

Feasibility Study of a Residential Township Development at Kadambur, Chennai

Arun.S.Jena¹, Eashwar.S², Hariharan.V³, Nidhin.M⁴, Gayathri.B⁵

^{1,2,3,4} (UG Student, Dept. of Civil Engg., Easwari Engineering College, Chennai)

⁵ (Assistant Professor, Dept. of Civil Engg., Easwari Engineering College, Chennai)

arunjena92@gmail.com ; edeashwar@gmail.com ; sai.haran2@gmail.com; nidhinmadhu1993@gmail.com;
ergayucivil@gmail.com

Abstract: Planning of a town is not so common in India though some cities in India are very well planned (Chandigarh, Jaipur, Pondicherry, Delhi etc). Unplanned development leads to many undesirable effects such as space scarcity, large impact on available resource, poor connectivity, pollution, congestion, stagnation of drain, inefficient disposal of wastes etc. With good employment opportunities, healthcare, education and rapid development, Chennai has already attracted huge population from all around the state as well as from other states. Metro cities face the biggest challenge of allocating people with houses due to the galore of population and diversity of people with different needs. Thus in order to avoid further difficulties the Chennai Metropolitan Development Authority (CMDA) has framed development control regulations with due consideration to Town and country planning act, in September 2008.

This paper deals with feasibility study of a township adhering to all the prescribed regulations to serve a population of 1,00,000. All basic facilities like spacious dwelling units, good road connectivity, shops for essential commodities, efficient sewage treatment and disposal, etc. are provided. Also other facilities like hospital, school, community hall, swimming pool, playground, park, shopping mall, religious centre, gym, indoor games, etc. are also provided. Good road connectivity is provided within various parts of the township. A treatment plant for treating waste water and reusing the same for gardening is given, a substation is also provided. A dedicated administrative block responsible for maintenance of the township is provided. Ground water in the township is augmented using rain water harvesting. The plan of various units of the township and the 3dimensional view of the township are attached. A rough estimate of the project is also included and this is compared with the current market rate of such developments.

Keywords: Planning, CMDA, Township, Estimation.

I. INTRODUCTION

Cities/towns are probably the most complex creations that human beings have ever created. They are the wellsprings of culture, technology, wealth and power. Ancient man settled in and around the rivers as water was very much necessary for the existence of life in this world. As the time passed man invented various ways in which goods and necessities could be transported to long distance this along with increase in population made humans to move towards core areas away from the river. This is how urbanization started. Increased facilities in urban areas drew more and more people into it and this increased population had to be accommodated within the available land which led to the emergence of a new discipline called urban planning.

Urban Planning can be defined as the design and regulation of the uses of space that focus on the physical form, economic functions, and social impacts of the urban environment and on the location of different activities within it. The various fields that are encountered in urban planning are Engineering, Architecture and Social and Political concerns. The need of the hour is sustainable development. With increasing population and growing pollution, one cannot ignore the ill effects of planning on the environment.

The current population of the Chennai City is estimated to be around 4.8 million and the diversification of this metropolitan city is varied with different areas. This requires proper planning including forecasting as it used to be 4.3 million in the year 2001 as per UN data. With this ever increasing population, it will become very difficult to allocate houses, unless an advanced planning such as township is prepared and brought into action.

OBJECTIVES

Zoning of available residential population which includes HIG, MIG, LIG and EWS. It is planned to provide the following facilities to the inmates:

- The residential units, school, hospital and mall giving due consideration to the requirements of people and aesthetics
- Water supply, sewage systems and road network across the township
- Propose rain water harvesting system
- Provision of security and fire fighting systems
- Prepare a detailed estimate and scheduling of the project

II. METHODOLOGY

The methodology adopted to achieve these objectives comprises of the following steps:

- Collection, review of the literature and analyzing the benefits of planning
- Division of the available area into various zones.
- Deciding on the type, area and number of residential units required.
- Drawing the layout and fitting various residential units into their respective zones
- Alignment of the road, water supply and sewage system.
- Other requirements such as fire fighting, security system are decided.
- Scheduling the township through the software by dividing into various phases
- A detailed estimation of the quantity of materials required for each residential unit.
- Reviewing of the progress of all the above steps and providing feasibility study report of the township.

