

## CHAPTER – 9

### COST ESTIMATES, PHASING AND FINANCING PLAN

#### 9.1 UNIT RATES

9.1.1 The Traffic and Transportation Plan comprising proposals for public/mass transport system, inter-city bus terminals, pedestrian facilities, parking facilities, road infrastructure, integrated freight complexes, transport system management measures etc has been prepared for the BMA to cater to travel demand up to the year 2025 at an acceptable level of service as explained in Chapter 7. In order to know the financial implications of these proposals, block cost estimates have been worked out in this chapter. Unit rates adopted for items at 2007 prices are given in **Table 9.1**.

**Table 9.1 Unit Rates**

S.No.	Item	Unit	Rate (Rs Cr.)
1	Metro Elevated Section	per Km	130
2	Metro Underground Section	per Km	250
3	Mono Rail/ Light Rail Transport System	per Km	85
4	Commuter Rail System inc. dedicated line, signalling systems, improvement of stations etc.	per Km	15
5	BRT	per Km	12
6	Low floor urban commuter buses	Each	0.4
7	Bus terminal cum Traffic & Transit Management Centres (TTMC)	Each	45
8	Bus station	Each	12
9	Bus depot	Each	6
10	Bus shelter	Each	0.03
11	Inter-city bus terminal	Each	45
12	Elevated Road	per lane/ Km	10.0
13	New dual carriage way road	per lane / Km	1.66
14	Widening of roads	per lane/Km	0.5
15	Grade separators 6 lane dual CW 700 mts long	each	30
16	Improvements of Foot paths	per Km	0.2
17	Sky walks	Each	2
18	Automatic Mechanical Parking	per parking space	0.05
19	Conventional Multi Storey Parking	per parking space	0.02
20	Integrated Freight Complex	Each	45

## 9.2 COST ESTIMATES OF PROPOSALS AND PHASING OF IMPLEMENTATION

**9.2.1** Considering the various proposed schemes and unit rates, cost estimates of these schemes have been worked out at 2007 prices and are given for Proposed Mass Transport Corridors, City Bus System, Road Infrastructure, Grade Separators, Pedestrian Facilities, Parking Facilities, Integrated Freight Complexes and Transport System Management Measures in **Tables 9.2 to 9.9** respectively. The entire transport development plan is not required to be implemented in one go. Considering the existing problems, expected traffic demand levels and schemes already under implementation/ active consideration of the Government, phasing of implementation of various projects has been suggested in three phases (2007–12, 2013–18 and 2019–24) and is also given in these tables. Cost estimates for each project to be implemented in the three phases have also been given in the tables.

**Table 9.2 Cost Estimates of Proposed Mass Transport Corridors (Rs Crore)**

S.No.	Corridor	Length km	Unit Cost per Km	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
<b>Metro System</b>							
1	Baiyyappanahalli to Mysore Road East-West Corridor	18		5605	5605		
2	Peenya to R.V terminal North-South Corridor	18.8					
3	R.V .Terminal to PRR	10.2	130	1326	1326		
4	Baiyyappanahalli to Benniganahalli along Old Madras Road	1.5	130	195	195		
5	Yelahanka R.S. to PRR via Nagavara , Electronic City	36	175	6300		6300	
6	Indiranagar Metro Stn. to White field Railway Station via 100ft Indiranagar Road	19.5	130	2535		2535	
7	Proposed Devanahalli Airport to M.G.Road via Bellary Road	33	120	3960	3960		
	<b>Total</b>	<b>137</b>		<b>19921</b>	<b>11086</b>	<b>8835</b>	

S.No.	Corridor	Length km	Unit Cost per Km	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
<b>Mono Rail / LRT System</b>							
1	Hebbal to J.P.Nagar (Bannerghatta Road) along the western crescent of outer ring road	31	85	2635	2635		
2	PRR to Toll gate along Magadi Road	9	85	765	765		
3	Kathriguppe Road / Ring Road Junction to National College	5	85	425	425		
4	Hosur Road – Bannerghatta Road Junction to PRR along Bannerghatta Road	15	85	1275		1275	
	<b>Total</b>	<b>60</b>		<b>5100</b>	<b>3825</b>	<b>1275</b>	
<b>Commuter Rail System</b>							
1	Kengeri – Bangalore City Station.	13	15	195	195		
2	Bangalore City Station – Whitefield	24	15	360	360		
3	Bangalore City Station – Baiyyappanahalli Via Lottegollahalli	23	15	345		345	
4	Lottegollahalli to Yelahanka	7	15	105		105	
5	Banaswadi upto BMA Boundary	29	15	435		435	
6	Kengeri– BMA Boundary	9	15	135	135		
7	Yeshwantpur to BMA Boundary	14	15	210		210	
8	BMA Boundary – Hosur	12	15	180		180	
9	BMA Boundary– Ramanagaram	23	15	345		345	
10	BMA Boundary to Tumkur	50	15	750			750
	<b>Total</b>	<b>204</b>		<b>3060</b>	<b>690</b>	<b>1620</b>	<b>750</b>
<b>BRT System</b>							
1	Hebbal to Bannerghatta Road along Eastern portion of the ORR	33	12	396	396		

