 114, (attached as addendum).

10. LEAVE

Although vacation leave is granted in terms of your conditions of employment, the timing thereof is still considered a privilege which is why you are requested to file the anticipated date of your annual leave with the DD/AS well in advance. For any form of leave you are to complete form 81/103506(21). There are basically three types of leave.

10.1 VACATION LEAVE

As the name implies this is the agreed upon period of vacation leave that you may be entitled to. The number of days per annum is stipulated in your letter of appointment and will increase after ten years service. You are not obliged to take all your leave in one year, you may accumulate as much as you wish. However, should you resign at any time, you will forfeit this accumulated leave unless you make use of this accumulated leave before your notice period. No leave is to be taken in the month following resignation. On retirement however, at present, you will be paid for all you accumulated leave, tax-free up to R30,000.00.

10.2 SICK LEAVE

As the name implies this is for legitimate illness accompanied with a doctor's certificate for a period of 3 days or longer. You are entitled to a maximum of 120 days sick leave on full pay during a three year cycle. The first year of the present three year cycle began on 2nd January 1992. Obviously, sick leave is not accumulative.

10.3 SPECIAL LEAVE

Special leave falls into various categories and includes, amongst others,

(a) compulsory military training

(b) representing the country in a recognised sport during an international event

(c) attending a course with special permission when not paid for by the State

(d) maternity leave (for females)

(e) study-leave to write examinations in an approved cause of part-time study

(f) attending a funeral

10.4 LEAVE CREDIT

Leave credit is not related to an employee's salary scale or notch. For the first ten years of service, an employee accumulates 2.5 days leave per calender month and thereafter 3 days per calender month calculated on the basis of 30 days per year in the former instance and 36 days per year in the latter instance. An employee's leave credit at any point in time can be ascertained by completing form 00/ET 52 and submitting it to the Department's personnel section via the "Chief's Secretary".

11. TYPING

A typing service is provided for all official letters, proformas and documents. The typist allocated to the Architectural Services are the two typists based in room 603.

11.1 Any typing that you wish to have done, must be neatly prepared in your own handwriting, placed in the "Cover for Typing" with your name, room no. and telephone extension clearly written up, or either despatched up to room 603 or taken there personally.

11.2 On receipt of your typing document, you are to check it carefully, mark the corrections up in the recognised and accepted manner and return the document for re-typing.

11.3 Typing is done on a chronological rotation basis so please be patient.

12. GUARANTEE (SURETY) BY CONTRACTOR

All contracts entered into by the Department with a private contractor will, on acceptance, require the submission of a stipulated guarantee in the format acceptable to the Department.

12.1 During the initial briefing of the consultants, the Control Architects are to unambiguously impress upon all the consultants in general and the Principal Agent in particular the vital importance of both the guarantee and the priced Bills of Quantities checked, amended and approved before the handing over of the site to the contractor can even be considered. Contractually the appointed contractor has a limited period of time to lodge a satisfactory guarantee. At the time of appointment of a successful tenderer the Control Architect is to deliberately repeat this warning to both the Quantity Surveyor and the Principal Agent.

12.1.1 The accepted format of the surety is included in the tender documents and if adhered to will present no

difficulty in being accepted by the AD/WA whose function it is to approve, accept and place in safe custody until it has served it's contractual purpose.

12.1.2 Contractually this guarantee, or surety, is held by the Department until "First Delivery" of the entire project has successfully been taken or until such time as the contractor may be sequestrated or liquidated.

12.1.2.1 In the case of the "First Delivery" being successfully negotiated including, where applicable, the imposition and securing of penalties, the surety or guarantee is to be returned to the contractor or guarantor without delay and, in terms of the contract, without the necessity of application. Notification of successful "First Delivery" is sufficient.

12.1.2.2 In the case of a liquidation or sequestration the guarantor is called upon to submit to the Department the full cash amount of the surety or guarantee and the contract will then be completed according to the conditions of contract pertaining to the event of liquidation, strictly, as well, in accordance within the law of suretyship.

12.2 From the foregoing, it can be perceived just how important the submission of an acceptable guarantee or surety is before the signing of the contract (with a checked and corrected Bills of Quantities) before the site can be handed over to the contractor, in that particular sequence.

12.3 You are advised to carefully study the Departments standard "Conditions of Contract" since you will often be called upon to give decisions which may never be in contradiction to the "Standard Conditions of Contract".

APPENDIX G:

Guidelines for lecture on evaluation

DEPARTMENT OF EDUCATION, Ex DET Component

Lecture conducted by Mr George Candiotes on 17 November 1995: PRELIMINARIES BETWEEN CLOSING OF TENDERS AND HANDING OVER OF SITE

1. TENDER EVALUATION

The importance of exact, objective and comprehensive evaluation of tenders cannot be over emphasised since, not only does this have a direct bearing on the correct appointment of the successful tenderers but, in this day and age, can have serious or aggravating political consequences. The correct approach towards this exercise must be one of greater intensity of thoroughness than that which one were to adopt if the project was one's own property and financed by one's own resources.

The following aspects must be carefully investigated and briefly but succinctly responded on:

1.1 IDENTIFICATION

Is the tenderer personally known to you and if so, what is your personal opinion of the tenderers competency? If not, contact some of your colleagues referred to you by the tenderer or from your own contacts and submit their objective evaluations.

1.2 PLANT AND EQUIPMENT

With the tenderers' assistance, establish the extent of the tenderers' plant and equipment and whether it is hired or whether it is the tenderers' own assets.

1.3 FULL REQUIREMENTS

Check the tenderers' submissions carefully to ascertain whether or not the omissions or additions, if any, do not disqualify the tender.

1.4 COMPETENCE

Investigate the competency of the tenderer to evaluate the contract satisfactorily. This would require an investigation into the tenders previous undertakings including the tenders limitations with regards to the nature and scope of the contract.

1.5 TENDER AMOUNT

Notwithstanding the official estimate, in your opinion, is the tender amount realistic and market related?

1.6 TRACK RECORD

If possible, inspect the quality of recent work executed by the tenderer. If it is not possible to visit the site personally because of distance or for some or other reason, try through your colleagues or associates, to ascertain what quality of work the tenderer has produced recently.

1.7 FINANCIAL STATUS

Through your own bankers, obtain a bank report on the tenderer. The charges levied for this service are, on production of proof, refundable. It will suffice to report which bank is involved, what type of account is operated and what bank rating the tenderer commands. If possible try to establish the tenderers cash flow status.

1.8 GUARANTEE

Establish what type of guarantee will be provided by the tenderer should the tenderer be successful. If the tenderer does not intend supplying a guarantee as stipulated in the conditions of tender it is quite possible that the type of guarantee that the tenderer intends providing will be unacceptable to the extent which will cause an unnecessary delay.

1.9 VALIDITY

The conditions of tender stipulate that the tender is to be valid for a period of sixty (60) days. It is not the intention of the Department to exploit this condition, on the contrary, every effort must be made to expedite all the facets at the pre-appointment stage. Therefore time is of the essence.

It does often happen that the fax transmission is illegible or faulty and when a large amount of tenderers are received an incoming fax machine may not readily be able to cope with the volume. It is therefore acceptable that the evaluations are carefully parcelled and sent by courier to the relevant official handling the returns. The process would be expedited if the consultant is prepared to personally collect and deliver the tenders to be evaluated. Please indicate if you are prepared to do this.

1.10 RECOMMENDATION

After having gathered all the facts and criteria, properly authenticated where necessary, you are now in a position to compile your recommendation. You are free to recommend as you see fit after summing up carefully. Remember that yours is an honest, objective and unbiased recommendation. Before you do this, however, it is important for you to understand that you are restricted to an honest recommendation based on a thorough evaluation arising out of substantiated facts.

The Departmental tender committee has a limited delegated authority. Should the Departmental Tender Committee, totally reliant on your fact finding evaluation and recommendations, nominate the lowest tenderer, then the Departmental Tender committee is empowered to make the appointment directly without any further ado.

However, should the Departmental Tender Committee find that it has sufficient evidence not to nominate the lowest tenderer, then it is mandatory that the Committee refer the nominations to the State Tender Board, supported with the necessary substantive motivations. They will then make a decision based on undisputed facts and appoint the successful tenderer.

The successful tenderer will be notified directly of his appointment and the Department will be accordingly advised. The Department will then start the process of enabling the successful tenderer to take possession of the site and commence operations. You will observe from the foregoing reasoning that your recommendations must be honestly objective and based on undisputed facts. Any doubt belongs to the tenderer and the tenderer must be given the benefit of the doubt.

Whatever your recommendations may be, you are required to present them in an orderly and substantive manner in order that the Departmental Tender Committee can speedily arrive at an unbiased decision.

Bear in mind throughout your entire inset that your absolute function is a thorough investigation, recommendation, and evaluation and that the final adjudication rests with either the Departmental Tender Committee or the State Tender Board depending on the choice of nomination.

The Department will advise you at the earliest possible convenience as to the results of the tenders. On receipt of this advice, no time must be lost to complete the next very important stage.

2. SIGNING OF CONTRACT AND SITE HANDOVER

2.1 AVAILABILITY OF SITE

The reason that this action is dealt with first is because of the increasing problem of squatters possessing our sites, and inability to conclude this action, and very often the inability to remedy this situation.

In view of this sometimes inevitable probability, it is essential that the Civil/Structural Consultant Engineer visit the site at the VERY EARLIEST opportunity, even well before the tenders close to establish the accessibility of the site as well as the existence of the boundary pegs. Should there be a problem then immediate remedial action must be taken so that the possibility that extension of time can be claimed is minimised.

2.2 SURETY/GUARANTEE

Before the site can be handed over the contract must be signed. Prior to this signing of the contract documents, two most important actions must be completed within twenty one (21) days of the acceptance of the tender. The first, and probably the most important of the two actions is the obtaining, lodging and approval of the surety/guarantee.
With the smaller contractors and those with a questionable bank rating, the surety/guarantee is the one item that holds the highest delay potential and the Principal Agent is advised to exert continuous pressure on the appointed tenderer. This is the main area from which a delay could possibly stem.

2.3 PRICED BILLS OF QUANTITIES

Immediately upon being advised of the successful tender the Principal Agent is once again to exert pressure firstly on the Q.S. to supply the contractor with two (2) blank bills of Quantities together with two(2) blank parts "B" and secondly on the contractor to submit the priced bills for checking and adjustment. Because the contractor uses "Subs" this is also an area of concern, time wise, so be sure to apply continuous pressure.

2.4 SIGNING OF CONTRACT DOCUMENTS

As early as during tender procedure the Principal Agent is to contact Mr. A.M. Pretorius, tel: 012-3126408 to arrange for the despatch of six(6) complete sets of ALL working drawings plus two(2) sets of the site plan and 1:100 drawings (A3) to ensure that there will be no cause for claims for extension of time due to a delay in the supply of these drawings.

After the contractor has complied with both the previously mentioned conditions of contract required prior to the handing over of site, the Principal Agent has fourteen(14) days in which to have the contract documents signed and the site handed over. The signing of the contract documents, is purely an administrative and legal action and can take place in the Principal Agents office or any other suitable office prior to the handing over of the site. The signed documents are to be despatched to the Department and in particular to Mr.P.C. Kok, room 615, Thutong building, Pretoria, as soon as possible after signing. This is to be done by courier. It is advisable to hand over the six sets of working drawings to the contractor at this stage and receive a preliminary receipt for same.

2.5 HANDING OVER OF SITE

The Department must be advised of the date of intention to hand over the site. Before the site is handed over the Civil/Structural engineer will ensure that the boundary pegs are in place. The Principal Agent has already been briefed on the procedure to be followed and the proformas to be issued during this function. The important factor with regards to the handing over of the site is that it must be successfully completed within fourteen(14) days after the contractor has complied with the two previously mentioned prerequisites: the surety, and correctly priced bills. Every effort must be made to ensure that the contractor has no cause for a claim for extension of time due to any default on the part of the Department or its agents during the period of acceptance of tender and site handover.

APPENDIX H:

Lecture on Conditions of Contract

GUIDE TO BRIEFING ON SALIENT POINTS WITH REGARD TO POST TENDER ACTIONS AND SITE ADMINISTRATION WITH SPECIAL REFERENCE TO "VARIATION ORDERS" AND "APPLICATION FOR EXTENSION OF TIME"

A. INTRODUCTION AND PURPOSE OF BRIEFING

B. POST TENDER REQUIREMENTS FOR "SITE HANDING OVER"

1. Submission of comprehensive evaluation reports on all the lowest or any tenderers as will be required by the Department for consideration to accept or reject.

