AN INVESTIGATION OF THE TRAFFIC AS AFFECTING THE RETAIL STRUCTURE OF THE CLAREMONT BUSINESS CENTRE

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Sydney Passmore Wood
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INTRODUCTION

Decentralisation of the cities throughout the world linked with the added mobility of the community due to the automobile has resulted in the phenomenal growth of the old satellite villages which were normally located at transportation nodes. To these new growth points must be added the true regional shopping centre set in the country and surrounded by its sea of parked vehicles. The regional centre has, as yet, not developed in South Africa but the phenomenon of decentralisation has stimulated the growth in certain of the old-established local shopping areas surrounding the larger cities.

In Cape Town these local shopping areas were all separate Local Authorities until 1913 while Wynberg retained its separate identity until 1932. Decentralisation strengthened these self-contained villages. Initially the independent Wynberg maintained its prime position in the Southern Suburbs but when economies of scale forced it into unification with Cape Town Wynberg's dominance commenced to dwindle due primarily to the superior locational advantages of Claremont.

In establishing the growth potential of the Claremont retail centre this shift in balance of power will be investigated and means of extending the dominance of Claremont as the regional centre will be analysed. While transportation improvements can be of benefit to a shopping centre and can stimulate the centre's growth, they cannot in themselves create growth or growth factors. The transportation inputs are the catalysts to the system while traffic friction or congestion can restrict a centre's growth.

It is in this context that the study of Claremont has been undertaken. The growth potential and the threshold of the market area is established and from this the magnitude of the traffic build-up

is assessed. The growth of the centre depends only on the successful application of the necessary catalysts, one of which is the injection of the necessary transportation inputs into the system. If these injections are too late or misphased the full potential of the centre will not be realised. The second part of this thesis is thus the selection and phasing of these inputs in order to maximise the growth potential of the centre.

1. HISTORICAL SETTING OF CLAREMONT

The earliest road from Cape Town to the south left the inner settlement at Westervoort - the Westerford of today - and crossing the Liesbeek River it followed the southern bank of the river to van Riebeeck's farm Boschheuvel, to be renamed Bishopscourt when acquired by Bishop Grey in 1848. It was from this road near Sans-Soucy that a second road branched off towards the south into the fertile Constantia Valley first developed by the van der Stels in the late 17th century. This southern route can still be traced along Grove Walk, Herschel Road, Herschel Walk and Waterloo Road past Wynberg Camp and Alphen into the valley. The routes of many of these tracks today form the foundation of the road structure of modern Claremont. These can be clearly traced on the excellent survey map prepared by L. N. Thibault (1812-1813)[1] and registered in the Deeds Office. A portion of this map of the southern suburbs is shown in Fig. 1 together with an overlay indicating a few of the relevant roads of both old and modern Claremont. It is of interest to note that even at this early date the drift (or ford) had been replaced by Westervoort Bridge and that the intersections at Herschel Road, Newlands Avenue and Tennant Road and to a lesser extent that at Bishopscourt Road, Newlands Road and Paradise Road formed important cross-roads.

With Wynberg Hill forming one of the vital strategic posts in the outer defences of the Cape, the presence of the militia here resulted in the birth of the first Wynberg Village on Waterloo Road immediately below the camp. After the second British occupation the establishment of the permanent naval base at Simonstown necessitated the construction of a more direct all-weather route with less severe grades than those on the earlier road over Wynberg Hill. This new route left the old Constantia road at the north-eastern corner of Sans-Soucy and headed due south over the farms of Questenburg, Sans-Soucy and Veldhuyzen skirting the lower paddocks of Stellenburg and Welgelegen and thence on to Vredenhof and Rust-en-Werk.

It was thus in the early 19th century that the new village of Wynberg was re-located in the vicinity of Vredenhof immediately below the old village and the strategically situated military camp on the slopes of Wynberg Hill.

The prime position of Wynberg was further enhanced when it became the terminal of the newly established railway line in 1864. This line was doubled in 1882 and extended to Kalk Bay in 1883, further strengthening the settlement.

The first urban development in Claremont occurred in 1840 with the subdivision and sale of portions of the farms Sans-Soucy and Questenburg on the western side of the "Main Road" between Obelisk Walk and Draper Lane, followed by further subdivisions on the north side of Stegman Road in 1841. This early village which was of the "villa" type of development containing no retail structure, was located on the route of the Cape Town - Wynberg omnibus which commenced operation in 1836 at a fare of 2/- per trip each way.(2)

With the construction of the Cape Town - Wynberg railway line in 1864 the Claremont Station was built between this villa suburb and its church - St. Saviours. The station building is still in use and today is the oldest station in South Africa. The location of the station tended to pull the village to the south and in 1881 the first subdivisions of Veldhuyzen were approved. The draper F. J. Pearce was established in 1883 and in 1894 his Kimberley manager, Mr. Thomas Henshilwood, opened up his "Bon Marche" store in its present location.(3) John Hall in 1892 and E. K. Green and Company in 1894 were among the initial businesses established in the rapidly developing village.

In the "Wynberg Times" of the 9th April 1892 the columnist writes :

> "Claremont streets assume a very busy appearance on Saturday nights. The shops are literally thronged with people, whilst the main road is a gay promenade, being lit up from end to end by the lights from the numerous shops". (4)

With the establishment of the South African Railway Company in 1857 and the Wynberg Railway Company in February 1860 and the subsequent opening of the first railways to Stellenbosch in May 1862, Wellington in November 1863 and Wynberg in December 1864, the first stages of decentralisation in the Cape had started. In particular the villa settlements on the main road to the south flourished in the immediate

vicinity of the railway stations. In order to attempt to hold the road passengers now being attracted to the newly established railway, the Cape Parliament in the 1861 session authorised the transportation of passengers by tramway. The first horse-drawn trams operated to Green Point in 1863 and shortly afterwards to Wynberg. In 1896 these routes were electrified.

By the turn of the century when the motor car had made its first appearance the railway still remained the major transportation mode of all classes. Special trains were operated after the Government House Balls, and the Station Square with both the Town Hall and the Railway Station was the centre of the community activity in the villages of Claremont, Wynberg and Rondebosch.

Transportation improvements thus instigated the suburban movement and improved transportation modes stimulated its growth and tended to form nodes at or near the stations.

Site inspections indicate that while the initial stations were located at fairly regular spacing on the length of the line, the actual nodal growth in most cases occurred strongest at those stations where the Main Road and the station were in closest proximity as in the case of Rondebosch, Claremont and Wynberg. This is shown in Fig. 2. The only exception to this rule is Rosebank where marsh land to the east forced this locational proximity but precluded any village growth. It was thus the twin influence of both road and rail which established the villages and while the stations located the growth point it was the road that dictated its growth pattern. In all cases the villages showed the typical ribbon development along what was then the only hardened access road.

These stations which had initially located the nodes, later became the reasons for their further growth. An examination of the maps at the turn of the century indicates clearly a pattern of radiating roads as shown on Fig. 3. These roads were now starting to play an important part in the village growth and as early as 1903 we find the continued agitation for the construction of an overhead bridge at Lansdowne Road owing to traffic congestion at the level

crossing. Even in these early days the division of costs between the Railway Administration and the Local Authority would appear to have been the major obstruction to its erection. These roads developed into the primary network of main roads and on this road matrix the distribution system of the feeder bus routes was to develop. This firmly established the villages as the nodal interchanges and further stimulated their growth.

2. CLAREMONT RELATIVE TO METROPOLITAN CAPE TOWN

In recent years Claremont appears to have assumed the dominant role within the Metropolitan area outside the C.B.D. An analysis of the reasons for this dominance, often at the expense of other shopping complexes, is necessary to ensure that the potential is available to support this growth pattern both at present and in the future. In this context the relationship of Claremont to the Metropolitan area and in particular the relationship of Claremont to its immediate neighbours must be investigated.

What are the locational advantages peculiar to Claremont today which have resulted in its ever increasing dominance over its rival centres?

An examination of Fig. 4 which shows the urban area of the 01 region of Greater Cape Town together with the hierarchy of roads and railways indicates certain of these locational advantages. Claremont is seven miles from the C.B.D. of Cape Town at the first station on the Southern Suburbs railway line where the physical restraints of marsh and mountain fall sufficiently away to give a circular market area of 1 mile radius. This market area is relatively unimpaired by other constraints such as extensive open space and is located at the major point of the transportation routes. This has resulted in Claremont becoming the major nodal interchange point in the Southern Suburbs.

The residential amenity provided in the vicinity of the new village was initially realised by van Riebeeck when he located his farm in the sheltered Boschheuvel Valley. It was not until 1945 that the full locational potential of the village was realised with the

resultant evidence of an outward movement from the existing linear development.

From this nodal point urban sprawl was possible with the minimum limitations of constraint to create a potential market. The well-balanced suburbia which developed within the market area was graded from the highest income groups of Bishopscourt through the full range to the lowest income groups of the Coloured settlements within the village itself. This together with the potential of the available market provided the sure foundation necessary for a stable shopping centre.

The older village of Wynberg possessing many of these same advantages was for many years the dominant village. This dominance was due in part to its age and in part to the location of the military camps within its market area. This dependence of Wynberg upon the military establishment is clearly shown in comparisons of the residential areas and available shopping areas in both suburbs as existed in 1945 immediately after World War II. The total residential acreage in the Wynberg area was 1320 excluding the military camp as compared with 1180 in Claremont while the area of available shopping was 197,365 sq. ft. as opposed to 121,225 sq. ft. The floor area of both shopping centres had shown very similar growth rates over the two previous decades with Wynberg having the slight edge on Claremont - 58% as opposed to 54% increase in Claremont. After the war years Wynberg no longer was the training centre for the Active Citizen Force with the resultant drastic reduction in personnel stationed within the camps. This disturbed the balance of market and materially altered the relative shopping pattern within the centre. While the area of available shopping in Wynberg still showed an increase in toto of 38% from the previous two decades in certain components, such as non-durable shopping, there was an actual decrease in shopping areas of 6%. In Claremont, with its more stable base of a well-graded residential population, a completely different pattern of growth in available floor area developed in the same period. The total increase in retail floor area was 103% and compared with the decrease of 6% in Wynberg in non-durable shopping, Claremont increased its floor area by 48%. It is thus seen that the military establishment which maintained the vitality in the Wynberg shopping centre in its early days became

sterile barrier zones and resulted in the partial decay in its growth rate. The extent of these sterile zones is shown in Fig. 5 where the various physical constraints to urban growth such as open space, schools and sportsgrounds are shown together with the crossing points on the suburban railway lines. These constraints, more in evidence in Wynberg than in Claremont tend to channelise traffic movement and inhibit growth. The hierarchy of roads, both existing and proposed, will tend to strengthen the existing advantages of Claremont due to its interceptor location on the routes from Hout Bay, Constantia and the south Cape Flats areas.

This dominance in the southern suburbs can in no way be affected by the growth of an equally dominant centre on the line to the north. The probable pattern will be the establishment within this area of a similar centre at either Bellville or Parow forming with the C.B.D. and Claremont a market triangle. This pattern will be strengthened with a degree of in-filling provided by lower order centres at Goodwood, Pinelands, Milnerton, Rondebosch, Athlone, Lansdowne, Wynberg and Heathfield. It is doubtful if any of these lower order centres will at any stage in the foreseeable future, under a normal unrestricted growth pattern, be able to compete with the market triangle. In most instances this weakness is due to the comparative uniformity of income structure in each of their market areas. Of these lower order centres only Athlone could possibly act as an interceptor to the three principal centres but only if the very real dis-economics of its single strata income structure are compensated by an even more stringent restriction policy of the Group Areas Board. It is only protective Government legislation or extensive Government subsidies that could upset or distort the present market system.

3. DESIGN MODES TO STRENGTHEN DOMINANCE

The strengthening of any shopping centre can be achieved by one or more of the following design modes :

3.1 Facilitate accessibility to the centre by improving the road system. These improvements can not only be beneficial to the existing market area but can considerably extend the area.

3.2 Improve mass transit links to the centre and where possible extend these links into new market areas.

3.3 Improve modal transfer and modal interchange terminals.

3.4 Induce entrepreneurs into the centre by an improved environment.

3.5 Improve the public image of the centre and thus extend its market area.

3.1 Improvement of Accessibility

Improvement of the regional transportation system will usually bring varying degrees of benefit to the component areas within the region, depending on the relative geographical location of the areas with reference to the transportation system. In general a poor transportation system will tend to result in a multiplicity of small centres while a good transportation system will develop fewer larger centres but more widely scattered. The development of the Urban Freeway System would thus tend to create a number of lower order centres within the metropolitan complex together with a dominant centre. This dominant centre is the one best able to capitalise on its geographical location relative to the freeways.

The hierarchy of any national transportation system is the linking of the major cities throughout the country while on the regional scale it forms the link between the towns and the city. Superimposed on the regional pattern we have the metropolitan pattern of transportation links connecting the suburbs and the C.B.D. Cape Town and its environs follow this standard pattern with the National Roads N2, N9 and N12 supplemented by the two partially constructed urban freeways forming the regional framework. Superimposed on this basic framework is the main road system. These two systems are shown on Fig. 4. As in the standard model this entire system is oriented to the C.B.D. The existence of any suburban shopping centre depends on its ability to act as an interceptor to the C.B.D. oriented traffic and the greater its interceptor role the greater the growth rate of the centre. In this respect both Wynberg and Claremont are ideally located to function as interceptors on the southern freeway links.

To improve this interceptor function it is essential that the access routes into the centre from the C.B.D. oriented urban freeway system must be strengthened and made both desirable and functional. A shopping centre will not function unless its existence is known and it is clearly accessible. In Claremont, to improve accessibility to the centre, it is necessary to provide strong east-west links on either side of the centre between the two urban freeways. Easy accessibility will thus act as a magnet and draw traffic off the C.B.D. oriented freeways provided there is absence of congestion or at least less congestion than exists at the competing centres including the C.B.D.

3.2 Improvement in Mass Transit Links

In an affluent society which is automobile oriented the interceptor role is probably the most important factor in the location of a shopping centre. However in a less affluent society the secondary role of modal transfer or interchange may have an equally important function. In the North American city the trend is for the low income section of the population to locate in those areas of urban blight within the outer fringes of the C.B.D. This low income group is thus oriented to the C.B.D. and they have little or no influence on the location of the regional or urban shopping centres. However in South Africa, due to Government legislation, these sections of the population are located on the outer periphery of the city, usually in a zone or sector and often saddled with the highest transportation costs to place of employment and shopping. It is usually attempted to locate industry in the vicinity of these labour pools, in particular those industries that are labour oriented. This zonal development pattern results in the necessity of indirect transportation routes to and from the places of employment across the C.B.D. oriented freeway system.

This demand can be met either on automobile oriented transportation to place of work with high vehicle occupancy to reduce travel costs or indirect travel by mass transit with one or more modal interchange points.

In South Africa the modal interchange is in itself still a two-tiered structure in the lower income groups. Superimposed on the flow pattern of home to factory of the male member of the community

there is the home to home movement of the domestic servant. The first of these movements is becoming increasingly automobile oriented due in part to its indirect route and in part to the ever-improving living standards of this income group, but the second movement - that of the domestic servant - is still almost entirely mass transit oriented. It is this movement with the increased leisure time or time off which markedly increases the shopping potential of those centres located at a major point of modal interchange. In this respect Claremont and Bellville have marked locational advantages. The improvement of the east-west cross-links between the freeways will result in improved running time on the mass transit links and this in turn will tend to generate additional patronage. The present concentration of mass transit bus traffic towards the Claremont modal transfer or interchange point is shown on Fig. 6. Route locations indicate a preference by the transit management for the modal transfer to be located at Claremont as opposed to the more direct run to Wynberg. The preference for the less direct route is due mainly to the reluctance of a transit operator to cross large areas of sterile land with little or no possibility of intermediate passengers. This is the case in many of the approaches to Wynberg.

3.3 Improvement in Modal Transfer and Interchange Facilities

The vast majority of the commuters from the low income areas of the Cape Flats are, in fact, captive in the shopping area at points of modal interchange as all these transport services are feeder services only. In particular this applies to the transfer commuter who is compelled to move from the terminal in the Station Place to the Main Road to effect the transfer to the through bus. No direct links from the Cape Flats area to the C.B.D. or factory areas of Woodstock, Salt River, etc. exist at present nor would it appear likely that any direct links will be permitted under current Government policy of protection of the State-owned railways.

As with urban freeways it is found that improved transportation imputs - i.e. improved transfer stations and improved running times - can generate commuter traffic. Improved all-weather transfer points are important, in particular in the Western Cape.

3.4 Inducement of Entrepreneurs to an Improved Environment

Most suburban shopping centres which have originated at a nodal point on a main access road tend to become linear in structure with the minimum amount of parking. In this respect Claremont is no exception. In many cases these centres display all the disadvantages of the C.B.D. shopping i.e. congestion, lack of parking, etc. - and have none of the economies of scale such as alternate choice shopping, etc. Initially it was thought that the provision of parking areas in and around a shopping centre was sufficient to make the centre viable. Today it is realised that more than this is necessary. The environment of the centre must be changed in order to induce the entrepreneur to invest capital in the centre. This can be achieved by a realistic type of zoning which will give the commercial centre a workable shape. In far too many a suburban centre the zoning regulates the commercial development to a 100 ft. wide strip on either side of the Main Road. In Wynberg the strip of commercial zoning still applies while in Claremont the commercial area has depths of up to 800 feet from the Main Road to the west as shown in Fig. 7. Claremont in the past four years has attracted the entrepreneurs while Wynberg has had little impact notwithstanding the presence of the Magistrates' Court and other Government offices. One of the contributing causes of this indifference of the entrepreneurs to Wynberg is the extended shape of the area zoned for commercial purposes and the breaking up of the available area by the large hotel and by the motor industries. In Claremont both these fringe industries are located at both ends of the commercial area and act as cut-offs to the centre. In recent years the two small hotels within the Claremont centre have been sold. The advantages of this squared-off shape of the Claremont centre are adequately borne out when it is realised that Stuttafords, the first of the new investors in the Claremont area, purchased land 400 ft. from the Main Road in Warwick Street at prices varying from R0.90 to R1.40 per square foot. These properties are adjacent to an existing parking area. These purchase prices were all less than those of the municipal valuation. Preference was given to this area as it was as close to the strongest opposition as possible but located on the interceptor side of its market. This is based on sound economic marketing principles as opposed to the old-

established conventional approach that for business success departmental stores must locate on the Main Road.