S.No.	Corridor	Length km	Unit Cost per Km	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
2	Benniganahalli (ORR) to PRR along Old Madras Rd.	7	12	84	84		
3	From ORR to Hosur Road along Hitech Corridor	8	12	96	96		
4	Hosur Rd. to Tumkur Road along PRR (western part)	41	12	492		492	
5	Tumkur Road-PRR Junction to Hosur Road along PRR via Tirumanahalli, Old Madras Road, Whitefield	76	12	912		912	
6	Along Core Ring Road	30	12	360	360		
7	Vidyaranyapura to Nagavarapalya via Hebbal, Jayamahal Road, Queens Road, M.G. Road, Ulsoor, Indiranagar, CV Raman Nagar	29	12	348	348		
8	Kengeri Sattelite Town to J.P. Nagar along Uttarahalli Road, Kodipur	13	12	156		156	
9	Banashankari III stage to Banashankari VI stage Ext. along Ittumadu Road, Turahalli, Thalaghattapura	6	12	72		72	
10	Domlur Ext. to Koramangala along inner ring road	5	12	60	60		
11	Mulur to Maruti Nagar (up to Hitech corridor) along Sarjapur Road	7	12	84	84		
12	Peenya to PRR along Tumkur Road	6	12	72	72		
13	Old Madras Road near Indiranagar to ORR near Banaswadi along Baiyyappanahalli Road - Banaswadi Road	5.5	12	66	66		
14	Hebbal to Devanahalli Airport along Bellary Road	25.0	12	300	300		
	<b>Total</b>	<b>291.5</b>		<b>3498</b>	<b>1866</b>	<b>1632</b>	

**Table 9.3 Cost Estimates for Proposed Improvement in City Bus System and Intercity Bus terminals / IMTCs ( Rs Crore)**

SNo.	Proposals	Phase	Units	Qty/Nos.	Unit Cost (Rs Cr)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
<b>City Bus System</b>									
1	New Buses to be added by 2010	P-1		2500	0.4	1000	1000		
	Addl. Buses to be added by 2018	P-2	1500	3000	0.4	1200		600	
	Addl. Buses to be added by 2025	P-3	1500		0.4				600
2	Bus Terminal cum Traffic & Transit Management Centres (TTMC)	P-1	45	45	45	2025	2025		
3	New Bus Stations	P-1	23	23	12	276	276		
4	New Bus Shelters	P-1		300	0.03	10	10		
5	New Depots Upto 2010	P-1	27	27	6	162	162		
	Addl. Depots required by 2018	P-2	10	20	6	120.00		60	
	Addl. Depots required by 2024	P-3	10						60
6	Improvement of IT Infrastructure	P-1				184.00	184		
7	Multimodal Transit Centre at Subhashnagar	P-1	1	1	350	350	350		
8	Development of HRD Infrastructure	P-1				150	150		
9	Environment Protection Projects	P-1				49	49		
<b>Intercity Bus Terminals / IMTCs</b>									
10	Intermodal Transit Centres cum Intercity Bus Terminal-Peenya	P-1	1	1	60	60	60		
11	Intermodal Transit Centres cum intercity Bus terminals- Hosur Rd, Bellary Rd, NGEF at Old Madras Road	P-1	3	3	45	135	135		
	<b>Total</b>					<b>5721.0</b>	<b>4401</b>	<b>660</b>	<b>660</b>

**Table 9.4 Cost Estimates for Proposed Road Infrastructure Development Plan ( Rs Crore)**

S. No.	Corridor	Length km	Unit Cost per Km (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
<b>New Roads</b>							
1	Core Ring Road (CRR) (elevated)	30	40	1200	1200		
2	Arterial Roads crossing CRR	30	1	30	30		
3	Peenya Industrial Area To Bangalore Mysore Expressway	2.2	10	22	22		
4	Peripheral Ring Road (PRR)	114	30	3420	3420		
5	Air Port Link Road (Expressway)	26	20	520	520		
6	Link from Tigalarapalaya main road to Nelagadaranahalli (Cost included in Item 42 of parallel ring road)	1.23					
7	Link from Hesarghatta main road to Shettihalli and Madarahalli to Mohammed Sabi Palya (Cost included in Item 43 of parallel ring road)	4.02					
8	Link from Sampigehalli to CRPF parade ground (Cost included in Item 25 of parallel ring road)	1.72					
	<b>Total</b>	<b>209.17</b>		<b>5192</b>	<b>5192</b>		
<b>Outer Ring Road Re Alignment</b>							
1	Elevated road along Bang. University Road (excluding cost of Construction of ORR connecting Mysore Road to Magadi Road including underpass across Bangalore Mysore Rly Line accounted for at item no. 9 of RUB/ROB List)	2.5	20	50	50		

S. No.	Corridor	Length km	Unit Cost per Km (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
2	Realigning ORR between Magadi Rd. and Pipe Line Rd	1.9	10	19	19		
3	Realigning ORR at Tumkur Rd through CMTI	1.2	10	12	12		
4	Realigning ORR from Kasturi Nagar to Mahadevapura along Salem railway line	5	10	50	50		
5	Elevating ORR along common portion with Sarjapur Rd (excluding cost of grade separators at Agara & Ibbalur at item no. 6 & 7 of list of Grade separators)	2	10	20	20		
6	Elevating ORR along common portion with Bannerghatta Road	1	40	40	40		
7	PESIT to Janabharti Entrance Bangalore University	3	40	120	120		
	<b>Total</b>	<b>16.6</b>		<b>311</b>	<b>311</b>		
<b>Road Improvements (Inside ORR)</b>							
1	Bellary Rd	7.60	1	7.6	7.6		
2	Palace Road	1.75	1	1.75	1.75		
3	Seshadri Road	0.50	1	0.5	0.5		
4	Nrupatunga Road	1.10	1	1.1	1.1		
5	Vidhana Veedhi	0.20	1	0.2	0.2		
6	Mission Road	1.00	1	1	1		
7	Devanga Hostel Road	0.50	1	0.5	0.5		
8	Sankey Road	3.40	1	3.4	3.4		
9	Lalbagh Road	0.41	1	0.41	0.41		
10	Jaymahal Road	2.80	1	2.8	2.8		
11	Hosur Road	1.60	1	1.6	1.6		
12	Hosur Laskar Road	4.30	1	4.3	4.3		
13	Victoria Road	1.60	1	1.6	1.6		
14	Lower Agaram Road	2.40	1	2.4	2.4		
15	Sarjapur Road	3.35	1	3.35	3.35		
16	Hosur Road	4.30	1	4.3	4.3		

