CHAPTER 3

SPATIAL DEVELOPMENT OF RESIDENTIAL AREAS

3.1 INTRODUCTION

The post independence era has seen a rapid growth of urban centres in India. According to the 1991 census, 217 million out a total population of 844 million lived in urban areas, the urban population is projected to increase to 300 million by the turn of the century. In other words, one out of every three Indians will be an urban resident by the turn of the century (Urban environmental management, 1992). Every year an estimated 5 million people migrate from the rural areas to various urban centres in search of employment, the result has been a four fold increase in the country's urban population from, 62.44 million in 1951 to over 217.17 million in 1991 (H.H.Singh, 1994). These demographic changes have occurred due to a major structural transformation of the Indian economy. Urbanisation is the result of massive shifts of labour and capital from predominantly rural to predominantly urban activities (Urban Environmental Management, 1992).

India's urban population is distributed in 3609 cities, but 65% i.e. two-thirds if them live in Class 1 cities, these are urban areas with a population of over a million, also called the metropolitan cities. The last decade has seen a near doubling in the number of metros from 12 in 1881 to 23 in 1991. Of these 23 metros are mega cities, with a population of over 5 million, they are the

The rapid increase in population, in the absence of accompanying increase in housing stock and infrastructure has resulted in the deterioration of living conditions in these areas. One third of the urban population of India live in hutsments built on pavements or on land totally unfit for dwellings, without any basic infrastructure facilities. Another 44% live in one room tenements or cramped multi-storeyed flats. So high is the level of congestion in India that nearly 19% of the urban families live in less then 10 square meters of space (H.H.Singh, 1994).

A study of the landuse patterns in the 23 metropolitan cities shows that nearly 50% of the developed area is under residential use. Industries account for a mere 7% of the area. This is because urbanisation in India is not adequately backed by industries, and also that in many of the cities industries are located beyond the city limits. Parks, playgrounds, and open spaces occupy only 4% of the developed area in the cities. Business and commercial establishments account for a mere 2.5% of the total landuse. Of the remaining land area, an average of 15% comes under public and semi-public landuse, and about 14.5% for roads and streets (H.H.Singh, 1994).

Though about half the land in the metropolitan cities are being used for housing, shortage of housing facilities is a chronic problem in the urban centres. Absence of adequate housing facilities is one of the main reasons for the rapid proliferation of slums, another reason being poverty. In the
metropolitan cities around 31% of the population live in slums (Urban Environmental Management in India: An Assessment, 1992). Associated with the problem of inadequate housing is the non-availability of basic infrastructure facilities such as, supply of clean drinking water, drainage and sewerage facilities, and solid waste disposal facilities.

All the metropolitan cities have been expanding spatially, with the growth of population. Haphazard development has been taking place in the suburban parts of the city, without any reference to landuse planning. Developers buy agricultural land, divide them into residential plots without any care to the absence of infrastructure, and sell them. The result of such development is urban sprawl, settlements interspersed with vacant land. It is not considered cost effective to provide urban services to such dispersed settlements, and the environmental conditions in these areas quickly deteriorate when the population crosses certain thresholds (Urban Environmental Management in India: An Assessment, 1992).

Thus it is seen as essential that development of housing takes place to accommodate the swelling millions in the cities, but along with this it is imperative that services such as water supply, drainage facilities and garbage clearance and disposal, are developed. They are crucial in determining the quality of life in the metropolitan areas, for inadequate services not only reduce the efficiency of functioning, but also contribute to the degradation of the environment (Urban Environmental Management in India: An Assessment, 1992).
3.2 RESIDENTIAL DEVELOPMENT IN MADRAS CITY AND M.M.A.

3.2.1 Historical perspective

Madras in 1600 was formed of scattered settlements separated by vast stretches of land. Each settlement grew around a nucleus of a temple and has a history of its own. One of the most important settlements of that time was Mylapore. The Portuguese, who arrived on the Madras coast in 1522, established their settlement and a fort at Santhome. Triplicane was another important settlement at that time. The other smaller settlements included, Purusawalkam, Egmore, Nungambakkam, ans Saidapet, which all are now a part of the city. Among the suburbs of today the settlements that were there included, Tiruvottriyur, St.Thomas Mount, Pallavaram, Tambaram, Tiruneermalai, Mangadu, Padi, Poonamallee, Kannarathur, and Ambattur, to name a few (Structure Plan for Madras Metropolitan Area, Vol.1, 1980).

