

**ACTION PLAN AND MANAGEMENT PLAN FOR SOLID WASTE
MANAGEMENT OF CHIKMAGALUR CITY.**

Submitted to
Directorate of Municipal Administration
Government of Karnataka
Bangalore

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Part 1: Status Report

1. Introduction

Chikmagalur is the headquarters of the district of the same name. Chikmagalur is one of the important hill station located in the western part of Karnataka and situated in the backdrop of the picturesque Bababudan Mountain of the Western Ghats. Chikmagalur is the district headquarters and largest urban center in the district. The city is very well known for coffee. The city is located at a distance of 40km from Kadur and 57km from Hassan. There are two state highways, Mangalore-Kadur at a distance of 40km. The nearest seaport & airport is Mangalore located at a distance of 124km. The city is situated at an altitude of 1021m above the mean sea level and is located on 13⁰36' North altitude and 75⁰45' Eastern longitude.

The administrative limits of the Chikmagalur City Municipal Council encompass an area of 27.00 sq.km. The city has increased in area with inclusion of new areas into the municipal limits. There has been stress on Solid Waste Management for the city. Now the Karnataka State government has formulated a State Policy for Solid waste management. The Nirmala Nagara programme has also emphasised on Solid Waste Management for the town. A programme for improvement of the Solid waste management system is proposed for Chikmagalur city on the lines of the State Policy for Solid Waste Management. The table 1 gives a gist of the recommendations and implications of the National and State policy documents.

Table 1: Recommendations and implications of National and State Policy documents.

Recommendations	Implications
Daily clearance of Waste, daily sweeping, door step collection	Needs strengthening of the present system
Multiple handling of wastes to be avoided, well designed collection	The requirement necessitates complete overhaul of the present collection &

system and covered transport	transport equipment.
No burning of wastes, segregated collection to be promoted	Public awareness creation and change in knowledge, attitude and practices of the public is essential. Has implication on collection, transport and disposal systems.
No open dumping, processing of biodegradable waste - inert and non biodegradable to be land filled	Needs major up gradation of the waste processing and disposal facility
Biomedical and industrial hazardous waste to be handled separately	Requires incorporation of these facilities

This document gives the action plan for implementation of improved solid waste management systems in Chikmagalur.

This document provides an overview of the existing system of Solid waste management at Chikmagalur. The details of the existing staff, equipment, contracts and budgets are provided to give a backdrop to the proposed changes. The action plan for each of the components of Solid waste management has been detailed. The overall strategy, equipment and manpower requirement and mode of execution are presented. The investments involved and the strengthening of the municipal staff is also proposed.

2. Report of Objectives & Methodology

This report gives the action plan for solid waste management for Chikmagalur with a ten – year perspective. The objective of the report is as follows:

- a. To consolidate the information on the existing system of Solid waste management.
- b. To detail the action plan for Solid waste management in conformity with the State Policy on Solid Waste management and MSW rules 2000
- c. To provide a document which would be used for immediate procurement of equipment and services for implementation of Solid Waste Management system and provide a baseline for all future plans for solid waste management.

The methodology used for formulating the report is given below:

- a. An initial plan for the solid waste management was prepared based on the standards proposed in the state policy of Solid waste management.
- b. The supporting collateral data for implementation of the plan has been collected. An extensive survey and data collection has been under taken in the city about various waste generators. Ward wise data has been collected and used for the analysis. Cost estimates have also been obtained for different equipments.
- c. Waste collection quantification has been carried to provide a baseline for waste generation estimates.
- d. Extensive discussions have been held with the municipal councilors to socialize the concepts proposed and obtain acceptance for the same.
- e. Discussions have been held with the waste generators and self-help groups to assess their interest and acceptability to the proposals. The suggestions received have been incorporated into the plans.
- f. There is a wealth of experience within the health department staff and the revenue department staff of the municipality about the various factors of waste management, People acceptability and profile of the city. This has been tapped in collecting, understanding and interpreting the data.
- g. This document gives detailed plans for waste management in Chikmagalur. The understanding and knowledge in the municipality has been used to draw up the details. But there are many imponderables, which would get known as the plan gets implemented. Consequently although the plan goes into specifics there is still scope provided for corrections that may be required at the field level during implementation.

Table 2 gives the section and page numbers where the report objectives are covered in the report.

Table 2: Report on objectives and sections where it is covered in the report.

Objectives	Coverage
Collect all relevant data and assess all the existing solid waste management practices	Under points 3,4,5
Detailed plan for various aspects of waste management	Under points 6,7
Financials of solid waste management	Under points 8

3. Profile of Chikmagalur

3.1 History: The history of Chikmagalur can be traced back to 9th Century A.D or even farther back to the mythological period of King Janamejaya. There are many versions, historical and mythological details about naming of the old city. The city is named after Chikmagalur, the younger daughter of Rukmangada, the king of Sakrepatna. This village is supposed to have been a part of Rukmangada's dowry.

3.2 Structure of the city: The city is located on a plateau and is surrounded by terraced paddy fields. Like a typical hill city Chikmagalur has developed in a liner pattern in the north-south direction. Basavanhalli Tank towards the northeast end and Turuvekere tank towards the south inhibit further development in these directions. The earlier development is towards the south, whereas the suburbs developed later are located towards the north. The busstand is in the center of the city.

3.3 Location & Linkages: Chikmagalur is one of the important hill station located in the western part of Karnataka and situated in the backdrop of the picturesque Bababudan Mountain of the Western Ghats. Chikmagalur is the district headquarters and largest urban centre in the district. The city is very well known for coffee. The city is located at a distance of 40km Kadur and 57km from Hassan. There are two state highways, Mangalore-Kadur at a distance of 40km. The nearest seaport is Mangalore located at a

distance of 124km. The city is situated at an altitude of 1021m above the mean sea level and is located on 13⁰36' North altitude and 75⁰45' Eastern longitude.

Table 3: Salient Features of City Municipal Council, Chikmagalur.

City	Chikmagalur
District	Chikmagalur
Population (Present)	106500
Area	27.00sq.km
Geographic location	75 ⁰ 45' Eastern longitude & 13 ⁰ 36' North altitude Elevation: 1021m above the mean sea level
Rainy season	July-October
Connectivity	Air: Bangalore (245km);Mangalore(124km) Road: Kadur(40km); Hassan(57km);Bangalore(250km) Rail: Kadur(42km); Bangalore(245) Seaport: Mangalore(124km)
Growth Potentials	Coffee curing Trading center for Agro, forest and plantation products Location advantages The administration status as the District Headquarters. City More potential for improving the economic base and employment opportunities.
Main Tourist Spots	Ratnagiri Bore Kodandarama Temple
Rainfall	920mm (normal average annual)
Temperature	14 ⁰ C-32 ⁰ C

3.4 Population Growth and Density:

Chikmagalur had a population of 101248 persons in 2001. The population growth pattern of the city is illustrated in the following table:

Table 4: Population Growth of the city.

Census year	Population	Decade variation
1901	9515	-
1911	8537	-10.28
1921	10207	19.56
1931	12225	19.77
1941	15383	25.83
1951	21744	41.35
1961	30253	39.13
1971	41639	37.66
1981	60582	45.49
1991	80567	33.00
2001	101248	25.67

Source: Development Plan of Chikmagalur and Census of India;2001

Karnataka State is one among the most urbanized states next to Maharashtra, Gujarat and Tamilnadu in India as per 2001 Census. The urbanization level of the Karnataka State is 33.95% as per the 2001 census, which is higher than the National average of 27.78%. The state is endowed with large number of small and medium urban settlements.

