Draft Master Plan – II for Chennai Metropolitan Area

[A short version of the main report]

Chennai the fourth largest metropolis in India is the focus of economic, social at cultural development and it is the capital of the Tamilnadu state. It is growing at a rapid pace, and there is a demand for integration of the past developments with the future requirements. To achieve the objectives of making this metropolis more livable and of international standard, a co-ordinated and integrated approach among the various agencies involved in urban development and provision of services are needed including participatory process in planning and implementation at local body levels.

2. Though Madras Town Planning Act, was enacted in 1920 itself and a few Detailed Town Planning schemes were sanctioned for small areas within the Chennai city, no comprehensive plan (called as General Town Planning Scheme then) for city or metropolitan region was prepared. This Madras Town Planning Act was superceded in 1971 by the Tamilnadu Town and Country Planning Act. The process of preparation of Master Plan for the metropolis started in 1973, by constitution of an adhoc body viz CMDA in 1973; it had become statutory body by Act amendment in 1974 (Tamilnadu Act 22 of 1974) and notification of the CMA was made in 1975. The draft master plan for CMA consented by Government was notified in Gazette on 5.08.75 and from that date developments are regulated with reference to Master Plan / Development Control Rules). The first Master Plan was finally approved by the Government in 1976.

3. The first Master Plan laid down policies and programmes for overall development of CMA taking long-term view of the requirements. It dealt with distribution of future population in various parts of CMA, policies for economic growth and future location of economic activities, future physical developments, circulation pattern, programmes for Traffic and Transportation, developments of land use zoning, requirements of urban infrastructures for the future population, policies and programmes for sectoral developments and development control regulations. All the above had been translated in the plan mainly as land use plans with hierarchy (viz. Master Plan, Detailed Development Plan, Layout plans / Project / Scheme plans) implemented mostly through zoning and Development Control Regulations.

4. The actual population of CMA as per 2001 census was 70.41 lakhs against the first Master Plan assignment as per strategy / projection of 71 lakhs; the variation is not significant. In the case of Chennai city, it was 43 lakhs against the projection of 40 lakhs; the variation of 3 lakhs may be due to extension of the city corporation area in 1978 and it could be termed that the population in Chennai city also had grown as per the first Master Plan strategy.

5. As far as Chennai city area is concerned, Detailed Development Plan for 52 planning units have been prepared covering about 60% of the area, and the remaining area could not be proceeded for various reasons including the non-availability of micro land / subdivision level land data, ongoing resurveys by Revenue Department etc.

6. Unlike other major cities such as Delhi and Navi Mumbai in our country, realisation of the plan through large scale acquisition and development of land, to ensure spatial pattern of development and provision of recreational, educational and other institutional facilities, was not aimed at. Public sector lead growth and development process was not envisaged, but it was of private involved growth process (regulated by public) to achieve the objectives of town planning. The land use zoning concept adopted since 1975 was the 'Mixed Zoning Concept' which suit better Chennai's social way of life considerations, and not exclusive zoning (mostly adopted in western countries and also in zone of our metro cities) which have created major problems in our Indian cities.

7. As a follow up process in planning after the preparation of Master Plan, the Madras Urban Development Project (MUDP) report was prepared to address the infrastructure needs of the Chennai Metropolitan Area (then) and implemented as MUDP-I (1977-82), MUDP-II (1983-88) and TNUDP. Decongestion projects such as Koyambedu Wholesale Market Complex, Madhavaram Bus and Truck Terminal, Sathangadu Iron and Steel Market, Manali urban node, MM Nagar New Town were implemented by CMDA. Infrastructure projects were implemented by the agencies / departments concerned.

8. The major agencies involved in the infrastructure planning and development in Chennai Metropolitan Area are listed below.

The Details of Agencies and its Responsibilities			
Sl. No.	Agency	Responsibility	Jurisdiction
Local Government			
1	Chennai Corporation-	Provision of Roads, construction of ROBs, RUBs, Pedestrian subways etc., streetlights, solid waste collection and management, micro-drainage, parks and play grounds in their area of jurisdiction	Within the local body area
2	Municipalities-	Provision of Roads, construction of Pedestrian subways etc., streetlights, solid waste collection and management, micro-drainage, parks and play grounds in their area of jurisdiction	
3	Town Panchayats		
4	Village Panchayats		
Parastatals Agency			
5	TNHB	Neighbourhood development including provision of plots and ready built houses, Sites and Services schemes.	Tamil Nadu State but focus is more on CMA
6	MTC	Bus Transport	CMA
7	Traffic Police (Greater Chennai)	Traffic Management Schemes	Greater Chennai
8	TNEB	Electricity generation and supply	Tamil Nadu State
9	CMWSSB	Water Supply & Sewerage facilities for CMA	CMA*
10	TNSCB	Provision of housing, infrastructure and livelihood programs in slum areas	Tamil Nadu State but focus is more on CMA
11	Highways Department	Major roads within Chennai City, all bus route roads and major district roads, construction of ROBs, RUBs, pedestrian subways etc.	Tamil Nadu State
12	PWD	Implementation & Maintenance of macro drainage system	Tamil Nadu State

* Though CMWSSB has jurisdiction over the CMA as per their Act, their area of operation are limited presently to Chennai City Corporation area and a few adjoining areas such as Mogappair, I.T.Corridor etc. However they have proposal to expand their area of operation covering the entire CMA.

9. Chennai Metropolitan Area comprises Chennai city Municipal Corporation, (176 sq.km), 16 Municipalities (240 sq.km.), 20 Town Panchayats (156 sq.km.) and 214 villages in 10 Panchayat Unions (617sq.km.). It encompasses the Chennai District (176 sq.km.), part of Thiruvallur District (637 sq.km.) and a part of Kancheepuram District (376 sq.km.).

10. Chennai is a hub for the region surrounding it. There is no declared region in the area for the purpose of planning and in 1975 the Metropolitan area itself was declared as a region with boundaries limiting the planning process. But the Government has been considering to declare the areas adjoining the CMA as a Region comprising parts of Thiruvallur and Kancheepuram Districts for preparing Regional Plan, considering the developments coming up in the Kelambakkam-Tiruporur, Orgadam-Sriperumbudur and Gummidipoondi-Ponneri areas. When such a larger Regional Plan is prepared it should be in consonance with the Master Plan for CMA, for balanced development in the region.

11. Draft Second Master Plan 2011 for CMA was prepared and submitted to Government and the Government given its consent for the draft in G.O.Ms.No.59 H&UD 30.06.1995. After public consultation it was submitted to Government in December 1995 for approval. In the meanwhile, a Writ Petition was filed in the Hon'ble High Court of Madras against finalisation of the plan and the Hon'ble High Court had ordered interim injunction confining issue of final notification and the interim order was made absolute on 1.07.1997. The High Court in its order dated 10.07.2001 in Writ Petition No. 14819 / 95 dismissed the Writ Petition. Government in G.O.Ms. 408 H&UD dated 5.10.2001 had returned the draft Master Plan 2011 to CMDA directing to modify the Master Plan taking into account of the urban developments, amendments to DCR till then made, future need of CMA etc and resubmit it. The revised draft Second Master Plan was submitted to government by CMDA in December 2005 for approval with the request to give an opportunity to the Public and Local Authorities for giving their suggestions before final approval. The Government in G.O. Ms. No. 331 H&UD department dated 5.12.2006 have returned in draft Master Plan to CMDA with the direction to prepare Master Plan afresh incorporating further developments in the field and submit a proposal for consent under section 24(2) of Town and Country Planning 1971. This was done in February 2007 and the Government gave its consent on 30.03.2007.

SWOT of Chennai

12. Cities are engines of development. They are also loci of the most important impacts of globalisation and hence the places of change and expectation of the future. Strengths – weaknesses – opportunities and Threats in respect of Chennai are -

Strengths	**Opportunities**
• Strong Commercial and Industrial Base	• High telecom penetration
• Skilled and educated man power	• Growth oriented reforms
• High standard of Educational Institutions	• Public Private Participation
• Good Urban Land Market and availability of developable lands.	
• Uninterrupted and quality power supply	
Weaknesses	**Threats**
• Traffic congestion	• Automobile pollution
• Inadequate infrastructure	• Overcrowding in certain pockets
• Water shortage	• Decrease in manufacturing industry

13. **Vision 2026** is to make Chennai a prime metropolis which will be more livable, economically vibrant and environmentally sustainable and with better assets for the future generations.

Demography

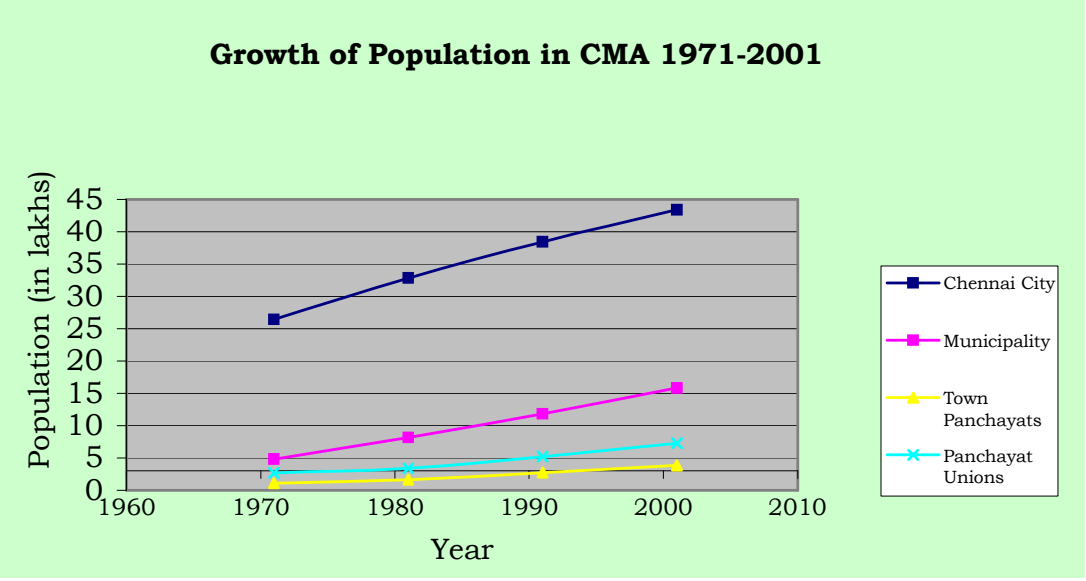
Chennai has a long history since 1639. The Chennai city corporation was constituted in 1798. City extending over an area of 68 sq.km in 1901 had a population of 5.40 lakhs. Since 1941, it had grown rapidly and the growth of population in Chennai city and other local bodies within CMA is given in the Table below:-

Growth of Population in CMA

Sl. No.		Population (in lakhs)				Annual Rate of growth (%)			Area Sq. Km.	Gross Density per Ha. in 2001	Net Residential density/hect. in 2001
		1971	1981	1991	2001	71-81	81-91	91-01			
1.	Chennai City	26.42	32.85	38.43	43.43	2.20	1.58	1.23	176	247	459
2.	Municipalities	4.84	8.14	11.84	15.81	5.24	3.80	2.91	240	66	162
3.	Town Panchayats	1.11	1.64	2.71	3.86	4.43	4.94	3.62	156	25	114
4.	Village Panchayats	2.67	3.38	5.20	7.31	2.40	4.38	3.58	617	12	87
5.	CMA Total	35.04	46.01	58.18	70.41	2.76	2.37	1.93	1189	59	227

Source: Census of India, and CMDA

2. The municipalities and Town Panchayats have experienced higher growth rate than that of the city. The density pattern indicates that the city has the highest gross density of 247 persons/ha, whereas the average gross density in CMA is only 59 persons/ha. The gross density in most of the municipal areas and Town Panchayats is very low, indicating that these areas offer high potential for growth and would be the receiving residential nodes in future.



Birth & Death Rates

3. The registered birth rates in Chennai City in 1981 were 31.20 and varied from 38.6 to 24.06 during 1981-91 and have reduced to 22.62 in the year 2003. Similarly the death rate also reduced to a considerable extent from 9.20 in 1981 to 8.01 in 2003. The rate of natural increase declined from 22.00 in 1981 to 14.61 in 2003.

Migration

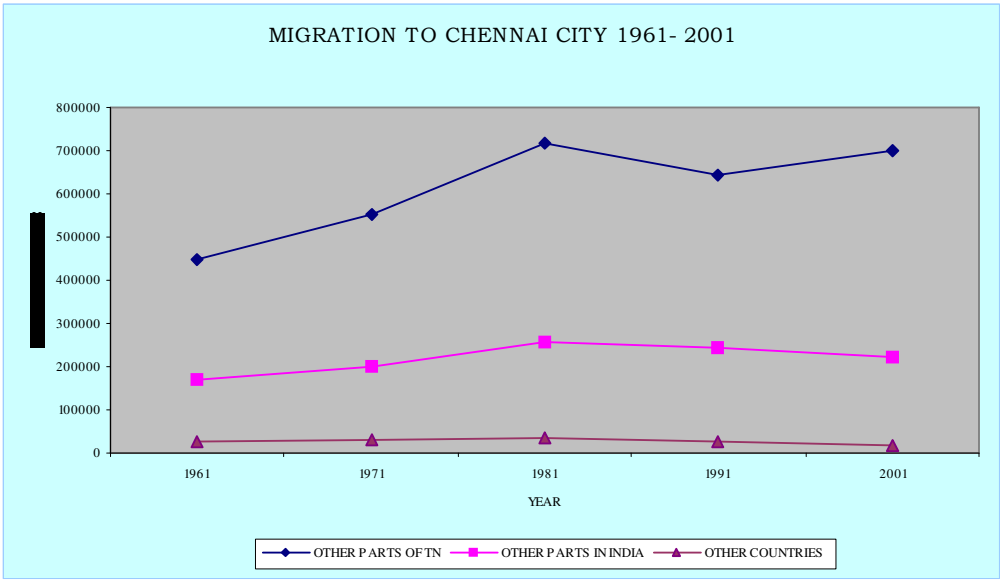
4. The cosmopolitan nature of Chennai was a reflection of its attractions to migrant groups from all over India. Migrants came not only predominantly from the surrounding Tamil and Telugu speaking areas, but also from southern and northern India. These migrant groups from other states have made their distinctive mark on the patterns of residential and social organisations within this Chennai metropolis.

5. Chennai is a city of migrants like any other metropolitan city in India. According to 2001 Census, migrants to Chennai City from other parts of Tamil Nadu State constitute 74.5 %, and the table below shows a down ward trend in the migration to the City from 37.24% in 1961 to 21.57% in 2001. Migrants from other parts of India constitute 23.8% and the remaining 1.71 % of the migrants are from other countries.

Migration to Chennai City, 1961-01 (in Lakhs)

Year	Total Population	Total migrants to the city from								% of Total Migrants to the total population
		Other parts of Tamil nadu		Other parts of India (Excluding Tamilnadu)		Other Countries		Un-classi-fiable	Total migrants	
		No.	%	No.	%	No.	%			
1961	17.29	4.47	69.45	1.71	26.6	0.25	3.90	--	6.44	37.24
1971	24.69	5.51	70.61	2.00	25.63	0.29	3.76	--	7.80	31.59
1981	32.84	7.19	71.28	2.55	25.31	0.34	3.41	--	10.08	30.70
1991	38.43	6.44	70.51	2.42	26.47	0.28	3.01	0.04	9.18	23.90
2001	43.44	6.98	74.49	2.23	23.80	0.16	1.71		9.37	21.57

Source: Census of India, 1961, 1971 & 1981, 1991 Social and Cultural Table



Migration to Chennai Urban Agglomeration (CUA)* - 2001					
Sl. No.	**Place**	**Males**	**Female**	**Total**	**% to Total**
1.	Total Migrants	8,55,103	7,53,196	16,08,299	
2.	Elsewhere in the district of enumeration	1,38,235	1,24,844	2,63,079	16.35
3.	Other Districts of the State	5,49,214	4,71,981	10,21,195	63.50
4.	Outside the state	1,55,431	1,45,307	3,00,738	18.70
5.	Outside India	25,360	22,360	23,287	1.45

Source: Census India, Tamilnadu Migration Tables-2001.

* CUA comprises of Chennai City, 14 Municipalities, 20 Town Panchayats and 21 Village Panchayats around Chennai City as defined in the Census of India, 2001. Its extent is 633 sq.km.

6. In respect of migrants from southern region of the state, the urban proportion (75%) is higher and the rural proportion being only 25%, and among migrants from other southern states of India, there are more female migrants than male migrants (with migrants from Kerala being an exception).

7. The composition of growth in Chennai City is given in the table below.

Composition of Growth - Chennai City			
1	Population in the reference year	32,84,622 (in 1981)	38,43,195 (in 1991)
2	Natural increase	6,40,370 (1981-91)	5,82,745 (1991-01)
3	In migration	9,18,298 (1981-91)	9,37,111 (1991-01)
4	Jurisdiction change	- (1981-91)	- (1991-01)
5	Sum of (1) to (4) above	48,43,290	53,63,051
6	Population in the next reference year	38,43,195 (1991)	43,43,645 (2001)
7	Net increase in population	5,58,573 (1981-91)	5,00,450 (1991-01)
8	Out Migration (arrived)	10,00,085 (1981-91)	10,19,406 (1991-01)

8. An interesting and important fact found is the out migration from Chennai City to its suburbs and other areas. The population of the Chennai City in 1991 was 38.43 lakhs which include 9.18 lakhs migrant population and natural increase of 6.40 lakhs (for 1981-91) population; the net population increase works out to only 5.59 lakhs which shows that there was a net out migration of 10 lakhs (30.4% of 1981 population) from City (during 1981-1991). Similarly, an out migration of 10.19 lakhs (26.5% of the 1991 population) is noted during 1991-2001. Though there were large scale building construction activities noted during the above periods, the out migration of resident population from Chennai City proves that considerable conversion of residential premises into non-residential mostly for office, shopping, hotels and other commercial purposes took place; this trend will continue in this metropolis.

Sex Ratio

9. Sex ratio is denoted by number of females per 1000 males. The sex ratio in CMA increased from 936 in 1991 to 956 in 2001. The sex ratio in Chennai city and CMA are presented in Table below.

Sex Ratio in Chennai City & CMA			
Year	**Chennai City**	**CMA**	**Urban TN**
1961	901	909	992
1971	904	907	978
1981	934	927	977
1991	930	936	972
2001	957	956	987

Source: Census of India

Literacy

10. The analysis of literacy level in CMA shows that the incidence of illiteracy is found to be higher in Chennai city and CMA than in the State. The literacy rate in CMA and Chennai city is more or less the same and has exhibited an increase during 1991-2001. The literacy rate in CMA is presented in Table below.