In the same period of time initial purchases were being made by other power groups in Claremont for R23.8 per sq. ft. on the Main Road and R19.6 per sq. ft. 200 feet down a side road at prices more than 10 times the Municipal valuation.

The demand for land is so great in this portion of the commercial area that transfers have taken place at prices in excess of R34 per sq. ft. Comparable values in the C.B.D. are the R70 per sq. ft. for the Trust Bank site in Heerengracht and sites near S.A.N.L.A.M. at R15 per sq. ft. and in Long and Riebeeck Streets at R27 per sq. ft. Property sales in the commercial section of Claremont for the period 1956 - 1968 are shown on Fig. 8 with 76% of these sales occurring in the last four years.

It is of interest to note that the prime mover in the price escalation in Claremont was a large insurance company utilising public funds for investment as opposed to the initial more conservative approach of the established commercial enterprises. The commercial developers today are now forced to pay these higher prices in order to consolidate their parcels of land. Time alone can tell how inflated these prices are, if at all, or how long-term the investment must be.

3.5 Extension of the Market Area by an Improved Public Image of the Centre

A progressive zoning policy for Claremont has materially assisted in its development. However the Local Authority can provide further incentives to the developer to induce a greater vitality into the centre. To do this a more enlightened and more flexible interpretation of both the zoning ordinances and building regulations is required. If innovation within the centre is to be ach ieved in the way of pedestrian segregation and other similar processes it is impossible to do this in isolation on one site. Complete pedestrian segregation in a centre as large as Claremont in its ultimate can only be successfully achieved by a two-tiered structure.

This will necessitate extensive elevated pedestrian walks and the linking of buildings at first floor level which is not possible under the present interpretation of the current regulations.

4. MARKET AREA OF CLAREMONT

4.1 The Extent of the Present Market Area

Prior to an investigation of the market area of Claremont, a preliminary site survey was undertaken of the area. Inspection of the shopping complex revealed that a fundamental structural difference is evident between that of Claremont and town centres like Bellville, Paarl or one of the many British new towns. This difference is the absence of both the office component together with the industrial or work component. Thus Claremont neither conforms to the Ebenezer Howard concept of a new town which was to be fully self-supporting, nor to the modified concept of a dormitory town which consists of strong neighbourhood centres rather than a town centre. Claremont was initially a neighbourhood centre but today it has grown beyond this to become a centre as strong as any in its retail components. However due to the close proximity of both the C.B.D. and the industrial areas of Woodstock, Salt River, Ndabeni, Paarden Eiland, Epping, Athlone Industria and Lansdowne, all within 15 minutes travel time, Claremont is lacking employment opportunities except in the service component. Examination of the parking areas of Claremont at 8.45 a.m. substantiates this concept for there is a 30% overall occupancy, the largest being 40% at the Newry Street parking area where half the cars are at the station end of the area - i.e. removed from the shopping area. These vehicles are used for park and ride. The metered parking at this time has an occupancy of 54% of which 38% were illegal parking i.e. unpaid meters.

In 1965 with a total retail floor area of 246,590 sq. ft. and with one departmental store with a floor area of 36,000 sq. ft. (O.K. Bazaars) Claremont would qualify as a Community Centre in Homer Hoyt's classification of shopping centres.(6) In addition Claremont has four other stores - Ackermans, Woolworths, Henshilwoods and Pearces - averaging 16,000 sq. ft. Hoyt's limits for a

Community Centre are 100,000 sq. ft. to 400,000 sq. ft. with an average of 223,000 sq. ft. and at least one junior department store of 25,000 sq. ft. to 90,000 sq. ft. with an average of 45,000 sq. ft. The limits of the Regional Centre are a total floor area of 250,000 sq. ft. to 1,000,000 sq. ft. with an average of 645,000 sq. ft. available retail area and a major department store of 100,000 sq. ft. or more with an average of 275,000 sq. ft. The known planned new development will within the next three years raise the status of Claremont to that of one of Homer Hoyt's Regional Centres. The proposed new shopping complex on Stuttafords and Greatermans sites only will more than double the present retail floor area in Claremont. Both of these stores will be completely new to the centre. The zoned commercial area of Claremont is approximately 58 acres which compares favourably with Hoyt's requirements of 35 to 100 acres for a Regional Centre and 15 to 40 acres for a Community Centre.

An assessment of the market area of Claremont was made by use of a gravity model based on travel time. For this purpose a series of isochrons was drawn utilising mean travel time at morning and afternoon shopping peaks. This is shown in Fig. 10. In addition isochrons were prepared for the two competing shopping components of Rondebosch and Wynberg. These travel times were weighted in proportion to the available retail floor area in each centre and from this the isochrons of Claremont were modified by the gravity model to those shown in Fig. 11.

This modified isochronal chart of Claremont was then compared with the retail market area obtained by Coetzee in his comparative study of Wynberg and Claremont in 1965[5] Fig. 12. Very close correlation was obtained in the case of Claremont where the weighted six minute isochron is within 15.5% ofCoetzee's primary area and of the same form. The primary area of Wynberg shows greater variation due mainly to the absence of a competing shopping centre to the south and its present function in the interceptor role on the Constantia and Bergvliet markets. The proposed increased floor area in Claremont will, in the gravity model, give added weight to that centre and permit it to extend its market into those zones at present under Wynberg's influence.

Although Wynberg indicates a very much larger market area than that of Claremont in the primary zone this physical superiority is considerably offset by the extremely low population density in that large portion of the area to the west of the Main Road - i.e. Constantia and Tokai areas - and by the low purchasing power of that area to the east of the railway line. In addition large areas of sterile land in the immediate vicinity of the shopping centre further reduce Wynberg's potential. This is summarised in Table 1 below :

	CLAREMONT			WYNBERG		
	Total	Sterile	Residential	Total	Sterile	Residential
4 min Isochron	1710	230	1480	1160	250	910
6 min Isochron	3330	460	2870	3630	1160	2470
Coetzee's Prim. Zone	2810	340	2470	10800	3000	7800

Table 1. Area of available residential land in Immediate Market Areas in acres.

The method used by Coetzee in his analysis was a market investigation of the entire area taking a sample survey of the shopping habits of the public. The primary zone is that area where more than 60% of the shoppers shop in the centre under consideration. This method of micro-analysis by zones is used extensively overseas and is regarded as a more accurate method of determining the relative market area. While close correlation is shown between the two primary zones using the two entirely independent methods, considerable variation is in evidence in the outer or secondary zone. This lack of correlation between the methods can be attributed to an over-simplification in the operation of the gravity model where the relative strength of minor convenience shopping and neighbourhood centres has been ignored. In addition the influence of a mass transit link in low income groups can be underestimated in the gravity model. This is clearly the case in the Lansdowne Road link as is emphasised in the shape of Coetzee's secondary area in Fig. 12.

4.2 The Possible Expansion of the Market Area

Coetzee's market areas for 1965 have been accepted with growth

extending outwards due to the increased dominance provided by the additional known development within the centre. This on the gravity model would increase Claremont's zone of influence over its neighbours. This anticipated development will by its greater variety of alternative choice, the presence of additional departmental outlets, the greater economies of scale of the centre and the improved transportation imputs, permit the extension of the market area around and beyond the competitive areas of Wynberg and Rondebosch. This will result in extensions into Mannenberg and of the two out-flank horns around Wynberg's immediate market area as shown on Fig. 13. Thus the primary zone will increase to 2600 available residential acres while the secondary zone will extend from its present 6000 available residential acres to a possible 9,500 residential acres.

The only competitive retail complex on the Cape Flats is the Athlone Centre which due to its major locational disadvantages will not, without drastic Government restrictive legislation, tend to intercept any of the Claremont market area. The eccentric location of Athlone relative to its market area together with its poor linkage to the southern portion of the non-white townships tends to markedly weaken its zone of influence. The stronger mass transit links are to the suburban line station at Claremont. The evidence as seen in Bonteheuwel where the town centre of an established community of approximately 40,000 persons has shown a case history of vacant shops and numerous bankruptcies does not augur well for any future competition in this area. The neighbourhood centres in Bonteheuwel function well but the shopper still indicates his preference towards the C.B.D. or the centres of Athlone or Claremont where a wider variety of alternative choice is available. The failure of these centres in the non-white townships is in all probability due to the homogeneity of the purchasing power of the population. In contrast the reason for the strength of Claremont lies in the vast diversity of the purchasing power of its market area. Due to this extreme range of purchasing power the centre is able to offer the complete variety of both durable and non-durable goods in competition with the C.B.D.

5. POPULATION OF MARKET AREA

With the anticipated physical extension of the market area due to the proposed transportation imputs resulting in improved accessibility to the retail centre, must be coupled population increases both within the existing market area and in its anticipated extensions. If any rational estimate is to be made on the future population of the market area it is necessary to assess it at the present population of the area and then project this population to the future period in time.

Accurate population projections are extremely difficult to achieve, but these projections when on the macro scale - i.e. for the whole country - are in general more accurate in trends. City population projections can be extremely variable and influenced by many local and national conditions which can result in unpredicted migrations. Such a variable would be the consolidation of the Legislative and Administrative capitals of the Republic at Pretoria or some other centre. Should this occur, it would result in an immediate and very vital change in the population projections of both the cities, but would have little or no effect on the national figures. Variable as the city population projections are, even greater are the errors which can be found on the micro scale when investigating the suburban population projections. This population is dependent on the variables of personal choice, price and availability of land, zoning conditions, variations in the zoning conditions over a period of time, etc. and Government policy in both housing and industrial location. It is in this very problematic field that an attempt must be made to assess the trends within the market area.

5.1 Present Population of the Market Area

In the 1967 project of the Department of Urban and Regional Planning at the University of Cape Town investigations were undertaken on the growth of Greater Cape Town.(7) Among the wealth of information collected and correlated was an assessment of the population of Greater Cape Town by zone together with an assessment of population densities in the various enumeration districts.

In the study of the market area the subdivision into primary and

secondary market areas was made. As is shown in Fig. 12 these subdivisions did not entirely conform to the enumerators district boundaries used in the 1967 population and density studies. In order to obtain a figure for the population of both these zones the split was determined in proportion to the area of available residential land in the case of both the nine districts and the twenty-five subdivisions. The current population figures as obtained by this method are 36,400 in the primary zone and 69,500 in the secondary zone as compared with the 36,800 and 65,100 as obtained by Coetzee. This total population of the market area of 105,900 and 101,900 obtained by the two independent investigations indicates an acceptable degree of correlation between the two sets of figures.

This agreement in the independent analyses of these areas indicates that the extensions and breakdowns of both studies can thus be linked within the acceptable limits of error. The 1967 figures give the white population as being 69.6% in the primary zone i.e. 25,100 whites and 13,350 non-whites. In the secondary zone the split between the two race groups is reversed with 21,300 whites as opposed to 50,600 non-whites. These figures are shown in Appendix 1.

5.2 The Ultimate Population of the Market

The above assessment has established the present market and the population of that market. In addition to this it is necessary to attempt to assess the ultimate population or the population projected at some fixed point in time. As mentioned earlier it is extremely problematical to estimate the population growth of a suburb by extrapolation or other demographic processes due to the innumerable variables such as personal choice, public image, price mechanism and even the excellence or otherwise of a school or schools. In view of the doubt that exists in this form it has been decided to attempt to arrive at the ultimate market by initially measuring the existing extent of available residential land in the market area. Utilising an estimated average gross residential population for each district area and multiplying these densities by the total gross residential area the ultimate or saturation density of the market area has been assessed. These figures indicate that when the existing market area is fully developed the population will be doubled to 59,850

and 62,800 in both the white primary and secondary market areas and to 115,700 in the non-white secondary area. With the estimated extensions to the secondary areas the ultimate figure is raised to 76,100 for whites and 178,400 for non-whites. The above figures gave a total potential increase in the population of both the market areas as 95,520 whites and 127,830 non-whites. It is assumed that by the time the ultimate development is reached the Government policies of Group Areas and Segregation will have achieved their theoretical objectives and that all the non-whites including domestic servants will have been zoned from the primary zone. It is extremely doubtful if this would ever become a complete reality and thus additional non-whites will always be housed within the medium and high income zones. This population increase will be predominantly in the area to the south and west of the shopping area of Claremont. The initial assumption of no non-whites is thus a conservative estimate on the viability of the shopping complex.

6. ECONOMIC GROWTH AND CHANGE WITHIN THE MARKET AREA

The market area has been established and its present and ultimate population has been assessed. However the character of the market area is neither a static nor a dominant concept. The market area is a structure susceptible to change in all probability more so than any other part of the city.

6.1 Change due to Government Legislation

In South Africa Government Legislation has forced a considerable change on the characteristic form of the market. In particular the Group Areas Act has forced the major portion of the non-white population to be relocated on the Cape Flats. This has tended to lay emphasis on the points of modal transfer or or modal interchange. This is particularly so in the case of Claremont where the majority of the public transport vehicles from the Cape Flats have their terminal at the Station. The little villages of "volkhuise" which were scattered through the old estates in this vicinity have either been renovated to create "Little Chelseas" or they have been demolished in a process of urban renewal. In either case the population density has usually declined but the total spending power of the area has

increased.

6.2 Change due to Innovation

While many of the changes experienced in the market area are due to change in the physical structure such as urban renewal, infilling of vacant land and full utilisation of the existing zoning on the sites, the market area can be extended by a dynamic and progressive approach to the form and structure of the shopping centre itself.

Any shopping complex relies on its population which lies within 10 minutes walking distance of the centre together with its outer or regional market. This outer market has been broken into the primary and the secondary areas, the former being within a six minute travel time while the secondary zone is within the twelve minute travel time adjusted by means of the gravity model for the influences of the competitive centres. However this regional zone - both primary and secondary - can be extended by the action of the developer in the centre especially if the entrepreneur is encouraged by a progressive Local Authority.

The regional market normally consists of four entirely separate sections of the shopping population.(8) These sections are :

(a) The true unbiased shopper who shops because it is the most convenient market place to his residence. The attraction of the centre is based solely on the proximity of the centre.

(b) The shopper who is attracted to those sections of the retail trade which can only survive in the larger centres. Due to the extent of the minimum threshhold of those classes of retail goods they are not found in the smaller convenience or neighbourhood centres.

(c) The captive shopper who is employed within the centre and is tempted to complete his shopping activity at his place of employment.

(d) The "extra regional" shopper who is located closer to some other centre but from personal choice prefers to shop at the

centre. This shopper is unlikely to be tempted to the centre from those more favourably located to h is point of residence unless the centre sets out to entice him by an active policy. Such a means of tempting the extra-regional shopper is by the provision of adequate parking, pleasant environment, ease of accessibility and a compactness in form, etc.

The extension of the market by an active and progressive policy to attempt to attract this potential extra-regional shopper can be highly successful and very rewarding to the centre from the financial aspect. It is in this aspect that the shopping centre of Rosebank, Johannesburg owed its initial success and in a similar way it can be the means of Claremont irrevocably establishing its supremacy and dominance in the Southern Suburbs. The estimate of this extended market area is shown in Fig. 12 where added areas claimed are in the Constantia and Cape Flats areas on the axis of the Blue Route end of Lansdowne/Strandfontein Road artery.

7. A SYNTHESIS OF THE POTENTIAL OF CLAREMONT AND ITS EFFECT ON THE TRAFFIC

The history of Claremont shopping dates from 1881 when the first sub-division of Veldhuysen farm occurred on the Main Road for retail purposes. Since that date the Claremont shopping centre has steadily grown, keeping pace with its larger neighbour of Wynberg and very much dominated by C.B.D. This steady growth was maintained up to the end of World War II at which stage it was still less than 50% of the potential of Wynberg which had always been bolstered by the presence of the military establishments in its immediate vicinity. The urban sprawl which developed in the following two decades tended to mushroom outwards from the railway line. The first and most convenient location for this mushrooming to occur was at Claremont where the physical restriction of mountain, river and marsh had fallen away. The overall growth in this period is amply evident in an examination of Fig. 14 and Fig. 15 which show the residential areas as existed in 1946 and in 1966 and is the reason for the phenomenal growth of the shopping centre.

Can this growth rate be maintained over the next two decades? In the study of the Urban Structure and Growth of Cape Town, Project 1966/1/2 an overall increase in population to the year 2000 was estimated as being 157.2% with an increase of 40.6% in the white population and 252.0% in the non-white population. These figures are shown in Table 2 below :

Table 2 : Population Projection for Metropolitan Cape Town

	Projected Population		Population Increase	% Increase
	1966	2000		
White	345,000	485,000	140,000	40.6
Non-White	540,000	1,900,000	1,360,000	252.0
Bantu	87,000	115,000	28,000	32.2
TOTAL	972,000	2,500,000	1,528,000	157.2

It was anticipated that this increase in white population will be distributed in the natural infilling, in the Constantia Valley, and in the area to the north of Goodwood/Parow and east of Milnerton. This entire anticipated increase can be housed on the available land within the primary and secondary areas of Claremont when saturation density is attained. However it is assumed that only 40% or 56,000 will be pulled to this area, the remainder settling in the northern areas. This 56,000 is still short of the estimated saturation point of the area by 40,000 whites. With regard to the non-white population there is little doubt as to what the settlement areas will be for the anticipated increase of 1,360,000 persons will occupy the entire non-white arc contained by the Cape Flats, Main and Strand railway lines with growth extending from the established railway lines inwards. The initial area of development will thus be in the north-eastern section of the market area and the saturation of this sector requires an estimated 127,830 persons i.e. approximately a 10% increase. This area is scheduled for complete occupation by the end of 1972.

Utilising the current population estimate of the market area of Claremont, together with its available purchasing power of the full potential of this market area is realised in rands and cents. This in turn is converted to the potential floor area that this

market, with its available purchasing power, can support. These analyses indicate that the Claremont retail component is developed only to 23.5% of its full potential.

It is evident that Claremont is ripe for a period of phenomenal growth in which its current floor area of 246,000 sq. ft. can, and in all probability will, increase towards the 1,100,000 sq. ft. which is the potential that the present market can support. The Stuttafords/Greatermans complex alone anticipates adding a further 320,000 sq. ft. to the retail structure of Claremont[10]. With the population growth within the market area over the next two decades the Claremont shopping complex could more than double itself again to 2,470,000 - i.e. 10 times its present size - and still be a viable unit.

