IKOYI MULTI-STOREY CAR-PARK, LAGOS: AN ARCHITECTURAL CONTRIBUTION TOWARDS THE OPTIMISATION OF URBAN PRIME SPACE

BY

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SEPTEMBER, 1998

DECLARATION

I hereby declare that this thesis has been written by me and that it is a record of my own research work. It has not been submitted in any previous application for a higher degree. All quotations are indicated and the sources of information used are duly acknowledge by means of references.

....

SIGNATURE DATE

CERTIFICATION

This thesis entitled "IKOYI MULTI-STOREY CAR PARK, LAGOS: An Architectural Contribution Toward, the Optimisation of Urban Prime Space". Meets the regulations governing the award of degree of Master of Science (M.Sc.) in Architecture of Ahmadu Bello University, and is approved for its contribution to knowledge and literacy presentation.

S S Tullpule ..... 04/11/98 .....
Chairman Supervisory Committee Date

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Head of Department Date

..... 06/11/99 .....
Dean Postgraduate School Date

DEDICATION

To Afar

ACKNOWLEDGEMENT

First of all, I would like to thank Allah for his guidance and infinite mercies over me. I also wish to acknowledge my indebtedness to the following people who have contributed immensely towards the success of this research: My most sincere thanks goes to my Parents and entire members of my family for their financial, moral and spiritual supports.

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TABLE OF CONTENTS

Title Page i

Declaration ii

Certification iii

Dedication iv

Acknowledgement v

Table of Contents vi

List of Plates xi

List of Figures xii

Glossary xiii

Abstract xv

CHAPTER ONE: PROBLEM DEFINITION

1.1 Introduction 1

1.2 Motivation 4

1.3 Aims and Objectives 5

1.4 Design Scope and Limitation 5

1.5 Architectural Contribution 6

1.6 Research Methodology 6

CHAPTER TWO: LITERATURE REVIEW

2.1 Theoretical Review: Parking Problem 8

2.1.1 Parking Situation in Lagos State 9

2.2 Traffic and Urban Land-Use 11

2.3 Traffic as a function of activity 12

2.4 The cost of congestion 14

2.5 The need for parking facilities in the urban centre . 15

CHAPTER THREE: PLANNING AND DESIGN PRINCIPLES

3.1 Fundamental Factors of the Multi-storey Car park . . . 17

3.2 Parking system 17

3.2.1 Attendant parking 17

3.2.2 Customer parking 18

3.2.3 Combined attendant and customer parking . . 18

3.3 Parking layout 19

3.3.1 Car Basic Data 19

3.3.2 Length and width of stall 22

3.3.3 Aisle width 22

3.3.4 Parking angle 23

3.3.5 Head room 23

3.4 Ramp 23

3.4.1 Straight Ramp 24

3.4.2 Curved Ramp 25

3.5 Building types 26

3.5.1 One-way parallel system 27

3.5.2 Two-way parallel system 27

3.5.3 One-way parallel system 27

3.5.4 Staggered floor systems 27

3.5.5 Flat floor - spiral ramps 27

3.6 Mechanical car park 35

3.6.1 System types 36

CHAPTER FOUR: OPTIMISATION OF THE URBAN PRIME SPACE

4.1 Mixed-use 42

4.1.1 Mixed-use combination 42

4.1.2 *Occurrences of Mixed-use* 43

4.1.3 Benefits of Mixed-use 43

4.2 Location theory 44

4.2.1 Location designs within an urban space . . . 45

CHAPTER FIVE: CASE STUDIES

5.1 *Introduction* 48

5.2 Young Street Car Park 48

5.2.1 site 49

5.2.2 Planning 49

5.2.3 Construction and Materials 50

5.2.4 Appraisal 50

5.3 Welbeck Street Car Park 55

5.3.1 Site 56

5.3.2 Planning 56

5.3.3 Construction and Materials 57

5.3.4 Appraisal 57

5.4 Marina Car Park 58

5.4.1 Site 58

5.4.2 Planning 59

5.4.3 Appraisal 59

5.5 Lagos Island Car Park 60

5.5.1 Site 60

5.5.2 Planning 63

5.5.3 Appraisal 63

CHAPTER SIX: THESIS STUDY AREA

6.1 Lagos 65

6.2 Geographical Content 66

6.3 Relief and Drainage 66

6.4 Climate 66

6.4.1 Temperature 66

6.4.2 Rainfall 67

6.4.3 Wind 67

6.4.4 Humidity 67

6.4.5 Sunshine 69

6.5 Thesis Site Physical Data 69

6.5.1 The Site Location and Characteristics . . . 69

6.5.2 Soil Conditions 69

6.5.3 Vegetation 70

6.5.4 Utilities 70

6.6 Climatic Data 70

6.7 Feasibility Survey 71

6.7.1 Research Findings 72

6.7.2 Inferences from counting 75

CHAPTER SEVEN: PLANNING AND SCHEME REPORT

7.1 The Design 80

7.1.1 The Brief 80

7.2 Schedule of Space Accommodation 82

7.3 Design Concepts and Criteria (Design report) 83

7.3.1 Site Concept 86

7.3.2 Design Concept 86

7.4 Design Proposal and Report 89

7.4.1 Designs Components 89

7.5 Summary and Conclusion 93

Bibliography 95

LIST OF PLATES

1.1 Surface parking in Lagos Central Business District, Marina 7

3.1 Car basic data 20

3.2 Bin width 21

5.1 Young street car park: Location plan 51

5.2 Young street car park: Plan 51

5.3 Young street car park: Section 52

5.4 Young street car park: Approach view 52

5.5 Welbeck street car park: Location plan 53

5.6 Welbeck street car park: plan 53

5.7 Welbeck street car park: Section 54

5.8 Welbeck street car park: Approach view 54

5.9 Marina Car park: Location plan 61

5.10 Marina Car park 62

5.11 Marina Car park: Stall arrangement 62

6.1 On street parking on both side of Awolowo Road due to lack. of adequate parking spaces. 76

6.2 Parking on Keffi street 76

6.3 Car backing out from Kerb side often stop traffic flow . 77

6.4 Redevelopment going on in Awolowo Road 77

6.5 Parking lot inadequate at Falomo shopping centre as customers car spill over into the road. 78

6.6 Double parking within the set back of Triumph Merchant Bank, Awolowo, Ikoyi 78

LIST OF FIGURES

3.1 One-way opposed straight ramp system separated 28

3.2 One-way opposed straight ramp system - separated . . .28

3.3 Two-way parallel system 29

3.4 One way parallel system 29

3.5 Straggered floor ramp system - two way 30

3.6 Straggered floor ramp system - one way 30

3.7 Straggered floor ramp system - one way, concentric circulation 31

3.8 Straggered flour ramp system - three level 31

3.9 Continuos sloping floor ramp system - one way circulation with inter locking floor 32

3.10 Continuos sloping floor ramp system - two way . . .32

3.11 Semi-circular ramp system 33

3.12 Parallel circular ramp system 33

3.13 Circular opposed ramp system 33

3.14 Lift system 34

3.15 Rail and parallel system 34

3.16 Continuous Chain system 34

6.1 Climatic data 68

6.2 Census of cars 73

7.1 Site Concept 84

7.2 Design concept 85

GLOSSARY

Adjacent Parking	-	Parking stalls which are feed direct from the main circulation travelled way instead of from aisles.
Attendant-Parking Garage	-	Cars are parked by attendants instead of by customers.
Bin Width	-	The total distance covering the width of an aisle and the stalls either side of it.
Clear way aisles	-	A circulated travelled way feeding parking aisles. This is the opposite of the adjacent parking.
Clear way parking	-	Parking stalls are fed from a parking aisles which is not a main travelled way.
Continuous ramp or sloping floor garage	-	This parking system has both ramps and stalls on the same slope.
Dolly	-	A unit on which cell can be moved side ways as well as backwards and forwards.
Express Exit Ramp	-	Circular down ward ramp which connects all floors,

		thus saving the drivers long driving distance - often provided in continuous ramp garage.
Off - Street Parking	-	Any *form of* park accommodation that is not on the street
Ramp Systems	-	A general term which covers a dozen or more variants of parks using ramps as access.
Reservoir	-	Area from which cars are received for processing: Ticketed or taken over by attendants.
Self-Parking Garage (Customer parking garage)	-	Cars are parked and collected by the customer.
Stall	-	Area designed for a car to park in.
Split level garage	-	This is a ramp garage in which the floor levels vary by half a storey height staggered vertically.
Storage floors	-	Car parking floors
Travelled way	-	This is the main drive way providing access to parking aisles and flows or, as in the *case of* adjacent parking, two stalls.

ABSTRACT

The use to which the Urban Land is put, is largely determined by competition between potential users, such that, land would be converted from one use to another if the demand price or rent bid of one user exceeded that of another potential or the existing ones. Thus land is used for the highest and best use. Theoretically both an optimum use and optimum building at a given time.

However, to treat efficiency optimum as the sole objective of an economic system would be implicity assuming that social benefits is directly related to effective demand: demand backed by purchasing power. There are merit goods which should be provided free or below cost in order that they are available to all. Moreover, such uses, precondition and establish a broad frame work for the profit motivated activities.

A city can be considered as a locational arrangement of activities or a land-use pattern: one of the prime determinant of movement. Activity is a trip generator and will dictate the type of transportation facilities needed to move traffic.

The attraction of both new economic activities and people generate high traffic as a result of the intensified use of the urban space, it also increases the demand for parking accommodation. It become imperative to accommodate the vehicle to prevent lost of business and property value.

The thesis attempts to achieve this through architectural

analysis, design and proposal of a car park that will help decongest the road and help preserve the value of the place. The scope of the thesis will be limited to the design of the car park complex with secondary uses incorporated to improve the economic concern.

CHAPTER ONE

PROBLEM DEFINITION

1.1 INTRODUCTION

In an urban area, the non-transferability of land in geographical space means that every site has a unique spatial relationship with all other sites. The urban area provides a mechanism (accessibility) which facilities the exchange and distribution functions that are basic to any economy. This exchange of goods and services is facilitated by the close integration of people involved. The larger the number of persons who are accessible to each other the longer the number of possible contacts and therefore the longer the market. Population responds to economic opportunity and is attracted to urban areas with the greatest relative advantage; those with the greatest market potential. This increases the number of person in the urban area and provides further opportunity for specialisation and exchange. Interdependent specialisation comes together in space and form more integrated local sequences, such activities are complementary to each other and find it advantageous to be in close proximity in order to reduce cost from efforts to reduce space frictions and operational imperfections. Other uses cluster within the urban area, in order to provide more range of good and services or to stimulate sales through comparison.

Accessibility to a perceived market can cause conversion of land use. Some firms depend upon accessibility and/or complementary and they will pay more for a given site, than, for less accessible ones. Awolowo Road Ikoyi, is an example of this form of conversion. It developed due to the present of concentration of high-income consumers, conversion is from residential to commercial, mostly speciality stores, that sell one or few line of related goods gear toward consumer who are willing to pay higher prices for merchandise in order to obtain more specialized services and/or a more complete line for a range of goods.

Traffic is a function of activities and activities takes place in buildings. Therefore the use to which the building is put will determine the numbers of trip generated. The attraction of both new economic activities and people generate high traffic as a result of the intensified use of the urban space. Prosperity in industry depends on efficiency to complete with markets. Efficiency includes efficient means of communication and transportation and this cannot be brought about while there are long and expensive delays on traffic routes caused by the haphazard parking of cars on main road.

The increased use of private cars not only place a long burden on the roads at the peak periods in the morning and evening. It also increases the demand for parking accommodation because many of the cars used for travelling are parks all day.

Land as a factor of production is heterogenous and differs in the natural occurrence at urban locations and in the characteristic of land available for urban development. Space and location in an urban area are economic commodity subject to supply, and demand forces. Although economic factors determine to a great extend the land use pattern. These purely economic actions may be modified by and in the public interest. According to Goodall (1974); "The land use pattern in an urban area at any particular time represents the cumulative effect of a myriad of decisions and actions by various individuals and organisations. The pattern is a reflection of response to repeatedly changing demands built-up over time".

The determination of the optimum use for a particular parcel of urban land may not be subject to economic cost and returns, but rather to the benefits to be derived from such use and how the use improves the general condition of the urban space.

Car parks are not likely to make any profit, unlike a commercial outlet in terms of rents for investment that could possibly be considered as a favourable economic proposition. Never the less, adequate car parking is a necessary part of development in a city centre, and without it trade cannot prosper.

1.2 MOTIVATION

In recent times, there has been an increase in the number of businesses and retails outlets that have moved to Ikoyi. This has created considerable pressure on the once residential zone resulting in increased traffic volume and indiscriminate parking on the street due to lack of well defined or non-availability of parking. The existing chaotic conditions of the place has to be resolved if the efficient utility of vehicles in town and the pleasantness and safety of surrounding environment is to be maintained.

Surface parking accommodations would occupy an area larger than the commercial space, and would displace many of the facilities they were intended to serve. Their very size would seriously impede the efficient functioning of the centre, on economic and operational ground. The required spaces much therefore be accommodated in multi-storey car park.

It is important to provide a multi-storey car parks to cater for the needs of the people of Ikoyi in order to enable them transact their business without much hindrance by traffic congestion. Thus preventing the incapacitation of the city economic vitality.

Moreover, there is the desire to effectively utilise a parcel of urban land that has been lying idle for close to ten years.

1.3 AIMS AND OBJECTIVES

i. The aim of the thesis is to provide a complex where cars can be parked with as little inconvenience as possible, and where cars and contents are safe from the fire and from collision.

ii. To optimally utilise the urban space, without affecting neighbouring property negatively.

iii. To strengthen the economic base of the local council.

iv. To create a landmark for the entire Eti-Osa Commercial Community.

v. To reduce congestion and its consequent hazard.

vi. To achieve an efficient and effective functional integration of secondary use with the car park.

vii. To utilise the result obtained in the research as a guiding principle in the design of the car park.

viii. To ensure that the interests of business establishments along streets is enhanced by good parking provision and preserve the character of the neighbourhood.

1.4 DESIGN SCOPE AND LIMITATION

The car park shall embody the following facilities namely:

i. Car park with Administrative facilities

ii. Commercial facilities: Retail shops, office lettable spaces and bukateria.

Emphasis will be placed on the development of the car park and the integration of the secondary uses of the car park complex.

1.5 ARCHITECTURAL CONTRIBUTION

The main contribution within the field of Architecture is the effective utilization of the urban space and incorporation of the secondary uses with the car park.

It is envisaged that the complex will meet the parking needs of the community it is intended to serve.

1.6 RESEARCH METHODOLOGY

The method employed for the collection of data was as follows:

i. Through review of relevant existing literature, i.e. reports, seminar papers, journals and books.

ii. Appraisal of existing relevant facilities. However it must be mentioned here that due to absence of purpose-built commercial multi-storey car parks in Nigeria, all standard cases appraised are foreign.

iii. Personal observation, interview and survey.



PLATE 1.1 - SURFACE PARKING IN LAGOS CENTRAL BUSINESS DISTRICT — MARINA.

CHAPTER TWO

LITERATURE REVIEW

2.1 THEORETICAL REVIEW:- PARKING PROBLEM

Parking are essential part of the total transportation system, they are the terminal stations (nodes) of road traffic.

Brierley, (1972) notes that this is not a new phenomenon; that in Rome special off-street parking facilities were provided to get chariots off the travelled way and vehicles where prevented from entering the business districts of large cities in the Roman empire by Julius Caesar during certain hours of the day because of traffic congestion and in London there was traffic congestion in those days with horse-drawn vehicles.

Coming to more recent times, with the advent of the industrial revolution coupled with the explosion of the town centres: The internal combustion engine has changed the pattern of our lives. The motor car has made transport from door to door not only possible but quick and easy. Whilst the numbers of cars in use was small no great inconvenient was caused by parking on the high way, (Buchaman, 1972), but the change is the distribution of wealth have enabled more and more people to become the owners of some type of motor vehicles. The motor car has made an incursion into our way of life very gradually over the years.

This presents dual problems of how to keep vehicles moving on the road and how to park them satisfactorily off the road.

It is the town centres, where land values are at their highest that the car parking is most concentrated and it is there that its environmental impact can be most damaging. (Black and Blunden, 1984; Duprer, 1987).

Parking is a universal problem in most urban centre of the world. Paterson, (1960) observed that United State being the leader in production of motor vehicles has been the first continent to create a network of roads designed specifically for this form of transport. It is noted that cities like New York and Los angeles experiences intense congestion of arterial roads. While the centres of cities have become virtually impassable and the parking facilities is the significant feature of the motor way.

In Tokyo the world's second largest city illegally parked cars can be seen on the street at any time, parking meters have been tried once and abundant and are to be reintroduced while the Germans look to Britain, for new ideas to solve there parking problems. In Flensbury near Donish frontiers, too many parking infringements may cause a motorist to lose his driving license.

Strasbury, nice and menton in France have meters but not Paris where in there place there is the 'blue-zone' where discs are used. Similarly in London, where meters are used the chances of avoiding a fine for street parking are increasing every day. In other cases discs have been introduced in a few genteel towns such as Cheltersham, Deviyes, Harvogate and

Ruislip. Moreover many of the largest cities in Britain have introduced meters with varying degree of success. (Sanusi, 1998).

2.1.1 PARKING SITUATION IN LAGOS

The divergence of the place of work from the place of abode of worker in Lagos put a tremendous strain on the main access routes to Lagos, Ikoyi and Victoria Island. These Islands have been the location for civil services employment in the city and in addition accommodate major commercial and industrial organisations in addition to housing members of the diplomatic corps. (Fapohunda, and Lubell 1978; Ayeni, Pacione, 1981).

Large number of vehicles enter this Islands on a daily basis, but in the absence of enough parking space, many vehicles are indiscriminately parked at every available space. This illegal parking of vehicles often result into traffic jam. At the moment there are five public parking and about twenty one private car parks in Marina, (Punch July 30th 1998). Despite their large number they are not enough to meet growing demand. In the seventies the urban administrator promulgated an edict which restricts the numbers of cars reaching Municipal Lagos. This Lagos State traffic edict permits only those cars whose registration number begins with an odd number to enter on specific day of the week and those with even numbers to enter the following day. This edict cannot be said to be effective since many family brought a second car hence both even and odd

initial number. To alleviate parking problem in Lagos it is mandatory for new design proposal to incorporate parking spaces, in order to meet the planning regulation for approval. Thus many high rise buildings provided multi-storey level parking, this is pronounced in Marina and Broad street. In addition on street parking is ban in certain part of the state and a fine is paid before impounded vehicles can be retrieved.

2.2 TRAFFIC AND URBAN LAND USE

Transportation is the result of different type of land use in the city spatially separated. (Brown 1974; Nourse 1974; Bourne, 1982). Khristy (1990) observed that the symbolic relationship between transportation and land uses, produces the movement and traffic flow pattern seen in urban area. The accessibility of places has a major impact on land values, and the location of a place within the transportation network determines its accessibility. (Nourse 1974) thus in the long run this transportation system and the traffic flow on it shapes the land-use pattern.

It is generally agreed that the transportation system is an integral part of production and distribution, both large-scale production and mass distribution are necessary for economic development. Efficient and relatively cheap transportation provide the foundation upon which the economic growth of a nation progress. (Farri and Sampsin 1975; William and Makie, 1975; Black and Blunder, 1984; Duprer, 1987; Gomer-Bawy, John,

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i. Transport of raw materials, merchandise and food

ii. Conveyance of passenger in bulk (buses, coasters)

iii. Conveyance of persons individually or small numbers - car, motor cyçles, etc.).

iv. Mobile service (fire engine). The proportion of vehicles used in these four ways naturally vary between any one body of traffic and activities carried on.

It is noted that residential, manufacturing and public lands generate traffic at about the same average rates where as commercial generate traffic at a rate nearly four times greater.

Sanusi (1998) stated that parking demand is a reflection of the distribution and type of land uses is an area together with levels of accessibility provided by competing nodes of transport. He further state that under any auto dominated transportation system, stores, office buildings and industrial plants are often faced with the necessity of parking purposes for customers and employees who arrive by automobile. Often there services is provided at no cost or less than fully allocated cost of providing this services. However, if employee and customer utilize main transit, employer and merchants escape the necessity of providing expensive parking facilities (Anthony J; Sanusi 1998).

2.4. THE COST OF CONGESTION

Brierley (1972) states that "traffic congestion is like a malignant disease which unless arrested will surely bring death to the heart of the city". It is observed that land value tend to fall where there is traffic congestion or the city lacks car parking facilities. (Buchanan, 1963; Brierley, 1972; Dewis, 1979; Dupree, 1987).

Congestion cost though difficult to calculate, however it is obvious that congestion cost time and money to all mass of transportation facilities:

i. These is cost of operational expenses for delivery trades held-up in traffic and, also the utility of vehicle in town will decline rapidly in traffic hold-up. It should be noted that any automobile has a speed at which it operate most economically, usually 50 to 60 kilometer per hour. (Uyange J. 1982).

ii. Cost in efficiency for extra police and warders to keep traffic moving.

iii. Time and value loss to the passengers.

iv. Deterioration of public health condition due to increased stress from an increasingly hostile environment.

v. The pleasantness and safety of surrounding will deteriorate castastroplically, in all probability both will happen together.

Major, 1987;).

2.5 TRAFFIC AS A FUNCTION OF ACTIVITY

Traffic and buildings were identified as two facet of the same problem in a report based on the study of the long term problems of traffic in urban area, (Buchanan, 1963). The report stated that traffic and buildings are not two separate thing; that building are the generation of the traffic and the destination to which it is going. It further noted that if there are no buildings there would be no traffic and conversely if there were no traffic there would be few buildings.

The view is generally held that traffic is a function of activities. (Buchanan, 1963, Brown, 1974, Nourse, 1974; Dewis, 1979; Black and Blunden, 1984; Khisty, 1990). Activities in town take place in building therefore, traffic can be said to be a function of building. All the movements by vehicle that take place in the street have an origin or destination in building of one kind or the other, in some place or other e.g. some vehicles will be moving within town from one building to another building, from building outside town to building within it, or vis-versa while other will merely pass through the town in the case of moving between origin and destination where both lie outside the street.

Kishly (1990) identified four basic ways in which motor vehicles are used in connection with these activities. They are as follows:

2.6 THE NEEDS FOR PARKING FACILITIES IN THE URBAN CENTER

Traffic delays is a serious interference with the swift movement of vehicles and hence with the economic efficiency of the country. The reduction of traffic and parking in the urban centres by decentralisation policy is a long term policy even when there is a large scale redevelopment contemplated (Brierley, 1972).

There appears to be an awakening to the fact that the stationary vehicle must be accommodated and this facility must be carefully sited, designed and planned with the same care in which moving vehicles are accommodated on road. (Irstr, Sanusi 1998).

The problem is that too many cars want to park at the same time in too small an area. Where the cost of land is high. If requirement for parking has to be accommodated the space would occupy an area larger than the conventional space and would displaces many of the function they were intended to serve. There very existence would severely interfere with the efficient functioning of the center, on economic and operational ground, became, even in the motor age there would always be an increasing numbers of pedestrian in our city center and pedestrian required reasonably compact shopping and business areas and its a great disadvantages and time wasted if the area is broken-up by extensive car parks. Thus multi-storey parking accommodation would be appropriate in the city center.

Conclusively, Dupre (1989) observed that parking is an

economic commodity that is subject to laws of economies. Then if a parking policy is enforced that reduces the on-street parking spaces, a new equilibrium point will be establishment, resulting in a higher price to make a trip because of a higher parking price. The probability of making a trip by automobile to city town will decrease. In short, parking price affects energy consumption.

CHAPTER THREE:

PLANNING AND DESIGN PRINCIPLES

3.1 FUNDAMENTAL FACTORS OF THE MULTI-STOREY CAR PARK

The four important factors to consider when designing a multi-storey car park are:

i. The parking demand which must be ascertained locally.

ii. Simplicity and speed in parking and unparking.

iii. Cost

iv. That building should be harmonised with its surrounding.

3.2 PARKING SYSTEM

There are three basic system and the choice of any is subject to the locality and its customers. They are:

i. Attendant parking

ii. Customer parking

iii. Customer and attendant parking

3.2.1 ATTENDANT PARKING

In this case customers only submit or accept cars at the reservoir space. The attendant does all the driving and parking. The advantage it has is that a larger number of vehicles can be parked on a given floor area because an attendant can park cars closer together than customers would be expected to do, though this advantage is lost because it is

necessary to have a reservoir. The main disadvantage with the system is that an increased staff is required at peak periods.

