Appendix

Appendix 3.1

Ward wise Population Projection

Appendix 3.1: Wardwise Population projection

Region	Zone	Population			
		2007	*2011*	*2021*	*2031*
PMC	1	20,191	23,485	30,503	38,184
PMC	2	19,909	23,156	33,547	46,839
PMC	3	18,638	20,775	28,021	36,425
PMC	4	20,882	23,276	29,069	34,989
PMC	5	21,204	23,635	31,878	41,440
PMC	6	22,302	24,859	31,046	37,368
PMC	7	22,985	26,734	38,730	54,075
PMC	8	24,254	29,386	41,104	55,411
PMC	9	22,765	27,582	41,336	59,704
PMC	10	20,800	23,186	31,272	40,652
PMC	11	24,991	31,490	47,193	68,164
PMC	12	21,660	27,293	40,903	59,078
PMC	13	20,495	24,832	34,733	46,823
PMC	14	25,012	31,516	47,232	68,221
PMC	15	22,088	25,691	33,369	41,770
PMC	16	20,599	24,957	37,402	54,022
PMC	17	19,074	21,261	25,491	29,455
PMC	18	17,872	19,056	20,942	22,182
PMC	19	21,381	25,905	32,352	38,940
PMC	20	18,722	20,869	25,020	28,910
PMC	21	18,029	19,222	23,046	26,629
PMC	22	22,274	25,907	36,238	48,851
PMC	23	21,773	25,325	35,423	47,753
PMC	24	22,845	26,572	37,168	50,105
PMC	25	20,444	23,779	33,261	44,838
PMC	26	23,452	28,414	39,744	53,578
PMC	27	21,402	25,931	38,861	56,130
PMC	28	23,284	29,340	43,970	63,509
PMC	29	25,187	31,737	47,562	68,697
PMC	30	25,002	31,504	47,214	68,194
PMC	31	23,030	29,019	43,489	62,815
PMC	32	21,170	22,571	30,444	39,575
PMC	33	22,892	26,626	37,243	50,207
PMC	34	21,853	25,418	35,553	47,929
PMC	35	22,618	26,308	36,798	49,607
PMC	36	19,855	23,093	32,302	43,545
PMC	37	19,375	22,535	31,521	42,493
PMC	38	21,316	26,860	40,253	58,141
PMC	39	18,985	21,162	26,429	31,811
PMC	40	19,966	23,222	32,482	43,789
PMC	41	18,368	19,584	27,393	36,928
PMC	42	19,972	23,230	32,493	43,803
PMC	43	21,493	22,916	30,908	40,179
PMC	44	22,294	24,850	31,035	37,355
PMC	45	22,146	25,759	36,030	48,571
PMC	46	18,911	21,080	26,326	31,687
PMC	47	20,473	22,820	30,780	40,012
PMC	48	20,904	23,301	27,936	32,280
PMC	49	22,064	24,594	29,486	34,071
PMC	50	20,896	23,292	27,925	32,267
PMC	51	18,985	20,242	24,269	28,043
PMC	52	17,998	19,189	23,006	26,584
PMC	53	21,705	25,245	35,312	47,603

PMC	54	20,126	20,483	21,897	22,561
PMC	55	20,613	23,976	33,536	45,209
PMC	56	21,785	25,339	35,442	47,779
PMC	57	19,309	19,651	22,579	25,003
PMC	58	18,207	19,412	24,244	29,181
PMC	59	17,907	18,224	20,939	23,187
PMC	60	19,208	22,342	31,250	42,128
PMC	61	24,773	31,215	46,781	67,569
PMC	62	21,248	24,714	34,569	46,601
PMC	63	22,267	24,820	29,757	34,385
PMC	64	20,261	22,585	30,462	39,598
PMC	65	18,837	20,997	28,320	36,814
PMC	66	20,833	23,221	29,001	34,906
PMC	67	19,333	22,487	31,454	42,402
PMC	68	19,338	22,493	31,462	42,413
PMC	69	19,589	21,835	26,178	30,249
PMC	70	18,407	20,517	24,598	28,423
PMC	71	21,851	24,357	29,202	33,743
PMC	72	21,128	23,551	28,236	32,626
PMC	73	20,977	23,383	28,034	32,393
PMC	74	20,180	22,494	26,968	31,162
PMC	75	19,454	21,685	25,998	30,041
PMC	76	19,077	21,264	25,494	29,458
PMC	77	21,969	24,488	29,359	33,924
PMC	78	21,217	23,650	28,355	32,764
PMC	79	19,929	22,214	26,633	30,774
PMC	80	18,927	21,097	25,294	29,227
PMC	81	19,883	23,126	32,348	43,608
PMC	82	18,401	19,619	23,522	27,180
PMC	83	18,520	20,644	24,751	28,599
PMC	84	20,332	20,692	22,121	22,792
PMC	85	20,846	23,237	27,859	32,191
PMC	86	20,235	20,594	22,015	22,683
PMC	87	19,900	22,182	26,595	30,730
PMC	88	17,403	17,712	18,935	19,509
PMC	89	21,455	22,875	28,568	34,386
PMC	90	21,235	22,641	27,144	31,365
PMC	91	19,637	20,937	25,102	29,005
PMC	92	18,951	18,736	19,656	19,873
PMC	93	19,916	21,235	25,459	29,417
PMC	94	19,962	20,316	23,342	25,848
PMC	95	18,185	19,388	23,245	26,860
PMC	96	20,638	23,005	28,730	34,581
PMC	97	20,651	23,019	28,748	34,602
PMC	98	21,483	23,946	32,299	41,986
PMC	99	21,651	24,134	32,551	42,315
PMC	100	22,456	25,031	33,762	43,888
PMC	101	17,715	18,888	22,645	26,166
PMC	102	18,181	19,385	23,241	26,855
PMC	103	20,167	22,480	26,952	31,142
PMC	104	18,404	18,730	21,520	23,830
PMC	105	18,916	20,168	25,187	30,316
PMC	106	18,627	19,860	24,803	29,854
PMC	107	20,954	23,356	31,503	40,952
PMC	108	20,240	22,561	28,176	33,914
PMC	109	22,482	26,149	36,576	49,307

PMC	110	20,418	23,749	35,592	51,408
PMC	111	21,755	25,304	35,394	47,714
PMC	112	22,128	25,738	36,000	48,531
PMC	113	23,133	26,907	37,636	50,736
PMC	114	20,842	24,241	33,908	45,710
PMC	115	20,687	23,059	31,101	40,430
PMC	116	18,902	21,070	28,419	36,942
PMC	117	19,782	22,050	27,538	33,145
PMC	118	20,954	24,372	34,090	45,956
PMC	119	21,684	25,221	35,278	47,558
PMC	120	19,843	20,195	23,203	25,694
PMC	121	23,279	27,076	37,873	51,056
PMC	122	23,155	26,932	37,671	50,784
PMC	123	17,860	18,177	20,885	23,127
PMC	124	22,470	25,046	33,782	43,914
PMC	125	21,889	24,398	32,908	42,779
PMC	126	19,828	20,180	23,186	25,675
PMC	127	20,369	21,718	27,123	32,646
PMC	128	21,885	25,456	35,606	47,999
PMC	129	20,826	22,204	31,058	41,869
PMC	130	19,880	23,123	32,344	43,602
PMC	131	18,601	19,832	24,768	29,812
PMC	132	21,777	24,274	32,741	42,561
PMC	133	18,634	20,771	28,015	36,418
PMC	134	20,557	22,914	30,906	40,176
PMC	135	18,948	21,121	28,488	37,032
PMC	136	17,745	18,060	19,307	19,892
PMC	137	19,033	20,293	24,329	28,112
PMC	138	22,325	24,885	33,565	43,632
PMC	139	21,124	23,547	31,759	41,285
PMC	140	20,343	21,690	30,339	40,899
PMC	141	18,187	19,391	27,123	36,564
PMC	142	18,950	19,286	22,159	24,538
PMC	143	19,789	23,017	32,195	43,401
PMC	144	19,640	22,844	31,953	43,076
PC	145	112,630	116,377	126,070	136,225
KC	146	115,387	120,735	134,875	150,112
PCMC	147, 148, 149	1,416,210	1,735,729	2,747,043	4,102,868
PMR	150	36,640	41,769	56,258	73,127
PMR	151	27,971	31,887	42,947	55,825
PMR	152	146,320	166,802	224,661	292,026
PMR	153	41,189	46,955	63,242	82,205
PMR	154	87,802	100,092	134,812	175,235
PMR	155	47,023	53,606	72,200	93,850
PMR	156	28,877	32,920	44,339	57,634
PMR	157	92,833	105,827	142,536	185,276
PMR	158	71,990	82,068	110,535	143,679
PMR	159	33,587	38,288	51,570	67,033
PMR	160	45,943	52,374	70,541	91,694
PMR	161	36,805	41,957	56,511	73,456
	Total	**5,309,395**	**6,112,264**	**8,482,822**	**11,413,417**

Appendix 3.2

Ward wise Employment Projection

Appendix 3.2: Wardwise Employment Projections

Region	Zone	Employment			
		2007	*2011*	*2021*	*2031*
PMC	1	4,549	5,914	8,279	11,591
PMC	2	1,426	1,854	2,595	3,633
PMC	3	377	453	588	765
PMC	4	689	895	1,253	1,755
PMC	5	3,734	4,481	5,625	7,062
PMC	6	18,575	24,147	33,806	47,329
PMC	7	8,516	11,071	15,500	21,700
PMC	8	19,822	25,769	36,608	52,048
PMC	9	13,399	17,419	25,236	36,605
PMC	10	754	905	1,177	1,530
PMC	11	4,055	4,866	6,144	7,760
PMC	12	6,436	7,724	9,768	12,358
PMC	13	17,705	23,017	32,862	46,966
PMC	14	4,722	5,667	7,310	9,432
PMC	15	3,136	3,450	3,967	4,563
PMC	16	24,431	29,317	41,043	57,461
PMC	17	3,082	3,390	3,899	4,483
PMC	18	2,841	3,126	3,594	4,134
PMC	19	25,790	28,369	32,624	37,517
PMC	20	3,203	3,523	4,052	4,660
PMC	21	12,548	16,312	22,837	31,971
PMC	22	14,098	16,917	21,472	27,263
PMC	23	33,406	40,088	56,424	79,446
PMC	24	10,497	12,596	15,847	19,941
PMC	25	3,094	3,713	4,720	6,002
PMC	26	37,273	48,454	67,836	94,971
PMC	27	11,813	14,176	18,015	22,903
PMC	28	38,578	50,152	70,213	98,298
PMC	29	45,442	59,075	82,705	115,786
PMC	30	11,391	14,808	20,731	29,023
PMC	31	4,713	5,655	7,917	11,084
PMC	32	27,320	35,516	49,723	69,612
PMC	33	5,814	6,977	8,989	11,585
PMC	34	8,479	10,175	12,914	16,397
PMC	35	12,962	15,554	19,628	24,775
PMC	36	14,963	17,956	22,825	29,026
PMC	37	5,034	6,041	7,640	9,665
PMC	38	4,039	4,847	6,169	7,855
PMC	39	8,660	10,392	13,079	16,465
PMC	40	5,658	7,355	10,297	14,415
PMC	41	6,886	8,952	12,532	17,545
PMC	42	13,479	17,523	24,532	34,345
PMC	43	14,596	17,515	22,167	28,065
PMC	44	4,922	5,907	7,679	9,982
PMC	45	4,311	5,173	6,725	8,743
PMC	46	1,658	1,990	2,523	3,200
PMC	47	10,299	12,359	15,947	20,581
PMC	48	524	576	662	762
PMC	49	5,889	6,478	7,449	8,567
PMC	50	10,978	12,076	13,887	15,970
PMC	51	12,302	14,763	19,145	24,831
PMC	52	2,884	3,461	4,405	5,609
PMC	53	7,647	9,176	11,852	15,312