The above **table No. 4** reveals the growth in population of the city. The population decreased in 1911, due to plague and other epidemics; the population has increased steadily from 1911 to 2001 due to functional importance of the city.

The city encompasses an area of 27.00sq.km. The population density of the city is worked out at about 3750 persons per sq.km as per 2001 census, it has continuously increased from about 805 persons per sq.km as per 1951 census.

3.5 Ward Profile:

Chikmagalur has 31 wards. The various features of the wards are presented in this section. Ward is a political boundary and also the basis of planning and allocation of funds. Especially the proposed system of Solid waste management involves door-to-

door collection and extensive people participation. The ward councilor is the people representative from the ward and operating in ward jurisdiction would be provided better chances of succeeding in implementation of the programme. The data on population area and the households is given in table 5. The population across all the wards is more or less same. The area varies significantly. Consequently the population densities also vary significantly. The most densely populated wards include 7,8, 11, 12,13, 14, 15, 16, 24 etc.

Table 5 : Ward wise population, area and density (2001 censuses)

Ward No.	Population	Area	Households	Slum Households	Total households	Population density
1	3631	3.60	988	-	988	274
2	3254	4.05	827	-	827	204
3	3048	1.10	454	34	488	475
4	3442	1.99	642	-	642	323
5	2610	0.45	761	-	761	1691
6	3326	1.37	849	-	849	620
7	3327	2.51	1550	82	1632	683
8	2666	0.58	1212	-	1212	2090
9	2871	0.14	544	166	710	6257
10	3501	0.12	702	39	741	6500
11	2642	0.12	596	44	640	5700
12	3344	0.27	824	66	890	3541
13	5880	3.00	1021	-	1021	340
14	2586	0.10	610	-	610	6100
15	2964	0.09	402	-	402	4467
16	2968	0.12	602	-	602	5017
17	4097	0.09	206	341	547	9867
18	3036	0.10	600	-	600	6000
19	3957	0.20	86	511	597	5955
20	2111	0.71	402	48	450	701
21	2947	1.60	473	-	473	296

22	2866	0.11	483	-	483	4391
23	4720	0.09	369	-	369	4100
24	2977	0.26	1336	117	1453	6038
25	3094	0.14	367	-	367	2621
26	3840	0.06	242	68	310	6300
27	4580	0.20	442	145	587	3660
28	4422	0.14	617	-	617	4407
29	3277	1.43	703	-	703	492
30	4119	2.04	797	-	767	376
31	4397	0.22	624	-	624	2836
	106500	27.00	20335	1661	21962	3300

Table 6: Declared and identified Slums of Chikmagalur

Sl. No	Location	Type	Ward Number	Household
1	Hiremagalur Agalagundi	Identified	3	34
2	Vasthare toll gate	Declared	7	82
3	Shankarapura	Identified	9	81
	Shankarapura	Identified	9	85
4	Shankarapura- by the site of drain	Identified	10	39
5	Christian Colony	Identified	11	44
6	MI Channel Area	Identified	12	66
7	Landy Thallab	Declared	17	132
	Landy Thallab	Declared	17	122
	Landy Thallab	Declared	17	87
8	Market Road Slum	Declared	19	150
	Sandy Maiden	Declared	19	152
	Sandy Maiden	Declared	19	179
	Sandy Maiden	Declared	19	180
9	Kakheers Colony- Dantarmakki	Declared	20	48
10	Taragina pete	Identified	24	20
	Gawri Kalvae	Identified	24	97

11	Behind Polythenic	Identified	26	68
12	Near Soweshwara Temple- Basavanhalli	Identified	27	145
Total Slums = 12 (wardwise)				1811

Table 7: Ward wise details on Road infrastructure.

Roads for daily sweeping				
Ward No.	Roads	Width (ft)	Type	Dist (M)
3	Kodandarama Temple Road	30	A	250
4	Suggikal Road	30	A	330
	Kanchagara Road	20	A	570
5	Belur Road	80	A	150
	Kote agrahara road	30	A	150
	Belur Road Quarters	30	A	400
	PWD Guest house	20	A	150
6	Belur Road	80	A	600
	Belt Road	30	A	380
	Employment office Road	25	A	70
	Agrahara Road	25	A	235
7	PWD Link Road	80	A	250
	Hosmane Main Road	30	A	500
8	Naidu bedi	30	A	280
	Church Road	30	A	190
	Azad park circle	40	A	200
	IG Road	80	A	385
	MG Road	40	A	300
	Market Road	40	A	170
	Prabhu beedi	30	A	340
	Naekar beedi	30	A	225
	Chokanna beedi	20	A	200
	Saganipura road	20	A	200
	Hunasemarad beedi	20	A	180
	Sheetra Beedi	30	A	185
	Deepa Nursing home down	20	A	500
	Shankarapura last cross	20	A	290
Deepa Nursing home down	20	A	500	
10	Market Road	40	A	350
	Janatha Hamam Road	20	A	200
	Ram Mandir Road	20	A	200
	Shankarpura 3 rd Cross	20	A	240
	4 th Cross	20	A	240
	Anupama Mn Road	20	A	200
	Shankarapura Main Rd	30	A	500
11	IG Road	80	A	650

	Jail Road	80	A	150
	Private Busstand	40	A	75
	Kamath Hotel Road	20	A	150
	Municipal Quaters Road	30	A	200
	Barlane Road	30	A	400
14	Syndicate Bank to SBM	80	A	350
	Hanumantappa circle to syndicate bank	80	A	250
	Hanumantappa circle to Hassan Bakery	40	A	350
	Municipal Hospital Road	30	A	150
	Cooptex Road	30	A	200
	NR Pura Road	30	A	200
	Andechatra	30	A	200
	SM Street	20	A	150
	Anjuman Street	20	A	50
	Koramragalli +Gundappa street	20	A	300
	Md. Khan Galli + Hariyappa Street	30	A	400
15	MG Road (Hassan Bakery-Neekar beedi)	40	A	850
	Andechatra Road	30	A	235
	Jain Temple Road	20	A	240
	Neekar Beedi	20	A	200
	Canara Bank Road	30	A	490
	Agasara beedi	20	A	340
	Arauf Galli	20	A	115
	Maryff Galli	20	A	145
	Hunasemarada Beedi	20	A	125
16	Shettara beedi	30	A	175
	Shariff Street	30	A	300
	Market street	30	A	600
	Hale Bandimattada rasthe	20	A	175
	Acchamma Street (mini galli)	20	A	140
	MG Road	40	A	600
	Jamma Masidi road	20	A	175
	Hanumantharayana beedi	20	A	300
	Sungeeta road	20	A	175
	Anjunaya Temple Street	20	A	175
	Chotta mattan rasthe	20	A	175
	Dergi road	20	A	170
	Road behind Vegetable Market	20	A	120
17	Market street	40	A	375
	MG Road	40	A	375
	Shariff Street	30	A	325

	Ajjamma Street	20	A	145
	Jyothi Theatre	20	A	160
18	Shankarapura Main Road	20	A	415
19	Park road	20	A	265
	CPI Office rd	20	A	350
22	Vijayapura Rd till Nehrunagar	40	A	460
	Mallandur Rd	80	A	540
	Shadi Mahal Rd	30	A	250
	Anjuyana Temple Street	30	A	165
	Kenipoint road	20	A	150
	Darbar Hotel road	20	A	200
23	Ashrivad cir to NMC	60	B	300
	Tilak Park Rd	30	A	275
	1 st Con	20	A	280
	Dildhar Road	20	A	150
	Anjuyana Temple Street	30	A	375
	Primary School Rd	30	A	185
24	Water tank road	30	A	200
25	Basavanhalli Main Rd	80	A	450
	Arale katte rd	80	A	340
	Ratnagiri Rd	80	A	365
	Town Canteen Rd	80	A	205
26	Edga Rd	20	A	355
	Broad Way Road	20	A	350
27	Basavanhalli Main Rd	80	A	410
	Aruna NH down Road	30	A	280
28	Hanumantappa Cir- Arale katte	80	A	390
	Adj. Taluk Office	30	A	190
	Aaralee marada rd	30	A	235
	KM Road	80	A	605
	Ratnagiri Rd	80	A	500
	Kumbara Beedi	30	A	150
	Neekar Beedi	30	A	115
				31235
Roads for twice a week sweeping				
Ward	Roads	Width (ft)	Type	Dist (M)