The resultant effect of this growth on the transportation system can be clearly seen by the anticipated growth of the available parking required to maintain this shopping complex under current modal split to the centre. At present the parking requirements are sufficient if all private parking is used - i.e. 695 parking bays required and 652 public parking bays available with a further 251 private parking spaces also available on a partially or totally restricted basis. With the development of the shopping complex to its full potential this requirement will increase to 3,105 without any increase in the population of the market area. The problem of both parking and handling this increased traffic in the immediate future is very real. Parking sites are not available at present and the purchases of additional land for parking at the current market value of more than R20 per sq. ft. is extremely costly. It is fortunate that the developers have been well-advised by their architects and designers and in most cases are making on-site parking available. Stuttafords/ Greatermans are contemplating on-site parking for over 1000 cars mainly on the roof deck. The future additional requirements can be accommodated by the provision of multi-storied parking garages on the existing public parking lots as and when required.

The added problem is however the handling of the traffic into and out of these parking lots for the existing road structure can barely cope with its present flows as is evident on site inspection. Should the

present congestion increase this will in turn detract from the centre and reduce its potential as a regional shopping centre by limiting its interceptor role.

8. THE RETAIL CENTRE OF CLAREMONT

8.1 Existing Zoning

The present retail centre of Claremont consists of a form of core and a fringe area. In this respect Claremont is unique among the other suburban complexes for fringe industries such as the hotel trade, motor trade, etc. are located in the outer extremities of the linear development acting as stoppers at either end of the Main Road. The central core of the retail structure is zoned for business purposes on either side of the Main Road for a distance of between 120 ft. and 200 ft. together with the 2½ complete blocks between Stanhope Road and Newry Street. The balance of the area eastward to the railway reserve and westward to Douglas Road between Vineyard Road and midway between Warwick Street and Grove Avenue is zoned for commercial purposes. The entire centre is surrounded by an area of medium density flat development to the west of the railway, while the area to the east of the line is single residential area. The zoning map is shown in Fig. 7.

8.2 Existing Land Use of Commercial Area and Changes

By far the greater portion of the area zoned for commercial purposes is at present occupied by single family residential properties which were, until recently, owned by the non-white community. Group Areas Legislation has zoned this for white occupancy and over the past years the Coloured community has been moved out into the Cape Flats non-white townships. It is into this area that the commercial concerns and the property investors have moved. A number of power groups have developed and these have purchased large tracts of land in order to consolidate and to prepare a planned and well-integrated development. It is the rivalry between these groups which has caused the escalation in property prices in the area as indicated in Fig. 8. The power groups and the areas they have acquired or are in the process of acquiring are shown on Fig. 9.

8.3 Entry Points to Claremont

8.3.1 Mass Transit

8.3.1.1 Rail Transit

The station which initially established Claremont as a nodal centre still plays an important part in the every day function of the centre. It is the most important point of modal interchange in the Southern Peninsula and its importance is recognised by both transit operators in their mutual desire to establish an efficient terminal in the immediate vicinity of the station. The pedestrian entry from this terminal to the retail area is evenly divided between Ralph Street and Station Road with a smaller proportion - predominantly white - utilising Newry Street and Roscommon Road.

8.3.1.2 Feeder Transit Terminal

The terminal for the feeder service which handles over 200 buses per day is located in Station Place. While the larger portion of this traffic is transfer traffic, an appreciable portion filters into Claremont almost exclusively utilising Ralph Street and Station Road. This traffic into Claremont is predominantly non-white and is either moving into its interchange point on the Main Road bus route, into the retail component itself or passing through to their place of employment in the residential area. This transfer traffic has a greater effect on the shopping centre than the interchange traffic onto the railway as it has physical contact with the shopping environment and to that extent is partially captive to the environment.

As the major portion of the non-white population has been moved out of the primary zone of Claremont the influence of this feeder mass transit service can be assured. At the peak period on a Saturday morning on the Main Road between Newry Street and

Ralph Street pedestrian densities of 3350 persons per hour have been recorded while on the opposite side the density was 2750 persons per hour. Of these peak counts 73.9% were non-white on the east footway while 58.1% were non-white on the west i.e. Pearce's footway. By far the largest portion of these shoppers will have reached the centre by this transit route. The 2000 and 2800 persons per hour in Ralph Street and Station Road were over 85% non-white.

These pedestrian densities obtained in Claremont on a Saturday are considerably higher than the Friday shopping density obtained in Cape Town at O.K. Bazaars - 2364 persons per hour - or even the lunch hour peak density at Stuttafords - 3252 persons per hour.(11)

8.3.1.3 Main Road Transit Route

This mass transit service is a through service which at peak periods has a certain percentage of its buses starting at Claremont in order to handle the additional passenger load from the feeder service. It has four loading/off-loading points on the north-bound run and three on the outward-bound run within the retail area. However the major passenger transfer point is between Ralph Street and Station Road. This route acts as a collector for the two large flat complexes through which it passes at either end of Claremont and this traffic is predominantly white and usually consists of either elderly persons or the very young.

8.3.2 Private Vehicles

The entire area to the west of the Main Road has no regular bus service. This is an area of medium to upper income groups and is predominantly an area of two car ownership. The entry routes of th is section of the population are on Herschel Road, Bowwood Road and Protea

Road with Newlands Road and Grove Walk acting as distribution roads into the centre. These filter roads are narrow and congestion is extensive with the resultant effect of forcing additional traffic on to the Main Road to gain entrance to the parking areas.

The market area to the north and north-east is of medium to medium-high income and its point of entry into the shopping area is by the new Camp Ground Road Bridge and the Main Road. There is no alternative route into the shopping centre except by a lengthy deviation to Mark Road - 1900 ft. up Protea Road.

The two public parking areas are behind the two principal medium priced retail outlets and these act as terminals for the vehicular traffic from the north and east sections and the west respectively. The longitudinal ribbon type development is still much in evidence in Claremont and with the exception of Ralph Street and Station Road there is little or no retail development off the Main Road due to absence of any generators in these areas. This tends to result in additional car usage in the Main Road with an extensive kerbside shopping. The entire length of the Main Road has parking meters but there is evidence of a high rate of turnover and short time occupancy, in particular to the north of Vineyard Road where one-stop shopping is not required. South of Vineyard Road one-stop shopping is more frequent and the period of occupancy is very much greater. One-stop shopping is also the general practice from the established parking areas in Claremont.

9. TRANSPORTATION

Any detailed investigation of traffic and traffic congestion in particular in the urban areas should be based on information obtained by one or other of the recognised traffic survey techniques. The most commonly used of these is the origin and destination survey from

which desire line patterns can be plotted for the various conditions. This necessitates an elaborate investigation of the entire area by home interview survey, cordon surveys with cards or roadside interview. From the origin and destination survey desire lines can be plotted in order to obtain the pattern of trips both within and outside the study area.

A recent development of traffic study is the traffic analysis model where the procedure is the investigation of the socio-economic factors and person trips in each zone of the study area and the determination of the trips generated in each zone both now and in the future. These trips are then distributed to the predetermined land use in interzonal transfers. These transfers are weighted in the distribution with factors for distance between like zones, trip purposes, etc. A modal split is then made in which the factors of the social and economic structure of each zone, the accessibility to transit routes, etc., were weighted. Finally a traffic assignment is made onto the known routes throughout the network and the shortcomings of such routes are investigated. The success of this method of analysis depends on the accuracy of the land use predictions together with the detailed economic studies of the zones. In view of the absence of field data to implement either the Origin and Distribution Study or the Traffic Analysis Study, and because a field survey is beyond the scope of this investigator, both of these standard tools of traffic survey were abandoned.

9.1 Method of Analysis

As indicated in the study of the market area a large proportion of the Southern Peninsula is in a state of flux and social change. The extent of this change is very evident when one examines the population mobility in some of the zones due to a combination of Group Areas zoning coupled with infilling of the urban structure. This is particularly so in the Kenilworth area where the 1967 study of the Department of Urban and Regional Planning of the University of Cape Town indicated the magnitude of these population changes between the census of 1951 and 1960[7] These are shown in Table 3 :

CENSUS	WHITE	NON-WHITE	TOTAL
1951	734	13,980	14,714
1960	12,463	10,829	23,292

Table 3 : Population Change in Kenilworth

With areas undergoing such rapid change, which in most cases is unpredictable due to its being motivated by legislation and not by natural growth patterns, it is extremely doubtful if the standard method of traffic analysis would produce data which could be used with any confidence on this micro scale. It is for this reason that in the present investigation a series of measurements of the degree of congestion which exists in Claremont at present has been undertaken. From these an attempt is made to estimate the possible future traffic requirements of the area by assessing the growth potential of the shopping complex and from this the traffic that this complex will generate both at present, in the immediate future as a result of imminent planned development and in the future. Traffic is then assigned to the existing and proposed routes and if necessary a change in the modal split be induced by improved mass transit facilities in those areas when it becomes uneconomical to increase the road system.

9.2 Existing Traffic Pattern

The Main Road through the Southern Suburbs has been proclaimed as an 80 ft. belt and this, in certain areas, has been developed to its full width when the land was available. In its full development it will consist of two 30 ft. carriageways in each direction each of which will have two travelling lanes and a parking lane. In a residential zone with light cross traffic the capacity of such a facility will be 3000 vehicles per hour of available green in the robot cycle which will give an overall capacity of 2500 vehicles per hour when the red period can be maintained at the minimum of 10 seconds in each full cycle. This facility is adequate for normal operation on the Main Road at present but would break down when entering a built up commercial or retail area. In these sections a very much higher cross and entry traffic exists and this together with the necessity

of the provision of pedestrian cycle reduces the available green to 20 or 25 seconds and the overall capacity of the facility to 1000 or 1250 vehicles per hour. The Sir Lowry Road screen line count in 1967 was 1270 vehicles per hour on an identical facility. It is thus seen that even with the same cross-sectional widths the overall capacity of the Main Road is reduced to less than half when it passes through a developed commercial/retail area.

Three alternatives exist :

(a) The increasing of the width of the facility through the congested areas,

(b) the restriction of entry onto the facility within the congested area and

(c) the provision of an alternative facility through the area.

The duplication of the carriageways through a retail structure would appear to be impracticable on the grounds of excessive cost, for the land required would be that of peak land values. In addition the increase in width for the already wide 80 ft. to a minimum of 140 ft. would effectively destroy the entire unity of the shopping area which at present is evenly divided on either side of the ribbon development.

The second alternative is virtually turning the existing centre of activity into a through and no-stopping road and will destroy any retail centre even more rapidly than the first alternative.

The final alternative is thus the only workable solution but here again it can be varied in its application depending on the form of the retail structure as it exists. If the layout is of a grid iron pattern then it may be possible to develop one of the parallel roads into a one-way couplet with the existing main shopping street and thus maintain traffic flow through the centre. This solution will speed up traffic flow and remove vehicular congestion but it will increase pedestrian congestion due to difficulty in crossing the one-way couplets. This solution has recently been successfully implemented in Hillbrow, Johannesburg with the east-west couplets of Pretoria and Kotze Streets. However if there is not a suitable road to link in a couplet or if the proportion of through traffic warrants it, the

other alternative is the construction of a by-pass.

Mr. Jack Leisch in his courses on the Capacity Manual at the Winter School in Durban in 1967[12] indicated that the construction of the freeways had created the problem of the location of the service components necessary in its successful operation. The proposed solution was the construction of two interchanges fairly close together with a service road linking the interchanges on which all the necessary services are located. It is essential that the service area is easily identifiable and has easy exit and entrance facility from the freeway. This pattern of development is shown diagrammatically in Fig. 16a. A variation on this theme is possible in an existing facility where the existing road is retained between villages but is by-passed round the villages or towns as shown in Fig. 16b. This solution of a rural freeway problem can be extended to the urban complex in particular where the existing reservation is perfectly adequate between the retail centres when constructed to its ultimate width.

9.3 Traffic Surveys

9.3.1 Through Traffic Surveys

Investigations carried out by the Town Planning section of the City Engineer's Department in 1965[13] utilising numberplate surveys indicated that of the traffic on the Main Road, Claremont in peak periods on a Saturday morning 43% of the vehicles passed through without stopping. Subsequent platoon observations have indicated that this figure varies between 33% and 66% with an average at 40%. This percentage of through traffic is not exceptional and in fact falls well within the statistical envelope submitted in Colin Buchan's report on Traffic in Towns[14].

9.3.2 Peak Traffic Flow

Peak traffic flow at the intersections of Claremont were taken at both morning and evening peaks under three variable conditions and these flows were compared. The three conditions were :

(a) University on vacation - 17th February 1968
(b) Schools on vacation - 28th March 1968
(c) Normal day - 18th April 1968

The variation of flow in particular at the Camp Ground Road/ Protea Road intersection is of particular interest and is shown in Fig. 17. Traffic flows were decreased on the couplets by amounts varying between 65% to 38% in the morning peaks for the University vacation but only by 35% to 10% for the school holidays. In the peak flows on the normal working day in April the flows at the three robot-controlled intersections were measured and the entire flow pattern in Claremont was analysed. This peak traffic flow is shown on Fig. 18. The maximum flow attained in either direction in Claremont was 823 vehicles per hour in the afternoon peak, the next highest being 801 vehicles per hour in the morning peak.

The modified curves of the Highway Capacity Manual of 1965 as set out by Jack E. Leisch in Public Roads of August 1967 and October 1967[15] gives the capacity of the intersections with a 12% right turn as 880 vehicles per hour. If the no-stopping rule is enforced this will raise this capacity to 1,100 vehicles per hour. These flows are with a 65% green in favour of the Main Road which is the absolute maximum that can be permitted to give a 25% green to clear Warwick Street and a 10% for the pedestrian cycle. It is thus evident that the Main Road is at present loaded to its capacity and that the total prohibition of parking will only increase this capacity by a further 25%. Additional traffic control methods on the existing Main Road will thus only effect marginal improvements in the road capacity. In order to handle the anticipated 350% increase of local traffic, when the shopping complex is developed to the capacity of the present market, a radical re-assessment of the present road system is necessary.

9.3.3 Alternative Routes

The average time required to traverse the length of

Claremont's Main Road from Stanhope Road to Protea Road at peak periods is 3 minutes 30 seconds, with the morning maximum time of 5 mins. 25 secs. on a normal week day. This is an average velocity of 7.2 miles per hour and a minimum of 4.7 miles per hour. The shortest alternative routes to avoid this area of congestion are shown on Fig. 19. Both these indirect routes through the residential section must traverse the narrow streets of the old Coloured settlement off Protea Road. Travel time for these routes varies between 3.00 mins. and 4 mins. 50 secs. depending on the degree of congestion which may occur in the new "Chelsea" area and in Grove Walk. With this 16% marginal gain in time the average travel speed is increased to 16 miles per hour. With many drivers this is the overriding factor for the psychological effect is that this route is quicker because the average speed is higher and the car is not stationary at robots. There is no alternative route to the east of the Main Road except the Palmyra Road route which is four times the length of the direct route and is therefore not used because of additional distance and the congestion on the Stanhope railway bridge.

9.4 Effect of Removal of Through Traffic

It has been estimated that 40% of the traffic on the Main Road is through traffic, i.e. of the 823 vehicles at peak flow 330 have no business in Claremont and do not stop. These vehicles can be removed by the construction of a by-pass road. The remaining 493 vehicles are thus assumed to be the local traffic which is feeding the present retail structure. It was estimated that the present Main Road with no stopping zones enforced during peak periods could handle 1100 vehicles per hour i.e. 225% its present local traffic. In the above assessment of the functional advantage of the by-pass it was assumed that the by-pass would only divert the through traffic. In order to function effectively it must be built for a carrying capacity of not less than that of the existing Main Road on either side of the Claremont area, i.e. 2000 vehicles per hour in each direction. This high grade facility can then with efficiently designed

exits act as a feeder into the centre of the retail area. This will further extend the functional life of the existing Main Road.

9.5 Alternative Designs of the Secondary Road System

The investigation of the market potential of Claremont in terms of parking requirements has indicated that the parking available today is adequate for the size of its present shopping area measured as a ratio floor area. The floor area however is totally inadequate for the size of its potential market and could be expanded to 4½ times the current size. This has been recognised by the entrepreneurs and known development plans should increase this area to three times its present size within the next three years. This would imply that at present Claremont is "over-shopped", i.e. the shopping facilities are inadequate for the number of shoppers utilising them. Site inspection, parking area counts and pedestrian counts all tend to confirm this and augur well for the success of the proposed expansions.

This assessment of the anticipated immediate growth does not make any allowance for the increased market area which it is estimated will treble in the next two decades. This is an overall increase in shopping area of 10 times with anticipated increased parking requirements - and hence traffic requirements of over 14 times those existing today. The implementation of any major scheme of this magnitude can not be immediate but the planning process must be initiated and must if necessary be revised to meet the changing circumstances. The plan must be flexible in execution but the overall objectives must be outlined and where necessary the reservations set out in order to avoid development jeopardising implementation of the scheme. To formulate an estimate of the magnitude of the problem the anticipated traffic capacities that will be generated by the shopping centre have been estimated. The peak hour local traffic is estimated as being 7200 vehicles per hour in 1990 and the through traffic will have doubled to 1000 vehicles per hour. The requirement within 3 years is through traffic up to 400 vehicles per hour and local or domestic traffic up to 2200.

There are a number of alternative actions which can be taken to improve the functional operation of traffic in the retail structure of Claremont. A number of these alternatives will be critically examined and an attempt made to assess the most rational solution and one that will encourage meaningful growth within the centre.

The solutions analysed are :

9.5.1 Nul Alternative
9.5.2 Widening of the Main Road
9.5.3 Duplication of the Main Road
9.5.4 By-pass to the west of the Main Road
9.5.5 By-pass viaduct down the Main Road
9.5.6 By-pass to the east of the Main Road

9.5.1 Nul Alternative

This is the alternative of taking no action and has been included only because opinions have been advanced in the press that the congestion in Claremont is desirable and that no action is necessary. Examination of traffic flows and pedestrian flows showsthat the traffic flows at present are at the limit that the existing facilities can handle. Even if no stopping is enforced on the Main Road its capacity can only handle 1100 vehicles per hour. This is an increase of 40% in its present local traffic. The indirect routes which are extremely narrow are heavily congested even in off-peak periods due to parked vehicles, etc. Pedestrian densities on a Saturday morning are higher than the peak densities at Stuttafords on a Friday at lunch time. Under these conditions shopping is no longer a pleasure. The present congestion is barely tolerable and any increase will reduce the attractiveness of the centre. This nul alternative is thus rejected.