S. No.	Corridor	Length km	Unit Cost per Km (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
17	Bannerghatta Road	4.11	1	4.11	4.11		
18	80' Koramangala	4.00	1	4	4		
19	Dickenson Road	0.30	1	0.3	0.3		
20	Ulsoor Road	0.60	1	0.6	0.6		
21	Kensington Road	0.32	1	0.32	0.32		
22	Murphy Road	1.70	1	1.7	1.7		
23	Old madras Road	1.70	1	1.7	1.7		
24	Richmond Road	5.20	1	5.2	5.2		
25	Airport Road	5.20	1	5.2	5.2		
26	Goods shed Road	1.35	1	1.35	1.35		
27	Cottonpet main Road	1.20	1	1.2	1.2		
28	17th main J CNagar in ward13	1.50	1	1.5	1.5		
29	5th cross Malleshwaram	1.00	1	1	1		
30	Commissariat Road	0.74	1	0.74	0.74		
31	A M Road	0.75	1	0.75	0.75		
32	Lalbagh fort Road	1.35	1	1.35	1.35		
33	Race Course Road	1.66	1	1.66	1.66		
34	Kasturba Road	0.77	1	0.77	0.77		
35	A S char street & BVK Iyengar Road	1.21	1	1.21	1.21		
36	Vanivilas Road	0.85	1	0.85	0.85		
37	Suranjan Das Road	3.85	1	3.85	3.85		
38	Mysore Road	3.90	1	3.9	3.9		
39	Mt joy Road & Kattriguppe main Road via vidyapeeta Circle	3.00	1	3	3		
40	Mahalakshmi layout & Nandini Layout road via Ayyappa temple & Singapore layout	2.70	1	2.7	2.7		
41	Dinnur main Road and kavalbyrasandra Road (via ganganagar sulthan palya)	4.50	1	4.5	4.5		
42	Hoskerehalli main Road(via girinagar)	2.05	1	2.05	2.05		
43	Vasanth nagar main Road	0.62	1	0.62	0.62		
44	K R Road	1.16	1	1.16	1.16		
45	Sulthan Road	0.42	1	0.42	0.42		
46	1st main Chamarajpet	0.15	1	0.15	0.15		
47	3rd cross Chamarajpet & Bull temple Road	1.00	1	1	1		
48	Link Road	0.63	1	0.63	0.63		
49	Padarayanapura main Road	1.86	1	1.86	1.86		



S. No.	Corridor	Length km	Unit Cost per Km (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
50	Bull temple Road via N R Colony, Chennamma tank bed & 30th main BSK 3rd stage	1.10	1	1.1	1.1		
51	Infantry Road	1.83	1	1.83	1.83		
52	Park Road	0.50	1	0.5	0.5		
53	Hospital Road	1.10	1	1.1	1.1		
54	Dispensary Road	0.50	1	0.5	0.5		
55	K Kamaraj Road	1.25	1	1.25	1.25		
56	Dharmaraj Road	0.40	1	0.4	0.4		
57	Chandini chowk	0.45	1	0.45	0.45		
58	Meenakshi koil street	0.60	1	0.6	0.6		
59	Thimmai Road	2.10	1	2.1	2.1		
60	Old poor house Road- Haine's Road	1.00	1	1	1		
61	Millers tank bund Road	0.52	1	0.52	0.52		
62	Station Road	1.30	1	1.3	1.3		
63	Queen's Road	0.95	1	0.95	0.95		
64	Millers Road	1.42	1	1.42	1.42		
65	Cunningham Road	0.80	1	0.8	0.8		
66	Road in front of Russel market	0.25	1	0.25	0.25		
67	Dr. Ambedkar Road (tannery Road)	4.43	1	4.43	4.43		
68	Hennur Road	3.62	1	3.62	3.62		
69	Banaswadi Road & Wheelers Road (via Banaswadi)	6.35	1	6.35	6.35		
70	Hare Krishna Road	0.70	1	0.7	0.7		
71	HMT main Road	2.10	1	2.1	2.1		
72	Magadi Road	2.40	1	2.4	2.4		
73	Baiyyappanahalli main Road	3.35	1	3.35	3.35		
74	Bapujinagar cross Road	0.80	1	0.8	0.8		
75	Kumaraswamy layout main Road	1.75	1	1.75	1.75		
76	South link Road	0.50	1	0.5	0.5		
77	MTB Road	0.50	1	0.5	0.5		
78	Kurubarahalli main Road in ward 16	1.00	1	1	1		
	<b>Total</b>	<b>141.73</b>		<b>141.73</b>	141.73		