PMC	54	492	541	622	716
PMC	55	2,872	3,447	4,481	5,825
PMC	56	10,870	13,044	18,309	25,704
PMC	57	1,004	1,205	1,537	1,960
PMC	58	1,252	1,502	1,903	2,411
PMC	59	1,456	1,747	2,201	2,774
PMC	60	2,281	2,737	3,831	5,364
PMC	61	5,342	6,944	9,722	13,611
PMC	62	1,506	1,807	2,281	2,879
PMC	63	4,306	4,737	5,447	6,264
PMC	64	858	1,029	1,317	1,685
PMC	65	1,376	1,651	2,110	2,697
PMC	66	1,462	1,755	2,225	2,822
PMC	67	1,316	1,579	1,991	2,511
PMC	68	3,573	4,288	5,539	7,156
PMC	69	14,059	15,465	17,785	20,453
PMC	70	7,361	8,097	9,312	10,709
PMC	71	12,298	13,528	15,557	17,891
PMC	72	2,244	2,469	2,839	3,265
PMC	73	12,350	13,585	15,623	17,966
PMC	74	2,870	3,157	3,631	4,176
PMC	75	5,541	6,095	7,009	8,060
PMC	76	4,241	4,665	5,365	6,169
PMC	77	7,130	7,843	9,019	10,372
PMC	78	7,107	7,818	8,991	10,340
PMC	79	5,452	5,997	6,897	7,931
PMC	80	9,007	9,908	11,394	13,104
PMC	81	17,184	20,621	26,591	34,297
PMC	82	7,199	8,639	11,147	14,386
PMC	83	1,322	1,454	1,673	1,924
PMC	84	2,733	3,006	3,457	3,976
PMC	85	14,696	16,166	18,591	21,379
PMC	86	2,159	2,374	2,731	3,140
PMC	87	13,194	14,513	16,691	19,194
PMC	88	3,192	3,511	4,038	4,643
PMC	89	16,986	20,383	25,608	32,178
PMC	90	16,955	22,041	32,147	46,941
PMC	91	874	1,049	1,349	1,735
PMC	92	963	1,155	1,444	1,805
PMC	93	3,629	4,355	6,097	8,535
PMC	94	1,436	1,723	2,171	2,737
PMC	95	5,589	7,266	10,319	14,666
PMC	96	12,171	15,822	22,150	31,011
PMC	97	16,656	19,987	28,257	39,974
PMC	98	3,049	3,659	4,657	5,930
PMC	99	5,935	7,122	9,065	11,541
PMC	100	14,263	17,116	22,043	28,397
PMC	101	5,948	6,543	8,446	10,906
PMC	102	6,560	7,872	10,059	12,858
PMC	103	6,874	7,561	8,696	10,000
PMC	104	7,523	9,027	11,535	14,744
PMC	105	2,665	3,198	4,086	5,223
PMC	106	1,399	1,679	2,125	2,690
PMC	107	2,450	2,940	3,757	4,802
PMC	108	6,541	7,849	9,952	12,622
PMC	109	1,194	1,552	2,173	3,043

PMC	110	10,275	13,358	18,701	26,182
PMC	111	3,390	4,068	5,695	7,973
PMC	112	2,343	2,812	3,936	5,511
PMC	113	1,220	1,464	1,896	2,457
PMC	114	2,372	2,847	3,701	4,811
PMC	115	5,316	6,379	8,173	10,475
PMC	116	5,932	7,119	9,086	11,601
PMC	117	3,578	4,293	5,501	7,050
PMC	118	20,716	24,859	32,253	41,851
PMC	119	12,518	15,021	21,141	29,764
PMC	120	3,250	3,900	4,897	6,149
PMC	121	3,232	4,201	6,094	8,851
PMC	122	2,768	3,322	4,650	6,510
PMC	123	8,439	10,127	12,705	15,941
PMC	124	4,861	5,833	7,458	9,540
PMC	125	4,827	5,792	7,433	9,542
PMC	126	3,010	3,612	4,564	5,769
PMC	127	1,030	1,236	1,569	1,992
PMC	128	2,099	2,729	3,903	5,588
PMC	129	10,838	14,090	20,205	29,007
PMC	130	8,001	9,601	13,442	18,819
PMC	131	5,658	6,789	8,613	10,931
PMC	132	5,427	6,512	8,411	10,867
PMC	133	3,105	3,726	4,824	6,246
PMC	134	3,869	4,256	5,526	7,175
PMC	135	3,559	3,915	5,083	6,601
PMC	136	2,521	2,774	3,190	3,668
PMC	137	5,133	6,160	7,905	10,149
PMC	138	3,370	3,707	4,745	6,076
PMC	139	1,961	2,353	3,059	3,977
PMC	140	22,312	29,006	40,608	56,851
PMC	141	1,582	2,056	2,878	4,030
PMC	142	14,035	16,842	21,083	26,394
PMC	143	4,081	4,897	7,027	10,093
PMC	144	1,835	2,386	3,340	4,676
PC	145	40,547	41,896	45,385	49,041
KC	146	41,539	43,465	48,555	54,040
PCMC	147, 148, 149	538,576	719,708	1,259,488	1,889,232
PMR	150	13,190	15,037	20,253	26,326
PMR	151	10,070	11,479	15,461	20,097
PMR	152	52,675	60,049	80,878	105,129
PMR	153	14,828	16,904	22,767	29,594
PMR	154	31,609	36,033	48,532	63,085
PMR	155	16,928	19,298	25,992	33,786
PMR	156	10,396	11,851	15,962	20,748
PMR	157	33,420	38,098	51,313	66,699
PMR	158	25,917	29,544	39,792	51,724
PMR	159	12,091	13,784	18,565	24,132
PMR	160	16,540	18,855	25,395	33,010
PMR	161	13,250	15,105	20,344	26,444
	Total	**1,980,402**	**2,438,030**	**3,515,386**	**4,849,638**

Appendix 4.1

Traffic Survey methodology and Survey Results

Traffic Volume counts

Two types of traffic volume counts are conducted for the study. They are: (1) Screen line counts and (2) Outer cordon point counts. The locations, methodology, data analysis are described below.

Screen Line Counts

These surveys are conducted at identified screen line locations for 12 hours duration at some locations and 24 hours at some locations on a normal working day. The data is used for validation of travel demand forecasting model. There are 2 screen lines identified for the study. They are;

- **Screen line 1**: Railway line from Mumbai to Solapur
- **Screen line 2:** Mula-Mutha River

Screen Line-1 passes through the heart of the city connecting all the important areas like CBD, major commercial and residential areas. There are 10 mid block classified volume count locations across this screen line.

Screen Line-2, the Mula Mutha River gives the information regarding the traffic entering the city from the western and northern part of Pune city. There are 17 mid block classified volume count locations across this screen line.

Screen line survey location list is given in **Table 1** and in **Figure 1**.

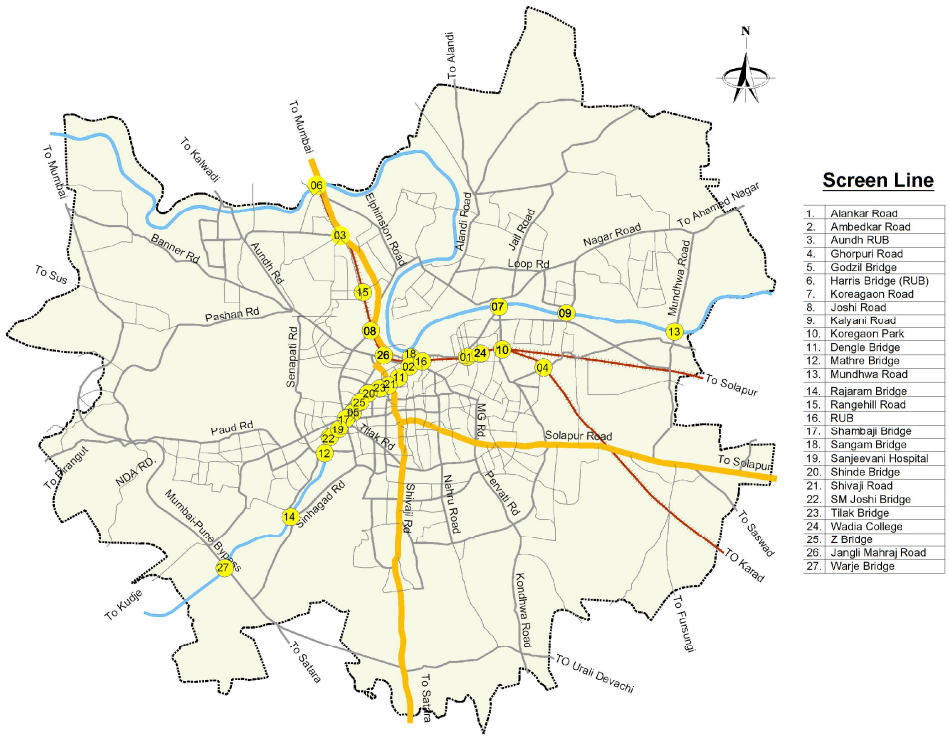


Figure 1: Screen line survey locations

Table 1: List of Screen Line Count Locations

Sl. No.	Location
	Screen line 1 Railway line from Mumbai to Solapur
1	RUB at Aundh Road
2	Level crossing at Ghorpadi Road
3	RUB near Harries Bridge
4	RUB at Joshi Road
5	ROB near Alankar Theatre
6	ROB near Koregaon Park
7	RUB at Range hill Road
8	RUB near Railway Station
9	ROB near Sancheti Hospital
10	ROB near Wadia College
	Screen line 2 Mula - Mutha River
1	Warje Bridge
2	Raja Ram Bridge
3	Mhatre Bridge
4	S.M. Joshi Bridge
5	Dengale Bridge
6	Sambhaji Bridge
7	Sangam Bridge
8	Bridge near Sanjeevani Hospital
9	Shinde Bridge
10	Shivaji Bridge
11	Tilak Bridge
12	Z- Bridge
13	Bridge at Ambedkar Road
14	Godzill Bridge
15	Yerwada Bridge
16	Bridge on Kalyani Road
17	Bridge on Mundhwa Road

Outer Cordon Point Counts

Traffic count surveys are also conducted at the identified outer cordon points for 24 hrs duration to establish the peak to daily flow ratios. The list of the cordon count survey locations are given in the **Table 2** and also in **Figure 2.**