9.5.2 Widening of the Main Road

The present road reservation is 80 Cape ft. throughout Claremont with two 30 ft. carriageways and two footways.

Extensive widening in advance of property development is uneconomical due to the necessity of setting back existing shops on lengthy frontages. It is a possible scheme but the benefits gained are limited from the traffic capacities. With parking the capacity is increased to 1350 vehicles per hour while if stopping is prohibited this capacity is up to 1900 vehicles per hour. In principle it is necessary to assume the "with parking" capacity as that with the presence of bus stops at the vital points. With the through traffic component of 400 vehicles per hour this reduces the available local component to 950 vehicles per hour or less than 50% of the anticipated flows. With reference to the pedestrian movement there is no improvement on the Main Road where footways are maintained at the present width and in this proposal no alternative routes are provided on the public streets. The development of the sites might assist in alleviating this pedestrian congestion either by the setback of the building line as in the C.B.D. or by the provision of pedestrian walks on the site. This is a short term scheme and its rate of implementation is of necessity behind that of the rebuilding of the centre and in execution is piecemeal. Maximum benefit will only occur where all sites are constructed and set back, i.e. this can only be implemented when it is already too late.

The first two proposals can at best be only considered as short term proposals for they cannot attempt to handle the anticipated capacities of the year 1990. Even with the provision of a collector/distributor road of a width of 40 ft. between kerbs the above combination would barely handle the three year anticipated flows. Both of these schemes are thus rejected.

9.5.3 Duplication of the Main Road

An alternative solution to the provision of a by-pass is the widening of the Main Road to handle both the through and the local traffic being generated within the retail

centre. Accepting the provision of two collector/ distributor roads on either side of the shopping complex these will with their signalised intersections, reduce the ultimate domestic flow of 7200 to 3200. To this must be added the through traffic of 1000 vehicles per hour. The road width to handle this anticipated flow is 60 ft. between kerbs in each direction or a 150' wide reservation. The surgical effect of a road of this size in splitting the retail area and excluding mutual interaction is well appreciated in Cape Town. In Claremont it would be a major catastrophe. The alternative to this is to split the road into two one-way couplets. When the existing road pattern is of a gridiron form the system of one-way couplets is an economical method of approaching the problem of traffic congestion. This is at best a compromise in which economy of execution is weighted against the compromised physical environment. This is well illustrated in Hillbrow, Johannesburg where the couplets of Kotze and Pretoria Streets have eliminated the traffic congestion at the expense of the shopping environment. For a couplet to operate successfully two loops must be in close proximity to each other and must have a good linkage at either end. In many old established areas with an irregular lay-out where a subdivision does not align with those adjacent to it, it is often difficult to locate the second road of the couplet. In Claremont this is the case and the location of a successful couplet would require major property acquisition and not minor road widening as in the gridiron layout. The road reservation required to handle the traffic would be 80 ft. and the overall effect would be to split the commercial section into two elongated ribbon developments with poor pedestrian interaction across the two excessively wide and heavily trafficated streets. If located adjacent to the railway reserve this would, occupying the same width of reserve as the proposed by-pass, provide a very much lower grade facility at a slightly reduced cost. This duplication other than at the railway reserve would nullify the potential advantages

the centre has gained by the greater depth of its commercial section. This scheme is rejected in that it will necessitate an extensive property acquisition as a by-pass scheme but would be of a lower order facility.

9.5.4 By-pass to the west of the Main Road

For the construction of a by-pass to any urban structure to operate effectively it must maintain the equivalent level of service and capacity throughout its length as exists at either approach. For this to be attained the facility must either become a limited access urban freeway in which the same flow capacity can be maintained on a narrower facility or it must be increased in running lanes as it approaches the urban structure in order to handle the increased cross traffic at the at-grade intersections. In the by-passes of rural towns with low acquisition costs and low density cross flow the latter solution is ideal but in the urban structure the facility of urban freeway standards is essential. This urban freeway can take a number of forms in that it can be -

(a) a viaduct throughout its length with the cross linkages below it or
(b) depressed throughout its length with the local traffic bridging the cutting or
(c) on ground surface and bridged at the necessary points of crossing.

Irrespective of mode of construction the freeway acts as a barrier across the urban pattern and restricts movement and interaction. Where possible the effect of this severing one section of the urban neighbourhood from another should be minimised by locating the facility along existing points of discontinuity and urban constraint such as parkland, rivers, etc. not only because of the availability of low-priced land but also because of its location adjacent to the existing barriers.

The location of a freeway to the west of the Main Road would have to traverse through the existing residential section of Claremont and would virtually complete a constraining ring round the centre. The viaduct is not an aesthetically pleasing structure but has economic advantages in limiting the land required for construction. The location of a route to the west could traverse the side of Claremont Park and then through to Grove Avenue. This is then through dense residential development which would tend to be devalued. The route is possible but is rejected when compared with other alternatives due to its greater length, greater cost, its restriction on the integrated growth of the urban and retail structure and its being aesthetically undesirable.

9.5.5 By-pass down the Main Road

The separation of the through and the domestic traffic is the prime concern of a by-pass and this can be readily achieved within the single reserve by vertical separation. This solution has g reat merit in many ways in that it limits the amount of property acquisition to a minimum - provided the reservation is adequate throughout the centre. This method has been successfully used in Brussels and is proposed on the Foreshore Freeway, in both cases in wide road reservation in excess of 200 ft. It has been less successful in Hammersmith, London, where the road reservation was restricted. Here it was found that during construction all commercial activity virtually came to a standstill on the affected roads. To be able to use ground level as a local traffic road it is necessary to construct the viaduct on stilts but the foundations of these are normally in excess of 20 ft. by 20 ft. by 5 ft. depending on foundation conditions in order to carry the loads. This will necessitate extensive service alterations and the diversion of all traffic during the period of construction - i.e. two to three years. In Claremont the problem of diversion of traffic is virtually impossible unless the construction is delayed until a collector/

distributor road is built on one or other side of the Main Road.

Together with these constructional difficulties is the effect the viaduct will have on the physical environment of the Main Road itself. For efficient operation the structure would have to be an absolute minimum of 54 ft. wide if the shoulders are omitted, and 70 ft. wide if the shoulders are included which is desirable on a viaduct of this length - 4000 ft. overall. To accommodate this width of viaduct with its road surface at 20 ft. above the existing road, the road reservation would have to be increased to 103 ft. minimum in order to get sun and light to the shopping level. A cross section of the Main Road with its viaduct is shown in Fig. 20. In a centre where the developer was attempting to create an attractive physical environment the viaduct would completely destroy this, at least in the Main Road, which is the area of top property values. The increase of the reservation width would necessitate the purchase of this high priced land and the setting back of existing structures to the new building line. A cost analysis of the viaduct is :

Property acquisition at Municipal Valuation	R3,900,000
Cost of structure and road	R3,168,000
Reconstruction of Main Road under structure	R1,000,000
	R8,168,000

The property acquisition has been valued at the Municipal Valuation which is an unrealistic figure in the current Claremont market. However it is the only available figure on which comparable estimates can be made and should tend to favour the costing of the Main Road acquisitions. This scheme will be evaluated against that of Scheme 9.4.6.

9.5.6 By-Pass to the east of the Main Road

To the east of the Main Road at a distance of between 500

and 700 ft. away is Claremont's principal physical constraint - the railway reserve. With the exception of pedestrian subways access across this barrier occurs only at the two extremities of the shopping area by vehicle bridges - the existing Stegman Road level crossing is to be closed shortly. The siting of a by-pass on this boundary could be at ground level except for the partial interchange needed at either end. This location is ideal as except for the two extremes it has a minimum disruptive effect on the environment. At the north end the necessary provision has been made for the underpassing of Camp Ground Road and the major section of its length will thus be constructed at ground level.

At the southern end with the ground falling rapidly away towards the railway line it is necessary for the by-pass to bridge Stanhope Road and to continue at this level over the existing Station Place which can then retain the bus terminal at ground level. It is proposed to utilise the viaduct as a feeder into the Newry Street parking area and to do so it is retained at full height to Newry Street to permit an underpass from the south bound carriageway into the parking area. Ground level is reached at Roscommon Road and the by-pass continues at ground level to the northern ramp at San-Souci Road. This proposal combines the two areas of constraint and restricted access into one zone and permits the free development in other areas. The estimated costs of the proposals are :

Acquisition of property at current Municipal Valuation	R515,000
Viaduct Stanhope - Roscommon Roads	R1,120,000
Road construction at ground level	R700,000
Bowwood Road Bridge	R150,000
San-Souci Bridge	R90,000
Service roads	R35,000
Alteration to services	R50,000
	R2,660,000

As the length of both this scheme and the viaduct on the Main Road is approximately the same and the levels of service and designed capacity are identical the user benefit of both these schemes will be identical. The construction costs of the by-pass adjacent to the railway line are less than half that of the Main Road viaduct and the property acquisition one-eighth. In addition to this the constructional difficulty involved with the Main Road viaduct and the economic effect that this scheme will have on the shopkeepers both during and after construction are all so heavily weighted in favour of the by-pass on the railway line that no further investigation is necessary. The by-pass with its 2200 vehicles per hour capacity has a surplus capacity of 1200 in each direction available to be fed into the centre at Roscommon Road and Newry Street. This together with available capacity of 1350 vehicles per hour in each direction of the collector/distributor road to the west and 1000 vehicles per hour on both Vineyard Road and Harfield Road Extension, provide the total capacity of the proposed street system into the centre as 7100 vehicles per hour. The capacity of this system is thus adequate to handle the entire peak traffic into the retail complex of Claremont without the utilisation of the Main Road in the design year of 1990. In this the proposed by-pass scheme thus gives flexibility of both design and of capacity. The proposed hierarchy of roads in the system is shown in Fig. 21.

10. INTERNAL TRAFFIC MOVEMENT

To encourage full utilisation of the by-pass this must be of full urban freeway standards and a design speed of 35 miles per hour in conformity with the speed restriction on the balance of the Main Road free flow. On and off ramps are to be provided at both ends to give free movement of all traffic on, to and off the by-pass. The total length of the by-pass is 4150 ft. and it is necessary to elevate it over Stanhope Road and over Station Place. If the by-pass is to be utilised as a collector for that portion of the local

traffic destined for the area between the Main Road and the railway reserve, then these exit ramps must in no way restrict the free-flow conditions of the by-pass. In order to do so the viaduct section must be extended to Newry Street and the off ramp from the north can underpass at this point into the road feeding the parking areas. A single exit ramp on each carriageway will each provide an exit capacity of 1200 vehicles per hour without interruption of flow on the by-pass.

A similar capacity can be provided in an on-ramp on to the north-bound carriageway which will be on that section of the by-pass which is at ground level. Traffic movements to the south are of a lower intensity due to the limited market area to the west of the railway reserve and these movements can be adequately accommodated on the Harfield Road and Station Road loops, therefore no on ramp is provided. Due to the anticipated high volume of traffic crossing from Lansdowne Road to the retail structure on the west side of the railway and the limited storage area available between Palmyra Road and the Main Road it is necessary to provide a minimum of three lanes in each direction at this point. This together with the limited manoeuvring area available has eliminated any possibility of providing direct linkage with the by-pass, Station Place and Stanhope Road with the exception of the Stanhope Road/Station Place link essential for the bus traffic. Adequate allowance can be made for all these movements by the provision of additional lanes at the Brooke Street/Main Road and Bowwood Road/Main Road intersections and are shown on the detailed plan on Fig. 22.

Direct access from that portion of Kenilworth that lies between the Main Road and the railway line is to be provided by the extension of Harfield Road along the edge of the railway reserve and under the Stanhope Road Bridge into Station Place. Portion of this route is to be utilised by the bus services from the eastern areas as shown on Fig. 23.

The limited weave length and maximum grades on the Stanhope Road Bridge prohibit an on ramp from either Station Place or the by-pass. This linkage, important to the mass transit services, is provided by the widening of Station Road and the allowing of a free left

hand turning lane in the Main Road.

The Main Road will continue to act as a feeder road in the initial stages until such time as both the by-pass to the east and the collector/distributor system to the west have been constructed. In the final development stage the Main Road can be closed to all traffic other than mass transit vehicles from Vineyard Road to Station Road south-bound and Brooke Street to Vineyard Road north-bound with both the local and the through traffic assigned to proposed new routes.

At the northern terminal of the by-pass free through linkage is provided between the Main Road and the by-pass and the other movements which are of a minor nature are handled at an "At-grade" intersection. Again due to lack of maneouvring area direct linkage with the Camp Ground Road Bridge is not practicable.

To the west of the Main Road the area is free of all the physical restraints found to the east of the Main Road. The provision of a collector/distributor road linking the two direct feeder roads from the urban freeway system can adequately provide the highway capacity required with a six lane facility.

As Claremont will remain a predominantly shopping area with a minor office component this traffic will have a dispersal build up through the day and a more concentrated evening peak. To cater for the eccentric peak distribution the in-bound traffic is fed through the widened Warwick Street while the south-bound evening peak is filtered through Grove Avenue, Warwick Street and Vineyard Road. A north/south service road is provided immediately behind the Main Road shopping area. This road will be depressed between Warwick Street and Vineyard Road where it crosses the retail area and in addition to providing service facility to the retail outlets it will form an access link between the western parking areas.

11. MASS TRANSIT

Claremont today acts as the principal modal interchange and transfer

area in the Southern Suburbs. As indicated the main feeder routes from the Cape Flats terminate at the station and the interchange is either to the train service or to the Wynberg/Sea Point bus service on the Main Road. No through bus service exists from the Cape Flats to the City or through Claremont to Wynberg. The present bus terminal is on the west of the station in Station Place which necessitates every bus crossing the railway at Stanhope Road Bridge. A functional traffic design would be to build the terminal to the east of the railway line and reduce the traffic congestion on the bridge and its approaches. This solution has however met with strong opposition from all quarters for a large variety of reasons many of which have considerable merit.

For this reason the provision of a terminal on the west side of the station has been accepted as a realistic design parameter and one which will assist in materially strengthening the centre. A terminal position has been located under the by-pass and immediately to the north of the Stanhope Road Bridge. On this 1½ acre site at present occupied by the Star Bottle Store, the General Post Office and the Police Station a terminal similar to that recently built at Mowbray can be erected with 50% increased capacity on that of Mowbray. The major portion of this terminal will be under the by-pass and thus protected from the elements. Access to the terminal will be from the off-ramp of the Stanhope Road Bridge onto Harfield Road extension, under the road bridge and immediately left into the terminal. Exit from the terminal will be up a widened Station Road into a special free left-hand turning lane in the Main Road and down Stanhope Road.

The Wynberg/Sea Point bus route will remain on the Main Road which can become an extended pedestrian precinct, if so desired, with the exception of the through bus traffic. Specially designed loading and off-loading bays can be provided at selected points at which adequate shelters can be erected for the large volume of transfer passengers. Conflict between the transit passenger and the normal movement of the shopper will thus be eliminated. The requirements of the vehicular traffic within Claremont would limit the extent of such a precinct to that area between Station Road and Vineyard Road.

12. PARKING

The major portion of existing public parking in Claremont is concentrated in the two parking areas adjacent to the two chain store outlets. These parking lots have a capacity of 307 parking bays and planned extensions will provide parking for a further 100 vehicles. In America the recommended standards for parking requirements at shopping centres is 5.5 vehicle spaces per 1000 ft. of retail floor area[16]. These standards have been based on the car ownership of 2.2 persons per vehicle in order to provide sufficient parking on all but the three peak shopping days of the year. In estimating the parking requirements in Claremont these standards have been adjusted to South African conditions in proportion to the respective car ownership figures as set out in Appendix B.

The immediate parking requirements of the potential market are 3105 parking spaces of which less than one-third is at present available. The developers of a number of the proposed complexes have indicated their intention of providing roof parking together with limited ground level parking as an integral part of this scheme. The provision of on-site parking within the shopping complex has a practical limit and particular care must be taken in the design of the entrance and exit ramps in order to safeguard the pedestrian. In Durban it is proposed to prohibit any additional on-site parking within the core area for this reason. In Claremont it is essential that additional off-street parking be made available in certain areas, in particular to the north of Vineyard Road where no parking is available. At present the Electricity Department and the Cleansing Branch occupy Municipal land in this area. The property occupied by the Cleansing Department which has adopted a policy of centralisation will thus become available in 1970 while the Electricity Department whose premises are partially effected by the proposed road improvements can be re-located on Municipal land immediately to the east of the railway reserve. These sites can then become available for off-street parking. To the west of the Main Road land will have to be acquired to provide the necessary parking. These additional facilities together with the existing stock and the on-site parking to be provided by the larger developers in the area will more than suffice the immediate demand of 3100 parking bays.

In order to supply sufficient parking for the anticipated market in the year 1990 together with its increased ratios of car ownership, a further 7060 parking bays will be required. To meet this demand it will be necessary to construct multi-deck parking garages on these existing sites. Construction of these garages can be staged to meet the parking demand.

13. STAGING

A programme of construction has been investigated in order to progressively alleviate the major areas of congestion. At present congestion is at its worst at the intersection of Palmyra Road, Lansdowne Road and Stanhope Road. Congestion is so extensive that the peak periods north/east bound traffic tends to be diverted onto the Main Road and thence down either Camp Ground Road or Belmont Road. The improvement of this facility will thus tend to divert traffic off the Main Road in addition to improving the travel times of the east bound mass transit facilities all of which must pass through this overloaded intersection. The upgrading of this facility is programmed for Stage 1. Stage 2 is the provision of the western collector/distributor roads together with the Harfield Road extension into Station Place. Both of these collector roads are designed to remove further traffic from the Main Road. The benefit of the Harfield Road extension will only be fully realised when access from Station Place to Newry Street is provided. The construction of Stages 1 and 2 will, together with the Main Road, be able to handle all the normal peak traffic in the immediate future inclusive of the traffic generated by the programmed growth within the centre.