1	KM Road	80	A	120
	Holi cross Road	60	B	250
	5muki Ganapathi Temple Street	60	B	350
	School Road	60	B	150
	Jayaram STD Road	40	B	150
	Commissioner's House	60	B	200
	Filter Bed Road	40	B	350
3	Hiremagalur Main Road	25	B	150
	Colony – 1 st Cross	25	B	150
	Colony 2 nd Cross	25	B	150
	Chikkamma Temple Road	25	B	150
	Muttinamma Temple Road	25	B	200
	Lakshmipura main Road	25	B	75
4	Kanchagara Road	20	A	570
	Kandal Road	30	A	370
	Sheshappa beedi	20	B	160
	Shankermane road	20	B	200
5	CMC Road	60	B	225
	Sheshappa Road	20	A	360
	Old SBM Road	40	B	475
	Link Road	60	B	375
	KSFC Road	60	B	530
	RTO Office road	60	B	175
6	Harihareshwara beedi	20	B	180
	Donikana	20	A	400
	Kote Veerabhadrashewra tpl st	20	A	100
	2 chappadikal road	20	B	250
	Cement roads	10	B	100
	Subbanayakana beedi	20	A	160
	Gandhinagara 2 con roads	30	B	300
	P&T Road	30	B	385
7	Forest Office Road	80	B	375
	IB Shanker Mane Road	20	A	320
	Spencer Road	40	B	325
	RTO Office opp Road	40	B	230
	Gandhinagar main road	30	B	300
	PWD guest house main road	30	B	200
9	Lakshminagara colony 8 Cons roads	30	B	1200
	BeltRoad - Shpura 1 st main	30	A	250
	Shankarapura 2 nd main	30	A	235
	Shankarapura 3 rd main	20	A	235
	P&T behind	30	A	205
	Muttinamma Temple Rd	20	A	300
	2 ND main cross rd	20	B	140
	Conservancy	20	B	355
	Lakshminagara main road	30	B	150
	SJRCY Office rd+Con	30	B	450
10	Janatha Hamam Road	20	A	200

	Ram Mandir Road	20	A	200
	Shankarpura 3 rd Cross	20	A	240
	4 th Cross	20	A	240
11	Behind Prakash Lodge + 2 cons	20	A	575
	Behind Annapurna Towers	20	A	300
	Fish Shop Road	20	A	160
12	12 Ayyappanagara 2 nd Cross	20	B	250
	3 rd Cross	20	B	190
	4 th Cross	20	B	225
	5 th Cross	20	B	190
	Barlane Road	30	A	250
	Pension Mohalla	20	A	215
14	KoramaraGalli +Gundappa street	20	A	300
	Md. Khan Galli + Hariyappa Street	30	A	400
16	Conservancy Road	20	A	155
17	Hamam Road	30	B	200
	Landy Tallab	30	B	400
18	Akbar Ahamed Rd+2 con rds	20	B	135
	Buden Road	20	B	275
	Buden Rd's two conservancy rds	20	B	155
	Mutton Shop rd	20	B	300
	MSR & 2 con rds	20	B	140
	Alfa Tailor Rd	20	B	175
19	Conservancy	20	A	400
	Colony Road	20	A	100
	Adj. Chamundi coffee works	20	A	175
	Bovi Colony	20	A	175
	Roads perp Azeez galli	20	B	105
	Azeez galli	20	B	265
	Muniyamma rd	20	B	150
	Con rd	20	B	150
	School Rd	20	B	150
	Market Area	30	B	300
	Public Toilet Road	30	B	200
20	Dantaramakki Main Road	30	A	200
	Anjunaya Temple Road	20	A	150
	KEB Quaters Road	30	A	150
	Harijan Colony Main Road	20	A	150
	Anjunaya Temple 1 st Cross	20	A	75
	Anjunaya Temple 2 nd Cross	20	A	75
	Anjunaya Temple Road 3 rd Cross	20	A	75
	Right of main Road 1 st Conservancy	20	A	300
	Left of main Road 1 st Conservancy	20	A	250
	2 nd Conservancy	20	A	100
	Urdu School Road	20	A	300
	Kere Kodamma Temple Road	20	A	150
22	Makka-Madina road	20	A	275
	BDO office rd	20	A	165

	Usha Lodge + 5 Conc roads	20	A	430
	Nagegowdara vone	20	A	150
23	Bhadria Masidi Rd	20	B	60
	Uttaiah Mane Rd	20	B	340
	Armugam Rd	20	B	335
	Plegamma Temple rd	30	A	275
	1 st Con	20	A	280
	Dildhar Road	20	A	150
	Cement Road	20	A	150
	Bhdriya masidi 2 con rds	20	A	120
	Primary School + 2 con rds	20	A	540
	2 nd Con + perpendicular rd	20	A	240
	2 nd Con	20	B	270
24	Valti mane rasthe	30	B	150
	Paiz mane road	20	B	150
	Mini tank road	30	B	150
	Road behind Rubi mane	20	B	100
	Dhobi krishnappana mane road	20	B	100
	Pujari mane road	20	B	100
	front & Backside Gare Rajannana mane	20	B	150
	5 Conservancy roads	20	B	250
	Nurani Masadi Road	30	B	350
	Jaithoundi mane road	30	B	150
	Rashimallappa 's hosue road	30	B	200
	10 Conservancy roads	20	B	500
	Boti Krishnappana mane road	40	B	700
	Kariyannana mane angadi road	20	B	100
	left of Church road	30	B	100
	Gare Rajanna road	20	B	200
	Shanima Temple road	20	B	150
	Bhavikal road	20	B	175
25	Tilak Park Road	30	B	345
	Conservancy Rd	20	B	240
	Aadibhootappa Rd	20	B	360
	Rd per to Conservancy	20	B	390
26	Tilak Park St	30	B	350
	Urdu School Road*2	30	B	700
	Arch – 3 Slum rds	20	B	100
	Urdu Shale Rd	30	B	245
	Rd II to Arch Rd	30	B	85
	Urdu Shale Road	30	B	115
	Cement road	20	B	185
	Roads behind & front of RevannaGowda mane	30	B	200
	Mini tanker road	30	B	200
	Puttammana mane road	20	B	100
	Adi bottappa Temple road	20	A	375
	7 Conservancy roads	20	B	700

	front roads of Rama Mandira	20	A	300
	front road Maruthi Gim	20	A	350
	Baba mutton stall road	20	B	100
27	Narayanapura Road	20	B	135
	Typing Inst. Rd	20	B	150
	SDA School Rd	20	B	245
	Aradhya Mane Rd	20	B	185
	Kanaka Water Supply Rd	20	B	160
28	Narasinga Roa Rd	30	B	285
	Conservancy Rd	30	B	285
	GK Temple Rd	30	B	370
	Service Station Rd	30	B	290
31	Ramachandra Mane Rd	30	B	365
	Jaitumbi Mane Rd	30	B	310
	Gullu Road	30	B	275
	Ganapathi Temple Rd	30	B	150
	Nehru nagara 1 st Main	60	B	225
	Nehru nagara 2 nd Main	60	B	150
	Vanja Printers Rd	40	B	550
	Behind hostel	30	B	160
	Tinker Babu Rd	30	B	340
				40670
Roads for Once in a week sweeping				
Ward	Roads	Width (ft)	Type	Dist (M)
1	HUDCO 1 st Phase & 9 Cons. roads	40	C	1800
	III Phase & 10 cons. roads	40	C	3000
	II Phase & 8 Conservancy roads	40	C	2400
2	Jyothinagara	30	C	700
	Naragudanahalli Main Road	30	B	200
	Doddakurubarahalli Main Road	30	B	100
	Chickakurubarahalli Main Road	30	B	100
	Kalyana Nagara	40	B	100
	Ambedkar Colony	25	B	100
	Ashraya Colony	25	B	200
3	Lakshmipura colony	20	C	150
	Amblay Road	20	C	50
	Water tank road	20	C	75
	Gouthmeshwara Temple Road	20	C	75
	Anjunaya Temple street	20	C	100