In 1639 when the British acquired the, where Fort St. George stands, is where the seeds were sown for the establishment of today’s Madras. The economic activities associated with the East India Company brought people into the area. Congestion inside the Fort made people move out of the Fort. The weaving Community occupied Chintadripet and Tiruvottriyur. The washermen who were in the Mint area moved further westwards, The potters moved out and formed a new settlement, Kosapet. Other places that gained importance at this time and got populated included, Triplicane, St.Thomas Mount, and Royapuram. The British started living along the Cooum river, a picturesque waterway at that time. To give access to them several roads were laid, such as Marshalls road, Halls road, Montieth road, and Casa Major road.
By the beginning of the 18th century Madras was a well established administrative and trading centre. It occupied an area of about 24 square kilometers, which included agricultural lands (Structure Plan for Madras Metropolitan Area, Vol.1, 1980).

In 1901 the city had a population of 5.09 lakhs. At about this time many new industries were established including timber, beedi manufacturing, tanneries and metal works. Despite congestion in a few pockets such as, Royapuram, George Town, Purusawalkam, and Trplicane, plenty of vacant areas were available. The fort still remained the main area of concentration of population. The railway line from beach to Tambaram was electrified in 1931, which resulted in development of residential and industrial areas along the railway line. By 1941, the city had a population of 8.81 lakhs and occupied an area of 80 square kilometers. There was considerable infilling in the already developed areas, and new development took place along the electrified railway lines in areas such as, Nungambakkam, Kodambakkam, Guindy, Meenambakkam and Pallavaram. Growth of new residential and industrial suburbs took place in the southern and western fringes of the city. In 1950 the city limits were extended to occupy an area of 129 square kilometers, which was further expanded in 1978 to cover 172 square kilometers. In 1964 the Madras Metropolitan Area was demarkated to cover areas beyond the limits of the city, forming its hinterland covering an area of 1038 square kilometers (Structure Plan for Madras Metropolitan Area, Vol. 1, 1980).
3.2.2 Landuse patterns in 1974

The First Master Plan drawn out by the Madras Metropolitan Development Authority for Madras city and the rest of M.M.A. drew out the detailed landuse pattern for the entire M.M.A. region for the year 1974. Here landuses were categorised as residential, commercial, industrial, institutional (which included, public and semi-public uses, utility services, transport and communication lines), and open spaces and water bodies (which includes, vacant lands and agricultural landuses).

3.2.2.1 Landuse in Madras city

A study of the 1974 landuse pattern showed that 50% of the land in the city was under residential landuse, 25% was under the category of open spaces, which included vacant lands, water bodies and non-urban uses. About 6% of the land was under industrial and commercial landuse. The remaining land area was categorised as institutional land (Structure Plan for M.M.A., Vol.1, 1980).

With 50% of the land about 58 sq.km. under residential landuse, it can be said that residential areas were spread over most of the city interspersed with other landuses (Fig. 3.1). The only parts of the city that did not have residential landuse were the vacant lands found along the north-western and southern boundaries of the city at Kolathur, Villivakkam, and Velachery. Areas having dense residential development included areas such as, Royapuram, Kurukupet, Pulianthpoe, Chintadripet, Egmore and Triplicane, these areas had
MADRAS CITY
RESIDENTIAL AREAS - 1974

Source: Based on Landuse - 1974

Kms.
population densities of over 50,000 persons per square kilometer. The areas that had moderate residential density included, Tondyarpet, Cheriyar Nagar, Agaram, Maraimalai Nagar, Kilpauk, Nungambakkam, Aminjikarai, Saidapet and Thyagaraya Nagar. These areas had population densities of 20,000-50,000 persons per sq.km.

The other landuses found in the city included commercial, industrial and institutional areas. Most of the commercial areas were found to exist along side of the residential areas. The main pockets of concentration were in the northern parts of the city in and around Parry’s Corner, George Town, Choolai, and Kurukupet, in the central parts of the city at Chintadripet and Roypettah, and in the south at Adyar. Commercial establishments on the whole occupied 7.6 sq.km. which comprised about 6% of the total area of the city.