Stage 3 is the provision of the by-pass which should be scheduled for construction in the second five-year programme, the initial date of construction being dependent on the growth pattern of the retail structure after its initial impetus. The final stage of the four stage programme is the improvement of all the primary east/west feeder roads leading into the collectors. A staging programme is shown in Fig. 24.

14. SYNTHESIS OF TRAFFIC AND THE CLAREMONT RETAIL STRUCTURE

The study of the growth pattern of the retail component of Claremont together with its market area both as it exists and its future extent indicates that today this complex has a vast latent potential. All sections of the retail outlets have shown a continued expansion even when the neighbouring shopping complexes have indicated either declining rate of growth or in certain components decay. The growth in the centre has rapidly increased the congestion within the centre itself both on the roads and the footways but in neither case has this congestion reached extreme conditions which would tend to discourage the shoppers from entering the centre. It has, however, altered the purchasing pattern of many of the shoppers. Random interviews have indicated that in certain non-durable goods regular customers have moved their shopping period from Saturday morning or Friday afternoon to earlier in the week to avoid this ever increasing congestion.

The decay which is evident in Wynberg over the past two decades has been attributed in this analysis primarily to the presence of the physical constraints of the non-residential zones around the centre together with the reduction of personnel in the military establishments in these areas. However there exists a third imponderable. How much of this decay can be attributed to the congestion caused by the excessively narrow Main Road? There is no known means of measuring this factor. As an indication of this relative congestion it is noted that south-bound traffic on passing through Claremont tends to divert round Wynberg via Waterloo and Gabriel Roads. If this assumption is only partially correct, is Claremont not now nearing this critical point of congestion affecting growth? Will additional congestion tend to slow growth by forcing a complete change in shopping habits, not just the change of shopping days?

It has been seen that vehicular congestion in the C.B.D. has resulted in decentralisation of certain city functions. This decentralisation has resulted in a decline of central city sales due to growth in the outlying shopping districts and planned shopping centres.[18] The retail component in the city has survived

this decrease in sales due to its regional context and to its extensive captive population.

As congestion has resulted in decentralisation of the city so to a lesser extent can it result in decentralisation of the shopping centre with particular regard to non-durable goods where the supermarket at the convenience centre is rapidly extending its threshold. It is in this sector that Wynberg first experienced its initial decay as shown in Fig. 12. The true shopping centre, with a negligible office component and the resultant absence of a captive population, will be particularly vulnerable to this pattern of decline.

While Claremont shows every evidence of possessing a very real growth potential and has a market area to support this growth, this will remain only a pot ential unless it can be fully exploited. The road network of Claremont is at present extended to the limits of its capacity, but could in all probability operate successfully for a number of years provided no further generator is added to the existing retail structure.

Property investors realising this market potential have purchased large areas of available land in the centre in an attempt to consolidate these into larger parcels for future development. Various commercial undertakings and an insurance company have joined in the demand for this scarce and very limited commodity with the resultant escalation of prices in the free market mechanism.

The rental return from these properties, many of which are old and dilapidated and tending to slum conditions, is negligible when compared with the capital investment and profits can only be achieved by demolition and redevelopment. This creation of new stock within the retail complex will act as the generator for additional trade and with it, additional traffic and additional congestion. The developer of any large component within a retail centre fully realises how vital both the provision of parking and the ease of access are to the efficient operation of the centre. The developer can provide the necessary parking facilities on the site but only by sacrificing available ground floor sales area or at increased building cost. Of these alternatives in a limited retail area

with high land values as exists today in Claremont maximum usage must be made of ground floor shopping space. The parking area must be either at basement level or on the roof deck. Economic justification of this method of parking is only possible on large sites.

The improvement of accessibility of the centre to the market area is the direct responsibility of the Local Authority. The developer can only exert an indirect pressure as a large ratepayer on those in authority with regard to the implementation of these improvement schemes which are not directly affected by the building operations. In this respect conflicting interests of the power groups can create a degree of uncertainty in the Local Authority and result in extensive delays in the implementation of any road improvement scheme. It is this confliction of interests that has delayed the acceptance of the proposed City Engineer's scheme for road improvements in Claremont which was finally only settled as the result of a firm line of action being taken by the Provincial Administration.

It is thus evident that while limited pedestrian congestion does enhance the environmental setting of a centre this does not apply to vehicular congestion which can only serve to extend the process of decentralisation to competing centres even if they are of a lower order. In areas of a well-developed and a high standard highway network it is found that the centres located in this network are of a large size and are well spaced. In a similar area with a low-graded transportation network the centres are found to be smaller in size and more closely spaced. This reduced threshold of the centre results from the increased travel time due to traffic friction within the network.

This is the setting in the Southern Peninsula today. Claremont has all the locational advantages to become the dominant regional centre. It is well located, has an interceptor role on two C.B.D. oriented urban expressways, its retail area is well proportioned and it is located at a point of major modal transfer. If accessibility into Claremont is restricted the existence of these expressways will be detrimental to the centre itself as they will permit easy access to other complexes which have a lower entry

friction factor. The ultimate result could be a matrix of closely spaced centres similar in ultimate size to present-day Claremont, but none of sufficient magnitude to completely dominate the others. The establishment of the new large shopping complexes within Claremont will increase the degree of congestion in the approaches to the centre. When the motorist finds it more convenient to return to the C.B.D. or to a lower order but competing centre, he will divert and leave the developed potential of the centre only partially fulfilled. In other words, Claremont, which today is "over-shopped", will then become "under-shopped".

Improvement of the secondary road network to reduce this traffic friction - the cause of congestion - will enable the centre to develop to its full potential and become the dominant influence in its region. With similar development in the Western Cape Claremont will, in combination with other retail complexes, form a pattern of higher order centres superimposed on the matrix of convenience or neighbourhood centres and linked with a well integrated transportation system.

Transportation inputs alone can never create growth of a region or centre. These inputs act only as an added flux which determine whether the growth potential that exists can be fully realised. They can in addition act as a catalyst to spark off a dormant or partially established growth pattern. In Claremont the potential exists, its growth is starting but is constrained by a network of old hardened traffic arteries. Surgery is needed, or a catalyst is required, to enable the retail complex to explode to its full potential. This catalyst is the transportation inputs as outlined in this study, the most effective being the by-pass to the east of the Main Road and the supporting collector/distributor roads as outlined in 9.5.6. and 10.

CLAREMONT 1813

Scale Rhinet Roods
(1: 12,500 approx)

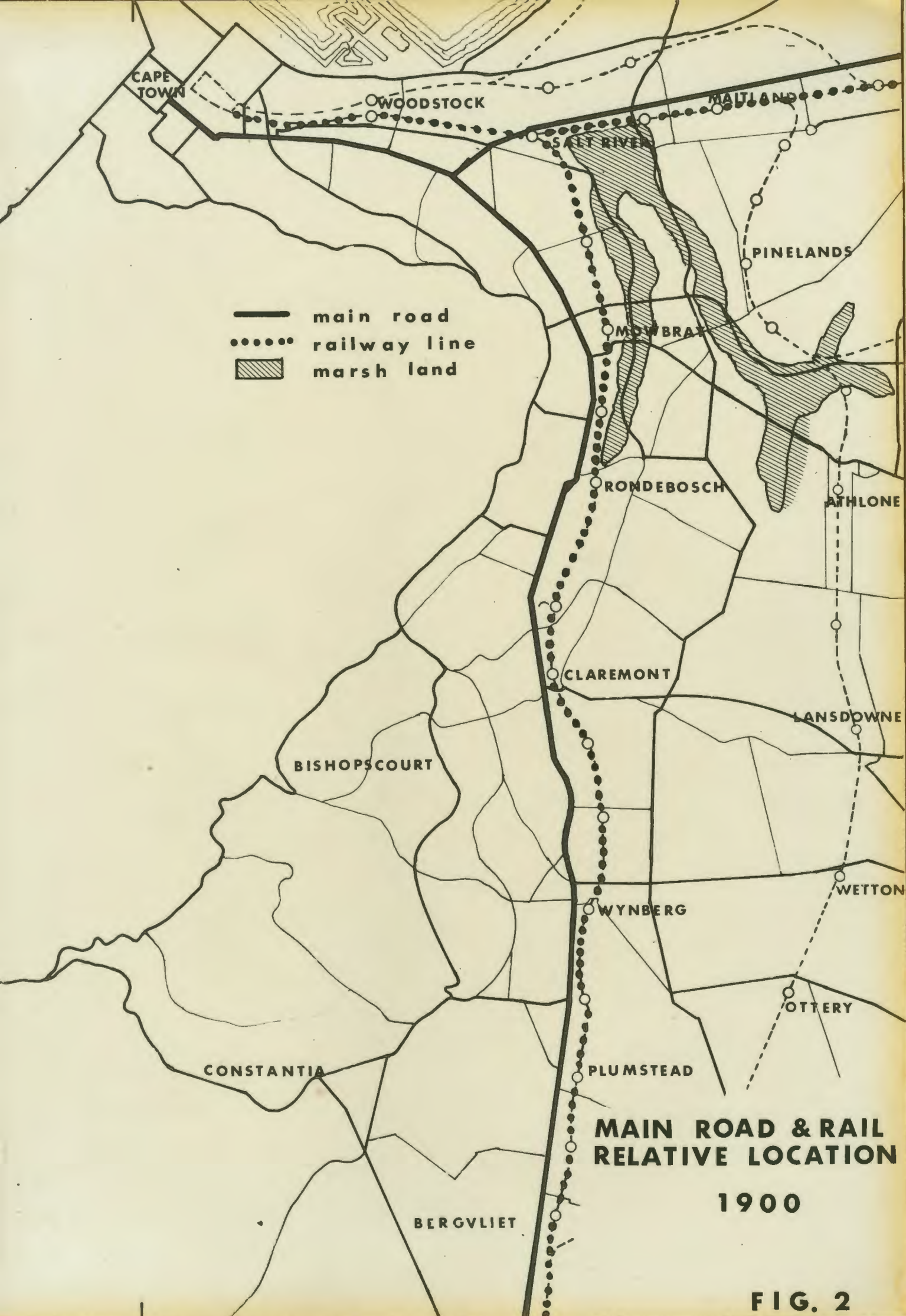
FIG. 1

NOTE

Name of Place	Reference	Extent
ZONNEBLOEM	CF Vol 2 page 7	175 Morg 415 sq Rds
KALK-BRANDERY	C O F Vol 6 page 144	11 · 173 ·
LELIE-FONTYN	· · 6 · 170	38 · · 425 ·
ROODE-BLOEM	· · 6 · 168	125 · 387
WELGELEGEN	· 6 · 172	244 · 521

Name of Place	Reference	Extent
MOUNT PLEASANT	C O F Vol 6 page 182	86 M
PAPENBOOM en BROUWERY	· · 6 · 152	83
WESTERVOORT	· · 6 · 120	33
QUESTENBURG		8
SANS-SOUCY	C O F 6 178	31


Union Ave.
Newlands Rd.
Mains Ave
Dean St.
Klipper Rd.
Groot Schuur Ave.
Main Road
Protea Rd.
Obelisk Walk
Grove Ave.
Grove Walk
Stanhope Rd.
Herschel Rd.
Highwick Ave.
Tenantry Rd.
Stellenberg Ave.
Palmyra Rd.
Landpowne Rd.
Bishopscourt Rd.
Bowwood Rd.
Struben Rd.
Sidmouth Rd.
Hillwood Rd.
Edinburgh Drive
Newlands Road
Foldhaven Ave
Kildare Rd.
Middlingh Ave.
Paradise Rd.
Boshpf Ave.
CLAREMONT 1813
CLAREMONT 1968
FIG. 1
Scale 4 Rhinet Roods
(1:12,000 approx)