1.1 Validity of tenders

2. Relevant Conditions of Contract to be discussed are Clause 1, 20 and 24.

3. Establishing accessibility to site, positions of boundary beacons and availability of services.

4. Scrutiny of validity of security offered and approval by the Department.

5. Checking Bills of Quantities and/or schedules of rates, where applicable and adjustment of the rates and tariffs in the Bills of Quantities and/or schedules of rates all in accordance with the standard and accepted building practice.

6. Signing of Contract Documents.

7. Arranging for the official handing over of the site to the appointed contractor on a date agreed to and acceptable to the Regional Chief Director.

7.1 The official handing over of the site is the responsibility and prerogative of the Regional Chief Director.

7.2 Principal Agent to ensure that all relevant documents and drawings are in his possession to be handed over to the Contractor at the handing over of the site or even prior to this date.

C. HANDING OVER OF SITE TO CONTRACTOR

1. Most Regions require a "Ceremonial" site handing over of site for the benefit (and delight) of the local community. Because of this we will consider two separate functions and discuss them separately. The first handing over of site will be referred to as the "official" or "legal" site hand over and the second as the "ceremonial" site hand over.

2. Legal handing over of site.

2.1 It is assumed that the contract has already been signed and forwarded, under registered cover to the Department's head office for the attention of the Deputy Director/Works Administration.

2.2 The meeting will be chaired by the Regional Deputy Director: Works Inspections or his duly authorised representative all in accordance with the authorised pro-forma, who will, during the meeting hand the site administration over to the appointed private consultant principal agent.

2.3 The positions of the boundary pegs, the service connections, the two relative concreted dates and the positions of the sheds and offices required for the duration of the contract will, in the presence of the Regional Representative, be accurately pointed out and defined for the main contractor.

2.4 The principal agent is advised to draw the main contractor's attention to the full implications of the Conditions of Contract with special reference to clause 20, 22 and 24. (This may also be done during the signing of the contract which should then be minute as a formal meeting for future legal, or otherwise, reference to these facts).

2.5 The position of the sample facebrick panel is to be pointed out with the instruction that this panel is to be erected to approval immediately after the decision on the facebricks has been taken. Please note, that if more than one type of facebrick is to be used then there must be as many samples panels.

2.6 The Contractor is to be advised that, in his own interests, he is to satisfactorily place a rainwater gauge in a safe position, properly protected. The reason for this will be dealt with under a separate heading.

2.7 The provision of the Site Instruction Triplicate book/s and it's safekeeping under the responsibility of the main contractor is to be discussed and minute.

2.8 The suitable monthly date (week and day) must be established and minute, for the conducting of the official, compulsory monthly meeting which all professional consultants must attend with special reference to the Quantity Surveyor during which meeting measurements will be taken for the preparation of the monthly progress payment. Refer to the whole of clause 23 of the Conditions of Contract with special reference to clause 23(2)(a).

2.9 The position of the "Contractor's Notice Board" must be established and the Principal Agent will issue the Contractor with a detailed drawing showing the lettering required on this board.

2.10 The Contractor must be advised of his liability to provide an acceptable "progress bar chart" which must be updated for each official monthly meeting.

2.11 All aspects detailed in the standard "site handing over minutes" must be adhered to.

3. CEREMONIAL HANDING OVER OF SITE

3.1 As stated earlier, this is the prerogative of the Regional Chief Director and is his field day. It is an important and serious affair and therefore all private consultants must be present.

3.2 The date for this function must be decided upon in full consultation with the Region's Deputy Director: Works Inspections and also include the Main Contractor.

3.3 In some areas the Regional Chief Director will want to perform the "SOD turning ceremony" personally, in which case he is to be provided with a suitable spade etc.

3.4 The details of this ceremony will be at the absolute discretion of the Regional Chief Director.

3.5 Obviously, this ceremony must only take place after the legal function when the necessary sheds etc. should be in position.

D. SITE ADMINISTRATION

1. It is not intended to deal with "site administration" in detail but to confine this discussion to the two aspects of site administration that appear not to be completely understood and therefore not properly administered, namely (a) Variation orders and (b) Applications for Extension of Contractual time.

2. Variation Orders:

Variation Orders are a necessary evil which should, and can, be restrained to an absolute minimum since, very often, the so-called savings or benefit is outweighed by the costs, in manhours, of the administration and paperwork involved.

2.1 Carefully examine the most common reasons for having to resort to a variation order being necessarily processed.

2.1.1 Careless documentation for which there really is no excuse.

2.1.2 Request for the use of alternate construction methods under the pretext of savings, sometimes valid but not always.

2.1.3 The preference of the Principal Agent or other professional consultant for an alternate material or method.

2.1.4 The application of "savings" sometimes an insatiable desire to insist an "authorised policy savings". Whose policy?

2.1.5 Personal idiosyncrasies of either the professional consultants or the inspectorate.

2.1.6 Inaccurate preliminary assessment of site conditions.

2.1.7 Late discovery of so-called local conditions affecting design or finishes.

2.1.8 Additions or omissions due to late discovery of inaccurate assessment of accommodation requirements.

2.1.9 Add to these ad Nauseum.

2.2 Reference to clause 18, in its entirety, with regard to variation orders.

2.3 Reference to the standard forms to be used and procedures to be adopted in the issue and approval of variation orders.

2.4 The legality of "faxes"

2.5 The separation of variation orders applying to construction work and to electrical work.

2.6 The numbering of variation orders and timeous issue. (Not to be accumulated).

3. Extension of time and application therefore, is probably the most contentious issue in the course of site administration and must be carefully analysed with special reference to clause 2, 3, 16, 18, 24 and 25 of the Conditions of Contract.

3.1 Right at the outset, it must be clearly understood that the granting of an extension of time is a concession to the Contractor and as such it is one of the Contractor's absolute obligations and responsibilities to apply for this concession, in writing, within the stipulated time frame regardless of whatever the reason, valid or invalid may be to warrant consideration of the approval or rejection of an application for the extension of time on a contract.

3.1.1 Because of the foregoing, it follows that since the granting of an extension of time is a concession, the onus of claiming and providing undisputed proof of validity rests entirely with the Contractor and is time bound therefore, should the Contractor not timeously comply with the contractual requirements in lodging this claim, he has not redress whatsoever. By the same token, the moment he does comply with all the conditions the onus is now squarely in the court of the Principal Agent to process this claim or claims without any delay whatsoever and the same applies to the Department notwithstanding the provisions of clause 20(5).

3.1.2 The Principal Agent is, however, in my opinion, morally obliged to take pains to explain the legal implications to the Contractor because, having done this, the Principal Agent can, with a clear conscience continue to refuse to process any such claim for an extension of time always being careful not to be guilty of deliberately delaying any such claim or claims.

3.2 The Department will always view the application for any extension of time with the utmost responsibility since, whatever the outcome, there is a financial implication which subjects any claim for an extension of time to audit scrutiny.

3.2.1 The legitimate granting of an extension of time can result in increased escalation in the final costs of a contract whilst the legitimate rejection of such a claim can result in the imposition of penalties to the Contractor.

3.3 The Department requires all applications for an extension of contractual time to be administered by the Principal Agent in a specific manner and routine to enable the Department to dispose of all applications as speedily and effectively as possible.

3.3.1 There are specific proformas to be used and these must be strictly adhered to. There is no objection to the Principal Agent duplicating these proformas on a particular word processor programme provided the format is accurately maintained.

3.3.2 Each incident (event) shall be handled separately with only one incident per set of proformas regardless of the length of the incident (event).

3.3.3 The incidents (events) must be numbered chronologically and if there should be several contributing factors involved in one particular incident they are to be treated separately for purposes of easy adjudication.

3.3.4 With the first application for an extension of time a certified true copy of the Contractor's letter of appointment must be attached so as to eliminate any doubt in the assessors mind as to the date of commencement of the contract.

3.3.5 Under no circumstance must an application for extension of time be forwarded to Head Office for consideration unless all information is clearly supplied and ALL supporting documents attached. The Principal Agent is advised to draw up a "check list" and compare before dispatch. (Always retain certified copies).

3.3.6 Should the Contractors application appear to be doubtful although fully documented or appear to fall in an unspecified area, but appear to have merit, then the Principal Agent must, never the less, submit this claim, with his recommendation for possible condonement leaving the final decision to the Director General or his deligated authority. It is stressed here that, even although the claim may be doubtful although have merit, all possible supporting evidence must be appended initially.

4. First and final deliveries to be briefly discussed.

006(6)T(wp)

APPENDIX I:

Typical consultants minutes of a briefing

MINUTES OF BRIEFING MEETING FOR ARCHITECTS, CIVIL AND STRUCTURAL ENGINEERS, QUANTITY SURVEYORS AND ELECTRICAL ENGINEERS BY MR GEORGE CANDIOTES AT THE DEPARTMENT OF EDUCATION AND TRAINING OFFICES, GOLDEN MILE CENTRE, PORT ELIZABETH ON THURSDAY, 20TH FEBRUARY 1992 FOR NEW PRIMARY AND SECONDARY SCHOOLS

Mr Candiotes opened the meeting by telling the architects that they should make one set of minutes of the Briefing Meeting that would be used as a handbook for proceedure. Mrs Roux undertook to do this and send a draught copy to Mr Candiotes for approval before issuing it to the other architects who were present at the meeting.

ATTENDANCE

G.T. Bain	Bowler, van Heerden, Bain & Partners
A. Sweetman	Louw Strydom and Partners
J.C. Peace	Louw Strydom and Partners
B.C. Spiers	Stewart Scott Inc.
N. Wicht	Louw Strydom and Partners
V.J. Danoher	S.S. Inc.
John Orpen	John Orpen, Architect, Knysna
Jack Thomson	Law, Hepple, Ayton & Thomson
Tony de Lange	De Villiers & Moore-George
Pat Callaghan	E.A. du Toit en Vennote
Jennifer Roux	Eaton, Roux & Wolmarans
V.C. Grant	V.C. Grant, Quantity Surveyor
B.S. Reid	Erasmus Rushmere Reid
I.J. Potgieter	M.D. van Schalkwyk & Potgieter
M.G. Nixon	Watermeyer, Legge, Piesold & Uhlmann
M.A. Raaff	Graham, Raaff & Le Roux
Wayne Gresham	Graham, Raaff & Le Roux
Francios Theron	F.D. Theron Architects
Lydia Theron	F.D. Theron Architects
I.L. Huisman	Ivo Huisman & Assoc.
D.T. Liebenberg	Ballenden & Robb
P.J. Ellis	Murray Biesenbach & Badenhorst
G.C. Milne	Londt Knight Fieggen & Moors
A. Markram	J.D. van Niekerk & Prt.
W.A. Brock	Rousseau Probert Elliott Brock Inc.
A.J.M. Moors	Londt Knight Fieggen & Moors
J. Grosse	Jones & McWilliams & Grosse
J.P. Haviland	Jones & McWilliams & Grosse
M.J. Grosse	Jones & McWilliams & Grosse
E.P. Roux	Eaton, Roux & Wolmarans
M.J. Costa	Daniels & Costa

1. DESIGN, DOCUMENTATION & ADMINISTRATION

Attention

The designs for the Primary and Secondary Schools had all been standardised and the architects had to place the school buildings on the site. Mr Candiotes will send down all the sepia drawings that are applicable next week as well as the Lump Sum contract document for Primary Schools. — Architects

Above all the Department wants perfect Site administration as this seems to be lacking today and the politicans do not consider that we are doing our Site administration correctly. — Architects, Engineers, Q.S.'s

2. LETTERS OF APPOINTMENT

Letters of appointment have been typed and will be posed on Wednesday, 26th February 1992.

3. NUMBERING OF DRAWINGS

a) Reference Numbers for Drawings

The correct numbering of drawings is of vital importance.
Each school is registered with a "B" no. and it is never duplicated.
Each drawing will have a "B" no. on it.
The "B" Numbers allocated are as follows:

B 24923 - KHOLEKA Primary School - Motherwell, P.E.

Architects	: Erasmus Rushmere Reid cc
Q.S.	: M.D. van Schalkwyk & Potgieter
Elec. Engineers	: Ballenden & Scott
Struct. Engineers:	Watermeyer Legge Piesold & Uhlmann

B 24909 - KHULILE Primary School - Motherwell, P.E.