Industries were located mainly in the periphery of the city. The areas they occupied included parts of Guindy, Villivakkam, Agaram, Chembium and Perambur. Few pockets of industries were also seen within the central parts of the city at Azhagiri Nagar, Krishnampet, and Chintadripet. Industrial areas occupied an area of 8.6 sq.km., which is nearly 7% of the area of the city.

Next to residential landuse the other most predominant landuse was that under institutional areas. It covered nearly 22 sq.km. and occupied 17% of the total land area of the city. The main institutional areas of the city were in the south along the Guindy forests, they were the I.I.T. Madras, Anna University, Guindy Engineering College, and the A.C. Tech. Along the mouth of the Adyar river was the Theosophical Society. Another stretch of
institutional land was along the Marina beach, which housed the University of Madras, and several State and Central Government offices located at Chepauk. Apart from these prominent pockets of institutional areas, several small pockets of areas under institutional landuse were found throughout the city, comprising colleges, government offices, libraries, and bus and railway stations.

Most of the available land in the city had been built upon, and only a few stretches of vacant land were seen in the periphery of the city. Apart from these vacant lands there were areas demarcated as open lands, the most prominent being the Guindy Park, a wooded forest located in the heart of the city. Small patches of agricultural lands were there in the western fringes of the city at Kodambakkam and Virugambakkam. All the open spaces along with the water bodies occupied an area of 33 square kilometers, which was about 26% of the total area of the city.

3.2.2.2 Landuse patterns in the rest of M.M.A.

In 1974 the area occupied by the whole of M.M.A. was 1166.80 sq.km. of which the city covered an area of 128.80 sq.km. the rest of the area of 1037.90 sq.km. was occupied by the rest of M.M.A. Here the area was predominantly rural in character with agriculture occupying 76% of the land area.

The residential areas here occupied 85 sq km of the land, which was about 8% of the total area. The residential areas were mainly located in small
pockets along the boundary of the city, and developed in a linear pattern along the rail routes and trunk roads (Fig.3.2). Another reason for the development of residential areas was the proximity to industries that were coming up in the area. The areas where residential development was seen included, St.Thomas Mount, Perungudi, Kottivakkam, Alandur, Tambaram, Tiruvottiyur, and Minjur. The areas which had more dense residential development were, Kottivakkam, Valsaravakkam, Alandur, Ambattur, Avadi and Tiruvottiyur which had population densities of more than 5,000 persons per sq.km. The moderately populated areas were, Tambaram, Kunnattur, Poonamallee, Naravarikuppam, and Manali, with population densities of 1000-5000 persons per sq.km.

Industrial and institutional landuse also was seen to follow the same pattern as the residential areas, with concentration along the city boundary and along the railway lines and major roads. The main industrial areas were, Avadi and Ambattur which developed along the westward rail route and Manali and Tiruvottiyur to the north of the city along the main trunk road. Totally they occupied an area of 28.60 sq.km. Institutional areas were seen along the G.S.T. road in the south-westen part of M.M.A. at Meenambakkam, Pallavaram, and Tambaram, and also at Avadi.

A large number of water bodies were seen dotting most of the areas in M.M.A. The main water bodies are the Red Hills lake located in the north-western part of M.M.A. and the Chamberambakkam tank, located along the western fringe of M.M.A. Apart from these two large water bodies numerous smaller water bodies dotted the rest of the landscape, these included, the
Cholavaram tank, Ambattur tank, Korattur tank, Porur tank, and Madavaram tank to name a few. Water bodies and open spaces together occupied about 107 square kilometers of land, which was about 10% of the total land area (Fig. 2.4).

3.2.3 Landuse Patterns in 1991

M.M.D.A. prepared its Second Master Plan for the whole of M.M.A. in 1991, wherein an updated landuse map for Madras city and the rest of M.M.A. was prepared. This map showed the existing landuse for both these areas as it was in 1991. Here the city occupied an area of 170.47 sq.km. and the rest of M.M.A. occupied an area of 993.38 sq.km.