Literacy Levels in CMA					
Unit	**1961**	**1971**	**1981**	**1991**	**2001**
			%		
City	59.47	62.01	68.68	72.54	76.81
CMA	54.82	58.64	66.56	70.32	76.09
Urban TN	21.06	30.92	40.43	51.33	82.53

Source: Census of India

Age Structure

11. Age structure of a population in a city / metropolis plays a major role in urban planning. It gives an idea about dependent population, working population, jobs to be created, the present and future requirements of educational, health and other facilities and amenities. It depends on birth rate, death rate and also migration. Age structure of population in CMA as per Census 1971 to 2001 is given in the table below:

Age Structure in CMA in %					
Age Group	**1961**	**1971**	**1981**	**1991**	**2001**
0-4	13.2	12.51	11.03	8.68	7.31
5-9	12.39	11.74	10.35	9.56	7.97
10-14	10.64	10.97	11.37	10.51	8.95
15-19	8.66	9.97	10.61	10.22	9.55
20-24	10.73	11.05	10.68	11.14	10.47
25-29	10.21	9.29	9.61	10.20	10.33
30-34	7.98	7.15	7.46	8.06	8.46
35-39	6.69	6.99	6.66	7.48	8.04
40-44	5.49	5.14	5.36	5.68	6.19
45-49	4.15	4.33	4.7	4.98	5.50
50-54	3.65	3.51	3.7	3.92	4.37
55-59	2.1	2.46	2.73	2.90	3.10
60-64	2.06	2.30	2.4	2.64	2.83
65-69	1.1	1.15	1.37	1.51	1.96
>70	1.2	1.65	1.97	2.33	3.02
not stated		0.00	0	0.18	1.93
Total	100.00	100.21	100	100.00	100.00

12. From the above, it may be seen that the proportion of primary school going children percentage has reduced from 12.39% in 1961 to 7.97% in 2001, and the proportion of Secondary school going age group has also reduced from 10.64 in 1961 to 8.95 in 2001. But the proportion of old age group has increased from 4.36 to 7.81% in the said period.

Population Projection

13. Population projections have been carried out for CMA based on the past trends. It is estimated that CMA would house a population of 126 lakhs by 2026, of which Chennai city alone would account for 58 Lakhs. The population projection of CMA is presented in Table below.

Projected Population for CMA and Chennai City (In Lakhs)

Sl. No.	Description	Actual	Projection				
		2001	2006	2011	2016	2021	2026
1	Chennai City	43.44	46.28	49.50	52.39	55.40	58.56
2	Municipalities	15.81	18.52	21.75	25.60	30.20	35.69
3	Town Panchayats	3.86	4.73	5.89	7.41	9.45	12.22
4	Village Panchayats	7.31	8.70	10.59	12.96	15.99	19.88
5	CMA [total]	70.41	78.96	88.71	99.66	111.97	125.82

Economy

The economic base of the Chennai City had shifted from trade and commerce to administration and services by the early part of the 20th Century. In the post-independence period, manufacturing became an important sector and CMA continues to be most important industrial area in the State. Recent trend shows that the economic structure of the city is tertiarised with growing contribution by Information Technology/Information Technology Enabling Service/Business Process Outsourcing Industries.

2. Chennai City alone accounts for 10.94 percent of the State Income. The income in the areas of Kancheepuram and Thiruvallur District, which fall within CMA, based on proportion of population, roughly, has been estimated at 2.8 percent and 2.5 percent respectively. These show that CMA accounts for 16.21 percent of the state income from all sectors.

Occupational Structure

3. The comprehensive profile of employment in CMA has been made on the basis of secondary sources including Census data. The participation rate i.e. proportion of main workers to the population of CMA was 30.74percent in 1991 and 30.96percent in 2001. The corresponding figures for Chennai city was 30.50percent in 1991 and 31.79percent in 2001. The number of marginal workers both in Chennai City and in CMA is negligible.

Occupational structure CMA _ 1991 and 2001

1991			2001		
Component	**City**	**CMA**	**Component**	**City**	**CMA**
Total Workers	1173062	1675512	Total Workers	1488364	2519278
Main Workers	1171739	1669213	Main Workers	1380757	2284457
Main Cultivators	883	19778	Main Cultivators	15149	33170
Main Agriculture Labourers	199	70085	Main Agriculture	5849	33390
Fishing & Forest	9982	15422	Main House Hold	25836	43394
Mining	1245	3484	Main Others	1333923	2174503
Manufacturing House Hold	7683	20271	Marginal workers	107607	234821
Manufacturing & others	275916	423253	Marginal Cultivators	2026	5728
Main Construction	74856	104913	Marginal Agricultural	1233	22681
Main Trade	300928	372672	Marginal House Hold	5156	10511
Main Transport	125853	166648	Marginal Others	99192	195901
Main Others	374194	472687	Non Workers	2855281	4859201
Marginal Workers	1323	6299			
Non Workers	2668334	3753958			

Source: Census of India

4. The workers in primary activity constitute 6.52 percent in CMA and 1.05 percent in City 1991. In 2001, it was 2.91 percent and 1.52 percent respectively in CMA and Chennai city indicating that the primary activities are on the decline in the

peripheral areas due to the emergence of manufacturing and new economy industry. The workers in primary activity are dwindling and it is negligible compared to total, both in Chennai city and in CMA with more than 90 percent of the people engaged in the tertiary sector. The percentage of non- workers was 65.73 percent in city and 69.14 percent in CMA during 2001.

Chennai Port

5. Chennai Port is one of the largest ports of India and consists of well equipped shipping facilities (23 berths including 4 exclusive berths for containers), marine services and other associated facilities like warehouses and storages The principal items of Imports are Petroleum, oil, Lubricants, Fertilizers, Food Grains and Fibers. The main items of export are Ores (mainly iron ores) granite stones, quartz, Barites, hides and skins, chemical and cotton goods. Chennai Port handles 60 percent of the total cargo handled by the State. The total number of containers handled during 2003 - 2004 was 5, 39,265 showing an increase of 67 percent in the last 5 years. The passenger traffic shows an increase of 22 percent in the last five years.

Ennore Port

6. Currently, Ennore Port comprises only two berths and is planning to expand its shipping facilities to handle large volumes of bulk cargo. A port specific Special Economic Zone (SEZ) is being planned to enhance the economic opportunities of the port as well as the region.

International Airport

7. Chennai Airport is one of the largest airports of the country. It handled about 20.54 lakhs international passengers and 25.01 lakhs domestic passengers during 2003-04. In addition, the airport handled cargo of about 1.50 lakhs tonnes including 1.35 lakhs tons of international cargo and has a significant share in total passengers as well as cargo handled in the four major Airports.

Manufacturing Sector

8. The manufacturing sector of Chennai comprises large industries such as petrochemicals and chemical industry, electrical and automobile and related ancillary industries. Some of the largest industrial areas such as Ambattur and Manali are located in CMA and house multi-product industries. Other Industrial estates at Guindy, Thirumazhisai and Thirumudivakkam house medium and small-scale industries. Chennai has a large base of leather industry and accounts for 50% of the total exports of the country. Tamil Nadu accounts for 70 percent of leather tanning companies in India and 38 percent of leather foot wear and components; most of the footwear industries are located within CMA. A cluster of chemical industries is located at Manali in CMA. An export-processing zone (MEPZ) spreading over an area of 261 acres is located at Tambaram for apparel and other exports.

9. Large automobile engineering, glass and ceramic industries, are located at Marai Malai Nagar, Irungattukottai, Sriperumbudur, Thiruvallur and Gummidipoondi around Chennai. Tamil Nadu accounts for about 21 percent of passenger cars, 33 percent of commercial vehicles and 35 percent of automobile components produced in India. Chennai, the 'Detroit of India' is emerging as a major export hub for cars in South East Asia.

New Economy Industries

10. Chennai is a preferred destination for IT/ITES and houses the entire top 10 IT Indian multi national Companies. The Tidal Park, with a combined area of 2.5 million sq.ft. is an established self-contained IT park housing all the major players in the IT

sector. In addition, an exclusive IT Park is being developed at Siruseri to promote IT investments in the region and a Knowledge Industrial Township is being planned in Sholinganallur along the IT Corridor to meet the growing demands of the sector. Tamil Nadu is the second largest software exporter in the country next to Karnataka with more than 90% of the exports from Chennai alone. In addition, the initiatives that are planned/on-going would catapult Chennai as the most preferred destination for new technology industries including Development of Biotechnology Park by TICEL, Development of IT Corridor.

Employment Projection

11. The employment potential and projection are future are worked out based on the existing and envisaged economic developments and past trends.

Employment Projections for CMA-2026			(in lakhs)	
Description	**2011**	**2016**	**2021**	**2026**
Population	88.71	99.66	111.98	125.82
Eligible Workers 15-60 (69.15%)	61.34	68.92	77.43	87.01
Eligible Male Workers (52%)	31.90	35.84	40.26	45.24
Eligible Female Workers (48%)	29.44	33.08	37.17	41.76
Male Willing to Work	27.91	32.25	37.25	42.98
Female Willing to Work	8.37	10.64	13.41	17.19
Total	36.28	42.89	50.65	60.17
Additional Jobs to be created	10.09	16.70	24.47	33.99

Strategy and Actions to be taken

12. Economic Growth is important to realize the main objectives of planning and public policy, such as providing adequate and decent work opportunities, eradicating poverty, reducing disparities, and also improving the quality of people in general.

13. Tamil Nadu's Tenth Plan has been drawn envisaging 8% growth rate. The goal set is to make Tamil Nadu the 'number one State' among all the States in the country. Chennai Metropolitan Area's share of contribution to the state income is more than 16%. Reforms to improve the investment climate particularly for manufacturing will have to be pursued. This may have to include a new thrust to infrastructure development, not only quantity but also quality power supply, taxation reforms, labour reforms and business deregulation.

14. Promotion and development of Small Scale Industries should be pursued. CMA's competitiveness in the areas of Information Technology, Tourism and Biotechnology should be strengthened.

15. Department of Economics and Statistics (DES), estimates on the population below poverty Line (BPL) are given in the Table below.

BPL Population				
	1993-94		**1999-2000**	
	(in lakhs)	% Of BPL	(in lakhs)	% Of BPL
Chennai District	9.55	31.58	3.93	9.58
Kancheepuram Dist. and Thiruvallur Dist.	12.09	27.00	7.43	13.21
Tamil Nadu	170.52	31.66	113.34	19.18

16. Eradication of poverty is a major objective in planning. In the earlier 5-year plans 'trickle down' theory of development was tried with stress on project and policies, which could achieve a higher rate of growth of economy. Later, the strategy was changed to include specific plans and programmes to attack on poverty. Special programmes for poverty alleviation in the State and CMA have to continue improving its phase to achieve the goal of total eradication say by 2016.

17. For achieving accelerated Industrial growth and creating additional production employment potential in CMA has to be increased. Small Scale Industrial sector is a powerful instrument. Government Departments and agencies concerned should not only provide support for common facilities, but also introduce a package of measures for rehabilitation of viable sick units.

18. Simplified system of obtaining clearances for industrial units with more than Rs.0.25 crore investments with a common application form and single window clearance is in force. For SSI Units also it shall be introduced.

19. Government agencies concerned should upgrade the infrastructures in the existing industrial estates at Guindy, Ambattur, Vyasarpadi, Taramani etc. providing essential infrastructure to standards. At the same time measures should be taken to prevent commercial exploitation of these industrial plots in the estates for other than manufacturing industries defeating the objectives of creating these industrial estates.

20. Appropriate policies and programmes and policies should be arrived at by the Government for encouragement of labour intensive industries such as small and medium industries, construction, I.T., tourism etc. where large potential for new job opportunities exist.

21. Organised sector has a limited absorbing capacity for additional jobs; where as unorganised sector has high potential for generating employment in future. Hence education and development of vocational skills may be oriented towards the needs of the unorganized sector also.

22. Globalisation and economic liberalization in the recent years have resulted in competitiveness in production and services, leading to cost-effective processes and management such as out-sourcing, up gradation of technology resulting in many cases reduction of manpower particularly in larger industrial units. There has been significant change in skill structure of manpower in the recent years with opportunities increasing in highly skilled areas such as I.T. sector while decreasing in traditional production sectors. It is emphasized that to meet the demand of the competitive economy in the years to come, a well-trained and adaptable work force is to be made available, and the vocational education of training becomes more important in tackling the problems of unemployment. Presently in CMA Vocational Education and Training is imparted by Higher Technical Education through professional colleges, vocational education (diploma level) through Polytechnics, Vocational training through Industrial Schools, Vocational education at degree level in Arts and Science Colleges, Vocational education at +2 levels in schools, and apprenticeship training. The institutions in CMA not only serve the CMA population, but also the adjoining districts and the rest of the state in the specialized courses. These institutions need to be strengthened periodically reviewing the market demand, which may arise in the plan period.

23. SEZ location at Ennore has to be expedited and new location identified for future SEZ by the concerned Government agencies.

24. Industrial estate at Sholinganallur and Perumbakkam should be developed for computer hardware and software industries.

25. Existing Trade Centre at Nandambakkam has to be expanded and improved to meet the demand of the economic activities in CMA.

26. Though public investments can act as a catalyst for employment growth, it is the private sector that will have to generate substantial employment; hurdles in getting permissions/licenses by private sector should be removed.

27. Attention should also be given in the service sector such as health, education and recreational facilities and municipal/local body services, which would not only increase employment opportunities but also improve standards of living in this metropolis.

28. Thriving CBD is an asset to the city and it will not be desirable to reduce its importance. At the same time, it should be seen that it functions to its capacity and contributes to the city economy. The decongestion measures taken to shift some of the wholesale activities to planned locations with all infrastructures as envisaged in the First Master Plan have to continue and the other remaining CBD activities should be encouraged to continue therein.

29. Though adequate lands are zoned for industrial and commercial activities in this Master Plan, where land use reclassifications are sought for employment generating activities, (taking into account of the normal process of examining with reference to environmental impact, compatibility with the uses around etc.) its processing should be speeded up and such developments should be encouraged. Government agencies should also periodically review the demand for serviced plots for industrial developments, identify lands, develop industrial estates and make available to private the serviced plots.

30. Tamil Nadu is one of the most favoured investment destinations not only for foreign direct investment but also for domestic investments in India - relative attractiveness possibly increasing recently. Chennai Metropolis, being the State capital had a lion's share of these investments. Taking advantage of the boom in I.T. sector and I.T. enabled service sector, the attractiveness should be maintained and improved.

31. In India, 90% of Indian Foreign trade is routed through sea. Efficient marine transport including port is essential for integrating the global markets. Though Chennai Ports have improved their operational efficiency, they may require reforms to improve further their efficiency, reducing delays in shipping, trucking, administration of exports and imports etc.

32. Chennai is the base for the South Indian Film Industry and in the western part of Chennai City a number of studios are located. The film industry makes about 300 movies a year including movies in other South Indian languages apart from Tamil movies, giving employment to a large number of people. This industry also needs government attention for provision of adequate infrastructure for its growth.

33. Chennai – Sriperumbudur corridor, Chennai – Mamallapuram corridor, and Chennai – Gummidipoondi corridor are developing as major industrial development corridors around Chennai. These are home for many clusters of industries that are fundamental drivers of Tamilnadu's manufacturing growth. These clusters are being forced to compete globally owing to GATT / WTO. The future of these clusters depends on the ability of the Government to raise the quality and efficiency of the infrastructure and provision of enabling environment. These areas fall outside CMA. Regional plans for these areas may be prepared and implemented in coordination with the departments/agencies concerned.

Traffic and Transportation:

The need to take an integrated long term view of transport needs of CMA and to plan road development, public transport services and suburban rail transport as a part of the urban planning process have been well recognized as essential for the efficient functioning of the urban system.

2. The traffic and transportation schemes are presently implemented by several departments and agencies. While long-term planning and coordination is carried out by CMDA, individual schemes are executed by Railways, DHRW, CC, MTC; traffic enforcement by Traffic Police. The total length of road network in Chennai city is 2,780 km.

3. While the urban rail network development is carried out by the Southern Railway, the major arterial & sub-arterial road corridors and other roads are developed and maintained by Highways Department and the local bodies concerned respectively. The roads within the local body areas are improved and maintained by the Directorate of Municipal Administration, Directorate of Town Panchayats and Directorate of Rural Development through the local bodies concerned. As regards traffic management and enforcement, the same is looked after by the City Traffic Police in respect of Greater Chennai Area and District Police for the rest of the CMA. The public bus transport is with Metropolitan Transport Corporation (MTC)

Road Network

4. The road network of Chennai is dominated by a radial pattern converging at George Town, which is the main Central Business District (CBD) of the CMA. The road network is primarily based on the four National Highways, leading to Calcutta (NH5), Bangalore (NH4), Thiruvallur (NH 205) and Trichy (NH 45). In addition to these, Arcot Road, Kamarajar Salai, Thiruvottiyur High Road, Old Mahabalipurm Road and East Coast Road are the other important radial roads in CMA.

Rail Network

5. The commuter rail system in CMA operated by the Southern Railways consists of 3 lines:

- Chennai Beach - Tambaram BG line running south-west
- Chennai Central - Thiruvallur B.G.line running west and
- Chennai Central - Gummidipoondi BG line running north

6. These lines radiate from the city-centre. These 3 lines together account for 300,000 commuter trips per day. While the first two corridors carry intercity passengers on separate dedicated lines, the third corridor carries both commuters and intercity passengers on the same lines.

7. In addition, the Phase 1 & Phase 2 of MRTS are currently in operation traversing a length of more than 15 km covering the residential and IT corridor on the south eastern side of the city.

Bus Transport

8. The bus transport is being operated by Metropolitan Transport Corporation (MTC), which had a fleet strength of 2,773 buses in 2004. They operate 537 routes and carry 36 lakhs trips/day.

9. There is acute overcrowding in buses during peak hours. The overloading is as high as 150% in certain routes as the supply is inadequate. As a result,

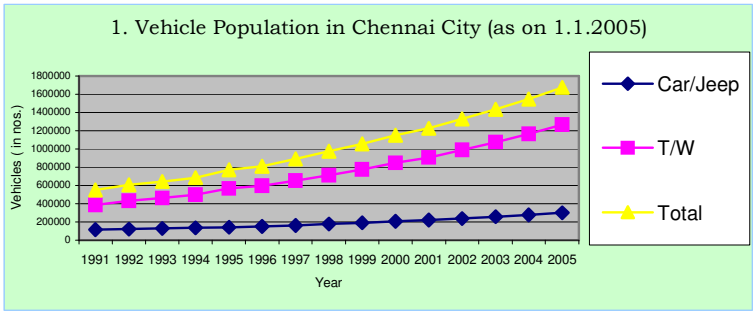
overcrowding at the bus stops and spillover on the carriageways has become common. The waiting time at the bus stops has also increased.