3.2.2 CUSTOMER PARKING

Customer does the driving and parking as directed by an officer the advantages of these system are that a larger reservoir space is not required, customer may have access to his car while parked, a smaller staff is required to operate the car park. In addition time is saved by the motorist collecting his own car at peak periods. There is no congestion on the ramps, as the cars come out is single file and it is less irritating to the motorist to be delayed in his car rather than to wait for an attendant to deliver his car.

However, the disadvantages are that more space is required in the aisles and parking bays, and some timid drivers are uncomfortable driving on ramps.

3.2.3 COMBINED ATTENDANT AND CUSTOMER PARKING

Transfer of car from customer to attendant is done on all floors, thus reducing reservoirs space on the main floor. The customer are relieved of the difficulty of parking. Saving in space is gained as storage stalls can be minimum and time lost by attendant running up and down to collect cars as in attendant parking system is saved.

3.3 PARKING LAYOUT

The three basic dimensions of any parking layout are:

i. Length and width of car stall.

ii. Width of access road and

iii. The angle between car stall and access road.

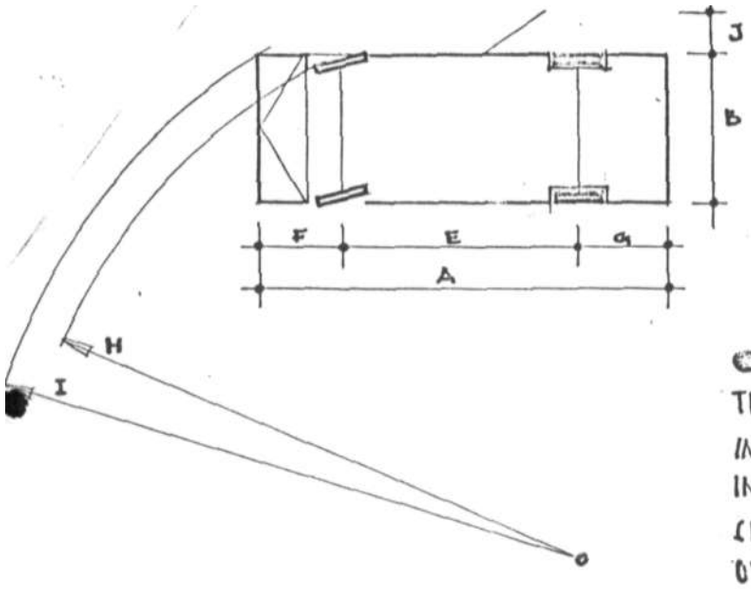
For economy the maximum capacity should go on every storage floor but an over crowded layout will make operation difficult and so impair the efficiency of the garage.

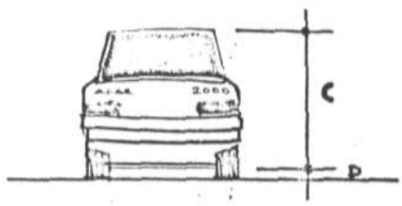
Stall and aisles, should be based on the modern car design and possibly on future ones so as to check in advance obsolescence and inflexibility should car design change.

3.3.1 CAR BASIC DATA:

The main aspects of car design which must be considered in designing for parking are: length, width, height, turning circle, wheel base, ground clearance overhang, bumper height, door design.

Most cars are less than 4.75m in length and most are under 1.75m wide. Cars are usually under 1.8m and mini-buses go up to 2.15m. The minimum turning circle between walls and kerfs are 12.20m and all car are under 15.0m most ground clearances are about 100mm and the wheel bases 2.13m to 2.7m increasing to 3.65m for the Rolls Royce Phahtom V. Over hangs rarely exceed .9m over centre line of front wheels. Bumper height depends on fashions and ranges from 100 to 450mm. Most door are side hung





CAR BASIC DATA

THE MAIN ASPECTS OF CAR DESIGN WHICH MUST BE CONSIDERED IN DESIGNING FOR PARKING ARE: LENGTH, WIDTH, HEIGHT, TURNING-CIRCLE, WHEEL BASE, GROUND CLEARANCE, OVERHANG, BUMPER HEIGHT, DOOR DESIGN.

A LENGTH: MOST CARS ARE LESS THAN 4·75M IN LENGTH

B WIDTH: MOST CARS ARE LESS THAN 1·75M

C HEIGHT: CARS ARE USUALLY UNDER 1·80M AND MINIBUSES GO UP TO 2·15M.

D GROUND CLEARANCE: MOST GROUND CLEARANCES ARE ABOUT 100MM

E WHEEL BASE: MOST WHEEL BASES ARE ABOUT 2·13M TO 2·75M. WHEELBASES MAY INCREASE BUT THE 3·6M WHEELBASE (ROLLS ROYCE PHANTOM V) IS UNLIKELY TO BE EXCEED

F, G OVERHANG: THE OVERHANG OF CARS OVER WHEELBASE VARIES CONSIDERABLY. REAR OVERHANG IS SUBJECT TO WIDER VARIATION FROM MAKE TO MAKE. FRONT OVERHANG RARELY EXCEEDS 900MM OVER CENTRE LINE OF FRONT WHEELS

H, I TURNING CIRCLE: MOST CARS HAVE KERB TURNING CIRCLES UNDER 12·5M AND ALL CARS UNDER 15·0M DIAMETER. TURNING CIRCLES BETWEEN WALLS AND KERBS

J DOOR DESIGN: ALMOST ALL DOORS ARE SIDE HUNG. THE MINIMUM OPENING OVER WIDTH TO ENABLE THE DRIVER TO GET OUT VARIES BETWEEN 300M AND 450MM.

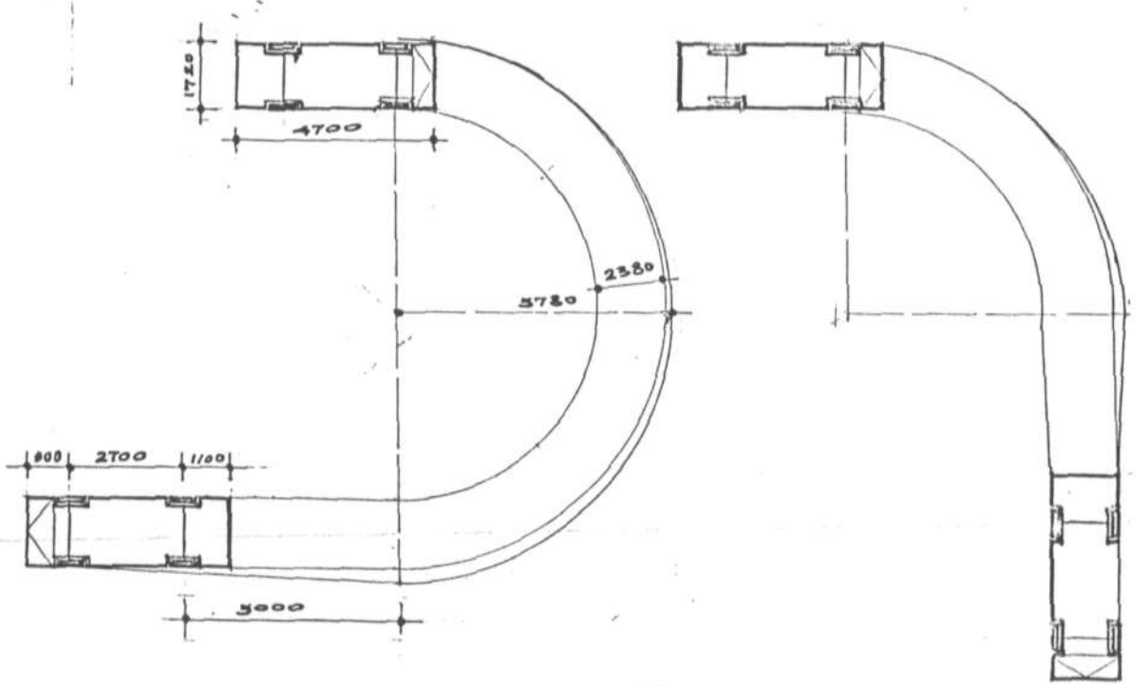


PLATE B·1: CAR BASIC DATA

BIN WIDTH

DISTANCE COVERING THE WIDTH OF AN AISLE AND STALLS EITHER SIDE. BIN WIDTH WILL DEPEND ON THE ANGLE AT WHICH CARS ARE PARKED.

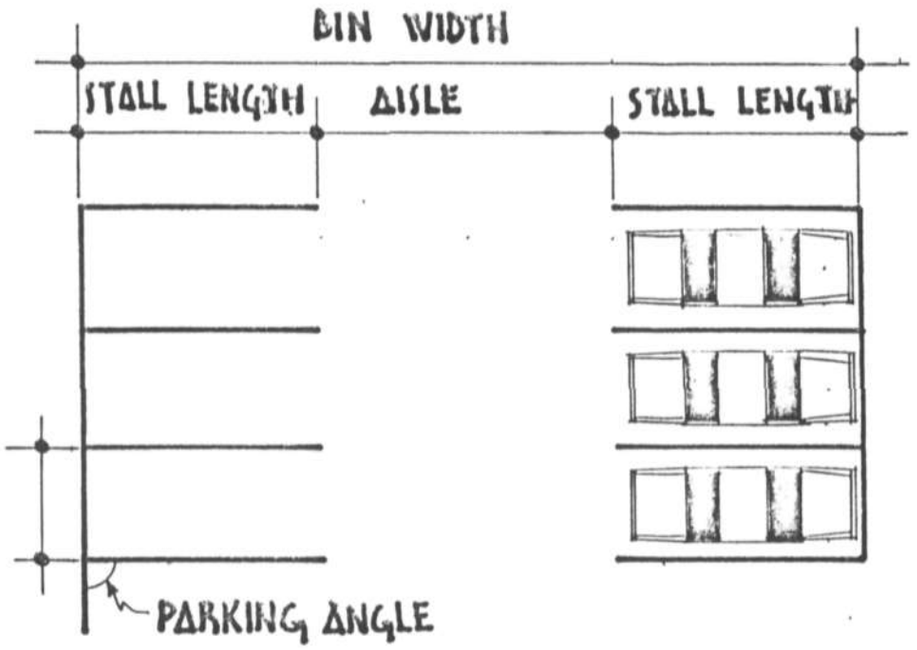


PLATE 3.2 : BIN WIDTH

the minimum opening over car width to enable the driver to get out varies between 0.3m and 0.45m.
(Brierley, J. 1972, Dechiara, J. and Calender, J. H. 1973; Hobbs, F.D, 1979; Ernst Neufelt, 1980).

3.3.2 LENGTH AND WIDTH OF STALL

The average design length is 4.8m, stall width depends on the car width plus room for drivers and passengers to emerge. The average car is 1.7m with one foot clearance each side the theoretic width is 2.3 but 2.4 is recommended.
(Brierley, J. 1972, Dechiara, J. and Calender, J. H. 1973; Hobbs, F.D, 1979; Ernst Neufelt, 1980).

3.3.3 AISLE WIDTH

For head in parking at 90^0 an aisle width of 6.0m is usually considered desirable, with a parking angle of 70^0 and aisle width of 14.5m is adequate, with a parking angle of 60^0 an aisle width of 4.2 is adequate, for 45^0 and 50^0 parking 3.3m is adequate, for 30^0 and 35^0 a 3.0m aisles is adequate but for parking parallel to the aisle 0^0 the aisle must be 3.3 in wide to permit cars to back in. The 6.0m aisle for 90^0 parking is wide enough for 2-way traffic with all other parking angles movement along aisles is usually one way.
(Brierley, J. 1972, Dechiara, J. and Calender, J. H. 1973; Hobbs, F.D, 1979; Ernst Neufelt, 1980).

3.3.4 PARKING ANGLE

The choice of parking angle should be one that allows ease of parking and unparking or the one that best fits in with the structural system to be used. Stalls at 90^0 are very commonly used and are better fitted into buildings between columns and into corners. Angle parking 30^0, 40^0, 60^0, are generally preferred by customers. Angle parking required deeper stalls but narrower aisles than 90^0 parking and some space is wasted at the end of each row of stalls. Parking stalls may be intermeshed or interlocked to save some space.
(Brierley, J. 1972, Dechiara, J. and Calender, J. H. 1973; Hobbs, F.D, 1979; Ernest Neufelt, 1980).

3.3.5 HEAD ROOM

Height of stall should not be less than 2.0m however 2.4m is desirable and will enable cars with roof racks and mini-buses to use the park. Floor to floor heights should be kept to a minimum to save in area devoted to ramps.
(Brierley, J. 1972, Dechiara, J. and Calender, J. H. 1973; Hobbs, F.D, 1979; Ernst Neufelt, 1980).

3.4 RAMPS

These are for inter floor travel. They can be straight or curved. It would be wrong to say any one ramp system is the best for all sites. Each site must be given individual consideration, taking into account the limitations and

facilities available and the type of motor traffic the garage will have to serves. Ramps are of two types:
Clear way ramp and Adjacent Parking Ramps. Clear way ramp serves only to give access to and from the garage. While the adjacent parking ramp gives access to parking stalls and between floors.
(Brierley, J. 1972, Dechiara, J. and Calender, J. H. 1973; Hobbs, F.D, 1979; Ernst Neufelt, 1980).

3.4.1 STRAIGHT RAMP

This is the easiest to construct and often most economical of space. They tend to slow traffic flow because of 90^0 turn at each floor level. Best suitable for parks in which cars drive up through each parking floor until an unoccupied stall is reached.

i. **Slope**:- Down ramps can be steeper than up ramps but should not exceed 1 in 6. The most suitable gradients lie between 1 in 7 and 1 in 10. Blend where gradient greater than 1 in 8 is used as transition slope, or bend. It should be provided for 1.2m at top and bottom at half the gradient of the ramp e.g. 1 in 14 for a ramp of 1 in 7. So that number plates may not scrape the floor at the bottom of the ramp and the under side of the car may not be damaged at the top. Ramps on which parking occurs should not be steeper than 1 in 20.

ii. **Width**:- Ramp should be 2.7m - 3.0m wide with a kerf of 50cm high by 300mm on each side. Kerf should be chamfered face to avoid damage to tyres. Two-way ramps are not desirable but where unavoidable should be clearly divided by central kerf 45mm wide.

(Brierley, J. 1972, Dechiara, J. and Calender, J. H. 1973; Hobbs, F.D, 1979; Ernst Neufelt, 1980).

3.4.2 CURVED RAMPS

Spiral and curved ramps are commonly used to provide express exit from parking floors. For spiral ramps the outer radius of the ramp is critical 9m is recommended.

i. **Slope:-** As for straight ramps, the slope is measured on centre line path of ramp.

ii. **Blend:-** Area of access to curved ramp must be carefully considered to ensure that the change from flat floor to banked curved is achieved without risk of damage to front or underside of car. The blending distance must be at least as long as most wheel base lengths about 3.0m but 36m is recommended.

iii. **Width:-** Ramps must be wide as curves become tighter: 3.6m is adequate for a ramp with 9.0m radius this gives an inner radius of 4.8m with a 12.0m radius a 10.0m wide ramp will be adequate. Ramp sides should be .9m high.

(Brierley, J. 1972, Dechiara, J. and Calender, J. H. 1973;

Hobbs, F.D, 1979; Ernst Neufelt, 1980).

3.5 BUILDING TYPES

There are three types of ramped parking building:

i. Flat parking floors linked by straight

ii. Flat parking floors linked by spiral ramps

iii. Ramped or sloping floor

Many variations of each type have been devised and built and many buildings are combinations of the three types: e.g sloping floor with spiral express exit ramp.

3.5.1 ONE-WAY OPPOSED STRAIGHT RAMP SYSTEM

The two traffic streams flow in the same direction on each parking floor, and conflicting traffic movements are immediately reduced. Opposed ramps may be separated to shorten travel paths and give clear way for operation and they may be planned adjacent to one another and place by the side or in the centre of the storage floor. (Fig. 3.1,3.2).

3.5.2 TWO-WAY PARALLEL SYSTEM

This simplest type of ramp to construct. The two-way divided ramps are set one above the other at edge or in the centre of the parking floor. This system can fit into relatively narrow site. The disadvantage is that turns are made immediately on leaving the ramp. (fig 3.3)

3.5.3 ONE-WAY PARALLEL SYSTEM

It has the advantage of rectangular shape and small ramp area. But the up and down circulation lanes intersect on the parking floor; unless the floor area is so large that each circulation can be kept within its own half on one-way lane. So that hazard can be reduced. (fig. 3.4)

3.5.4 STAGGERED FLOOR SYSTEMS

In this system the storage floors are built in two or three sections with each section half a storey above the other. The system are applicable to narrow lot were more use of space is essential. (fig. 3.5, 3.6, 3.7, 3.8)

3.5.5 FLAT - FLOOR - SLOPING - FLOOR

This are gently sloped floors which serve both as ramp and storage floors cars are parked at 90^0 to the slope to minimise the possibility of rolling down. Drivers entering the park pass every stall and are therefore sure that they would get the nearest parking stall available. With either two-way or one way route the exist can be long and tedious. (fig. 3.9, 3.10)

3.5.6 FLAT FLOORS - SPIRAL RAMPS

Spiral ramps give short drive distances from entrance to parking stall and back to exit as drivers do not have to pass through parking aisles. This can be disadvantageous for cars

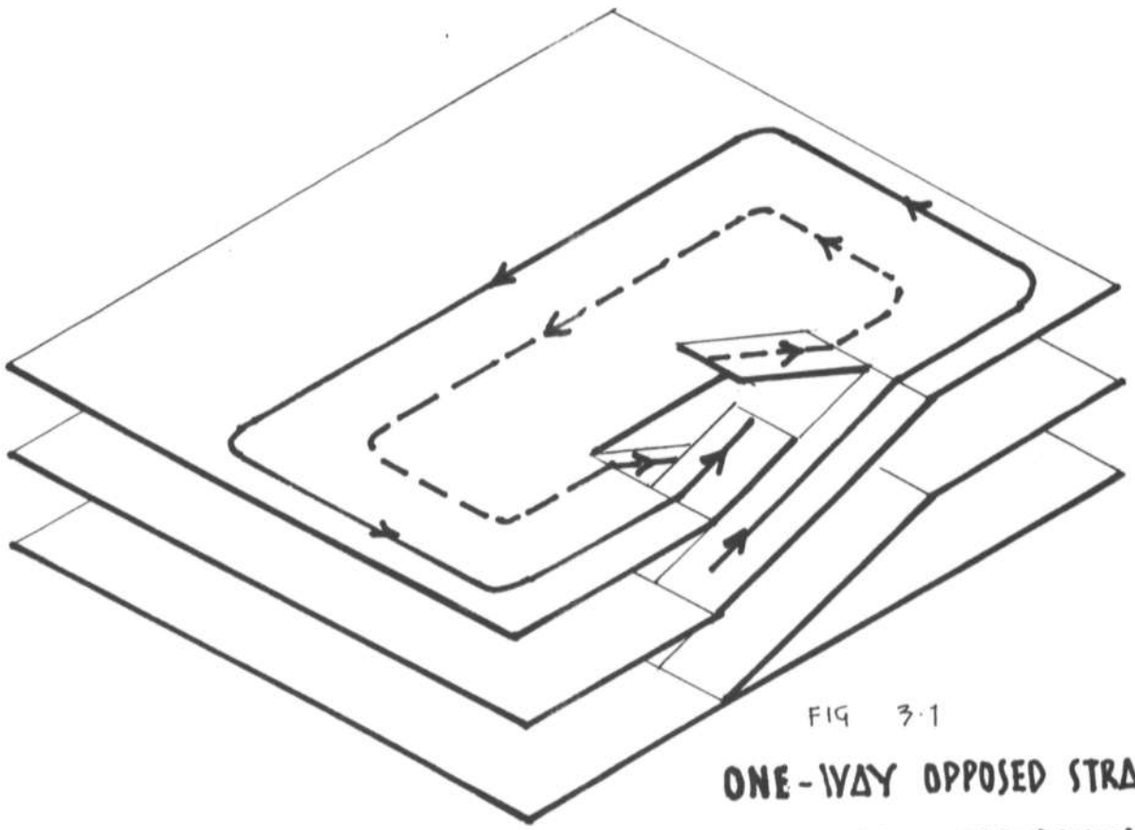


FIG 3·1

ONE-WAY OPPOSED STRAIGHT RAMP SYSTEM (ADJACENT).

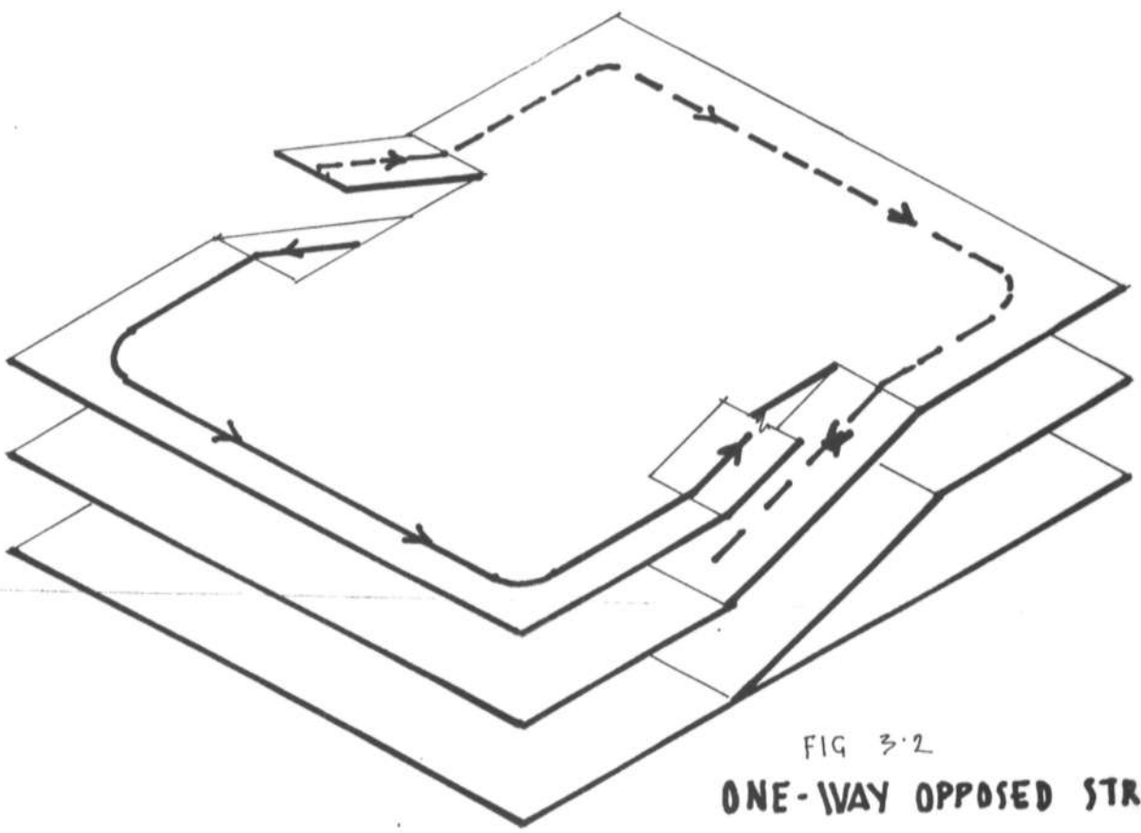


FIG 3·2

ONE-WAY OPPOSED STRAIGHT RAMP SYSTEM. (SEPARATED)

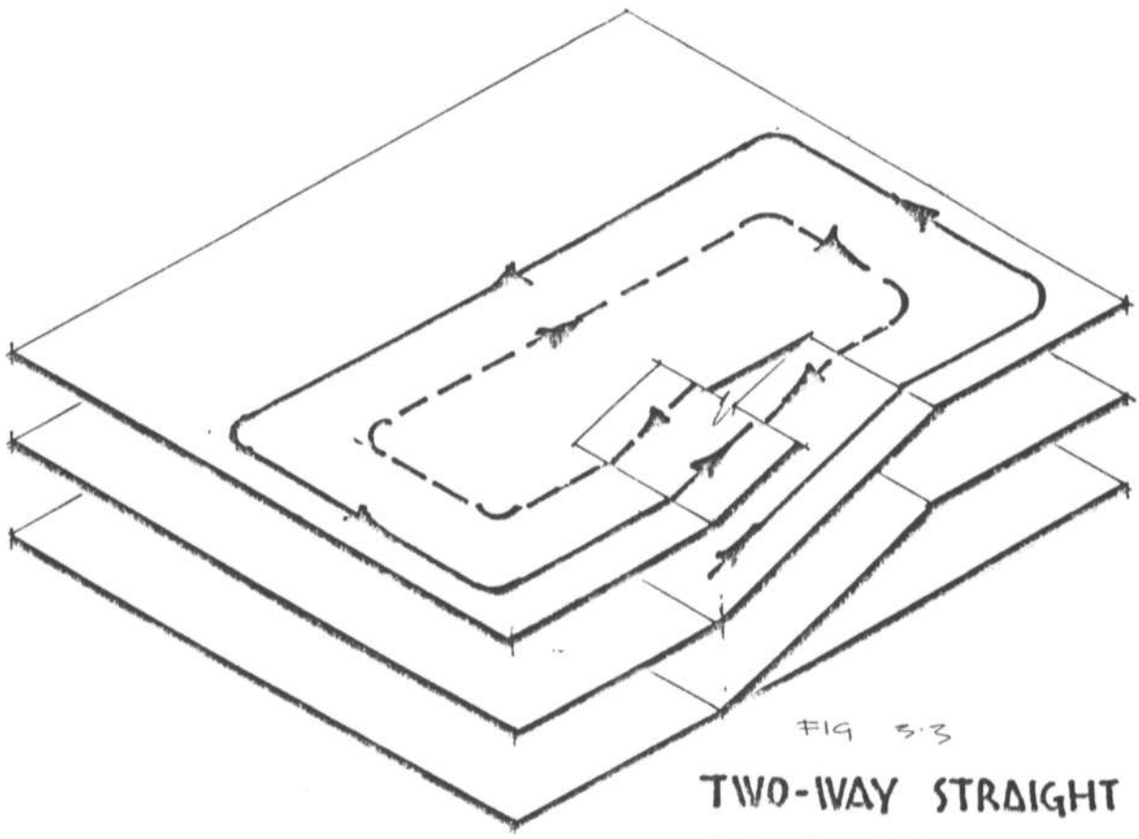


FIG 3.3

TWO-WAY STRAIGHT RAMP SYSTEM.