3.2.3.1 Landuse in Madras city

The landuse pattern in 1991 showed that the city still remained predominantly residential in nature, occupying an area of over 81.38 sq.km. These areas were spread throughout the entire city, but areas with high concentrations of residential areas were in the central and northern parts of the city (Fig. 3.3). High concentration residential areas with a high density of over 1 lakh persons per sq.km. were in, Triplicane, Zam Bazar, Kumaran Nagar, Saidapet, Gangadeeswaran Koil, Pattalam, Pulianthope, Kurukupet, Kumara swamy Nagar, and Washermanpet. Areas with low density of residential landuse were Kodungaiyur, Villivakkam, Anna Nagar, Virugambakkam, Kilpauk, Kodambakkam, Guindy, Velachery, Adyar, and Thiruvanmiyur. These areas had population densities of less than 25,000
persons per sq.km. The rest of the city had medium densities of between 25,000-1,00,000 persons per sq.km. The only visible vacant lands were small patches at Velachery and Kodungaiyur.

Commercial landuse continued to be concentrated towards the north and in the central parts of the city, in and around Parry’s Corner and George Town, along the Anna Salai at Teynampet, Egmore, Thousand Lights, and Royapettah. They developed along the main arterial roads in the city such as, Nungambakkam High Road, Kodambakkam High Road, Athar Road, Lattice Bridge Road, Poonamallee High Road, Panthion Road, Usman Road, and Pondy Bazar Road. Apart from these main areas of concentration, commercial establishments are found scattered throughout the city interspersed with residential areas. Totally commercial landuse covered an area of 11.83 sq. km.

Industrial areas were mainly seen in clusters along the outer fringes of the city. The industrial landuse within the city was in and around Pulianthope, where the B&C Mills were located. Guindy, the only industrial estate located within the city limits, was seen in the south-western corner of the city. The other areas having industrial landuse included, Virugambakkam, and Anna Nagar located in the western fringe of the city, Chembium in the north-west, and Radhakrishnan Nagar, Cheriyar Nagar, and Tondiarpet in the north. Industrial landuse occupied 9% of the total area of the city.

Institutional areas the second most widespread landuse in the city after residential landuse occupied 47.7 sq.km. which was 28% of the total area. Prominent areas with institutions included, the area around the Fort, where
the secretariat is located, as well as the harbour and the port. In the north at Kodungaiyur, there were large areas demarked as institutional areas. In the west at Vadapalani and Saligramam a large area of institutional land use was seen. In the south-western parts of the city around the Guindy park extending upto Taramani large areas of institutional lands were demarked where numerous learning institutions like the I.I.T., Anna University, A.C.Tech, Central Leather Research Institute, Cancer Institute, and numerous other research and training institutes were located.

Open spaces and agricultural land occupy 11 sq.km. of land area, but it was not evenly distributed throughout the city. The main stretches of open lands were seen at the Gandy Park and the coastal stretch of the beach. Apart from this most of the city is devoid of any open space. Vacant lands occupy a mere 7 sq.km. and were getting more and more scarce due to the growing demand for land, and the ever growing population pressures.

3.2.3.2 Landuse in the rest of M.M.A.

The rest of M.M.A. consisted of 993 sq.km. forming the hinterland of the city. Though the influence of the city was a dominant feature here, there was a blend of both urban and rural landuses here. In terms of spatial spread of the different landuses, it was seen that areas in M.M.A. just bordering the city, and along the major rail routes and roads, the landuse was mainly urban in character with most of the areas having residential or industrial structures (Fig.3.4). Thus it was seen that the areas of St. Thomas Mount, Villivakkam, Alandur, Tambaram, Pallavaram, Ambattur, Avadi, Madavaram, and
Thruvottiyur had mainly industrial and residential landuses along with patches of commercial land uses.

Residential landuse which occupied over 207 sq.km. was mainly concentrated in the areas of St. Thomas Mount Panchayat Union, Pallavaram, Tambaram, and Alandur Municipalities. Small patches of residential areas were also seen distributed over the rest of the area, and also around the main industrial centres. Industries were located in distinct patches to the south, north and west of Madras city. In the north they were Tiruvottiyur, Madavaram, Manali and Kathivakkam. In the west the industries were mainly concentrated in the Ambattur industrial estate. In the southern side industries were located in and around Pallavaram, Tambaram and Perungudi. Apart from the institutional lands which occupied over 50 sq.km. of the area and were mainly located in Tambaram, Pallavaram, and St. Thomas Mount, the most wide spread landuse was agriculture which occupied an area of 410 sq.km. Agriculture was predominant in the northern and western parts of M.M.A. supported by the Chembrambakkam tank in the west, and numerous small water bodies in the north associated with the Red Hills lake.