	Vinayaka nagara & 6 Cons Roads	25	C	700
	Hosamane Colony	30	C	700
	Colony Main Road	20	C	400
	Bus stop Road	60	C	50
4	Kote Channapura Road	30	C	300
5	Kuvempu Nagara	30	C	500
7	Maruthi nagara & 4 cons roads	30	C	300
	Kambakanahalli colony	30	C	200
	Srinivas nagara colony	30	C	100
	Jayanagara Colony & 10 Cons Roads	30	C	500
	Parvathipura	30	C	150
	Gavanhalli & 5 conservancy roads	20	C	500
	Hosamane road	40	C	150
	KM Road	60	C	150
	Gavanhalli main road	60	C	75
	Hosamane colony & 6 conservancy roads	30	C	300
	Adarshanagara & 4 conservancy roads	30	C	200
Kuvempunagara	30	C	500	
8	Belt Road Circle	30	C	200
	School Road	20	C	200
	Pais compound road	30	C	450
11	Mavinatooop	30	C	300
12	Extension Areas	30	C	1480
13	Ashraya colony	20	C	200
	Didhir nagara	20	C	100
	Masidi colony	20	C	75
	School colony	20	C	20
	Mallandur road (Behind Hero Honda show room)	20	C	55
	Ashraya Colony Road	20	C	100

	Upalli New Extension Main Road & Cross Roads	30	C	500
	Indeevara Road	30	C	200
	Fakker Colony 1 st & 2 nd Cross	30	C	150
	Lakshmi Temple Road	30	C	75
	Masadi Road	30	C	75
	Patelara mane Road	30	C	75
	KM Road	60	C	300
	Mukthidama to Upalli	60	C	400
	AK Colony Road	20	C	300
	Hiraekollale road	60	C	500
	Hale uppalli Road	30	C	250
17	Puribhatti badavane & 5 Con. roads + boxdrains	20	C	600
	NTC Building	20	C	60
	Madeena Mosque	20	C	50
18	KP Nagesh Mane Rd	30	C	240
	Councilor's mane rd	20	C	235
	Gujari + nazer rd	20	C	515
	Chruch Rd	20	C	375
	Chandru Residency	30	C	260
21	Kuppenahalli Cross Roads	20	C	100
	Jyothinagra Extension Areas	40	C	150
	Govt. School Road	40	C	100
	IDSG College Road(from Petrol Bunk-AIT Circle)	40	C	200
	Kuppenahalli Main Road	30	C	100
	Jyothinagra Main Road	40	C	100
25	BT Road	80	C	220
	ITI + Sheshappa Rd	20	C	285
	Behind Kalyana Mantap	20	C	210
	Raghavendra Swamy Temple Rd	30	C	345

	Conservancy Rd	20	C	345
27	AK 47 conservances	30	C	120
	SDA School Conser	20	C	240
	Srilekha Theatre Rd	30	C	160
	Infront of Srilekha	30	C	275
	Sowmeshwara Temple St	20	C	200
	KR Pete Colony	20	C	335
	Chaudeshwari Temple st	20	C	275
28	Anche linganna beedi	30	C	320
	Sowmeshwara Temple st	30	C	90
	Dr. Raj Rd	30	C	210
	Bandiya st + Con	20	C	160
	Kalleshwara Rd	20	C	100
	Behind Ranganna Choultry	20	C	90
	Behind Basavanhalli Mn Rd	20	C	230
29	Housing Board colony	30	C	150
	Chandranagara & 3 conservancy roads	30	C	150
	Hosamane colony & 5 conservancy roads	30	C	150
	AK Colony & 5 Conservancy roads	30	C	250
	Kalidas nagara	30	C	200
	Karkipate main road	30	C	75
	Patil mane road	30	C	100
	KEB to Chandrakatte	80	C	150
	Basaveshwara temple & 4 conservancy road	30	C	250
	Padma raju mane road	30	C	100
	Kempannahalli school road	40	C	100
	Raju Doctor mane road	40	C	125
Ratnegiri Bore & 5 conservancy road	30	C	350	
30	Halenahalli main road	20	C	100

	Govt. Primary School Road & 6 Conservancy	25	C	200
	Fathima mane road	20	C	100
	Gauri chitra mandira road	20	C	50
	TCH Training school & 4 Conser. roads	20	C	200
	Town Canteen to Mountain View School	60	C	1500
	Post office road & 4 conservancy road	30	C	500
	Police Quatres roads	30	C	800
	Ramanahalli main Road	60	C	200
	Kenchaiah mane road& 4 conservancy road	30	C	250
31	Chruch pakkada rd	30	C	345
	4 th Cross Rd	30	C	200
	Masadi Rd	30	C	75
	2 nd Cross	30	C	200
	1 st Cross	30	C	170
	Behind Chitra saw mill	30	C	180
				35445

- A Daily Sweeping
 B Twice a week sweeping
 C Once a week sweeping

Table 8: Ward wise data on different waste generating establishments

Ward No	Fruit, vegetable shops	Meat shop	Vegetable markets	Choultry	Restaurants & hotels	Institutions	Nursing Homes & Hospitals	Religious places & others
1	1	-	-	-	2	2	1	3
2	-	-	-	-	-	-	-	1
3	-	-	-	1	-	-	-	4
4	-	1	-	-	-	-	-	4

5	-	-	-	1	1	-	2	-
6	-	1	-	2	2	6	-	2
7	-	1	-	-	5	5	-	7
8	-	-	-	1	7	-	4	1
9	-	-	-	1	-	-	-	5
10	-	1	-	-	2	-	-	2
11	-	2	-	-	9	3	-	1
12	1	4	-	-	8	3	-	6
13	1	3	-	-	-	1	-	4
14	-	2	-	1	5	3	1	3
15	1	2	-	3	11	1	-	7
16	1	6	1	3	5	-	-	7
17	2	3	-	-	2	-	-	-
18	-	-	-	-	-	-	-	3
19	1	18	1	1	-	-	-	3
20	-	-	-	-	-	-	-	4
21	-	-	1	-	-	3	-	1
22	4	3	-	-	13	-	1	-
23	1	4	-	1	2	5	-	4
24	-	-	-	-	-	-	1	3
25	3	-	-	1	5	2	1	4
26	2	1	-	1	2	-	1	2
27	1	-	-	1	4	3	1	4
28	2	-	-	3	6	4	-	3
29	-	-	-	-	-	4	-	10
30	2	1	-	-	-	3	-	5
31	1	-	1	1	-	1	-	5
Total	24	53	3	22	91	48	13	108

3.6 Salient data about the city:

The salient data about the city is presented in table 9:

Table 9: Salient data of the city

Sl. no	Item	Details
1	Population	101248 persons (2001) with 21925 households with 9 declared and 10 identified slums
2	Area	27 Sq. Km
3	Number of wards & Councilors	31 wards & 31 elected councilors
5	Markets	There are 3 vegetable major markets. In addition there are 24 vegetable and fruit shops, 53 meat shops
6	Biomedical establishments	13 hospitals and nursing homes
7	Hotels and restaurants	There are 91 hotels & restaurants in the city
8	Offices, industries	3456 shops, 22 marriage halls, 30 major offices and one major industrial area
9	Budget of the city Corporation	The estimated budget for 04-05 is Rs. 9.47 crores. The SWM budget for 2004-05 is 1.11crores.