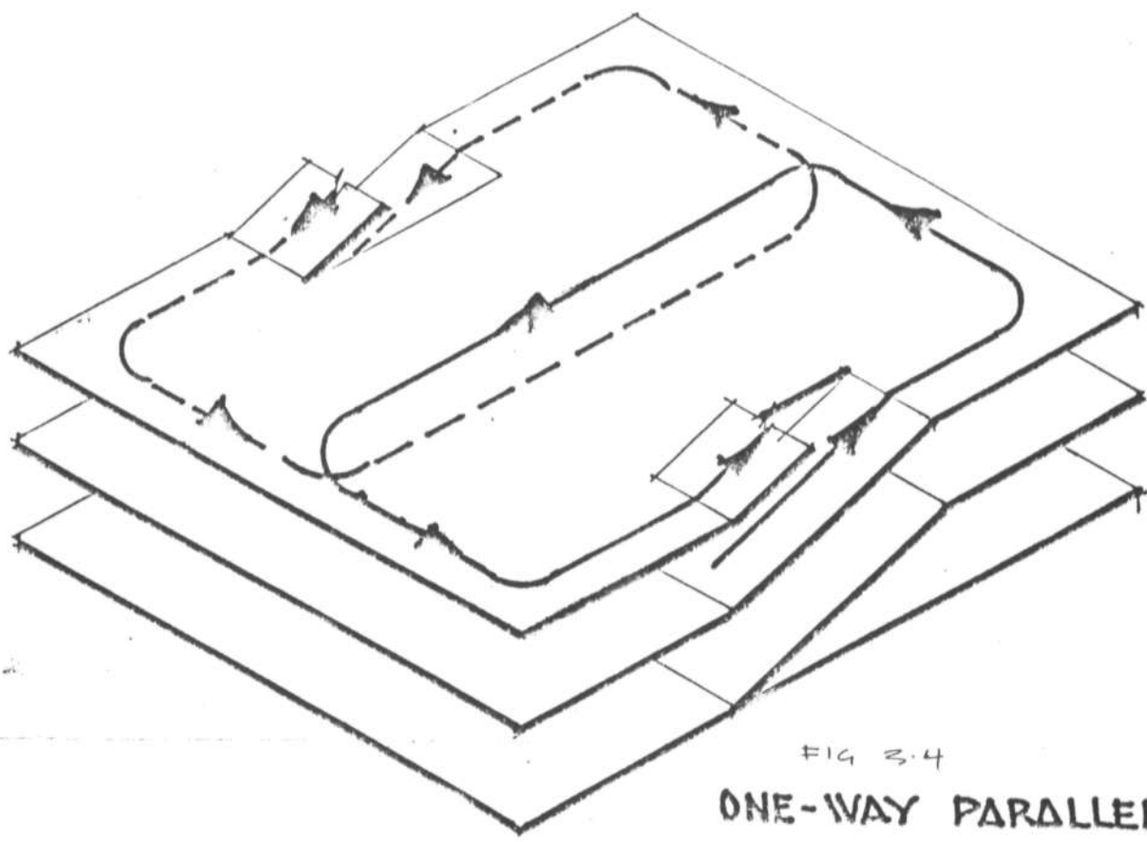


FIG 3.4

ONE-WAY PARALLEL RAMP SYSTEM.

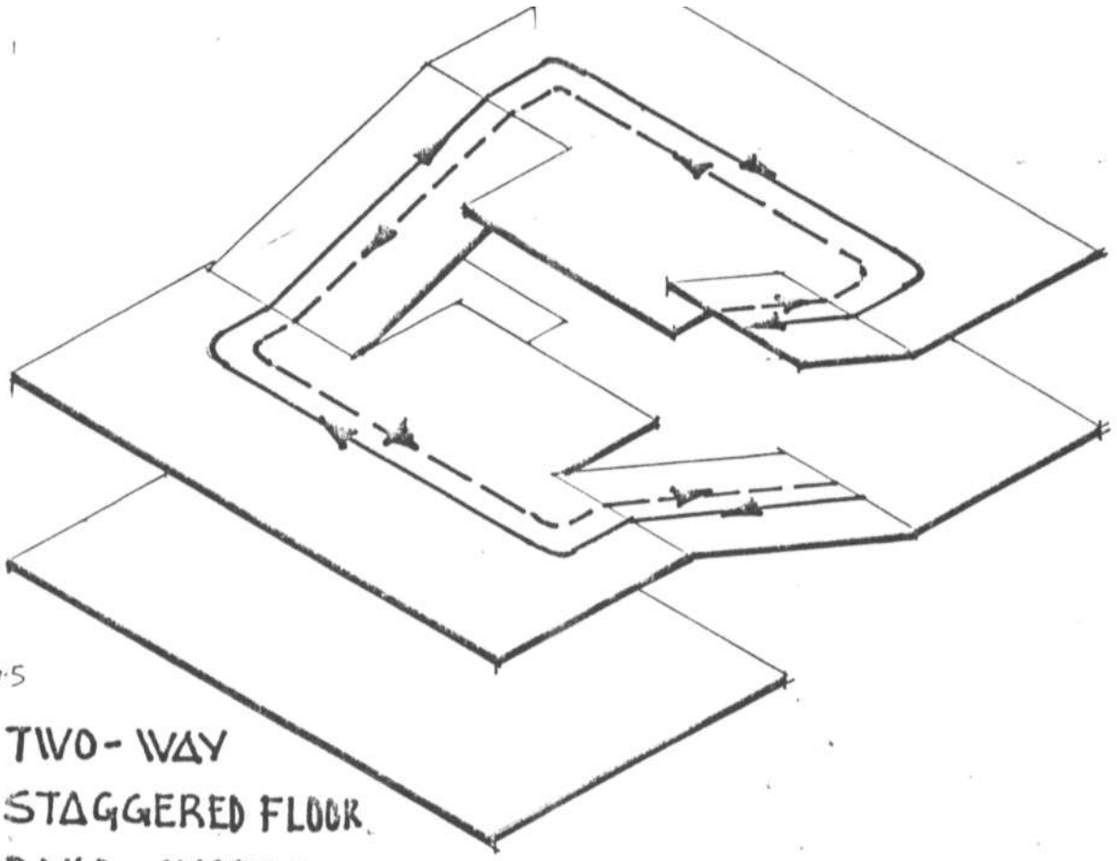


FIG 3.5

TWO-WAY
STAGGERED FLOOR
RAMP SYSTEM.

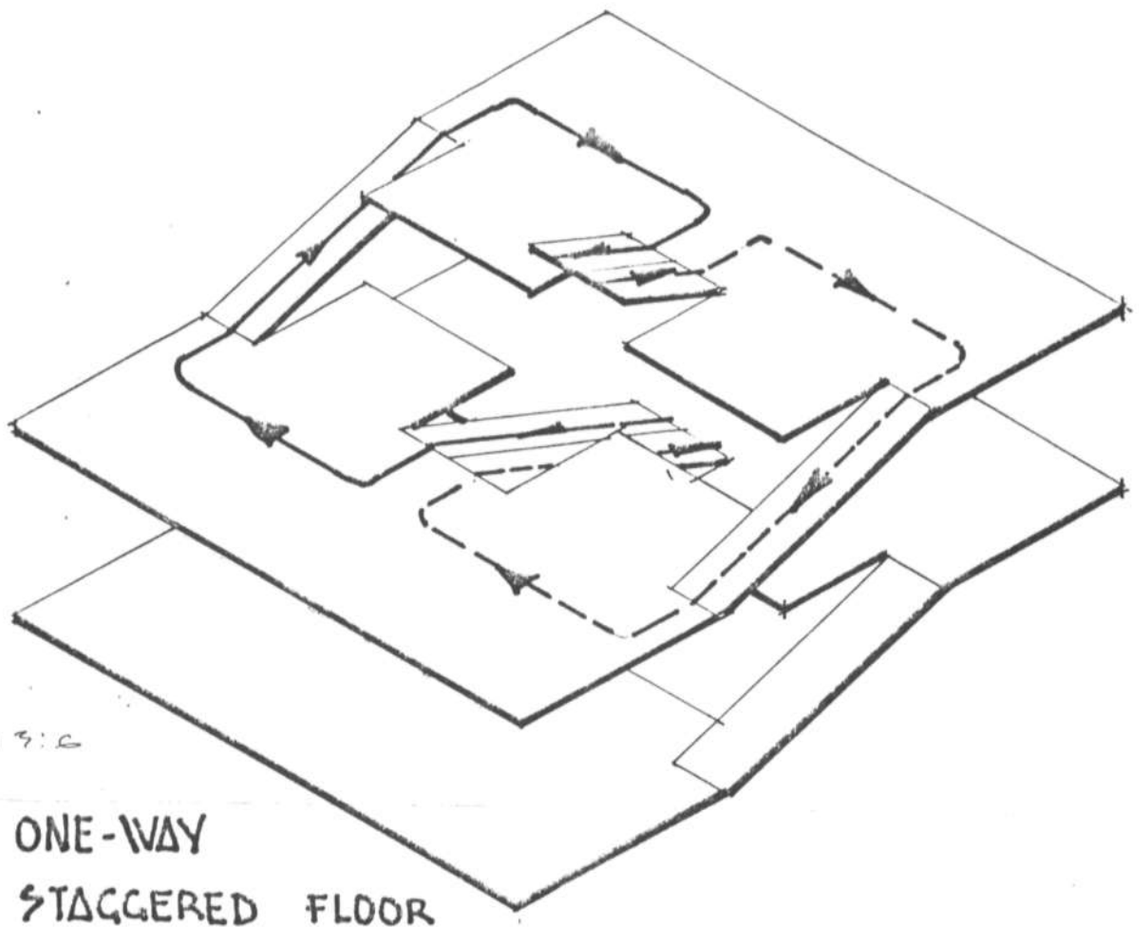


FIG 3.6

ONE-WAY
STAGGERED FLOOR
RAMP SYSTEM.

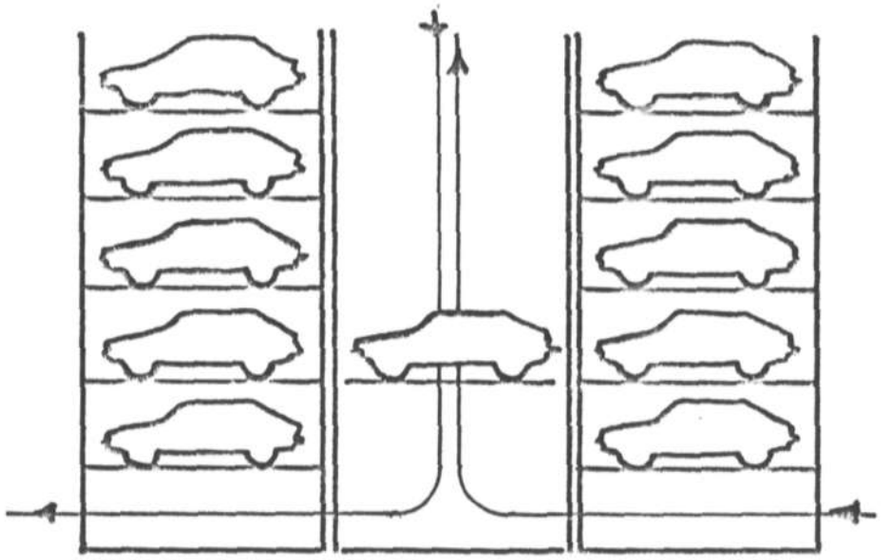


Fig 3:14 LIFT SYSTEM. LIFT IN CENTRAL WELL SERVING STALLS TO EACH SIDE. IN SOME SYSTEMS THE LIFT CAN MOVE HORIZONTALLY TO SERVE MORE STALLS.

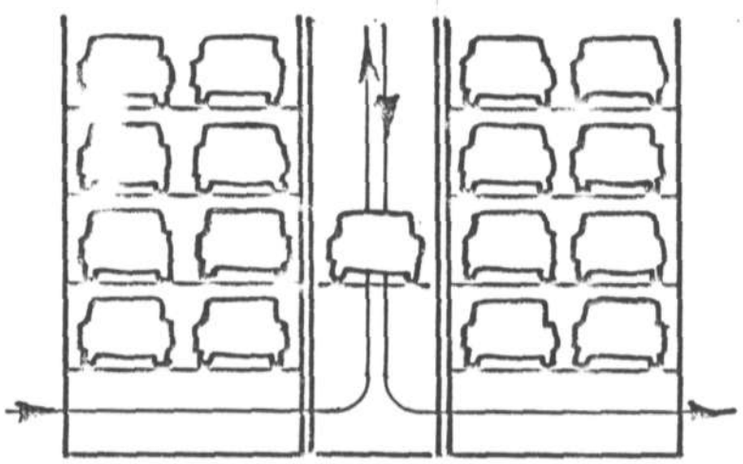


Fig 3:15 RAIL AND PALLET SYSTEM. LIFT IN CENTRAL WELL SERVING STALLS TO EACH SIDE. CARS MOVE ON PALLETS OR DOLLIES AND CAN BE PARKED TWO DEEP OR SINGLY.

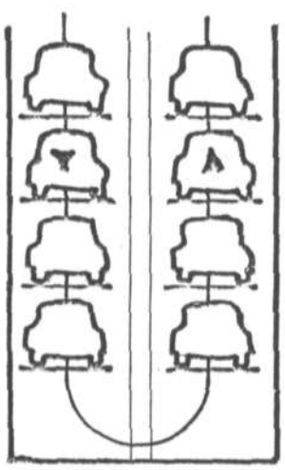
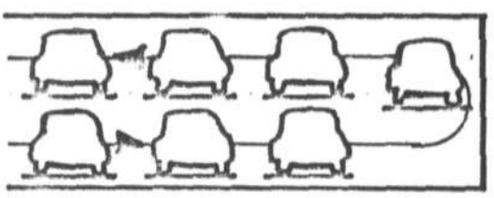
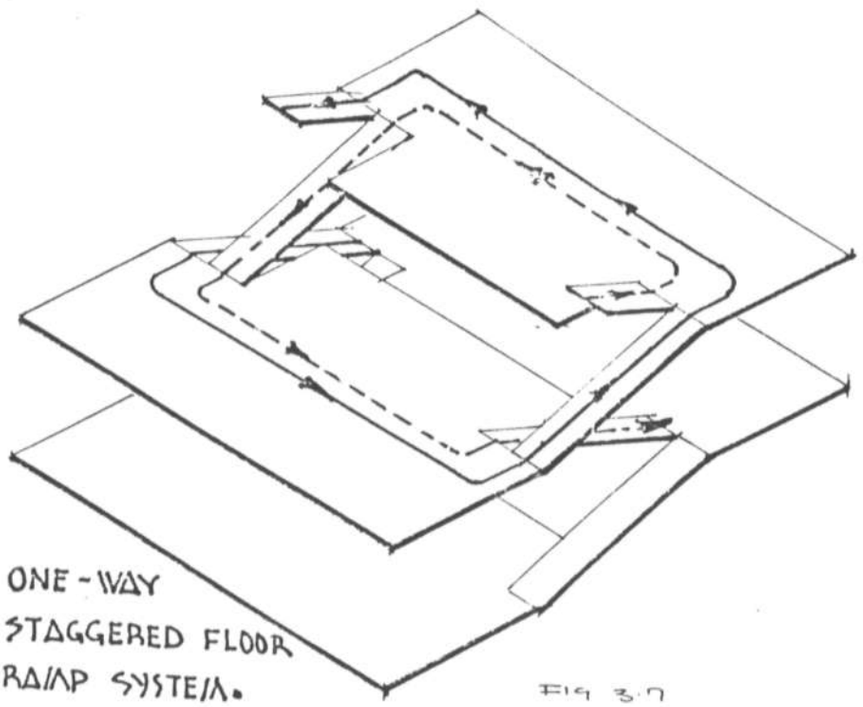


Fig 3:16
CONTINOUS CHAIN SYSTEM. THE CONTINOUS CHAIN PRINCIPLE, CAN BE USED VERTICALLY OR HORIZONTALLY.





ONE-WAY
STAGGERED FLOOR
RAMP SYSTEM.
(CONCENTRIC CIRCULATION)

Fig 3.7

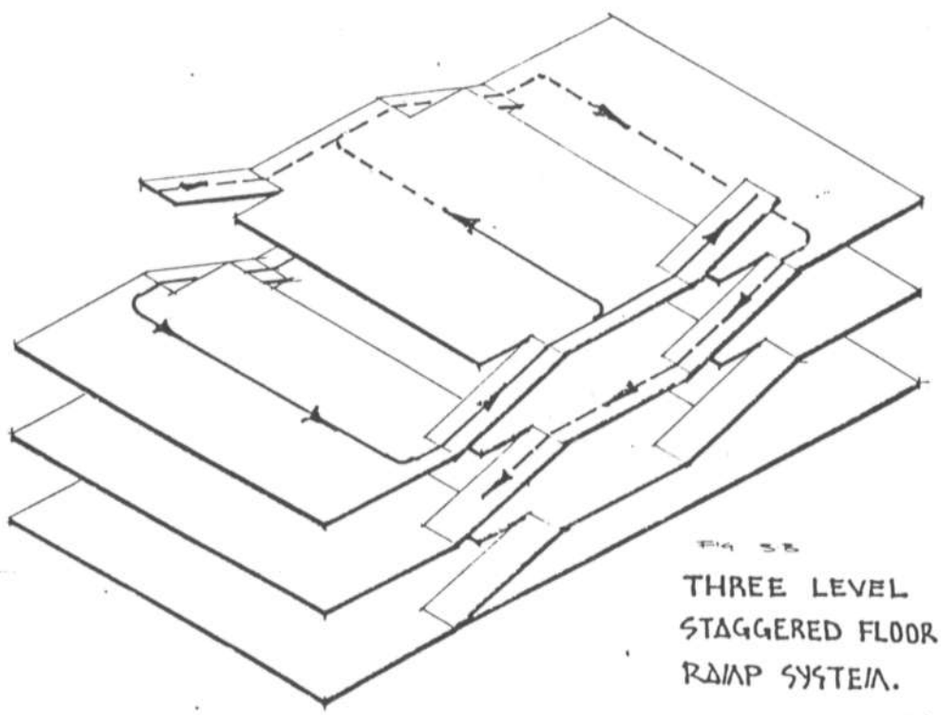


Fig 3.8

THREE LEVEL
STAGGERED FLOOR
RAMP SYSTEM.

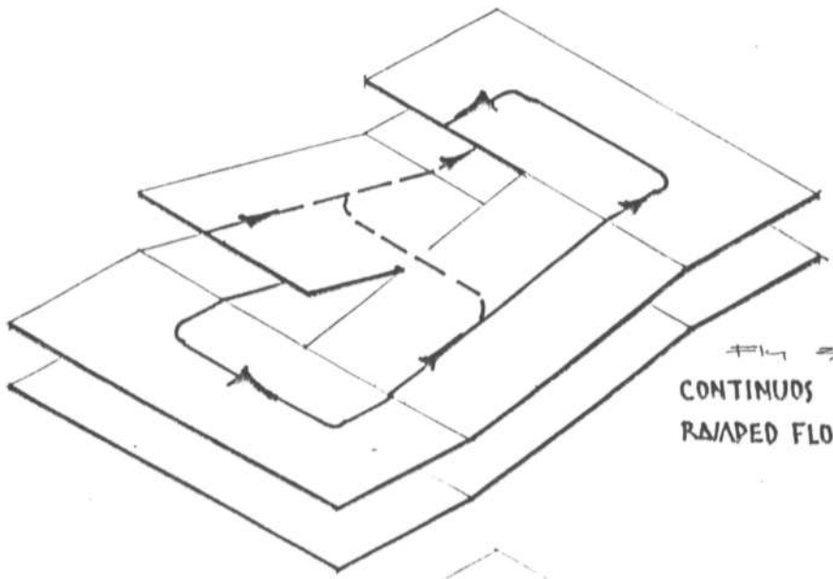


Fig 3.9
CONTINUOUS SLOPING INTERLOCKING RAMPED FLOORS - ONE WAY CIRCULATION

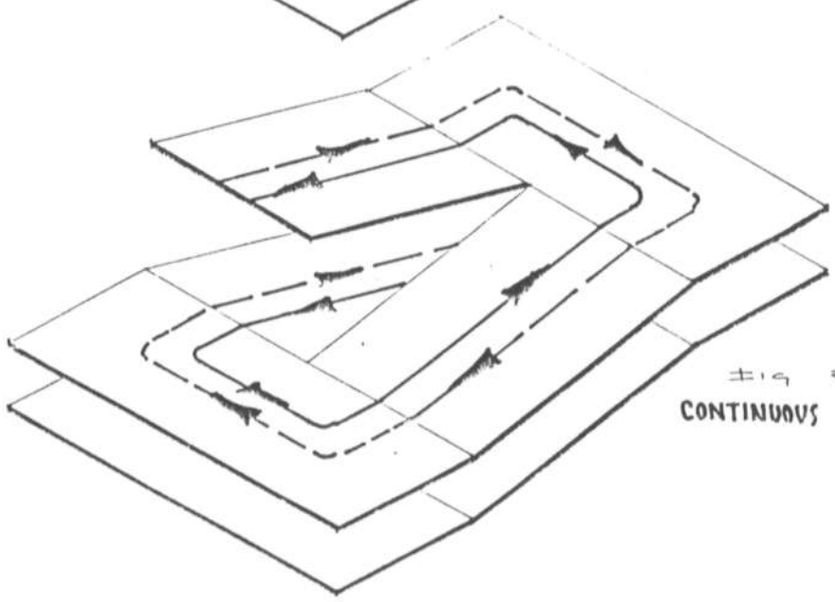


Fig 3.10
CONTINUOUS SLOPING FLOORS

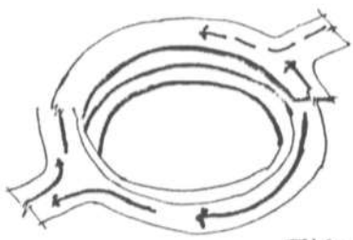


FIG 3:11
SEMI - CIRCULAR RAMP.