Architects	: Eaton Roux & Wolmarans
Q.S.	: V.C. Grant
Struct. Engineers:	Daniels & Costa
Elec. Engineers	: J.D. van Niekerk & Part.

B 25551 - NESINA Primary School - Knysna

Architects	: John Orpen
Q.S.	: Law, Hepple, Ayton & Thomson
Struct. Engineer	: Stewart Scott Inc.
Elec. Engineer	: De Villiers & Moore

Attention

B 24622 - UKHANYO Secondary School - Alexandria
Architect : F.D. Theron
Q.S. : Graham, Raaff & Le Roux
Struct. Engineer : Ivo Huisman & Ass. cc.
Elec. Engineer : Louw Strydom & Part.

B 24622 - LUNGISO Secondary School - Humansdorp
Architect : Jones & McWilliams & Grosse
Q.S. : Vosloo & Partners
Struct. Engineer : Bowler van Heerden, Bain & Partners
Elec. Engineer : C.A. du Toit & Partners

B 24777 - BENJAMIN MAHLESELA Secondary School - Grahamstown
Architect : Londt Knight Fieggen & Moors
Q.S. : Rousseau Probert Elliott & Brock
Struct. Engineer : Murray Biesenbach & Badenhorst
Elec. Engineer : Ballenden & Robb

b) Sketch Plan Numbering:

Use the reference "B" number plus an "A" number for all Sketch plans. Architects
e.g. B/24622/A1
B/24622/A2 etc.
If an second sketch plan needs to be done, use the "B" number plus a second "B" number
e.g. B/24622/B1
B/24622/B2 etc.
Once the sketch plans have been approved, the "A" is dropped from the drawing or the drawing or the second "B" is dropped in the case of a second sketch plan.

c) Working Drawing Numbering:

Architects: B/24622/1 Architects
B/24622/2
For drainage drawings, add a "W"
e.g. B/24622/1W
B/24622/2W etc.

Electrical Consultants: Elec. Eng.
B/24622 1E
B/24622 2E etc.
Note: There is no slash before the E

Attention

Please consult with the architects
to allow a set number

Structural Engineers: — Struc. eng.
B/24622/S1
B/24622/S2 etc.

Civil Services: (Stormwater etc.) — Civil eng.
B/24622/S1D
B/24622/S1D
Note: "D" stands for "Dienste"

d) Number of Correspondence & Fee Accounts

All correspondence goes to the Director General of Buildings — Architects Engineers Q.S.'s
For pre-contract correspondence the registered "B" number is to be used e.g. B24622.
At the beginning of the Contract, the "B" number changes to /1
Professional Fee accounts automatically go straight to Mr Candiotes. Professional fee accounts don't need the /1 number on them. One original and two copies (1 + 2) of the professional fee account are to be sent in to the Department.

4) SIZE OF DRAWINGS SHEETS:

All drawings are to be done on an A1 sizepolyester film sheet with a pre-printed title block on it supplied to each discipline by the Department of Education and Training in Pretoria. To order these, telephone Mr Andre Pretorius (012)312-6408. No A0 sized sheets will be allowed. Bending schedules are to be done on an A4 size sheet and must be properly bound for storage. — Architects & Engineers

5) SCALES:

The Department of Education will only tolerate the pure metric scales — Architects & Engineers
1:1, 1:2, 1:50, 1:100, 1:1000, 1:200
Scales of 1:25, 1:125, 1:1250 will not be accepted.

6) SITE PLAN:

The site plan is to be done to 1:500. — Architects

Attention

If the site plan is too large, draw a section of the site with the school building on it to 1:500 on an additional plan of 1:1000 and call it a Locational Plan.

7) ORIENTATION:

Architects

Up until now the Department has been emphatic about complying with the North/South Orientation. They will now accept a deviation of 15% if this will result in a more economic plan.
In extreme cases a school has been turned 90 degree to face East/West with large windows on the West and small windows on the East provided with shading.

8) HEAD OFFICE:

Director: Department of Education and Training:
Mr Ken Jacobs
He is only to be telephone if a consultant is under extreme duress.

Deputy Director of Professional Services:
Mr Ben Jansen
Telephone no.: (012) 312-6415/6
He is in charge of all professional services and the person who will handle all professional complaints. As he is an architect, he will also deal specifically with architects.

Architects

Architect, Head Office - Pretoria
Mr George Candiotes

Regional Chief Works Inspections: Mr B. Mc Geer
Telephone no.:. (041) 571866

Engineers:
The contact person for Engineers is Mr Van Tinteren
Telephone no.: (012) 312-6421 or
Mrs Welgemoed
Telephone no.: (012) 312-6415

Engineers

Quantity Surveyors:
The contact person for quantity surveyors is Mr Stoffel Kat telephone no.: (012) 312-6413

Q.S.'s

Attention

10) LEADER OF THE TEAM:

The architect is the leader of the team of consultants and needs the fullest co-operation. Everything that is done in connection with the project must be done with his knowledge. Pre-contract and post contract, keep your architect informed of all decisions and instructions. The architect is to call a meeting with all the consultants in his team directly after this briefing meeting.

Architects
Engineers
Q.S.'s

11) CONTRACT DATE FOR TENDER DOCUMENTATION:

Primary Schools - 7 April 1992
Secondary Schools - 5 June 1992

(Note: If the tender documents for secondary schools can be completed sooner it will be appreciated).

Both the Primary and Secondary Schools have already been designed. The Department of Education and Training will send sepias of all the relevant drawings to each architect. The contract documents for the Primary Schools should be ready within a month.
The Department has adopted this method of operation in order to cut down on the time it takes to design and build a school, in order to provide classrooms as soon as possible. Full attention is to be given to quality and to cost effective buildings. If an architect has any further suggestions as to cost effectiveness, he can advise the Department.

12) FEES:

Architects

Architects Fees:
Fees will be paid on a statutory time basis until documentation is completed using a cut and paste method.
Fees after documentation are as set out in the letter of appointment.
The architect is asked to repeat this plan, and he will be paid for this and any further repetition - 1% for building and repetition of Standard Plans, 4,5% for Site Works, 1,5% for Supervision after acceptance of the Tender.
At the end of the contract, the Quantity Surveyor assess the cost of the Site Works and the repetition of plans for assessing the final fee.
Mr Candiotes said he would not query the number of

Attention

hours put down on the account but pointed out that he did not like this system as it assists the office which is not efficient.

Engineers Fees: — Engineers
Engineers are to contact Mr van Tinteren (012) 312-6418 to establish their fee structure.

Quantity Surveyors: — Q.S.'s
Quantity Surveyors are to contact Mr Stoffel Kat (012) 312-6413 to establish their fee structure.

13) PRIMARY SCHOOL CONTRACT DOCUMENT:

Primary Schools will go out on a Lump Sum Contract. — Architects
Mr Candiotes will send the documentation to the architects next week. The Lump Sum Contract will allow for any type of system and also forms the Bill of Quantities so that the contractor does not have to employ his own Quantity Surveor.
A MANTAG Certificate is called for.
The Department will, from the tariffs, be accurately able to assess the variations. The documentation including the Site Plan can be done in a week.
Documentaiton and the Site Plan is to be completed and submitted by 9 March 1992 except for Knysna and Grahamstown. The submission date for these is flexible as there is a problem with the sites which is being sorted out with the municipalities.

With this type of contract documentation, the Department has been able to build a Primary School for R1,27 million instead of R2,5 million.
Mr McGeer of the Regional Chief Director's office will give each architect the details of the site today and this will be taken as the handing over of the site. — Architects, Engineers, Q.S.'s

14) COMMUNITY INVOLVEMENT:

The architect is to redraw the Site Plan to 1:200 without any deviation plus an elevation of the front of the school. This plan is needed for the community involvement. — Architects
Mr McGeer of the Regional Office will assist you with this. He is in charge of the Technical Section and is your right hand. Community involvement is necessary because the community must know that they are getting a school, the

Attention

size of the school and when it will be build. They must be given a realistic date for getting the contractor on site and getting occupation of the school.

15) DUTIES OF THE DISCIPLINES:

1) The Architect is the chief agent. He is to call a meeting of the consultants to establish a programme. — Architects

2) a. The Civil Engineer's first duty is to investigate the site and to check on the sewerage and water connections available and the cost of the connections. It a conservancy tank is needed, this is to be a minimum size and not overdesigned. It is to be built on the boundary of the site with access to the point of extraction available at all times. An indentation is to be made to the boundary fence so that the vechicle used for extraction does not have to enter the school grounds. — Civil Eng.

b. The Civil Engineer is to do a contour drawing and will be paid a statutory fee for this. He is not to employ a Land Surveyor. Hlaf meter contours are sufficient for the architect. If the site pegs are not available, do an approximated survey. When the contractor moves onto the site the Engineer must employ a Land Surveyor to put in the pegs if they are missing. The engineer is to pay the Land Surveyor fee directly to him and the Department will reimburse the Engineer. — Civil Eng.

3) The Electrical Engineer must find out if there is a power supply available and the cost of the connection. Primary schools can have a 50 K.V.A. supply and Secondary schools can have a 70 -75 K.V.A. supply. For Primary schools the electrical work forms part and parcel of the contractor's work. For Secondary schools there is a separate Electrical contract. This may change. If it does, Mr Candiotes will advise the architects. The Electrical consultant will produce his own documentation and this is to be ready at the same time as the architect's documentation. — Elec. Eng.

4) The Quantity Surveyor is to provide normal services. It is his duty to provide tight financial control and estimate realistically. He must bring pressure to bear — Q.S.'s

Attention

on the architects and engineers if they are spending more than the Department expects them to. When the architect receives the standard documentation, the Quantity Surveyor is to assist the architect to apply the relevant document to each service.

5) The Structural Engineer must obtain the soils report from the Civil Engineer and base his foundation designs on the soil conditions and reports. He is to submit his foundation proposals to Mr van Tinteren, telephone no. (012) 312-6421.
The Department has been accused of over overdesigning their buildings and will gratefully accept recommendations for economies.

16) SKETCH DESIGNS:

The Sketch Plan is to be redrawn to 1:200. Two sets of sketch designs are to be submitted to Mr McGeer. He will have these signed and sent to Head Office. They can be sent personally. Architects
When Head Office approves of the sketch design and the positioning of the building, the soil investigation will take place as soon as possible. The Civil Engineer must contact Head Office and advise them of how many trail holes they want to put down. Civil Eng.
The Structural Engineer must use the most effective solution for the foundations and avoid unnecessary piling and broad bases. Struc. Eng.
If necessary the Department will take a risk if the Engineer advise them of the percentage of the risk.
On having the trial holes done, the project then goes out to informal Tender under the control of the Structural Engineer in collaboration with the Region's Chief Works Inspections.

17) WORKING DRAWINGS:

Once the foundations have been designed, the architect makes sure that the size of the beams and slabs are correct and then completes the working drawings by cutting and pasting.
On completion of the working drawings/structural/civil and electrical drawings, send one set of paper prints to Pretoria to the following:
Architectural Drawings - Mr Ben Jansen
Structural/Civil Drawings - Mr van Tinteren
Electrical Drawings - Mr Zorgman
DO NOT send prints of these drawings to the regional office.

Once the Head Office in Pretoria has examined these paper

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prints, they will telephone and advise each consultant whether the drawings are approved.
If amendments are required to be made to the drawings, the marked up prings will be sent to the consultant and he is to correct his originals in accordance with the marked up prings. When the corrections have been made, send the original drawings plust the marked up prints to Pretoria.

18) NUMBER OF PRINTS REQUIRED:

For Contract purposes: Architects

1 Set of 1:100 drawings for Primary and Secondary Schools for the Site Inspection

1 Set of 1:100 drawings for the Contract.

19) PRINTS REQUIRED FOR HANDING OVER OF THE SITE:

6 Sets of working drawings for conventional Primary School and Secondary Schools.

Distribution: 4 Sets to Contractor at Technical handing over of site
1 Set to the Regional Office
1 Set divided between the Disciplines e.g. Structural and Electrical
The consultants may need 2 sets.
If the Contractor needs exstra prints he pays R3.80 per print directly to the architect. The architect will advise Mr Andre Pretorius at Head Office in Pretoria. The Department will supply the necessary prints and will deduct the cost of the prints from the architect's fees.