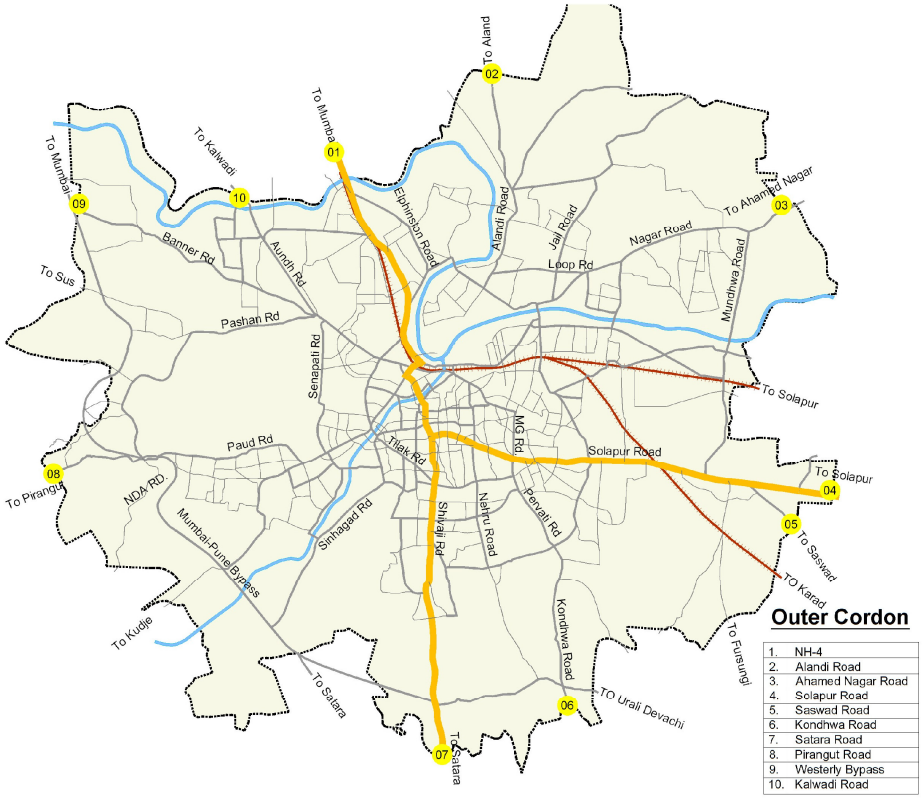


Figure 2: Outer Cordon Points Survey Locations

Methodology

Manual traffic counts were carried out on a typical working day at all locations listed above. At each identified station, both directional counts was carried out by vehicle type i.e. cars, jeeps, vans, buses, trucks, MAVs, LCVs tractors, motorized two wheelers and three wheelers, and other slow moving vehicles.

Data Entry and Analysis

The traffic data collected from the field was scrutinized and processed. The Passenger Car Unit (PCU) value recommended by Indian Roads Congress (IRC) for urban roads was used in the analysis. All results are presented in tabular and pie chart forms for each count station.

Roadside Interview Surveys

The main objective of the survey is to derive the passenger and freight travel pattern by road. These surveys are aimed at analyzing the movement within different sub areas of the city, also between the study area and other parts of the State and the Country.

Conduct of the Survey

The survey was carried out at all outer cordon points listed in **Table 2** for 24 hours along with the classified traffic counts. Interviews were carried out on a sample basis on a typical working day by stopping the vehicles with the help of police. Classified volume counts carried out along with the interviews were used to calculate expansion factors. The information was collected by trained enumerators and experienced supervisors, the data collected include origin and destination of trip, occupancy, trip purpose and in the case of goods vehicles their commodity type and approximate distance between origin and destination.

Table 2: List of Inner and Outer Cordon Points

Sl. No.	Road Name	Outer Cordon points
1	Satara Road	Toll Plaza
2	Alandi Road	Dighi
3	Old NH4	Pimple Nilakh
4	NH4	Kasarwadi
5	Kondhave Road	Kondhave Budarch
6	Mumbai Pune Expressway	Wakad
7	Nagar Road	Hadapser Bypass
8	Pirangut Road	Bhukan
9	Saswad Road	Toll Plaza
10	Solapur Road	Toll Plaza

Data Entry and Analysis

The collected data was coded and processed to eliminate all illogical data and entry errors. The data was processed and expanded to total traffic using the expansion factors for each vehicle type. Desire line diagrams was prepared for passenger and goods vehicles separately, which would represent the major traffic movements in the city and help the planners to identify and conceive transport schemes to cater to such demand.

Road Network Inventory

Road network inventory was aimed at updating the network database with the existing features of roadway sections.

Conduct of the Survey

A detailed reconnaissance undertaken, a field inventory of the road network in the study area was carried out. For all the major road sections in the city, a full-scale inventory surveys was undertaken to create a road network database. Inventories of the following facilities were undertaken as part of the task.

- Road Network
- Section length

- Effective Road width
- Median width and type
- Quality of riding surface
- Adjoining Land use and available Access control
- Intersection Facilities
- Pedestrian Facilities
- Parking Facilities
- Traffic Control Measures

A team of two enumerators traversed the road network with the datasheet to record the road network details listed above.

Data Entry and Analysis

The road network attribute data collected from the field was integrated with the network database. The database is used in developing the base year network facilitating both qualitative and quantitative evaluation of the present sufficiency of road networks vis-à-vis existing standards and usage pattern.

Speed and Delay Surveys

The principle objective of the study is to find out the journey speed, running speed and types of delay such as stopped delay and operational delay to evaluate the level of service or quality of traffic flow of a road or entire road network system. In relation to the model, the purpose of this survey is dual – Journey speeds are used for validation and delay at junctions/level crossings for developing delay function.

Conduct of the Survey

The survey was conducted using moving car observer method. The survey vehicle was moved in stream of the traffic at the speed as of other traffic during different times of the day in both peak and off peak times. The enumerators traveled along the stream by noting down the time of stop of the vehicle on the road stretches, at intersections and the reasons for the same.

This data is used to evaluate congestion levels in the influence area with and without the improvement measures. The data was also used in developing the speed flow relationships which is used in building the Transport Model and to validate journey speeds predicted by the transport model. The survey was conducted along the important corridors/ roads within city and as well as outside the city.

On –Street Parking Surveys

The survey was carried out to assess the existing facilities present, demand for parking and characteristics of the parked vehicles.

The survey was conducted for a period of 12 hours covering peak period on important commercial areas where parking is predominant and is needed to plan facilities.

Conduct of the Survey

On street parking surveys were carried out on all important locations in the city with predominant parking. Enumerators were asked to note the vehicle type and registration number of parked vehicles every 30 minutes. Parking inventory such as length of parking stretch, type of parking, availability of signs/markings, associated parking fees (if any), etc.

Data Entry and Analysis

The parking data collected from the field was processed using the appropriate analysis tools. The results are presented in tabular and pie chart forms for each location.

Pedestrian Crossing Count Surveys

The aim of the study is to provide facilities for the pedestrians who are the vulnerable road users and to access the need for grade separate facility at locations with heavy pedestrian crossing.

Conduct of the Survey

A count of pedestrians crossing the road was duly recorded over a twelve hour period covering both the morning and evening peak periods. The pedestrian count locations are given in **Table 3**.

Table 3: Pedestrian Count Survey locations

Sl. No.	Location
1	Ahilya Devi Chowk
2	Alka Cinema Talkies Chowk
3	Ambedkar Chowk
4	Appa Balawant Chowk
5	Balgandharva Chowk
6	Belbagh Chowk
7	Dandekar Chowk
8	Engineering College Chowk
9	Fathima Nagar Junction
10	Golibar Chowk
11	Goltekdi Chowk
12	Hadapser Bypass
13	Jahangir Chowk
14	Kandooji Baba Chowk
15	Kumbarwes Chowk
16	Laxmi Narayan Chowk

Sl. No.	Location
17	Lal Deval Chowk
18	Limbharaj Maharaj Chowk
19.	Maldhakka Chowk
20.	Mitra Mandal Chowk
21.	Nal stop Junction
22.	Puram Chowk
23.	Sant Kabir Chowk
24.	Sena dutta Chowk
25.	Near Court at Ambedkar Road
26.	Near Chitle Bhandhu at Baji rao Road
27.	Near Collector office
28.	At First Gate on F.C Road
29.	Near University chowk at Ganeshkhind Road
30.	Near Market at Jawaharlal Nehru Road
31.	At Juna Bazaar
32.	Khelkar Road
33.	Kumtekar Road near Shivaji Road junction
34.	Laxmi Road
35.	Lal Bahadur Sastri Road
36.	M.G. Road near Arora Towers
37.	Motilal Road near Le Meridian Hotel
38.	Senapathi Bapat Road near University chowk
39.	Shivaji Road near Shiv Mandhir
40.	Station Road near Central Building
41.	Tilak Road

Household Travel Surveys

The objective of the survey is to establish travel characteristics of the residents of household and the general characteristics of the household influencing trip making.

Conduct of the Survey

The survey questionnaire comprises of three sections, a) Socio-economic datasheet, b) Household member characteristic datasheet, and c) the travel diary of each individual member of the household. The travel diary section requests information for all trips made by each person in the household for the previous day. This information includes the time of the trip, the trip purpose, the address of the trip starting, ending place and the mode of travel. The respondents also are given a set of stated preference questions to provide additional detail about their mode choice preferences across a range of travel conditions.

A complete household survey script is developed for client review. Approved script is used to develop the survey instruments. While the interviewers are trained in the details of how to collect the survey data, the forms are designed to be self-explanatory and to minimize the chances of miscoding or omitting data. The respondents are explained about the purpose of the study and interview before interviewing them.

Data Analysis

The household travel survey sample data thus collected is expanded to represent the entire population. A by-proportional fitting method is used to correct the socio-demographic characteristics of the sample to the known distributions in the 2001 Census. Corrections for non-response will be developed based on the data on the number of contacts needed to generate a household response. Imputation methods that preserve the distribution of missing data elements is used wherever appropriate to fill in important pieces of missing information in the survey responses.

The household survey is used to estimate mode splits and mode choice model parameters. The trip diary information provides descriptive information about current mode choices. Combined with network information about available mode options, this information can also be used as “revealed preference” data to estimate parameters of a mode choice model.

The outputs from the survey include

- Household trip rates for different sub areas in the region and average trip rate for the region.
- Detailed origin/destination trip matrix by mode and by purpose
- Trip length distributions, by trip purpose and by mode

Off Street - Parking Surveys

The principal objective of the study is to assess the demand for parking and characteristics of the parked vehicles.

Conduct of the Survey

Off street parking surveys will be carried out on all important off street parking locations with work centers, business centers, shopping complexes and tourist places. Enumerators are asked to note the vehicle type

and registration number of vehicles entering and exiting the off street parking facility for every fifteen minutes. Information will also be collected on associated parking fees (if any).

Data Entry and Analysis

The parking data collected from the field will be processed using the appropriate analysis tools. The results will be presented in tabular and pie chart forms for each location.

Bus Passenger/ Terminals Survey

The Principal objective of the study is to evaluate the percentage of people using the public transport and to identify the characteristics of the intra city travelers using the public transport system for validation of the subsequent urban transport model.

The outputs from the survey include

- The travel & traffic characteristics of the intra city travelers.
- Public transport trip matrix and the existing demand and supply scenarios

IPT Survey

The Principal objective of the study is to evaluate the percentage of people using the public transport and to identify the characteristics of the inter city travelers using the Intermediate public transport system.

The outputs from the survey include

- The travel & traffic characteristics of the inter city travelers.
- The existing demand and supply scenarios

NMT Survey

The Principal objective of the study is to evaluate the percentage of people using the Non-Motorised Traffic (NMT) and to identify the characteristics of NMT users.