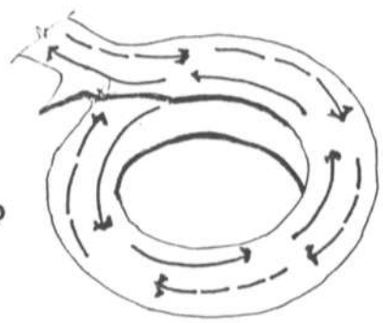


FIG 3:12
PARALLEL
CIRCULAR RAMP
SYSTEM.

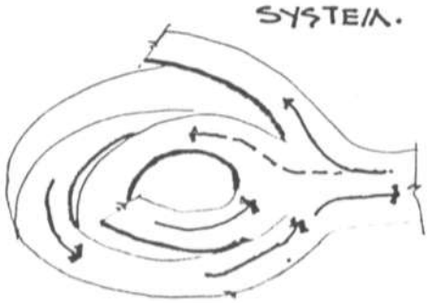


FIG 3:13
CIRCULAR OPPOSED
RAMP SYSTEM.

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entering the park unless the driver knows where their are vacant stalls.

i. **Semi Circular Ramp System:**

The up and down ramp will never meet, even at the parking floor connections, so there is less traffic conflicts. As entrance and exit points are at opposite sides of the ramp cylinder the best position for this type of ramp will be near the centres of the parking floor. (Fig. 3.11)

ii. **Parallel Circular Ramp System:**

This is a two-way ramp type. The entrances and exits are located at corresponding points above one another and is best planned to a side. One-way up and down lanes are on a single banked surface, there is crossing of traffic of each parking floor connection. But driver have a clear view of each way. (Fig. 3.12)

iii. **Opposed Circular Ramp:**

In this system two ramps are at opposite slopes and placed to meet at a landing. There is danger of up coming and down going drivers not seeing each other until they reach the common landing. (Fig. 3.13)

3.6 MECHANICAL CAR PARK

This are suitable where other parking systems cannot be

provided economically the extra cost must be justified by increased parking intensity. The chief advantages of Mechanical parks are:

i. guarantee parking intensity
ii. suitability for site with restorated access
iii. suitability for site shapes where other forms of parking cannot be provided:
iv. little risk to cars:
v. no height limit (theoretically)
vi. greater security for cars

Mechanical parks also have important disadvantage:

i. high capital cost and/or maintenance;
ii. risk of mechanical breakdown;
iii. delays to storage and delivery at peak times,
iv. need to provide reservoir spaces.
v. inability of drivers to visit car while parked.

3.6.1 SYSTEM TYPES

A wide range of mechanical systems is available. They fall in to three basic categories:

i. Continuous chains;
ii. Lift serving stalls;
iii. Rail and pallet systems.

i. **CONTINUOUS CHAIN SYSTEM:-**

Continuous chain parks operate either on a conveyor pallet or chain cage principle there are variations on the cage principle. Notably a big wheel or cages linked together which can be made to suit any reasonable volume. 75 seconds is the average delivery time for a horizontal conveyer belt of thirty cars. (Fig. 3.14)

ii. **LIFT SYSTEM:-**

The simplest form of lift system is where the driver enters the lift, is raised to an appropriate floor and drivers into a parking space. This entails a full ventilation system. Wide bays for getting out of cars and pedestrian access to the ground floor from all parking spaces more sophisticated systems make the transfer from lift to parking bay automatic. There are also lift designed to travel on rails. Serving more than one vertical column of parking bays. There are also lift system where cars are moved on dollies sideways into parking bays. (Fig. 3.15)

iii. **RAIL AND PALLET SYSTEM:-**

Cars are driven on to pallets which are then moved mechanically or manually along rails in these systems. Transfer parking will give a high density of cars, and

its advantage over direct lift park is that move cars can be accommodated for a given floor area. This is usually offset by increased mechanical costs. The complexity of mechanical movements may make this form of parking expensive and time for delivery are likely to be longer than with simpler systems. (Fig. 3.16)

3.71 PARKING SURVEY

Surveys are done to collect information on parking in the area under consideration, before any recommendation can be given. The followings are information sought from parking survey.

i. Parking Habits Survey - This is done with the objections to ascertain the usage of street parking: Information on legally parked and those causing some obstruction, including the type of vehicle parked, extend to which regulations are being ignored, areas of dangerous parking and length of time cars are parked.

ii. Parking Inventory - This is done to take stock of existing parking facilities both on and off-street parking.

iii. Parking Concentration Survey - This is done to gather information on the concentration of parking of certain time of the days or the time when it is likely to be at a maximum.

iv. Parking Duration Survey - To determine length of time cars are parked so that accommodation can be made for both long and short term parking.

Estimate Future Parking Demand

Future parking demand is very difficult to access accurately, because it depends on many variable factor: increase in car ownership, increase in population, development in business areas, and the extensions of the shopping catchment area due to increased mobility of population.

One method is to ascertain the number of persons working in central area, and the number of shoppers and visitors likely to be in area during working hours plus number of residents. The total number of cars parked from parking of residents. The total number of cars parked from parking survey is related to the number of people in the area. A growth factor is allowed for the increased number of vehicles registered, plus an allowance for either increase or decrease in population.

Another method is the gross floor space of different building uses in the whole of the central business area, related to the number of cars parked. The future flow space area can be estimated together with a growth factor for vehicles. From these figures, the parking demand can be estimated.

A third method is to take the parking situation as a basis and estimate the future demand by applying an average growth

factor for the whole area.

CHAPTER FOUR

4.1 OPTIMISATION OF AN URBAN PARKING SPACE - CENTRALISED

It is generally accepted that the variation in the spatial distribution of land- use is a result of activities tendency to seek out and segregate themselves where they enjoy their greatest relevance advantage and of which they can exclude all other use (Brown, 1974; Goodall, 1974; Nourse, 1974). This view is further confirm by Dewis, (1979). However, he states that land is not only subject to purely economic activities. There are non-profit uses of land. Moreover this non-profit uses preconditions and establish broard frame work for the profit motivated activities. Gwilliam and Mackie (1975) agree to this view in theIr analysis of optimum situation. They note that to treat efficiency on the sole objective of an economies system, would be implicity assuming that social benefit is directly related to effective demand, that is to say demand backed by purchasing power. In their conclusion they identifies certain key commodities frequently known as merit goods, which it is felt should be provided free or below cost in order to ensure they are available to all e.g. health and education.

Unlike the private sector, where developer can compare schemes in terms of their money costs and returns to him. Rational choice in the public sector is different, for so often the benefits to be derived are for general use and therefore

have no market price. However to improve the economic concern of a public use the concept of mixed use may be adopted to optimise the utilisation of the site.

4.1 MIXED USE

Mixed use is a concept where a piece of land or building is put to more than once activity simultaneously: where a combination of two or more uses exist.

4.1.1 MIXED-USE COMBINATION

Mixing should be compatible mutually tolerant and capable of existing together is the same place without experiencing any negative externalities. They major land uses that go into combination to form a mixed land-use patterns are residential, commercial, industrial and public/semi-public uses. Combination could be of two or more uses. Simon, (1984) identifies eleven possible patterns and combinations.

Mixing could be horizontal, vertical or a combination of both. Horizontal mixing of land-uses are spatially arranged on the same plot. e.g. the frontage of a plot could be commercial and the back residential.

Vertical mixing of land-uses are spatially arranged on different floors of the same building e.g. ground floor for commercial activity while first floor is left for residential use.

A third combination is where both horizontal and vertical patterns of mixing are combined.

4.1.2 OCCURRENCES OF MIXED LAND USE

Concentration of mixed-use activities are mostly along major street of residential, commercial and industrial area. Patterns of land use are influenced by the size of the city. The need for a variety of activities to generate the mixing of more than two uses is high in larger cities.

Land use mixing has a strong locational preference for the major circulation routes in the city and show a pattern of decrease in intensity and type from the core (centre) towards the periphery, except at intervening points of transportation inter change, where localized peaks of intense mixing of land-uses is noticed. (Simon 1984; Unvegamomere 1991).

4.1.3 *THE BENEFITS OF MIXED USES*

Mixing ensure economic and spatial growth in the city. It produces desirable patterns and also ensure the proper functioning of the city, to meet changing needs and requirements of societies.

There are savings to be derived from the mixing of uses on a piece of land. It enable savings in resources and space which would have had to be spread out were uses zoned separately.

The intensified site utilization it enhances in terms of time, site and use of building on it.

It reduces the initial and recurring expenditure on utilities and services. This is because the concentration typical of mixing reduces the extent over which there uses would have to be transported.

The preferred combinations in a mixed-used is a subject of the activity dominant in the area and this would be better understood by examining the principle of location theory, because different activities can be more easily or profitably carried out in one place than in others.

4.2 LOCATION THEORY

Location theory provides a basis for identifying the distribution of resources across space. In general people locate where they can maximise their satisfaction over time and manufacturing firms locate where they can maximize their profit. (Nourse, 1974; Brown, 1974; Goodall, 1974); the principle that underlies this theory suggest, that the determination of the profit-maximizing location, is a matter of balancing anticipated cost and resources at alternative site. The relative advantage of possible location at any given time reflects differentials, in put, transportation cost and different opportunities in respect of scale and agglomeration economics.

Goodall identifies the dependence on a single factor explanation (that output cost varies systematically with distance from a given point) as the critical limitation of the theory. Further, he shows that the theory contributes to an

understanding of the factors influencing location decision on an inter urban scale rather than on the intra urban level. Moreover, when applied to the distribution of productive and consumptive activities. The location choice via the market in practice does not work as perfectly as in the establishment of the theoretical optimum since the imperfection of the price mechanism has basic repercussion for locational patterns. Furthermore, decision may be made on the basis of a satisfaction rather than maximization. In this case there is greater flexibility of locational choice.

4.2.1 LOCATION DECISION WITHIN AN URBAN AREA

i. LOCATION CRITERIA

The location of any urban activity is it ability to offer the highest price where anticipated contacts are in equilibrium, that is, the site where an activity relative advantage is optimise. Brown, 1974).

ii. ACCESSIBILITY

The ease with which contacts may be made between various sector of the urban area, determine the benefit derived and the cost of operation from a given site. Contact may be through letter/telephone as well as movement of people and goods.

The access needs of users differs, and will affect the degree to which advantage is taken of the locational

qualities, of the position of greatest accessibility. Activities requiring personal contact tend to cluster in areas with superior mass transit facilities or heavy pedestrian traffic. While those handling goods in bulk tend to locate adjacent to heavy transportation facilities. The accessibility requirements is subject to the nature of the contacts. (LEAN and Goodall, 1974) i.e. a producer's dealing with his customers may be on a face to face basis, over the telephone, via letters, or some intermediary. The need of a departmental store (personal contact) differs from a mail-order store (postal service). Therefore, the restriction to the choice of alternative site for a given business, is a reflection of its needs for accessibility.

Households' choice of residential location in an urban area reflects the degree to which it is dependent on and can benefit from accessibility. (Nourse 1968).

iii. COMPLEMENTARY

This is the clustering within the urban area of like uses, in order to provide more range of good and services, or to stimulate sales through comparison.

Unlike uses also cluster where integrated local sequences arise from efforts to reduce space frictions and operational imperfections, in order to reduce cost. The number and size of complementary clusters is a function of the size of the urban area and level of accessibility. (Nourse, 1968).

iv. INCOMPATIBILITY

The spatial proximity of any pair of land-uses may be so incompatible that they seek location protected from each other. This is due to the effect on the operation of one or both activities, in terms of reduction revenue/self satisfaction or an increase in cost (Goodall, 1974).

CHAPTER FIVE

CASE STUDIES

5.1 INTRODUCTION

It is imperative to study similar buildings before embarking on any design, in order to establish Architectural merits and demerits which would eventually be used as appropriate in design-proposal.

Though it would be preferable if cases were taken from study area but the absence of a purpose - built multi-storey commercial public car park in Nigeria. Meant standard case studies appraised had to be foreign, however, efforts was made to featured two existing situations. The case studies considered provided necessary exposition and relevant data on car parks. They are:

i. Young street car Park - U.K

ii. Welbeck street car park - U.K

iii. Marina car park - Lagos

iv. Lagos Island car park - Lagos

5.2 YOUNG STREET CAR PARK

LOCATION: Young street, London W8, U.K.

CLIENT: Royal Borough of Kensington and Chelsea

ARCHITECT: Roy Chamberlain Associates.

The site for young street car park was purchased by the

Royal Borough of Kesington and Chelsea who lease the whole building to the car park operators. In a location such as this it was considered that a more valuable ground floor use than just car parking could be achieved. Several alternative uses were considered. As a retail use in this location was out of the question. It was decided to plan the whole ground floor area as showrooms and storage accommodation with minimal visual disturbance to the adjacent Kensington square. In addition, 279m^2 of office accommodation was provided to meet the local demand for small suites.

5.2.1 SITE

The site is located at Kensigton in London. The site is restricted and lies between other buildings. It has a difficult shape being restricted severely in length, and it is affected by planning requirements resulting in a set back at high level both at the front and rear.

5.2.2 PLANNING

A frontage height restriction to young street was imposed by the Planning Authority with a desirable maximum of five-and-a-half floors drive-up. These were the constraints in providing 11 - split - level parking decks.

Internal planning of the car park with a restricted frontage led to adoption of a two way ramp circulation, as a

one-way circulation with four ramps would have led to an undue loss of car parking spaces.

The principal design difficulty on this restricted site was the planning and location of vertical circulation and services to suit three separate and different users. Independent access was required to each, and each user provided different local authority requirements. Stringent requirements for the protection of residential property, particularly at the rear, from sound and head light disturbance coupled with fire regulations requiring maximum flow of air through the facades led to the provision of a deep finned box sectioned louvre from floor to underside of slab.

5.2.3 CONSTRUCTION AND MATERIALS

In general the construction is conventional insitu r.c columns and slabs. Exposed concrete faces are faced with mosaic or neutral - coloured sprayed stone finish. Light coloured facing bricks are used for the relatively small areas of infill and facing panels required. The full height louvers were purpose-made in asbestos with a glazed white finish.

5.2.4 APPRAISAL

MERITS

- Effective incorporation of secondary uses: office accommodation

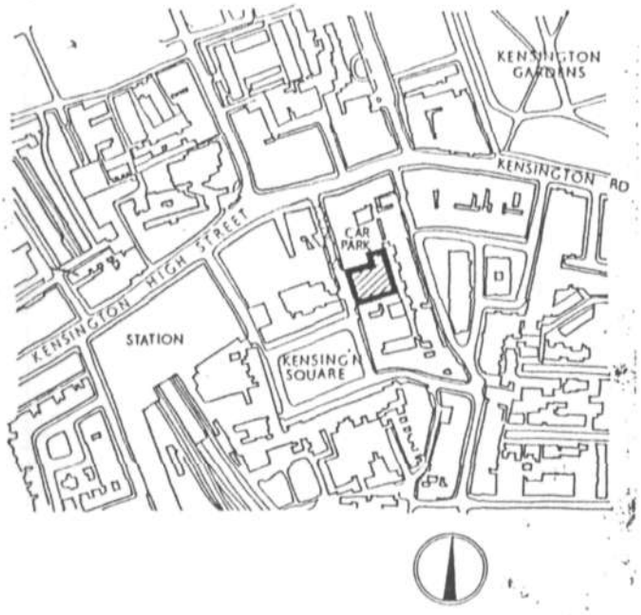
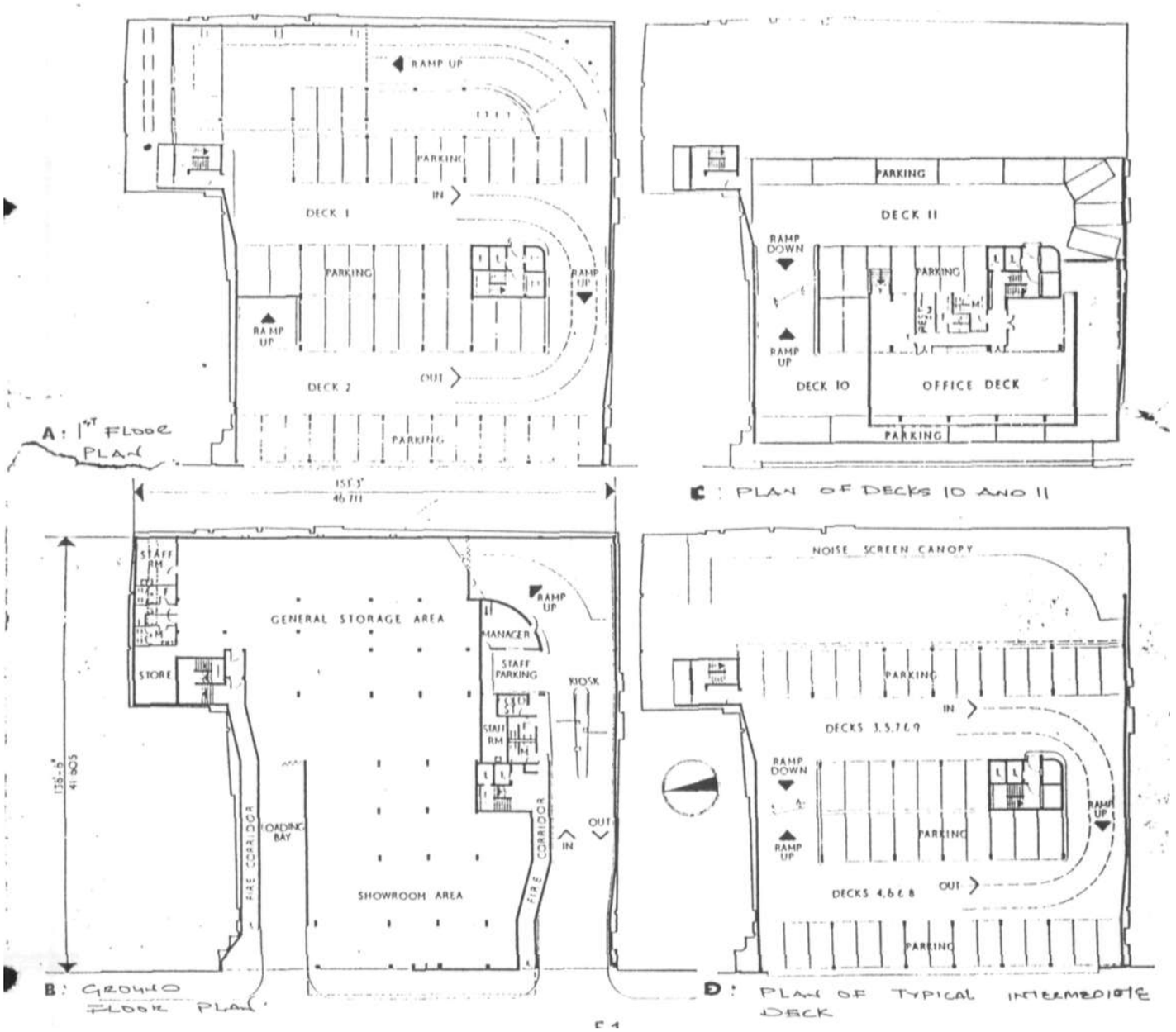


PLATE 5·1 : YOUNG STREET CAR PARK
LOCATION PLAN

PLATE 5·2: YOUNG STREET CAR PARK
PLANS



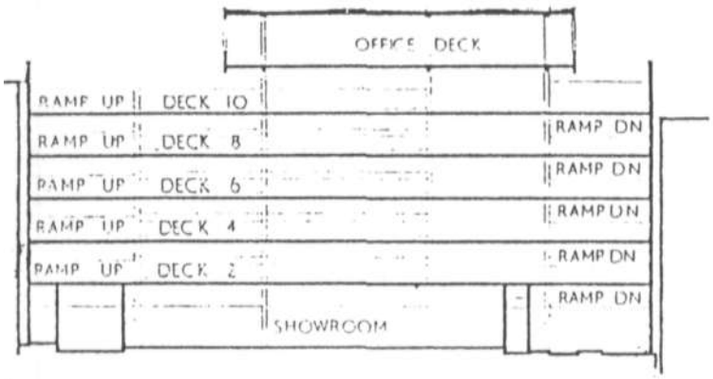


PLATE 5·3 : SECTIONS

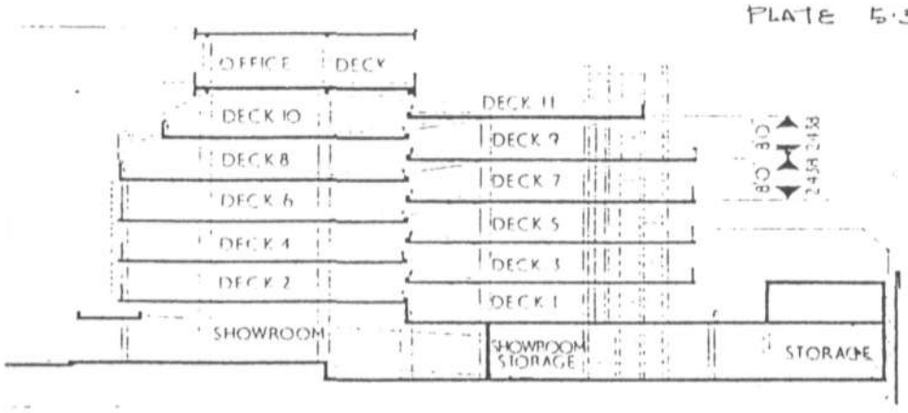
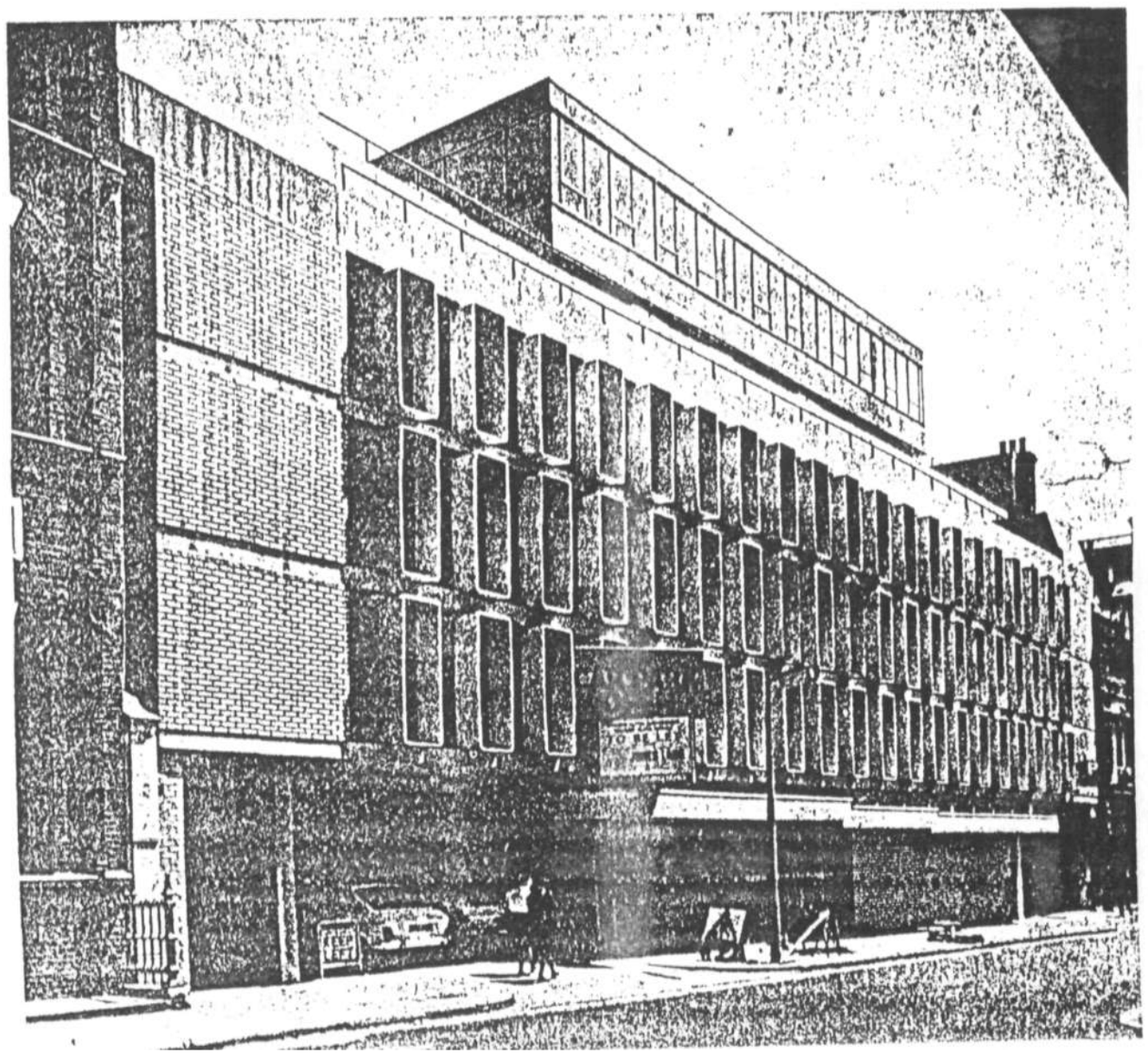