20) GOING OUT TO TENDER:

Mr Neels Opperman will give the Quantity Surveyor the date that the document will be advertised. The contractors are normally given 6 weeks in which to tender and this is mentioned in the advertisement. Q.S.'s
A date is set aside for a Site Inspection on which all tenderers can view the site and all the consultants must

Attention

be kept and signed by everyone.

Tenders close at the State Tender Boards and the documents are sent to Pretoria Head Office. Pretoria sends a list of the tenderers and the Tender Prices to the architect to make a recommendation. The architect's recommendation is sent to head office in Pretoria who sends it to the State Tender Board who takes a final decision. The State Tender Board writes directly to the winning Tenderer as well as informing Pretoria who also informs the winning Tenderer. — Architects

21) DOCUMENTS NEEDED FROM THE CONTRACTOR:

The architect must get the following documents from the contractor and send them to Head Office in Pretoria: — Architects

1) Guarantee
2) Priced Bill of Quantities

Once the guarantee and the Priced Bill of Quantities have been checked and accepted, Pretoria will contact the architect who is to arrange for the signing of the contract.

22) SIGNING OF CONTRACT:

Once the Guarantee and Priced Bill of Quantities have been accepted, the contract is signed in the Architect's office. The architect must advise Mr McGeer but he does not have to be present when the contract is signed. — Architects

Note: The commencement of the contract is from the date of the letter from the State Tender Board to the contractor, accepting his tender.

23) HANDING OVER OF SITE:

The architect must meet the contractor and the Region on the site to point out where to put the site office. The architect must also assist the Region to do an official handover to the community. All the consultants must be present. It is the perogative of the Region to organize this ceremony. — Architects, Engineers, Q.S.'s

Attention

24) SITE INSTRUCTION BOOK:

The contractor must supply a triplicate copy A4 size site instruction book which is kept on site. Everything that happens on the site is recorded in this book. All visitors must sign it. Don't use a separate page for each entry. Draw a line between each separate entry. — Q.S.'s, Architects, Engineers

25) COPIES OF SITE INSTRUCTIONS:

a) Top copy of Site Instruction to Architect
b) Photostat copies made by architects for each consultant — Architects
c) Second copy of Site Instruction to go to the Region — Engineers, Q.S.'s
d) Third copy of Site Instruction stays in the Site Instruciton book.

The architect is the only person who can remove copies from the Site Instruction Book. The architect must provide Head Office with a full set of copies of the Site Instruction book/s. The Site will not be taken over without this.

26) MOTIVATION FORMS FOR VARIATION ORDERS:

Before issuing a variation order, the architect MUST have approval in principal from the Deputy Director of Proffessional Services in Pretoria. — Architects, Engineers, Q.S.'s
The architect makes out a motivation form a variation order on a special form with a written indication from the contractor of the costs. All motivation forms go through the architect to the Region to Head Office in Pretoria - no motivation form goes directly to Head Office.
The variation order is only issued at a later stage.
The numbering for V.O.'s is 1, 2, 3, ...etc. for architects
1E, 2E, 3E, ... etc. for Electrical Engineers — Elec. Eng.
1S, 2S, 3S, ... etc. for Structural Engineers — Struc. Eng.
The Region is responsible for quality control. The Region cannot override the architect but will and must bring poor quality work to the architects attention.

27) COMPLETION:

First Delivery Forms are obtainable from the Region and the architect must complete this form. — Architects
The architect must give the contractor a Shag List and it is to be the Final Snag List and no more items are to

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be added to this list. The architect should not write out a Snag List until he is certain that it will be the final list.
When the Department takes First Delivery and finds that 5 items have not been done, then the architect aborts the First Delivery. The architect is to tell the contractor that he will pay for all subsequent attemps at First Delivery and this must be itemised in the Bill of Quantities.

28) SECURITY ARRANGEMENTS:

Before entering the Townships, consultants are advised to liase with Mr McGeer.

29) DOCUMENTS:

At the conclusion of the meeting, Mr Candiotes handed out proformas and prints of standard plans and details to the architects as well as a limited number of polyster film sheets with a preprinted titlebook. Mr McGeer handed out photostats of the various site plans with each site marked up on it in red.

SINGED:

MRS J. ROUX
APPOINTED MINUTES SECRETARY

007(6)(T)(wp)

APPENDIX J:

Typical Standard Conditions of Contract

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF EDUCATION AND TRAINING

CONDITIONS OF CONTRACT

Definitions

1. (1) (a) "Bills of Quantities" means the document referred to in this Contract in which is entered the description and quantity of work for the execution of this Contract. The Priced Bills of Quantities means the Bills of Quantities as amended or approved by the Director-General, which contain the rates at which the Director-General agrees to pay the contractor for the Works, which rates are hereinafter referred to as Schedule Rates.

1. (1) (b) "Contract" means and includes the articles of agreement, the conditions of tender, the tender and the acceptance of tender, these conditions of contract, and if any, the Specification, the Drawings and the Bills of Quantities.

1. (1) (c) "Contractor" means the person or persons, partnership, firm or company whose tender for this work has been accepted and includes his or their heirs, executors, administrators and/or successors and any representative of the Contractor appointed in writing for the purpose only of receiving on behalf of the Contractor communications from the Director-General/ Representative/Agent.

1. (1) (d) "Contract Sum" means the sum stated in the articles of agreement.

1. (1) (e) "Department" means the Department of Education and Training of the Government of the Republic of South Africa.

1. (1) (f) "Director-General" means the officer appointed to the post of Director-General: Education and Training and includes any person acting in that capacity as well as any officer to whom any powers vested in the Director-General in terms of these Conditions of Contract have been delegated.

1. (1) (g) "Drawings" means any drawing relating to the Works referred to in this Contract or available to the Contractor at the time of tender or supplied by the Director-General or his Representative/Agent to the Contractor during the construction of the Works and also any working drawing, detail drawing or sketch supplied by the Director-General or his Representative/Agent to the Contractor from time to time.

1. (1) (h) "Final Delivery Certificate" means the document issued by the Representative/Agent confirming that all the known defects have been rectified and that the Works are prima facie in good order and have been accepted.

1. (1) (i) "First Delivery Certificate" means the document issued by the Representative/Agent confirming prima facie completion of the Works or a portion thereof.

1. (1) (j) "Order in Writing" means any printed, typed or writtten document or letter signed by or on behalf of the Representative/Agent and addressed to the Contractor for the purpose of conveying any instructions to the Contractor relating to the Works and the execution thereof.

1. (1) (k) "Representative/Agent" means the person appointed generally or specifically by the Director-General to act on his behalf in regard to certain aspects of the administration and execution of this Contract.

1. (1) (l) "Site" means the land or other place on, under, in or through which the Works are to be executed or carried out and any other land or places provided by the Director-General for the purpose of the Contract.

1. (1) (m) "Specification" means the document referred to in this Contract in which the method of executing the Works and the nature of the materials to be supplied and used are described.

1. (1) (n) "Works" means all the buildings, structures or services (including any omissions, substitutions, additions, alterations and variations thereto) that are to be erected or constructed in terms of this Contract and includes materials or goods wherever the same are being manufactured or prepared, whether the same are on the site or not, and all excavations and other structures and services that are necessary for the execution of the work under this Contract.

1. (2) Words importing the singular also include the plural and vice versa unless the intention of the Contract indicates otherwise.

Drawings, Specifications and Bills of Quantities

2. (1) Within twenty-one days of the date of acceptance of his tender the Contractor shall deposit his Bills of Quantities with the Director-General with all items properly priced, extended and cast in ink. The Director-General shall be at liberty to make such adjustments to individual rates as will eliminate errors, discrepancies or what he considers to be imbalanced rates without altering the Contract Sum.

2. (2) The Drawings, Specification and/or Priced Bills of Quantities and other relevant documentation shall form part of the Contract, shall be signed by the Contractor and shall be retained by the Director-General. The Contractor shall be supplied with an unsigned copy of these documents.

2. (3) The Contractor shall in addition be supplied with two copies of the Drawings, Specification and/or Bills of Quantities, one set of which must at all times be kept on the Site and be accessible to the parties to the Contract and the Representative/Agent and on completion of the Works these documents shall be returned to the Director-General or the Representative/Agent together with any copies made thereof. Where additional copies are reasonably required such copies shall be provided free of charge to the Contractor. No extension of time will be granted as a result of delays resulting from such request for additional copies. These documents shall remain the property of the Director-General and shall be delivered to the Representative/Agent whenever this is requested.

2. (4) Figured dimensions shall be followed in preference to scale.

2. (5) None of the documents hereinbefore mentioned or any information contained therein shall be used for any purpose other than for this Contract. The copyright in these documents vests in the Government.

Contractor's obligations

3. (1) The Contractor shall provide everything necessary for the proper execution of the Works, comply with the provisions of the Contract and Orders in Writing and carry out and complete the Works to the satisfaction of the Representative/Agent, who may from time to time issue further or amended Drawings and/or Orders in Writing.

3. (2) Unless there is an apparent or obvious error in an Order in Writing, the Contractor shall at all times proceed to act on such Order in Writing unless or until such Order is amended or countermanded, so that neither the execution of the Works nor the supply of material or labour is delayed by any difference, controversy or dispute regarding such Order.

3. (3) No objection to the decription or terms of an Order in Writing will be entertained unless lodged in writing with the Representative/Agent within twenty-one days of the date of the Order in Writing.

Contractor's representative

4. The Contractor or his representative, who shall be identified in writing to the Representative/Agent and empowered to act for him, shall constantly be on the Site to receive Orders in Writing and directives from the Representative/Agent and Orders in Writing and directives so given to the Contractor's representative by the Representative/Agent shall be deemed to be given to the Contractor.

Employees to be efficient

5. The Contractor shall employ on the Works only such persons as are efficient and of good character. If in the opinion of the Representative/Agent any person employed by the Contractor misconducts himself, interferes with harmonious labour relations or is likely to cause or has caused quarrels, delays or is incompetent, the Contractor when so directed in writing by the Director-General or his Representative/Agent shall at once remove such person from the Works. Any cost arising under this clause shall be for the account of the Contractor.

Material and Work to conform to Description

6. (1) All material and work shall be as described on the Drawings and in the Specification and/or in the Bills of Quantities.

6. (2) Should any difference or discrepancy between or in such Drawings, Specification and/or Bills of Quantities be detected by the Contractor, it shall be his duty to seek in writing a decision also in writing of the Representative/Agent on the true intent and meaning of the Contract.

6. (3) The Director-General and his Representative/Agent shall at all reasonable times have access to the Works and/or to the workshops or other places where work is being done or material prepared for the Contract and shall have the right to inspect the Works and the Contractor shall afford them every facility for the performance of such duties.

6. (4) The Contractor shall upon the request of the Representative/Agent furnish him with evidence that material and work are in accordance with that described in the Contract.

6. (5) The Contractor shall provide without extra cost all assistance and everything necessary for weighing and measuring of material and work done as may be required by the Representative/Agent.

6. (6) Should the Representative/Agent so require the Contractor shall within fourteen days carry out any test of material and/or work or arrange for such test to be carried out by a person nominated by the Representative/Agent and the cost thereof shall be borne by the Department unless the test shows that the said material and/or workmanship is not in accordance with the Contract, in which case the cost shall be borne by the Contractor.

6. (7) Should the Representative/Agent decide at any time during the construction of the Works or prior to the issue of the First Delivery Certificate that any part of the Works has been executed with material and/or the workmanship is not in accordance with the Contract he may notify the Contractor accordingly in writing and the Contractor shall cause the objectionable material and/or the workmanship to be removed and replaced by material and/or work in accordance with the Contract at his own cost. In the event of the Contractor failing to comply with the instructions of the Representative/Agent within a period of twenty-one days from the date of receipt thereof, the Director-General shall be at liberty forthwith himself to arrange for the removal or replacement of the said material and/or work at the Contractor's cost or to proceed in terms of 24 hereof.

7. Unless otherwise instructed by the Representative/Agent the Contractor shall during the currency of the Contract conform to the provisions of any Act of Parliament and to the regulations and by-laws of any local or other authority relating to the Works and shall give all notices required, and pay all fees payable, to any such authority in respect of the Works and shall hold the Director-General free from all losses, costs, damages or expenses caused by the Contractor failing to comply with such Act of Parliament, regulations and by-laws. In the event of such fees not being paid by the Contractor the Director-General may make payment direct and any such payment and related profit shall be omitted from the Contract and any cost incurred in making direct payment and arrangements connected therewith shall be deducted from payments due to the Contractor or recovered from him.