III. PROPOSED RESIDENTIAL TOWNSHIP

The proposed township taken for study is a development at Maraimalai Nagar, Kancheepuram district, Tamil Nadu. Maraimalai Nagar is a suburb of the southern Indian city of Chennai. Maraimalai Nagar and its surrounding areas are referred to as "New Chennai" by the media due to recent industrial development around this area. It is a Satellite town developed by CMDA in the year 1980. Many heavy industries are located in Maraimalai Nagar. As of 2011, Maraimalai Nagar had a population of 81,872. Figure 1 indicates the location of the proposed location with

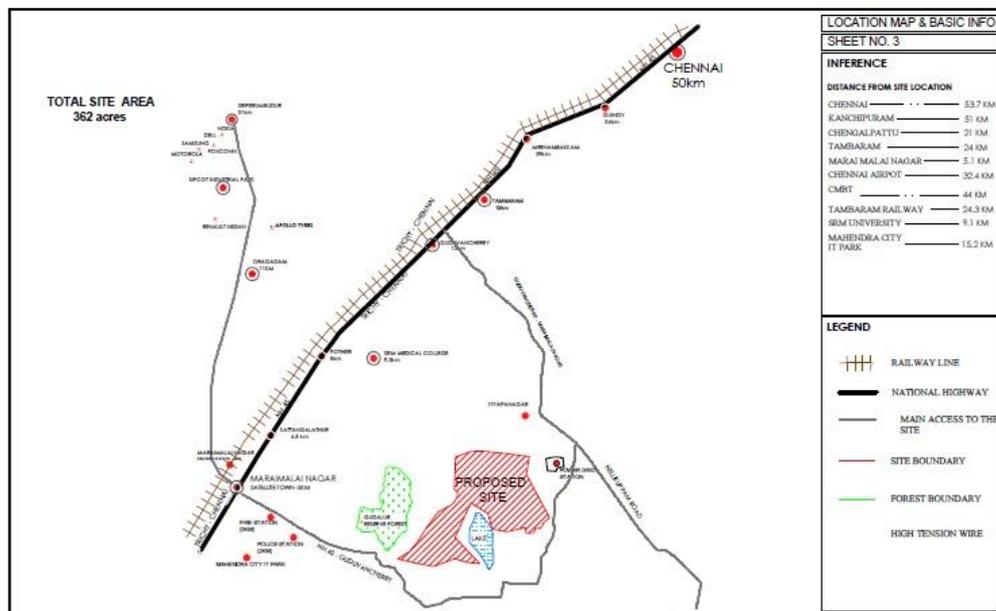


Fig 1. Location map

IV. FACILITIES PROVIDED

The following facilities are planned to be provided in the township

- Spacious dwelling units
- Parking facilities
- Higher secondary school

- d) Adjacent to National Highway
- e) Park covering more than 3 Acre
- f) Shopping mall with theatre
- g) Multi specialty hospital
- h) Planned as per DCR norms
- i) 24x7 security cover
- j) Outdoor Playground
- k) Adequate green cover
- l) Rain water harvesting
- m) Sewage Treatment plant & Substation for the township
- n) Artificial recharge of ground water
- o) Very good connectivity of road network
- p) Well planned drainage
- q) Exclusive shops for necessities
- r) Separate zones for residential and commercial establishments



Fig 2. Layout

V. TIME SCHEDULE OF THE PROPOSED TOWNSHIP

Time schedule of the proposed township has been prepared with Primavera software. The total area of the township is divided into 4 phases and shown in Figure 3.

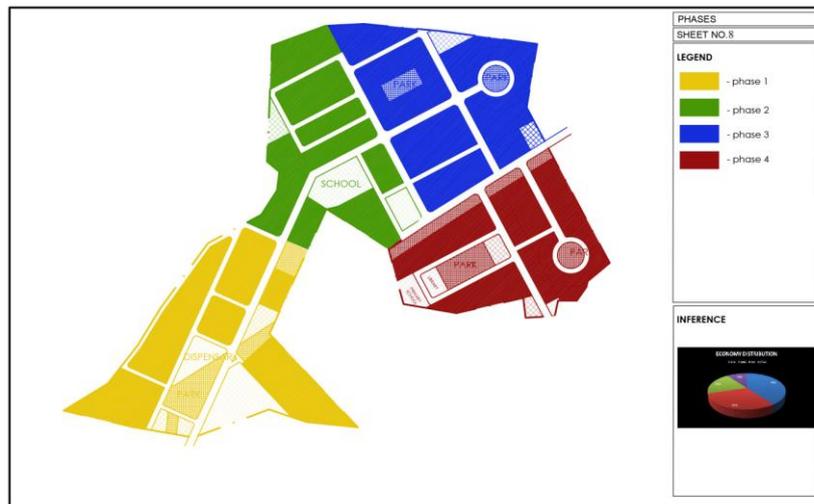


Fig 3. Phases

A detailed scheduling of one phase of the township for the residential blocks such as EWS, LIG, HIG & MIG blocks including roads and a park has been done and the abstract time schedule has been indicated in table 1 . A calendar of a standard 6 day worksheet has been assigned to this project thus enabling one phase of project to be completed in 2 years. Similar schedules for other phases shall ensure the overall completion of the project in a period of two years when independent crews and contractors are allocated for each phase separately.