3.3 CHANGES IN RESIDENTIAL LANDUSE PATTERNS

FROM 1974 TO 1991

3.3.1 Changes in Madras city

A comparative study of the landuse patterns in Madras city for the years 1974 and 1991 (Fig. 3.5) show that the proportion of land under the different categories has remained by and large the same. In 1974 it was seen that
MADRAS CITY

PREAD OF RESIDENTIAL AREAS
BETWEEN 1974 & 1991


Fig. 3.5
residential areas occupied 45% of the total area, and in 1991 this had increased to 48% of the total area of the city. This shows an increase of a mere 3% in the area under residential landuse, and this is despite a 19% increase in population from 1981 to 1991. This means that though there is a very small increase in the spatial extent of residential areas commensurate with the population increase, the existing residential areas are accommodating a larger number of people. Thus there is a more intensive utilisation of all available land in the residential areas of the city. This has resulted in the shift from independent single unit houses to multi-storeyed structures accommodating numerous small flats. A plot of land which used to house about 5 to 10 people at the most now accommodates 80 to 100 people. This type of change is prominently visible in the well developed areas of the city such as Nungambakkam, Thyagaraya Nagar, Alwarpet, Adyar and Kodambakkam. Here the single unit houses in plots ranging in size from 4 to 6 grounds are giving way to multi-storeyed flats, and these developments are mainly taking place along and off the main roads such as off Nungambakkam High Road, G.N.Chetty Road, T.T.K.Road, C.P.Ramaswamy Road, Chamiers Road, off Sardar Patel Road in Gandhi Nagar, off Lattice Bridge Road, and Kodambakkam High Road. Some of the newer residential areas are also seeing this kind of development apart from all the vacant land also being taken up for housing development, such as in Tiruvanmiyur, Besant Nagar, Velachery, Anna Nagar, and Villivakkam. The vacant lands that were seen in Villivakkam, Kolathur, and Velachery in 1974 had nearly altogether disappeared.
Despite the non-availability of land for expansion of residential areas, and the resulting prohibitive costs of housing in the city, people still prefer to stay in the city. The main reasons for this are the availability of certain infrastructure facilities such as water supply, drainage and sewerage connections, and public transport and roads, many of which are absent or inadequate in the rest of M.M.A. outside of the city. The change in the type of houses from single unit to multi-storeyed has resulted in a marked increase in the number of people accommodated on a piece of land. Often a ten fold increase, when a single house accommodating about 8 to 10 people gives way to a set of flats which could house a total of 80 to 100 people. This increase has resulted in an unprecedented pressure of population on basic infrastructure such as water supply, drainage lines, garbage collection facilities, congestion on roads, and public transport facilities. A study conducted in a developed residential area of Madras city near Alwarpet showed that the areas of maximum change were along the main roads, T.T.K. Road, Radhakrishnan Salai, Sullivan Road, and Luz Church Road wherein large numbers of multi-storeyed structures were coming up (Vasudha Lakshminarayan, 1991).

The study also revealed that the main infrastructure facilities affected were water supply and traffic on major roads from the city centre to the residential areas.

3.3.2 Changes in the rest of M.M.A.

In comparison to the landuse changes that have taken place for the time period 1974 to 1991 in Madras city the rest of M.M.A. has seen definite
changes in the landuse patterns with a marked increase in area under residential landuse. In 1974 there was only 8.2% of the land under residential landuse, and this increased to 21% of the total area in the rest of M.M.A. Residential areas overflowed out of the city and spread out into the rest of M.M.A. (Fig. 3.6). This spread took place mainly towards the south, south-west, and west of the city. The areas that experienced this growth of residential areas include, Kottivakkam, Injambakkam, Neelangarai, Ullagaram Puzhuthivakkam, which are in the St.Thomas Mount Panchayat Union to the south of the city, Alandur, Nandambakkam, Porur, Pallavaram, Pammal, and Tambaram to the south-west, and to the west of the city the areas of residential development include, Valsaravakkam, Nerkundram, Maduravoyal, Ambattur and Poonamallee. The areas having residential development in the north were mainly Madavaram and Tiruvottiyur.