S. No.	Corridor	Length km	Unit Cost per Km (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
<b>Road Improvements (Outside ORR)</b>							
<b>Radial Roads</b>							
1	From Peenya II Stage to Andrahalli (via Peenya II Stage, Industrial area, Andrahalli)	4.00	0.75	3.00	3.00		
2	Tumkur Road-NH4	8.80	0.75	6.60	6.60		
3	New BEL Road	3.40	0.75	2.55	2.55		
4	Jalahalli Main Road to Attur via Yelahanka	28.00	0.75	21.00	21.00		
5	Yeshwantpur to Yelahanka	20.00	0.75	15.00	15.00		
6	Doddaballapur Road.	6.00	0.75	4.50	4.50		
7	Devanahalli – Hebbal Bellary Road	25.00	3.0	75.0	75.00		
8	NH-7 Kogilu Junction to Nagavara Main Road	8.00	0.75	6.00	6.00		
9	Dasarahalli Main Road	16.00	0.75	12.00	12.00		
10	HBR Ring Road to Nagavara Main Road leading to Jakkur	20.00	0.75	15.00	15.00		
11	HBR Ring Road to Hennur Main Road	16.00	0.75	12.00	12.00		
12	Old Madras Road	5.25	0.75	3.94	3.94		
13	ITPL Road from Ring Road to Hope farm	8.50	0.75	6.38	6.38		
14	Varthur Road from Marathalli to Varthur Kodi	5.00	0.75	3.75	3.75		
15	Varthur to Outer Ring Road via Belegere and Panathur	6.50	0.75	4.88	4.88		
16	Kaigondanahalli to Sarjapur	10.00	0.75	7.50	7.50		
17	Bannerghatta Road – ORR to National Park	8.60	0.75	6.45	6.45		
18	Bannerghatta Road – National Park to PRR	2.40	0.75	1.80	1.80		
19	Begur Road from Hosur Road to Begur	7.00	0.75	5.25	5.25		
20	Kanakapura Road.	10.40	0.75	7.80	7.80		
21	Ring Road to Kanakapura Road (via Ittumadu)	7.00	0.75	5.25	5.25		
22	Rajarajeshwari Nagar Arch to PRR	10.00	0.75	7.50	7.50		

S. No.	Corridor	Length km	Unit Cost per Km (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
<b>Connector Roads</b>							
23	From Magadi Road to NH 4(Via Sunkadakatte, Hegganahalli Main Road, Peenya II Stage, NTT circle, KIADB Main Road)	6.00	0.75	4.50	4.50		
24	Peenya II Stage to Ring Road (via Peenya II Stage Bus stop, Rajgopal Nagar Main Road, Peenya Industrial Area)	3.00	0.75	2.25	2.25		
25	NH-7 to Nagavara Main Road through Jakkur	16.00	0.75	12.00	12.00		
26	NH-7 to Nagavara Main Road	12.00	0.75	9.00	9.00		
27	Hennur Main Road to Hoskote Ring Road	10.00	0.75	7.50	7.50		
28	Horamavu-Agara to HBR Ring Road	4.00	0.75	3.00	3.00		
29	Horamavu Road from Outer Ring Road to Kalkere	4.20	0.75	3.15	3.15		
30	T C Palya main Road from ORR to Anandapura	5.50	0.75	4.13	4.13		
31	Devasandra main road from NH 4 to Basavanapura Road	1.70	0.75	1.28	1.28		
32	Kundalahalli Road from Devasandra main Road to Kundalahalli gate via Hoodi	7.00	0.75	5.25	5.25		
33	ITPL Road to Varthur Road via Pattanadur Agrahara & Nellurahalli	4.00	0.75	3.00	3.00		
34	Sarjapur Road to Ring Road(near Devarabisanahalli)	7.00	0.75	5.25	5.25		
35	Nagarthapura to Matha Amruthamayee College	5.00	0.75	3.75	3.75		
36	Hosur Road to Nagarthapura (Hosur Road)	4.00	0.75	3.00	3.00		
37	Begur to Hosur Road (via Begur tank Bund, Chikkabegur and Manipal County)	7.00	0.75	5.25	5.25		
38	Bannerghatta Road to Begur (via Doddakammanahalli, Yelenahalli)	8.00	0.75	6.00	6.00		

S. No.	Corridor	Length km	Unit Cost per Km (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
39	Kottur Dinne to Bannerghatta Road	5.00	0.75	3.75	3.75		
40	Harinagar to Kottanur Dinne	4.00	0.75	3.00	3.00		
41	Corporation Bank to Ring Road via Javaraiana doddi	4.00	0.75	3.00	3.00		
<b>Parallel Ring Road</b>							
42	From Magadi Road to NH 4(Via Herohalli, karivobanahalli, Andrahalli, Tigalarapalya, Nelagadaranahalli, Nagasandra)	8.00	0.75	6.00	6.00		
43	Hesaraghatta Main Road to SM Road (via Mallasandra, Shetty halli, Abbigere, Kammagondanahalli main Road, Gangammagudi Circle)	6.00	0.75	4.50	4.50		
44	Vidyaranyapura Main Road to Hennur main Road	35.00	0.75	26.25	26.25		
45	Nagavara Main Road to Kalkere Junction	8.00	0.75	6.00	6.00		
46	Sarjapura Road to Kalkere via chikkaballapur, Gujarpalya, Varthur, Hope farm, Kadugodi, Sadaramangala, Kodigehalli, Basavanapura, T.C.Palya	31.00	0.75	23.25	23.25		
47	Matha Amruthamayee to Sarjapura Road(Kaigondanahalli)	5.00	0.75	3.75	3.75		
48	Kanakapura Road- Amruthnagar to Harinagar	4.50	0.75	3.38	3.38		
49	Kengeri to Konanakunte via Uttarahalli(end of Kanakapura Road)	13.50	0.75	10.13	10.13		
50	Kengeri 80' Ring Road to Ullalu Main Road via Matha Mata	10.50	0.75	7.88	7.88		
51	Begur Road to Hosur Road and Kudlu	6.00	0.75	4.50	4.50		