SCHEDULING OF PHASE 1			
Structural component	Start date	End date	Duration (days)
ROADS	22.12.2014	06.01.2015	12
EWS	05.01.2015	28.01.2016	279
LIG	05.01.2015	11.07.2016	396
MIG	05.01.2015	03.10.2016	456
HIG	05.01.2015	24.10.2017	732
PARK	09.02.2015	20.02.2015	10

VI. COST ANALYSIS

Any project needs to be economically feasible and hence cost analysis for this project is done in order to verify its feasibility and adoptability. Cost analysis for important components of our township which includes residential units, school, hospital, shopping mall, club house, community hall etc. are carried out. Other services like landscape, roads are also considered in the cost analysis.

The funds to be invested in various utilities of the project are worked out below:

INVESTMENT ON LAND		
Total area (acre)	Rate (₹ /acre)	Total cost (₹)
362	40000000	14480000000

TABLE 6. INVESTMENT ON RESIDENTIAL BUILDINGS

Sl.No.	Particulars	Area in sq.Ft	No. of floors	Total area	Unit rate (₹ /sq.Ft)	Cost per block (₹)	No.of blocks	Total cost of blocks (₹)
1	EWS	2389.59	3	7168.77	2500	17921925	219	3924901575
2	LIG	6350.71	11	69857.81	2500	174644525	100	17464452500
3	MIG	9752.1	12	117025.2	2500	292563000	57	16676091000
4	HIG	6565.99	25	164149.75	2500	410374375	102	41858186250
							Total cost (₹)	79923631325

TABLE 7. INVESTMENT ON COMMON FACILITIES

Sl.No.	Particulars	Area in sq.Ft	No. of floors	Total area	Unit rate (₹ /sq.Ft)	Cost per block (₹)	No.of blocks	Total cost of blocks (₹)
1	Club House	33378	2	66756	2500	166890000	1	166890000
2	Community hall	32614	3	97842	2500	244605000	1	244605000
3	Religious Center	7600	1	7600	2500	19000000	1	19000000
4	Administrative Block	33583	2	67166	2500	167915000	1	167915000
5	Land scaping	1587762	-	1587762	25	39694050	-	39694050
							Total cost (₹)	638104050

TABLE 8. INVESTMENT ON PUBLIC UTILITIES

Sl.No.	Particulars	Area in sq.Ft	No. of floors	Total area	Unit rate (₹ /sq.Ft)	Cost per block (₹)	No.of blocks	Total cost of blocks (₹)
1	Hospital	26996	3	80988	2500	202470000	1	202470000
2	School	35624	3	106872	2500	267180000	2	534360000
							Total cost (₹)	736830000

TABLE 9. INVESTMENT ON COMMERCIAL UTILITIES

Sl.No.	Particulars	Area in sq.Ft	No. of floors	Total area	Unit rate (₹ /sq.Ft)	Cost per block (₹)	No.of blocks	Total cost of blocks (₹)
1	Shopping mall	77844.6	3	233533.8	2500	583834500	3	1751503500

TABLE 10. INVESTMENT ON SERVICES

TABLE 10.1. DG ROOM

S L N o.	Particulars	Area in sq.Ft	No. of floors	Total area	Unit rate (₹ /sq.Ft)	Cost per block (₹)	No.of blocks	Total cost of blocks (₹)
1	DG room	23,088.00	1	23,088.00	500.00	1,15,44,000.00	1	1,15,44,000.00

TABLE 10.2.ROADS

Sl.No	Particulars	Length in m	Width in m	Area in sq.m	Unit rate (₹ /sq.m)	Total cost (₹)
1	Road (30m)	2870	30	86100	400	34440000
2	Road (20m)	5760	20	115200	400	46080000
		8630			Total cost (₹)	80520000