Thus it can be said that residential development in the rest of M.M.A. is taking place all along the boundary of the city as well as in a linear pattern along the rail routes and roads that traverse the area in a radial pattern. Thus the spatial development of residential areas is taking place along the G.S.T. Road in the south-west, the coastal highway in the south, and the railway lines running from the city to the west and the north. From 1974 to 1991 area under residential landuse has increased by 13% to accommodate a 25% increase in population. The main reasons for the growth of residential areas in the rest of M.M.A. is the availability of land there with costs not as prohibitive as those in the city. This is despite the fact that infrastructure facilities are not at all adequate in most of the places there. But there is an environmental cost to all
MADRAS METROPOLITAN AREA

SPREAD OF RESIDENTIAL AREAS BETWEEN 1974 & 1991


Fig.3.6
this. Lack of infrastructure means that there are no treatment facilities for drainage and sewage waters, which are then let out into the soil or waterways. For a small population the soil and water are able to assimilate these effluents but when the population grows beyond a certain threshold they result in the pollution of the ground and water. Another environmental fallout is due to the absence of comprehensive landuse zoning, as a result of which residential areas have come up without any thought to the environment. This has resulted in residential areas coming up around water tanks, which are precious sources of water in an already water deficient areas. For the low lying areas which act as percolation ponds were also used as sites for development. This has resulted in the choking of these water bodies which then begin to dry up. In other words, the first affected part were the natural channels which drain rain water into these lowlying areas and ponds. They are virtually cutoff by indiscriminate residential development by private promoters. People begin to dump waste into them and then they get lost forever. Some of the tanks being threatened are the Madipakkam tank, Korattur tank, and those in Ambattur, Avadi and Madavaram. Another problem due to the absence of landuse zoning is the fact that residential areas have come up very close to industries and vice-versa. Many of these industries either produce hazardous products such as chemicals, dyes etc. or the production process let out toxic effluents. Thus it is extremely dangerous to have housing in the proximity of these industries, but this is what exists. The main reason for this is that large tracts of agricultural land are bought up by private developers who then mark out plots and sell them with little care for the existing physical environment or infrastructure. This is what is happening in areas such as Pammal,
Tiruneermalai, Porur, Nandambakkam, Poonamallee, Ambattur, and Tiruvottiyur.

3.4 FUTURE DEVELOPMENT OF RESIDENTIAL AREAS

An indicator for the spatial spread of residential areas in M.M.A is the fact that land under the category of vacant lands increased from 10% of the total area in the rest of M.M.A. in 1974 to 28% in 1991. This increase of 17% in vacant lands and fall 35% in land under agricultural landuse indicates a move away from agriculture to other landuses. These vacant lands were previously agricultural lands that have been bought over by private developers such as the V.G.P. group, who buy these lands demarkate them into plots, and sell them in the future as residential plots. This kind of development is mainly taking place along the coastal highway at Kottivakkam, Injambakkam, and Perungudi, in the west and south-west at Ramapuram, Porur, Valsaravakkam, Nerkunram, Poonamallee, and Ambattur.

In the next decade or so, the pattern of growth will be along similar lines, with the urban character becoming more pronounced in the rest of M.M.A. Agricultural lands and water bodies are under threat of giving way to residential landuse. The city has already become saturated with no scope for any horizontal spread, the only scope is in a vertical growth with multi-storeyed buildings coming up. But the scope here is very limited and costs prohibitive, and hence it cannot cater to the housing needs of all income groups. Hence the answer lies in the development of residential areas in the rest of M.M.A. where land is available, and also unlike Madras city ground
water potential still exists. For how long it will survive and it’s quality be maintained in the face of uncontrolled tapping and unchecked discharge of industrial effluents and household wastes is yet another question. But as of now the residential development is likely to take place in two main directions, to the south along the coastal highway in areas such as Neelangarai, Injambakkam, upto Muttukadu which lies just outside the M.M.A. boundary, and towards the west in the Pooramalle area towards Sriperumbudur. These areas have a good ground water potential, and are linked to the city and outside by major link roads. The maintainence of the environmental quality, protection of water tanks, and control in the exploitation of the ground water are essential steps to be taken if these areas are to remain as conducive for residential development in the future.