S. No.	Corridor	Length km	Unit Cost per Km (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
52	B G Road to Begur Road(via BTM Layout, Kodichikkanahalli	5.00	0.75	3.75	3.75		
53	Chunchaghatta Road to B G Road	6.00	0.75	4.50	4.50		
54	GnanaBharati Circle to Magadi Road	11.00	0.75	8.25	8.25		
	<b>Total</b>	<b>502.75</b>		<b>433.31</b>	<b>433.31</b>		

**Table 9.5 Cost Estimates for Proposed Grade Separators (Rs Crore)**

SNo	Location / Road	Nos.	Unit Cost per G.S (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
<b>Grade Seperators–Roads</b>							
1	Hudson Circle– N.R.Road Under pass	1	30	30	30		
2	Cauvery Theatre Junction–Bellary Road Grade separator	1	10	10	10		
3	Minerva circle– J.C.Road Fly over	1	25	25	25		
4	Nagavara Junction Along ORR Flyover	1	22	22	22		
5	Hennur Banasvadi along ORR underpass	1	25	25	25		
6	Sarjapur Road & ORR Jn. Along ORR flyover near Ibbalur	1	23	23	23		
7	On ORR Jn. Along ORR near Agara flyover	1	40	40	40		
8	Flyover along Hosur Road near Check post	1	25	25	25		
9	Hosur Road–Inner Ring Road along Hosur Road fly over	1	25	25	25		
10	Additional slip road at CSB intersection	1	25	25	25		
11	Hosur Road Grade separator @ Attibelle	1	25	25	25		

SNo	Location / Road	Nos.	Unit Cost per G.S (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
12	Along 16 main BTM Layout underpass	1	25	25	25		
13	Puttenahalli along ORR underpass	1	23	23	23		
14	Kanakapura Road & ORR Jn. Along ORR flyover	1	30	30	30		
15	Kadirenahalli Road & ORR Jn. along ORR flyover	1	30	30	30		
16	Flyover on RV road near RV Teacher College	1	14	14	14		
17	Tagore Circle underpass on Gandhi Bazaar Main Road	1	25	25	25		
18	Tumkur Road & ORR Junction along ORR Grade separator	1	40	40	40		
19	Flyover along NH 4 at Jalahalli Cross	1	25	25	25		
20	Underpass along pipeline road near Ayyappa Temple	1	25	25	25		
21	Grade separator along Guttahalli Main Road near Guttahalli Circle	1	25	25	25		
22	Grade separator at Yeshwantpur Circle near Bus Station	1	22	22	22		
23	Bridge at Gali Anjaneya Junction	1	32	32	32		
24	Grade separator at Malleshwaram Circle	1	12.5	12.5	12.5		
25	Underpass at Prof. CN Rao Circle	1	27.5	27.5	27.5		
26	Underpass along Chord Road at Magadi Road & Chord Road Junction	1	31.5	31.5	31.5		

SNo	Location / Road	Nos.	Unit Cost per G.S (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
27	Underpass along ORR at ORR and Banaswadi Ramamurthy Nagar Road Junction	1	21.5	21.5	21.5		
28	Grade separator at ORR & Magadi Road Junction	1	29	29	29		
	<b>Total</b>	<b>28</b>		<b>713</b>	<b>713</b>		
<b>Road Over Bridges / RUBs–Rail</b>							
29	ROB along MES Road near Jalahalli	1	20	20	20		
30	Underpass along Link Road Connecting D Rajagopal Road & Kodigehalli Road	1	20	20	20		
31	Ashoka Theatre - Pottery Road	1	20	20	20		
32	Nagavara-Arabic College Road	1	20	20	20		
33	Kasturinagar-Chikka- Banaswadi Road	1	20	20	20		
34	Baiyyappanahalli Road	1	20	20	20		
35	Kadugondanahalli Railway line along Nagavara Main Road	1	20	20	20		
36	Hudi Main Road near Whitefield Railway Station	1	20	20	20		
37	Construction of ORR connecting Mysore Road to Magadi Road including underpass across Bangalore Mysore Rly Line	1	87	87	87		
38	along Settihalli main Rd.	1	20	20	20		
39	along S M Road near Gurudwara	1	20	20	20		
40	Along Koigehalli Main Road near Kodigehalli Rly Stn	1	20	20	20		
41	Along Hesaraghatta Main Road	1	20	20	20		
42	Near Tanisandra Rly Stn	1	20	20	20		
43	Along Kundalahalli Road at Kundalahalli gate.	1	20	20	20		

SNo	Location / Road	Nos.	Unit Cost per G.S (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
44	Along Varthur Road near Lakshmi Layout	1	20	20	20		
45	Along Panathur Main Road near Bellandur Rly Stn	1	20	20	20		
46	Along Sarjapur Road	1	25	25	25		
	<b>Total</b>	<b>18</b>		<b>432</b>	<b>432</b>		
<b>Elevated Roads</b>							
47	Elevated Road From Sirsi Circle to ORR on Mysore Road	6	60	360	360		
48	Elevated Road on Hosur Road	10.5	60	630	630		
	<b>Total</b>	<b>16.5</b>		<b>990</b>	<b>990</b>		