Goods Transport

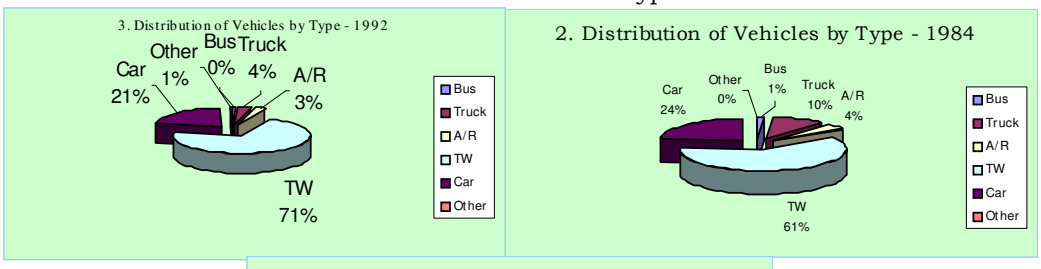
10. The number of goods vehicles in Chennai has increased from 6,671 in 1980 to 32629 in 2005. According to a study by MMDA (1985) the main items of movement are manufactured goods (15.5%), building materials (9.9%), industrial raw materials (9.2%), perishables (9.1%) and parcels (8.5%). CMDA had taken steps to shift some of the wholesale markets and create truck terminals on the periphery of the City. Of these Sathangadu steel market, Koyambedu perishables market and Madhavaram truck terminal have been made operational.

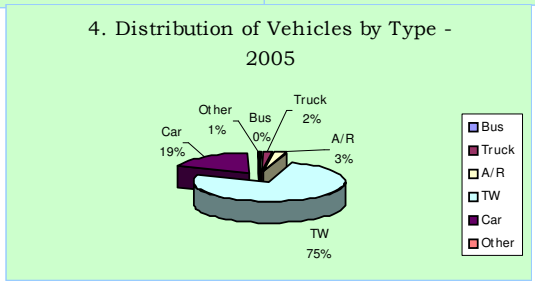
Vehicle and person trips in CMA

11. The total number of motor vehicles in CMA has increased from 144,282 in 1984 to 1,674,185 in 2005. The vehicle population has grown at the rate of 50% per annum during this period. The number of two-wheelers has grown enormously from 87,000 in 1984 to 1,266,114 in 2005, at the rate of about 65% per annum. Two-wheelers constitute 76% of the total vehicle population (67% in Delhi, 41.5% in Mumbai and 43% in Calcutta). The number of motorcars has also increased significantly. Vehicle population in Chennai city is illustrated in Figure below.



Distribution of Vehicle type





12. In a group of 100, 38 travels by bus, 4 by train, and 30 by walk, 14 by cycle, 7 by two wheeler, 2 by car and 5 by other modes. The average person trips in CMA are

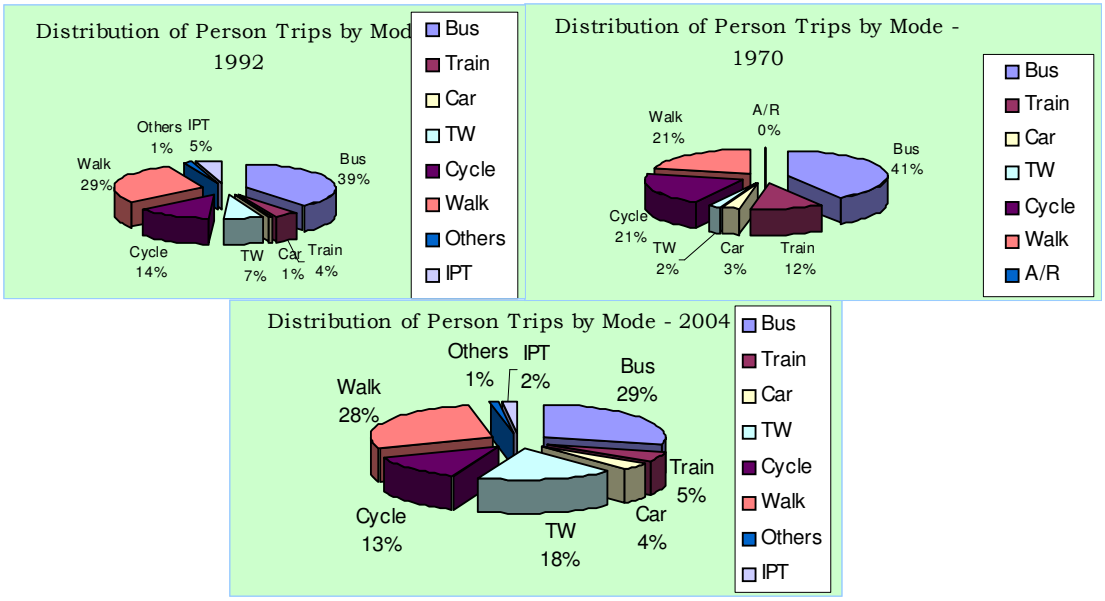
presented in Table 8.1. The fatality rate is also high at 40 per 10,000 vehicles. Forty-two percent of accidents involve pedestrians and 10% cyclists.

Daily average person trip distribution by mode in CMA

Sl. No.	Mode	No. & percent of total trips by mode (Trips in million)					
		1970		1984		1992	
		No.	*Percent*	*No.*	*Percent*	*No.*	*Percent*
1	Bus	1.100	41.50	3.074	45.50	2.84	37.90
2	Train	0.303	11.50	0.610	9.00	0.31	4.10
3	Car/Taxi	0.084	3.20	0.103	1.50	0.11	1.50
4	Fast two wheeler	0.043	1.70	0.219	3.20	0.52	7.00
5	Auto rickshaw	-	-	0.024	0.40	0.16	2.20
6	Bicycle	0.565	21.30	0.720	10.70	1.06	14.20
7	Cycle rickshaw & others	0.002	0.10	0.105	1.60	0.24	3.50
8	Walk	0.550	20.7	1.895	28.10	2.21	29.50
	Total	2.647	100.0	6.750	100.00	7.45	100.00

Source: MATS (1968-69), Short-term Traffic Improvement Programme Report (MMDA & KCL, 1984) & CTTS (MMDA, RITES, KCL & PTCS, 1992-95). The diagrammatic

Distribution of Person Trips By mode



13. The issues that need to be addressed immediately are the following:

- Capacity of almost all roads in the present system is reduced due to poor quality of riding surface, inadequate pedestrian pavement, poor lighting conditions and lack of properly designed intersections. The volume capacity ratio (V/C ratio) on many of the links during the peak hour is more than one. In the CBD links the V/C ratio is more than 1.5.
- Establishment of multi-national car companies in the vicinity of the CMA (Mahindra Ford Company at MM Nagar, Hyundai Company at Sriperumbudur, Hindustan Motors at Thiruvallur) and establishment of Tidel Park and a large of number of IT (Infosys, Wipro, TCS) and IT enabling service establishments is bound to increase car ownership in the CMA thereby adversely affecting the traffic condition. With the

mushrooming financial institutions making available easy finance to own motorized vehicles by individuals, the problems of the traffic congestion on city roads will escalate further.

- The phenomenal growth of vehicles coupled with minimal increase in road space has resulted in travel speeds as low as 15 kmph in CBD and 20 kmph in other major roads along with considerable hold-ups in junctions.
- Certain missing links especially in the orbital direction have also reduced the efficiency of movement.
- Ad hoc use of the carriageway and footpaths for utilities and inadequate and poorly maintained drainage system also affect the efficient use of the roads.
- The parking shortage is acute in the CBD area. The demand for parking in CBD is 1.5 to 2 times the supply and the acute shortage of parking supply is pronounced in the commercial areas of Anna Salai, T.Nagar, Purasawalkam and Mylapore. Parking is inadequate along the major arterial roads.
- Conflicts between fast moving vehicular traffic and bicycle and pedestrian traffic have reduced the capacity and safety.
- Lack of organised parking including loading/unloading facilities for trucks results in reduced capacity and safety of movement.
- Permanent and temporary encroachment of footpaths and carriageway has reduced the capacity of the road.
- Inadequate enforcement of traffic rules and lack of road sense among the road users and insufficient regulatory measures have resulted in inefficient use of the network system.
- Increase in air pollution levels with the suspended particulate matter (SPM) ranging from 264 to 451 against the permissible limit of 200, and carbon monoxide (CO) ranging from 1908 to 4198 μ g/m3 against the permissible limit of 2000.
- Bus and rail developing as competing modes rather than being complementary to each other and the sprawling suburban development without adequate transport facilities has placed considerable demand in favor of private vehicles and have emphasized the warrant for interchange facilities at mass transit stations.

Railways

14. The most used commuter line is Chennai Beach – Tambaram rail line and its capacity is limited and restricted by a number of grade crossings. Inter-modal transfers from bus to rail and vice versa is generally absent or under-developed and there is no system integration of the rail and bus modes. The Southern Railway operates daily 180 arrivals and departures which amount to 2.25 lakhs trips

Bus Transport

15. There is acute overcrowding in buses during peak hours in almost all the routes and in off-peak periods also in certain routes. The overloading is as high as 150% in certain routes. The supply is grossly inadequate leading to inhuman conditions of travel in buses. The State Transport Corporations similarly operate daily 4160 arrivals and departures, which result in another 1.66 lakhs trips

Goods Transport

16. The number of routes for goods movement is limited. There is acute shortage of parking for goods vehicles. All these add to the economic cost on the city.

Parking

17. CMDA has undertaken a two-stage parking study for the CMA. The first stage study has principally focused on the problems of parking across the CMA and drawn up a comprehensive parking policy for the CMA as a whole. The upshot of the study is outlined as follows:

18. The total peak parking demand in the city is in the order of 13,000 PCE against a supply of 5100 PCE. The haphazard parking has led to loss in the road capacity that ranges between 15% to 60%.

19. After taking stock of the entire parking problems and issues in the CMA, the study recommended a parking policy for Chennai on the basis of best practices followed both inside and outside the country. The thrust of the recommended parking policy is as follows:

- Short-stay parking is preferably located in proximity to trip destinations and protected from long-stay parkers;
- Institutions (e.g. education institutions), industrial establishments, commercial complexes, cinema theatres, kalyana mandapams, entertainment halls, hotels and restaurants should provide adequate off-street parking facilities for employees, visitors etc;
- Commuter parking should be provided at the railway stations and at the MTC bus terminals by the respective authorities to facilitate the commuters to adopt the park and ride concept;
- Multi level parking (ramp type and mechanical parking) facilities should be planned and developed at suitable locations;
- Considering the existing road network and the growth trend in the private vehicle population, it is necessary to bring down the demand on parking spaces, both on-street and off-street;
- Since transportation is a function of land-use, allocation of spaces for various land-uses within the CMA could be done with a view to reducing the use of private motorised vehicles such as high dense developments, exclusive commercial neighbourhoods;
- Parking pricing should be judiciously devised to manage Parking problem on the demand side. Till the proposed Unified Metropolitan Transport Authority (UMTA), is formed the agencies / departments which are currently looking after parking related issues should be facilitated to perform their expected roles effectively and in a co-ordinated manner;

An effective institutional structure is necessary to implement the various provisions of the parking policy discussed above

Future Travel Trips

20. The travel demands in 2004, 2011, 2016, 2021 & 2026 have been projected on the basis of increase in per capita trips (from 1.32 in 2004 to 1.6 by 2016 and 1.65 by 2026). The modal split between public and private transport will change from 43:57 to 35:65 (2004), 55:45 (2011) and 60:40 (2016), 65:35 (2021) and 70:30 (2026) in line with the trend in share of public transport increasing with city size.

21. The number of trips carried by bus transport in 2004 would become nearly 2.8 times in the year 2026. Similarly the volume of passengers to be carried by rail transport will be nearly 11 times the present volume.

Mass Transport Trips 2004 & 2026 (in lakhs)		
Mass Transport Trips (in lakhs)	**2004**	**2026**
Total Mass Transport Trips	35.36	145.32
Increase in 22 years		109.96
Total road (bus trips)	30.22	87.19
Increase in 22 years		56.97
Total rail trips	5.14	58.13
Increase in 22 years		52.99

Source: Short term study to update CTTS (1992-95)(CMDA, RITES & PTCS, 2004)

Proposals & Interventions

22. In order to facilitate the proposed development strategy and to meet the future travel demand, transport projects have been identified for implementation during the plan period. The projects identified include improvements to rail system, road network, bus system and goods transport. Map 8.5 shows traffic and transportation proposals in Chennai Metropolitan Region

- Strengthening and expanding the urban rail network including MRTS;
- Completion and commissioning of other strategic transport developments such as the ongoing MRTS Ph.II, Gauge Conversion project, northern segment of NH bypass, missing links to Inner Ring Road (IRR) and grade separators on IRR would assist in improving the modal share of rail to increase by 10% and that of bus by 16%.
- Improving the capacity of major arterial road corridors such as Anna Salai, Periyar EVR Salai, Jawaharlal Nehru Salai by exploiting the potentials of Area Traffic Control (ATC) measures in the initial years including promoting exclusive bus lanes where applicable;
- Augmenting the capacity of the major arterial road corridors such as Anna Salai, Periyar EVR Salai, Jawaharlal Nehru Salai as a whole by constructing elevated road-way / transit-way along the median of the road;
- Improving the road density in the peri-urban areas to match with the spatial strategy pursued;
- Removing bottlenecks in the road / rail corridors such as road-rail crossings, narrow bridges across rivers / canals etc.
- Increasing the transit options by development of bus way, metro rail, mono-rail along street corridors.
- The Inner Circular Corridor (Rail) (ICC (Rail) from Velachery to Ennore.
- Connecting Chennai Central and Chennai Egmore
- Development of a Centralised Goods Terminal for Chennai Area at Korukkupet
- Construction of a new railway line between Athipattu and Puttur/ Thiruvallur to bypass northeast and south-west rail corridors to decongest freight movement in the CMA
- Augmenting the bus transport with an optimal fleet size of 4500-7000 buses to keep pace with the growing commuter travel demand.
- Additional truck parking at Adayalampattu Village along NH Bypass in an areas of 16 acres and a major truck terminal at the intersection of Thirumanam and Vayalanallur on ORR in an area of 160 Ha.
- Construction of well-designed grade separators at all the critical intersections of radial roads with IRR.
- Introduction of a hybrid monorail system for Chennai.
- Development of metro rail for Chennai for a length of 45 km (at a cost of Rs.5087 crores for implementation during 2006- 2011).

Shelter

Shelter is a basic need. When the need for shelter is not satisfied, it becomes almost impossible for an individual to think of satisfying his family aspirations and intellectual needs. Primary responsibility of any city is to provide its members with a decent and habitable shelter. A standard housing does not mean merely land and building, but includes basic services like water supply, sanitation and access roads.

2. Demand for housing is a universal phenomenon, which exists in all societies, but it varies from "no shelter" to "better shelter"; consequently it is related to economic level of households. An assessment of housing need, demand and supply becomes necessary to work out a meaningful shelter strategy. Normally, 'housing demand' is less than 'housing need' in a developing economy like ours, and these converge when society's economic level is rich, distributed with less disparity and stable.

Housing Scenario in CMA

3. The decadal growth of households and housing units is given in the Table below. It shows that the housing requirement gap is not significant for the period 1971-91 and there is significant gap in the year 2001.

No. of Households and Housing Units in City and CMA

	(in Lakhs)				Growth rate in %			
	1971	1981	1991	2001	1971	1981	1991	2001
Households in the City	4.44	6.29	7.96	9.62	--	41.7	26.55	20.85
Households in the CMA	6.89	9.04	11.82	16.19		31.2	30.95	36.97
Housing Units in the City	4.80	6.37	7.98	9.57	--	32.7	25.22	20.55
Housing Units in the CMA	6.63	9.15	12.34	15.83	--	38.00	34.90	29.50

Source: Census of India

Rate of change in population, households, housing units, 1971-2001

	Annual rate of growth in population	Annual rate of growth in Households	Annual rate of growth in Housing units
1971-1981	2.76	3.12	3.27
1981-1991	2.36	3.07	3.03
1991-2001	1.93	3.69	2.63

4. In Chennai City 75% of the houses are with roof made up of brick, stone, concrete and other materials of pucca nature, about 15% are with semi-pucca roofing materials such as tiles, slate, G.I. metal sheets and asbestos cement sheets, and about 10% are with 'Katcha' materials such as thatched, bamboo etc.

Distribution of Houses by Predominant Nature of Roof – Chennai City			
Sl.No.	Type		% total
1.	Grass Thatch, Bamboo, Wood, Mud, etc.	90,735	9.48
2.	Plastic and Polythene	2,966	0.31
3.	Tiles	71,403	7.46
4.	Slate	1,662	0.17
5	GI metal ,Asbestos sheets	65392	6.83
6	Brick	18908	1.98
7	Stone	5246	0.55
8	Concrete	696997	72.83
9	Any Other Material	3767	0.39

Source: Census of India

5. Even though the proportion of the housing units with '*Katcha*' roofing materials accounts for only about 10%, in absolute numbers it is large i.e., 93,701 and these are vulnerable to fire accidents, particularly in summer months and such occurrences of fire accidents burning down whole area of such thatched roofed slums are common in Chennai city, some times resulting in casualties. The proportion of dilapidated / deteriorating housing units accounts for only about 0.5% of the total households.

6. According to Census, 2001, about 71% of households live in less than three roomed housing units; proportion of households which live in one roomed, two roomed, three roomed houses etc. is given in the Table below.

Distribution of Households by number of Dwelling Rooms – Chennai City, 2001		
Number of Rooms	Households	% Total
No. of Exclusive Rooms	205020	02.47
One Room	318325	38.45
Two Rooms	251659	30.40
Three Rooms	144149	17.41
Four Rooms	57555	06.95
Five Rooms	17938	02.16
Six Rooms and above	17665	02.13

Source: Census of India

Slums

7. The Government of India Slum Areas (Improvement and Clearance) Act of 1954 defines a slum as "any predominantly residential area where the dwellings by reason of dilapidation, overcrowding, faulty arrangement, lack of ventilation, light or sanitary facilities or any combination of these factors are detrimental to safety, health or morals. In 1971, the Tamil Nadu Slum Clearance Board, drafting officials from Survey, Statistical, Revenue and Town Planning Departments then, conducted Socio-Economic survey of Madras Slums. For the purpose of the survey, a slum was taken to mean "hutting areas with huts erected in a haphazard manner without proper access, without

protected water supply and drainage arrangements and so congested as to allow a little free flow of air to get in".

8. The TNSCB was formed in 1970 and the Tamil Nadu Slum (Improvement and Clearance) Act, was enacted in 1971. The following were the objectives of the Board:

(1) To clear all the slums in Madras city within a targeted period,

(2) To prevent further growth of slums in Madras city,

(3) To give protection to the slum dwellers from eviction and to re-house them in modern tenements and

(4) To provide basic amenities such as drinking water supply, electricity, storm water drainage etc. to certain slum areas until they are finally cleared.