4. Current SWM Practices

The Chikmagalur City Municipal Council is responsible for Solid waste Management of the city. It has its own staff and equipments to under take the solid waste management for the city. The details are given in this section.

4.1 Overview:

The solid waste management system of the town consists of Door to door collection from 24 city wards by an NGO called Swaccha. The collected wastes are then being dumped in mesh like bins, which are secondary collection receptacles. In addition there are other open storage sites where waste is disposed by waste generators, street sweepers & primary collectors. The number of such location ward wise is given in Table

10. The mesh like bins as well as waste from open dumping places is emptied into tractors manually by loaders. The tractors then transfer waste to the dumping site.

Table 10: Details of dustbins & open storage site

Ward No	Meshes/Bins	Open dumping sites
1	15	20
2	-	5
3	-	4
4	1	3
5	4	4
6	-	2
7	1	6
8	1	3
9	1	8
10	-	6
11	-	3
12	1	3
13	-	6
14	1	2
15	2	-
16	-	4
17	1	5
18	-	7
19	-	13
20	-	7
21	-	4
22	-	4
23	1	3
24	1	4
25	1	-
26	1	4
27	-	5

28	1	4
29	1	5
30	-	7
31	1	9
Total	35	171

The road sweeping activity is carried out by Pourakarmikas. There is no standard for the length covered by a PK. The PKs are using the conventional brooms and pushcarts for sweeping. The sweeping is done in two beats.

Table 11: Data on road sweeping

Sl.No	Activity	Details
1	Road Sweeping	The activity is divided into 3 zones each managed by one Health Inspector.
2	Drain Cleaning	The smaller drains are cleaned along with street sweeping and on demand basis. The deeper drains are cleaned 2 times in a year. The health department manages all drain cleaning.

There are 3 tractors, 2 lorries and 2 minilorry owned by the CMC. Out of these 2 tractors, 2 lorries and 1 minilorry are used for solid waste management and 1 tractors & 1 minilorry for water supply operations. The list of vehicles owned and operated for Solid waste management is given in Table 12.

Table 12: List of vehicles & their dimensions.

	Vehicle No	Owner	USE	Dimensions		
				L	B	H
Tractor 1	KA 18 G 3081	CMC	MSW	5387	1985	1768
Tractor2	MYC 3652	CMC	MSW	5387	1985	1768
Lorry 1	KA 18 3038	CMC	MSW	5945	2132	2290
Lorry 2	MEC 3996	CMC	MSW	5945	2132	2290

Minilorry	KA 18 351	CMC	MSW	5387	1985	1768
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4.2 SWM Staffing:

The permanent staff of the CMC includes 101 Powrakarmikas, 6 Drivers (3 Contract), 7 Supervisors, 3 Junior and 1 Senior Health Inspectors. There is minimum 3% absenteeism among the Powrakarmikas and the effective strength is 80 (some of them are deployed for other office works). The CMC has been provided with an Environmental Engineer on contract.

Table 13: Deployment of Staff

S.No	Staff	Permanent	Temporary/ Contract
1	Pourakarmikas	101	-
2	Drivers	3	3
3	Supervisors	7	0
4	Jr.Health Inspector	3	0
5	Sr.Health Inspector	1	0
6	Environmental Engineer	-	1

Table 14: Deployment of PKs

Sl. No	Total Number	Allotted Number	Allotted Work
1	101	7	Supervisors (In charge)
2		3	UGD
3		1	Driver
4		1	Office work
6		1	Water supply
7		1	Engineering Section
Total		101	14

4.3 Privatisation

The Chikmagalur CMC has privatised collection of waste from bins and open dumping site. In this contract vehicles are provided by CMC only manpower is provided by the contractor.

4.4 Financial Aspects:

Budgeted estimate for the year 2004-05 is positive. The Chikmagalur CMC spent about Rs. 5.09 crores, in the year 2003-04. The Budgetary expenditure for the year 2004-05 is 9.16 crores. Both revenue and expenditures are approximately same figures.

Table 15: Consolidated budgets of the Chikmagalur CMC (Rs. in lakhs)

Head of Account	Actual Accounts 2002-03	Revised estimate 2003-04	Budgeted estimate 2004-05
Opening Balance	22.27	18.11	40.94
Receipts	470.25	509.42	906.65
Expenditure	479.97	509.58	906.62
Closing Balance	12.55	17.95	40.97

The table 16 gives the detailed break up of the salaries for solid waste management and the table 17 gives overall budget for SWM for the years 2000-01 to 2003-04 and for the first half of 2004-05.

Table 16: Expenditure on salaries for Solid waste management (in Rs)

Year/ Month	Health inspectors	Pourakarmikas	Drivers	NMEP	Total
2000-01	399961.00	6425678.00	264019.00	1477957.00	8567615.00
2001-02	423930.00	6054243.00	283678.00	972031.00	7733882.00
2002-03	537474.00	5860600.00	345680.00	675058.00	7418812.00
2003-04	397808.00	7980539.00	325126.00	841410.00	9544883.00
Apr-04	39379.00	489637.00	27521.00	74006.00	630543.00

May-04	39379.00	404094.00	27521.00	74034.00	545028.00
Jun-04	39379.00	505587.00	27521.00	74034.00	646521.00
Jul-04	40011.00	498057.00	28008.00	74034.00	640110.00
Aug-04	40011.00	560826.00	28008.00	77446.00	706291.00
Sep-04	40223.00	438699.00	28208.00	80614.00	587744.00

Table 17: Expenditure on SWM (In Lakhs)

Year/ Month	Diesel Expenses	Repair & Maintenance	Sanitary Materials Purchase	Miscellaneous	Contracts	Total
2000-01	414785	70847	261,425.00	103,840.00	859,036.00	1709933
2001-02	479506	107212	254,120.00	48,690.00	976,717.00	1866245
2002-03	658295	87339	274855.00	4165.00	1396409.00	2421063
2003-04	648537	37036	156100.00	3925.00	1050075.00	1895673
Apr-04	67834	13002	-----		72500.00	153336
May-04	74260	-----	2660.00	11775.00	72500.00	161195
Jun-04	67653	2988	-----		60625.00	131266
Jul-04	76141	9441	14518.00	49430.00	72500.00	222030
Aug-04	78494	-----	-----		72500.00	150994
Sep-04	75824	885	-----	32100.00	72500.00	181309

4.5 Biomedical and Industrial Wastes:

The biomedical wastes of the city are being collected by a private operator & will not come to municipal solid waste.

4.6 Activities undertaken under Nirmala Nagara programme

As part of the Nirmala Nagara Programme the classification of dustbins for routine collection of waste has been undertaken. Detailed data collection and planning has been done. Identification of self help groups as well as capacity building of these groups have been undertaken. Identification and possession of a disposal site has also been undertaken.