Table 9.6 Cost Estimates for Proposed Pedestrian Facilities ( Rs Crore)

SI No	Name of Road	Length (km)/No.	Unit Cost per Km	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
1	Improvement & augmentation of foot paths	350	0.2	70	70		
<b>Skywalks/subways</b>							
2	Cauvery Bhavan to KG circle crossing across KG Road and Distt. Office Road	1	10	10	10		
3	Opposite NTI connecting Guttahalli Road and Palace (opposite Bus Stop) on Sankey Road.	1	3	3	3		
4	Arya Bhavan Sweets to Kanthi Sweet to Himalaya Theatre, crossing KG Road	1	3	3	3		
5	Lalbagh Main Gate (Javaraiah Circle)	1	3	3	3		
6	Bannergatta Road near Jayadeva Hospital	1	3	3	3		
7	BMTC Main Bus Stand to Amar Lodge Building in Majestic Area	1	3	3	3		



SI No	Name of Road	Length (km)/No.	Unit Cost per Km	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
8	KSRTC Kempegowda Bus Station to BMTC Main Bus Station.	1	3	3	3		
9	At Kengeri Bus Stand, Mysore Road	1	3	3	3		
10	At Byatarayanapura on Bellary Road (near Junction of BBMP office complex).	1	3	3	3		
11	BMTC Main Bus Station to Railway Station Premises	1	3	3	3		
12	Shanthala Silk House to KSRTC Main Bus Station and to Good-Shed Road	1	3	3	3		
13	RNS Motors, Tumkur road	1	3	3	3		
14	Jalahalli Circle, Tumkur Road	1	3	3	3		
15	Near Webb junction	1	3	3	3		
16	Near Kamakhya, Kathriguppe Ring Road	1	3	3	3		
17	Gandhi Bazaar Main Road	1	3	3	3		
18	On Vittal Mallya Road near Mallya Hospital	1	3	3	3		
19	Seshadri Road near Maharani College	1	3	3	3		
20	On JC Road near Ravindra Kala Kshetra	1	3	3	3		
21	On Hosur Main Road near Madivala Check post	1	3	3	3		
22	On Raja Ram Mohan Roy Road, near Pallavi theatre	1	3	3	3		
23	On Richmond Road near D'Souza Circle.	1	3	3	3		
24	On Race Course Road near Chalukya Hotel	1	3	3	3		
25	On Commissariat Street near Garuda Mall	1	3	3	3		
26	On Residency Road near Mayo Hall.	1	3	3	3		
27	On Kamaraj Road near Commercial Street	1	3	3	3		

SI No	Name of Road	Length (km)/No.	Unit Cost per Km	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
28	Near Indira Nagar 100 feet Road & Water Tank junction on Airport Road	1	3	3	3		
29.	On Hosur Road (Near Forum)	1	3	3	3		
30.	On Tumkur Road, near SMS Railway Junction	1	3	3	3		
31.	On Air Port Road, Marath Halli at Village Road	1	3	3	3		
32.	On Air Port Road, Marath Halli at Junction of ORR Under Pass	1	3	3	3		
33.	K.R. Pura Bus Stand	1	3	3	3		
34.	Bharatiya Vidya Bhavan, Devaraj Urs Road	1	3	3	3		
35.	On Hosur Road “T” Junction with Tavarekere Main Road (Opposite Sai Sadan & Prestige Acropolis) (High Rise Apartments Condominium)	1	3	3	3		
36.	Mission Road at the foot of Fly over	1	3	3	3		
37.	Vidhana Veedhi near M S Building	1	3	3	3		
38.	Tumkur Road near Yeshwantpur Circle	1	3	3	3		
39.	At South End Circle	1	3	3	3		
40.	30 no. Sky -walks / Sub-Ways along the eastern crescent of the ORR	30	3	90	90		
	Sub-Total	68		211	211		
	<b>TOTAL</b>			<b>281</b>	<b>281</b>		

Table 9.7 Cost Estimates for Proposed Parking Facilities ( Rs Crore)

S.No	Location	Type	Capacity	Cost per Parking Space (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
1	M G Road	AMP	500	0.05	25	25		
2	Kamraj Road	AMP	500	0.05	25	25		

S.No	Location	Type	Capacity	Cost per Parking Space (Rs. Cr.)	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013-18	Phase-III 2019-24
3	Gandhi Nagar	AMP	500	0.05	25	25		
4	Jayanagar Shopping Complex	CMP	1000	0.02	20	20		
5	Koramangala near Raheja Tower	CMP	1000	0.02	20	20		
6	Rajaji nagar BDA Complex	CMP	500	0.02	10	10		
7	Banashankari BDA Complex	CMP	1000	0.02	20	20		
8	Gandhi Bazaar	CMP	500	0.02	10	10		
9	Malleswaram	AMP	500	0.05	25	25		
10	Fire Station, Residency Road	AMP	500	0.05	25	25		
11	Dhobi Ghat, Cunningham Road	AMP	500	0.05	25	25		
12	SP Office, Miller Road, Cunningham Road crossing	AMP	500	0.05	25	25		
13	Near Sagar & States	AMP	500	0.05	25	25		
14	Kanteerava Stadium	AMP	500	0.05	25	25		
15	City Market	AMP	500	0.05	25	25		
16	Bakshi Garden	AMP	500	0.05	25	25		
17	Majestic	AMP	500	0.05	25	25		
	<b>Total</b>		<b>10000</b>		<b>380</b>	<b>380</b>		