The outputs from the survey include

- The travel & traffic characteristics of NMT users

Traffic Demand Analysis

Classified Volume Counts

The analysis of the directional classified traffic volume counts observed at various count locations has been carried out to work out the following traffic characteristics:

- Traffic composition
- Hourly variation and
- Directional distribution

The various vehicle types having different sizes and characteristics were converted into equivalent passenger car units. The Passenger Car Unit (PCU) factors recommended by Indian Road Congress in "Guidelines for Capacity of Urban Roads in Plain Areas" (IRC-106-1990) have been used for conversion, and are presented in **Table 4**.

Table 4: PCU Factors Adopted for Study

Fast Moving Vehicles	PCU	Slow Moving Vehicles	PCU
Car & Van	1.0	Agricultural Tractor & Trailer	4.0
Mini Bus	1.5	Cycle	0.5
Standard Bus	2.2	Cycle Rickshaw	2.0
LCV	1.4	Carts	8.0
Truck	2.2		
MAV	4.0		
Two Wheeler	0.75		
Auto	2.0		

(Source: IRC – 106-1990)

Table 5: Screen line locations

Sl. No.	Screen Line	No. of Locations
1	Screen line 1: Railway Line from Mumbai to Solapur	10
2	Screen line 2: Mula Mutha River	17
Total		**27**

Screen Line 1: Ten locations were identified for midblock CVC across screen line-1, which included all the important roads crossing the screen line-1 of the Pune city. **Table 6** presents the summary of data that was collected across the screen line both for peak hour and total volume count (12 hrs) in volume and PCUs.

Table 6: Summary of CVC collected across Screen line-1

Sl. No.	Location	Peak Hour			Total (12 Hours)	
		Time	Vehicles	PCUs	Vehicles	PCUs
1	RUB near Harries Bridge	17.00-18.00	3,247	3,446	26,333	27,882
2	RUB at Aundh Road	10.00-11.00	3,762	3,871	28,676	32,263
3	RUB at Range hill Road	16.00-17.00	1,693	1,683	16,414	14,900
4	RUB at Joshi Road	18.00-19.00	3,298	3,045	31,004	29,007
5	ROB near Sancheti Hospital	19.00-20.00	6,600	6,964	72,761*	81,732*

6	RUB near Railway Station	18.00-19.00	8,230	9,269	58,815	66,260
7	ROB near Alankar Theatre	18.00-19.00	6,669	6,703	50,923	52,883
8	ROB at Wadia college	11.00-12.00	4,634	5,995	44,423	50,448
9	ROB near Koregaon Park	18.00-19.00	13,455	12,476	79,002	76,073
10	Level crossing at Ghorpadi Road	16.00-17.00	2,751	3,828	25,804	30,482

Note: The numbers with * indicates that the count is for 24 hours

Koregaon Park is close to Railway station, and Pune Cantonment area is the busiest of all the locations with about 79,002 vehicles accounting for 76,073 PCUs during 12 hour volume count and second in the race is RUB near Railway Station, caters traffic of 58,815 vehicles accounting for 66,260 PCUs. Both the count locations are close to the heart of the city and Railway station. ROB near Alankar Theatre, Wadia college ROB, and RUB at Joshi Road caters traffic of 50,923 vehicles (52,883 PCUs), 44,423 vehicles (50,448 PCUs) and 31,004 vehicles (29,007 PCUs) respectively. These three roads are the roads coming inside the CBD area and close to Railway station. Location wise details are presented below.

ROB near Koregaon Park: The peak hour traffic composition is shown in **Figure 3** depicts that majority of the share is taken by two wheelers which shared 58% of the total share. Auto, car and van shared 19%, 12% and 3% respectively. Overall passenger vehicles shared 94% of the total traffic, Goods vehicle and other vehicles shared 5% and 1% respectively. The peak hour traffic volume at this location is 13,455 vehicles and 12,476 PCUs between 18.00 and 19.00.

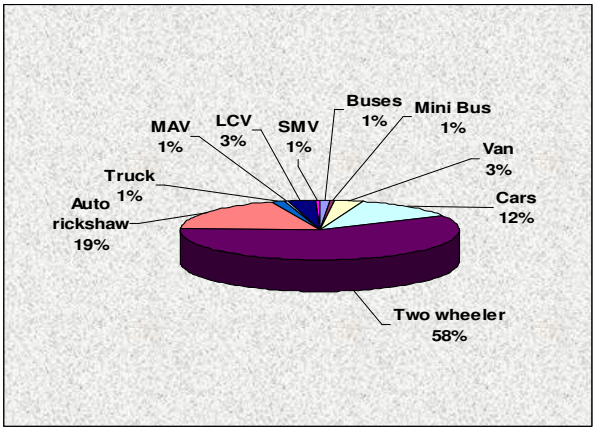


Figure 3: Peak Hour Traffic Composition at ROB near Koregaon Park

The hourly variation of traffic in terms of PCUs is shown in **Figure 4**. The directional distribution analysis depicts that the traffic is distributed in the ratio of 44%: 56% from Yerwada to Hadapser and vice versa.

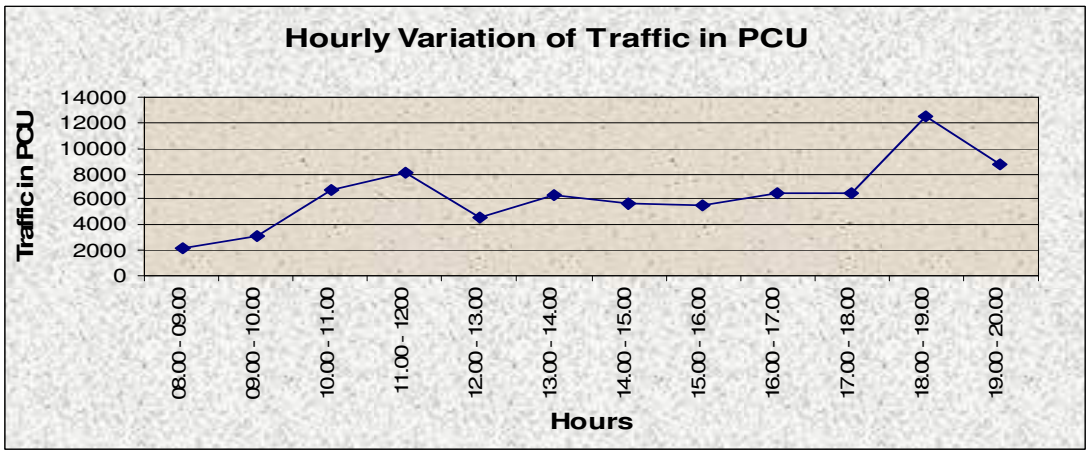


Figure 4: Hourly variation of Traffic at ROB near Koregaon Park

RUB near Railway station: The peak hour traffic composition is shown in **Figure 5** depicts that majority of the share is taken by two wheelers which shared 35% of the total share. Auto, car and van shared 30%, 13% and 5% respectively. Overall passenger vehicles shared 88% of the total traffic, Goods vehicles shared 12%. The peak hour traffic volume at this location is 8,230 vehicles and 9,269 PCUs between 18.00 and 19.00.

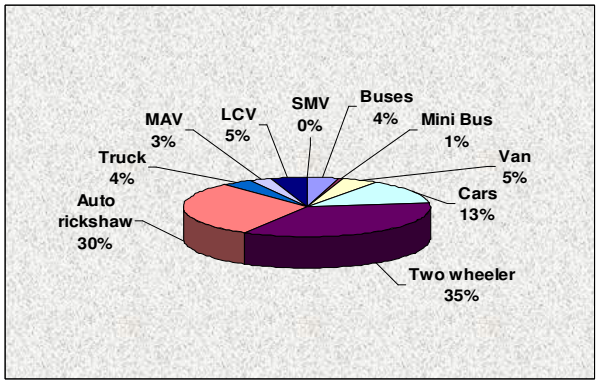


Figure 5: Peak Hour Traffic Compositions at RUB near Railway station

The hourly variation of traffic in terms of PCUs is shown in **Figure 6**. The directional distribution analysis depicts that the traffic is distributed in the ratio of 53%: 47% from RTO to Station and vice versa.

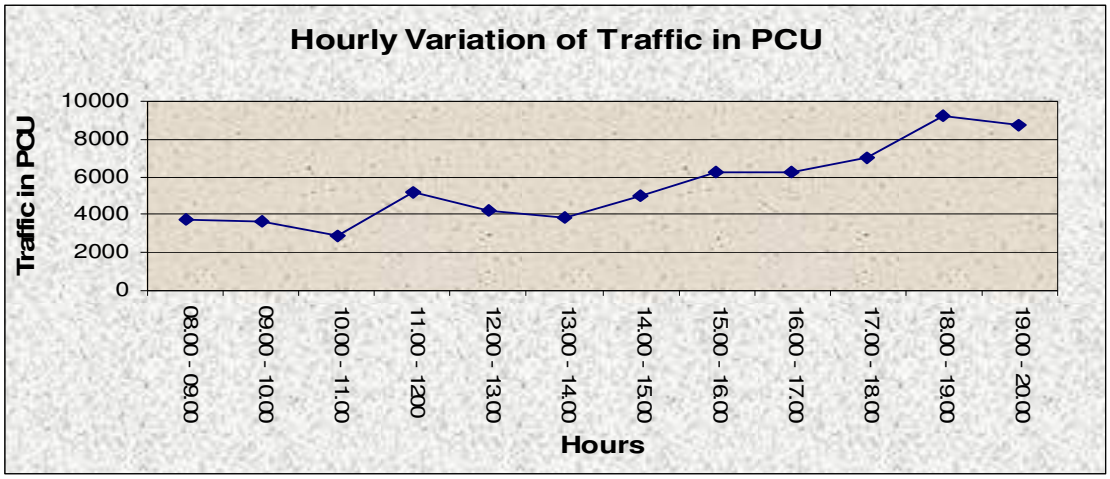


Figure 6: Hourly variation of Traffic at RUB near Railway Station

ROB near Alankar Theatre*:* The peak hour traffic composition is shown in **figure 7** depicts that majority of the share is taken by two wheelers which shared 46% of the total share. Auto, car and buses shared 21%, 13% and 12% respectively. Overall passenger vehicles shared 95% of the total traffic and other vehicle shared 5%. The peak hour traffic volume at this location is 6,669 vehicles and 6,703 PCUs between 18.00 and 19.00. The hourly variation of traffic in terms of PCUs is shown in **Figure 8**.

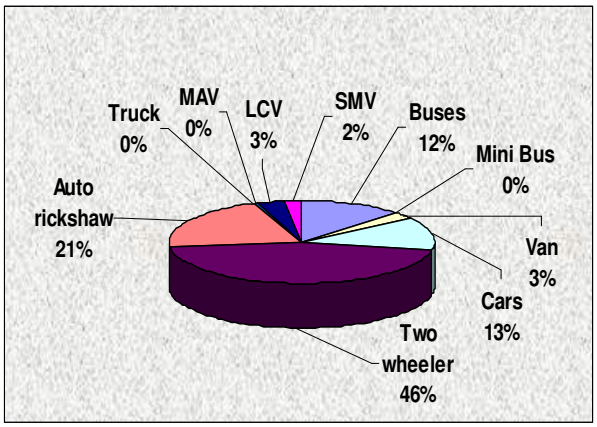


Figure 7: Peak Hour Traffic Composition at ROB near Alankar Theatre

The directional distribution analysis depicts that the traffic is distributed in the ratio of 59%: 41% from Sadhuwaswani Chowk to Jahangir Hospital and vice versa.