Setting out of the Works

8. (1) The Representative/Agent shall provide the Contractor with the necessary information to enable him to set out the Works.

8. (2) The Contractor shall provide everything necessary for the setting out of the Works and shall set out the Works.

8. (3) The Contractor shall be responsible for the setting out of the Works and shall rectify at his own cost any error in the work that may arise therefrom.

8. (4) The Contractor shall provide at no extra cost all assistance and everything necessary to enable the Representative/Agent to check the accuracy of the setting out and to this end shall preserve all bench marks, pegs and other aids used in the setting out.

8. (5) The checking of the setting out by the Representative/Agent shall not in any way relieve the Contractor of his responsibility for the accuracy thereof.

Notice of Covering Work

9. The Contractor shall give due notice to the Representative/Agent whenever a portion of the Works is intended to be covered with earth or otherwise in order that the correct dimensions and/or quality may be ascertained before being covered. In default of such notice being received the said Works shall be uncovered when so required at the Contractor's cost.

Material and Goods to be the Property of the Director-General

10. (1) All material and goods delivered on Site shall be deemed to become the absolute property of the Director-General and shall not be removed from the Site or other place of storage referred to in 23 (3) hereof without the prior consent in writing of the Representative/Agent.

10. (2) In the event of the default by the Contractor referred to in 24 hereof the Director-General may use or allow others to use such materials and goods for the completion of the Contract and may retain and/or sell the same in the circumstances set out in 24 (4) and 24 (5) hereof.

10. (3) Subject to the provisions of 24 (4) and 24 (5) hereof, ownership of unused material and goods shall revest in the Contractor upon the issue of the Final Delivery Certificate and he shall remove such material and goods from the Site within twenty-one days of the date of the Certificate, failing which the same may be disposed of by the Director-General forthwith in whatever manner deemed expedient and any costs incurred in so doing shall be deducted from amounts due to the Contractor or shall be recoverable from him.

Plant to be the Property of the Director-General

11. (1) Temporary buildings and plant or equipment of whatever kind (hereinafter referred to collectively as plant) brought onto the Site by the Contractor for the execution of the Works shall be deemed to become the absolute property of the Director-General and shall be subject to use thereof by the Diretor-General or by any other contractor employed to complete the Works or be subject to the retention and/or sale thereof as contemplated in 24 (4) and 24 (5) hereof in the case of default by the Contractor as contemplated in 24 hereof, and shall not be removed from the Site without prior consent in writing of the Representative/Agent.

11. (2) Subject to the provisions of 24 (4) and 24 (5) hereof, ownership of plant shall revest in the Contractor upon the issue of the Final Delivery Certificate for the entire Works and he shall remove such plant within twenty-one days of the date of the Certificate, failing which the same may be disposed of by the Director-General forthwith in whatever manner deemed expedient and any costs incurred in so doing shall be deducted from amounts due to the Contractor or shall be recoverable from him.

Injury to the Works

12. (1) Without in any way limiting his obligations under 3 hereof, the Contractor shall bear the full risk of damage to and/or destruction of the works by whatever cause during construction of the Works and hereby indemnifies and holds harmless the Director-General against any such damage. He shall take such precautions and security measures and other steps for the protection and security of the Works as he may deem necessary.

12. (2) The Contractor shall at all times proceed immediately to remove or dispose of any debris arising from damage to or destruction of the Works and to rebuild, restore, replace and/or repair the Works.

12. (3) The Director-General shall carry the risk of damage to or destruction of the Works and material paid for by the Director-General that is the result, whether direct or indirect or proximate or remote, of—

12. (3) (a) war, invasion, an act of a foreign enemy, hostilities or warlike operations (whether war is declared or not), civil war, mutiny, military rising, insurrection, military or usurped power or martial law or state of siege or any other event or cause that determines the proclamation or maintenance of martial law or a state of siege;

12. (3) (b) any risk or peril only insurable in the Republic of South Africa by means of a political riot insurance policy issued by or on behalf of the South African Special Risks Insurance Association;

12. (3) (c) ionising radiations or contamination by radio-activity from any nuclear waste from the combustion of nuclear fuel;

12. (3) (d) nuclear weapons material;

12. (3) (e) confiscation, nationalisation or requisition or destruction or damage by or under the order of any government de jure or de facto or of any public or local authority; or

12. (3) (f) the design of the Works or temporary Works by the Director-General or by the servants or agents of the Director-General.

12. (4) Where the Director-General bears the risk in terms of this Contract, the Contractor shall, if requested to do so, reinstate any damage or destroyed portions of the Works and the costs of such reinstatement shall be measured and valued in terms of 18 hereof.

Injury to Persons or Property

13. (1) The Contractor shall be liable for and hereby indemnifies the Director-General against any liability, loss, claim or proceeding, whether arising in common law or by Statute, consequent upon personal injuries to or the death of any person whomsoever arising out of or in the course of or caused by the execution of the Works unless due to any act or neglect of the Representative/ Agent or any person for whose actions the Director-General is legally liable.

13. (2) The Contractor shall be liable for and hereby indemnifies the Director-General against any liability, loss, claim or proceeding consequent upon loss of or damage to any moveable, or immmovable or personal property or property contiguous to the Site, whether belonging to or under the control of the Director-General or any other body or person, arising out of or in the course of or by reason of the execution of the Works unless due to any act or neglect of the Representative/Agent or any person for whose actions the Director-General is legally liable. The Contractor shall upon receiving an Order in Writing from the Representative/Agent cause the same to be made good in a perfect and workmanlike manner at his own cost and in default thereof the Director-General shall be entitled to cause it to be made good and to recover the cost thereof from the Contractor or to deduct the same from amounts due to the Contractor as stated in 24 hereof.

13. (3) The Contractor shall be responsible for the protection and safety of such portions of the premises placed under this control by the Director-General for the purpose of executing the Works until the issue of the First Delivery Certificate.

13. (4) Where the execution of the Works involves the risk of removal of or interference with support to adjoining properties including land or structures or any structures to be altered or added to, the Contractor, if requested to do so, shall and will remain adequately insured or insured to the specific limit stated in the Contract against the death of or injury to persons or damage to such property consequent on such removal of or interference with support until such portion of the Works has been completed.

13. (5) The Contractor shall at all times proceed immediately at his own cost to remove or dispose of any debris and to rebuild, restore, replace and/or repair such property and to execute the Works.

Cession or Assignment

14. The Contractor shall not cede or assign this Contract or any portion thereof or any right or obligation thereunder.

Prime Cost Items and Provisional Sums

15. (1) An item containing the words "Prime Cost" (PC) is for goods to be obtained by the Contractor under such conditions as the Representative/Agent shall instruct. Such goods shall be fixed by the Contractor. The Contract Sum shall be adjusted by the omission of the Prime Cost amount and the addition of the sum actually paid by the Contractor for such goods and the fixing thereof.

15. (2) A provisional sum as indicated in the tender documents for work to be performed by a Nominated Sub-contractor or for material to be supplied and fixed shall be expended at such times and in such amounts in favour of such persons as the Representative/Agent shall direct. Such amounts shall be payable by the Contractor or by the Director-General in terms of 16 (5), 16 (6) or 16 (7) hereof as the case may be without discount or deduction (accordingly all provisional sums are net). At the settlement of an account the amount expended shall be set against such provisional sum and the balance shall be added to or deducted from the Contract Sum, as the case may be; provided that no deduction shall be made by or on behalf of the Director-General in respect of any damages paid or allowed by any Nominated Sub-contractor to the Contractor; the intention being that the Contractor and not the Director-General shall have the benefit of any such damages. The Schedule Rates providing for profit and attendance on any provisional sum shall be adjusted on a value pro-rata basis.

15. (3) Without prejudice to the right of the Director-General to reject the lowest or any tender or quotation, the Contractor shall be permitted to tender or quote for any work for which a provisional sum has been provided where the Contractor in the ordinary course of his business directly carries out work of the nature specified.

15. (4) Material to be supplied and fixed or work to be performed by the Contractor for which a provisional sum has been included in the Contract shall be valued as provided for in 18 hereof and paid as provided for in 23 hereof.

Nominated Sub-contractors

16. (1) The Director-General may nominate a sub-contractor to execute work or supply or fix goods and such Sub-contractor shall hereinafter be referred to as a "Nominated Sub-contractor".

16. (2) The fact that the Director-General has nominated a Sub-contractor shall not create privity of contract between the Director-General and such Nominated Sub-contractor.

16. (3) The Contractor shall at any time on being requested to do so by the Director-General enter into a contract with a Nominated Sub-contractor within fourteen days of such request in respect of the work for which he has been nominated, in which contract the Contractor shall, inter alia, secure mutatis mutandis for himself the same rights that the Director-General has in terms of this Contract. If the Contractor satisfies the Director-General in writing that he is unable to enter into such a contract because—

16. (3) (a) he has an objection which is acceptable to the Director-General against such Nominated Sub-contractor;

16. (3) (b) a Nominated Sub-contractor declines to enter into a contract with the Contractor whereby he undertakes the obligations set out above; or

16. (3) (c) a Nominated Sub-contractor declines to save harmless and indemnify the Contractor against any negligence on the part of such Nominated Sub-contractor, his agents, workmen and servants or against any misuse by him or them of any materials or plant being the property of the Contractor and against all claims as aforesaid or any claim under the Workmen's Compensation Act, 1941, as amended,

the Director-General shall be entitled to nominate another Nominated Sub-contractor.

16. (4) The Contractor furthermore undertakes—

16. (4) (a) as against the Director-General, to carry out his obligations to the Nominated Sub-contractor under the Nominated Sub-contract and to co-ordinate the Nominated Sub-contractor's work and the work under the main contract and to ensure that the Nominated Sub-contractor carries out and completes the work under such sub-contract to the Director-General's satisfaction;

16. (4) (b) in case of default by the Nominated Sub-contractor, to take steps against the Nominated Sub-contractor similar to those set out in 24 hereof if and as requested to do so by the Director-General or, if requested to do so by the Director-General, to cede to the Director-General any rights that the Contractor may have against such Nominated Sub-contractor arising from such default;

16. (4) (c) to institute action against the Nominated Sub-contractor to enforce compliance by the Nominated Sub-contractor with such sub-contract or to claim damages for non-compliance or breach of such sub-contract or to take such other steps or to claim such other sums as may be taken or may be claimable under or arising from non-compliance or breach of such

sub-contracts or from any indemnities given by the Nominated Sub-contractor to the Contractor, if requested to do so by the Director-General or, if requested to do so by the Director-General, to cede to the Director-General any rights that the Contractor may have against such Nominated Sub-contractor arising from such non-compliance or breach;

16. (4) (d) if requested to do so by the Director-General, to apply for the sequestration of the Nominated Sub-contractor's estate (or for the liquidation thereof in the case of a company), to prove claims against such estate and to take all such steps as may be necessary for the recovery of amounts due under or arising from such sub-contracts or any indemnities given or, if requested to do so by the Director-General, to cede to the Director-General any rights that the Contractor may have against such Nominated Sub-contractor;

16. (4) (e) in the event of the liquidation or sequestration, as the case may be, of the Nominated Sub-contractor's estate or the abandonment by him of his contract or of the termination of such contract, to enter into a contract with another contractor nominated by the Director-General to complete the work under such first mentioned contract; and further agrees that all the provisions of this Contract shall apply *mutatis mutandis* with equal force to such fresh or any substituted nominated sub-contracts;

16. (4) (f) to advise the Director-General immediately in the case of the sequestration of the estate of the Nominated Sub-contractor (or of its liquidation, in the case of a company) or of any breach of contract by such Nominated Sub-contractor or of his failure to pay any damages or the amounts due under or arising from such sub-contracts and of the steps he proposes to take to carry out his obligations as set out above;

16. (4) (g) that his failure to carry out any of his obligations under 16 hereof shall constitute a default as contemplated under 24 hereof and that the Director-General shall be entitled to exercise the rights therein set out and, in addition thereto, to claim from the Contractor any damage, loss or costs that the Director-General may suffer as a result of such failure, to determine such damage, loss or costs and to deduct the same from any amounts due to the Contractor under this Contract or any other contract heretofore or hereafter entered into between the Government and the Contractor.

16. (5) Payment shall be made to a Nominated Sub-contractor by the Contractor within seven days of his receipt of a progress payment under 23 hereof which includes the value of such Nominated Sub-contractor's work.