Schemes implemented by TNSCB in CMA

9. The following are the major schemes implemented by TNSCB in tackling the problems of slums and improving their conditions:

Slum Clearance Scheme:- Under this scheme, the slum dwellers are rehabilitated in storeyed tenements either insitu or in a resettlement site. Tenements are allotted either on rental basis or on hire purchase basis. TNSCB has constructed 69594 No. of tenements from 1970 to 2004 in Chennai. In addition TNHB had constructed 10,423 slum tenements in Chennai.

Environmental Improvement Scheme (EIS):- Public fountain for water supply (for every 10 families) common bath and W.C. (for every 5 families) and street lights (for every 40 metres of road) were provided under this scheme. This scheme was discontinued in 1978. Under this scheme about 55,000 families were benefited.

Accelerated Slum Improvement Scheme (ASIS):– This scheme was started in 1977 and under this scheme also common infrastructures were provided in slum areas under the Government's 20 Point Programme. This scheme was discontinued in 1991. About 50,000 households were benefited by this scheme.

Slum Improvement Scheme under MUDP I and II and TNUDP-I: - The project comprised provision of security of tenure, basic infrastructure services and community facilities. The infrastructure improvements include:

New and improved roads, footpaths and drainage (storm and waste water), with vehicular access provided no more than 50 m from each hut and pedestrian access provided for each hut; Water supply, with one public standpipe per 10 households; Public latrines and washing facilities, with one toilet and one bath facility per 10 households; and Community facilities: 10 primary schools, 3 high schools, plots for pre-schools (1 per 100 households) and cottage industry centers (1 per 365 households)

The layouts of these slums were prepared "As-is-where-is" basis and security of tenure provided to the slum dwellers as part of the improvement package by selling the improved plots to the inhabitants on hire-purchase basis, with freehold titles to be issued on completion of payments. About 25,000 households in slums on government lands were benefited under the MUDP-I implemented from 1971 to 1982, about 50,000 households were benefited under the MUDP-II (1980-1988) and about 45,000 households were benefited under TNUDP-I (1988-1995).

Shelter for Shelterless Scheme: - Affordable houses for slum dwellers were constructed on serviced plots, using locally available materials and adopting low cost techniques. They were allotted to slum families on hire purchase basis. It was tried as a pilot project in Chennai by TNSCB with GOI grant 20%, GTN grant 15% and HUDCO loan component 65%. 2982 No. of families were benefited under the scheme.

TNSCB's Sites & Services Scheme: - Land acquired under the TNULC Act and allotted to TNSCB was used for this scheme. Open plot developments with basic

infrastructures made therein with loan assistance from HUDCO; the slum dwellers in objectionable areas resettled; the cost recovered from the resettlements over a period of 20 years. 1473 no. of families were benefited under the scheme.

Pavement Dwellers Housing Scheme: - Under this scheme, serviced plots with core housing were allotted to the identified pavement dwellers. It was funded by the GOI (Rs.4, 000/- per household) GTN (Rs.1000/- per household) and HUDCO loan (Rs.8, 000/- per household) 7787 no. of families benefited under this scheme.

Cash Loan Scheme: - Cash loan assistance for construction of house over the plot allotted by TNSCB under Lease-cum-Sale basis was given by TNSCB. It was financed by HUDCO as loan.15, 554 families were benefited under this scheme

(i) Mass Housing Scheme: - Apart from providing basic infrastructure in slum areas, grant to the slum family for conversion of thatched roof to tiled roof or mud walls to brick walls was given under the scheme. 97650 No. Of families benefited under the scheme.

(ii) Nehru Rozgor Yojana: - Loan assistance of Rs.4, 150/- per slum family (repayable in 10 years) was given for upgradation of their shelter. It was implemented by TNSCB with grant assistance from GOI & GTN and loan assistance from HUDCO.14, 000 No. of families benefited by this scheme

(iii) Resettlement under Special Problem Grant of Eleventh Finance Commission: - Under this, TNSCB availing grant from GOI and resettled 3,252 families from objectionable areas in storeyed tenements in CMA.

(iv) R&R under Flood Alleviation Programme: - TNSCB has identified that 33313 families are on the river margins and B'canal in the CMA. About 8164 tenements were constructed and a part of the above families (about 3000) were resettled. It is being implemented with Government of India's VAMBAY Grant, TUFIDCO loan under Mega Cities programme apart from allocation in the budget.

Pavement Dwellers:

10. According to Survey of Pavement dweller in Chennai City conducted by the consultant SPARC for CMDA in 1989-90, the number of households who were living on pavements was 9491 at 405 clusters at an average of about 23 households at a place; their population was 40763 (20811 Male and 19950 Female) with 40.2% children population. Unlike other old cities in India namely Delhi, Mumbai, Calcutta the number of pavement dwellers in Chennai is relatively few

EWS Plots in Layouts

11. Since 1989 CMDA, ensures that at least 10% of plots excluding roads are provided as EWS plots when according approval in cases of layouts exceeding one hect. By this way at least 10 % of the plotted out area in the layout is generated as EWS plots which can accommodate about one third of the population, which can be accommodated in the layout area.

12. TNSCB is presently adopting the following approaches in dealing with slum housing problem in Chennai.

i) In case of moderately dense slums where it is possible to rehouse them in storeyed tenement in-site, constructing storeyed tenements accommodates these slum dwellers.

ii) In cases of low dense slum where it is possible to earmark plots of reasonable extent and internal roads of reasonable width these slums are improved by provision of required bank amenities, land tenure given if it lies in Government lands.

iii) In case of slums, which lie on objectionable area such as river margins, road margins in the alignment of lands required for MRTS development etc., they are shifted from the objectionable locations and resettlement & rehabilitation

in the areas outside the city where land is available for such proposed developments.

13. According to revised figures available in respect of slum households in Chennai corporation as per 2001 census, slum population is 8.20 lakhs and the TNSCB has estimated that the slum families in undeveloped slums works out to 1.70 lakhs; out of which according to TNSCB / PWD Survey 2000, slum families living in objectionable slums (on river margins, canals, road margins and seashore were 75,498. TNSCB has also estimated that there are about 35,251 families in unobjectionable areas and further there are 6150 families who live in slum conditions in the encroached parts of the Tenement areas which have been reserved as parks, public purpose sites etc.

14. TNSCB has also estimated that the tenement constructions to house slums dwellers from early 70's are reaching its life and in the next 10 years most of these tenements have to be reconstructed and TNSCB has estimated that about 46,500 tenements units have to be reconstructed.

Delivery of Housing

15. The delivery agencies in CMA can be broadly classified as public, co-operative and private sector. Under the public sector, the agencies operating mainly are TNHB and TNSCB; the agencies which provided housing to its employees are TNPHC, Railways, P&T and CPWD, Port Trust, etc.

Private Sector Housing

16. It can be broadly divided into two. The first one being the private individuals or owners who construct the house by themselves, initially with a smaller floor area and adding incrementally when necessity arises and the fund position improves. The second one being the organized private agencies or real estate developers/promoters who acquire land, develop plots, construct houses/flats and sell.

17. The flatted housing units delivered by the real estate developers / promoters serve only the needs of the MIG and HIG households. LIG housing needs are met by the owner private developments.

18. It is estimated that the delivery of unauthorisedly constructed small housing units as about 25% of the total supply; the total delivery of housing units by private sector will be about 60,000 units per annum if the present trend continues; it excludes the housing plots delivered by public.

19. The supply of housing plots in the CMA is estimated to be about 12,000 plots per annum by the private sector.

20. Since 1989 CMDA ensures that at least 10% of plots excluding roads are provided as EWS plots when according approval in cases of layouts exceeding one hect. By this way at least 10 % of the plotted out area in the layout is generated as EWS plots which can accommodate about one third of the population, which can be accommodated in the layout area.

Projection of Housing Demand

21. The housing need for CMA was projected taking into consideration the growth of Households, Vacancy Rate, Demolition Rate of old buildings and Replacement rate. The Housing demand is estimated based on the Growth of House-Holds, Vacancy rate, Replacement rate and Affordability. The following Table gives the details of projected Demand for 2026.

Projection of Housing Need and Demand						
	2001	**2006**	**2011**	**2016**	**2021**	**2026**
Population	7040616	7896230	8871228	9966636	11197763	12582137
House holds	1619000	1754718	1971384	2214808	2488392	2796030.4
Total Housing Demand	**62520**	**193638**	**413012**	**659479**	**927151**	**1237482**
EWS (30%)	10796	58091	123904	197844	278145	371245
LIG (35%)	21882	67773	144554	230818	324503	433119
MIG (20%)	12504	38728	82602	131896	185430	247496
HIG (15%)	9378	29046	61952	98922	139073	185622

Strategy and actions to be taken

22. Projected annual demand for housing varies from 38,000 units in the first 5 years (ending 2006) 44,000 units in the second 5 years, 49,000 units in the 3rd 5 years, 54,000 units in the 4th 5-year and 62,000 units in the 5th five years (ending 2026). The present supply is about 60,000 units per annum. The gap is not wide when looked as a whole. Housing by owner private and private real estate developers should be continued to be encouraged.

23. Government agencies like TNHB can play a major role in providing affordable housing to lower MIG, LIG and EWS people, by cross subsidies. Such agencies can only make large-scale planned neighbourhood developments with all infrastructures, which can have catalytic effect for private developments around.

24. In the recent years, the funding for housing activities in CMA have increased and HDFC, LIC, Commercial Banks and also HUDCO are the major financial institutions, which provide financial assistance for housing.

25. TNHB may have to play a major role as provider of serviced housing plots leaving the construction of housing units to private agencies by private-public participation or by co-operative societies or by private real estate developers or owners. It should regard itself as a facilitator rather than builder of houses.

26. Standard housing includes basic services like water supply, sanitation and proper access roads. Before the Government declared that the layout of house sites unauthorisedly is opposed to public policy and prohibited registration of plots therein, a number of unauthorized layouts had come up in the last 30 years, which lack basic services. These unapproved layout areas should be properly merged with the urban fabric by framing suitable regulation and permitting constructions in these plots.

27.Considering land cost, availability of developable lands, land requirements, affordability etc., space standards for housing developments have been reviewed and modified in the Development regulations forming part of this Master Plan.

28. The intention of large scale land acquisition and neighbourhood developments by Government agencies like TNHB is to minimize undesirable speculation and increase in land costs, and ensure planned development with special reference to the needs of the lower income groups. However, in the past freezing of large extents of lands, slow land acquisition process and slow housing developments by the public agencies had sometimes opposite effects on housing supply and particularly to the poor. TNHB has initiated acquisition proceedings for about 1700 acres of land in 8 villages in CMA for Satellite Town development, which may add considerable quantum to the housing supply in future. TNHB has also proposed to acquire a few thousand acres in the areas around the city and they have already identified the locations with survey number details and communicated the same to CMDA for freezing of developments; if action is taken to acquire these lands and develop residential neighbourhoods, it could also help in solving the housing problems for this metropolis.

29. One may accept that 'house' means not necessarily a *pucca* or permanent building, but one that shelter adequately. Slums to be viewed as self initiated housing action and self generated housing stock (not for demolition but for improvement); slum dwellers to be viewed as productive resources, but not as an unproductive burden to the society.

30. In our conditions, the slums pose problems primarily of health, environment and basic services; the formal housing is secondary.

31. Provision of adequate shelter to the poor slum dwellers involves different dimensions. Firstly, the improvement of physical surroundings by public agencies so that it has adequate basic services such as water supply, drainage, sanitation, street lighting, and other physical conditions leading to better hygienic environment. Secondly, the improvement of the actual structures that the slum dwellers live in, preferably by themselves (extending assistance in terms of financial and physical resources). Thirdly, the improvement of the whole economic and social environment beyond the mere physical condition they live in. All these dimensions of the problems of shelter for the urban poor and their shelter improvement should be addressed.

32. Slum survey covering cent percent of the slum population, as that of done in 1971 should be carried out to create a clear database for better planning of shelter problems of these urban poor and their economic upliftment.

33. Comprehensive plan for shelter for those urban poor should be made by TNSCB; financially feasible and institutionally viable programmes should be worked out (instead of tying to tackle the problem in a piecemeal manner) with certain amount of cost recovery, with full involvement of the beneficiaries and also the local bodies concerned.

34. TNSCB should also segregate the objectionable slums which requires resettlement in the nearby sites or elsewhere; high dense slums which cannot be improved 'As - is - where - is' require to be housed in storeyed tenements; for slums which can be improved 'As-is-where-is' etc. plans may be prepared with phasing and the same implemented in order to achieve the goal of total eradication of slums in near future, say at the maximum by 2021.

35. Early action to develop New Towns around the city / CMA with all infrastructure facilities including those required for the IT developments at international standards to be taken. It would not only meet the demand of space for IT developments with all attendant infrastructure facilities but also the housing demand in the way the target population likes.

Infrastructure

Water Supply

One of the major problems faced in CMA is the inability of the administration to keep pace with the increasing need for utility services particularly the water supply and sewerage. This problem is not unique to Chennai and almost all the rapidly growing cities in India share the same.

2. In Chennai City, Chennai Municipal Corporation was responsible for construction, operation and maintenance of water supply system till August 1978. It was transferred to the (then newly formed) CMWSSB with all assets and liabilities. The major supply sources viz. Poondi reservoir, Cholavaram lake and Redhills lake are under the control of the State PWD (Irrigation)

3. In the rest of the CMA, construction and water supply schemes are undertaken mostly by TWAD Board at the cost of the local body concerned and after completion, transferred to the local body for future operation and maintenance.

4. The sources of water supply to Chennai in the year 2004 is given in the Table below. The areas served by it are Chennai City, adjoining urban areas (10 sq.km.) and industries at Manali.

Sources of Supply of water to Chennai, 2004	
Source (in ML) for the whole year 2004	
Veeranam Lake	14,842
Redhills Lake	4,155
Rain water	1,691
Chembarambakkam	133
Erattai Eri	207
Well fields	31,195
Southern Coastal Aquifer	776
R.O. Plants	182
TWAD Source	275
Porur Wells	210
Neyveli Aquifer	5,966
Distance Source	21,357
Total	80,988

Source: CMWSSB

Master Plan for Water Supply- Distribution System

5. A Master plan for the management of the water supply and sewerage for the city, which was prepared in the year 1978, was revised in the year 1991 in order to receive and utilize the water for city supply under Telugu Ganga Project from Andhra Pradesh and later updated in 1997. The Master Plan contemplated the construction of additional water treatment plant, water distribution stations, laying of additional transmission mains and strengthening of the existing distribution system. The Master plan envisages re-organizing the existing distribution system network to the 16 zones and adequate infrastructure to ensure equitable distribution of water supply. The implementation of the Master Plan has been taken up in stages for water supply management in Chennai city to utilise the Krishna water received from Andhra Pradesh.

Second Chennai Project

6. The Second Chennai Water Supply Project was taken up by CMWSSB during February 1996 with the World Bank Assistance at a cost of Rs.778.79 crores and most of the works contemplated under this project has been completed.

Chennai City Water Supply Augmentation Project-I

7. Chennai Water Supply Augmentation Project-I (to add 180 MLD water to Chennai City water requirement) was taken up by CMWSSB in 2004 at a cost of Rs.720 crores. It is to draw 190 MLD of raw water from Veeranam Lake near Sethiathope.

Chennai City Water Supply Augmentation Project-II

8. The Government on 27.2.2004 has accorded the revised administrative approval for the Chennai Water Supply Augmentation Project-II (CWSAP-II) at an estimated cost of Rs.124.00 crore. The objective of this project is to augment water supply to the city by intercepting the rainwater runoff into the sea by the construction / rehabilitation of check dams across Cooum, Adyar and Palar rivers. The aim of the project is to tap 20 MLD of water from different sources.

Telugu Ganga Project

9. Under this project 12 TMC of water from Krishna River will be received and stored in Poondi, Redhills, Cholavaram and Chembarambakkam lakes.

Desalination Plant

10. Keeping in view, the chronic problem of water scarcity in Chennai and adjoining areas due to frequent failure of the monsoons, Government decided to set up a desalination plant for supply of potable water to the residents of Chennai and adjoining areas. Accordingly CMWSS Board has proposed to construct a 100/200 MLD Sea Water Desalination Plant at Minjur on Design-Build-Own, Operate and Transfer (DBOOT) basis.

Third Chennai Project

11. CMWSSB has proposed to take up further systematic improvement projects in water supply, both for Chennai city and adjacent Urbanised Local Bodies as "Third Chennai Project" with World Bank assistance at a cost of Rs.750 crores. In order to improve the sources, works are proposed for deepening and desilting of Ambattur tank, Korattur tank and Madhavaram tank and for rehabilitation of Porur tank besides formation of Check dams. It is also proposed to install water meters to all the consumers to achieve sustainable revenue. The following are some of the major works envisaged under the proposed Third Chennai Project.

(a) Strengthening of water Distribution system in the left out 5 zones
(b) Infrastructure facility to draw additional ground water from A.K. Basin

Rest of CMA

12. Potable water supply system exists almost in all the Municipalities within CMA. Alandur, Pallavaram, Tambaram, Anakaputhur and Pammal Municipalities have water from Palar River as source, and other Municipalities have CMWSSB bulk supply or the ground water as source. Water supply in Panchayat areas is by local wells and public taps.