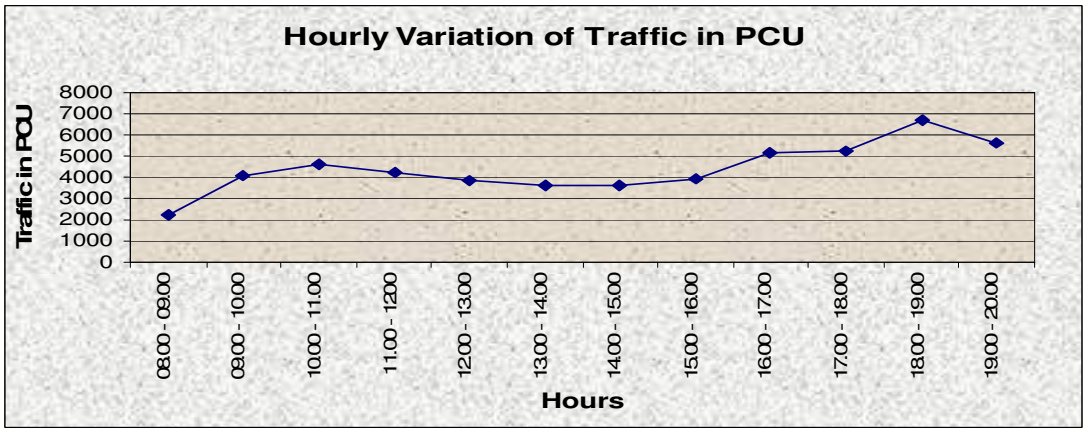


Figure 8: Hourly variation of Traffic at ROB near Alankar Theatre

ROB near Wadia College: The peak hour traffic composition is shown in **Figure 9** depicts that majority of the share is taken by two wheelers which shared 29% of the total share. Auto and car shared 28% and 10% respectively. Overall passenger vehicles shared 68% of the total traffic. Goods Vehicle and other vehicle shared 31% and 1% respectively. The peak hour traffic volume at this location is 4,634 vehicles and 5,995 PCUs between 11.00 and 12.00. The hourly variation of traffic in terms of PCUs is shown in **Figure 10**.

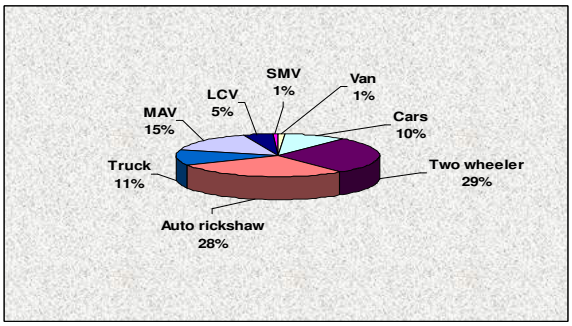


Figure 9: Peak Hour Traffic Composition at ROB near Wadia College

The directional distribution analysis depicts that the traffic is distributed in the ratio of 48:52 from Council hall to Bund Garden and vice versa respectively.

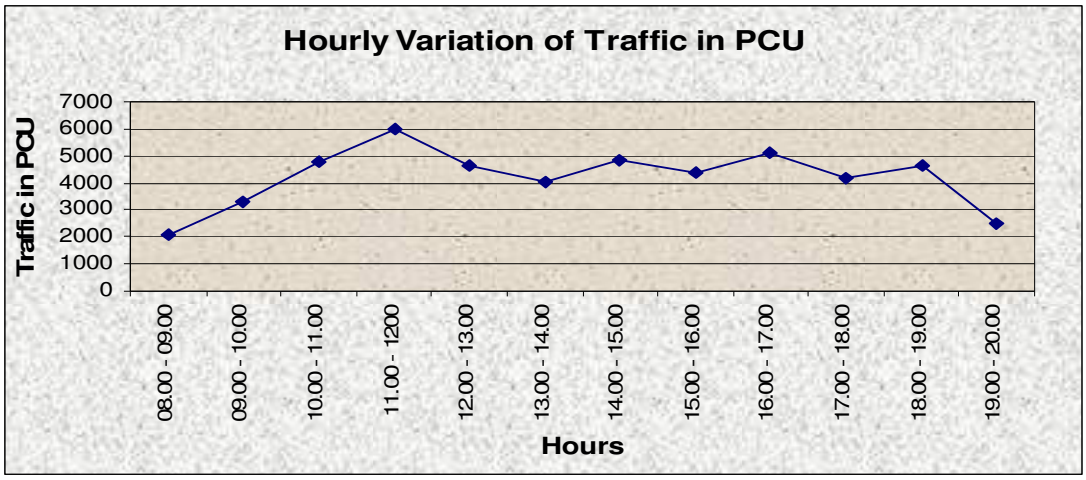


Figure 10: Hourly variation of Traffic at ROB near Wadia College

RUB at Joshi Road: The peak hour traffic composition is shown in **Figure 11** depicts that majority of the share is taken by two wheelers which shared 55% of the total share. Auto and car shared 26%, and 9% respectively. Overall passenger vehicles shared 93% of the total traffic. Goods Vehicles shared 4%. The peak hour traffic volume at this location is 3,298 vehicles and 3,045 PCUs between 18.00 and 19.00. The hourly variation of traffic in terms of PCUs is shown in **Figure 12.**

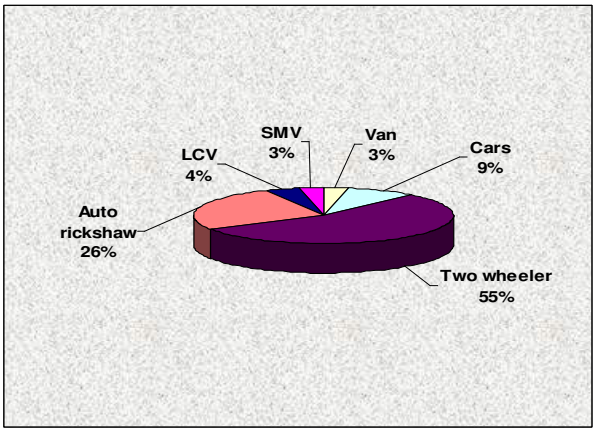


Figure 11: Peak Hour Traffic Composition at RUB at Joshi Road

The directional distribution analysis depicts that the traffic is distributed in the ratio of 49%:51% from Agriculture College to Waredwadi and vice versa respectively.

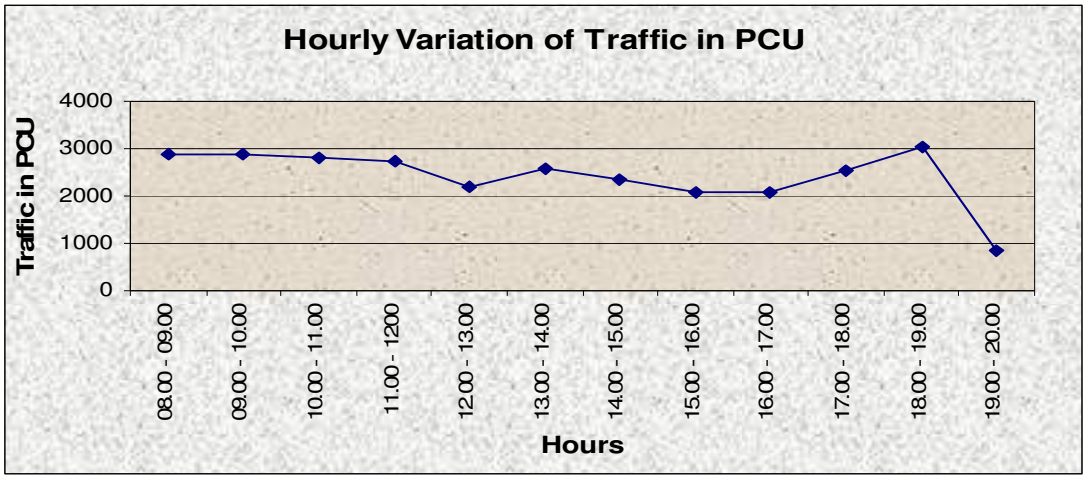


Figure 12: Hourly variation of Traffic at RUB at Joshi Road

Screen Line 2: Seventeen locations had been identified for midblock CVC across screen line-2, which included all the major arterial and other important roads crossing the screen line-2. **Table 8** presents the summary of data that was collected across the screen line both for peak hour and total volume count (24 hrs) in volume and PCUs.

Table 8: Summary of CVC collected across Screen line-2

Sl. No.	Location	Peak Hour			Total (12 Hours)	
		Time	Vehicles	PCUs	Vehicles	PCUs
1	Warje Bridge	17.00-18.00	2,875	3,359	47,448*	58,533*
2	Raja ram Bridge	10.00-11.00	7,830	6,155	56,323	46,097
3	Mathre Bridge	18.00-19.00	10,262	8,807	75,331	64,850
4	S.M.Joshi Bridge	11.00-12.00	4,302	3,491	35,015	28,734
5	Near Sanjeevani Hospital	10.00-11.00	3,004	2,623	24,079	21,592
6	Sambhaji Bridge	11.00-12.00	5,042	7,743	35,960	53,310
7	Godzil Bridge(TW only)	18.00-19.00	2,574	1,925	17,912	13,362
8	Z- Bridge	10.00-11.00	3,928	3,503	34,140	2,744
9	Tilak Bridge	10.00-11.00	2,213	2,162	20,794	20,974
10	Shinde Bridge	18.00-19.00	4,986	4,484	39,594	37,558
11	Shivaji Bridge	18.00-19.00	7,470	8,131	61,385	65,576
12	Dengale Bridge	18.00-19.00	7,819	8,288	71,262	73,947
13	Ambedkar Bridge	19.00-20.00	6,000	7,431	52,802	56,096

Sl. No.	Location	Peak Hour			Total (12 Hours)	
		Time	Vehicles	PCUs	Vehicles	PCUs
14	Yerwada Bridge	18.00-19.00	14,240	14,314	1,25,096	1,31,431
15	Kalyani Bridge	19.00-20.00	6,128	6,012	61,887	55,457
16	Khardi Bridge	10.00 –11.00	4,791	4,307	41,629	40,043
17	Sangam Bridge	19.00 –20.00	16,012	16,888	1,10,066	1,22,205

Yerwada Bridge with about 1, 25,096 vehicles, Sangam Bridge with 1, 10,066 vehicles and Dengale Bridge with 71,262 vehicles are the three busiest bridges along this screen lines.

Yerwada Bridge*:* Yerwada Bridge is the major screen line providing access to Nagar road, Airport. The entire Nagar road bound traffic from various places has to use this road to reach Pune city and as such the traffic on the road is considerable. The peak hour traffic composition is shown in **Figure 13** depicts that majority of the share is taken by two wheelers which shared 45% of the total share. Auto, car and buses shared 21%, 15% and 7% respectively. Overall passenger vehicles shared 90% of the total traffic.