4.7 Processing & disposal

At present efforts are being made under INEP (Indo Norwegian Environment Programme) programme for processing of waste. ASTRA Bangalore will be setting up a demo gasification unit as well as a demo composting units if capacities 6 & 7 MT/day respectively. Two Sites of 25 and 10 acres has been identified and taken possession.

Table 18: Analysis table of current SWM situation and MSW rules 2000.

S. No	Item	Present Situation	Comments
1	Storage at Source	Storage of waste at source is in practice in 24 wards where door-to-door collection is in practice	Needs strengthening of the system as well as promoting segregation before being handed over to the collection staff.
2	Primary collection	Is in practice in 24wards with the efforts of an NGO SWACCHA	Requires promotion of the same in other wards. Segregation should be introduced.
3	Sweeping	The sweeping is done based on adhoc plans	Proper plans have to be made for sweeping and put into practice. This should be based on a set of standards which have to be put into place
4	Secondary Storage	Meshes and open dumping sites where ever they are have become the storage points	Secondary storage points needs to be recognized and collection from these points should be regular
5	Transport	Tractor-trailers & lorries are used as transport equipments. Tractors are equipped with Tipping	There should not be manual handling of waste. There is a need to upgrade the transport system.

		mechanisms but in lorries loading and unloading is manual, covering of waste is not in practice.	
6	Processing	There is no processing facility	This is not acceptable as only non-biodegradable wastes can be land filled. A processing facility has to be established
7	Disposal	Unscientific dumping is in practice	Proper land filling has to be put into practice.

5. Waste Estimates

5.1 Waste generation pattern and projections

It is estimated that Chikmagalur generates about 36 tons of waste per day. Out of this about 73% is collected and transported out daily. The details and the basis of the estimates are provided. Based on these estimates the design capacity of the various facilities is also given.

5.2 Waste transported per day.

There are 2 tractors, 2 lorries & 1 minilorry operating at Chikmagalur city municipal council. Weighing of the waste transported per trip has been done for all the vehicles. The average number of trips being undertaken by each of the vehicles has been taken from the records and based on the data the waste transported has been estimated in table 19. A total of 13.2 tons is transported by 2 tractors, 6.5 tons by 2 lorries & a minilorry as per the estimate.

Table 19: Waste transported per trip

S. No	Vehicle	Number	Average trip /day	Waste /trip in kg	Total waste transported in kg
1	Tractor	2	2	3300	13200
2	Lorry	2	1	3285	6570

3	Mini Lorry	1	2	3260	6520
					26290

5.3 Waste generator based assessment

The estimate of the waste based on generator data is presented in table 19. The data is presented ward wise. The waste generation for each of the generator is taken from literature and the number of generators is taken for Chikmagalur. The product of the waste generation and the number of generators in the ward give the quantity of waste generation for that ward. The data for each generator and ward is calculated and presented. The total waste generation is estimated at 36 ton per day. The waste generated per ward is also listed.

Table 20 : Estimates of waste generation based on generator data

Ward No	House hold waste	Commercial waste	Hotels	Fruit & Meat shops & markets	Other wastes	TOTAL
1	988	29	60	7	10	1094
2	827	17	-	-	2	846
3	488	31	-	-	8	527
4	642	28	-	6	8	684
5	761	47	30	-	4	842
6	849	45	60	6	16	976
7	1632	64	150	6	24	1876
8	1212	43	210	-	10	1475
9	710	47	-	-	10	767
10	741	152	60	6	4	963
11	640	115	270	14	8	1047
12	890	99	240	35	18	1282
13	1021	93	-	28	10	1152
14	610	84	150	10	14	868
15	402	75	330	20	16	843
16	602	66	150	1450	14	2282
17	547	57	60	35	-	699

18	600	52	-	1133	6	1791
19	530	47	-	-	6	583
20	450	51	-	1000	8	1509
21	473	46	-	49	8	576
22	483	45	390	34	2	954
23	369	43	60	15	18	505
24	1453	39	-	-	8	1500
25	367	33	150	16	14	580
26	310	36	60	5	6	417
27	587	42	120	9	16	774
28	617	44	180	10	14	865
29	703	62	-	-	28	731
30	797	45	-	10	16	868
31	624	160	-	7	12	803
Total	21925	1780	2730	3911	338	30684
			Construction & demolition waste			2000
			Occasional Choultry waste			3300
			Total			35984

5.4 Assessment based on normative standards

The Supreme Court committee report suggest a normative number of 210 grams per capita as the waste generation in towns of size of Chikmagalur. Based on the present population of about 1.1 lakh the waste generation is estimated at about 25 MT /day.

5.5 Waste generation per day and quality of wastes

The waste collected is estimated at about 26.3 tons. The estimate based on waste generation is 36 tons and as per the normative standard is about 22 tons. Based on these three estimates and the assessment of the CMC the waste generation is estimated 36 tons per day.

The typical waste characterisation undertaken by various agencies and our estimate for chikmagalur is presented in table 20.

Table 21: Waste Characterization for Chikmagalur

Element	TIDE	NEERI	Our Estimate
Paper	11.6%	2.91%	15%
Glass	1.4%	0.56%	
Metal	0.2%	0.33%	
Compost able Matter	72%	44.57%	56%
Inhert & Misc.	14.8%	44.37%	26%
Unaccounted	0	7.26%	3%
Total	100%	100%	100%

5.6 Projection of waste generation

A planning period of 10 years has been taken for the design of equipment and services. The growth of waste over the next decade has been projected in table 21. The waste projection has been done to accommodate the increase in population and a 1% increase in waste generation rate per annum. chikmagalur would still retain a large area, which is not completely urban in character in the next decade, and a --- growth rate of waste generation is deemed adequate. In another decade the total waste generation is estimated at 45 tons per day.

Table 22: Growth rate of waste generation in Chikmagalur

Year	Population	Quantity of waste (T/day)
2001	101248	25
2004	106500	36
2009	111500	39
2011	117000	41
2014	125500	43

5.7 Design capacities of various facilities

Based on the assessed character of the waste and the projection of waste generation the design capacity of the various facilities is presented in table 22. The basis used is also explained in the table. The design capacity for the collection transport would be 30 tons per day, for processing would be 45 tons per day. The landfill sizing

would be done based on the capacity of the landfill site. It is estimated that 15% of the incoming wastes would have to be land filled.

Table 23: Design capacities of various facilities.

SI No.	Item	Design Year	Basis	Capacity
1	Collection & Transport	2004	This is designed based on 80% of recent capacity. The same can be upgraded as required	30 ton /day
2	Processing	2014	At 80 % of projected waste generation to accommodate for source segregation	43 tons /day
3	Landfill	2014	A maximum of 15 % of waste is estimated to be landfilled. The balance would be recycled as compost	7 tons/day

Part 2: Detailed Action Plan

6 Strategy for SWM for Chikmagalur

6.1 Principles

The principles enunciated in the Karnataka state policy for Solid Waste Management has been adopted in the preparation of the detailed action plan. Table 23 gives the standards used for calculation of the primary collection, secondary storage and equipment requirements.

Table 24: Standards used for calculation of primary collection & secondary storage and equipment requirements.

Sl. No.	Item	Standard
1	Handcart for Primary Collection	160 houses per day
2	Tricycles for Primary Collection	240 houses per day
3	Auto tipper for Primary Collection	1000 houses per day
4	Hand cart for Street sweeping	1 for every 2 PK
5	Container for secondary collection	3 m ³ for 1200kg and 4.5 m ³ for 1800 kg collection
6	Twin Dumper Placer	10 bins transported per day
7	Sweeping Standards	1 km /day/ PK

6. Detailed Plans

7.1 Primary collection and secondary storage

The waste generation have been classified into 5 groups of households, small generators, large generators, road based generators and generators not covered by CMC. Each of these groups has been further sub classified and a primary collection strategy for each of them is presented in table 24.