Water Demand

13. The rate of consumption of water in some Indian cities is given below:

Water Consumption in Indian Cities	
Town	Consumption litres per capita per day
Bangalore	140
Mumbai	260
Delhi	270
Chennai City	90
Pune	220

Source: CMWSSB

14. It was estimated in the Madras Water Supply and Sanitation Project report (1987) that the requirement of water will be 165 lpcd based on need based assessment. Future requirements of water at the rate of 150 lpcd for the city and 100 lpcd for the rest of CMA have been estimated and the estimates are given in the table below:

Estimate of Water Requirement (CMA)					
Chennai Metropolitan Area		Year			
		2011	2016	2021	2026
1.	Population in lakhs	88	100	112	126
2.	Water Requirement in MLD for the resident population				
a)	Scenario I @ 150 lpcd	1165	1284	1431	1606
b)	Scenario II @ 120 lpcd	938	1035	1154	1296
c)	Scenario III @ 100 lpcd	762	838	933	1046
3.	Water Requirement in MLD for the other than residential use such as office, commercial, industrial premises and other places of employment, education etc.				
	Scenario I (30% of 2(a) above)	349	385	429	482
	Scenario II (25% of 2 (b) above)	235	259	289	324
	Scenario III (20% of 2(c) above)	152	168	187	295
4.	Industrial Use				
	Scenario I 10% of 2(a) above	116	128	143	161
	Scenario II 10% of 2(b) above	94	103	115	130
	Scenario III 10% of 2 (c) above	76	84	93	105
5.	Total Requirement				
	Scenario I	1631	1797	2003	2248
	Scenario II	1267	1397	1558	1750
	Scenario III	990	1090	1213	1360

15. The sources presently available and also to be tapped in immediate future by CMWSSB are given in table below.

Sources and availability of water for meeting demands		
Sl.No.	Name of Source	Safe Yield in MLD
1.	Poondi-Cholavaram - Red Hills Lake system (including diversion of flood flow from Araniyar to Korataliyar	200
2.	Ground Water from Northern Well Fields	100
3.	Southern Coastal Aquifer	5
	Sub Total (A)	305
4.	Krishna Water I Stage	400
5.	Krishna Water II Stage	530
6.	New Veeranam (CWSAP-I)	180
7.	CWSAP-II (Proposed)	20
8.	Sea Water Desalination (Proposed)	100
	Sub Total (B)	1230
	Grand Total (A) + (B)	1535

Source: CMWSSB

16. To augment water supply, CMWSSB has taken action to execute the following projects:

Sl. No.	Name of the Scheme	Cost in Crores	Anticipated Quantity in MLD
1.	Second Chennai Project (WB assisted)	779	-
2.	Araniyar Korataliyar River Basin (proposed)	Studies on going	-
3.	Chennai Water Supply Augmentation Project-I (Veeranam Lake as source)	720	180
4.	Chennai Water Supply Augmentation Project-II (proposed)	124	20
5.	Sea Water Desalination Plan (proposed) (DBOOT Basis)	DBOOT	100
6.	530 MLD Chembarambakkam Water Treatment Plant (partly with French assistance)	200	-
Total			**300**

Rain Water Harvesting

17. The importance of conservation of water and rainwater harvesting can not be understated. While issuing Planning Permission for construction of major developments such as flats, residential developments, office, shopping and other commercial complexes, the condition to provide rain water-harvesting structures within the premises was put and ensured to be provided before issue of Completion Certificates. Provision of rainwater structures in all types of developments, irrespective of size or use was made mandatory by amending DCR and Building Byelaws in the year 2001, not only for the buildings proposed to be constructed but also for all the existing buildings.

After implementation of this scheme widely in CMA, a significant increase in the ground water levels and also quality of ground water was noted.

18. In 2001, it was also made mandatory that all centrally air-conditioned buildings shall have their own wastewater reclamation plant and shall use reclaimed wastewater for cooling purposes.

Sewerage

19. Chennai City Sewerage System was designed in 1910 for an estimated 1961 population of 6.6 lakhs

20. A comprehensive improvement to the city sewerage system was designed in 1958 for an estimated 1976 population of 25.5 lakhs and 1991 population of 27.2 lakhs at a sewage flow rate of 110 lpcd in 1976 and 180 lpcd in 1991; the city was also divided into five zones with proposals for five independent disposal works. It was planned to isolate the system of collection, transmission and disposal of sewage in each zone in order to obviate the difficulties of the relay system. Presently the sewerage network in Chennai city has covered 98% of its area.

21. As the capacity of sewers was limited, during rainy days they became surcharged due to ingress of storm water. Any surplus of sewage in excess of pumping stations capacity was drained into the nearby natural water courses of the city viz. Cooum river, Adyar river, Buckingham canal and Otteri Nalla.

Chennai City River Conservation Project

22. In order to cope up with the increased sewage flow resulting from water supply augmentation schemes under implementation, and to prevent the overflow of sewage into the city waterways, the Chennai City River Conservation Project has been taken up at a cost of Rs.720.15 Crores with Government of India grant of Rs.491.52 Crores and the remaining Rs.228.63 Crores borne by CMWSSB. The Project includes investments for providing additional sewage interceptor pipe lines, replacing sewer mains which are worn out, and enlarging the capacities of pumping stations and force mains to cope with the flow in the year 2021.

JBIC Project

23. CMWSS Board took up implementation of Chennai Sewage Renovation and Functional Improvement Project under JBIC funds. The following 2 components were taken up for implementation:

(a) Effluent Conveyance System
(b) Permeate Conveyance System

Proposal along I.T. Corridor

24. Tamil Nadu Government has declared the area along the Old Mahabalipuram Road as I.T. Corridor. CWSSB has made a study for provision of water supply and sewerage system in the I.T. Corridor and assessed the initial demand for water supply as 50 MLD and the projected future demand as 150 MLD.

25. The water supply for the I.T., I.T.E.S. Industries and other urban developments in the IT Corridor is proposed to be made in two Phases. The First Phase includes tapping 20 MLD of water from Palar river at Vayalur. Tentative cost of the project is Rs.46.00 crores.

26. In Phase-II, when additional demands come up, it is proposed to construct a Desalination Plant of 50 MLD capacity at Kelambakkam where 58.75 hectares of land belonging to Salt Corporation has been identified.

Providing Underground Sewerage System

27. The sewerage system is proposed to be provided at an estimated cost of Rs.26 crores along IT Corridor.

Strategy and actions to be taken

28. Taking cue from this Master Plan, Metro Water should update their plans for water supply and sewerage. New sources may be identified and plans prepared to meet the demand over the plan period.

29. Presently, for various reasons, operational area of the Metro water is restricted to the Chennai City, and small areas adjoining the same, though it has jurisdiction over the entire Chennai Metropolitan Area as per the CMWSSB Act. During the plan period, in phased manner if necessary, the Metro Water should enlarge its operational area to cover the whole of the CMA.

30. History has shown that over a period of time the quantum of water supply gets diminished, making it not possible to supply water as per the project design, mainly for the reasons of depletion of water potential because of failure of monsoons, inadequate recharge of ground water etc. In order to sustain the water sources, studies have to be carried out and recharge structures like check dams, percolation ponds and other rainwater harvesting structures have to be constructed.

31. Recycling of wastewater is one of the methods available for water conservation. CMWSSB may examine the alternate technologies available and recommend methods for adoption. Further it may publicize the methods adoptable by various users so the message reaches all sections of the people.

32. Urban sanitation programme in the rest of CMA should be integrated with water supply programmes in these areas; the urban areas in the rest of CMA with poor service levels should be covered on a priority basis.

33. A Comprehensive study on water supply and sewerage system for Municipalities, Town Panchayats and Village Panchayats in the rest of CMA should be conducted and the system planned and provided in a phased manner depending on the level of developments and need.

Electricity

34. Power is a basic infrastructure influencing the growth of industrial, agricultural and service sectors and ultimately the economic development. One of the determinants for quality of life is the level of availability and acceptability of affordable and quality power. It is one of the sectors, to which Government is giving priority in fixing the plan outlays at National as well as State levels.

35. Total number of HT and LT consumers in Chennai city is 19.14 lakhs with a connected load of 5460 MW as on 31.03.05. The demand of the City in March 2005 is 1593 MW and the Energy consumption is 31.03.MU per day, which is met by TNEB grid. The generating stations of 1396 MW capacity in and around the city are as detailed below:

NCTPS	630 mw	(Coal based thermal station - TNEB)
ETPS	450 MW	(coal based thermal station - TNEB)
BBGTS	120 MW	(Gas based station - TNEB)
GMR VASAVI	196 mw	(Diesel based station - IPP)
Total	1396 MW	

36. The projected demand of Chennai area at the end of 11th plan (2012) is 2513 MW. It is planned to establish a thermal station at North Madras with the capacity of 1000 MW during the 11th plan period under joint venture with National Thermal Power Corporation.

37. To meet the load growth due to increased Industrial activity and population, TNEB is preparing and implementing Master Plan for infrastructure development for every 5 years to meet out the load growth / demand with a perspective view to supply reliable and quality power to the consumers.

Social Facilities

Education

In the literacy rate, Tamil Nadu has attained third position both in terms of overall and female literacy, as per 2001 Census. Literacy in Tamil Nadu has gone up from 62.7% in 1991 to 73.47% in 2001 (against all India average of 65.38%). Tamil Nadu State Government is committed to the task of providing universal primary (elementary) education for all children upto 14 years.
The levels of basic infrastructure, educational infrastructure and pupil-teacher ratio in primary schools in Tamil Nadu are ranked within first three among the major states in our country.

2. 85% percent of the habitations in Tamil Nadu have been provided with secondary school facilities within a distance of 5 km and in secondary education also the State is ranked high among the States in our country.

3. In the tertiary education during the last decade, Tamil Nadu witnessed a rapid growth in the number of institutions in higher education ranging from industrial training institute (ITI) and Polytechnics to arts and science colleges and Engineering colleges.

4. Chennai, being the State capital, the educational facilities available are very good as well as specialized when comparing with the rest of the State. Some of the relevant statistics relating to literacy and educational infrastructure are given in the Table below.

Literacy & Educational Infrastructure in the districts covered in CMA

Sl.No.	Description	Chennai City	Kancheepuram District	Thiruvallur District
1	Life expectancy at birth (yrs) (1997)	74.21%	69.26%	67.38%
2.	Literacy rate (2001) Male Female	80.14 84.7 75.3	77.61 84.8 70.2	76.54 84.6 68.2
3	Sex ratio (2001)	95.1	96.1	97.1
4	Work participation rate (1991)			
	(a) Main workers	30.5	36.36	36.36
	(b) Marginal workers	30.54	38.06	38.06
5	Gross enrolment rate (1998-99)			
	(a) Primary	129.72	89.85	89.09
	(b) Middle	98.19	84.45	77.78
	(c) Secondary	85.28	58.50	81.94
	(d) Higher secondary	47.58	37.20	48.56
6	Gross Drop out rate (1998-99)			
	(a)Primary	13.74	14.83	14.83
	(b) Middle	39.74	42.72	37.96
	(c) Secondary	55.24	55.20	55.21
	(d) Higher Secondary	69.65	81.89	81.89
7	Pupil-Teacher ratio			
	(a) Primary (1998-99)	42	46	41

	(b) Middle (1998-99)	45	37	32
	(c) Secondary (1993-94)	33	45	(45)
	(d) Higher Secondary (1993-94)	37	49	(49)
8	Enrolment of girls in primary schools as % of enrolment of boys (1998-99)	128.35	73.96	72.68

5. Because of the family planning and population control measures taken in our country, from 1971 there is large variation in age structure including the school going children age group. It is estimated that in the future years the school going age group will stabilize at 7.5 % for primary school going age group, 5.19% for middle school going age group and3.71% for High School going age group and 3.96% for the Higher Secondary going age group. Based on these estimates, the future demand for schools has been worked out and tabulated in table below.

Number of Schools Required_2026							
	2001 No. of Schools	Average No of Students_2001	Average Strength assumed	2011	2016	2021	2026
Primary	1427	370	500	1329	1493	1677	1885
Upper Primary	775	471	500	920	1034	1161	1305
High School	998	261	400	822	923	1037	1165
HSC School	662	210	400	438	492	553	621

6. As regards Collegiate, technical and other professional higher educational institutions in CMA, they serve not only the CMA region, but also the state level apart from the national level for certain specialized fields. However periodical reviews of change in demand for this category of educational institutions should be made at least once in 10 years and necessary infrastructures have to be provided. Human resource development for the present and future demands and also Research and Development for economic development depend on investment and improvement on this higher education sector

Health

7. Planning for health becomes an integral part of metropolitan planning and health status of population is an important indicator of human resource development. Investments in health sector have direct relationship with longevity and improvements in physical and mental development of people. Tamil Nadu's health indicators place it near the top among the States of India. Policy of the Government is to provide a healthy and disease free life to the people of Tamil Nadu. Director of Medical & Rural Health Services (DMRH) is in charge of planning and implementation of programmes of Medical Services

8. This Directorate provides the health services in the districts except in Chennai City. The Dept. of Public Health and Preventive Medicine (DPHPM) is providing primary health care services.

9. Indian Systems of Medicine (Siddha, Ayurveda, Unani, Homeopathy and Yogaand Naturopathy) regained its importance and the Government has attached special importance to the growth and development of Siddha system, which is a part of Tamil culture.

10. Directorate of Indian Medicine and Homeopathy deals with teaching as well as providing health care system of Indian Medicine. The National Institute of Siddha established at Tambaram developed at a cost of Rs.47 Crores is a joint venture of GOI and GTN and it has been established and with the objective of imparting Post Graduate education in Siddha system and to provide medical care through Sidha system of Medicine.

11. The Tamil Nadu Health Systems Project (TNHSP), a 5-year project is being implemented since Jan. 2005, with a total outlay of Rs.597 crores. It aims to improve the effectiveness of the health care system, both public and private in the State through increased access to and utilization of health services (particularly by poor and disadvantaged) development of effective interventions to address key health challenges including non-communicable diseases, improved oversight and management of the health care system (both public & private), and increase effectiveness of public sector hospital services.

12. Chennai has established itself as the health Capital of the country and is fast becoming the health destination of choice for people all over the world with its excellent facility, competent specialists and good nursing care.

13. Government agencies involved in provision of health infrastructure are Directorate of Medical Education, Directorate of Public health and Preventive Medicine, Directorate of Medical and Rural Health Services, Directorate of Family Welfare, Directorate of Drugs Control, Commissionarate of Indian Medicine and Homeopathy.

14. A large number of private Hospitals deliver health care in CMA; Apollo Hospitals, Ramachandra Medical College Hospital, Malar Hospital, Vijaya Hospital, Devaki hospital, CSI Rainy Hospital, CSI Kalyani Hospital etc. are the major hospitals. According to the approved Government list, there are 130 private hospitals function in the city area itself.

15. From the Census figures, it appears that the total number of beds given relates only to Government Hospitals and not private. Specialty and the bed availability in Private Hospitals may be about 100% more than the Government ones.

16. Considering the longevity in life, improved health conditions predicated, it is assumed that the number of beds required in future may be at the rate of one in 500 population. The number of beds required for the projected population, for the year 2006, 2011, 2016, 2021, and 2026 are 15800, 17700, 19900, 22400 and 25100 respectively.

17. The existing facilities particularly the specialized & higher order ones, serve not only the CMA population, but also the rest of Tamil Nadu and the adjoining states population; as regards private sector, it attracts patients from all over India and also some of the foreign countries. It would be difficult to assess the adequacy of these facilities. Because of accessibility of good infrastructure including specialist manpower, technology, private sector investments in health sector high in recent times, the trend is expected to continue. On the government part, with assistance from World Bank, health infrastructure is being improved.

Strategy and Actions to be taken:

18. A detailed study on the health infrastructure in CMA, delivery to poor, accessibility spatially, future requirements, contribution by private sector, modernisation requirements in govt. sector etc. has to be made which may be a basis for formulation of Master Plan for Health infrastructure in CMA. The position may be reviewed every 10 years and suitable measures taken on health infrastructure investments.

Telecommunication

19. Telecommunication is an important tool for socio-economic development. Department of Telecommunication has been formulating development policies for accelerating the growth of telecom services in our country. There have been far reaching developments in the recent past in the telecom, IT, consumer electronics and media industries worldwide. Considering the above and also to facilitate India's vision of becoming an IT superpower and develop a world-class telecom infrastructure in India, a New Telecom Policy was announced in 1999

20. The New Policy Framework will focus on creating an environment, which enables continued attraction of investment in the sector and allow creation of communication infrastructure by leveraging on technological development.

21. The area of operation of Chennai Telephones is co-terminus with the CMA boundary notified by CMDA. There is an exponential growth in Chennai in the last decades. It has grown from 26 exchanges with 2, 14,400 lines in 1992 to 209 modernized exchanges with equipment and total capacity of 17, 86,079 lines in 2005. Number of exchanges has grown to 331 in 2006. According to BSNL in Chennai telephone district the number of their land lines were 10.09 lakhs and their cell phone connections were 5.78 lakhs. BSNL telephone density in Chennai alone works out to 20.08 and when the connections given by the private players also are taken into account of the telephone density in Chennai may in the order of about 30.

Recreation

22. Recreation becomes an essential part of life in any civilized society. It is an activity people pursue for relaxation and personal enjoyment usually during their leisure time to break from their routine busy work. In an urban environment, such recreation facilities have to provide a variety of opportunities accessible, affordable and attractive to all groups of population.

23. Recreation is a broad function being organised and unorganized, indoors and outdoors daily and intermittent, local and distant. Sometime even sidewalks could be a more important recreational facility than others in a residential area. Television viewing has become a major daily recreational facility within houses apart from music, hobbies & crafts. Indoor recreation activity pursued by people include the ones provided by cinemas, drama halls, music sabhas (halls), clubs, indoor stadium, exhibition and fairs; outdoor recreation facilities includes parks, playgrounds, beaches, zoos etc.

24. In order to provide for the preservation and regulation of parks, playfields and open spaces in the State of Tamil Nadu, the 'Tamil Nadu parks, playfields and open spaces (Preservation and Regulation) Act, 1960' was enacted. Parks, playfields & open spaces are periodically notified under the Act by the local bodies concerned. These spaces shall be maintained for the purposes notified in a clean and proper condition.

25. Chennai is endowed with the second longest straight sandy breach in the world, called *Marina*. Elliots Beach, another major beach in Chennai attracts large number of people. Thiruvanmiyur Beach, Kottivakkam Beach, Neelankarai Beach and small beaches at Thiruvottiyur are also being used by people in those areas. These beaches are used by the people throughout the year and the Marina & Elliots Beaches attract thousands of people every day.

26. In Chennai city, there are about 195 parks with extent varying from 150 sq.m. to 3.5 hectares and totaling to more than 60 hectares. Playgrounds maintained by the Chennai Municipal Corporation number more than 200 nos., with a total extent exceeding 50 hectares. In the rest of CMA, unlike the city, the parks & playfields are a very few.

27. CMA also boasts of a number of Theme Parks developed commercially in and around CMA, which attract not only the local population but also tourists.

28. CMA is dotted with a number of lakes (with minimum water spread in non-monsoon seasons), which may be developed as recreational spaces in a planned way taking into account of its environmental aspects also. It will not only help in conserving these water bodies but also preventing encroachments and pollution.

Strategy and Action Plan

29. Maintenance of existing parks / playgrounds and provision of new parks and playgrounds in the rest of CMA requires attention. A database on the existing parks & playgrounds within CMA may be created which is required for planning and its development.

30. CMDA may create OSR fund out of the OSR charges collected apportioning proportionately with reference to the amounts collected in the jurisdiction of the local bodies concerned, reserving a certain percentage for overall recreational facility development at CMA level (such as mechanized cleaning of major beaches as being done by CMDA, identifying & developing regional level parks etc.)

31. The local bodies concerned should identify lands for development as open spaces and initiate and complete action for acquisition/alienation and provide these facilities. For acquisition of lands for parks / playgrounds and development of new facilities project proposals may be prepared by the local bodies concerned and financial assistance may be availed from the said OSR Fund to be created.