MAIN ROAD & RAIL RELATIVE LOCATION

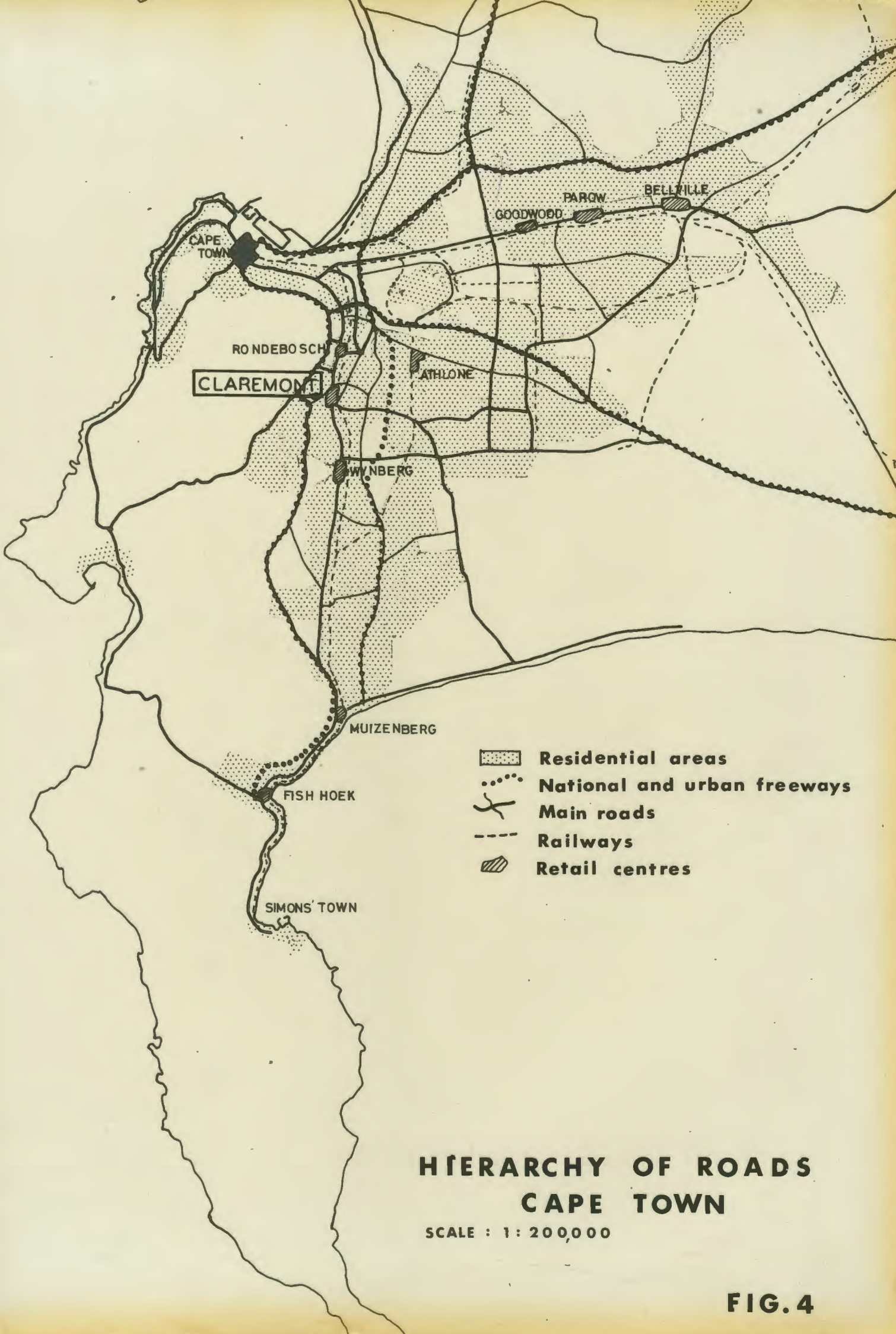
1900

FIG. 2

FEEDER ROADS - 1900

Scale 1 : 50,000

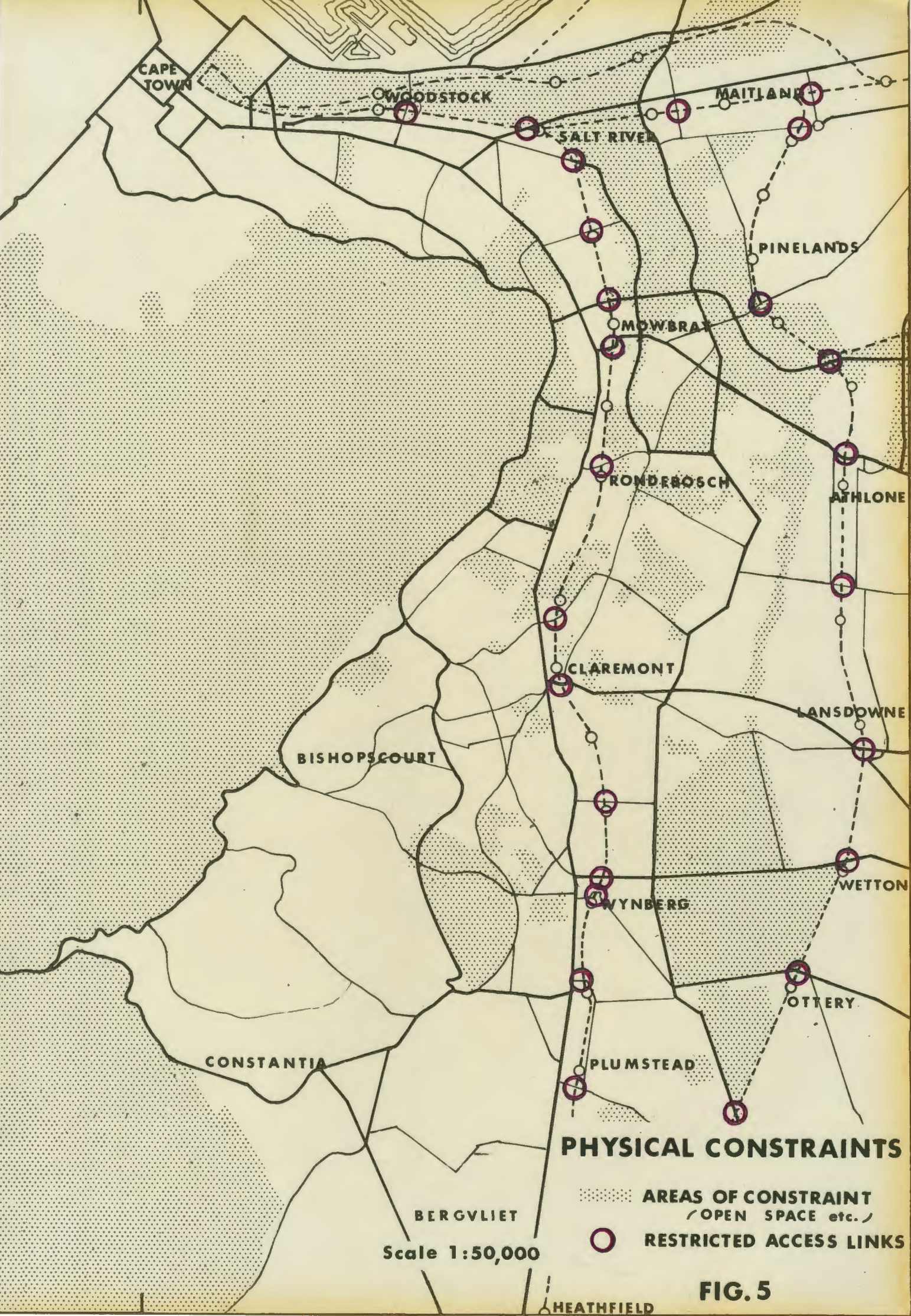
FIG. 3



HIERARCHY OF ROADS
CAPE TOWN

SCALE : 1 : 200,000

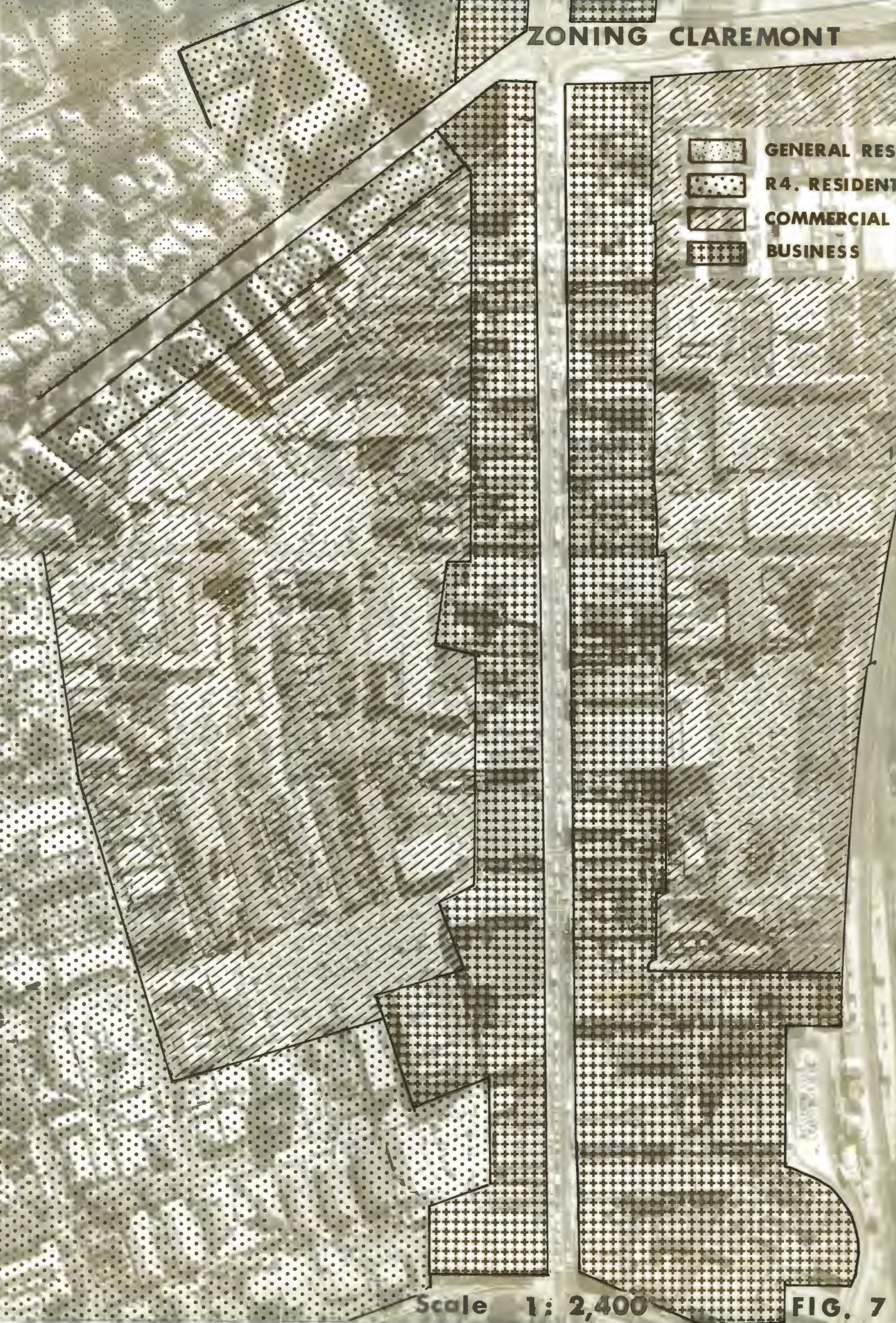
FIG. 4


CAPE TOWN
WOODSTOCK
MAITLAND
SALT RIVER
PINELANDS
MOWBRAY
RONDEBOSCH
ATHLONE
CLAREMONT
LANSDOWNE
BISHOPSCOURT
WETTON
WYNBERG
OTTERY
CONSTANTIA
PLUMSTEAD
BERGVLIET
HEATHFIELD
PHYSICAL CONSTRAINTS
AREAS OF CONSTRAINT
(OPEN SPACE etc.)
RESTRICTED ACCESS LINKS
Scale 1:50,000
FIG. 5

MASS TRANSIT FEEDERS SERVICE

Scale 1 : 50,000

FIG. 6


ZONING CLAREMONT
GENERAL RES
R4. RESIDENT
COMMERCIAL
BUSINESS
Scale 1: 2,400
FIG. 7

PROPERTY SALES CLAREMONT 1956 - 1968

Scale 1 : 2,400

FIG. 8

POWER GROUPS IN CLAREMONT

1 Ackermans
2&3 Foschini
4 Truworths
5 Woolworths
6 Pearces
7 S.A.Mutual
8 C.N.A.-E.K.Green
9 Henshilwoods
10 Stuttafords
11 Norric Investments
12 Clairmain Investments
13 Cowling Properties
14 Harbeth Properties
15 O.K. Bazaars

Scale 1 : 2,400

FIG. 9

CAPE TOWN
WOODSTOCK
SALT RIVER
MAITLAND
THORNTON
EPPING INDUSTRIA
PINELANDS
LANGA
BONTEHEUVEL
MOWBRAY
RONDEBOSCH
ATHLONE
HEIDEVELD
CLAREMONT
LANSDOWNE
BISHOPSCOURT
NYANGA
WETTON
WYNBERG
OTTERY
CONSTANTIA
PLUMSTEAD
SOUTHFIELD
BERGVLIET
HEATHFIELD

12
8
4
6
16

ISOCHRONAL TRAVEL TIME CHART

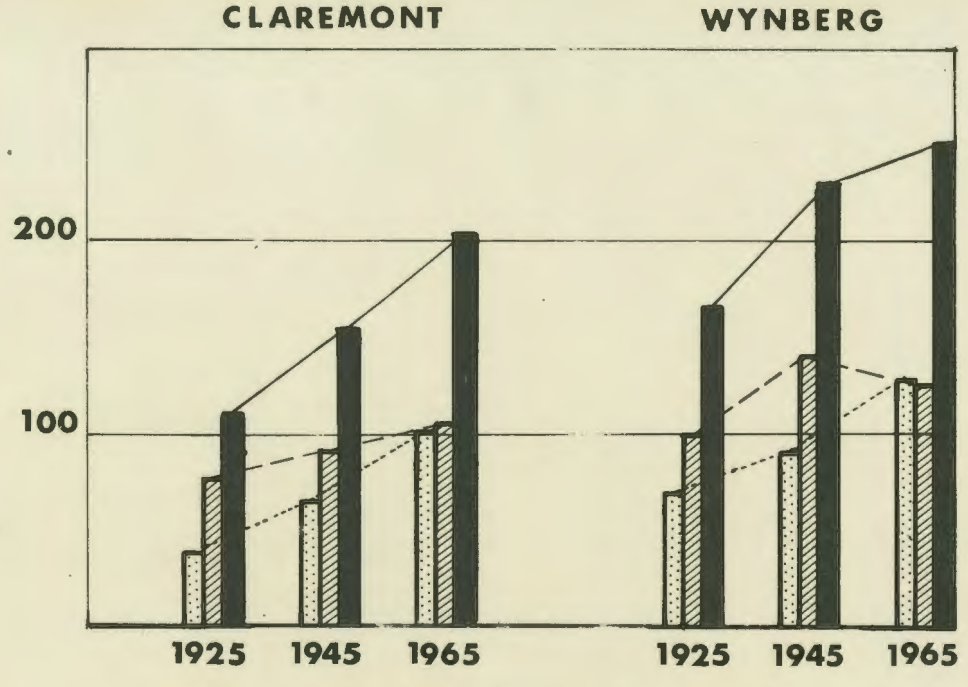
OFF-PEAK TRAVEL TIME IN MINUTES

Scale 1 50,000

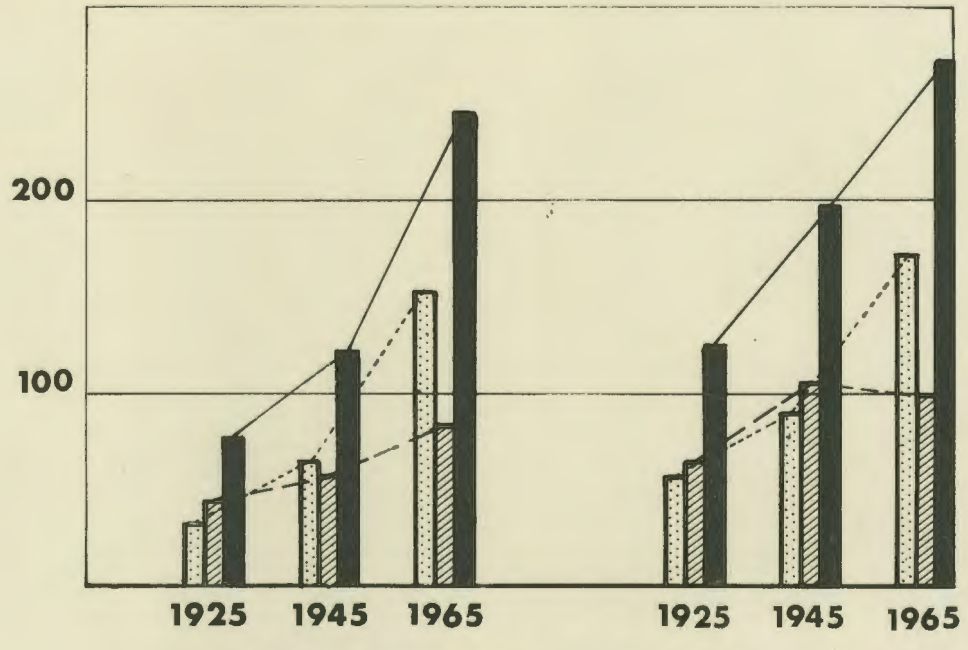
FIG. 10


CAPE TOWN
WOODSTOCK
MAITLAND
SALT RIVER
PINELANDS
MOWBRAY
adjusted market area
deleted by gravity model
line of equal isochron
J.G.Coetzee's primary market
J.G.Coetzee's secondary market
CLAREMONT
LANSDOWNE
BISHOPSCOURT
WYNBERG
OTTERY
CONSTANTIA
PLUMSTEAD
BERGVLIET
HEATHFIELD
ADJUSTED ISOCHRONAL CHART
Scale 1:50,000
FIG. 11

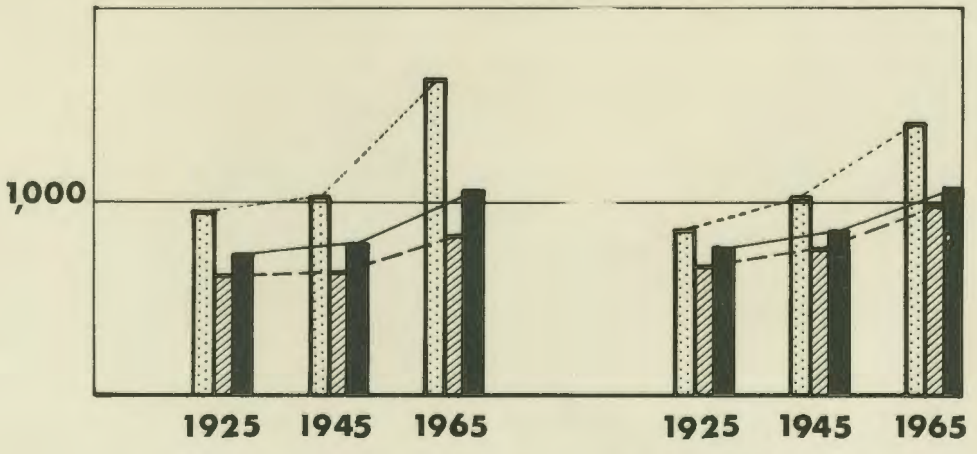
COMPARITIVE GROWTH OF TWO RETAIL CENTRES