16. (6) Before any progress payment certificate is issued to the Contractor, he shall, if so requested by the Representative/Agent, furnish proof that the amount included in a previous payment in respect of a Nominated Sub-contractor's work has been paid to the Nominated Sub-contractor. In default thereof the Director-General may make a direct payment of such amount to such Nominated Sub-contractor and deduct the amount so paid from payments due to the Contractor. The exercise of this power shall not create privity of contract as between the Director-General and a Nominated Sub-contractor.

16. (7) Should the Director-General require the Contractor to make final payment to a Nominated Sub-contractor before final payment is due to the Contractor and the Nominated Sub-contractor has indemnified the Contractor against damage due to any defects or breach of contract on the part of such nominated Sub-contractor, the Director-General may include an amount to cover such final payment in a certificate issued under 23 hereof whereupon the Contractor, after having paid the Nominated Sub-contractor, shall be discharged from all liability for the work performed and material supplied by the Nominated Sub-contractor except for such damage due to defects or breach of contract, which damages shall be recoverable by the Contractor from the Nominated Sub-contractor. Should such final payment be made to a Nominated Sub-contractor the retention money stated in 23 hereof shall be reduced accordingly.

16. (8) Should a Nominated Sub-contractor have undertaken a continuing obligation in respect of work executed or supplying and/or fixing any goods or if there are rights that must be enforced against the Nominated Sub-contractor in terms of 16 hereof which obligation or rights extend beyond the contract completion date, or if there are other rights that must be enforced against the Nominated Sub-contractor after the contractual completion date, then the Contractor's right to enforce such undertaking or such other rights against the Nominated Sub-contractor after such date may be ceded to the Director-General and the Contractor shall thereupon be released from any further obligation, responsibility and liability to the Director-General, but in all other respects the Conditions of Contract shall apply.

Facilities to other Contractors

17. The Contractor shall permit the execution of work not provided for in this Contract by, and shall give all facilities necessary and proper to, and shall co-ordinate his work with that of, any other contractor engaged by the Director-General or workmen employed by the Director-General whose work may adjoin or be connected with the Works and in the event of there being any dispute in this regard the decision of the Representative/Agent in the matter shall be final.

Variations

18. (1) No variations, additions, omissions and substitutions whatsoever by the Director-General shall vitiate this Contract.

18. (2) Variations to the Contract to a limit of 20 % of the Contract Sum calculated as a mathematical percentage, shall be valued as follows:

18. (2) (a) Where a variation comprises work that is of the same or similar character executed under the same or similar conditions as those to which Schedule Rates apply, it shall be valued at such rates.

18. (2) (b) Where a variation comprises work that is not of the same or similar character executed under the same or similar conditions as those to which the Schedule Rates apply, it shall be valued by the Representative/Agent at rates that he considers to be fair in relation to the general pricing structure of this Contract.

18. (2) (c) Schedule Rates shall determine the value of work omitted within the limit set out above.

18. (3) If variations to the Contract cause the said limit of 20 % to be exceeded and the method of valuing the work as set out in 18 (2) (a) and 18 (2) (b) hereof is not acceptable to the Contractor, he shall have the right, within twenty-one days of the date on which such Order in Writing was issued, to apply to the Representative/Agent to have new rates for the work in excess of the said 20 % determined. The whole of the variation which caused the said limit of 20 % to be exceeded and subsequent variations shall be valued as set out above. If the Contractor fails so to apply, the provisions of 18 (2) hereof shall apply.

18. (4) Schedule Rate shall determine the value of the work omitted in excess of the said limit of 20 % and an amount, not exceeding 10 % of the value of such excess, as determined by the Director-General shall be paid to the Contractor after receipt by the Director-General of evidence substantiating any damage and/or loss of profit suffered by him as a result of such omissions. Save for the above, the Contractor shall not be entitled to claim any other amounts whatsoever in respect of such omissions.

18. (5) If compliance with an Order in Writing involves the Contractor in costs not provided for in 18 (2) (a), 18 (2) (b) and 18 (3) hereof then, unless such Order was issued owing to some breach of this Contract by the Contractor, such costs shall be ascertained and determined by the Director-General upon receipt from the Contractor of evidence substantiating such costs, and the amount so determined shall be paid to the Contractor. The Contractor shall give notice of such costs and full particulars thereof within twenty-one days of the date of such Order in Writing, failing which he shall be debarred from claiming any further amounts in respect of work done under such Order in Writing.

18. (6) No claim for any extra or for any addition or for any variation shall be entertained unless such extra, addition or variation was ordered in writing by the Representative/Agent. No objection to the description or terms of an Order in Writing will be entertained unless lodged in writing with the Representative/Agent within twenty-one days of the date of the Order.

Daywork

19. Work that cannot be measured and valued shall be charged as daywork. Only the Director-General may decide that the Contractor shall carry out an Order in Writing on the basis of daywork, and then the following shall apply:

19. (a) Payment shall be made on the net value of all material used plus 10 % thereon together with direct labour cost incurred plus 33⅓ % thereon. Labour cost shall specifically exclude persons administratively employed in the Contractor's organisation.

19. (b) The percentages provided for under 19 (a) hereof as well as the adjustment of the amount in respect of Preliminaries in terms of the Bills of Quantities shall be deemed to cover the Contractor's supervision, profit and the use of all plant normally on the site inclusive of tools, equipment, etc., necessary for the performance of the work.

19. (c) Other direct costs that the Representative/Agent considers reasonably incurred and the net cost of plant other than that referred to in 19 (b) hereof, brought onto the Site with the approval of the Representative/Agent shall be allowed to the Contractor.

19. (d) The Contractor shall submit to the Representative/Agent fortnightly a fully detailed account in duplicate of labour, material and other direct costs one signed copy of which shall be returned to the Contractor which he shall furnish in terms of 23 (4) hereof. In the event of such account not being submitted the work shall be valued by the Representative/Agent at rates which he considers to be fair in relation to the general pricing structure of the Contract.

Commencement and Completion

20. (1) Time is considered to be the essence of the Contract.

20. (2) The contract period stated in the tender documents shall commence from the date of the letter of acceptance of the tender and shall include all statutory and building industry holidays.

20. (3) The Site shall be handed over to the Contractor within fourteen days after he has complied with the conditions of tender relating to security and the submission of priced Bills of Quantities, if applicable. After the Site has been handed to the Contractor he shall forthwith deliver his plant and material and shall proceed with due diligence and complete the Contract to the satisfaction of the Representative/Agent within the period stated in 20 (2) hereof. Should he fail to deliver his plant and material and to proceed as stated above within twenty-one days of the Site being handed over to him, or should he fail to complete the Contract within the contract period, he shall be considered to be in default and the provisions of 24 hereof may be applied.

20. (4) If the Works are delayed by variations, omissions, additions, substitutions or organised work stoppages by any workmen not due to any action on the part of the Contractor, exceptionally inclement weather, any substantial increase in provisional quantities, or any other cause beyond the Contractor's control including delays caused by the Director-General or his Representative/ Agent referred to in 25 hereof, then the Contractor shall be entitled to apply in writing within twenty-one days of the cause of delay arising to the Director-General through the Representative/Agent for extension of the contract period stating the cause of delay and period of extension applied for.

20. (5) Upon receipt of such written application the Director-General may in writing extend the contract period by a period to be determined by him or may refuse to extend the contract period or may delay giving a decision until after completion of the Contract. Any decision given by the Director-General shall be final and binding on the parties.

20. (6) Should the Contractor fail to apply in writing for an extension of the contract period within the said twenty-one days or should the Director-General not grant an extension of the contract period then the contract period referred to in 20 (2) hereof shall not be exceeded nor the Contractor exonerated from liability to pay the penalty stipulated in 24 (2) (a) or 24 (3) (a) hereof or from specific performance of the Works in every respect within the period specified in 20 (2) as read with 20 (5) hereof.

First and Final Delivery

21. (1) The Contractor shall deliver to the Representative/Agent the Works and premises when completed in a clean and perfect state internally and externally, fit for occupation and complete in every particular. When the Works are, in the opinion of the Representative/Agent, so completed the Representative/Agent will issue a First Delivery Certificate.

21. (2) The Final Delivery Certificate will be issued three months after the date of the First Delivery Certificate provided that if defects referred to in 22 (1) hereof, have occurred during this period which are rectified after such period of three months, the Final Delivery Certificate will be issued after the rectification of all such defects.

21. (3) When by arrangement with the Representative/Agent a completed portion of the Works is handed over, the Representative/Agent shall issue a First Delivery Certificate in respect of that portion of the Works and all relevant clauses shall apply *mutatis mutandis* with the exception of 23 (2) (e) (iv) hereof.

21. (4) Neither the First nor the Final Delivery Certificate shall in itself be conclusive evidence that the work, or any material or goods to which it relates, is being or has been executed in accordance with this Contract.

Contractor's Liability in respect of defects

22. (1) Any defects or faults which may appear within three months from the completion of the Works or part thereof due to materials or workmanship not being in accordance with the Contract shall be made good by the Contractor within such period as may be determined by the Representative/ Agent or the Director-General in written instructions to do so.

22. (2) Should the Contractor fail to rectify the defects or faults referred to in 22 (1) hereof, the Director-General shall, without prejudice to any other rights that he may have, be entitled himself to rectify such defects or faults or to arrange for the rectification thereof and to recover from the Contractor any damages that the Director-General may have suffered as a result of the Contractor's failure to carry out the terms of the Contract.

22. (3) The above provisions shall not deprive the Director-General of any rights that he may have in regard to defects and faults that may appear after the aforesaid period of three months.

Payment

23. (1) The Contractor shall be given the opportunity to be present on the Site when notes and measurements are taken for the preparation of progress payment certificates and for the preparation of the final account.

23. (2) (a) The Contractor shall be entitled to receive a monthly progress payment which shall be based on a progress payment certificate issued by the Representative/Agent. The amount stipulated for payment in such progress payment certificate shall be due and payable to the Contractor within twenty-one days of the date of such certificate. Such payment, if less than R1 000, shall be included for payment in the next progress payment certificate.

23. (2) (b) (i) Each progress payment shall be based on a reasonable estimate of the value of the work which in the opinion of the Representative/Agent has been satisfactorily executed and on the value of materials and/or goods as provided for under 23 (3) hereof less the amount retained in terms of 23 (2) (e) hereof and amounts previously paid or otherwise expended as provided for in or arising out of this Contract including any amounts erroneously paid by the Director-General for whatever reason in connection with this Contract: Such valuation shall be based upon the pricing structure of the Contract.

23. (2) (b) (ii) In addition an amount shall be allocated in respect of Preliminaries in the same ratio as that which the value of the work satisfactorily executed bears to the Contract Sum less contingencies and Preliminaries.

23. (2) (c) (i) Any payment shall be regarded as an open payment and shall be subject to revision and adjustment by the Representative/Agent at any time if he is of the opinion that a previous payment was not due or payable or was erroneously made for whatever reason.

23. (2) (c) (ii) No payment certificate shall in itself be conclusive evidence that any work or material or goods to which it relates is in accordance with this Contract or that any amounts reflected therein are due or payable to the Contractor.

23. (2) (d) (i) On request by the Contractor amounts making up a payment certificate will be provided in respect of work carried out under the various trades on the explicit understanding that the Director-General will accept no responsibility or liability should the value of work shown against any trade be in any way incorrect.

23. (2) (d) (ii) Notwithstanding the foregoing the amount payable to a Nominated Sub-contractor will in all cases be shown separately on any payment certificate.

23. (2) (e) An amount hereinafter referred to as retention money shall be retained from each progress payment and such amount shall be determined as follows:

23. (2) (e) (i) 10 % of all moneys due to the Contractor in terms of 23 (2) (b) hereof until such time as the amount retained equals 5 % of the Contract Sum;

23. (2) (e) (ii) on issue of the First Delivery Certificate two fifths ($^2/_5$) of the retention money shall be released to the Contractor;

23. (2) (e) (iii) on acceptance of the final account by the Contractor in accordance with 23 (4) hereof or on the issue of the Final Delivery Certificate whichever occurs first a further two fifths ($^2/_5$) of the retention money shall be released to the Contractor; and

23. (2) (e) (iv) the balance of the retention money shall become payable when the outstanding event referred to in 23 (2) (e) (iii) hereof has been complied with.

23. (2) (f) (i) Upon the issue of the First Delivery Certificate for a portion of the Works two fifths ($^2/_5$) of the retention money in respect of that portion of the Works shall be released as provided for in 23 (2) (e) (ii) hereof.