PLATE 5·4 : APPROACH VII



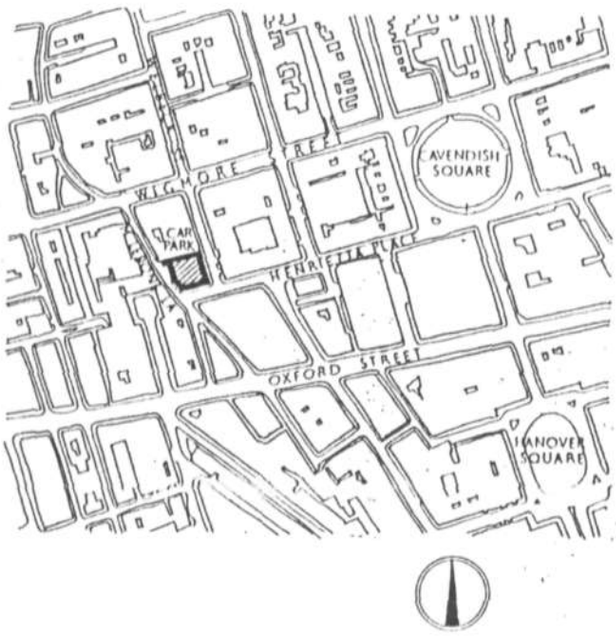
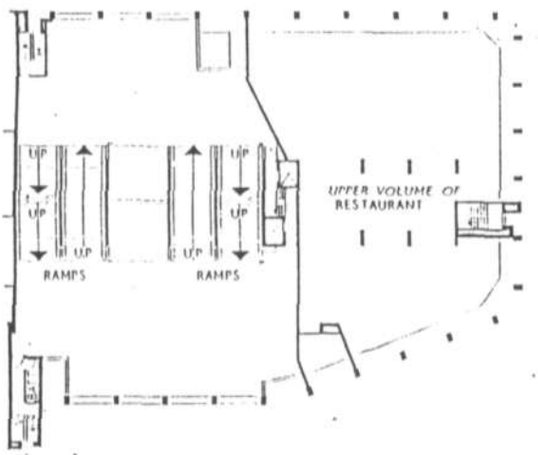
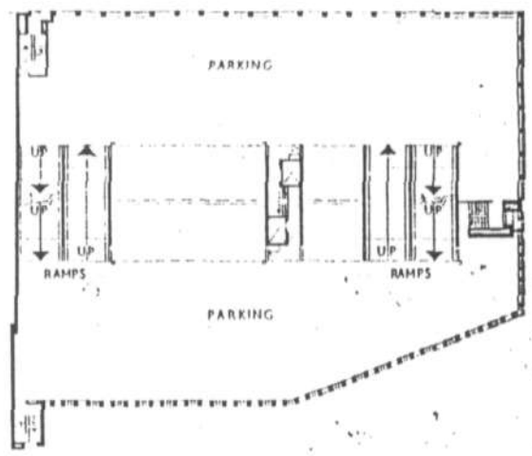


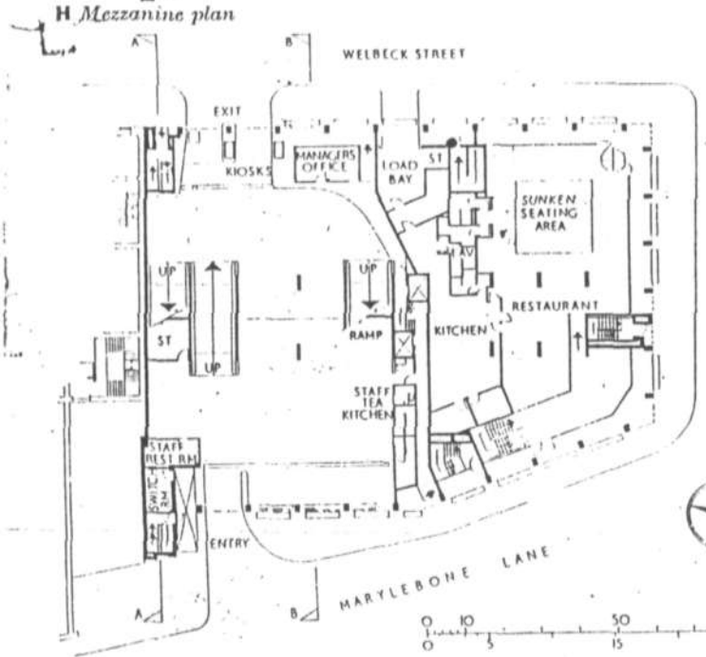
PLATE
5·5 : WELBECK STREET CARPARK :
Location plan



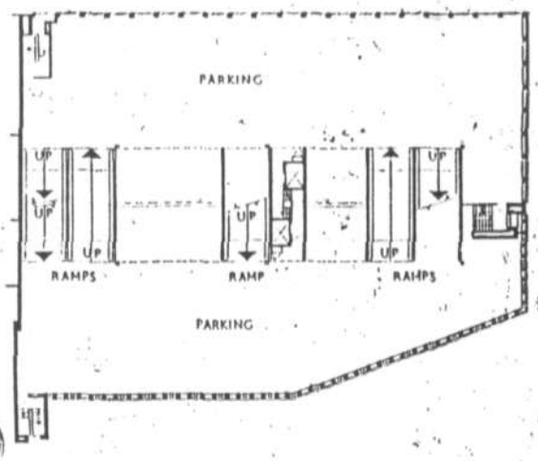
H *Mezzanine plan*



L *Fifth floor plan*



J *Ground floor plan*



M *First floor plan*

PLATE: WELBECK STREET: PLANS
5·6

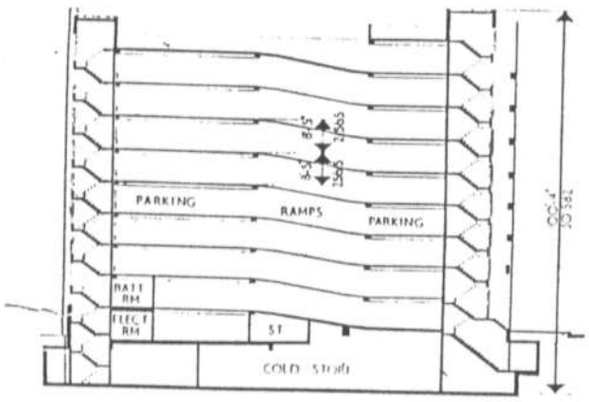


PLATE 5·7: WELBECK STREET CARPARK - SECTIONS

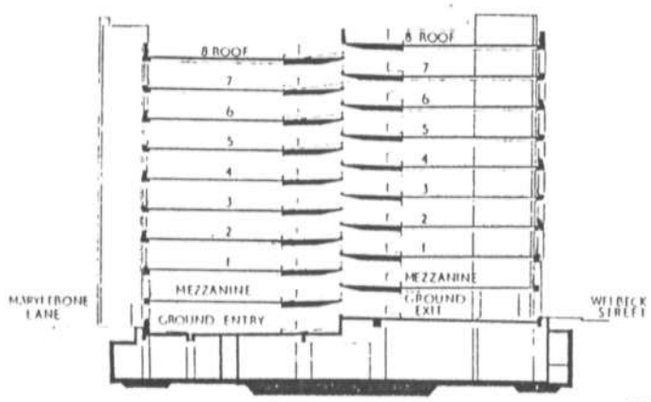
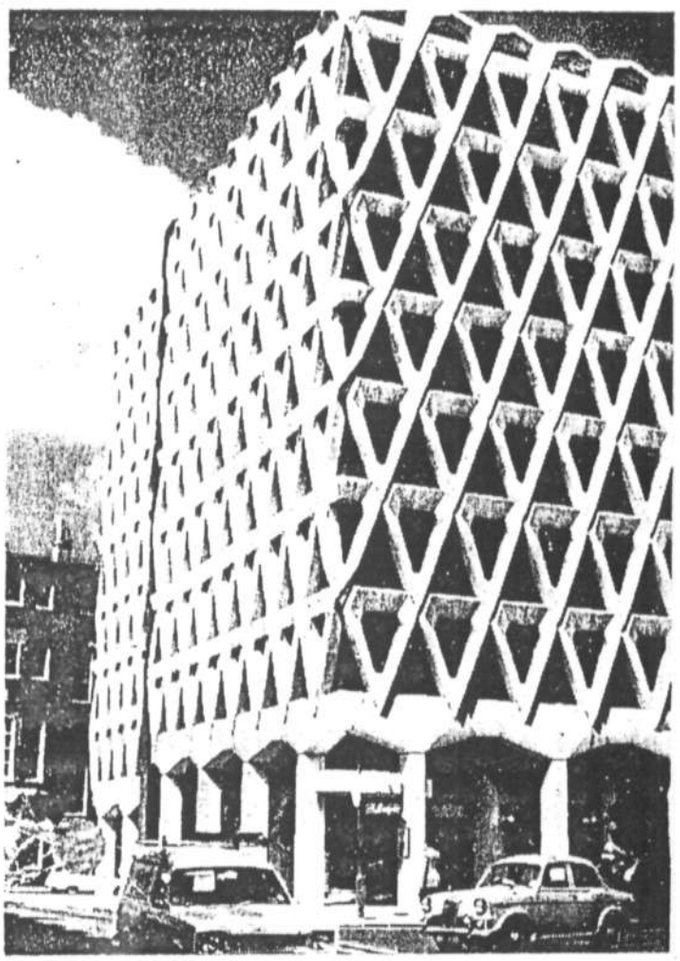


PLATE 5·8: WELBECK STREET CARPARK - APPROACH VIEW.



- The rhythm of the asbestos units on the elevations helps the building to blend with its neighbours.
- The reservoir space is well arranged
- A generous lead-in has been achieved by using the depth of the site and ample space is provided for cars should they have to queue.

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NA
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AT

DEMERIT

- Up traffic tends to cut corners at blind spot.
- Sitting of columns and spacings make manoeuvres difficult, in and out of stall - (particularly dangerous near blind corner of descending ramp.
- Unwelcoming entrance could be improved greatly by higher level of lighting which safety reasons alone would justify.
- No sightliness are provided for drivers leaving park, causing danger to pedestrians.

5.3 WELBECK STREET CAR PARK

LOCATION: Welbeck street, Henrietto Place, Marylebone Lane, U.K

CLIENT: Debenhoms Ltd.

ARCHITECT: Michael R. Blampied and Partners.

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Ahmadu Bello University

5.3.1 SITE:

The site is boarded by three road, the Welbeck st, Marylebone lane, and Henrietta place. The Marylebone road follows the course of a stream and there is a different in level of approximately 1.5m between the Welbeck of and Marylebone land frontages, with a continuous slope along the third raod frontage, Henrietta place.

The site is not only a small site but also one that is awkwardly shaped. The site is well placed adjacent to the most popular part of the West and shopping area and is central to offices and medical consulting rooms.

5.3.2 PLANNING

The brief was for approximately 400 cars plus lettable space (Restaurant) on the ground floor and part of the basement. The rest of the basement was to be devoted to the client's specialised storage requirements.

The different in level was partly responsible for the choice of the split-level car park formation. The unit height was governed by the floor to floor heights in the building. And a common modular width was calculated to suit all elevations of the rather awkwardly shaped site. It was not necessary to relate this module to a car space width in the building became column free parking areas are provided around the perimeter of each floor.

5.3.3 CONSTRUCTION AND MATERIALS

Of the various alternative forms of structure and cladding considered precast concrete proved to be the most economic, fulfilling the requirements of structure and providing a finish in keeping with the surrounding building.

The external structure is related directly to a system of 305mm deep prestressed, precast I-beams which forms composite floor with 31mm deep precast planks and a 76mm in-situ concrete topping. This floor is supported at the center of the building on shallow in-situ beams spanning r.c. ramp sections and lifts and stair case enclosure. Service holes were precast into the I-beams in the appropriate positions on each floor. According to the types of services to be contained, in an attempt to limit all lighting sprinklers and other services within the coffered section of the floor.

5.3.4 APPRAISAL

MERITS

- Effective incorporation of secondary uses: Restaurant.
- Good sightliness are provided by cutting back concrete structure to aid visibility.
- The site peculiar nature was taken advantage of and is partly responsible for the choice of the split - level car park formation.
- Good arrangement of stalls, which makes parking easy

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- Good sightliness are provided by cutting back concrete structure to aid visibility.
- The site peculiar nature was taken advantage of and is partly responsible for the choice of the split - level car park formation.
- Good arrangement of stalls, which makes parking easy

and quick, causing minimal interuption to traffic floor.

- The car park was design in a dynamic form, expressing both the construction and its use in a manner usually acceptable in itself and also in relation to the neighbouring buildings.

DEMERITS

- The reservoir space at the entrance is totally inadequate which is not surprising in view of the restricted site. Two cars entering is sufficient to interrupt the traffic floor in Marylebone lane.

5.4 MARINA CAR PARK

LOCATION: Marina Street Lagos

CLIENT: Lagos Island Government

5.4.1 SITE

The site of the car park covers an area of approximately 3.92 hectares (approximately 9.86 acres). The site is fairly flat and composed of reclaimed sandy soil. The site is located at the edge of the C.B.D of the city of Lagos in Lagos Island. The site is boarded on two of its sides by roads: Marina street to North-East. The ring road to the South-west. It is situated close by to the U.B.A Headquarter, Wema bank headquarter and

Kingsway shopping mall.

5.4.2 PLANNING

Advantage was taken of the set back between the Lagos lagoon and the property line to provide parking for Lagos C.B.D. Parking is generally open surface parking with bitumen top covering. Parking stall is at 45^0 angle: Herring bone intermeshing pattern.

There are two control points with generous lead-in to provide ample space for cars should they have to queue. The car park has a maximum of 1200 parking stalls. The side to the Marina street has retails outlets to improve the commercial concern of the parking.

5.4.3 APPRAISAL

MERITS

- Effective utilization of an empty lot to profitable use as a parking area.
- Incorporation of retail outlets (kiosk) at the side to Marina street to improve the commercial concern of the park.
- A generous lead-in has been achieved by using the depth of the site as ample space is provide for cars should they have to queue.
- Good arrangement of stalls, which makes parking easy

and quick causing minimal interruption to traffic floor.

DEMERITS

- Due to site handicap (set-back) upper level cannot be provided and expansion is remote.
- Unpleasant sight of ugly man of shiny car tops due to absence of landscaping.
- Lack of cover for cars from climatic element.
- Difficulty in spotting empty spaces due to absence of attendant at the entrances of aisles to direct incoming motorists to aisles where stalls are vacant.

5.5 LAGOS ISLAND CAR PARK

Location: Marina Lagos.

Client: Lagos Island Local Government

5.5.1 SITE

The site is opposite Union Bank building and First Bank Marina. This site like the Marina Car park site is the set back between the lagoon and the property line. The site .6 Hectares, fairly flat, firm and composed of reclaimed sandy soil.

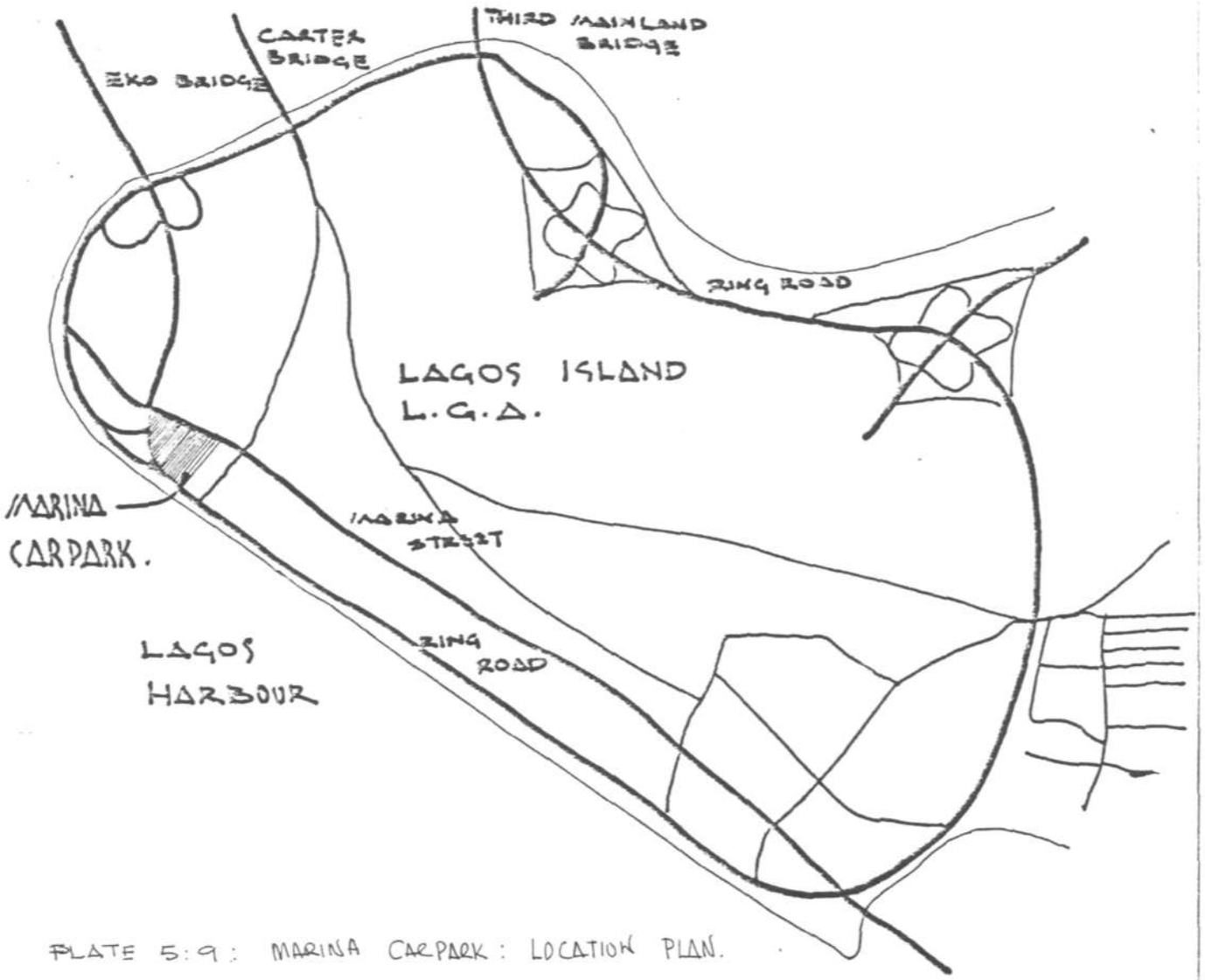


PLATE 5:9: MARINA CARPARK: LOCATION PLAN.

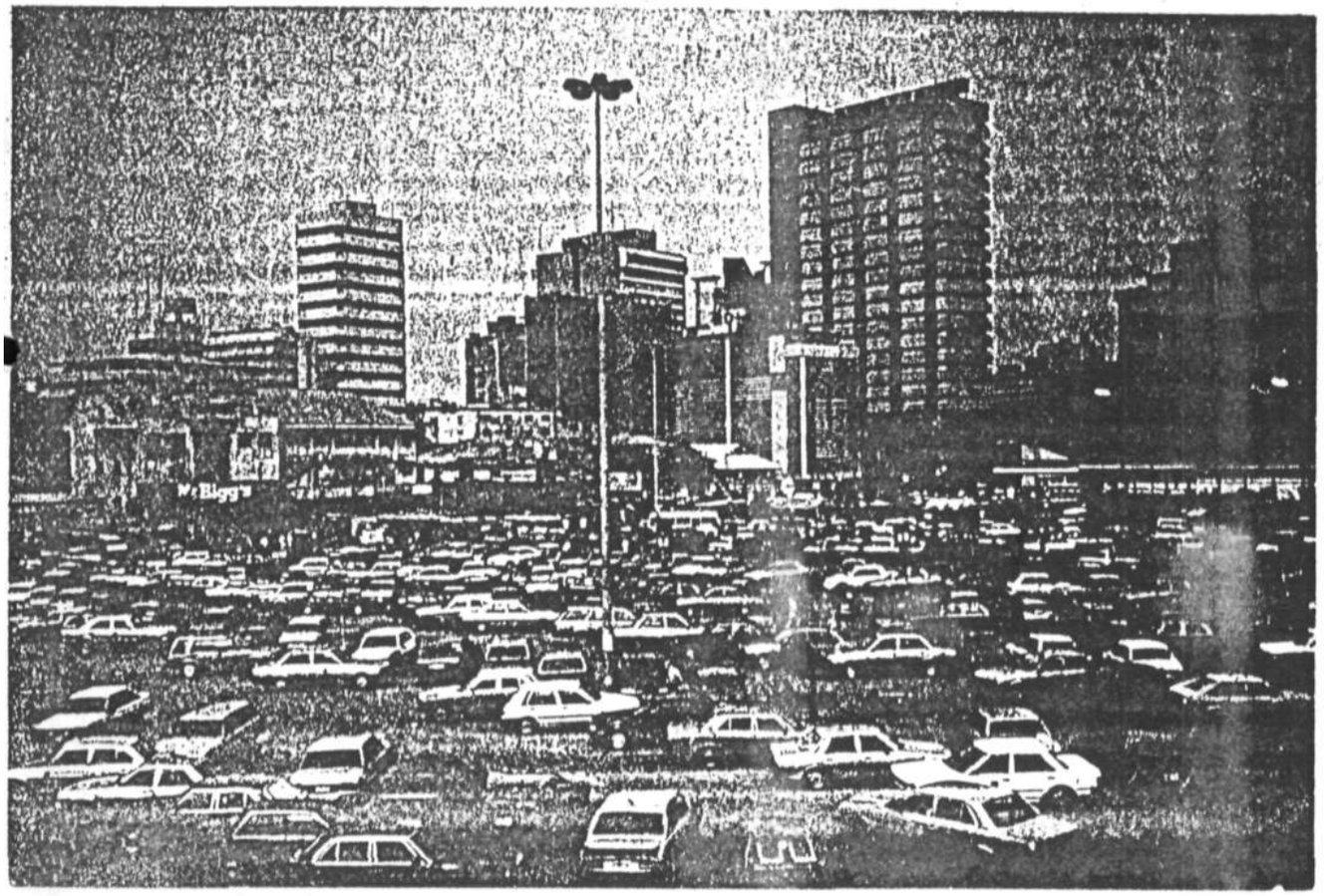


PLATE 5·10: MARINA CAR PARK

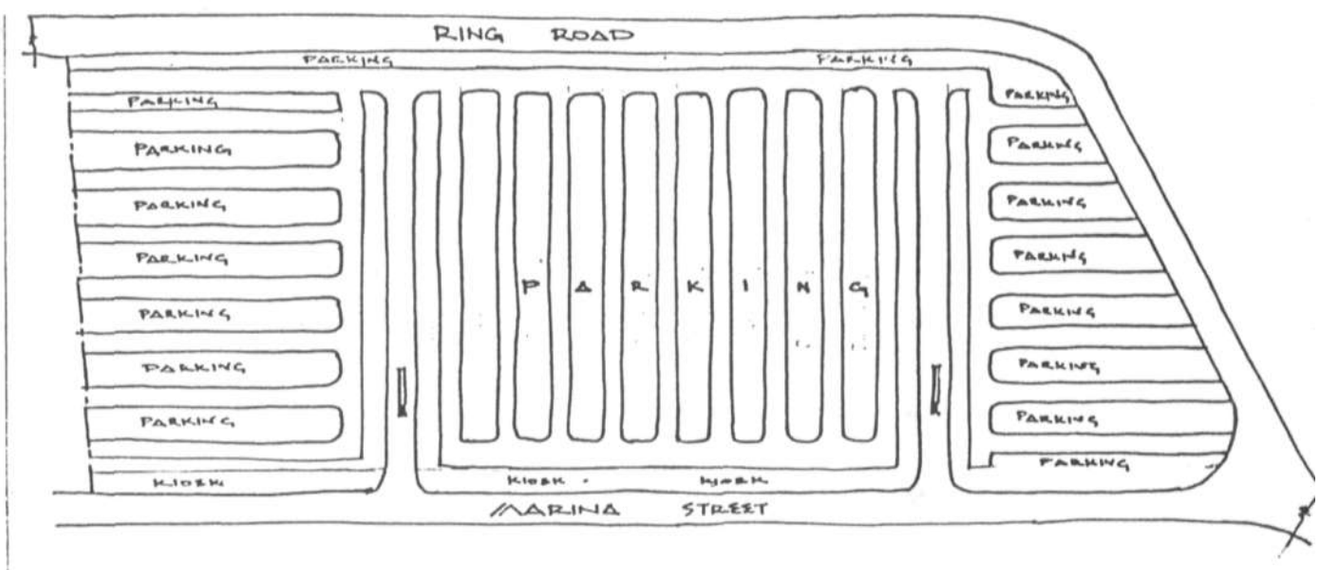


PLATE 5·11: MARINA CAR PARK STALL ARRANGEMENT

5.5.2 PLANNING

The set-back between the Lagos lagoon and the property line was converted to provide open surface off-street parking spaces with Bitumen for covering. The choice of parking angle is 90^0 with two-way circulation. The car park has provision for maximum of 134 parking stalls.