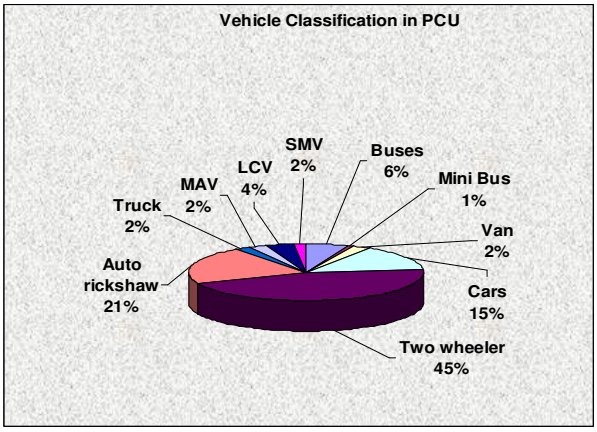


Figure 13: Peak Hour Traffic Composition at Yerwada Bridge

Goods Vehicles and slow moving vehicles shared 8% and 2% respectively. The peak hour traffic volume at this location is 14,240 vehicles and 14,314 PCUs between 18.00 and 19.00. The hourly variation of traffic in terms of PCUs is shown in **Figure 14**.

The directional distribution analysis depicts that the traffic is distributed in the ratio of 46% to 54% from Pune city to Nagar road and vice versa respectively.

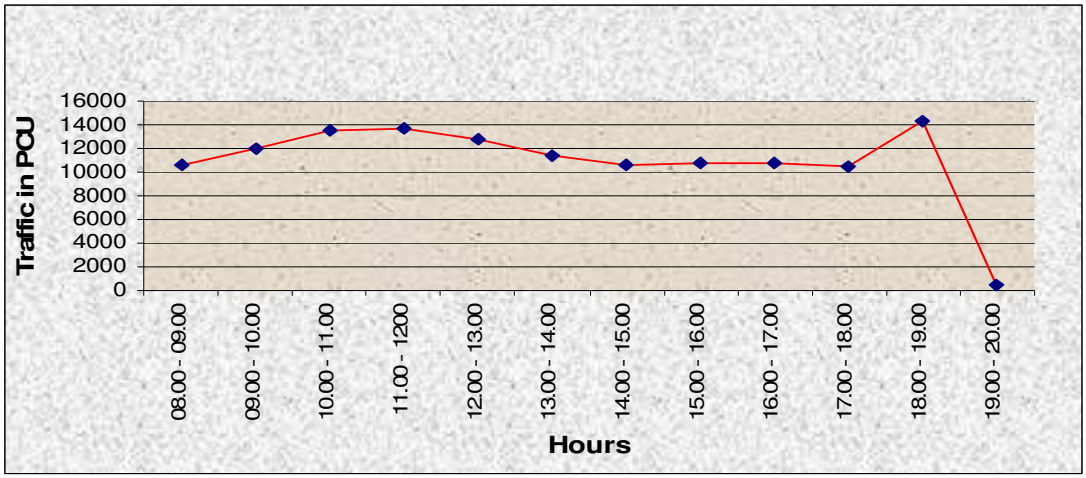


Figure 14: Hourly variation of Traffic at Yerwada Bridge

Sangam Bridge: Sangam Bridge is the most important screen line location for Shivaji Nagar and Bund garden bound traffic. Due to the presence of prestigious institutions such as Pune engineering college and Wadia College etc, on Sangam Bridge, the traffic on this road is high.

The peak hour traffic composition is shown in **Figure 15** depicts that majority of the share is taken by two wheelers which shared 41% of the total share. Auto, car and buses shared 14%, 19% and 12% respectively. Overall passenger vehicles shared 87% of the total traffic. Goods Vehicle and other vehicle shared 12% and 1% respectively. The peak hour traffic volume at this location is 16,012 vehicles and 16,888 PCUs between 19.00 and 20.00. The hourly variation of traffic in terms of PCUs is shown in **Figure 16**.

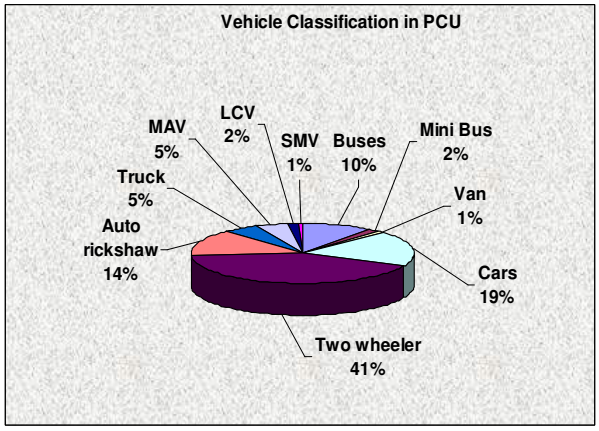


Figure 15: Peak Hour Traffic Compositions at Sangam Bridge

The directional distribution analysis depicts that the traffic is distributed in the ratio of 60 to 40 from Bund garden to Sancheti and vice versa respectively.

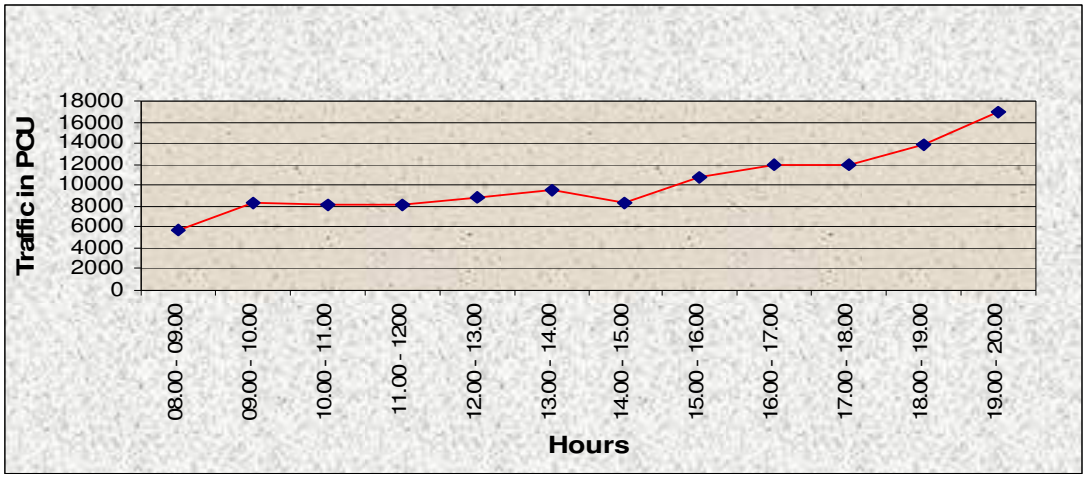


Figure 16: Hourly variation of Traffic at Sangam Bridge

Dengale Bridge: Dengale Bridge is an important screen line location connecting Shivaji Nagar and Pune Municipal Corporation with Railway station area.

The peak hour traffic composition is shown in **Figure 17** depicts that majority of the share is taken by two wheelers which shared 44% of the total share. Auto, car and buses shared 30%, 8% and 11% respectively. Overall passenger vehicles shared 93% of the total traffic. Goods Vehicle and other vehicle shared 5% and 2% respectively. The peak hour traffic volume at this location is 7,819 vehicles and 8,288 PCUs between 18.00 and 19.00. The hourly variation of traffic in terms of PCUs is shown in **Figure 18**.

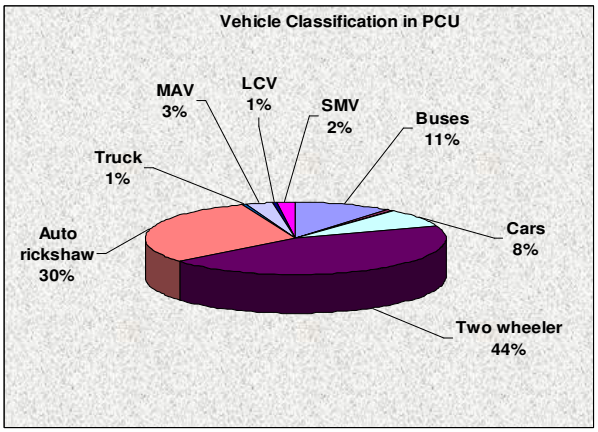


Figure 17 Peak Hour Traffic Compositions at Dengale Bridge

The directional distribution analysis depicts that the traffic is distributed in the ratio of 35 to 65 from Kumberwada to Shivaji court and vice versa respectively.

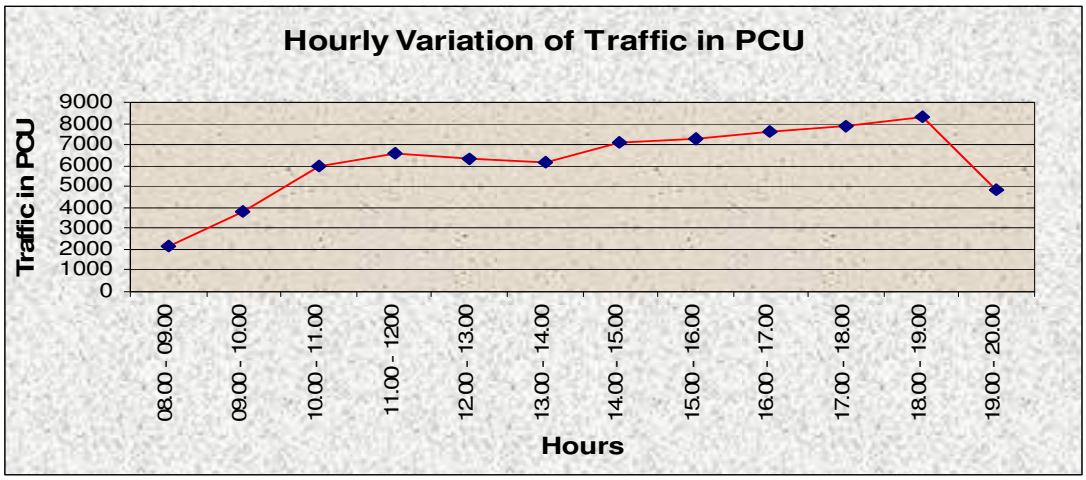


Figure 18: Hourly variation of Traffic at Dengale Bridge

Outer cordon locations

Kasarwadi: The peak hour traffic composition is shown in **figure 19** depicts that majority of the share is taken by Two wheelers, cars and buses which shared 38%, 11% & 21% of the total share. Auto and Trucks shared 7% and 5% respectively.

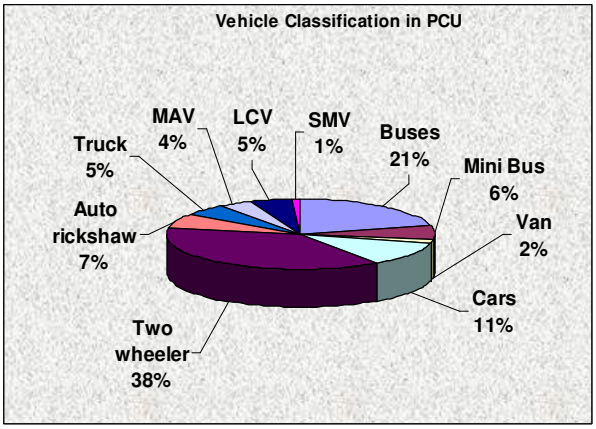


Figure 19 Peak Hour Traffic Compositions at Kasarwadi

Overall passenger vehicles shared 85% of the total traffic and goods Vehicle shared 14%, comparatively the goods traffic is very compared to all other locations. The peak hour traffic volume at this location is 10,284 vehicles and 11,150 PCUs between 18.00 and 19.00. The directional distribution analysis depicts that the entering/exiting traffic is distributed in the ratio of 53 to 47 respectively.