23. (2) (f) (ii) Upon the issue of the Final Delivery Certificate for a portion of the Works, a further two fifths ($^2/_5$) of the retention money in respect of that portion of the Works shall be released as provided for in 23 (2) (e) (iii) hereof.

23. (2) (f) (iii) The balance of the retention money as provided for in 23 (2) (e) (iv) hereof shall not be released in respect of a portion of the Contract.

23. (3) (a) Subject to the provisions of 6 (1), 10 and 23 (2) (e) hereof, the Representative/Agent shall authorise payment to be made to the Contractor in respect of expenditure on material and goods which are intended to form part of the Works and which have been proved to be the property of the Contractor and delivered on Site to the value thereof as determined by the Representative/Agent: Provided that such advance shall only be made if the material and goods are in the opinion of the Representative/Agent reasonably, properly and not prematurely brought onto the Site and are adequately stored and protected.

23. (3) (b) Should it be impossible to deliver such material and/or goods to the Site an advance may only be made at the sole discretion of the Director-General, provided that the following additional requirements are met:

23. (3) (b) (i) The material and goods shall be marked for identification purposes;

23. (3) (b) (ii) the material and goods shall be insured by means of an all risks policy to their full value, and

23. (3) (b) (iii) all costs arising from such insurance and storage and other charges, including protection from injury or damage due to any cause, shall be for the Contractor's account.

23. (4) After the completion of the Works a final account shall be prepared by the Representative/Agent and all relevant documents, including documents relating to the accounts of Nominated Sub-contractors, shall be furnished to the Representative/Agent by the Contractor and he shall provide all assistance necessary for the compilation of the final account. The Contractor shall be supplied with a copy of the final account which shall be returned to the Director-General duly signed by the Contractor. Should the Contractor within three months from the date of issue of the final account fail to object to the contents of the final account, giving full details of such objection, or fail to sign the final account, he shall be deemed to have accepted the final account. Payment shall thereafter be made to the party entitled to any amount due in terms of the final account. If any amount is due in terms of the final account to the Director-General, the Director-General shall be entitled in addition to any other rights that it may have to deduct the same from any amounts due or to become due by the Director-General to the Contractor under any other contract heretofore or hereafter entered into between them.

23. (5) The Contractor hereby undertakes not to cede his right or claim to any money due or to become due under this Contract and no such cession will be recognised by the Director-General.

Default by Contractor

24. (1) The Contract shall be in default if he—

24. (1) (a) fails to commence with the Works as prescribed in 20 (3) hereof, or

24. (1) (b) fails to proceed with the Works with due diligence or to complete the Works within the contract period or any extension thereof, or

24. (1) (c) stops, abandons or suspends the Works before completion, or

24. (1) (d) fails to comply with any of the provisions of 16 hereof, or

24. (1) (e) refuses or neglects to comply strictly with any of the conditions of this Contract or any instructions and/or Orders in Writing given in terms of the Contract.

24. (2) Should the Contractor be in default as provided for in 24 (1) hereof and he has furnished unlimited security by means of two or more sureties, the Director-General shall have the right to adopt, without prejudice to any other rights available to him, from time to time all or any one or more of the following courses, either wholly or partly, or by way of substitution or succession:

24. (2) (a) To allow the Contractor to proceed with the Works and to recover the penalty per day stated in the tender documents for each day on which the completion of the Works may be in arrear as provided for in 20 hereof. Such penalty may be recovered or may be deducted as from the day following the date of completion stated in the Contract, or any extension thereof, from any payment due or to become due under this or any other contract heretofore or hereafter entered into between the Contractor and the Government and/or the sureties and the Government, or

24. (2) (b) to instruct the Contractor in writing to discontinue the Works on a date stated and to withdraw himself from the Site. The Contractor shall not be entitled to refuse to withdraw from the Works on the grounds of any lien or right of retention or on the grounds of any other right whatsoever. The Director-General shall thereupon call upon the sureties mentioned in 24 (2) hereof in writing to complete the Works in terms of the Contract. Should the sureties after twenty-one days from the date of the said notice be in default as provided for in 24 (1) hereof the Director-General may thereupon—

24. (2) (b) (i) cancel the Contract and enter into a further contract or contracts by calling for tenders or otherwise with any other contractor or contractors for the completion of the Works or any part thereof, at such times and upon such terms as the Director-General shall deem fit; and/or

24. (2) (b) (ii) provide such number of men and/or purchase such material as the Director-General shall deem fit to complete the Works.

24. (2) (c) If the cost of completing the Works by the sureties, by another contractor, or by the Director-General, as the case may be, exceeds the amount still due under the Contract, if any, and the amount of any penalty, if any, the Director-General may, without prejudice to any other rights he may have, recover such excess from the Contractor and/or the Sureties. The Director-General shall be entitled to deduct such excess from any amounts still due under this Contract or any other contract heretofore or hereafter existing between the Contractor and the Government or his sureties and the Government and for this purpose all these contracts shall be considered an indivisible whole. The Contractor hereby agrees and binds himself, his successors in title or his trustees (or his liquidator) not in any way to dispute the right so to deduct. If the sureties complete the Works as aforesaid, the Director-General shall be entitled to pay to such sureties all amounts due and payable under the Contract (e.g. for work done by the Contractor, retention moneys, etc.). If the Contract is cancelled the Director-General may make an assessment of the cost of completing the Works and deduct such assessed amount from any of the aforesaid amounts that may be due to the Contractor. If it later appears that the actual cost of completing the Works is less than the assessed amount, such excess shall be refunded to the Contractor.

24. (3) Should the Contractor be in default as provided for in 24 (1) hereof and he has furnished security for completion of the Contract by means of a cash deposit or a guarantee, the Director-General shall have the right to adopt, without prejudice to any other rights available to him, from time to time all or any one or more of the following courses, either wholly or partly, or by way of substitution or succession:

24. (3) (a) To allow the Contractor to proceed with the Works and to deduct the penalty per day stated in the tender documents for each day on which the completion of the Works may be in arrear as provided for in 20 hereof. Such penalty may be recovered or may be deducted as from the day following the date for completion stated in the Contract, or any extension thereof, from any payment due or to become due under this or any other contract heretofore or hereafter entered into between the Contractor and the Government; or

24. (3) (b) to cancel the Contract and instruct the Contractor in writing to discontinue the Works on a date stated and to withdraw himself from the Site. The Contractor shall not be entitled to refuse to withdraw from the Works on the grounds of any lien or a right of retention or on the grounds of any right whatsoever.

The Director-General shall thereupon—

24. (3) (b) (i) enter into a further contract or contracts by calling for tenders or otherwise with any other contractor or contractors for the completion of the Works, or any part thereof, at such times and upon such terms as the Director-General shall deem fit; and/or

24. (3) (b) (ii) provide such number of men and/or purchase such material as the Diretor-General shall deem fit to complete the Works.

24. (3) (c) If the cost of completing the Works by another contractor or the Director-General, as the case may be, exceeds the amount still due under the Contract, if any, and the amount of the penalty, if any, the Director-General may without prejudice to any other rights he may have, recover such excess from the Contractor and/or the cash deposit or guarantee. The Director-General shall also be entitled to deduct such excess from any amounts still due under this Contract or under any other contract heretofore or hereafter existing between the Contractor and the Government and for this purpose all these contracts shall be considered one indivisible whole. The Contractor hereby agrees and binds himself, his successors in title, or trustees (or his liquidator) not in any way to dispute the right so to deduct. If the Contract is cancelled the Director-General may make an assessment of the cost of completing the Works and deduct such assessed amount from any of the aforesaid amounts that may be due to the Contractor. If it later appears that the actual cost of completing the Works is less than the assessed amount, such excess shall be refunded to the Contractor.

24. (4) In applying the provisions of 24 (2) and 24 (3) hereof, the Director-General may use or allow others to use such materials, goods and plant referred to in 10 and 11 hereof for the completion of the Contract.

24. (5) The Director-General shall in addition have the right to retain on completion of the Works all or any portion of unused material and/or goods referred to in 10 hereof as well as all or any portion of the plant referred to in 11 hereof, and have the right to sell the same, to recover any amount due to the Director-General and to apply the proceeds in satisfaction of any claim under this Contract. Such retention or right to sell shall in no way invalidate or effect the right of the Director-General to institute action for any amount due and payable by the Contractor or his sureties.

Delays by Director-General

25. (1) Any dislocation or delay in the execution of the Works caused by the Director-General or his Representative/Agent or for which he can be held liable in respect of his or their duties under this Contract or any delay caused as a result of an order by the Director-General to stop the work, or a part thereof, shall not vitiate or affect the Contract, or any part thereof, but if the Contractor intends holding the Director-General liable for any loss or damage caused by such dislocation or delay he shall immediately but in any event not later than forty-eight hours (excluding weekends, statutory and building industry holidays) after the commencement of such dislocation or delay notify the Representative/Agent of such dislocation or delay and the Contractor shall within twenty-one days of the dislocation or delay ceasing notify the Representative/Agent of any claim for extra time and or extra payment claimed, if any. If the Contractor does not comply with the foregoing he shall forfeit his right to claim for such dislocation or delay. In addition, failure on the part of the Contractor to give the Representative/Agent timely warning in writing of an impending dislocation or delay where such dislocation or delay could reasonably have been foreseen will debar him from claiming under this clause.

25. (2) The Director-General shall within a reasonable time advise the Contractor of his decision on a claim submitted in terms of 25 (1) hereof.

Sequestration, liquidation, insolvency and judicial management

26. If application is made for the sequestration of the Contractor's estate or, if it is a Company for the liquidation thereof, or if the Contractor lodges with the Registrar of the Supreme Court an application for the placing of his estate under judicial management, or if he approaches the creditors to make an assignment of his estate for the benefit of his Creditors or submits an offer of compromise or scheme of arrangement in terms of the Insolvency or Company Laws in force in the Republic of South Africa other than for the purpose of a scheme of reconstruction, then the Contract may be terminated by the Director-General and the Director-General shall be at liberty without prejudice to any other rights he may have, to act as provided for by one or other of the courses set out in clause 24 of these conditions and in addition to make an estimate of any damage that may be suffered by reason of such termination and to deduct such estimated amount from any amounts that may be or become due and payable to the Contractor under this or any other contract heretofore or hereafter entered into between the Government and the Contractor. If it subsequently appears that the assessed amount of such damage was more than the actual amount of such damage, the excess shall be refunded to the trustee in the estate of the Contractor. If the actual amount of the damage subsequently appears to be more than the amount so estimated, the difference may be recovered by the Director-General from the Contractor's insolvent estate.

Disputes

27. (1) Should any dispute or difference arise between the Representative/Agent or the Director-General and the Contractor as to any matter relating to the meaning of or arising out of the Contract the Director-General shall have the option of dealing with the claim directly to determine such dispute or difference by a written decision given to the Contractor. The said decision shall be final and binding on the parties unless the Contractor within twenty-one days of the receipt thereof by written notice to the Director-General rejects the same.

27. (2) Should the Contractor not accept the decision of the Director-General the Contractor shall be entitled to have recourse to the courts of law of the Republic of South Africa provided that any action to be instituted under this clause shall be commenced and process served within six months of the date of the aforesaid decision.

Cancelation by Director-General

28. The Director-General shall be entitled at any time to terminate or cancel the Contract or any part thereof unilaterally and in such case shall be obliged to pay the Contractor as damages and/or loss of profit an amount not exceeding 10 % of the Contract Sum or 10 % of the value of incomplete work or his actual damage or loss as determined by the Director-General after receipt by him of evidence substantiating any such damage and/or loss suffered by the Contractor, whichever is the lesser. Save for the above the Contractor shall not be entitled to claim any other amounts whatsoever in respect of such termination or cancellation of the Contract.

Amendment of Conditions of Contract

29. No modification or amendment of these Conditions of Contract shall be binding on either party unless it is in writing and signed by the Director-General and the Contractor. Any waiver of this requirement must also be in writing.

Witnesses:

(1) .... *Contractor*

(2) .....

Witnesses:

(1) .... *Director-General: Education and Training*

(2) .....