TABLE 10.3.PIPELINE

Sl.No	Particulars	Length in m	Width in m	Depth in m	Volume in cub.m	Unit rate	Total cost (₹)
1	Water supply line earth work	8630	0.5	0.75	3,236.25	750	2427187.5
	GI pipe	8630	-	-	-	500	4315000
						Total cost (₹)	6742187.5
2	Sewerage line earth work	8630	0.75	1.25	8,090.63	825	6674765.625
	Concrete pipe	8630	-	-	-	2,000.00	17260000
						Total cost (₹)	23934765.63
						Total cost For Pipe lines	30676953.13

VII. PUBLIC UTILITIES

The amount that is invested on public utilities and other services has to be recovered from the residential and commercial units. The selling price of these units has to be finalized from the total investment made on these utilities. The investment to be made on the utilities is mentioned below:

TABLE 11.INVESTMENT ON PUBLIC UTILITIES

Sl.No	Particulars	Cost (₹)
1	Club House	166890000
2	Community hall	244605000
3	Religious Center	19000000
4	Administrative Block	167915000
5	DG room	11544000
6	Road	80520000
7	Water supply line	6742187.5
8	Sewer line	23934765.63
9	Land scaping	39694050
10	Sewage treatment plant	1000000
	Total cost (₹)	761845003.1

VIII. COST DISTRIBUTION

The total amount that has to be invested on the common utilities is shared by the residential and commercial unit by based on the population in the units. The additional amount that has to be added with the construction cost for developing common utilities is determined from table 13 and added to residential and commercial utilities cost.

TABLE 12.COST DISTRIBUTION (COMMON UTILITIES)

Sl.No	Particulars	Ratio	Cost (₹)	Total area in sq.Ft	Rate (₹ /sq.Ft)
1	Shopping Mall	0.1	76184500.31	700601.4	108.7415759
2	Residential	0.9	685660502.8	31969452.53	21.44736455

TABLE 13.COST AFTER DISTRIBUTION

S.No.	Particulars	Area in sq.Ft	No. of floors	Total area	Unit rate (₹ /sq.Ft)	Cost per block (₹)	No.of blocks	Total cost of blocks (₹)	
1	EWS	2389.59	3	7168.77	2522	18079637.94	219	3959440709	
2	LIG	6350.71	11	69857.81	2522	176181396.8	100	17618139682	
3	MIG	9752.1	12	117025.2	2522	295137554.4	57	16822840601	
4	HIG	6565.99	25	164149.75	2522	413985669.5	102	42226538289	
5	Hospital	26996	3	80988	2500	202470000	1	202470000	
6	School	35624	3	106872	2500	267180000	2	534360000	
7	Shopping mall	77844.6	3	233533.8	2609	609289684.2	3	1827869053	
								83191658333	
								Land cost (₹)	14480000000
								Add 25 % for profit	24417914583
								Total cost (₹)	122089572916.58

IX. SELLING PRICE

The selling price of the residential and commercial units is taken up by adding the cost of investment on zone 2 and adding the contractors profit and the rate per SQ.FT is arrived which is found to be in accordance with the current market rate.

TABLE 14.SELLING PRICE PER UNIT

S.No.	Particulars	Area in sq.Ft	Selling price (₹ /sq.Ft)	No. of units	Rate per unit	Cost (₹)	
1	Shopping mall	700601.4	4700	120	27440221.5	3292826580	
2	EWS	1569960.63	4000	2628	2389590	6279842520	
3	LIG	6985781	4000	6600	4233806.667	27943124000	
4	MIG	6670436.4	4000	5472	4876050	26681745600	
5	HIG	16743274.5	4000	10200	6565990	66973098000	
						Total cost (₹)	131170636700

TABLE 15.ESTIMATED PROFIT

Selling price (₹)	Cost invested (₹)	Profit (₹)	Profit%
131170636700.00	122089572916.58	9081063783.42	7.438033868

X. CONCLUSIONS

The feasibility of township development at Kadambur, Chennai city has been studied and the following conclusions are drawn.

- Township has become necessary and important to handle the accumulating population in India and township provides the best solution to the population problem.

- In order to complete the project within the given budget and time, scheduling tools has to be used to properly plan each activity of the construction in order to save time and money.
- The project can be completed in 4 phases within a span of 2 years and micro scheduling helps to plan precisely which gives us the number of days it takes to complete each phase.
- The population distribution based on income:
- It is estimated that a profit of 7.44% can be made from the project recommending the feasibility of the residential township.

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