Near Hadapser Bypass: The peak hour traffic composition is shown in **Figure 20** depicts that majority of the share is taken by Trucks which shared 40% of the total share. Cars, auto, two wheeler and buses shared 17%, 5%, 13% and 9% respectively. Overall passenger vehicles shared 44% of the total traffic,

goods Vehicle shared 55% and other vehicles shared 1% of the total traffic.

The peak hour traffic volume at this location is 6,255 vehicles and 9,806 PCUs between 18.00 and 19.00.

The directional distribution analysis shows that the exit/entering traffic is distributed in the ratio of 41 to 59.

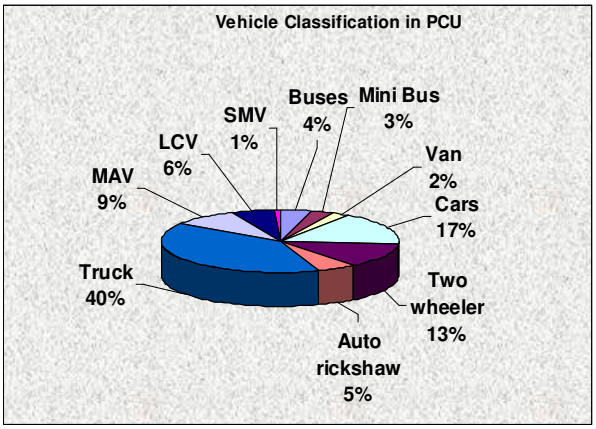


Figure 20: Peak Hour Traffic Composition near Hadapser Bypass

From the analysis of volume counts across the outer cordon, it is evident that the majority of the traffic is two-wheelers which shared about 40 % the total traffic. Cars and Auto shared 19% and 6% respectively. Overall 77% of the traffic is Passenger vehicles, goods vehicles shared about 20% and slow moving vehicles shared 3% of the total traffic.

Appendix 4.2

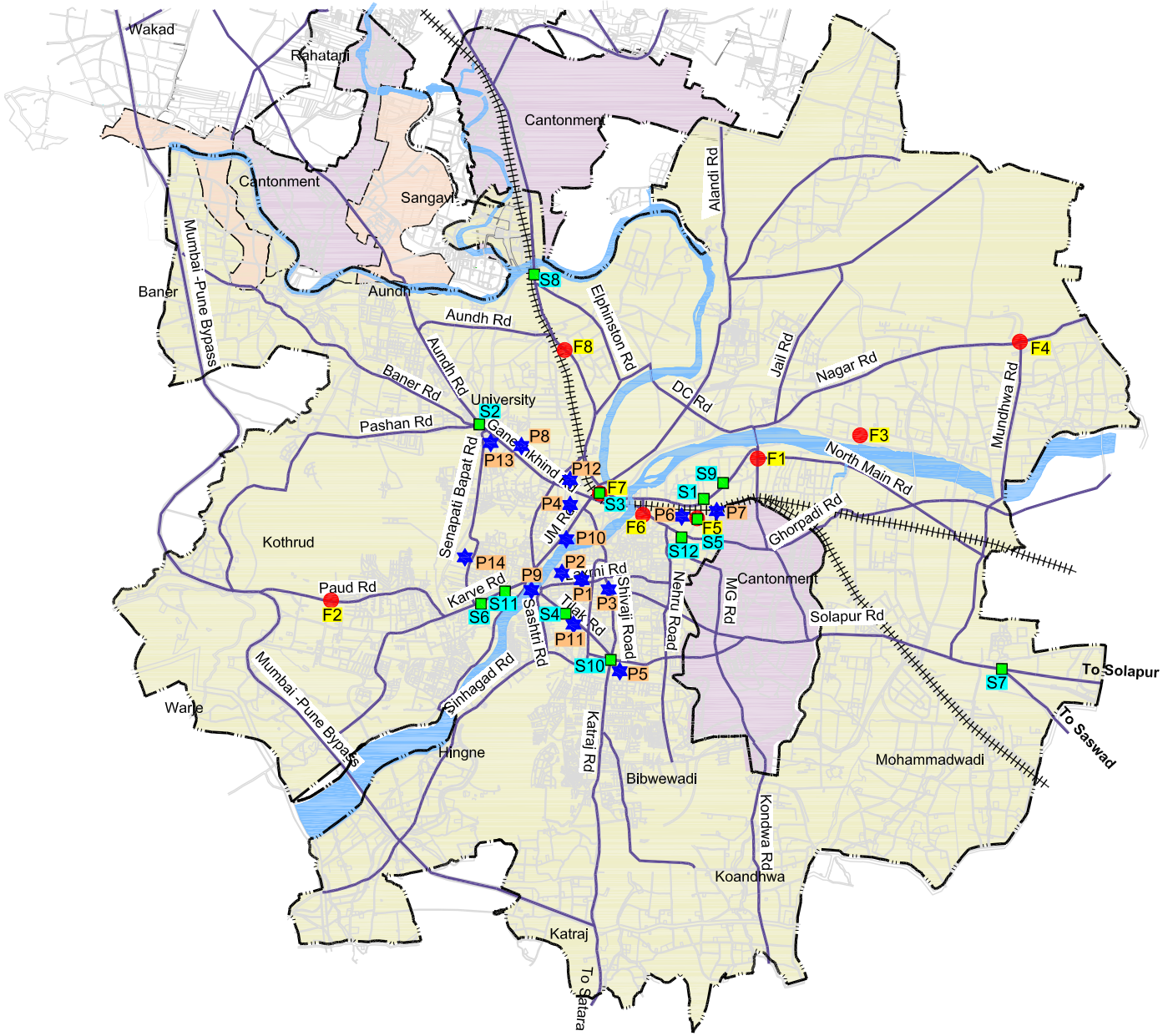
Inventory Details

Appendix 4.2: Ineventory Details

Sl No.	Road Name	Total Section Length (mtrs)	Foot Path Provision				% Footpath	
			LHS	P / UP	RHS	P / UP	LHS	RHS
1	Aundh road	12100	YES	P	NO		14%	0%
2	Baner chowk	7600	YES	P	YES	P	100%	100%
3	Pashan road	14200	YES	P	YES	P	30%	30%
4	Old mumbai pune road	6200	YES	P	YES	P	85%	100%
5	Ghorpuri junction	2800	YES	P	YES	P	100%	100%
6	Dhanori road	4100	NO		NO		0%	0%
7	Urali devachi road	11600	NO		NO		0%	0%
8	Fursungi road	3000	NO		NO		0%	0%
9	Saswad road	2200	NO		NO		0%	0%
10	Airport road	1300	NO		NO		0%	0%
11	Loop road	5400	NO		NO		0%	0%
12	Kadki cantonment	3100	YES	65% P & 35% UP	NO		100%	0%
13	Mangaldas road -(Koregoan road to Railway station)	4600	YES	P	YES	P	100%	75%
14	Mirza road	1200	YES	P	YES	P	100%	100%
15	Kondwa road	3000	YES	P	NO		13%	0%
16	East avenue road	4800	YES	P	YES	P	46%	46%
17	Pune cant Parallel road	2100	NO		NO		0%	0%
18	Bhandarkar road	1200	YES	P	YES	P	100%	100%
19	Lakaki road	700	YES	P	YES	P	100%	100%
20	Shivaji road	2000	YES	P	YES	P	100%	75%
21	Bibiwadi to Railway Station	4000	YES	75% P & 25% UP	YES	68% P & 15% UP	100%	83%
22	Tanajiwadi Road	5200	YES	P	YES	P	100%	100%
23	Ghole road	1900	YES	P	YES	P	95%	95%
24	Alandi Road	5600	YES	P	YES	12% P & 36% UP	39%	48%
25	Boat club Road	3900	YES	P	YES	UP	95%	95%
26	Parvath villa Road	1900	YES	UP	NO		100%	0%
27	Tanajiwadi Road	4600	YES	P	YES	22% Paved & 37% UP	59%	59%
28	Mahthre Bridge	1700	YES	P	YES	P	100%	100%
29	Koregaon Road	3200	YES	P	YES	P	100%	100%
30	Mumbai Pune Bye pass	16800	NO		YES	UP	0%	100%
31	Mumndhwa (Magarpatta city)	7700	YES	P	YES	UP	79%	21%
32	Lohegaon Road	7500	NO		NO		0%	0%
33	Swami Vivekananda Road	3100	YES	P	YES	P	100%	100%
34	North Road	3200	YES	P	YES	P	100%	100%
35	Ambedkar Road	2500	YES	P	YES	P	100%	100%
36	Pashan NDA	8500	NO		YES	UP	0%	100%
37	Paud Road	4400	YES	59% P & 41% UP	YES	UP	100%	100%
38	Karve Road	1300	YES	P	YES	P	100%	100%
39	Mahthre bridge (Intersection)	1300	YES	P	YES	UP	23%	77%
40	Warje Road	6800	YES	P	YES	P	85%	85%
41	Senapathi bapad road	3800	YES	P	YES	P	100%	100%
42	Range hill Road	3900	YES	P	YES	P	100%	100%
43	Park Road	1500	NO		NO		0%	0%
44	IT Road	900	YES	P	YES	P	100%	100%
45	Pune cant Parallel road1	1000	NO		NO		0%	0%
46	Pune cant Parallel road2	200	NO		NO		0%	0%

Appendix 5.1

Past reports Recommendations



Flyovers

F1 Blue Diamond
F2 Shastri Nagar
F3 Kalyani Nagar
F4 Chandan Nagar
F5 Pune Station
F6 Juna Bazar
F7 Engg.college
F8 Khadki Gate

Parking

P1 Hamalwada
P2 Narayan Peth
P3 Mandai
P4 Revenue Colony
P5 Swargate
P6 Railway Station
P7 Alankar Cinima Hall
P8 E-Square Cinima Hall
P9 Alka Cinima Hall
P10 Balgandharv Drama Hall
P11 Tilak Smarak
P12 Rahul Cinima Hall
P13 Modern College
P14 Law College