number of retail outlets



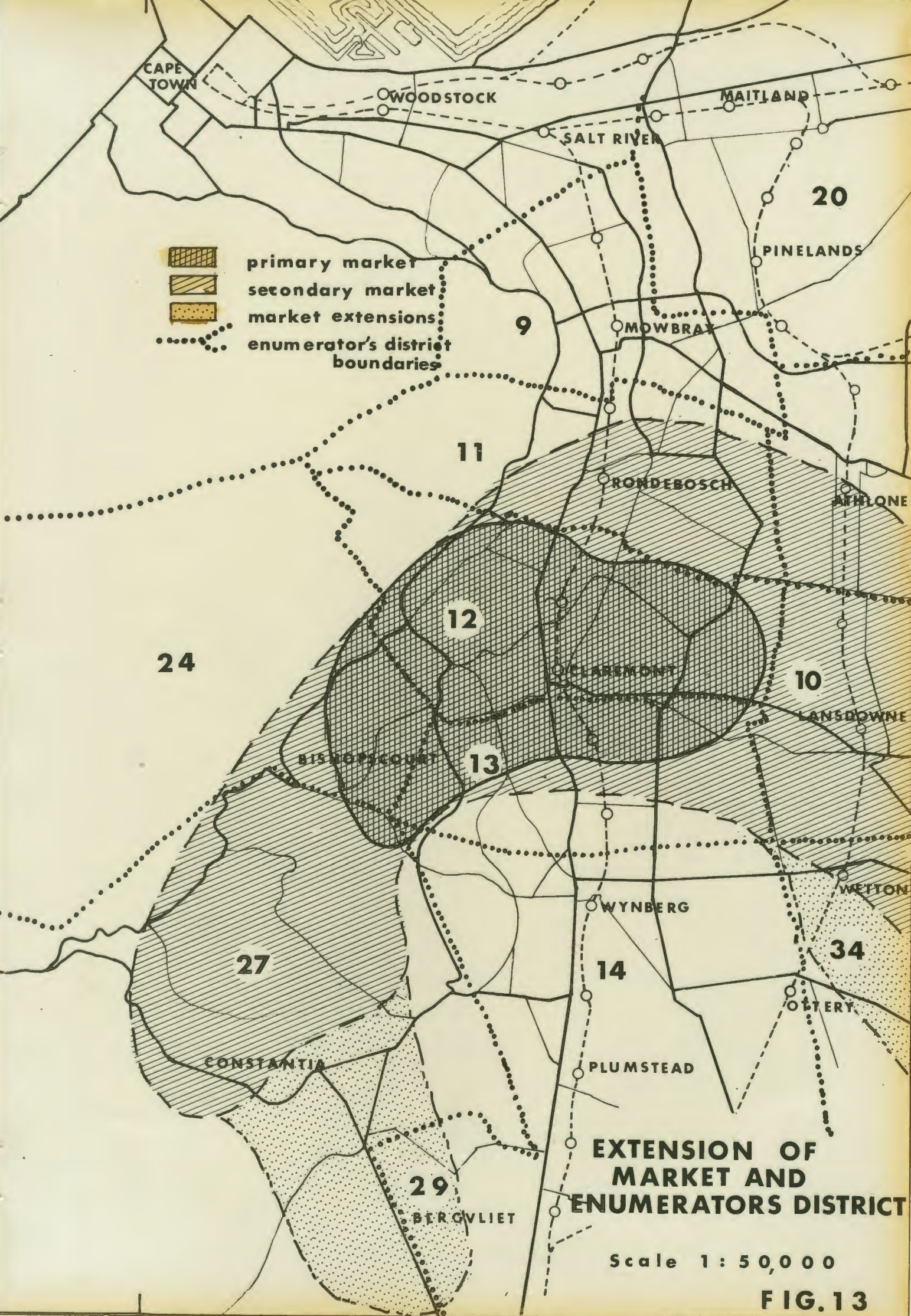
available floor area in 1,000 sq. feet



average floor area per retail outlet in sq. feet

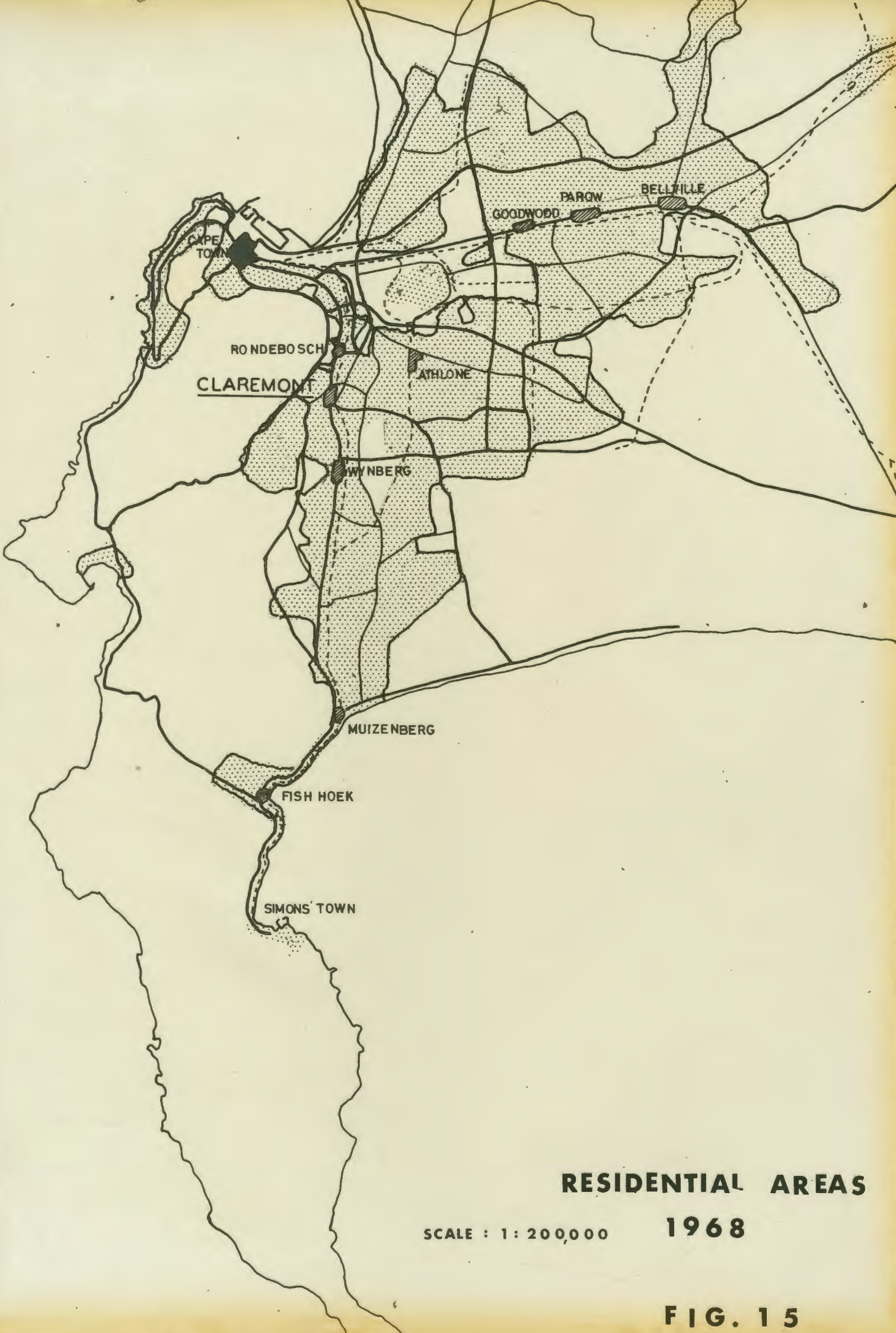
durable goods. non-durable goods all goods

FIG. 12


CAPE TOWN
WOODSTOCK
MAITLAND
SALT RIVER
20
PINELANDS
primary market
secondary market
market extensions
enumerator's district boundaries
9
MOWBRAY
11
RONDEBOSCH
ATHLONE
12
24
CLAREMONT
10
LANSDOWNE
BISHOPSCOURT
13
WETTON
WYNBERG
27
14
34
OTTERY
CONSTANTIA
PLUMSTEAD
29
BERGVLIET
EXTENSION OF MARKET AND ENUMERATORS DISTRICT
Scale 1:50,000
FIG. 13


CAPE TOWN
WOODSTOCK
MAITLAND
SALT RIVER
PINELANDS
MOWBRAY
RONDEBOSCH
CLAREMONT
BISHOPSCOURT
WYNBERG
OTTERY
CONSTANTIA
PLUMSTEAD
BERGVLIET
RESIDENTIAL AREAS
1945
Scale 1:50,000

FIG.14

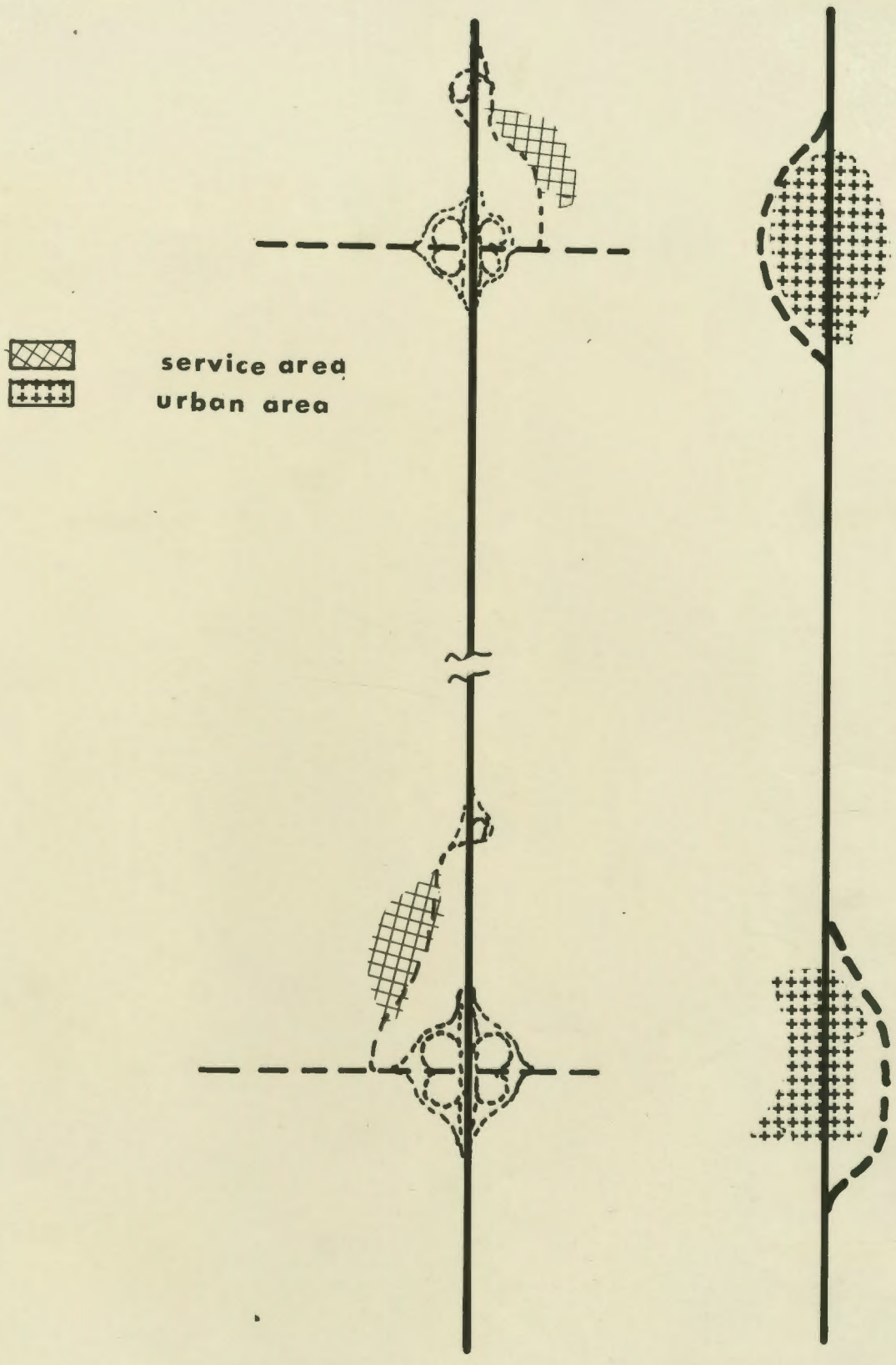


RESIDENTIAL AREAS

SCALE : 1 : 200,000 **1968**

FIG. 15

SERVICE AREAS

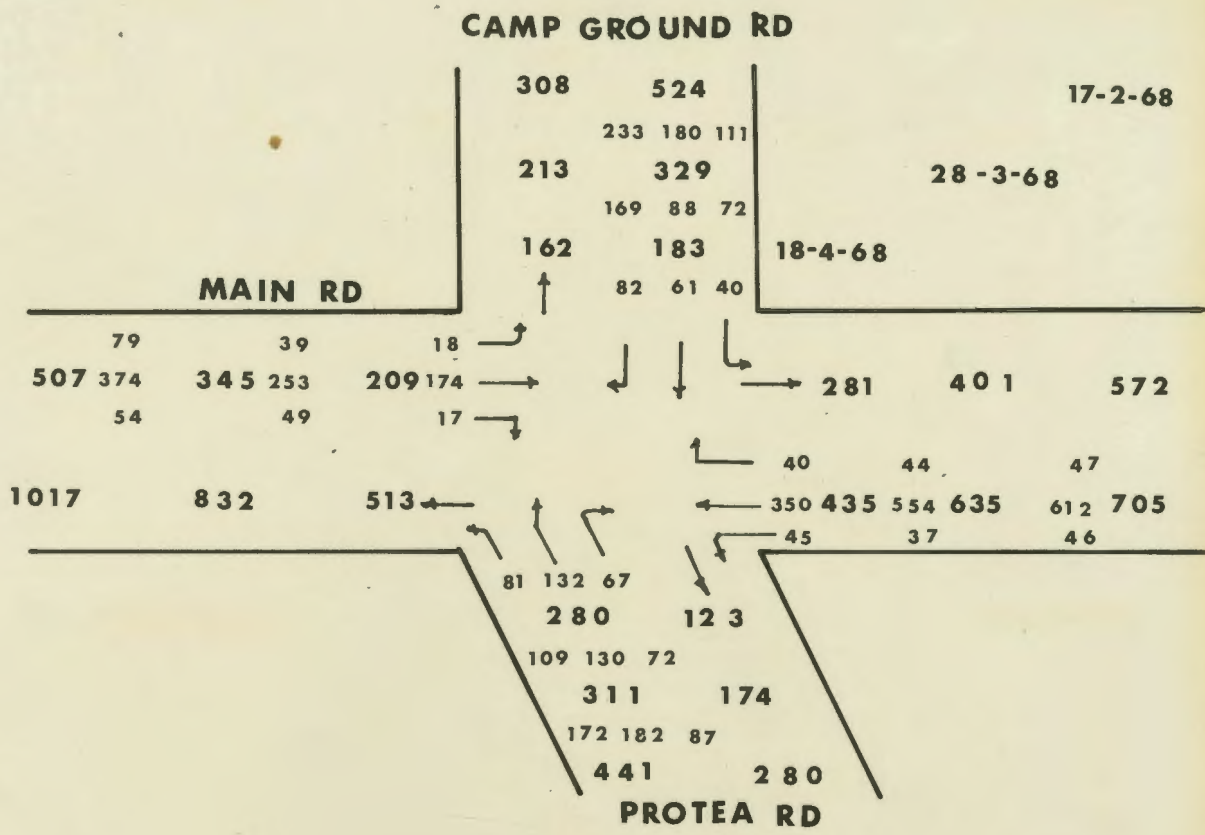


A new facility service area on by-pass

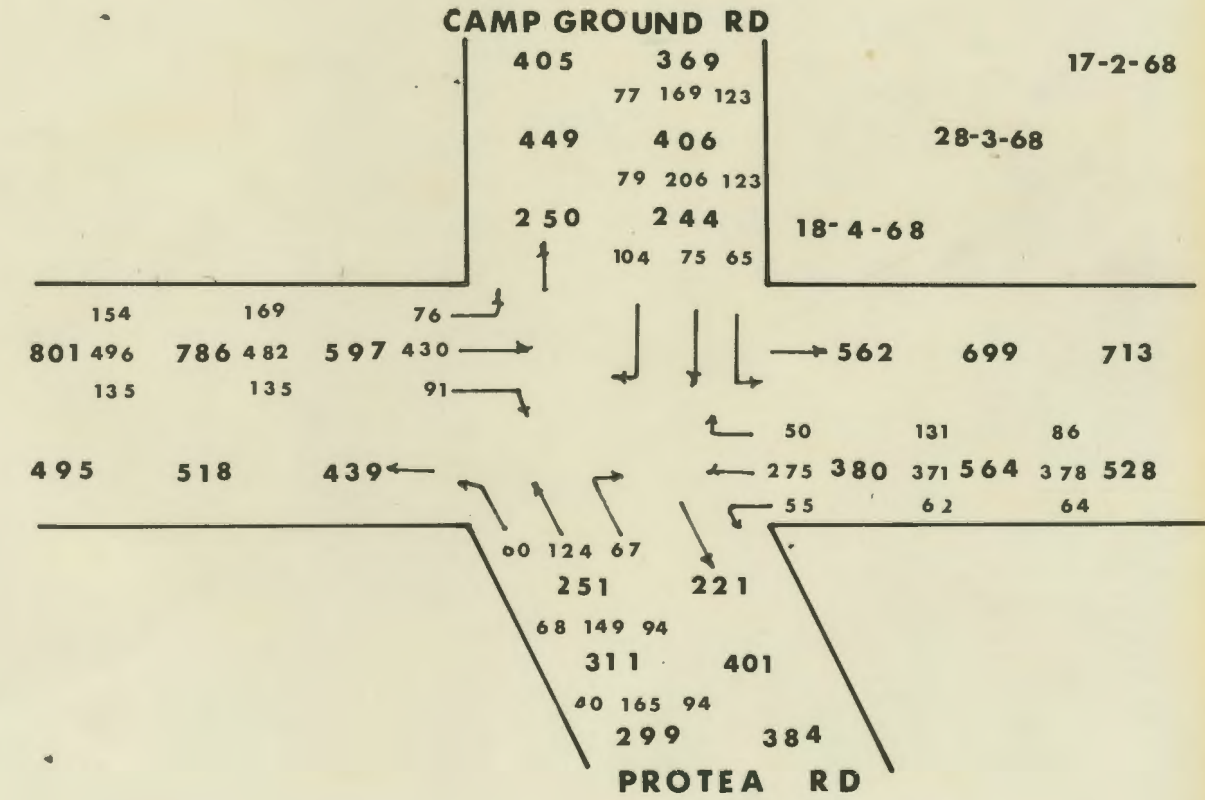
B old facility by-pass round urban structure

FIG. 16

PEAK TRAFFIC FLOW PROTEA & MAIN RD



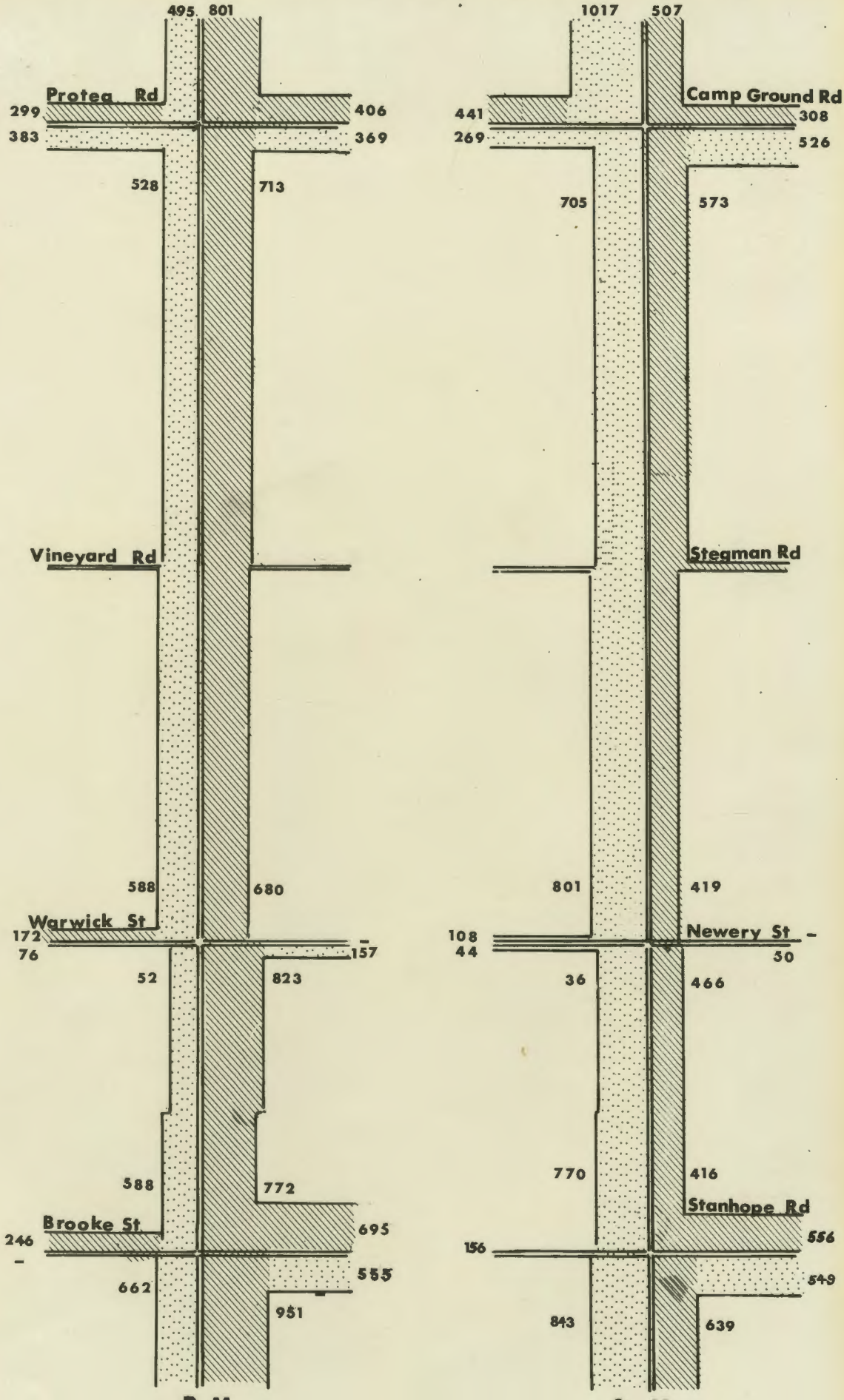
7·45 – 8·45 A. M.



5·00 – 6·00

FIG. 17

PEAK TRAFFIC FLOW MAIN ROAD



Scale 1 in. = 2000 veh. per hr.