Solid Waste Management

Solid Waste Management is an obligatory function of Municipal Corporations, Municipalities and other local bodies in India. Due to increase in population, urbanization, change in life style and consumption pattern the problem of solid waste management in urban areas is increasing. Chennai is not an exception to it.

2. Chennai Corporation is the responsible agency for solid waste management in the City Corporation area. Chennai Corporation area is divided into 10 zones and each zone is further sub divided in to about 15 Divisions totaling to 155 Divisions. Conservancy responsibility has been delegated to Zonal officials in City Corporation. The average per capita solid waste generated with in the City is estimated to be about 585 grams. It has been estimated that 3000 tonnes of solid waste is generated in these 10 zones in the City area daily and in addition Chennai Corporation also handles about 500 tonnes of debris.

3. NGO's in cooperation with Municipal Corporation are assisting communities to collect solid waste through Community Based arrangement in some areas of the City. Collection by NGO's from individual houses / establishments using tricycles are deposited in dustbins which are cleared by Chennai Corporation. Municipal Corporation provides street sweepings and scientific collections throughout the City. Municipal Corporation has handed over the solid waste collection and transfer to disposal sites in respect of the zones VI, VIII & X to a private organisation and it handles about 1000 tonnes per day.

4. Central Pollution Control Board has estimated that the solid waste generated in small, medium and large cities, towns in India to be 0.1 Kgm to 0.2 to 0.4 Kgm and 0.5 Kgm per capita per day respectively. In the ERM Study conducted in 1996 it was estimated that the per capita waste requiring disposal in respect of Chennai City was 0.585 Kgm per capita per day. It has also arrived at the figures of waste generation rate in respect of Municipalities as 0.585 Kgm, Town Pancahayts as 0.439 Kgm and Panchayat Unions as 0.293 Kgm per capita per day within the Chennai Metropolitan Area. Applying these arrived norms, the estimation of solid waste (excluding debris) generated in Chennai City, Municipality and other local bodies within CMA in 2026 would be as follows:

Chennai City	3400 Tonnes
Municipalities	2050 Tonnes
Town Panchayats	550 Tonnes
Panchayat Unions	540 Tonnes
Total for CMA	6590 Tonnes

5. Chennai Corporation has taken action to modernize 7 transfer stations and machinery and also to improve basic infrastructure facilities at the landfill sites. It has also taken action to execute the project of making manure from solid waste on Design-Build-Operate- and-Transfer basis. It has employed the consultants M/s National Productivity Council for preparation of detailed report on modernisation of the Perungudi and Kodungaiyur Solid Waste Disposal sites and they have submitted their report, which is under consideration of the Corporation of Chennai. As a small scale measure at Ward Level in 115 places, facilities have been created for making manure from community wastes and the Corporation uses the manure for the parks.

Rest of Chennai Metropolitan Area

6. All Solid waste Management functions are the responsibility of the executive authorities of the local bodies namely Municipalities, Town Panchayats, and Village Panchayats.

7. In respect of Municipalities, most of them do not have any Transfer Stations and they directly dispose off the waste collected in the Land filled sites available within the Local bodies. In most of the Village Panchayat areas the system of Solid Waste Collection and disposal is very limited.

8. In respect of the Municipalities within CMA availability of land for disposal presently and requirement of land as per the estimates of the local bodies by 2005 are given in the Table below.

Sl. No.	Name of the Municipality	Requirement of land (in acres)	Existing land (in acres)
1	**2**	**3**	**4**
1	Alandur	20.46	15.00
2	Pallavapuram	20.16	-
3	Tambaram	19.27	4.25
4	Pammal	6.86	1.00
5	Anakaputhur	4.44	-
6	Ullagaram- -Puzhithivakkam	4.26	-
7	Ambattur	42.35	7.60
8	Avadi	22.00	7.20
9	Kathivakkam	4.56	-
10	Madhavaram	15.00	3.66
11	Thiruvottiyur	29.65	12.00
12	Thiruverkadu	4.30	-
13	Poonamalle	5.95	-
14	Maduravoil	6.18	-
15	Valasaravakkam	5.77	-
16	Manali	5.30	5.00

9. All the municipal areas have identified disposal sites for scientific disposal of solid waste. A common land of extent 50 Acres has been purchased for Alandur, Pallavaram and Tambaram Municipalities at a cost of Rs.113.28 crore at Venkatamangalam village for developing the same as a modernized compost yard bringing the segregated wastes for the purpose. In addition, Tambaram Municipality has identified an extent of about 55 Acres at Nallur village in Sriperumbudur Taluk and 25 Acres in Punchai-Pothivakkam village, Chengalpattu Taluk. In respect of Ambattur Municipality 30 acres of land at Vengal village has been identified. For Kathivakkam Municipality, a site of an extent 5.5 Acre has been identified at Manali Village. Thiruvottiyur and Kathivakkam Municipalities are presently using the common disposal site of an extent 12 Acres at Sathangadu. Thiruvottiyur Municipality has taken action to alienate about 10 Acres from the sewage treatment plant site. Madhavaram Municipality has identified a site of an extent 4.70 Acres at Vadaperumbakkam and 4.93 Acres at Manali and taken action to acquire the same. Pammal Municipality has obtained 2.00 Acres of land for this purpose. Thiruverkadu Municipality has taken action to get 10.20 Acres of poromboke land at Koladi Village for this purpose. Valasarawakkam Municipality has also taken action to acquire lands.

Strategy and Action Plan:

10. To achieve 100% collection and also safe and environmentally acceptable disposal of solid waste, Chennai Corporation / Commissionerate of Municipal Administration / Directorate of Town Panchayat and Directorate of Rural Development should take action to implement the recommendations of the study conducted engaging the consultant M/s Environmental Resource Management, UK.

11. Presently no data on the e-Waste, the extent to which it could be recycled and the residue waste, which has to be disposed, is not readily available. A detailed study on these aspects has to be made through TNPCB and plans for safe disposal of these wastes have to be worked out and implemented.

Macro and Micro Drainage System in CMA

CMA is traversed by three major rivers namely Kosasthalaiyar River, Cooum River and Adyar River.

2. Sholavaram Tank, Red Hills Tank and Chembarambakkam Tank are the major tanks in the CMA. Sholavaram Tank is the secondary storage tank receiving water from the Poondi Reservoir via Poondi Feeder Canal to supply Red Hills Tank. Red Hills Tank is the main source of water supply to the Chennai City and during storm events water is released to Red Hills Surplus Channel, which enters the Kosasthalaiyar River and discharges into the Sea. Its maximum storage capacity is 3285 Mft^3 (93 Mm^3)

3. Chembarambakkam Tank has recently been developed as one of the sources for water supply to Chennai City and has maximum storage capacity of 103Mft^3.

4. Kesavaram Anicut and regulator which is located in the uppermost catchment of the Poondi reservoir controls the discharge from upper catchment entering Poondi reservoir

5. Tamarapakkam Anicut located across Kosasthalaiyar River in the downstream of Poondi reservoir controls excess discharge in the Kosasthalaiyar. If Sholavaram is not at its full capacity, then the gates are opened to divert the excess water along the supply channel to Sholavaram. Vallur Anicut is a small check dam constructed near Minjur across the Kosasthalaiyar River to control water levels and feed irrigation channels in the area.

6. CMA also has a network of lakes, canals and channels within its boundary. There are about 320 numbers of tanks /lakes that are earlier used as water source for irrigation and now serve as flood accommodators. Apart from these lakes there are a large number of ponds in CMA.

7. Buckingham Canal is a man-made canal, which was constructed during the year 1806. It originates at the place called Bedhakanjam in Andhra Pradesh and runs along the area very close to the East Coast, enters CMA at Athipattu village, passes through the Chennai City and leaves CMA at Semmencheri village, and it finally connects to Ongur River at Yedayanthittu Kaliveli near Cheyyur. Its total length is 418 kms and in CMA its length is 40Kms It was dug for the purpose of navigation and transport of goods and also to accommodate flood. But within CMA for various reasons it now serves as flood accommodator only.

8. Otteri Nullah is a channel to accommodate flood, which originates from a place called Otteri near Padi, flows through the city at Anna Nagar, Kilpauk, Purasawalkam, and Perambur and joins Buckingham Canal near Basin Bridge

9. Virugambakkam-Arumbakkam Drain originates near Oragadam passes through Virugambakkam-Arumbakkam area of the city and joins into Cooum River.

10. Mambalam Drain is also a flood accommodator, which originates from Mambalam area passes through T.Nagar, Nandanam and joins Adyar River.

11. Captain Cotton Canal originates from the Vyasarpadi area of the city and joins Buckingham Canal near Tondiarpet.

12. Velachery Drain is a flood accommodator originates from Velachery tank and joins Pallikkaranai Swamp.

13. The agencies responsible for management of storm water drainage in CMA are presented in Table below.

Agencies responsible for Management of Storm Water	
Agency	**Responsibility**
Chennai Metropolitan Development Authority (CMDA)	Project Packaging and Management Monitoring and co-ordination
Public Works Department (PWD)	Plan, Design and Implementation of Macro Drainage Works
Chennai Municipal Corporation (CMC)	Plan, Design and Implementation of Micro Drainage Works
Tamil Nadu Slum Clearance Board TNSCB	Formulation and Implementation of Rehabilitation and Resettlement Package

14. CMDA had engaged the services of the consultant M/s Mott MacDonald International, UK, to conduct the study titled 'Madras Metro Flood Relief/Storm Water Drainage Master Plan Study ' in 1992-93. The main objective of the study was to bring together the previous studies carried to assess the problem of flooding in Chennai and to identify using modern hydrological and hydraulic modeling techniques/measures to alleviate flooding in the North of the City.

15. The study area comprised two parts, (1) 90 sq.kms strip north of the river Cooum and (2) 30 sq.kms area south of the City named as Pallikkaranai. Both the Macro Drainage Systems (Rivers, Tanks, and Surplus Channels) and the micro Drainage System (Urban Storm Water Drains) had been examined.

16. The range of options examined included upstream storage (to be implemented under Krishna Water supply scheme), diversion of flood flows into tanks, canals, channel resection, structural improvements (including outfalls), provision of short cut canal between the Buckingham and the Sea, formalisation of flood path and provision of flood defences (walls, banks, etc

17. Schemes have been outlined for the Cooum, the Kosasthalaiyar, the Red Hills Surplus Channel, the Buckingham Canal, the Otteri Nullah and the Captain Cotton Canal. Protection has been proposed on the Kosasthalaiyar on the south bank only, and a controlled floodway is proposed for the north bank upstream of Minjur.

18. For the urban storm water (micro) system, existing coverage of drainage provision within the study area boundary was found to be 50%. However the drainage system was generally found to be in a poor state, with many blockages due to solid waste and services (water pipes, cables etc.) and repairs needed. The principal interventions envisaged are the repairs/rehabilitation of existing systems and improved maintenance. The Master Plan comprised the following components:

- Structural works for major flood alleviation and for rehabilitation of the urban storm water system
- Non-structural measures required to support these investments;
- Capacity building, with particular emphasis on system maintenance and master plan implementation;
- Further studies required to progress the plan;
- Monitoring and evaluation requirements.

19. Non-structural measures recommended include:

- Designated floodways on the North side of the Kosasthalaiyar with associated planning controls and flood warning/evacuation procedures
- Design guidelines for drainage systems

- Planning and regulatory controls to prevent development in old tank beds unless adequate flood defense measures are in place
- Planning and regulatory controls to prevent encroachment of squatter settlements in old tank beds and watercourses
- Provision of good facilities (vehicles, communications) for flood emergency management
- Public education (e.g. to prevent solid waste dumping in urban drains)
- Flood risk mapping

Drainage study for Pallikkaranai

20. The Drainage study for Pallikkaranai was included as part of the MMFR/SWD master plan study. The aim of the study is to identify ways of providing protection to an area about 30 Sq.km. lying in and around Pallikkaranai. The area was earmarked for development and the development was to be promoted by a number of government and private bodies then. For the purpose of the study the area was referred as Pallikkaranai Drainage Area (PDA). The aim of the project was to protect an area of approximately 30 sq.km. from flooding. It could be achieved by a diversion of substantial portion of run off from upstream catchments along a cut off drain linking the existing surplus channel close to a village called Karanai with the Kovalam Backwaters. Northern boundaries of Pallikkaranai Drainage Area cuts off the centre of the existing swamp area at Pallikkaranai. The area to the north will continue to be subject to inundation as run off enters the area from North and West. Protection to the area is to be provided by three interceptor drains, which carry overland flows from local catchment around the boundary of the PDA. An arterial drain has to be constructed along the centre of the PDA, which will pick up drainage flows within the area.

21. CMDA in consultation with the Line agencies viz. PWD, Chennai Municipal Corporation and TNSCB had prepared an outline project report on flood alleviation and improvement of storm water drainage system in Chennai Metropolitan Area with a total project outlay of Rs.300 Crores to be implemented over a span of 5 years and submitted to government.

22. The Micro Drainage works to the tune of Rs.43 Crores have been implemented by the Chennai Corporation for improvement of the drainage system in Chennai Corporation area integrating with the Macro Drainage System.

23. The study conducted by the consultant M/s Wardrop Engineering Inc. in 1995 revealed that the waterways in Chennai convey treated and untreated sewage and receive debris and solid waste also though they were originally natural flood discharge channels. The addition of untreated liquid waste had led to a very high level of pollutants and the disposal of solid and encroachment of slums had severely reduced flows particularly during Monsoon periods.

24. The consultant M/s Severn Trent International conducted the study on Environmental improvement of watercourses in Greater Madras in 1991. They have recommended for extension of sewerage system to unsewered areas and use of low cost sanitation wherever appropriate, purchase of jetting equipment and replacement of smaller pumps with submersible pumps, extension of storm water drainage system etc.

Chennai Waterway Conservation Programme

25. The Sludge disposal consultancy study conducted in 1994 by the consultant M/s MMI has revealed that contamination of water ways and anaerobic digestion of waste water flowing in the water ways had led to the accumulation of sludge causing hindrance to the hydraulic functioning of the water ways and also causing contamination of water ways in the eco system.

26. As part of the Chennai City River Conservation Project (CCRCP) CMWSSB had proposed project for prevention of sewage flow into waterways, treatment of sewage, construction of interceptor sewers and enhancement of pumping station capacity with a total project cost of Rs.720 Crores. But the National River Conservation Directorate (NRCD), Government of India, had finally accepted to fund the project to the tune of Rs491.82 Crores in the year 2000. Out of the project costing Rs.382 Crores approved by the NRCD, CMWSSB had executed works to the tune of Rs.325 Crores.

27. Under Chennai Metropolitan Development Plan (CMDP), projects for macro and micro drainage system to the tune of Rs.39 Crores have been executed during 2003-2004, Rs.41 Crores during 2004-2005Rs.103 crores during 2005-06 by PWD, Chennai Corporation, Municipalities and Other Local Bodies within CMA, and also by the Highways Department. An outlay of Rs98.99 Crores has been proposed for the year 2006-07 under this component

Strategies and Action Plans

28. All the structural and non-structural measures recommended in the MMFR/SWD Master Plan Study Report should be implemented to alleviate the existing flood problems and also to ensure prevention in future during the plan period (considering more than 50% of the 2026 population is proposed to be accommodated in the rest of CMA, and the City will also get densified additionally by 35%)

29. In CMA, all the lakes vested with the departments/agencies (such as Revenue departments, etc) other than PWD, should be transferred to PWD for its proper maintenance. Further, all these lakes and major drainage system within CMA should be brought under the control of a separate Division/Circle in PWD, which should be, in-charge of continuous planning and implementation of flood alleviation projects and maintenance of these water bodies.

30. The lakes / water bodies should be protected from encroachments and existing encroachments should be evicted by the departments/agency concerned bringing the water bodies to its original state.

31. The lakes may be developed not only as a flood accommodator and for ground water recharge, but also as open space with trees as wooded areas.

32. In respect of the Pallikkaranai Drainage Area and areas around, the recommendations made in respect of protection of the marshy land in Pallikaranai village, development of areas south of road connecting Sholinganallur with Medavakkam for electronic industries (after provision of proper drainage system by PWD) to be implemented.

Disaster Management

Natural disasters can neither be predicted nor prevented. The problem before us is how to cope with them, minimizing their impact. Tamil Nadu has witnessed havoc caused by cyclones and storm surge in the coastal regions, earthquakes, monsoon floods, landslides, and recently the Tsunami. Increase in urban population coupled with the construction of man-made structures often poorly built and maintained subject cities to greater levels of risk to life and property in the event of earthquakes and other natural hazards. One of the main objectives is to reduce the risk of loss of human life and property, and to reduce costs to the society. We have to recognize that in such cases of natural disasters, we deal with phenomena of enormous magnitude that cannot be controlled by any direct means of human intervention. But what we try to do is to reduce the impact on human beings and property.

2. Hazard Prone Areas in Chennai Metropolitan Area may be classified as follows:

(i) Earth Quake Prone Areas:

Chennai Metropolitan Area falls under Seismic Zone – III. The whole of Chennai Metropolitan Area falls in this zone.

(ii) Cyclone Prone Areas:

In this Chennai Metropolitan Area, it extends to a distance of 20 km. from the coast in all the coastal districts. In these areas, the risk is due to (a) cyclonic wind velocities combined with heavy storm, (b) flooding by seawater due to high waves and (c) flooding due to heavy storm. The map showing the cyclone prone areas in Chennai Metropolitan Area is annexed.

(iii) Land slide prone areas

Unstable geological conditions, indiscriminate construction activity, heavy rainfall and flash floods coupled with poor drainage due to urbanisation are the main factors causing landslides in hilly regions; earthquakes also trigger landslides. No area in Chennai Metropolitan Area qualifies for zoning as Landslide prone area.

(iv) Flood prone areas:

From the flood hazard map of India (mapped by meteorological department, New Delhi), it is seen that no area in Tamil Nadu falls in the risk zone. But within a local body area, particularly with reference to an area's proximity to a major drainage system like rivers, canals, and also water bodies like lakes, and further with reference to contour levels/low-lying areas, flood prone area mapping has to be done.

In Chennai Metropolitan Area, there are a few areas along the rivers and canals and low-lying areas, which are susceptible to flooding/inundation during heavy storms. Map showing the floodable areas [macro level] identified in the Madras Metro Flood Relief / Storm Water Drainage Master plan is annexed. Existence of macro and micro drainage networks in Chennai Metropolitan Area facilitates draining of these areas within a reasonable time. Developments in such low lying areas are allowed only when a proposed development conforms to standards and after getting clearance from PWD on the measures to be taken to make it free from inundation.