Exit and entering is through one control. A restaurant (Bukateria) located near the control point is the only commercial concern incorporated within the car park.

5.5.3 APPRAISAL

MERITS

- Effective utilization of a set-back to profitable use as a parking area.
- Incorporation of bukateria to improve the commercial concern and to optimise the utilisation of the park.

DEMERITS

- Lead-in to the site is short and should car have to queue at entrances it would affect traffic flow on Marina street.
- Poor resolution of vehicular and pedestrian circulation
- Due to site handicap (set-back) upper level can not be provided and expansion is remote.

- Unpleasant sight of ugly mass of shiny car tops due to absence of landscaping.

CHAPTER SIX

THESIS STUDY AREA

6.1 LAGOS

The economic capital of Nigeria, and the capital of the country till 1991, when the position was ceded to Abuja.

Traditional history has it that the first settlers on the Island which was variously known as Eko, Oko, and Awam were the Awori. With the coming of the British Colonialist. Lagos came into prominence in the 17th century as the seat of the colonialist government of the southern protectorate. With the amalgamation of the Northern and Southern protectorate, in 1914 under governor Lugard. Lagos became the capital. It comprised the protectorate of Nigeria and the old colony of Lagos.

After several constitutional conferences, Nigeria finally became independent on 1st October, 1960. Lagos was the capital of the Federation of Nigeria, and since 1963, of the Federal Republic of Nigeria until 1991.

The city of Lagos and it's suburbs have developed greatly from a small size city to a larger city with a population of over 7 million inhabitants. The growth witness expansion of the economic.

6.2 GEOGRAPHICAL CONTEXT

Lagos state lie in the region of Western Nigeria. It geographically falls between $6^{0}20'N$ and $6^{0}40'N$ of the equator and between longitudes $2^{0}40'$ and $^{0}5\ 20'$ East of the Greenwich Meridian. Lagos is bounded in the North by Ogun State, West by Republic of Benin and South by the Bright of Benin. The total land area is about 3.349 sqkm.

6.3 RELIEF AND DRAINAGE

The relief of Lagos is predominantly integrated by several water ways which ultimately drains into the Atlantic ocean these water ways include numerous streams, rivers and lagoons.

6.4 CLIMATE

Lagos is in the west humid climatic belt. Lagos falls into the mangrove swamp/rain forest belt type of vegetation modified by physical development.

6.4.1 TEMPERATURE

The mean maximum temperature is $30^{0}C$ while mean minimum monthly is around $23^{0}C$. The coolest period is in March and April and the highest temperature occurs in November to December and February to March. Approximate uniformity of temperature is usually experienced in Lagos.

6.4.2 RAINFALL

Rain falls in double maxima periods late April to early July and between September and October. The mean annual rain fall is 124.5mm. It is usual to have some rain in all months in Lagos. However in some year rainfall may differ widely from the normal condition outlined above.

6.4.3 WIND

There are two prevailing winds in Lagos these are:

i .The tropical maritime wind. It blows from the South-west to the North-east and is wet and warm. It brings rain with it and it blows during the month of April and September.

ii. The dry tropical continental air mass. This blows from the Sahara to the south-west (October - March). Dry and dusty it pushes the tropical maritime air mass to the South ensuring the on set of the dry season.

6.4.4 HUMIDITY

The maximum mean monthly average is between 85% and 95% throughout the year, and usually decreases to a minimum of about 60% to 80%. It is drier in the hamattan season: December to January. The wet season is usually more humid: June being the most.

CLIMATIC DATA.

MONTH	RAIN FALL AVE MONTHLY (mm)	SUN SHINE MEAN DURATION (Hr)	HUMIDITY AT 900 Hrs %	HUMIDITY AT 1500 Hrs %	TEMPERATURE MEAN MAX	TEMPERATURE MEAN MIN
JANUARY	41·7	6·1	75	56	32·6	22·1
FEBRUARY	26·8	5·3	76	56	33·2	24·3
MARCH	62·5	5·6	78	58	33·2	24·5
APRIL	180·8	6·0	77	62	32·9	24·5
MAY	298·1	5·0	83	71	30·6	22·7
JUNE	390·5	7·5	85	82	28·3	22·0
JULY	315·8	2·3	84	79	30·6	22·2
AUGUST	105·2	2·4	84	73	28·3	22·0
SEPTEMBER	136·7	3·2	84	72	29·53	22·5
OCTOBER	194·5	4·3	84	75	29·5	22·8
NOVEMBER	75·5	3·3	84	71	30·9	23·1
DECEMBER	12·4	3·2	84	65	31·7	23·4

ADAPTED FROM NIGERIA IN MAPS (BARBOUR, OGUNTOYINBO, Nwafor·(1982

FIG 6·1: CLIMATIC DATA.

6.4.5 SUNSHINE

Bright sunshine is experienced for longer period of time of 7.5 hours a day in June than any other month. July has the longest period of sunshine of five hours. The average period for sunshine for all months is 4.5 hours.

6.5 THESIS SITE PHYSICAL DATA

6.5.1 THE SITE LOCATION AND CHARACTERISTICS

The site measuring approximately 1.1 hectares is bounded on two of its sides by roads. To the East by Keffi street and to the South by Awolowo road. The site lies in Obalende ward in Eti-Osa Local Government. The flat topography will permit good planning without excessive grading cost.

The site is located in a high income mixed-use zone where land cost is relatively high. The nearby development most especially along Awolowo road consists of low-rise buildings though several redevelopment is currently going on with floor height to 6 floors. (The maximum permissible height). There is high presence of retail outlets and offices.

6.5.2 SOIL CONDITIONS

On the survey map for Lagos, the soil is composed of hydromorphic and alluvial soils. The soil has a load bearing capacity of 75 tones per square feet.

The soil consists of loose grading to dense sand with a thickness of approximately 15 meters. Underlying this unit is a strata of predominantly stiff day, often consisting of thin stiff layers of peat. The clay unit grades to a medium dense clay sand within an approximately distance of 3 meters and a total depth of 30m. The ground water table is with 6 meters from the ground surface.

This implies that the construction of a basement will have to be limited to one floor, if all, at and that pile foundations will be used for heavy structure on the site. Steel cannot be used in the piling because of the corrosive nature of the soil.

6.5.3 VEGETATION

Vegetation on the site is generally scanty with few shrubs and scattered dumps of grass growing. The soil is devoid of trees.

6.5.4 UTILITIES

Electric power lines, phone and pipe-borne water exist around the site.

6.6 CLIMATIC DATA

The climatic data of Lagos state are the same with those that affect the site in general.

6.7 FEASIBILITY SURVEY

The objective of the survey is to establish sufficient information about the study area with respect to the site suitability for traffic, assurance of adequate patronage, and avoidance of unprofitable competition.

METHODOLOGY

A field survey was undertaken to provide information to establish whether the project will be feasible.

Within the study area (the total site): This refers to the total environment of the building site where car parking creates acute problems, and which are within reasonable walking distance from the building site.

A survey to establish the total site revealed that parking problems were rampant through the area enclosed by Awolowo road, at Gregory street, Obalende road through Keffi street, to Norman Willam back to Awolowo and street, and Kesian Fasina street. The survey was carried out by counting of vehicles and observation with the objective to identify traffic generator in total site area, to take inventory of the existing parking facilities. To ascertain number of vehicle need, to determine the frequency and duration of parker in order to establish long and short time parker and to identify where parking is concentrated.

Findings will serve as a basis for the design proposal.

6.7.1 RESEARCH FINDINGS

i. Traffic generator: The traffic generators within the study area are mostly commercial concern located on Awolowo road and Keffi street. There are such buildings as Banks, Supermarket, Shopping complex, Speciality stores: Galleries, Bookshops, Flourists. ladies' Approach, Men's wear, Shoes - Jewelleries, Electronic, Furniture, Hardwoven stove, Dry cleaners, Boutique e.t.c; Embassies, Government offices, Hospitals, Schools, Church, Petrol Station, Restaurant, Clubs and Offices.

It is also observed that more commercial spaces are being created through redevelopment of some buildings: Upper floor level is built to the maximum 5 levels from the general 1 upper level to the area.

ii. Existing Parking Facilities - There is no public parking facilities within premises.

Street parking - All road sides are used, but, this is often grossly abused, drives waste parking space by leaving too much gap between one another, at times little allowance for other vehicle to entered or leave, and some park double, there are delays as parkers emerge from Kerbs to join stream of traffic and as other slow down to seek vacant spot.

Off-street accommodation - These are parking provision in some commercial premises, most especiallywithin the seat

DATE	COUNTING ZONE 1				COUNTING ZONE 2			
	9-10 A/N	10-12 A/N	4-5 P/N	5-6 P/N	9-10 A/N	10-11 A/N	4-5 P/N	5-6 P/N
6-7-98 (MON)	101	103	119	113	308	329	335	518
8-7-98 (WED)	92	95	107	107	289	305	318	331
10-7-98 (FRI)	104	99	117	119	319	330	334	346
11-7-98 (SAT)	87	98	112	121	277	287	344	348
13-7-98 (MON)	104	106	113	116	308	327	335	319
15-7-98 (WED)	95	99	104	102	297	311	316	332
17-7-98 (FRI)	101	111	115	114	321	329	338	344
18-7-98 (SAT)	86	96	114	120	297	289	344	349
TOTAL (AVERAGE)	96.25	100.88	112.88	114	300.75	313.87	333.5	335.87
AVERAGE PER ZONE	106				321			

AVERAGE OF 427 CARS PARKING PER HOURS AT PEAK PERIOD.

CENSUS OF CARS

FIG 6.2. CENSUS OF CARS

back between the road and the building line. However, this is not accepted parking provision going by the planning regulation. Moreover, these parking spaces were provide on the basis of residental standard before conversion of use and reclassification of zone from residential to mixed-use. The new activities generate much traffic than the former use and more over, the standard does not specify provision for access way with parking provision.

iii. Vehicle census - Counting was restricted to area where it obstructs the flow of traffic. Within the total site actual counting was done in two zone:

Zone 1 - Keffi street and Obalende road

Zone 2 - Awolowo road.

Average total number of car parked was 427 cars from the figure of the result fo the survey, there are more parkers in zone 2 (321cm) than those in zone 1 (106 cars) as the followings are the parking duration of car parked on site:

Zone 1	Zone 2
1 hour 58%	1 hour 51%
2 hour 23%	2 - 15 %
3 hour 12%	3 - 7 %
4 hour 5%	4 - 9 %
5 hour 1%	5 - 1 %
6 hour 1%	6 - 1 %
7 hour 9%	7 - 7 %
8 hour 11%	8 - 9 %

iv. The traffic flow of vehicle at peak period (7 - 9 and 5 - 6.30 p.m.) average 3200 vehicle per hour.

The following is a break down of composition of traffic:

Private car - 74%

Mini Buses - 13%

Taxi - 4%

Motor cycle - 8%

Van - 1%

(Road and traffic section of Eti-Osa Local Government, glover road Ikoyi).

6.7.2 INFERENCES FROM COUNTING

- There are more vehicle park on Awolowo road than other areas
- A large percentage of parkers are short time parkers
- Any parking provision must accommodate a total number of 427 cars parking at peak period.
- Conclusion on research findings

  Emanating from the research procedure several conclusion have been drawn:
- It is evident that there is not enough parking facilities to meet need of Ikoyi business district and parking problem will remain intense, in addition more problem will be created by re-development going on if no facility is provided.

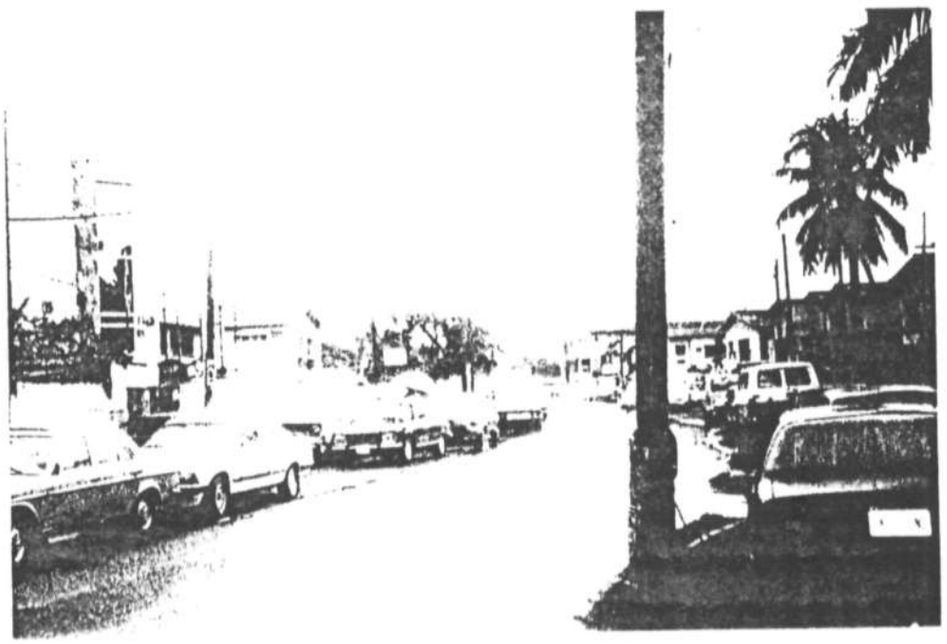


PLATE 6:1 : ON STREET PARKING ON BOTH SIDE OF AIVOLOWO ROAD DUE TO LACK OF ADEQUATE PARKING SPACES



PLATE 6:2 : PARKING ON KEFFI STREET



PLATE 6·3 : CAR BACKING OUT FROM KERB SIDE OFTEN STOP TRAFFIC FLOW



PLATE : 6:4 - REDEVELOPMENT GOING ON IN AWOLOWO ROAD.



PLATE 6.5 :- PARKING LOT INADEQUATE AT FALOMO SHOPPING CENTRE AS CUSTOMER CAR SPILL OVER INTO THE ROAD.

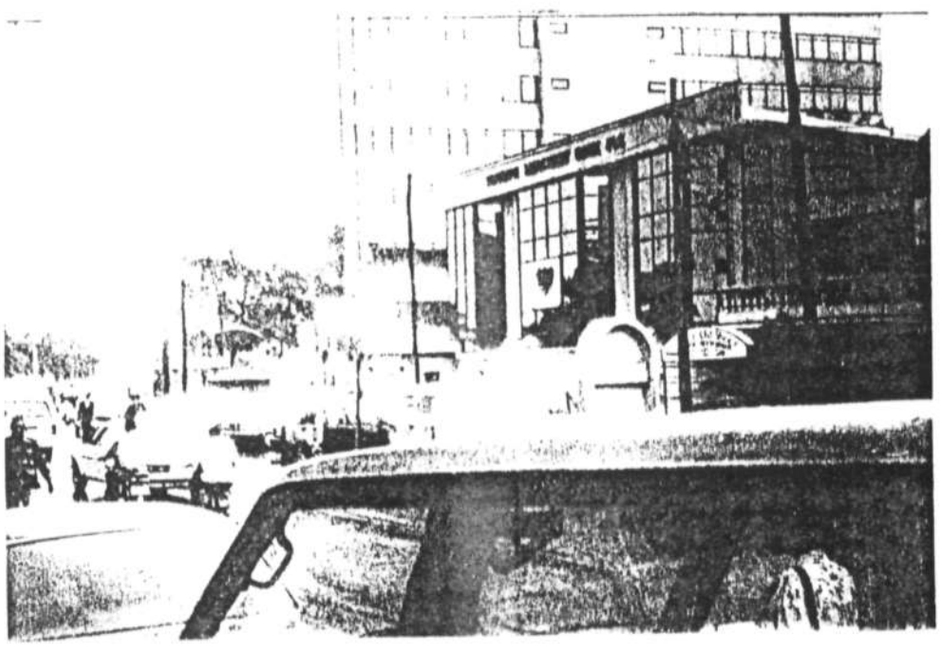


PLATE 6.6 - DOUBLE PARKING WITHIN THE SET-BACK OF TRIUMPH MERCHANT BANK, AWOLOWO, IKOYI.

- The peak period in the morning and evening of intense on - street parking, coincide with the peak traffic flow. Thus the double parking on the road reduces the effective width of the road.
- Majority of vehicle parking on street are private cars
- The roads can adequately accommodate volume of traffic to be generated, this is based on the volume of the traffic flow.
- The provision of the car park will be viable seen there wouldn't be any competition from other facilities.

Moreover, since the government is charged with the responsiblity of Lagos traffic and parking, it can alway direct onstreet parkers to the garage by promulgation of bye-laws restricting on-street parking. In addition, it can also direct all building without enough parking provision to provide one (off - site) within the study area.

CHAPTER SEVEN

PLANNING AND SCHEME REPORT

7.1 THE DESIGN

The main purpose of this thesis is to produce a design that would best suit an urban space that has be lying idle for some time and one that would have a positive impact on its neighbourhood.

The thesis is an architectural proposal for the establishment of a multi-storey car park with secondary uses incorporated to boast its commercial concern.

7.1.1 THE BRIEF

The design brief for this project is based on the following:

- The car park with its ancillary function
- The commercial concern.

The complex consists of various department with several unit within which are interrelated by circulation route and corridor. These are:

Retails Outlets:

The shops are to be in a basic cell which will be left for the tenant discretion, in terms of internal arrangements, and demand for bigger store can be provided by the allocation of

extra units.

Lettable Office Space:

The provision of space to meet various user's requirement. The office accommodation is anchored around the communal use of facilities e.g. service core, lobbies and the lavation. Despite the strong demand for office space. The scope of lettable space will be scale in order not to further intensify traffic volume.

Restaurant:

Apart from the needs of the occupancy of the retails outlets of office space. There is a strong need to retain some of the services provided by the squatter on the site and in addition, to provide a befitting place for the workers in the neighbourhood to eat.

The Car Park:

Provision of parking stall to accommodate more than 470 cars with separate provision for the secondary functions.

Administration:

This comprises of the management and administration units. It is made up of facilities that has to do with the day to day running of the complex e.g. caretaker's officer, security post,

entrance, reception. It is located on the ground floor near the entrance, or area of heavy traffic.

SERVICE UNIT:

This is made up of vertical and horizontal services e.g. storm drainage - sewage system , aircondition and electrical service. These are responsible for the smooth functioning of the complex. In addition, are staircase, lifts and toilets.

ANCILLARY UNITS:

Are for the general public and staff. These are facilities that would guarantee the maximum comfort of the building uses: relaxation area, public transportation system: bus stop etc.

7..2 SCHEDULE OF SPACE ACCOMMODATION

The complex layout is based on the stall: A rectangular stall determinate the optimum planning module, space may be wasted if the building itself is not rectangles. Thus the planning grid system or module is decided upon the stall width.

Space Delineation	No	Area (m^2)
Cashier's Booth	2	12
Store	1	9
Administration office	1	20
Manager	1	20
Staff Changing room	1	12
WC and Shower	1	5

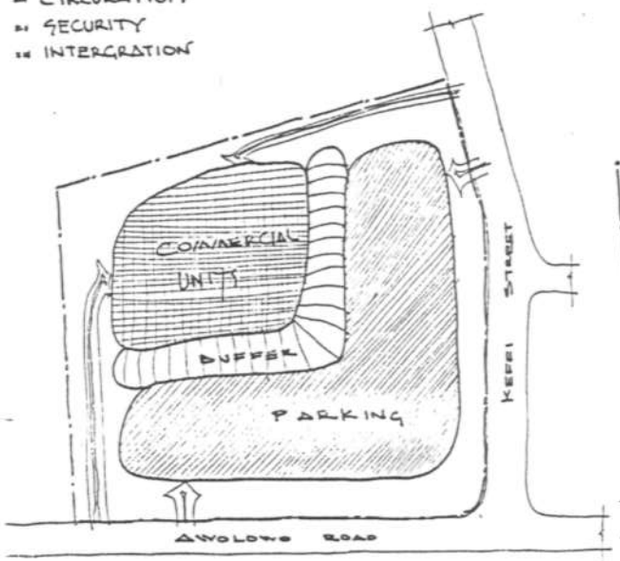
Space Delineation	No	Area (m^2)
Parking stalls for 600 cars		1200
20% for circulation and ramps		2400
Restaurant		
Dining hall for 50 dinner	1	75
Kitchen	1	15
Kitchen yard	1	18
Servery	1	6
Store	1	6
Office	1	10·8
Staff changing room	1	12
WC and Shower	1	5
Shops and Office		
Retail store		720
Lettable Offices		1440
Toilet provision		153.72
Total Area		16,950

7.3 DESIGN CONCEPTS AND CRITERIA (DESIGN REPORT)

The main thrust of the design is to have a complex that would be functional and aesthetically pleasant: Incorporation of secondary uses to achieving optimal utilization of space: By spatial organization.

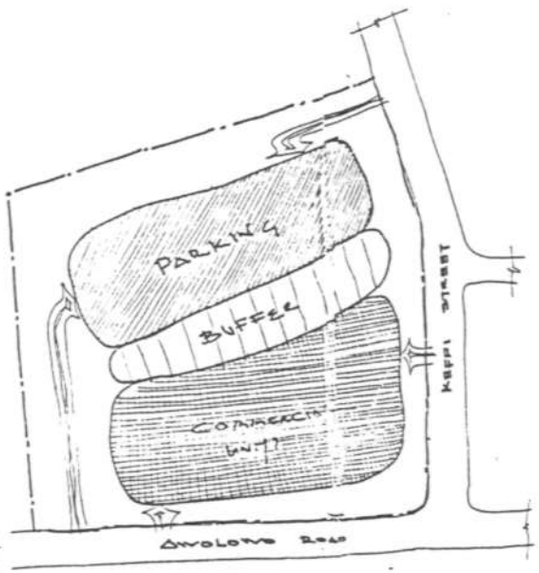
BROAD SHAPE BUILDING CONCEPTS

= ACCESSIBILITY
= CIRCULATION
= SECURITY
= INTERGRATION



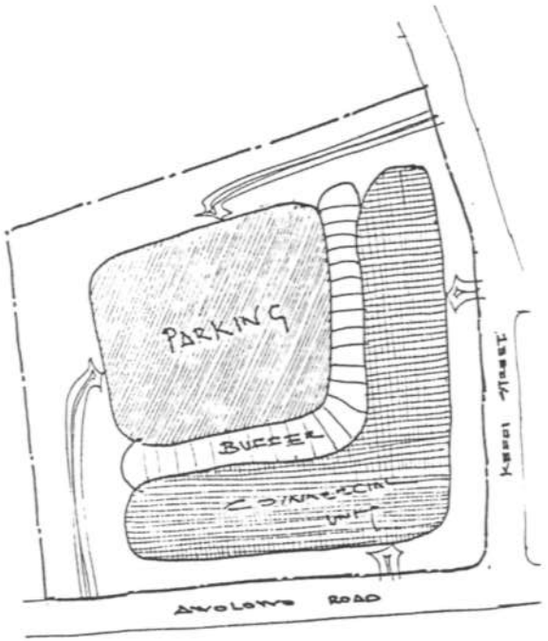
REMARKS : A

- GOOD ACCESSIBILITY FOR VEHICLES.
- RESTRICTION OF PEDESTRIAN MOVEMENT WILL BE DIFFICULT.
- COMPACT PLANNING.
- THE SHAPE REMAIN WITH SURROUNDING ROAD PATTERNS.
- THE COMMERCIAL UNITS HAS POOR VISUAL AND PEDESTRIAN CONNECTION TO THE STREET.
- RETAILS FACILITIES ARE NOT EXPOSED TO MAXIMUM FOOT TRAFFIC.
- VISIBILITY OF SHOPS FROM MAJOR THROUGHFARE NOT POSSIBLE.
- POOR DIALOGUE WITH THE STREET WITH RESPECT TO STREET RELATED USES.