Table 9.8 Cost Estimates for Proposed Integrated Freight Complexes ( Rs Crore)

S.No.	Location	No.	Cost per Unit	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013-18	Phase-III 2019-24
1	Hosur Road	1	45	45	45		
2	White Field Road	1	45	45		45	
3	Old Madras Road	1	45	45		45	
4	Bellary Road	1	45	45		45	
5	Tumkur Road	1	45	45	45		
6	Mysore Road	1	45	45	45		
	<b>Total</b>	<b>6</b>		<b>270</b>	<b>135</b>	<b>135</b>	

**Table 9.9 Cost Estimates for Transport System Management Measures (B-TRAC) ( Rs Crore)**

SNo	Component	Nos	Unit Cost Crs	Total Cost (Rs. Cr.)	Phase-I 2007-12
1	Junction Improvements	250	0.7	175	175
2	Street Furniture and Road Marking			100	100
3	Intelligent Transport System including. ATC, VMS etc for 250 intersections			150	150
4	Surveillance / monitoring and enforcement cameras etc			50	50
5	Education and Training / Others			25	25
	<b>Total</b>			<b>500</b>	<b>500</b>

**9.2.2** Summary of the cost estimates for various projects is given in **Table 9.10**. Overall cost of the entire plan is estimated as Rs 46,944 crore of which Rs 31,377 crore is proposed for Phase I (2007–12). Cost of the projects proposed in Phase II is Rs 14,157 crore.

**Table 9.10 Summary of Cost Estimates for the Entire T&T Plan (2007 prices)( Rs Crore)**

ITEM	Length kms/Nos	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
<b>MASS TRANSPORT CORRIDORS</b>					
Metro System	137	19921	11086	8835	0
Mono Rail / LRT System	60	5100	3825	1275	0
Commutor Rail System	204	3060	690	1620	750
BRT System	291.5	3498	1866	1632	0
<b>IMPROVEMENT IN CITY BUS SYSTEM</b>					
Improvement in City Bus System		5721	4401	660	660
<b>ROAD INFRASTRUCTURE</b>					
New Roads	209.2	5192	5192	0	0
Outer Ring Road Realignment	17	311	311	0	0
Road Improvements (Inside ORR)	142	142	142	0	0
Road Improvements (Outside ORR)	503	433	433	0.00	0.00
<b>GRADE SEPARATORS</b>					
Grade Separators-Road (Nos.)	28	713.0	713.0	0.0	0.0
Rail Over Bridges / RUBs-Rail (Nos)	18	432	432	0	0
Elevated Roads (Kms)	16.5	990	990	0	0

ITEM	Length kms/Nos	Total Cost (Rs. Cr.)	Phase-I 2007-12	Phase-II 2013- 18	Phase-III 2019- 24
<b>PEDESTRIAN FACILITIES</b>		<b>281</b>	<b>281</b>	<b>0</b>	<b>0</b>
<b>PARKING FACILITIES (No. of car spaces)</b>	10000	380	380	0	0
<b>Integrated Freight Complexes (IFC):</b>	6	270	135	135	0
<b>B-TRAC</b>		<b>500</b>	<b>500</b>	<b>0</b>	<b>0</b>
<b>GRAND TOTAL</b>		<b>46944</b>	<b>31377</b>	<b>14157</b>	<b>1410</b>

### 9.3 BROAD FINANCING OF TRANSPORTATION PROJECTS

9.3.1 The estimated investment for the entire T & T Plan based on public transport oriented system for the period till 2025 is estimated to be Rs 46944 crore at 2007 prices as given in **Table 9.10**. More than two-thirds of this investment is proposed during the period 2007–12 which coincides with the JNNURM mission period. The proposed Implementing Agency (given in **Table 9.11**) and tentative financing structure for each of the major investments proposed is dealt with briefly below:

**Table 9.11 Implementing Agencies for Various Projects**

S.No	ITEM	Implementing Agency
1.	Metro	BMRL
2.	Mono Rail / LRT	BMRL/New Company
3.	Commuter Rail System	Railways/Govt of Karnataka /BMRDA
4.	BRT	BMTCL / BBMP/BDA
5.	City Bus System (including Inter City Bus Terminals)	BMTCL/KSRTC
6.	New Roads	BBMP/BDA
7.	Road Improvements (Inside ORR)	BBMP
8.	Road Improvements (ORR & Outside ORR)	BBMP,BDA/NHAI
9.	Grade Separators	BBMP/NHAI/ BDA
10.	Rail Over Bridges / RUBs	Railways / BBMP
11.	Improvement & augmentation of foot paths	BBMP
12.	Pedestrian Sky Walks / Sub-Ways	BBMP
13.	Parking Facilities	BBMP
14.	Integrated Freight Complexes (IFC)	BDA
15.	B-TRAC	BBMP/Traffic Police

#### 9.3.2 Metro

Out of Rs 19,921 crore of investment for the 137 km of Metro, financing for Rs 5605 crore corresponding to the present phase I corridors under implementation now (about 34 km) has already been arranged and the project is implemented by BMRL, a company incorporated for the purpose. Balance investment for Metro would also be mobilized by the company through a combination of contributions from Government of India, Government of Karnataka and debt financing. It is also

recommended that JNNURM funding from Government of India to an extent of Rs 532 crores be sought to finance the balance Rs 1521 crores for the Phase I. The recommended funding pattern for Rs 1521 crores for Phase I is as follows:

- Government of India (JNNURM) funding: Rs 532 Cr
- Government of Karnataka (JNNURM) funding: Rs 228 Cr
- BMRCL / Debt funding: Rs 761 Cr

The Airport Metro Project may be implemented on BOT basis with viability gap funding from the Government.