(vi) Tsunami prone areas:

Mapping has to be done on the areas wherein Tsunami had directly hit and flooded the coastal areas in Chennai Metropolitan Area. These areas may have to be zoned as Tsunami prone areas. However this area within Chennai Metropolitan Area will fall within the CRZ area 500 metres from HTL along the coast.

3. Development Control Rules for CMA provide for regulating the constructions with reference to zone, location, height, number of floors, size of buildings, set back spaces to be left around, and the use of the building and land. Building Rules under the Local Bodies Acts provide for regulation of location of buildings, foundations, plinths, superstructures-walls, floors, and rooms, licensing of surveyors and inspection of Municipal Engineers at various stages of constructions, regulations on dead and superimposed loads, wind load/pressure, reinforced cement concrete and framed structures, construction materials, etc. Structural safety and soundness are regulated under the Building Rules under the Local Body Acts. Hence early action should be taken to include Special Rules for Hazard Prone Areas in the Building Rules of the Local Bodies and effectively enforce the same.

Action Plans

4. Most of the components of the GOI-UNDP Urban Earthquake Vulnerability Reduction Programme are also applicable to other natural disasters viz. cyclones, landslides, floods and Tsunami. Hence the awareness generation, development of techno-legal regime, earthquake preparedness and response plans, training and capacity building should be done covering these natural hazards also and the State Nodal Agency may take appropriate action on these.

5. Even after the GOI-UNDP DRM programme period, the State Nodal Agency should continue these measures. Pre-disaster preparedness and pre-disaster management plans should be periodically reviewed and up dated.

6. Early action to amend the Building Bye-Laws of local bodies should be taken to include special provisions for hazard prone areas and enforce the same since the whole of Chennai Metropolitan Area falls in Seismic Zone-III now and it also includes cyclone prone areas to a major extent.

Environment

Sustainable cities are fundamental to social and economic development. As stated in the tenth plan document of the National Planning Commission, sustainability is not an option but imperative. For a better world to live in, we need good air, pure water, nutritious food, healthy environment and greenery around us. Without sustainability, environmental deterioration and economic decline will be feeding on each other leading to poverty, pollution, poor health, political upheaval and unrest. The environment is not to be seen as a stand-alone concern. It cuts across all sectors of development. We have to improve our economic growth rate, provide basic minimum life support services to large section of our population and deal with the problems of poverty and unemployment. At the same time, we have to pay attention to conserving our natural resources and also improving the status of our environment.

2. Environmental deterioration is not a necessary or inescapable result of urbanization; what needs to be done is striking a right balance - in making development in such a way that they are more effectively attuned to environmental opportunities and constraints.

3. The metropolitan environment comprises mainly two components viz. (i) environment per se, and (ii) the habitat. The environment per se relates to natural features and resources including the air, noise, water and land (open spaces, forests etc.). The habitat is related to built environment and infrastructures such as water supply, sewerage, and solid waste disposal. The conservation of natural resources includes management of air, noise, water and land.

4. TNPCB in its Environment Management plan for Chennai city, 2003 has identified that the major pollutants generated in the city are particulate matter, sulphur dioxide, oxides of nitrogen, carbon monoxide, hydrogen sulphide, and ammonia gas. The major sources of air pollution are domestic (fuels for cooking), commercial (fuel consumed by commercial establishments, trade, industry, hotels etc.), industrial (due to wood, coke, furnace oil LPG, kerosene etc.) vehicular (petrol & diesel fuels), generator sets (diesel and kerosene fuels), natural sources (odour pollution due to gases emanated from polluted stretches, waterways – 'B' Canal, Adyar, Cooum).

5. The major contribution to Chennai air pollution load is vehicular sector (71.28%) followed by industrial sector (19.70%).

Water Pollution

6. The waterways of Chennai are not perennial in nature and receive flood discharge only during monsoon season; in the rest of the year it acts as a carrier of wastewater from sewage treatment plants and others.

7. TNPCB under the MINARS programme periodically monitors the water quality of the city waterways. Water samples are collected and analysed by TNPCB every month at 'B'canal (at north, central and south stretches), Otteri Nallah, Adyar River and Cooum River. According to PCB, all these water bodies in the city are polluted and not suitable for any designated uses (viz. drinking, bathing, propagation of wild life like animal husbandry & fisheries, industrial, cooking and washing and agriculture); level of contamination is relatively high in 'B' canal followed by Otteri Nullah and Cooum River.

Chennai Waterway Conservation Programme

8. The sludge disposal consultancy study conducted in 1994 by the consultant M/s MMI has revealed that contamination of water ways and anaerobic digestion of waste water flowing in the water ways had led to the accumulation of sludge causing

hindrance to the hydraulic functioning of the water ways and also causing contamination of water ways in the eco system.

9. Chennai City River Conservation Project (CCRCP) was conceived and CMWSSB had implemented a project at a cost of Rs. 720.15 Crores for prevention of sewage flow into waterways, treatment of sewage, construction of interceptor sewers and enhancement of pumping station capacity which was approved by the National River Conservation Directorate (NRCD), Government of India.

10. Chennai is underlain by various geological formations from ancient Archaeans to recent Alluviums. The agencies have observed that the chemical quality of ground water in Chennai City is generally brackish and not suitable for drinking purposes. In general it is alkaline with pH value from 7.8 to 9.0 and many pockets have high chloride and sulphate; very few selected pockets have potable quality

11. Mandatory provision of rainwater structures within the city has improved the recharging potential for the ground water and also the water quality and Ground Water table in the recent past.

Bio-Medical Waste

12. Bio-Medical wastes have become potentially hazardous because of their potential for infection, and also for the ingredients including antibiotics, cytotoxic drugs, corrosive chemicals and radioactive substances. TNPCB has estimated that the bio-medical waste generated per day is about 5000 kg. The hospital authorities themselves usually incinerate the infectious wastes and some of the major hospitals have double chamber incinerators. TNPCB has recently identified a site for location of common treatment and disposal of bio-medical wastes at Thenmelpakkam village to serve Chennai city and the adjoining Kancheepuram & Thiruvallur districts.

Hazardous Industrial Wastes

13. The hazardous wastes generated from the industries such as electroplating, chemical, petrochemical, service stations, textile processing and engineering type of industries are stored in the industries premises safely, recycled where possible and disposed at sites recommended by the TNPCB.

14. In the recent past, one of the major pollution problems identified is the one due to the non-degradable plastic wastes. The preventive, promotional and mitigative aspects considered to tackle this problem by the authorities concerned include, source segregation of municipal wastes, raising consumer and public awareness, specifying plastics suitable for recycling, penalties for littering, specifying minimum thickness of plastic carry bags.

Noise Pollution:

15. The Noise level survey conducted by the TNPCB reveals that noise level exceeded the limits mostly in commercial areas, mainly due to vehicular movement. During festive seasons in Chennai, the noise levels were noted high and particularly during Diwali it exceeded 120 dB (A).

Coastal Zone

16. The coastal line of Bay of Bengal in the east throughout its length bound Chennai Metropolis. In CMA, developments in the coastal stretches are regulated as per the CRZ Management plan approved by the Government of India on 27.9.1996 and the CRZ regulations notified by the Government of India under the Environment (Protection)) Act.1986.

Green Areas

17. Chennai city has only about 2% of the area as declared parks. In Chennai Metropolitan Area, the declared forest cover is about 24 sq. kms, which is about 2 percent of the CMA area. However, satellite imageries show that green cover over the city due to trees along roadside and within the sites is of considerable extent. There is ample scope for further development of this green cover within the city and also in the rest of CMA, particularly along roads drains, riverbanks etc. Increase in green cover in urban habitats becomes a necessity not only to alleviate the problems of pollution, but also to ensure ecological stability.

18. TNPCB may conduct a detailed study and prepare an Environmental Management Plan (EMP) for Chennai Metropolitan Area identifying the problem areas, hotspots, and proposing solutions for improving environment by the concerned agencies.

19. To increase green cover local bodies concerned particularly in the rest of CMA have to plan and implement tree planting programmes not only along the public roads maintained by them but also within the public premises with local people's participation.

20. River water conservation programmes to reduce pollution levels in the waterways in Chennai have to be continued by the agencies concerned viz. PWD, Metro Water, TNSCB and TNPCB.

21. Directorate of Environment should identify the ecologically sensitive areas, which require protection/conservation and take action for conserving the same with statutory provisions.

Gasified Crematorium in Chennai

22. Chennai Corporation is maintaining 29 conventional burial and cremation grounds and 4 electrical crematoriums. The conventional burial and cremation grounds require more space and firewood to burn the bodies and conventional burning has the element of air pollution in the vicinity apart from adding to the depletion of trees / cover.

23. To overcome these problems Chennai Corporation has proposed to convert 20- conventional burial / burning grounds in to gasified crematoriums.

Eco Park at Adyar Creek

24. A part of the Adyar Creek area which is in disuse and lying in the west of the Santhome High Road is proposed to be developed as an Eco Park by the Chennai Corporation at an estimated cost of Rs. 50 crores. It extends over an area of 58 hectares and when developed it will meet the recreational needs of the people in the area and add to the green cover of the city.

Investment Plans for CMA

In the recent past Chennai has attracted many industries including the Information Technology Industries. Chennai has many natural advantages including availability of a Sea Port and other infrastructure attracting large scale industries. The strength of Chennai city is mainly the availability of good infrastructure facilities, skilled labour and availability of land for developments.

2. CMDA considering the need for making Investments for infrastructure developments in a planned and co-ordinated manner, has proposed infrastructure investment plan called as Chennai Metropolitan Development Plan [CMDP] in consultation with the department agencies and local bodies concerned.

3. The major objectives of the Plan are:

i. to identify the infrastructure needs in each sector and work out the projects accordingly;
ii. to identify the quantum of finance for execution of these projects;
iii. to identify the source of finance;
iv. to prioritize the projects by working out the annual programme, medium term programmes and long term programmes;

4. In Chennai Metropolitan Area the development and maintenance of urban services are vested with the specialised agencies.

5. These agencies depend on Central Government, State Government and Financial Institutions for funding their projects.

6. The infrastructure requirements for Chennai Metropolitan Area have been collected from the concerned agencies and the Investment Plan for them has been prepared.

7. The Investment Program has been categorized in to 3 categories viz. annual, medium and long-term projects. The projects that need immediate investment have been included in the annual program. The projects which have to be executed to fulfill the infrastructure requirements in the medium term have been included in the medium term programmes, Projects which require heavy investments with long gestation periods have been included in the long term programmes.

Investment Plan		Rs. in Crores	
Programme/Agency	**Annual Plan (2003-2004)**	**Medium Term Plan (2004-2007)**	**Long Term Plan**
Traffic and Transportation			
Urban Rail Projects	165.00	519.24	3528.00
Road/River Bridge	3.00	7.00	-
Traffic Management	11.94	3.00	-
Resurfacing of Major Roads	43.11	-	-
Strengthening of peri urban Roads	4.54	13.62	4.56
ORR	-	250.00	250.00
Widening & Strengthening of city roads	57.80	-	-
New Road formation	21.50	-	350.00
Relaying of City Roads	99.00	297.00	-

Study for Augmenting the capacity of Major Arterial Roads	0.25	3.55	-
Widening & Strengthening	-	1595.58	-
Cement Conc. - Anna Salai	-	101.32	-
Road Over/Under Bridge	-	832.71	-
Bus Terminal	-	6.00	-
Multilevel Parking	-	48.00	-
Urban Road Projects	-	-	1126.00
Urban Transit System	-	-	855.00
Truck Terminal	-	80.00	-
Sub Total	**406.14**	**3757.02**	**6113.56**
Housing			
TNHB	5.00	570.00	-
TNSCB	27.70	330.41	325.00
Sub Total	**32.70**	**900.41**	**325.00**
Water Supply			
CMWSSB	**730.00**	**946.00**	**649.18**
Sewerage			
CMWSSB	295.00	607.00	897.78
CMA (Thiruvottiyur Mpty)	28.00	**-**	**-**
Sub Total	**323.00**	**607.00**	**897.78**
Storm Water Drain			
Chennai Corporation	40.00	47.00	-
PWD	44.65	3.65	-
Highways	3.68	-	-
SIDCO	0.68	-	-
CMA	13.77	-	-
DTP	8.94	10.59	-
Sub Total	**111.72**	**61.24**	-
Solid Waste Management			
Chennai Corporation	16.00	35.00	-
CMA	11.19	16.25	-
Sub Total	**27.19**	**51.25**	-
Electricity			
TNEB	**150.00**	**1910.81**	-
Total	**1780.75**	**8233.73**	**7985.52**
Grand Total			**18000.00**

8. The CMDP is implemented from 2003. In the first Annual Plan 2003- 04 Infrastructure projects costing Rs. 1321.54 crores had been implemented and in the 2nd Annual Plan 2004-05 projects costing Rs.957.66 crores have been implemented. In the 3rd Annual Plan for 2005-06 project costing Rs. 795.58 has been implemented. The revised outlay made for 2006-07 is Rs. 2129.14 crores and the projects are under implementation. The expenditure incurred during the current year upto December 2006 is Rs. 402.14 crores.

9. In the Annual Plan 2007-08, Infrastructure projects costing Rs. 2054.39 crores are proposed to be implemented.

Jawaharlal Nehru Urban Renewal Mission (JN-NURM)

10. The Government of India in 2005 has introduced the scheme called Jawaharlal Nehru Urban Renewal Mission (JN-NURM) to encourage reforms driven, fast tract planned development of identified cities with a focus on efficiency in urban infrastructure / service delivery mechanisms, community participation and accountability of Urban Local bodies towards citizens.

11. The Mission strategy includes preparing perspective plan called as City Development Plan, preparing projects, leveraging of funds and incorporating private sector efficiencies. The duration of the Mission is 7 years beginning from the year 2005-06. The nodal agency for the state of Tamilnadu is TUFIDCO and the concerned department at Government of Tamilnadu is Municipal Administration and Water Supply. Chennai is one of the identified cities for Government of India assistance under JN-NURM. To comply with the prerequisite of preparation of CDP, the City development plan for Chennai as called as 'Development Plan for Chennai Metropolitan Area' was prepared and Government of India's approval obtained.

12. The total estimated cost of the projects for proposed is Rs. 44,779.92 Crores. The summary of investments is given in the table below.

Proposed Summary of investments in CMA

Sl. No.	**Component**	**Total Cost**	**JNNURM**		
			GoI	**GoTN**	**IR/IF**
		Rs. Crores			
1	Water Supply	6,321.00	2,212.35	948.15	3,160.50
2	Sewerage	2,299.00	804.65	344.85	1,149.50
3	Solid Waste Management	847.80	296.73	127.17	423.90
4	Storm Water Drainage	1,423.88	498.36	213.58	711.94
5	Transportation	17,254.08	6,038.93	2,588.11	8,627.04
6	Mass Rapid Transit System	600.00	210.00	90.00	300.00
7	Metro Rail (45 km.)	7000.00	2450.00	1050.00	3500.00
8	Parking Lots and Spaces	43.85	15.35	6.58	21.92
9	Heritage and Recreation	103.08	36.08	15.46	51.54
10	Satellite Town development	5000.00	1750.00	750.00	2500.00
	Total	40892.69	14312.45	6133.9	20446.34
	Urban Basic Services for Poor	3,887.23	1943.61	1943.62	
	Grand Total	**44779.92**	**16256.06**	**28523.86**	

Development Planning in Chennai Metropolitan Area

Any new plan for the CMA should build on the information of the past. The following are the major plans that had been prepared for Chennai.

(i) General Town Planning Scheme (1957) prepared by Madras Corporation.

(ii) The Madras Interim Plan prepared by D.T.P., Govt. of Tamilnadu.

(iii) Madras Metropolitan Plan 1971-91 (1971) prepared by multi- agency group and published by RD&LA Dept., Govt. of Tamilnadu.

(iv) Madras Urban Development Project (1974) prepared by MMDA (now CMDA).

(v) Master Plan for MMA (1975) prepared by MMDA (now CMDA)

(vi) Structure Plan for Chennai Metropolitan Area (1980) prepared by CMDA with Alan Turner & Associates as consultants

General Town Planning Scheme (1957)

2. The General Town Planning Scheme was prepared by the Madras Corporation and submitted to the then Madras State Government in 1957.

3. The Scheme was then remitted to the Directorate of Town Planning, Madras for technical scrutiny. The DTP after careful scrutiny of the scheme had recommended that more detailed and extensive studies in depth would have to be carried out before the scheme could be finalised. Then it was decided to prepare a comprehensive development plan for Madras Metropolitan Area and as a first step to prepare Madras Interim Plan (1967).

Madras Interim Plan (1964)

4. The Directorate of Town Planning had prepared the Madras Interim Plan in 1967. In the Plan, the problems of the city were viewed and appraised in the urban context of the urban area being the first of its kind, the plan devoted itself purely to physical aspects of development and recommended that the fiscal plan should be separately worked out.

Madras Metropolitan Plan 1971-91 (1971)

5. To explore avenues for securing financial assistance for the city development from the national and international institutions, it was found then that the plan prepared earlier were inadequate in regard to long range prospective and also the scale of financial effort needed to direct the future development in orderly manner. Then the Government decided to prepare a report which would not only indicate the dimensions of the problems ahead, but also the necessary efforts - physical and financial - needed to make Madras a living city.

6. The proposals made in the Madras Metropolitan Plan 1971-1991 mainly contained the following:

(1) Strategy for physical growth of urban areas.

(2) Programmes for land acquisition for urban expansion, provision of infrastructure for transport, water supply, sewerage and drainage, slum clearance, provision of facilities for education, health, recreation and refuse collection.

(3) Action to bring revenue base in the area in line with the levels of expenditure.

(4) Recommendation on institutional set up required to implement the plan.

Madras Urban Development Project (1974)

7. The Madras Urban Project report was prepared by MMDA updating the earlier data and presenting a more viable case for exploring additional resources for investments from various financial institutions including World Bank.

8. It highlighted the then present deficiencies and future requirements in some of the critical sectors and suggested an investment programme for 1974-79. It also stressed the need for land use control.

9. The Madras Urban Project became the basis for appraisal of projects under the World Bank assisted Madras Urban Development Project-I (1977-82) executed at a cost of Rs.56 Crores, MUDP-II (1983-88) executed at a cost of Rs.73.9 Crores and TNUDP-I Chennai Metropolitan Area component executed at a cost of about Rs.450 Crores.

10. Drawing heavily on the Madras Urban Project report, the Master Plan was prepared also updating the land use surveys conducted in 1964. Land use and Development Control Regulations had become part of the Master Plan. On the resource aspects, it echoed the recommendations of the Madras Metropolitan Plan, 1971.

11. The first Master Plan for CMA laid down policies and programmes for overall development of CMA taking a long-term view of the requirements.

12. Salient features/main recommendations made in the first Master Plan are:

(1) The proposed population for 1991 and 2001 for Chennai City (128 Sq.m. then) was 3.60 and 4.0 millions respectively and for CMA was 5.80 millions and 7.10 million respectively.