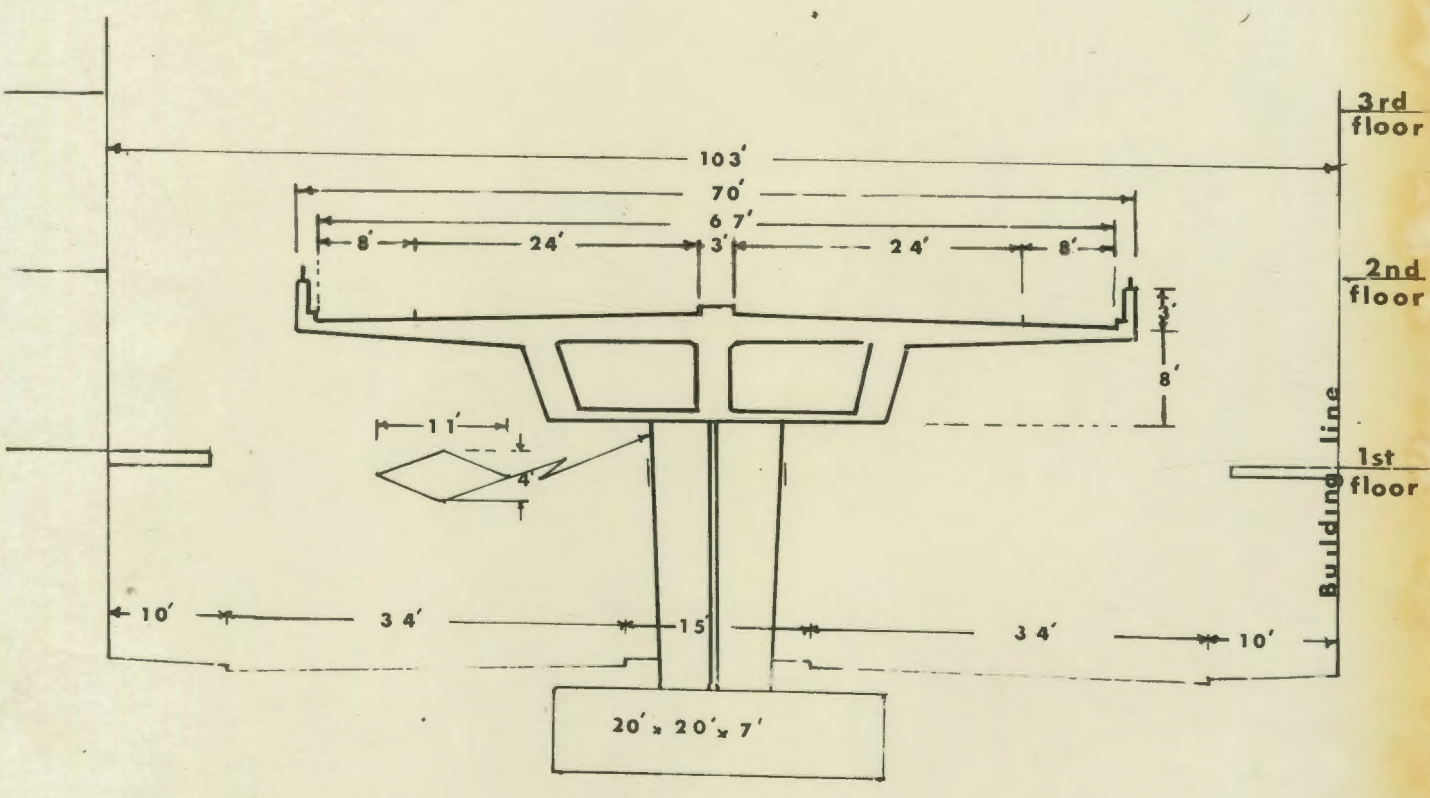
FIG. 18

ALTERNATIVE ROUTE TO MAIN ROAD

1968

Scale 1 : 7,200

FIG.19



VIADUCT SECTION MAIN ROAD

Scale 1 : 200

FIG. 20

main road
by-pass
main collector roads
secondary collector roads

HIERARCHY OF ROADS

Scale 1:7,200

FIG. 21

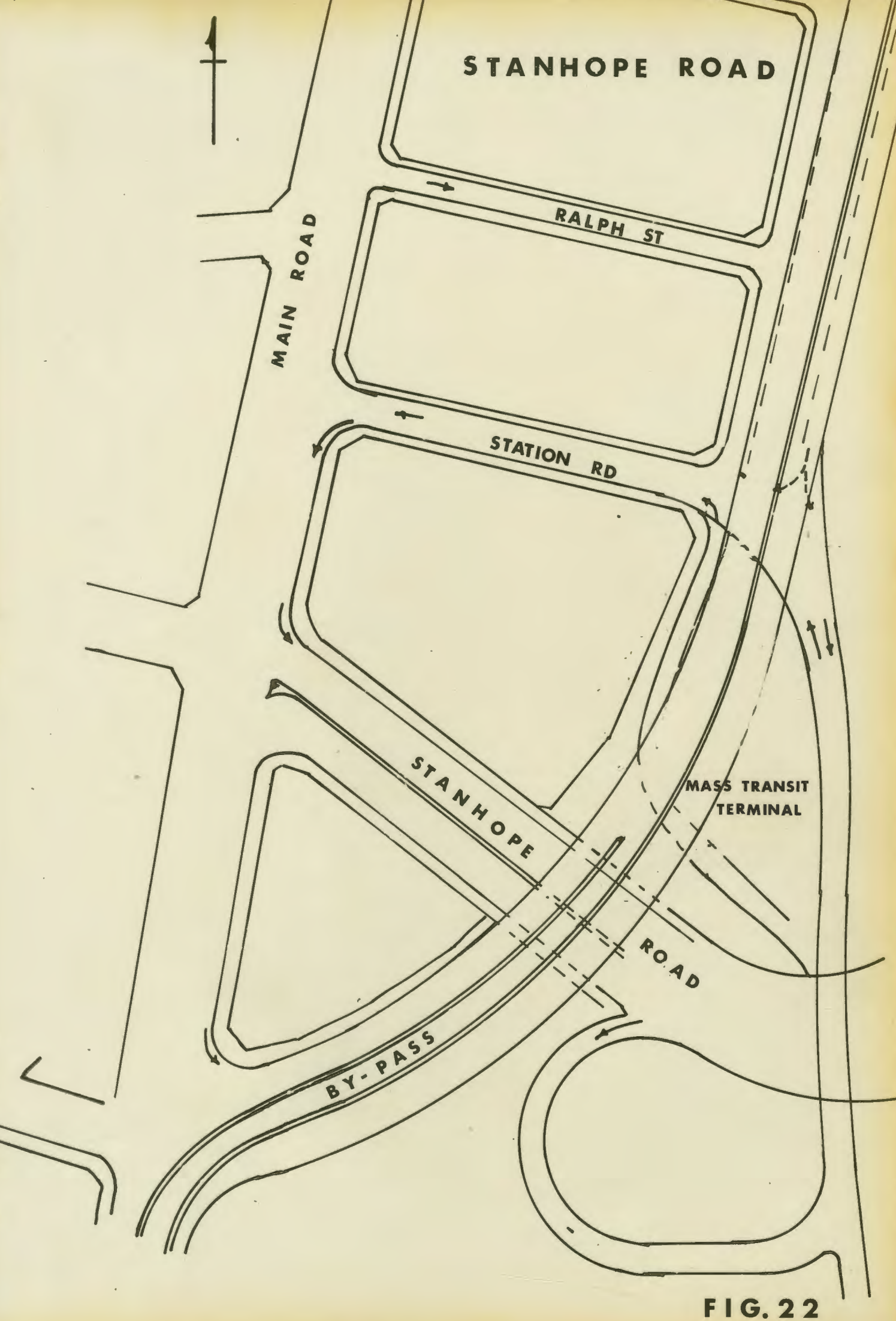

STANHOPE ROAD
RALPH ST
MAIN ROAD
STATION RD
STANHOPE
MASS TRANSIT
TERMINAL
ROAD
BY-PASS

FIG. 22

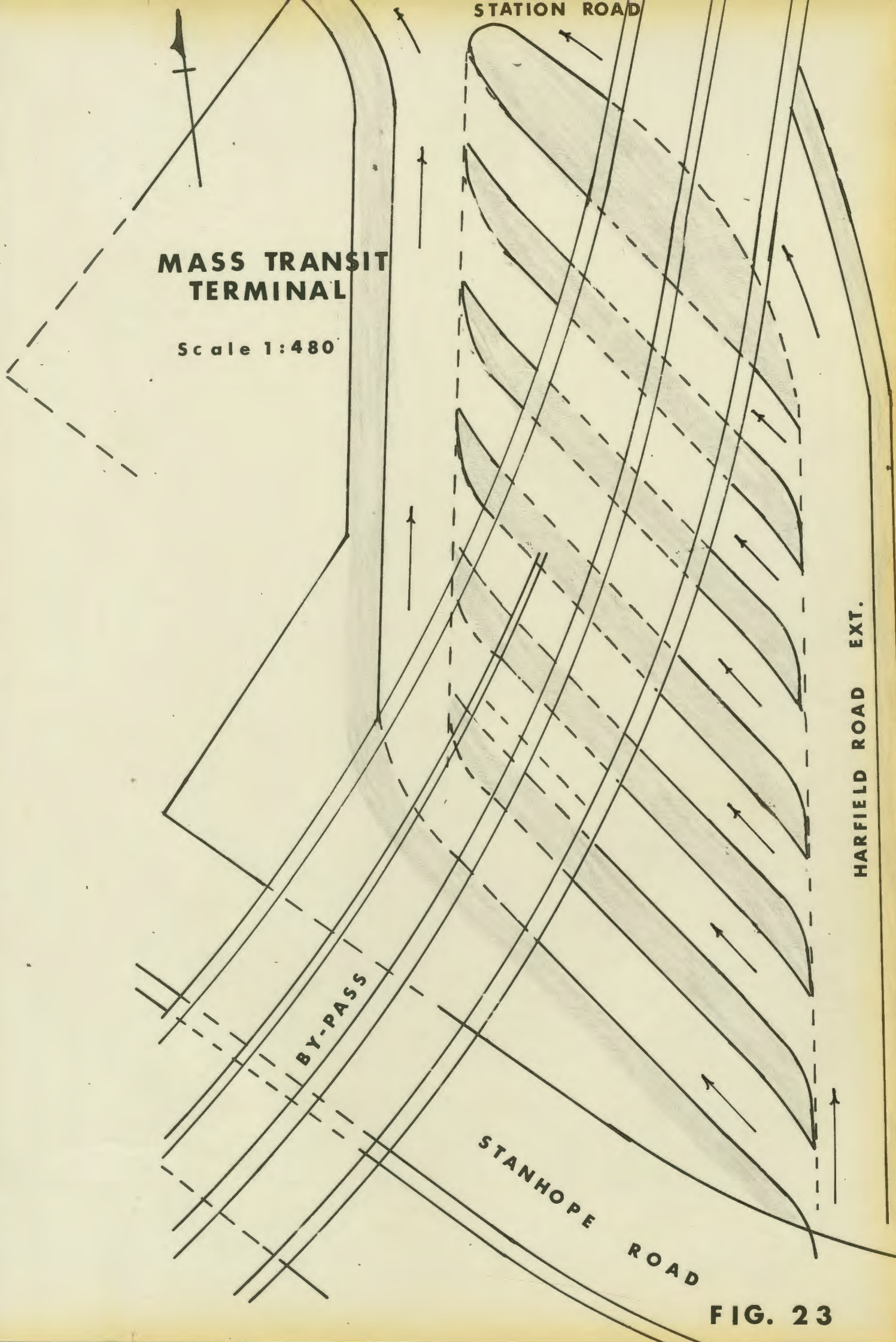

STATION ROAD
MASS TRANSIT TERMINAL
Scale 1:480
BY-PASS
STANHOPE ROAD
HARFIELD ROAD EXT.

FIG. 23

APPENDIX A

POPULATION POTENTIAL OF MARKET AREA

District	MARKET AREA 1968				MARKET AREA 1990	
	Present Population		Saturated Population		Saturated Population	
	White	Non-White	White	Non-White	White	Non-White
	PRIMARY ZONE					
12	17,700	4,800	35,750	-	35,750	-
13	7,400	6,500	24,100	-	30,100	-
TOTAL	25,100	11,300	59,850	-	65,850	-
	SECONDARY ZONE					
10	3,700	36,300	7,250	84,250	9,000	115,500
11	14,300	4,400	27,100	-	27,100	-
13	2,000	1,800	6,000	-	6,000	-
27	1,330	4,770	10,500	5,000	19,000	9,000
29	-	-	-	-	2,400	-
33	-	2,400	-	20,000	-	31,200
34	-	900	11,400	6,500	11,400	23,000
TOTAL	21,370	50,570	62,800	115,700	76,100	178,400
	CORRECTION FOR 01 GROWTH FACTOR					
PRIMARY	25,100	11,300	-	-	49,100	-
SECONDARY	21,370	50,570	-	-	53,330	178,400

APPENDIX B

Purchase Power of Market Area as Related to Retail Floor Area

The population of the market area has been assessed both today and in 1990 but these population figures must be related to the retail component of the shopping area and through this to the possible traffic component this retail structure will generate.

G. T. Visser in his analysis of the purchasing power of the population of the Peninsula found that the total purchasing power of the English-speaking white person was R624 per head in the 01 region in 1954. The purchasing power of the Southern Suburbs was higher than the regional average, being in the order of R795 per person. J. G. Coetzee updated this figure to R900 per person for whites and accepted a figure of R210 per person per year for non-whites based on F. E. Radel and C. De Coinings study of the Income and Expenditure of the Cape Coloured.

Utilising these two figures together with the population estimates of the market area, we arrive at the total purchasing power both today and in the year 1990 if the shopping centre is developed to its full potential.

However all of this purchasing power is not available to the Claremont shopping centre as a proportion will be drawn off to the C.B.D. In this respect the proportion of the C.B.D. market will be greater for the white population than for the non-white due to the greater proportion of the white population being captive in the C.B.D. The ratios accepted are that 30% of white and 10% of the non-white purchasing power is spent in the C.B.D. In addition to the loss to the C.B.D. a further portion of the available purchasing power is spent in the convenience store and neighbourhood centres within the market area. This proportion is greater in the secondary zone (45% of the residential purchasing power) than in the primary zone where Claremont acts in the dual role of shopping centre and neighbourhood centre.

The total purchasing power of the centre is now computed and from this the total potential floor area of the centre is obtained utilising the purchasing power per sq. ft. of floor area necessary to have a viable retail structure. This marginal purchasing unit will vary with the retail outlet, the current South African figures being between R20 per

sq. ft. for the clothing trade and R40 per sq. ft. for the supermarket. An average price of R25 per sq. ft. has been assumed.

To reduce this retail floor area to a measure of parking and automobile requirements the unit of number of parking lots per 1000 sq. ft. of retail area is utilised. The figure recommended by A. M. Voorhees and Carolyn E. Crow is 5.5 parking lots per 1000 sq. ft. of retail area to provide available parking on all but the three peak days. This is based on the current U.S.A. car ownership of 2.2 persons per vehicle as against the current South African figure of 3.66 persons per vehicle given by Prof. C. Verburg in 1966. Prof. Verburg's car occupancy rates for the non-white population of 90 persons per vehicle today and an anticipated figure of 15 persons per vehicle in 1990 are utilised to find the parking requirements for this section of the population.

The above computations are set out in Table B.2 in which the parking requirements for the fully developed market potential of Claremont as exists today will be 3105 while the requirements in the year 1990 will be 10,166 parking spaces. Utilising the present available retail floor area and the above unit requirements it is found that 695 parking bays are generated by the existing retail structure of Claremont without any additional development. 903 parking spaces are available in Claremont of which 327 are in public parking areas, 325 on kerbside parking and a further 251 in private parking lots. Vacancy in parking on a normal week day at peak shopping hours of 11 a.m. and 3.30 p.m. average 10% in the Newry Street parking area, 35% in Warwick Street and 50% in the kerbside parking bays. The reason for full utilisation of the existing parking facilities on Saturday mornings and other peak shopping days is not due to a low ratio of parking spaces to floor area but rather to the inadequacy of available retail floor area in the existing structure of the Claremont Centre as illustrated in this analysis. In other words, Claremont is over-shopped.

TABLE B.1

SCHEDULE OF RETAIL FLOOR AREA AND PARKING REQUIREMENTS

	1968		1990	
	White	Non-White	White	Non-White
	PRIMARY ZONE			
Population	25,100	11,300	49,100	-
Purchase Power/ head	R900	R210	R900	-
Total Purchase Power	R22,590,000	R2,374,000	R44,190,000	-
CBD Shopping	30% R6,780,000	10% R237,000	30% R13,260,000	-
Residual	R15,810,000	R2,137,000	R30,930,000	-
Neighbourhood Shopping	20% R3,160,000	20% R427,000	20% R6,190,000	-
CLAREMONT SHOPPING	R12,750,000	R1,710,000	R24,740,000	-
	SECONDARY ZONE			
Population	21,330	50,570	53,330	178,400
Purchase Power/ head	R900	R210	R900	R210
Total Purchase Power	R19,200,000	R11,610,000	R48,000,000	R37,480,000
CBD Shopping	30% R5,760,000	10% R1,160,000	30% R14,400,000	10% R3,750,000
Residual	R13,440,000	R10,450,000	R33,600,000	R33,630,000
Neighbourhood Shopping	45% R6,050,000	45% R4,710,000	45% R15,110,000	45% R15,130,000
CLAREMONT SHOPPING	R7,390,000	R5,740,000	R18,490,000	R18,500,000
	PARKING REQUIREMENTS			
Total Purchasing Power in Claremont	R20,140,000	R7,450,000	R43,230,000	R18,500,000
Turnover/sq.ft.	R25	R25	R25	R25
Total Floor Area	805,600	298,000	1,729,200	740,000
Parking lots/1000 sq. ft.	3.8	0.15	5.5	0.90
Parking Requirements	3060	45	9500	666
TOTAL PARKING	3105		10166	
	EXISTING RETAIL STRUCTURE			
Total Exist.floor Area	180,000	66,000	-	-
Parking Lots/1000 sq. ft.	3.8	0.15	-	-
Parking Requirements	685	10	-	-
Total Parking Requirements	695			
Parking Available	903			

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