APPENDIX K:

List of proformas issued to consultants

UPDATED: 10-01-95

INDEX:
PRO-FORMAS FOR PRIVATE CONSULTANTS

APPENDIX L:

Example of typical schedule of accommodation format

"ANNEXURE "

DEPARTMENT OF EDUCATION
EX DET COMPONENT

PLANNING: SECONDARY SCHOOLS

SCHOOL:	Mohaladitoe	B NUMBER: B25913-6	
SUBURB:	Sebokeng	COMPLETE NEW SCHOOL	
AREA:	Vereeniging	FIRST PHASE(S)	X
PROVINCE:	Gauteng	SUBSEQUENT PHASES	
		ADDITIONS	

ANTICIPATED NUMBER OF PUPILS: 1000

1. The project must be planned in its entirety. That includes the buildings as well as the development of sport and recreational facilities, roads, parking, additional site layout and the provision of services (The school hall is only to be indicated on the site plan as a future extension).

2. A proposed accommodation schedule in terms of all the assignable spaces sufficient for the educational requirements, is shown on pages B2 to B8. Apart from the assignable spaces the following NON ASSIGNABLE SPACES are to be provided as well:
   * Entrance halls, passage ways, covered walkways and other areas of circulation as deemed required.
   * Toilets (separate for staff and pupils) in accordance with the local health authorities and bylaws.
   * Store rooms for cleaning material (approximately five of 3m² each distributed through the school).

3. The following documentation must be presented simultaneously with the drawings:

   3.1 An accommodation schedule indicating the area of each new space as shown on the drawings. A maximum deviation of 10% from the proposed accommodation schedule of the Department is allowed in terms of individual spaces.

   The TOTAL assignable space (hall excluded) is not to exceed the proposed 2786m². Spaces are to be indicated in the same sequence as those in the proposed accommodation schedule.

"ANNEXURE "

3.2 A cost estimate of the project namely:

3.2.1 An estimate of the cost of the buildings and all professional fees. The Standard cost units for this section is not to exceed 2065.

3.2.2 An estimate for the cost of the development of the site which includes sport and recreational facilities, roads, parking, additional site layout and the provision of services. The Standard cost units for this section are not to exceed 296.

Sport and recreational facilities are only to be developed out of surplus SCU's subsequent to the conclusion of all crucial site works. It may thus happen that no sport facilities may be developed.

4. If the project involves the erection of PHASE ONE of a complete school only the requirements of the first phase are to be indicated. ASM's and SCU's is only relevant to PHASE ONE. Subsequent phases are managed in a similar manner and as separate projects with the exception that the positioning of subsequent phases are already indicated on the sketch plans and that the basic preparation of the site has probably already been completed during the first phase. Any subsequent phases are usually launched after a few years after the completion of the first phase as new projects.

This project consists of:

4.1	A COMPLETE NEW SECONDARY SCHOOL	
4.2	ADDITIONS TO AN EXISTING SECONDARY SCHOOL	
4.3	THE FIRST PHASE(S) OF A NEW SECONDARY SCHOOL	X
4.4	SUBSEQUENT PHASES OF AN EXISTING SECONDARY SCHOOL	

"ANNEXURE "

PROPOSED ACCOMMODATION SCHEDULE

1. The building complex is divided into the following blocks:

C : Classrooms	A : Administration
L : Laboratories/multi purpose/centres	S : Services block
M : Media Centres	C : Caretaker's cottage
W : Workshops	H : Hostel

2. The block in which each locale is situated is indicated in the following columns.

3. More information is supplied in the general manual regarding locales indicated with a (*).

ASSIGNABLE SPACES

1. EDUCATIONAL FACILITIES

1.1 Instruction areas

	Block	Area	No.	ASM	(*)
Ordinary classrooms	K	50m²	34	1700	
Music room (general purpose)	L	75	-	0	
Music centre	L	110	-	0	
Art centre	L	110	-	0	
Typing centre (general purpose)	L	75	-	0	
Drawing room (general purpose)	L	75	-	0	
Cookery centre	L	100		0	
Needlework centre	L	100		0	
Woodworking centre	L	150	-	0	
Workshop (elementary techniques)	W	100	-	0	
Workshop (Electronics)	W	75	-	0	
Workshop (Electrical)	W	140	-	0	
Workshop (Fitting and turning)	W	210	-	0	
Workshop (Woodwork)	W	210	-	0	
Workshop (Motor mechanic)	W	140	-	0	
Workshop (Welding and Metal)	W	140	-	0	
Workshop (Plumbing)	W	140	-	0	
Workshop (Panel beating)	W	140	-	0	
Workshop (Bricklaying)	W	140	-	0	

"ANNEXURE "

	Block	Area	No.	ASM	(*)
General Science (Demo Lab)	L	75	-	0	
General Science (General purpose)	L	75	2	150	
Physical Science (Demo Lab)	L	75	1	75	
Biology (Laboratory)	L	75	2	150	
History & Geography (General purpose)	L	75	-	0	
History (General purpose)	L	75	-	0	
Geography (General purpose)	L	75	-	0	
Total: Instruction areas			**39**	**2075**	

1.2 Educational support areas

	Block	Area	No.	ASM	(*)
Mathematics store	K	12m²	-	0	
General store	K	25	4	100	
Resources centre for Demo Labs	L	25	1	25	
General Science store	L	25	-	0	
Biology store (now obsolete)	L	25	1	25	
History store (now obsolete)	L	25	-	0	
Geography store (now obsolete)	L	25	-	0	
Gymnastics store	D	25	1	25	
Garden store	D	25	1	25	
Magazine (for workshops)	W	35	-	0	
Total: Support areas				**200**	

SUBTOTAL: EDUCATIONAL FACILITIES 2275

"ANNEXURE "

2. ACADEMIC SUPPORT SERVICES

2.1 Media centre (optional)

	Block	Area	No.	ASM	(*)
Exhibition and study areas	M	106m²	1	106	
Entrance foyer	M	12	1	12	
Workroom	M	22	1	22	
TOTAL: Media centre				**140**	

2.2 Educational media services

	Block	Area	No.	ASM	(*)
Audio visual store	M	25m²	1	25	
TOTAL: Educational media services					**25**

2.3 Supplementary support services

	Block	Area	No.	ASM	(*)
Duplicating room (Day school)	A	6m²	1	6	
Duplicating room (Adulte ducation)	A	14	-	0	
TOTAL: Supplementary support services				**6**	

2.4 Academic Administration

	Block	Area	No.	ASM	(*)
Head of Department Offices	K	10m²	4	40	
Head of Department Offices	L	10	-	0	
Head of Department Work room	K	15	4	60	
Book Store	K	25	1	25	
TOTAL: Academic Administration				**125**	

SUBTOTAL: EDUCATIONAL FACILITIES 2275

"ANNEXURE "

3. PUPIL SERVICES

3.1 Social and Cultural development

A school hall of 750m² is to be indicated on the site plan as a future extension.

3.2 Career Guidance

	Block	Area	No.	ASM	(*)
Guidance office	K	15m²	-	0	
TOTAL: Career guidance				**0**	

3.3 Pupil Health Services

	Block	Area	No.	ASM	(*)
Sick Rooms (2 @ 7,5m² each)	A	15m²	1	15	
TOTAL: Pupil Health Services				**15**	

SUBTOTAL: PUPIL SERVICES	**15**

4. INSTITUTIONAL SUPPORT

4.1 Top management

	Block	Area	No.	ASM	(*)
Day school					
Principal's office	A	24m²	1	24	
Vice principal's office	A	14	1	14	
Toilet for visitors	A	2	-	0	

"ANNEXURE "

	Block	Area	No.	ASM	(*)
Adult Education					
Principal's office	A	24m²	1	24	
TOTAL: Main management				**38**	

4.2 General Administration

	Block	Area	No.	ASM	(*)
Day school					
Reception	A	10m²	1	10	
Admin. office	A	24	1	24	
Admin. store	A	12	1	12	
Strong room	A	4	1	4	
Head of Department office	A	10	-	0	
Adult Education					
Reception	A	10m²	-	0	
Admin. store	A	15	-	0	
Strong room	A	10	-	0	
Head of Department office	A	16	-	0	
TOTAL: General Administration				**50**	

SUBTOTAL: INSTITUTIONAL SUPPORT 88

5. MANAGEMENT OF PHYSICAL FACILITIES

	Block	Area	No.	ASM	(*)
Workshop for Factotum	D	30m²	-	0	
Labourers toilets	D	25	1	25	

SUBTOTAL: MANAGEMENT OF PHYSICAL FACILITIES 25

"ANNEXURE "

6. SUPPORT SYSTEMS

	Block	Area	No.	ASM	(*)
Pupil accommodation services (Hostels)	H			0	
Pupil food services (Hostels)	H			0	
Pupil food services (Tuck shop)	D	25m²	-	0	
Staff support services:					
Caretaker's cottage	O	80	-	0	
Staff room (with kitchenette)	A	87	-	87	
SUBTOTAL: SUPPORT SYSTEMS				**87**	

SUMMARY OF PROPOSED ASSIGNABLE SPACES

1.	EDUCATIONAL FACILITIES	2275m²
2.	ACADEMIC SUPPORT SERVICES	296
3.	PUPIL SERVICES	15
4.	INSTITUTIONAL SUPPORT	88
5.	MANAGEMENT OF PHYSICAL FACILITIES	25
6.	SUPPORT SYSTEMS	87
GRAND TOTAL: (ASM'S)		**2786m²**

The provision of schools by the DET in South Africa during 1983-1994.

by

George Candiotes
Supervisor: Prof dr D Holm
Department of Architecture
Degree: Philosophiae Doctor (Architecture)

SYNOPSIS

The provision of primary and secondary schools for Black People in the Republic of South Africa (excluding the then Independent States and Homelands), by the Department of Education and Training during the years 1983-94 is compared with the preceding period in respect of schools actually built and relevant procedures followed. It is concluded that the pre-1983 approach was inadequate. By contrast, the 1983-94 period addressed the shortfall of school buildings successfully by the systematic and methodical introduction of standardisation of:

- classroom plans and layouts
- modular coordination of planning grids
- partial modular coordination of building components
- school layout and various acceptable configurations
- schedules of accommodation for specific schools dictated by the various permutations resulting from an approved curriculum followed and complying with the mandatory "space and cost norms" for school buildings
- procedures applicable to consultants from initial briefing to final delivery of the project
- documentation, production, storage and retrieval and
- internal procedures for departmental staff.

It is concluded that the principles of standardisation, long building life cycles, low maintenance, low energy and open ended planning, using modular standard units to facilitate any required number of configuration permutations are even more valid today.

Finally, it is stressed that a single dedicated schools building entity is more likely to succeed than an uncoordinated diversity of functionaries and clients.

Die voorsiening van skole deur die DOO in Suid Afrika gedurende 1983 -1994.

deur

George Candiotes
Promotor: Prof dr D Holm
Departement van Argitektuur
Philosophiae Doctor (Argitektuur)

SAMEVATTING

Die voorsiening van geboue vir primêre en sekondêre skole in Suid Afrika (uitgesluit die voormalige Onafhanklike State en Tuislande) deur die Departement van Onderwys en Opleiding gedurende 1983-94, word vergelyk met die voorafgaande tydperk met verwysing na skole wat opgerig is en die prosedures wat gevolg is. Die gevolgtrekking is dat die pre-1983 benadering onvoldoende was. In teenstelling hiermee is die tekort aan skoolgeboue in die 1983-94 tydperk geslaagd aangepak deur middel van die sistematiese standaardisasie van:

- klaskamerplanne en -uitplasings
- modulêre koördinasie van beplanningsroosters
- gedeeltelike modulêre koördinasie van boukomponente
- skooluitleg en verskeie aanvaarbare konfigurasies
- akkommodasieskedules vir spesifieke skole wat bepaal word deur die verskeie permutasies as gevolg van 'n goedgekeurde kurrikulum wat gevolg is in oorleg met die verpligte "ruimte- en kostenorme" vir skoolgeboue
- prosedures van toepassing op konsultante, van die aanvanklike inligtingsessie tot en met finale oorname van die projek
- dokumentasie, produksie, berging en herwinnig van inligting en interne prosedures vir departementele personeel.

Die gevolgtrekking is dat die beginsels van standaardisasie, lang gebouleeftydsiklusse, lae instandhouding, lae energieverbruik en ooppuntbeplanning, deur die gebruik van modulêre standaard eenhede om enige benodigde getal konfigurasiepermutasies te fasiliteer, tans selfs nog geldiger is.

Ten slotte word dit beklemtoon dat 'n enkele, gespesialiseerde skoolverskaffingseenheid 'n groter kans op welslae het as 'n ongekoördineerde diversiteit van funksionarisse en kliënte.