(2) The only way to regulate economic activity, optimise the use of existing (then) infrastructure facilities and plan their expansion to meet future needs in an area is to regulate land use and building activity therein.

(3) The strategy of developments of radial corridors linked to Satellite towns was found most suitable (then).

(4) Each major node was designed for a population of 200 to 300 thousands and would be predominantly a self contained unit providing for a substantial percentage of land for work places, schooling, shopping and other day to day needs.

(5) The nodes would be connected with rapid rail system and expressways to the city on the one hand and to the Satellite Town on the other

13. Based on the Traffic and Transportation Plan for MMA, 1974 important projects identified in the Master Plan (then) for implementation were:

Railways:

(a) Construction of a mass rapid transit system along the north-south eastern corridor between Manali and Thiruvanmiyur.

(b) Introduction of electrified suburban train system on Madras-Thiruvallur and Madras-Minjur lines.

(c) Construction of a combined railway terminal.

(d) Construction of a circular railway.

Roads:

(e) Widening of the arterial roads to carry six lanes of traffic with separate cycle tracks and footpaths:

(f) Replacement of the 26 level crossings over railways with grade separators.

(g) Construction of a new western expressway connecting Anna Nagar with Avadi.

(h) Construction of the missing links of the inner ring road within the City and construction of intermediate and outer ring roads.

Others:

(i) Construction of three terminals for long distance buses and truck terminals on the radial corridors at their junction with the outer ring road.

14. About 33.5% of city population [7.37 lakhs] lived in 1202 slums in the Chennai city in 1971. Considering (then) current and future requirements, a massive housing programme would have to be initiated and put through.

15. One of the major principles underlying the plan was securing of balanced development by decentralising the places of employment and residential areas. The plan had allocated land for industries, commerce, housing, play fields and other types of major urban land uses in appropriate locations and interrelated to each other so as to promote orderliness and smooth functioning.

16. Each land use zone had its special regulations designed to protect residential and recreational areas from harmful invasions of commercial and industrial uses and at the same time promoting business and industry by diverting them to most suitable places. By regulating the spacing of buildings, floor area ratio, set backs, parking etc. the plan aimed to ensure adequate light, air, fire protection etc. and to prevent over crowding in buildings and land, and thus facilitating the provision and continued adequacy of water, sewerage, transportation and other facilities.

17. It was observed that the land use plan was in essence a translation into physical form of planning policies and principles. The policies had taken into account the realities of the (then) present situation and were designed more to channelise future development on orderly lines rather than effect wholesale change in (then) existed development.

18. The proposed land use break up for various uses as per the Master Plan (1975) is given in table below.

Proposed Land use under First Master Plan for CMA

Sl.No	Land Use	Chennai City		Rest of CMA	
		Extent in hect.	% to total extent	Extent in hect.	% to total extent
1	Residential	8,081.98	48.57	32,255.78	30.98
2	Commercial	973.28	5.85	895.42	0.86
3	Industrial	1,107.51	6.66	6,361.62	6.11
4	Institutional	2,746.43	16.51	4,935.20	4.74
5	Open space & Recreational	3,254.11	19.55	7,767.21	7.46
6	Agriculture	-	-	50,924.14	48.91
7	Non-Urban	476.11	2.86	978.71	0.94
	Total	16,639.42	100.00	1,04,118.08	100.00

Structure Plan for CMA (1980)

19. The structure plan was prepared in CMDA in association with M/s Alan Turner and Associates in 1980 with the assistance of Overseas Development Agency of U.K. Earlier plans in Chennai Metropolitan Area were reviewed and recommendations made on various heads such as land development, financial resources, employment, shelter, transport, education and health, water management, water supply, drainage and sewerage, (detailed in the main report of the Master Plan –II for CMA.

Land Use and Planning Strategy

With the increase and concentration of population in urban areas, urban problems have increased. It requires and continues to require restriction in respect of the use and occupation of land in urban areas. In order to regulate the growth of the Metropolitan area in an orderly manner and also to ensure its economic viability, social stability and sound management for the present and the foreseeable future, the Master Plan with zoning and development regulation is necessary.

2. The idea of zoning is that the segregation of certain uses from others reduces the effect of negative externalities, which some uses have on others. Zoning provides spatial segregation of conflicting uses. It also has the benefit of increasing positive externalities because many uses find an advantage in being grouped with other similar uses. These external effects include air and water pollution, excessive noise levels, traffic congestion, and aesthetic disamenities. Because of its predominant role, modern zoning encompasses expanded objectives for supplying certain public goods such as preservation of open space, prime agriculture land and ecologically sensitive areas also. Zoning is also desired on reduction of costs of providing certain public services.

Land use regulation under Master Plan for CMA, 1975:

3. The land use plan was enforced through a set of regulations under Development Control Rules, which formed part of the master plan. Any person intending to make any development is required to apply under Section 49 of the Tamil Nadu Town and Country Planning Act, 1971, and obtain Planning Permission.

Reclassification:

4. Requests for Reclassification of land uses, received from the land owners, are examined and decided on individual merits of the cases under Section 32(4) of the Tamil Nadu Town and Country Planning Act. From 1976 to 1981, there were about 100 land use reclassifications within CMA, mostly in the areas of sanctioned Town Planning Schemes approved prior to 1975.

5. Unapproved sub-divisions/layouts are perennial problems faced by the public authorities. These unauthorised layouts contain substandard roads, which have not been properly laid out, and have no pavements, drains, culverts or streetlights provisions, and some of them made even on low-lying areas, which are not suitable for residential developments. Further they are at scattered locations, to which the local bodies could not provide amenities economically. In many of these unauthorised layouts, purchase of plots mostly for speculation purposes had resulted in no or a few constructions adding security problems to those few households, who have occupied the scattered constructed houses. Presently CMDA is considering regularisation of plots in layouts made prior to 31.12.1989 and issues Planning Permission for constructions thereon.

6. Development Control Rules for CMA formed part of the Master Plan came into force on 5.8.75. It contained detailed regulation on zoning related activity control, site requirements, plot extent, frontage, height, front, side and rear set backs, minimum road width, plot coverage, FSI, parking, open space for recreational purpose reservation, public purpose sites reservation. These planning parameter requirements were prescribed differentially for various activities such as residential, commercial, institutional, cottage industrial, light industrial, general industrial, special and hazardous industrial activities, and also differed for the Chennai City area, rest of the CMA and the George Town and Continuous Building Areas; it further differed for Multistoried developments.

7. Planning and development control is a dynamic process. In 1975, for the first time such a comprehensive development control rule was brought in. It was reviewed within few years of starting implementation of the same and when found necessary it was amended in 1979,

8. In 1980, the Development Control Rules provisions were comprehensively reviewed and amended. Major amendments to DCR made were in 1982, 1983, 1984, 1986, 1993, 1995, 1997, 1998, 1999,2001,2002,2003 and 2004.

Density and FSI:

9. Chennai is one of the high-density cities in India. Its density varies from 180 persons per hect. in Saidapet and Mylapore Corporation zones and 368 persons per hect. in Kodambakkam zone within the Corporation limits and the gross density for Chennai City is 247 persons per hect. FSI is the main tool used in Urban Planning to regulate the densities of population with reference to infrastructure provision. Density of population needs to be regulated for various reasons including carrying capacity of infrastructure (existing as well as proposed), sociological reasons such as crime rate etc and other physical factors.

10. The prevalence of High density in Chennai is attributed to the following:

(a) Smaller plot sizes
(b) Smaller dwelling unit sizes
(c) Large family sizes (on an average 4.5) against about 2.5 in America and other western countries.

11. Many of the major cities in USA and Europe, even though they may look high dense because of their physical mass of constructions, they are low in density when compared to the Indian cities.

12. For the above reasons, after examining the issue in detail, it is proposed to retain FSI almost as existing presently and being followed.

Development Regulations

13. The Development Control Rules have been reviewed and the following are the major changes proposed:

i) Permitting Multi-storeyed buildings in the rest of CMA also (excluding the Island Grounds, approved layout areas, Aquifer recharge area and Redhills catchments area)

ii) Redefining special buildings as the ones exceeding 6 dwelling unit

iii) Permitting I.T. buildings & Bio-informatics centers in PR, MR, commercial, industrial, institutional use zones

iv) Proposing higher FSI of 2.00 in the MRTS influence area between Luz and Velachery

v) Defining I.T. corridor along the old Mamallapuram Road

vi) Proposing separate set of parking standards for areas along transit corridors

vii) Proposing transfer of development rights in cases of road widening

viii) Accommodating working women's hostels in P.R. areas

ix) Providing for regulation of heritage buildings

x) Providing for restricted developments in Aquifer Recharge area (instead of total prohibition)

xi) Revising the parking standards totally based on the recommendations made in recent consultancy study on parking requirements

xii) Reducing set back requirements

xiii) Enlarging the areas of incidental structures that are exempted from FSI

xiv) Including provisions for persons with disabilities

Hierarchy of Roads:

14. The growing travel demand in the Metropolis has been dictating the need to increase the supply of road space. Implementation of the 1st Master Plan ensured enhancement of road space by way of provision of missing road links, widening of existing roads, removal of bottlenecks in the road network, construction of under passes/over passes, development of mini flyovers, etc. While the focus in the regime of the 2nd Master Plan would, not only be consolidating the efforts taken in the past to enhance the road and transport supply to cope with the increasing travel desires in the CMA but also establish a hierarchy of roads in the CMA so as to ensure the road and transport supply is optimally utilized.

15. The hierarchy of roads in the CMA has been so proposed that a person is able to access either an arterial road or sub-arterial road in the space of 2.5 km or 10 minutes travel by any of the private travel modes, with a view to ensure an equity of mobility and accessibility across the entire CMA.

Spatial Strategy

The objectives of the plan are to provide for:

(a) Optimum utilization of land by channalising the developments considering the latest policies and programmes of the Government.
(b) The future needs of the metropolitan area by recognising the existing growth trends and by suitable allocation of land uses and strengthening the infrastructure facilities
(c) Preservation and conservation of the ecologically sensitive areas in CMA.
(d) Wide scope for employment generation and economic development
(e) A conducive climate/environment to make Chennai as a primate city.
(f) The sustainable development and improving the quality of life and
(g) Efficient transportation net works integrating the land use patterns for balanced developments.

2. The strategies for achieving the same are given below:

(i) Tamil Nadu emerged as the third largest economy in India and the Chennai Metropolitan Area accounts for about 1/6th of the State income from all sectors. Maintaining this competitive edge in the State and fostering economic growth is one of the main objectives of the Second Master Plan.

(ii) Chennai metropolis will be one of the mega cities in the world with 10+ million population by 2016. Chennai city will continue to grow and the increase in population cannot be halted. The past trend has shown that there is decline in rate of growth and in the future years the retardation will continue. To accommodate the projected population of 59 lakhs, the city will get densified particularly in the low dense areas. The density of Chennai city will be about 335 persons per hectare in 2026. When the city will accommodate the population of about 59 lakhs, the rest of CMA will have to accommodate 66 lakhs by the year 2026.

(iii) To meet the need for space for different individual developments adequate lands have been earmarked in the plan as Industrial Use Zones.

(iv) To meet the commercial space and other related uses, adequate lands have been earmarked as commercial use zone and mixed residential use zone; further commercial activities are also allowable in the areas zoned as Industrial use Zones.

(v) To run on the fast track and to keep with the changes in the world economy, and recognising the strategic role the IT will play in the Chennai development, the incentives for location and physical development of I.T. parks /buildings announced by the Government are proposed to be continued; further it is proposed to develop the area along the I.T. Express Way as I.T.Corridor Zone to allow I.T. and other related development without references to land use zoning as a further incentive.

(vi) These efforts to provide for substantial economic growth are to be complemented by the provision of required infrastructure.

(vii) In order to make Chennai Metropolis economically strong the strategies for employment generation, creation of conducive atmosphere for strong industrial base including for IT and IT enabled services are stated in the Chapter III - Economy

(viii) To meet the future requirements for various activities such as housing, commercial, institutional, industrial and recreational integrating the existing and proposed rail and road transport facilities with the land developments, land use zoning has been proposed. Improvements to existing transport infrastructure and provisions of -new ones as proposed in the Chapter IV should be made to enhance the mobility and accessibility.

(ix) Chennai is generally a medium rise-high dense city; except for a few high-rise developments dot the metropolis, the developments are less than 5 storeyed or 15 mts in height. Because of the smallness in average dwelling size (about 50 sq. mts.), its density is one of the highest in India (247 persons per hect. as per 2001 census). Most of the areas were developed organically with narrow roads and small plot sizes with private land tenure. Development regulation modifications proposed will improve the physical environment of buildings/developments and also provide for conservation of Heritage buildings /precincts.

(x) The growth and densification of the urban areas in the south, southwest, west and northern directions will continue. In addition, the infilling areas between these corridors are proposed for developments by land use regulations.

(xi) Density of population in the city as per 2001 census is 247 persons per hectare and it is one of the highest in the world. Small plotted - low-rise development with individual ownership will continue. However high rise developments along wider roads, and larger plots are encouraged by allowing MSB's in the rest of CMA also, in order to have planned developments with large open spaces on ground which is preferable than low rise - high dense developments. In the MRTS influence areas; a higher FSI is proposed to maximize the transport utility.

(xii) In the Redhills catchments area, a wedge between the C.T.H. Road and GNT Road in the west of Redhills lake will continue to remain as area zoned for restricted developments in order to protect the run-off and also keep the potable water sources free from pollution.

(xiii) In the Aquifer Recharge Area in the south, restricted developments will be allowed to meet the demand for housing, particularly for I.T. sector along this area without reducing the recharge capacity in the area by rain water harvesting methods etc.

(xiv) Every city dweller has a rising expectation for a better quality of life; irrespective of his income level, culture, way of life etc. To meet the demand for housing, adequate lands have been zoned for residential uses in the plan. In addition, shelter strategies to be implemented are also given (in chapter V in detail). Strategy and action to be taken in respect of basic physical infrastructure developments, social facilities and investment Plan are detailed in Chapters VI to XII.

(xv) TNHB has taken action to acquire large chunks of lands along ORR to develop satellite townships. As part of land use planning also, large areas to accommodate future activities and population has been zoned along ORR. Special incentives may have to be worked out and given for locating employment generating activities along this corridor.

(xvi) Considering its locational and other advantages, the I.T. corridor in south will grow; governmental actions to provide required infrastructure shall continue.

(xvii) Chemical and other industries classified as hazardous are mainly located in the north outside the city. Areas for development of such industries in future are also zoned around the same in the proposed Master Plan.

(xviii) Considering the large scale I.T.developments taking place in Mahindra park SEZ (south of Marai Malai Nagar) housing development to meet

the demand from SEZ has to be taken up in the vicinity either by provision of plots with all infrastructure by TNHB or by regulating the lay out developments by private entrepreneurs, and provision of infrastructure by the local body concerned. It is roughly estimated that the housing demand over next 5 years in this area would be 10,000 housing units. Integrating the lands acquired and developed by the CMDA at Marai Malai Nagar, the balance bits of lands acquired and in possession of CMDA and also the adjoining areas around, delineating a proper planning area, development Plan should be prepared for this area by CMDA with approval of Government and developments regulated.

(xix) As envisaged in the First Master Plan, development of Thiruvallur and Gummidipoondi as Satellite Town should be encouraged by provision of adequate infrastructure for Housing and other developments in order to relieve congestion in the Metropolis and provide better housing facilities at affordable cost. In addition, in the southern corridor along OMR and the Western corridor along GWT, neighbourhood schemes have to be proposed and developed.

(xx) Considering the direction of growth potential for development in future, it has been proposed to extend the CMA limits in the south and southwesterly directions (about 363 sq.kms) upto MM Nagar in the southwest and Tiruporur in the south. Further extension of the CMA boundary in the westerly and north directions (particularly in the context of location of major industries for automobiles, electronics etc. in the west of Chembarakkam and also Ennore Port and SEZ developments in the north) has to be examined comprehensively, and plans have to be prepared and implemented.

(xxi) Instead of continuing local governance through a number of small local bodies, for efficiency in supply of public services, and enhancing the quality of local governance, amalgamation of local bodies into new corporations in the rest of CMA to be pursued.

Existing Land use 2006

	Chennai City		**Rest of CMA**	
	Extent in Hectares	%	Extent in Hectares	%
Residential	9523.18	54.25	22876.51	21.87
Commercial	1244.81	7.09	390.04	0.37
Industrial	908.42	5.17	6563.40	6.28
Institutional	3243.39	18.48	3144.35	3.01
Open space & Recreation	366.43	2.09	200.26	0.19
Agricultural	99.29	0.57	12469.65	11.92
Non Urban	82.46	0.47	2433.30	2.33
Others (Vacant, Forest, Hills, Low lying, Water bodies etc.,)	2086.93	11.89	56506.60	54.03

Proposed Land use 2026				
	Chennai City		Rest of CMA	
	Extent in Hectares	%	Extent in Hectares	%
Primary Residential use zone	5916.35	33.58%	29705.21	29.32%
Mixed Residential use zone	2426.90	13.78%	12392.07	12.23
Commercial use zone	714.24	4.05%	746.08	0.74%
Institutional use zone	2868.97	16.28%	3238.50	3.20%
Industrial use zone	691.83	3.93%	6678.86	6.59%
Special and hazardous Industrial use zone	130.67	0.74%	3355.09	3.31%
Open space & Recreational use zone	1000.65	5.68%	416.45	0.41
Non Urban	113.31	0.64%	11019.60	10.88%
Urbanisable			1882.01	1.86%
Others (Roads, water bodies, hills, Redhills catchments area, forests etc.,)	3754.79	21.31%	31864.54	31.46
Total	17617.70	100.00%	101298.42	100.00%

Development Regulations

In order to regulate developments, the areas within CMA have been designated as one of the 9 use zones listed in the Development Regulations (except for areas of specific use such as Water Body, Forests, Roads, Railways etc.). The developments in these use zones will be regulated in accordance with Development Regulations, which form part of the Second Master Plan. In each use zone certain uses will be permitted normally and certain other uses will be permitted with the special sanction of CMDA. The main purpose of the Development Regulation is to promote development in accordance with the land use zoning contained in this Master Plan.

2. Land Use plans are numbered as Map No. MP-II/CMDA.1/2007 to Map No. MP-II/CMDA.16/2007 read with MP-II/City 1/2007 to MP-II/City 42 /2007 and MP-II/ CMA 1 /2007 to MP-II/ CMA 250 /2007

3. The grant of Planning Permissions within CMA shall be regulated in accordance with the Development Regulations. (For details on the proposed Development Regulations, the main report of the Master Plan – II or the CMDA official website www.cmdachennai.org may be seen).