### 9.3.3 Mono Rail / LRT

The implementing agency for mono rail / LRT could either be BMRCL or a new special purpose company to be incorporated. It is recommended that funding for this project be on similar lines as Metro. The viability of the scheme should be established at the time of preparation of the detailed project report.

### 9.3.4 Commuter Rail System

This project involves the active participation of three principal stake holder's viz. Railways, State Government and the implementing agency. The implementing agency for the project could be BMRDA / BDA or a special purpose company. Since the proposed rail system extends beyond BBMP area it is recommended that the project promoter is BMRDA. The funding pattern is recommended to be:

- Railways – Railway related infrastructure including rolling stock and O&M approx one third of the project cost
- Government of Karnataka – One third of the project cost to cover the cost of expansion of stations, and additional tracks
- BMRDA – Access roads, parking facilities and passenger facilities to cover one third of the project cost

### 9.3.5 BRT System

Implementing agency for BRT system may be BMTC or a new special purpose company to be incorporated with representative from BBMP, BDA and BMRDA. The project may be implemented on PPP model.

### 9.3.6 All Road Improvements and New Roads

Investments to the extent of Rs 8154 crore proposed till 2012 for road related infrastructure would be implemented by Bruhat Bangalore Mahanagara Palike (BBMP), BDA etc. It is recommended that the funding for these projects be arranged under the JNNURM scheme seeking 35% grant from GOI, 15% from GOK and balance to be arranged by BBMP/BDA through debt financing and internal resources. Since this represents the core infrastructure for decongesting the city traffic system the funding should be routed through the JNNURM.

### 9.3.7 City Bus System/Inter-city Bus System

Out of estimated investment of Rs 5,721 crore, the cost of rolling stock requirement by the city bus transport corporation is Rs 2200 crore. This amount is proposed to be funded through internal resources and project financing structure of the corporation. The balance amount of Rs 3,521 crore represent the infrastructure support required by the transport corporations. An amount of Rs 3,401 crore is proposed to be incurred during the period 2007–12 and it is recommended that the same be funded under the JNNURM funding pattern viz:

- GOI: 35% – Rs 1,190 Crore
- GOK: 15% – Rs 510 Crore
- BMTC/KSRTC: 50% – Rs 1,701 Crore (IMTCs / Inter-city Bus Terminals could also undertaken by KSRTC on PPP model)

For the phases II and III the funding will have to be arranged by the company based on the strength of its balance sheet.

### 9.3.8 Footpaths/Pedestrian Sky Walks/subways and Parking facilities

An amount of Rs 661 crore is estimated towards improving and strengthening the pedestrian facilities and establishing parking facilities at identified locations across the city. The funding for the same shall be arranged through a PPP model where revenue sharing models could be explored. Viability gaps if any could be funded by BBMP the implementing agency.

### 9.3.9 Integrated Freight terminals

An amount of Rs 270 crore for establishing freight complexes at six locations is recommended to be funded through a PPP model involving oil companies, freight operators, industries' associations and BDA as the implementing agency.

### 9.3.10 Transport System Management Measures (B-TRAC)

This component represents the intelligent road system including traffic management systems to be introduced in the city to reduce the number of accidents and regulate the traffic using technological interventions. It is proposed that the amount of Rs 500 crore estimated under this head is posed under JNNURM with 50% contribution of the ULB allocated by BBMP (balance 50% from GOI and GOK as per JNNURM norms).

## 9.4 FUNDING OF INFRASTRUCTURE THROUGH DEVELOPMENT, CONVERSION & INFRASTRUCTURE DEVELOPMENT CHARGES

Alternatively Government can also partly finance the CTPP by imposing External Development Charges (EDC), Licence Fee, Conversion Charges of land-use and Infrastructure Development Charges (IDC) on the lines of Haryana Government for the new developing areas (about 320 sq km) in Bangalore. The estimated revenue that can be generated through these sources is given in **Table 9.12** below:

**Table 9.12 Expected Recoverable Charges through Development of External Areas as per Master /Zonal Plans 2015**

Landuse	Net Extension Area Sq. Kms	Rates prevalent per Sq Mts in Haryana	Suggested Avg.Rates of EDC, IDC, Conv. Charges, License Fee per Sq Km	Expected Returns Rs. Cr
Residential	255			
Plotted Dev. (60%)	153	1227	125	19125
Gr. Housing (40%)	102	3328	350	35700
Commercial	38	11297	1150	43700
Industrial	6.5	1250	125	812.5
I.T	20	2271	250	5000
<b>Total</b>	<b>319.5</b>			<b>104337.5</b>
Assuming 75 % of the above Returns to be used for Town Level Public Health Services ( Water Supply, Sewerage, Storm Water Drainage), Power, Community Facilities etc.				Rs. 78253.125 Cr.
Balance amount that should be used for financing CTTTP				Rs. 26084.375 Cr.

Thus about Rs 100,000 crore can be generated through the above charges for the planned new areas for development as per the Master Plan 2015. Out of this about Rs 20000 to 25000 crore may be used for financing transportation projects.