REMARKS : B

- GOOD ACCESSIBILITY FOR PEDESTRIAN.
- THE COMMERCIAL UNITS HAS VISUAL AND PEDESTRIAN CONNECTION TO THE STREET.
- VISIBILITY OF SHOPS FROM MAJOR THROUGHFARE POSSIBLE.
- DIALOGUE IS MAINTAINED WITH THE STREET WITH RESPECT TO STREET RELATED USES.
- RETAILS FACILITIES ARE EXPOSED TO FOOT TRAFFIC.
- PARKING IS RESTRICTED TO THE REAR.
- THE SHAPE OF THE COMMERCIAL UNITS DOES NOT TAKE FULL ADVANTAGE OF THE ROAD PATTERN.



REMARKS : C

- GOOD ACCESSIBLE FOR PEDESTRIAN AND VEHICLES.
- PARKING IS RESTRICTED TO THE REAR THUS ELIMINATE CROSS TRAFFIC BETWEEN PEDESTRIAN AND VEHICULAR
- COMPACT PLANNING
- THERE IS VISUAL AND PEDESTRIAN CONNECTION TO
- STREET RELATED USES AT SIDE OF THE ROADS ADHE RIGID STREET FACADE PATTERNS
- RETAILS FACILITIES ARE EXPOSE TO MAXIMUM TRAFFIC.
- THE SHAPE REMAIN WITH SURROUNDING ROAD PA AND ALLOW FOR FULL UTILIZATION.

O CONCEPT C ADOPTED BECAUSE OF ITS NUMEROUS ADVANTAGES OVER THE OTHER CONCEPTS.

DESIGN CONCEPT.

AMALGAMATION OF SEVERAL CONCEPTS TO PRODUCE THE TOTAL CONCEPT. THE CONCEPT IS HINGED AROUND THE FOLLOWING. INTEGRATION OF THE BUILDING WITH THE SITE, CIRCULATION AND ACCESSIBILITY. THE CENTRAL THEME IN THE DESIGN IS DIALOGUE WITH THE STREET. PREDOMINACE OF PEDESTRIAN TRAFFIC IS CREATED BY DELIBRATE RESTRICTION OF VEHICULAR MOVEMENT: THE SHOPS ARE WRAP AROUND THE PARKING AREA ELIMINATING CROSS TRAFFIC

LINEAR CONCEPT

IN THE DESIGN OF THE RETAIL-OUTLETS THE LINEAR CONCEPT IS ADOPTED. DISPLAY AREAS HAS IT APPROACH FACADE FOR SHOPPING ACTIVITY AND THE REAR FOR SERVICES. THE BUKATERIA IS PLACED AT THE EDGE OF THE RETAILS AND WILL ACT AS MAGNET TO DRAW SHOPPERS. SHOPPING IS KEPT TO THE SIDES BORDERING THE ROAD THUS RESTRICTING THE MOVEMENT OF CUSTOMERS TO THOSE SIDES. (THE SERVICING OF THE SHOPS FROM THE REAR, HENCE, MAXIMALLY SEPERATING THE PEDESTRIAN FROM THE VEHICULAR TRAFFIC).

THE SERVICING AREA WILL ALSO ACT AS A BUFFER BETWEEN THE CAR PARKING COMPLEX AND THE COMMERCIAL UNIT.

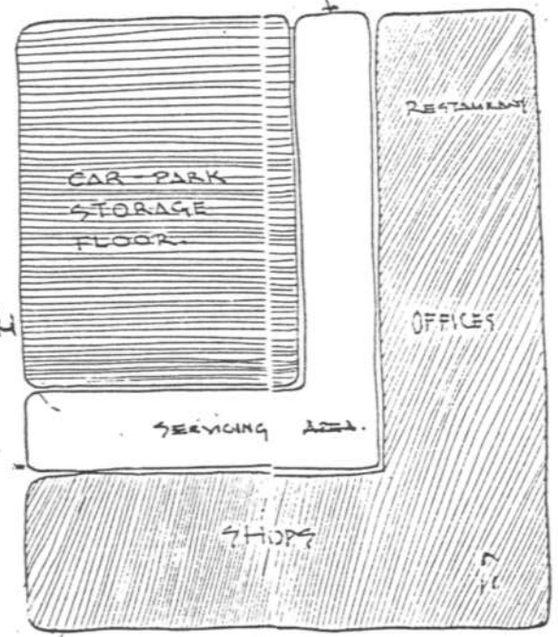
SPATIAL OBJECT

THIS IS THE WAYS IN WHICH STRUCTURE WITHIN A SPACE ARE RELATED TO EACH OTHER AND ORGANISED INTO COHERENT PATTERNS OF FORM AND SPACE. THIS IS BASED ON THE GESTOLT THEORY

i PROXIMITY - THE SIMPLEST FORM OF ORGANISATION IS THAT IN WHICH OBJECTS ARE ARRANGED CLOSE TOGETHER. THE RELATIVE CLOSENESS OFFERS THE STRONGEST TENDENCY IN CONNECTION BETWEEN THEM.

THE POSITION OF THE PARKING FLOOR AT THE REAR CREATES DISTINCTION IN CIRCULATION BETWEEN VEHICULAR AND PEDESTRIAN TRAFFIC.

SERVICING AREA ACTS AS HAS A BUFFER BETWEEN CAR STORAGE FLOORS AND THE COMMERCIAL UNITS



BUKATERIA IS PLACED AT THE EDGE OF THE RETAILS AND WILL ACT AS MAGNET TO DRAW SHOPPERS

THE LINEAR ORGANISATION EXPRESSES A DIRECTION SIGNIFYING MOVEMENT: EXTENSION OF GROWTH.

CONTINUITY OF DIALOGUE BETWEEN BUILT-ORA AND THE STREET: STREET RELATED USES AT GROUND LEVEL ADHERE TO RIGID STREET FACADE PATTERN. - RIM OF SHOPS FORMING INFILLS IN EXISTING STREETS TO FORM STREET UNIFIED WALL - THEREBY OF PAVILLIONS TO PROMOTE CONSUMPTION OF A PLACE: A PLACE TO SHOP, TO SEE, AND BE SEEN IN.

VISUAL AND PEDESTRIAN CONNECTION TO THE STREET. EXPOSES RETAIL FACILITIES TO MAXIMUM FOOT TRAFFIC AND ACHIEVES VISIBILITY OF SHOPS FROM MAJOR THOROUGHFARE

ii. SIMILARITY: IF ELEMENTS HAVE SIMILAR QUALITIES THEY TEND TO BE TIED INTO STABLE RELATIONSHIP THEIR SIMILAR QUALITIES MAY BE COLOUR, SIZE, VOLUME, OR TEXTURE.

iii CONTINUANCE: THE ARRANGEMENT OF FIGURES SO THAT THEY HAVE GOOD CONTINUANCE

iv CLOSURE: OPTICAL UNITS TENDS TO BE SHAPE INTO CLOSED COMPONENT WHOLE BY FORCES OF ORGANIC ORGANISATION AS SUCH ALMOST COMPLETED FIGURES TEND TO LOOK WHOLE.

TASK CONCEPT:

MEANS BY WHICH THE BUILDING IS PERCEIVED AND EXPERIENCED. THE TASK CONCEPT IS BASED ON NEED TO RELATE BUILDING TO SITE AND OTHER BUILDINGS.

DESIGN CONCEPT.

FIG 7:2 DESIGN CONCEPT.

7.3.1 SITE CONCEPT

This is the basis upon which the entire design is synthesis. The entire development takes into consideration hierarchy of space via accessibility and visual identity: Well co-ordinated and controlled flow of human and vehicular circulation in the complex; proper advantages is taken of the existing views and vistas; existing constaints of noise level; and combination of the both the physical and natural elements on the site, and integration of the various units.

7.3.2 THE DESIGN CONCEPT

The design proposal aims at producing a suitable space that will encourage optimum space usage. Several concept were taken into consideration, an amalgamation, to produce the total concept that governed the design.

i. Layout - in the design of the shop outlets. The linear concept was adopted as this has greater suitability for the particular nature of the site. In this case the display areas has its approach facade for shopping activity, facing the major road and easily accessible to the pedestrian, including the bustop and it provides the maximum exposure to customers. The rear is use for services. It helps to

continue the urban dialogue with the public and exposes retails facilities to maximum foot traffic. In addition, it helps to separate pedestrian and vehicular circulation and also help restrict movement to the periphery. The restaurant is placed at the edge of the shop to the extreme of the site to act as a magnet. The car park is placed behind the outlets and office accommodations. Thus screened from heavy pedestrian movement.

SPATIAL CONCEPT

Spatial organisation is the way in which structures within a space are related to each other and organised into coherent patterns of form and space. Organisation may be based on geometrical or topological principle but in general, organisation is based on the Gestolt theory of laws of organisations (Bakoshi, 1992) these are:

i. **Proximity:** Which state that; "the simplest form of organisations is that in which objects are arranged closed together their relative closeness offers the strongest tendency in connection between them".

iii. **Similarity:** Which state that; "it elements have similar qualities they tend to be tied into stable relationships". These may be of size, colour, volumes,

texture or contours.

iii. **Continuance:** Which state that; "the arrangement of figures so that they have good continuance will be seen more easily". Application of this concept is to binding together heterogenous elements.

iv. **Closure:** Which state that; "Optical units tend to be shaped into closed component wholes by forces of organ organisation as such almost completed figures tend to look whole. (Bakoshi 1992).

These principles help to structure building elements into a coherent whole, thus giving the total whole an individuality.

FORM CONCEPT

Form serves as a means by which the building is perceived and experienced and the choice of a particular form is a result of certain factor as experienced by Paul Rudolf (Bakoshi 1992) He called the determinant of form, and they are as follows:

I Environmental buildings relationship with other buildings and site

ii. Functional aspect

iii. Regional identity

In this case, the form is a reflection of the function and desire to harmonie the building with other buildings in the neighbourhood.

7.4 DESIGN PROPOSAL AND REPORT

7.4.1 DESIGN COMPONENTS

The complex consist of various units designed to produce a suitable space that will encourage optimum space utililisation.

THE CAR PARK

This is a six-floors of staggered flat floor straight ramps type in one way concentric circulation.

The parking has 2 staircases and 2 elevations for vertical circulation within the complex on the ground floor is the managers office and a staff room with toilet and shower provision. The building has three bins of parking except with floors above first floor level which have 4 bins.

THE RETAIL OUTLETS

These are restricted on the ground floor facing the roads on both side of the site: East (Keffi street) and South (Awolowo road). This is simply a basic rectangular cell, demand for bigger store can be met by addition of extra bay.

OFFICE ACCOMMODATION

The lettable office spaces are on top of the retail outlet on the first and second floor. Access is through the main entrance at the junction of the two linear configuration of the store. At the extremes are two staircases and toilet

RESTAURANT

This is at the extreme of the site on Keffi street and it has provision for 50 dinner at maximum seating. Their is a servery linked to the kitchen with provision for outdoor cooking area and store. It also has office for the catering officer and staff room with provision for WC and shower.

THE CONTROL UNIT

There are two control points at Keffi and Awolowo each control unit is equipped with electronic equipment for control of the barrier and a telecommunication system to the security room. Where number sparking spaces available can be obtained via closed circuit television and camera.

CIRCULATION

The circulation of the building can be classified into two main groups: the vertical and horizontal circulation.

The vertical circulation is by means of stair cases and with elevators in the parking structure. In the case of the parking structure, all stair cases are separated from parking space by walls which have fire resistance of at least are hour and openings in this walls are fitted with self closing door. The horizontal circulation are through corridors which linked

various units together .

CONSTRUCTION MATERIAL

Reinforce concrete on structural principle of beam and posts and on waffle is used for the structure. Steel lattice trusses is use for the roof with long span aluminum roofing sheets. Timber roof rafter were used the office with small span. Brick facing and stucco were employed as wall finishes and exterior surface of the building would be painted.

The finishes of the floors to the offices, corridor, restaurant, shops are hard wearing pigmented terrazzo. Toilets are to be in white ceramic tiles up to lintel level and partitions are to be in 150mm hollow clay pots rendered and painted. In the parking structure, floor are finished with concrete trowelled smooth with hardener and oil resisting agent.

SERVICES

Fire Precaution: The following method where adopted to protect both human and property.

i. Provision of escape staircases

ii. Designing of the structural member to produce sufficient time for the occupants of the building to escape safety before the structure weakers.

iii. Provision of smoke/heat detectors on all floors and fire extinguisher, fire hose that are wall positioned

and easily accessible and fire hydrants points on the site.

iv. Provision of adequate access into the complex by fire brigade in case of fire outbreak.

v. Provision of wet rising mains.

LIGHTING AND VENTILATION

Natural lighting and ventilation in to the building was emphasised on, artificial lighting and ventilation will only be used to complement the natural. For reason of cost and maintenance, room unit and split unit system of airconditioning system are recommended.

WATER SUPPLY

Water is connection from the main water supply pipe to feed a ground tank from where it is pumped in to a roof tank. Distribution is through 50mm galvanished mild steel down pipes.

WASTE WATER AND SOIL DRAINAGE SYSTEM

Sewage disposal is accomplish with the use of appropriate sizes of pipes to the septic tank via inspection chamber.

EXTERNAL DRAINAGE SYSTEM

Storm water collected from the roofs are channelled through pipes into a channel to the main municipal drainage system that

bounds the site.

POWER SUPPLY

Electricity supply is from NEPA, but generators are produce as alternative source of electric power supply due to fluctuation of power supply by NEPA.

7.5 SUMMARY AND CONCLUSION

SUMMARY

Owing to the growth of our urban area and the explosion of market and population with the consequent traffic situation. There is an urgent need to make provision for parking in certain area of the city to help prevent the strangulation of the economic vitality of our urban centres.

In an attempt to realize this dream, literature review was undertaken, field survey and indept study of car park building design and construction was done. And an attempt was made to integrate secondary uses with the parking to justify the optimum utilization of the space and in addition provision was made for flexibility and adaptability in the retails and office accommodations.

To obtain relevant information required, to ensure a reasonable and functional design a survey of parking situation was done, in addition, appraisal of some existing facilities was carried out for better understanding of relationship between

facilities and to identify their demerit. From the above the design proposal was made after analysis of functional and space requirement. The following have been achieved with the design proposal.

i. Proper incorporation of the commercial concern that will help improve the economic reason of the project.

ii. An effective utilization of the urban space.

iii. Effective segregation of vehicular routes from pedestrian.

iv. Accommodation of cars where cars can be parked with a little inconvenience as possible.

v. A land mark that will complement the commercial efforts of the business in Ikoyi.

CONCLUSION

This study was motivated by the desire to find a use for an urban space which has been lying idle for some time: One that will pave positive impact on it neighbour.

Though car park are not profit orientated project they are more of a social one. However the presence of a car park will to a large extend improve the prospect of the profit activities and, further more, preserve the value of the neighbourhood. Car parks should be an amenity to be given to the citizen just as water, light or road are given.

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VIEW FROM A

NORTH-EAST TRADE WIND DRY, DUSTY WIND BRINGING ALONG HARMATTAN HAZE BETWEEN OCTOBER AND APRIL. (DENSE SCREENING REQUIRED).



VIEW FROM E

VEGETATION

VEGETATION ON THE SITE IS GENERALLY SCANTY WITH FEW SHRUBS AND SCATTERED CLUMPS OF GRASS GROWING.

SUGGESTED POINT OF INGRESS



VIEW FROM B

IDEAL BUILDING ORIENTATION WITH LONGER SIDE ON N-E AXIS

EAST - SUNRISES IN THE EAST. BRIGHT EARLY MORNING SUN IS DESIRABLE FOR HUMAN COMFORT.

WEST - SUNSET IN THE WEST FAIRLY HOT AND UNDESIRABLE FOR HUMAN COMFORT. OPENING FACING WEST TO BE SHADED

SUNSET

KEFFI



VIEW FROM C

SUGGESTED POINT OF INGRESS

AWOLOWO ROAD

SOUTH-WEST TRADE WIND. COOL PLEASANT MOISTY WIND BRINGING ALONG RAIN USUALLY BETWEEN MARCH AND OCTOBER. (BUILDING TO BE ORIENTED TO CATCH THE BREEZE)

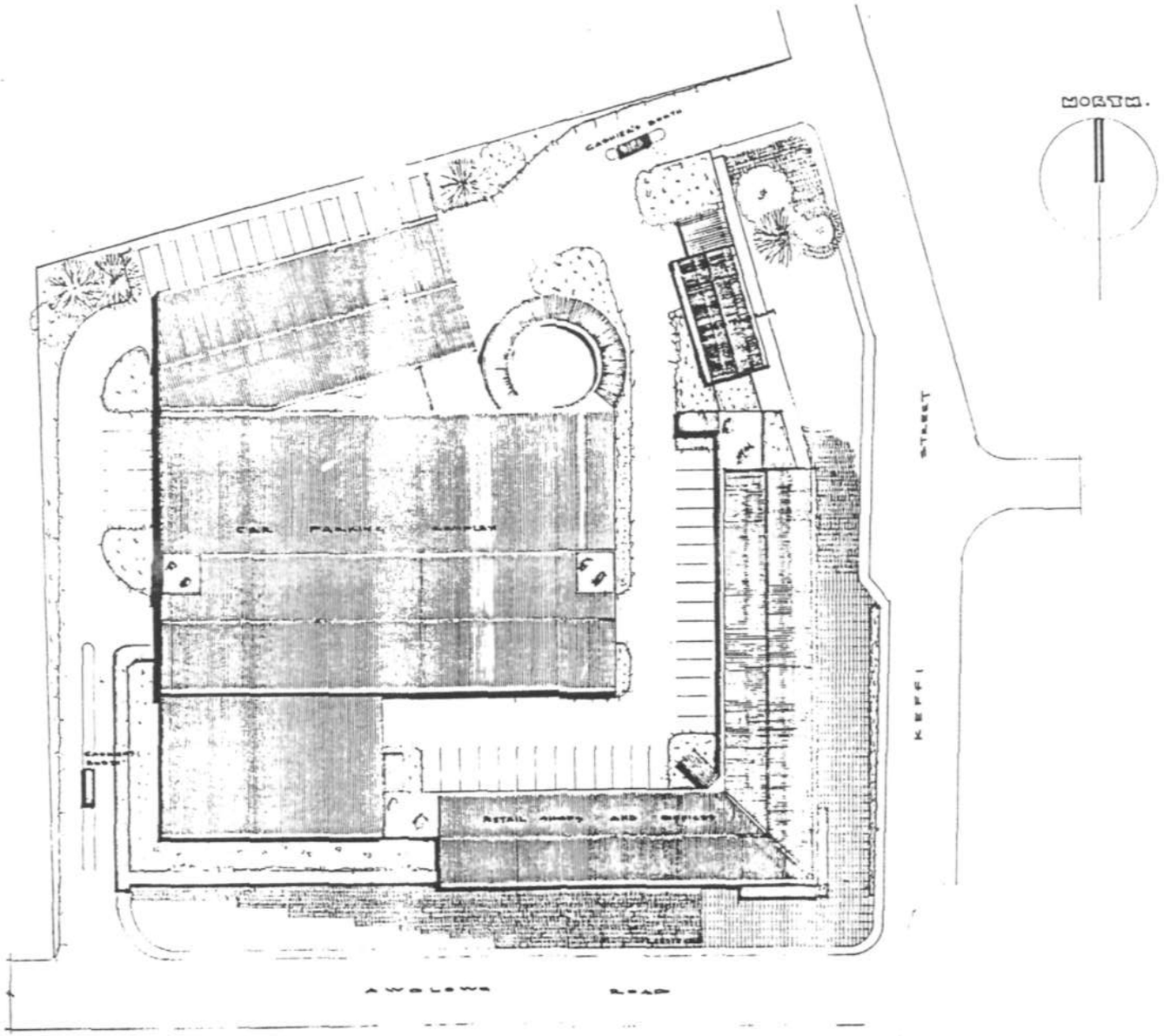
NOISE

SITE GENERALLY EXPERIENCES LITTLE OR NO NOISE FROM IMMEDIATE SURROUNDING EXPECT FROM MAIN ROADS (KEFFI AND AWOLOWO ROAD). HOWEVER, THE SETBACK WOULD PROVIDE ADEQUATE BUFFER BETWEEN THE ROAD AND THE BUILDING.