Table 25: Classification of waste generators and primary collection strategy.

S.No	Waste generator	Primary collection strategy
1.	Household	
	Which can pay	RWA (SWACCHA) to collect from 24wards on payment basis. Remaining wards (7) to be collected on alternate days by 4 SHGs. The boundaries for each group are demarcated. The choice of equipment would be with the agency performing the work.
	Slum households	The waste collection by placing 40 L bins and collection by CMC. Declared and identified slums included
2.	Small generators	
	Shops, offices, eateries, temples and other	Collection by SHG or RWA within which the generators are present using the equipment

	establishments generating less than 20 kgs of waste per day.	purchased.
3	Large Generators	
	Hotels, institutions and other waste generating more than 20kg Choultries, Fairs and occasional generators	Collection by Private agency based on user charges either through container hired or with tractor-trailer.
4	Road based generators	
	Road sweeping & shallow drain (45 cm depth) cleaning	To be done by PKs of CMC
	Litter from road users	To be done by PKs of CMC
	Debris	To be done by PKs of CMC
	Dead Animals	Municipal crew with tractor trailer to handle as a part of task based grouping to be created
	Deep drain cleaning	Municipal crew with tractor trailer to handle as a part of task based grouping to be created
	Open plot cleaning, parks and green wastes from road side	To be done by PKs of CMC
5	Waste generators not covered by CMC	
	Hospitals	by external agency as per Biomedical waste Rules
	Industries	To be handled on their own

Based on the estimate of the ward wise waste generation the deployment of the secondary storage container has been proposed. The same is presented in Table 25. The location of the container have also been identified and shown on maps. A total of 12 of 3m³ and 12 of 4.5 m³ are required.

Table 26: Primary Collection in non slum households.

BLOCKS (wards)	Houses	Commercials	Operated by	Vehicle Allotted	
				Autotippers	Pushcarts
1 (1)	988	58	SWACCHA	1	--
2 (2,3)*	1315	97	SHG	1	--
3 (4,5,6)	2255	241	SWACCHA	1	3
4 (7,8)	2844	214	SWACCHA	2	--
5 (9,18)	1310	202	SWACCHA	--	5
6 (10,16)	1343	437	SWACCHA	--	6
7 (11,14,15)	1652	548	SWACCHA	1	4
8 (12,22)	1373	288	SWACCHA	1	2
9 (13)*	1021	187	SHG	1	--
10 (17,19)	1077	210	SWACCHA	--	1
11 (20,21)*	923	195	SHG	1	--
12 (23,25,26)	1046	225	SWACCHA	1	1
13 (24,31)	2077	158	SWACCHA	2	1
14 (27,28)	1204	173	SWACCHA	1	1
15 (29,30)*	1500	215	SHG	1	--
15 blocks	21928	3448	1 RWA 4 SHGs	14	24

* Door-to-door collection to be made on alternate day basis.

Table 27: Waste collection in slums

Sl. No	Location	to be operated by	Operation pattern	Bin requirement	PKs deployed

1	Hiremagalur Agalagundi	CMC	to operate on alternate days in each slum	4	1
9	Kakheers Colony- Dantarmakki				
2	Vasthare toll gate	RWA	to motivate the public so as to deposit at near by Secondary bin location/ to be operated by RWA without usercharges	4	-----
3	Shankarapura	CMC	to operate on alternate days in each slum	10	1
4	S. pura- by the site of drain				
5	Christian Colony	CMC	to operate on alternate days in each slum	13	1
6	MI Channel Area				
10	Taragina pete Gawri Kalvae				
11	Behind Polythenic				
7	Landy Thallab	CMC	to operate daily + sweeping to be done	17	1
8	Sandy Maiden	CMC	to operate daily + sweeping to be done	25	1
12	Near Soweshwara Temple- Basavanhalli	CMC	to operate daily + sweeping to be done	7	1
Total Slums = 12 (wardwise)				80	6

Table 28: Secondary container location & their capacities.

Container Location	Ward No.	Name of the Location	Container Capacity
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number			
1	12	Pension Mohalla	3.0
2	14	CMC Hospital	4.5
3	13	Upalli near Hirekolale Circle	3.0
4	31	Nehrunagara- Triangular park	4.5
5	25	DSAG Polytechnic (Road margin)	4.5
6	26	Urdu School-Vijayapura	3.0
7	28	Pai Choultry- Basavanhalli	3.0
8	27	Karnataka Saw Mill-Narayanapura	4.5
9	20	Danataramakki - Conservancy	3.0
10	19	Tamil Colony – CMC Park	4.5
11	1	Housing Board Colony- near councilor's house	3.0
12	5	Agrahara Circle- Minor Irrigation Drain	4.5
13	17	Behind Choota Makkan - Sheriff Galli	4.5
14	18	Tippunagara- Veeraswamy point	3.0
15	6	Gandhinagar- CMC Park	3.0
16	9	Behind Ambedkar School - shankarapura	4.5
17	8	Behind Private Bus stand	4.5
18	7	Adarshnagara near Annapoorna Hospital (Road margin)	3.0
19	8	Naidu Beedi-Post office road	4.5
20	2	Narigudanahalli- Stadium Road	3.0
Total 20 containers, 12 (3.00cum) and 12 (4.5cum)			

7.2 Plan for sweeping & debris collection

It is proposed to use existing CMC PKs for Street sweeping. The town has been divided into 3 zones and detailed road wise listing for each of the zone has been done along with the road width and land use of the road. (Refer Table No.7)

7.3 Plan for transport of wastes

The transport of waste would be done by using dumper placers. 2 dumper placers are required to transport 24 containers.

7.4 Bio medical & industrial waste collection.

This collection would be done by the waste producers themselves.

7.5 Processing & disposal plan.

It is proposed to have a BOT based composting and landfill facility to be set up in Chikmagalur.

7.6 Private Sector Participation

A significant role for private sector participation has been identified. Transportation of waste with the dumper placer, transportation street swept waste and debris as well as Bulk waste management is proposed to be privatized. The **table no. 29** below shows the list of the agreements and tenders to be floated along with the terms of the tender. It is proposed that 3 agreements with the RWA/SHG would be entered into as a part of SWM activity.

S. No.	Name of the tender	Detail
1	Equipment procurement tender	a. Price fixation tender for handcart, and auto tippers b. Purchase of dumper placer (2) and containers (24) c. Purchase of tractor with all attachments (1)
2	Door-to-door collection agreements	1 agreement with SWACCHA & 4 with SHG (for places that are not covered by Swaccha)
3	Transportation using Tractor trailer (debris & street swept waste)	Contract between CMC and service provider to collect on daily basis form 3 circles using 3 tractor trailer

3	Transportation using Dumper placer	Equipment supply by CMC, operation & routine maintenance including providing one driver & one helper from contractor. Only one set of contract for 2 dumper placer
4	Bulk generators: Both regular & occasional contract	Contract between CMC and service provider to collect on daily basis from identified generators and on occasional basis, based on demand per use basis. Municipality in turn will charge the bulk generator
5	Processing & disposal	Build operate & transfer operation on term concession

7.7 Deployment of existing CMC Staff and Vehicles

Table no 30. gives the details of the deployment plan for the existing staff. The deployment plan for the vehicles is given in **Table 31.** The table gives information of the numbers available and the deployment location and roles:

S. No	Cadre	Total number	Number deployed	Deployment
1	Pourakarmikas	87	6	For slum collection
2	Pourakarmikas	87	31	For daily sweeping
3	Pourakarmikas	87	13	For twice a week sweeping
4	Pourakarmikas	87	6	For once in a week sweeping
5	Pourakarmikas	87	13	Considering 15% absentees
6	Pourakarmikas	87	18	Task force
7	Supervisors(promoted)	1	1	For management of Slum collection & Task force
8	Supervisors	6	2	Circle I
9	Supervisors	6	2	Circle II
10	Supervisors	6	2	Circle III
11	NMEP- Malaria Staff	16	4	Circle I
12	NMEP- Malaria Staff	16	4	Circle II
13	NMEP- Malaria Staff	16	4	Circle III
14	NMEP- Superior Field sup.	3	1	Circle I
15	NMEP- Superior Field sup.	3	1	Circle II
16	NMEP- Superior Field sup.	3	1	Circle III
17	UGD	4	3	UGD workers
18	UGD- Supervisor	1	1	UGD work
19	Drivers-SWM	5	3	For Tractor
20	Drivers- UGD	5	1	UGD vehicle
21	Drivers	5	1	Task force vehicle
22	Junior Health Inspectors	3	1	Circle I
23	Junior Health Inspectors	3	1	Circle II
24	Junior Health Inspectors	3	1	Circle III
25	Senior health Inspector	1	1	Managing contracts & agreement and attached to EE
26	Environmental Engineer	1	1	Manage SWM, Malaria activities

Table 31a: Deployment plan for existing vehicles & equipments

S. No	Vehicle	Total Number	Number deployed	Deployment
1	Tractor	3	1	Road sweeping, debris – maintained by CMC
2	Tractor	3	1	Under major repair
3	Tractor	3	1	Road sweeping, debris – maintained by CMC (now being used for Water supply)
4	Lorry	2	1	Under major repair
5	Lorry	2	1	Under major repair
6	Mini lorry	1	1	Taskforce

It is proposed to hire one Tractor trailer for lifting of debris & street swept waste.

Table 31b below shows the arrangement made for lifting of debris & street swept waste.

S. No	Vehicle	Total Number	Number deployed	Deployment
1	Tractor	3	1	Road sweeping, debris for Circle 1
2	Tractor	3	1	Road sweeping, debris for Circle 2
3	Tractor (to be hired)	3	1	Road sweeping, debris for Circle 3

8 Financial Aspect

The financial aspects of the SWM plan are given in this section. With the change in the system of SWM we do not expect in any significant costs saving immediately. With the inclusion of waste processing and disposal the costs would increase. But in the long run as the experience is gained we expect that the total cost of SWM would stagnate and not grow at the current rates.

8.1 Total investments required

The immediate investments required on the equipment are presented in table 33. The total immediate investment required is Rs.85.40 lakhs. The equipment procurement budget has been estimated at Rs.71.40 lakh and the subsidy for primary collection would be 14.00 lakhs.

Table 32: Additional Investment on Solid Waste Facilities

S.No	Equipment	Cost/Unit	Number	Amount
1	Push cart (Street sweeping)	7000	60	420000
2	Subsidy for Pushcart (Primary collection)	3500	24	84000
3	Subsidy for Auto tippers (Primary collection)	200000	4*	400000
4	3 cum containers	35000	12	420000

5	4.5 cum containers	45000	12	540000
6	Dumper placers	1000000	2	2000000
7	Tractor with attachments	1275000	1	1275000
8	Sweeping equipments	600	300	180000
9	Litter bins	5000	80	400000
10	40 L bins	350	80	28000
11	Mechanized Malaria equipment	100000	1	100000
	Total			5847000

* Out of 14 Autotippers to be procured, 10 will be handled by SWACCHA (RWA) and 4 by SHG. (Thus CMC has to spend Rs. 1lakh /tipper for those to be maintained by SHG)

The tender value of the contracts for dumper placer transports, tractor trailer transport and bulk waste generator collection has been presented in tables 33, 34 & table 35. This would be used as a basis for calling the tenders. The transport contract for Dumper placer would be Rs. 42500 per vehicle per month & for transport through Tractor trailer would be 128081 per month. The bulk generator contract would be Rs. 28807 per month at Rs. 244 per generator.

Table 33: Engineer estimate per annum per dumper placer

Average Distance per trip up & down	20	
Number of trips per day	6	
Total Distance per day	120	
Fuel Economy	8 km/lt	
Fuel Used	15	
Cost per litre	31	
Total cost per day	465	Cost / month
Total fuel cost		13950
Driver		6000

Helper		2500
Routine maintenance at 0.25% / month		2500
Cost of renting vehicle from ULB		12000
Profit @ 15%		5542
Cost per vehicle per month		42492
Cost per vehicle per year		509904

Table 34: Engineer estimate per annum for Bulk generator

Number of Bulk Generators	118	
Average waste per generator	30	
Total waste per day	3540	
Average waste per trip by tractor	2000	
Average distance per trip up & down	60	
Number of trips per day	2	
Total distance per day	120	
Fuel economy	8km/l	
Fuel used	15	
Cost per liter	31	Cost per month
Total cost of fuel	465	13950
Driver		4000
Helper		2100
Routine maintenance at 0.25% / month		2500
Cost of renting vehicle		2500
Profit @ 15%		3757
Cost per vehicle per month		28807
Cost per vehicle per year		345684
Cost Rs/ton transported		97.6
Average charge per generator		244

Table 35: Engineer estimate per annum for lifting debris & street swept waste using 2 CMC Tractor-trailer and hiring 1 Tractor-trailer

Average distance to be covered by each tractor	30 kms	
No. of tractors required	3	
Number of trips per day/vehicle	2	
Total no. of trips per day	6	
Distance per day / vehicle	60	
Total distance per day / vehicle	180	
Fuel economy	4km/lt	
Fuel used	45	
Cost per liter	32	Cost per month
Total cost of fuel	1440	43200
Driver	by CMC	
Helper	2100/vehicle	6300
Routine maintenance at 0.25% / month		2500
Cost of renting vehicle from ULB (2 vehicles)	2500/vehicle	7500
Profit @ 15%		8925
Cost per month		68425
Cost per year		821100

8.2 Cost of Municipal solid waste management

The CMC Chikmagalur has spent Rs.98.39lakh for Solid Waste management in the year 2002-03 accounting to Rs. 780/ton of solid waste & Rs. 114lakhs in the year 2003-04 accounting to Rs. 907/ton. In the first half of the year 2004-05 it has spent Rs.47.56lakh. If the trend in the first half continues the total expenditure for the year 2004-05 would be Rs.95.12 lakhs and cost per ton of waste would be Rs. 754. Based on the proposed system the costs for the various components have been estimated and presented along with the current data. If the proposed system was adopted the estimated costs system would be Rs.96.99

lakhs per year at present prices. The new system would be comparable in costs to the present system. In the long run as the efficiencies improve and high cost manpower retires the projected costs would be lower than the present system.

Table 36: Operational costs of the SWM system for Chikmagalur.

	Year 2003-04	April-Sept 2004 Actual	Oct-March equal to first half	Total	Proposed System
Salaries	9544883	3756237	3756237	7512474	7512474
Diesel expenses	648537	440206	440206	880412	-----
Repair & Maintenance	37036	26316	26316	52632	-----
Sanitary Materials Purchase & Miscellaneous	160025	110483	110483	220966	-----
Transportation contract	-----	-----	-----	-----	821100
Contracts	1050075	423125	423125	846250	-----
Sweeping	-----	-----	-----		-----
Dumper Placer	-----	-----	-----		1019808
Bulk Generators	-----	-----	-----		345684
Total	11440556	4756367	4756367	9512734	9699066