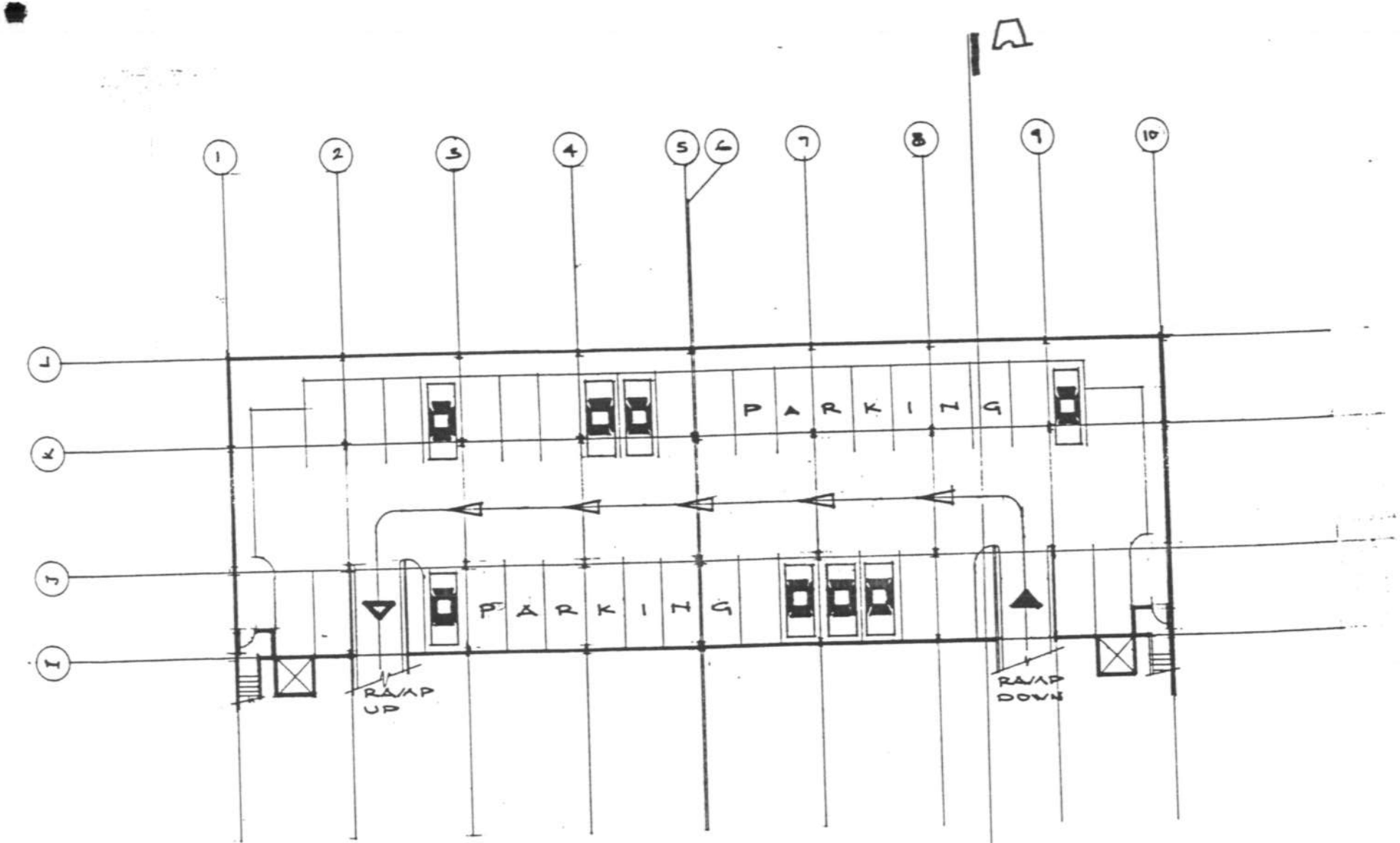


VIEW FROM D

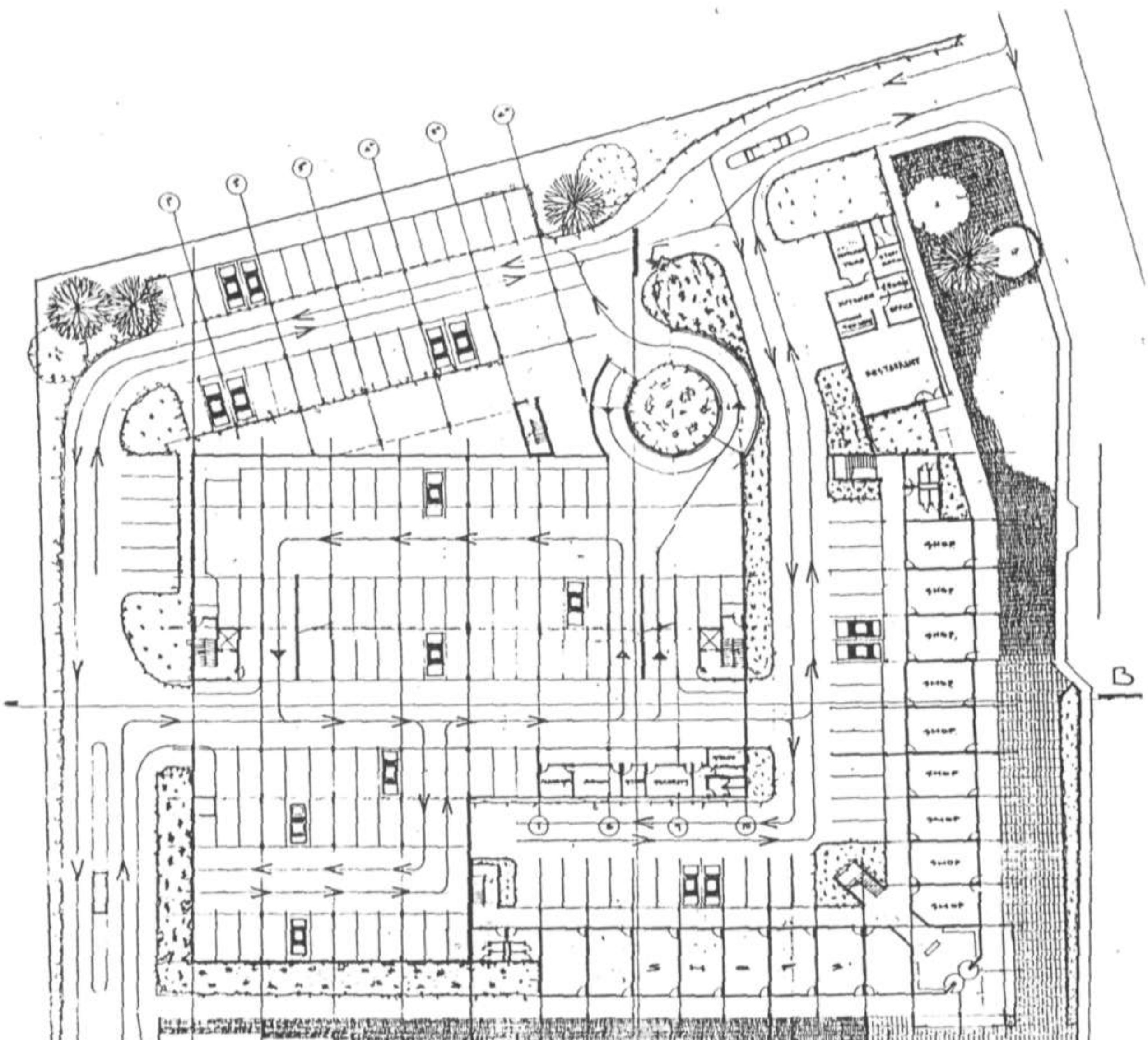
SITE ANALYSIS


NORTH.
KEFFI STREET
CAR PARKING AREA
RETAIL SHOPS AND OFFICES

SITE PLAN.

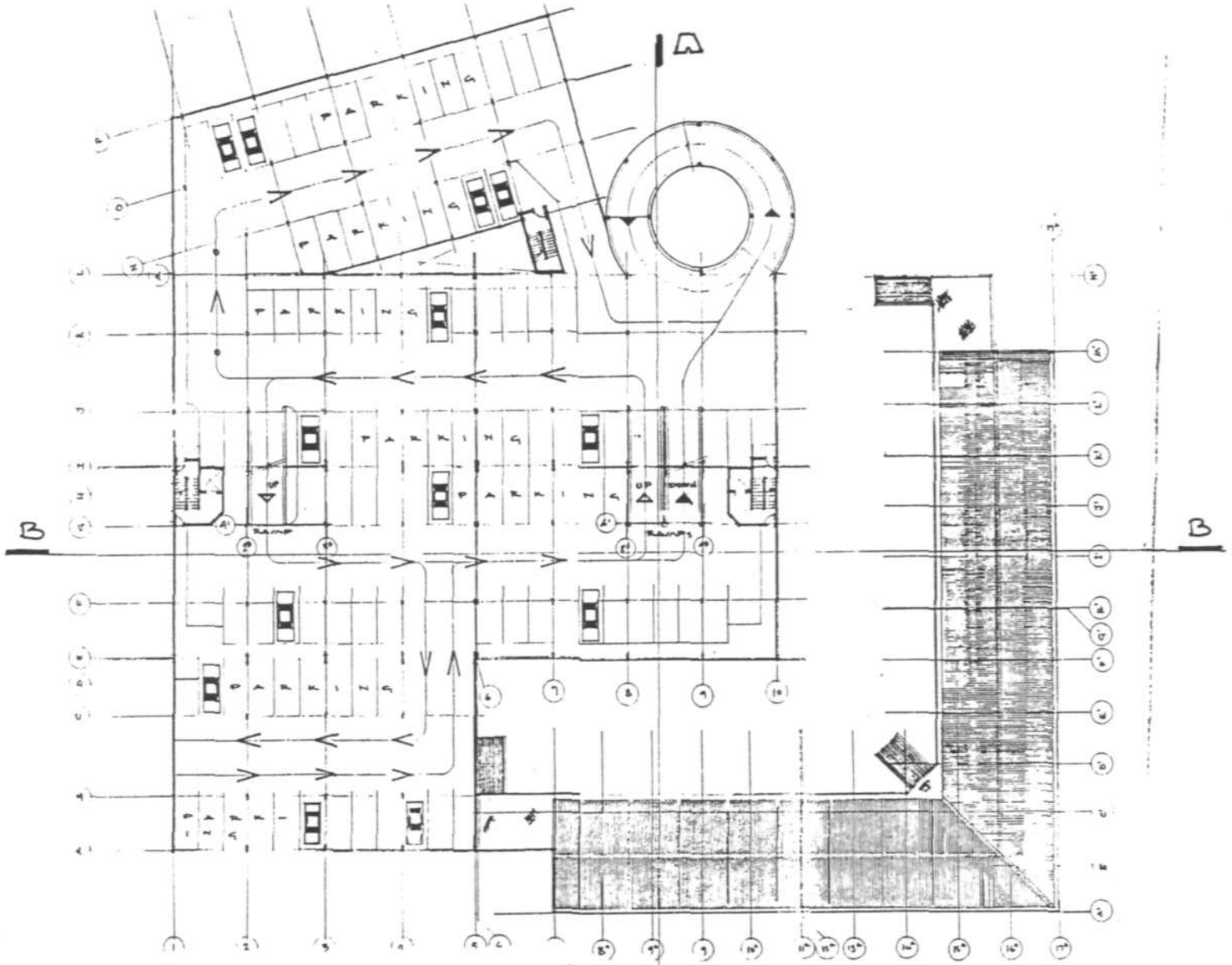


BASEMENT 1:100

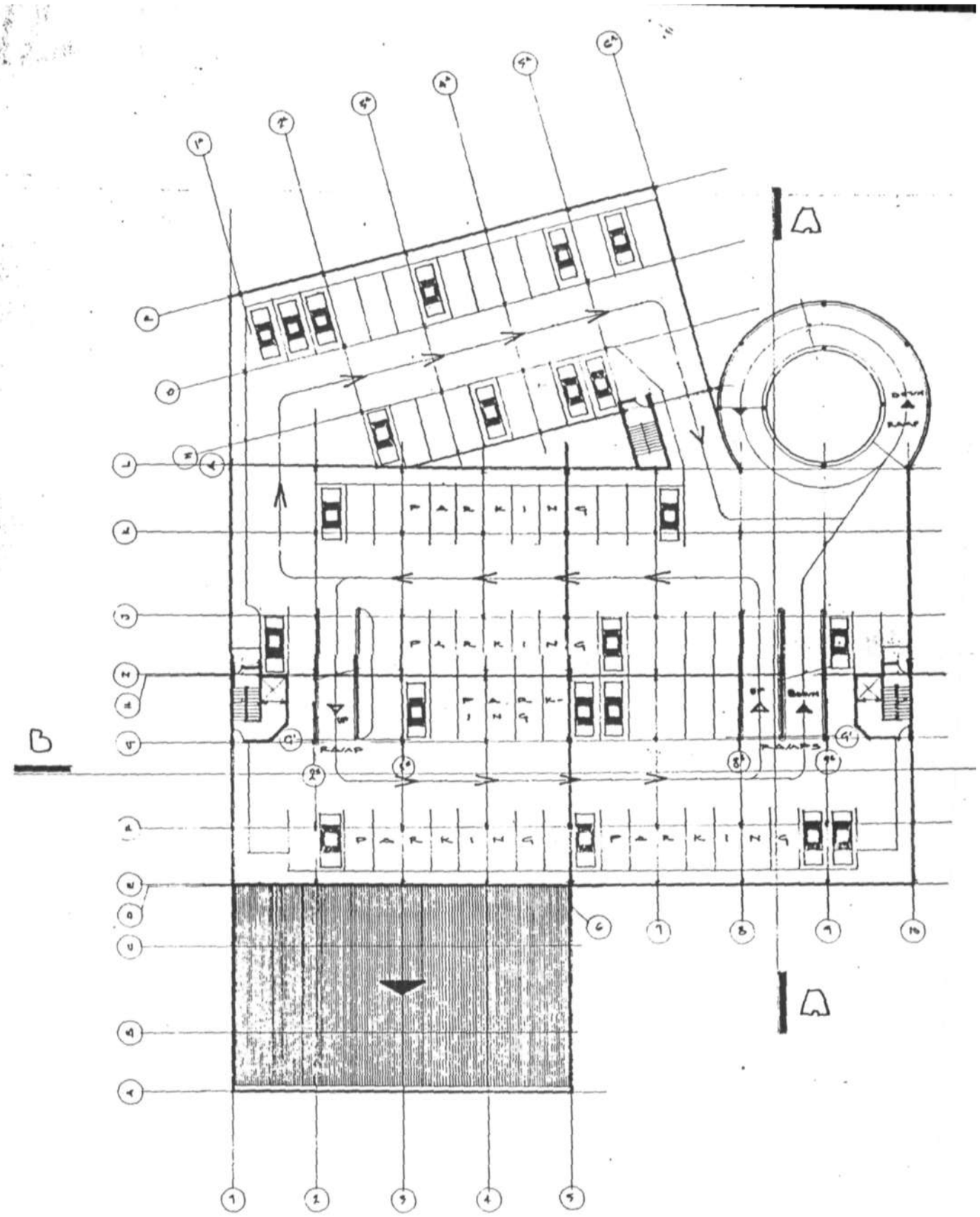


GROUND FLOOR PLAN.

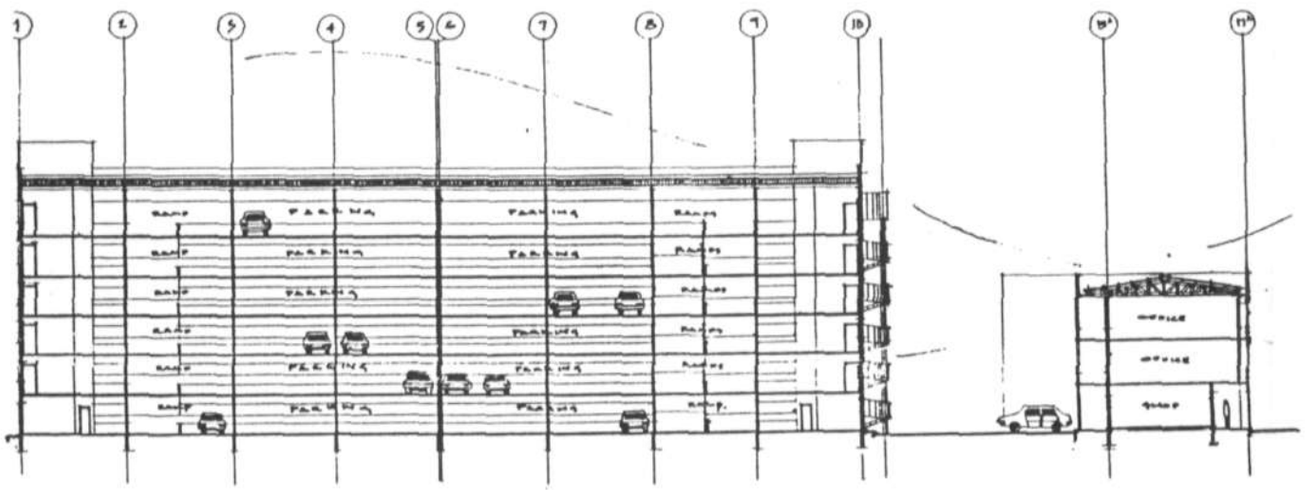
1st & 2nd FLOOR PLAN



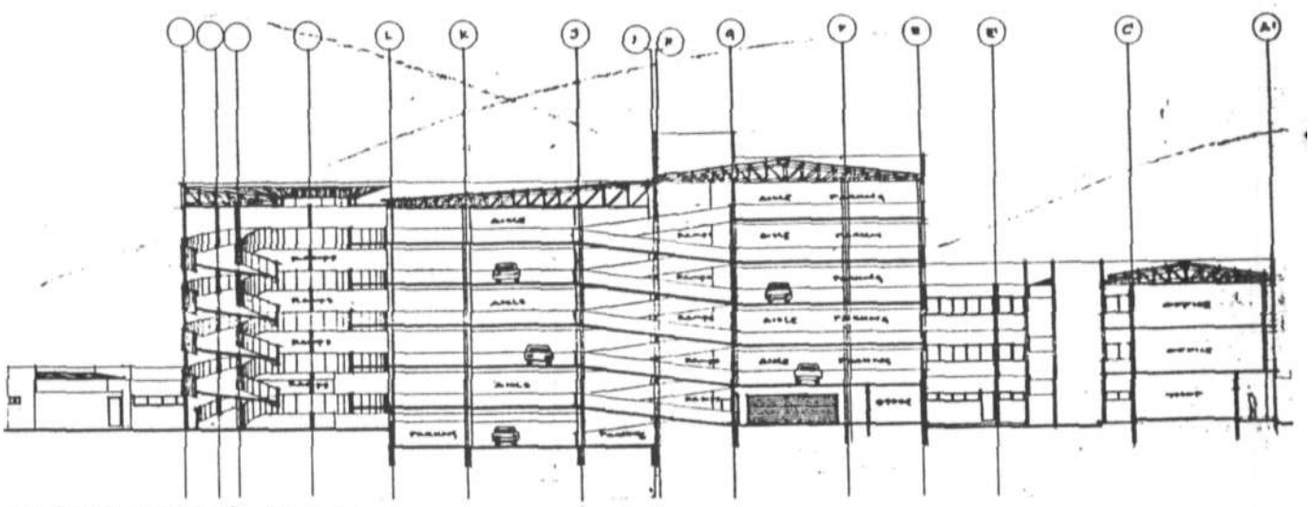
5th FLOOR PLAN



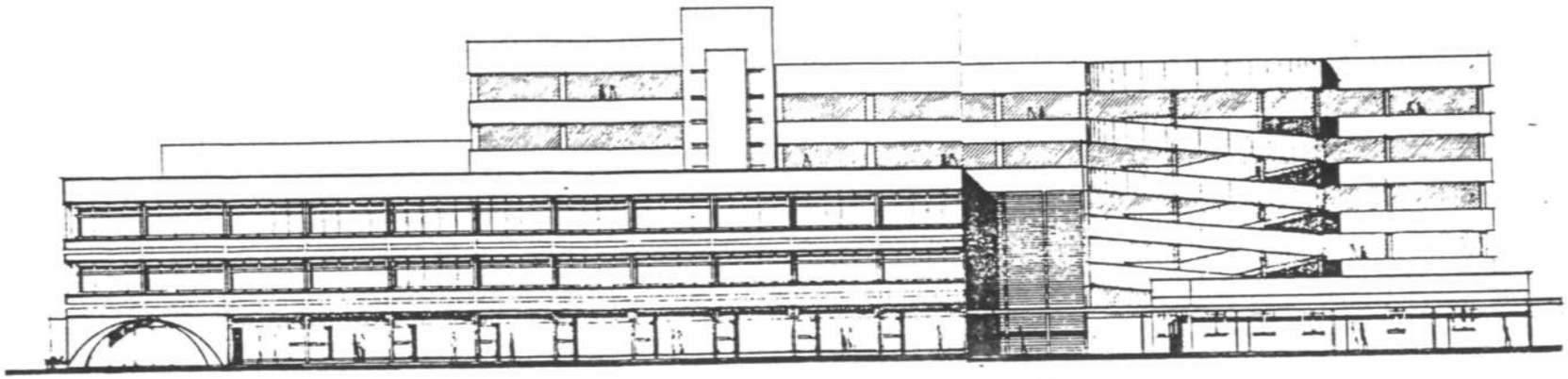
4TH-5TH FLOOR PLAN.



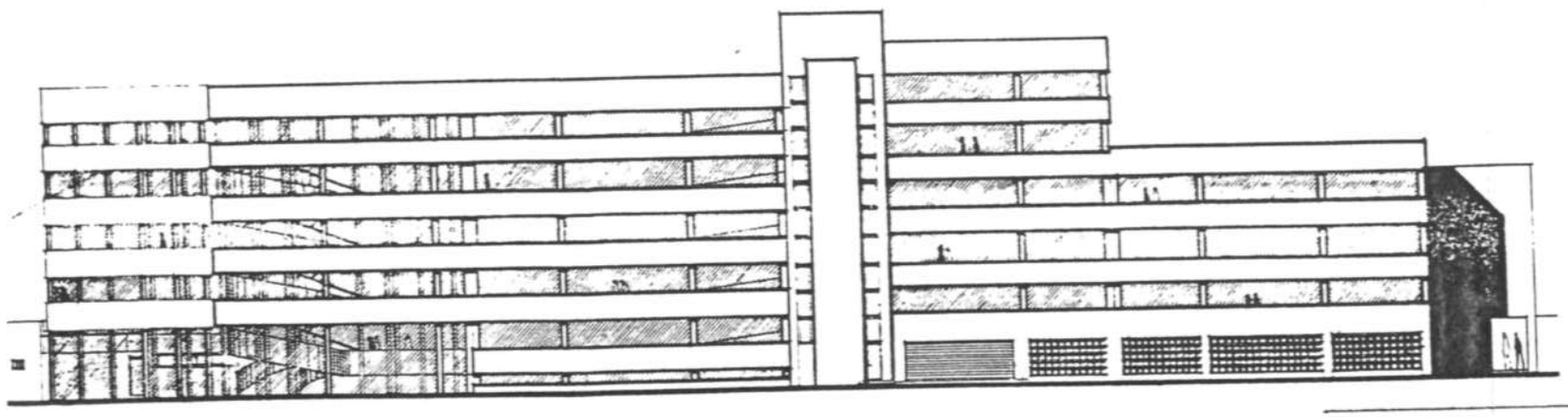
SECTION B-B



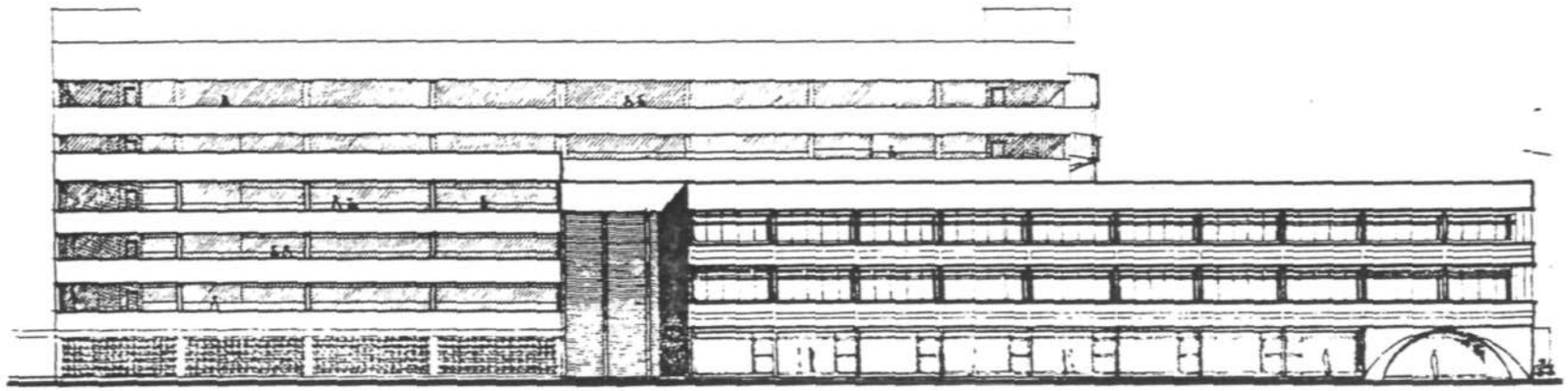
SECTION A-A



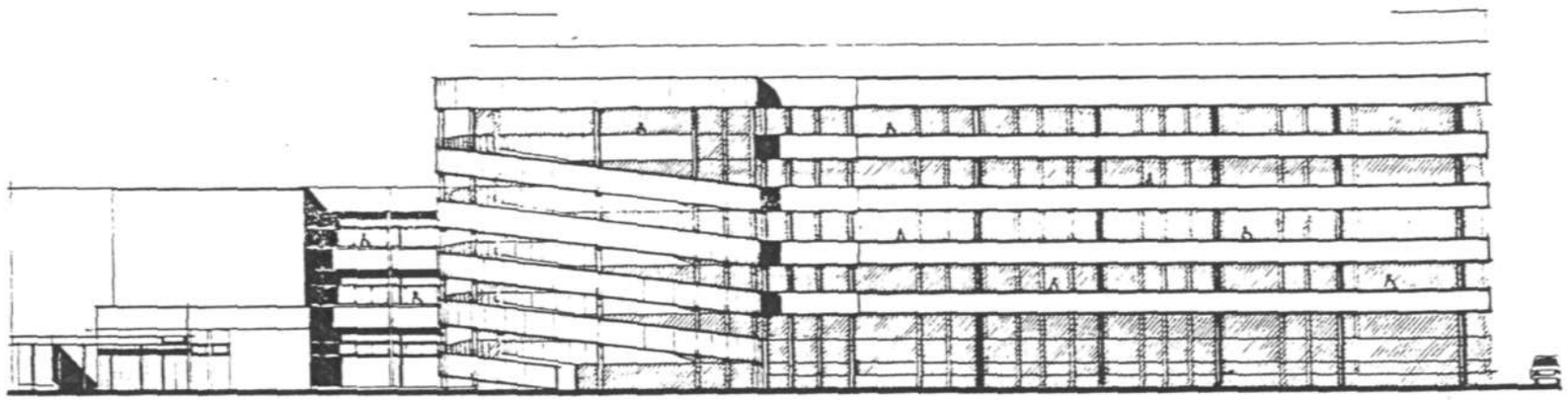
EAST ELEVATION. 1:100



WEST ELEVATION. 1:100



SOUTH ELEVATION. 1:100



NORTH ELEVATION. 1:100