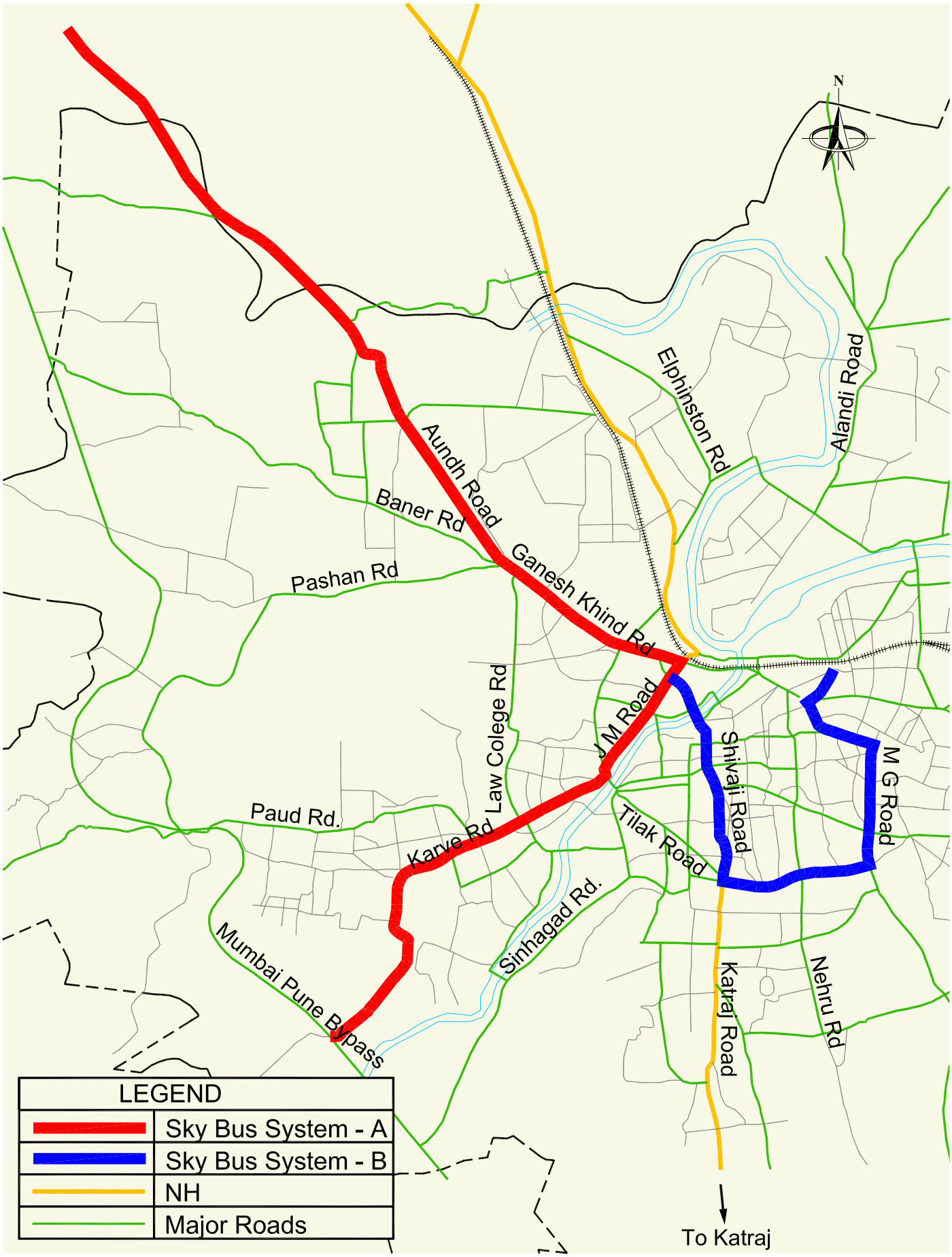
Subway

S1 Jhangir Hospital
S2 Pune University
S3 Engg. College
S4 SP College
S5 Railway Station
S6 Nal Stop
S7 Hadasper
S8 Bopodi Nakka
S9 Wadia College
S10 Swargate
S11 Garware College
S12 Zilla Parishad

Scale : Not To Scale

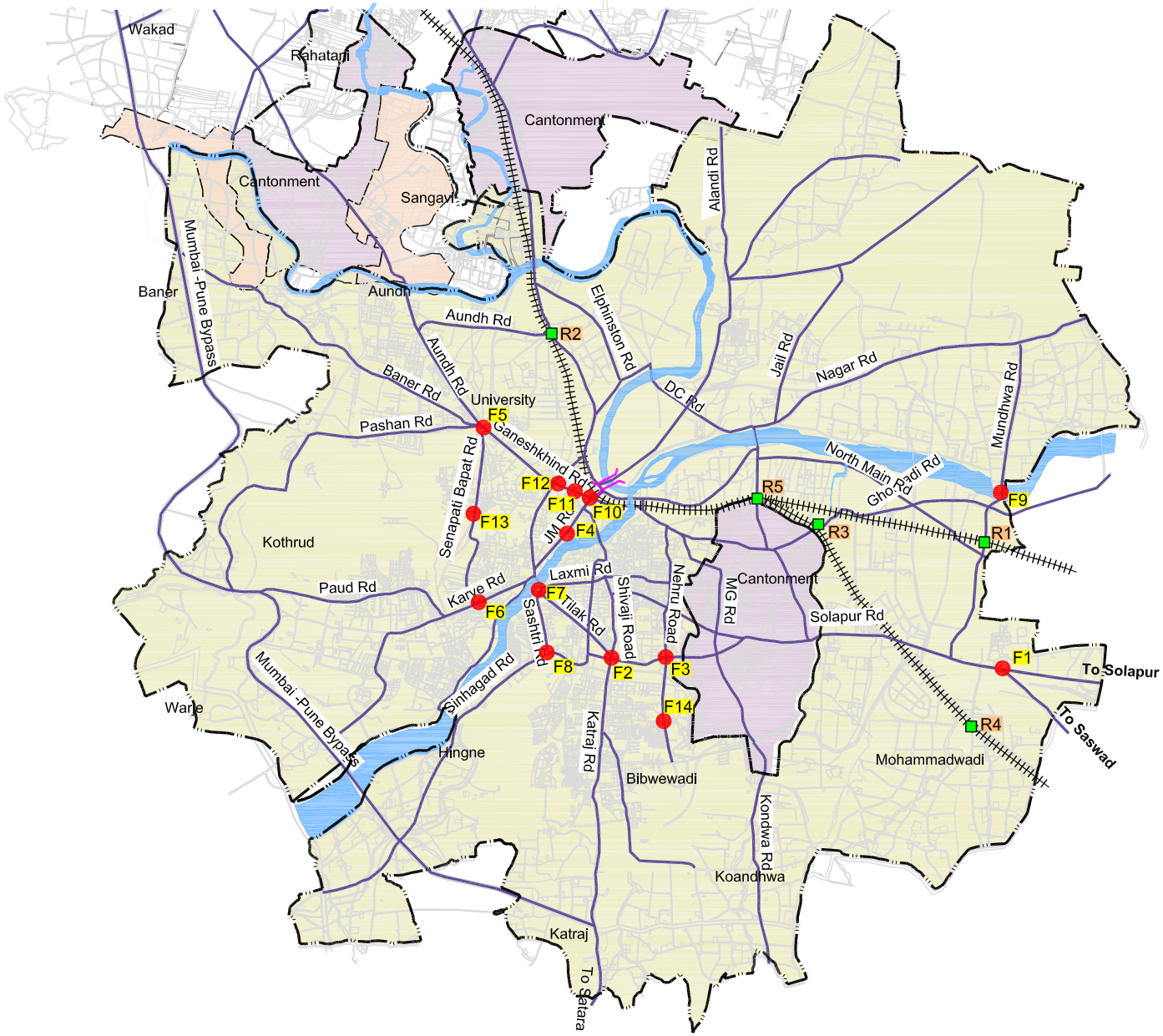
Appendix : 5.1
Figure : b

CTTS for Pune,SPAN



Appendix : 5.1
Figure : c
DPR Skybus ,KRCL

Scale : Not To Scale



Flyovers

F1	Hadapsar
F2	Swargate
F3	Seven loves
F4	Balghandharva
F5	University
F6	Nalstop
F7	Alka Talkies
F8	Singahad Rd Near Panmala
F9	Mundhwa
F10	Sanchetti Hospital
F11	Simla Office
F12	Rahul Talkies
F13	Vetel Chowk
F14	Market Yard

ROB

R1	Mundhwa
R2	Khadki Rly.Stn.
R3	Ghorpadi
R4	Sasane Nagar
R5	Wadia College

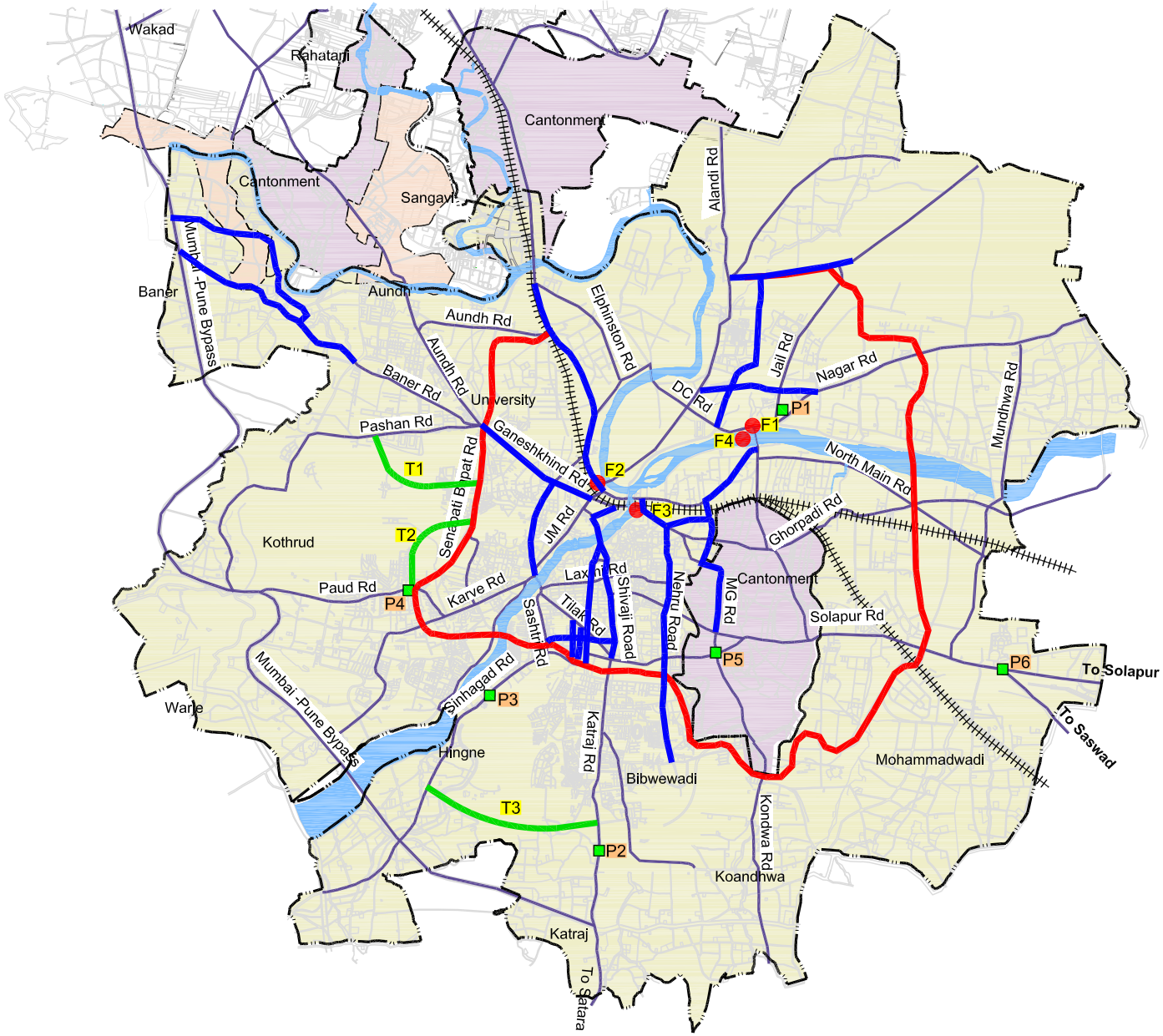
River Bridge

Mulla River at Sangamwadi

Appendix : 5.1

Figure : d

CSITDS for PCMC and PMC ,CES



Flyovers

F1 Sadal Baba Durgah
F2 Sangamwadi Bridge
F3 CID Office
F4 Bund Garden Road

Pedestrian Subways

P1 Gunjan Chowk
P2 Bibewadi Jn.
P3 Santhosh Hall
P4 Paud Phata
P5 Golibar Chowk
P6 Hadasper

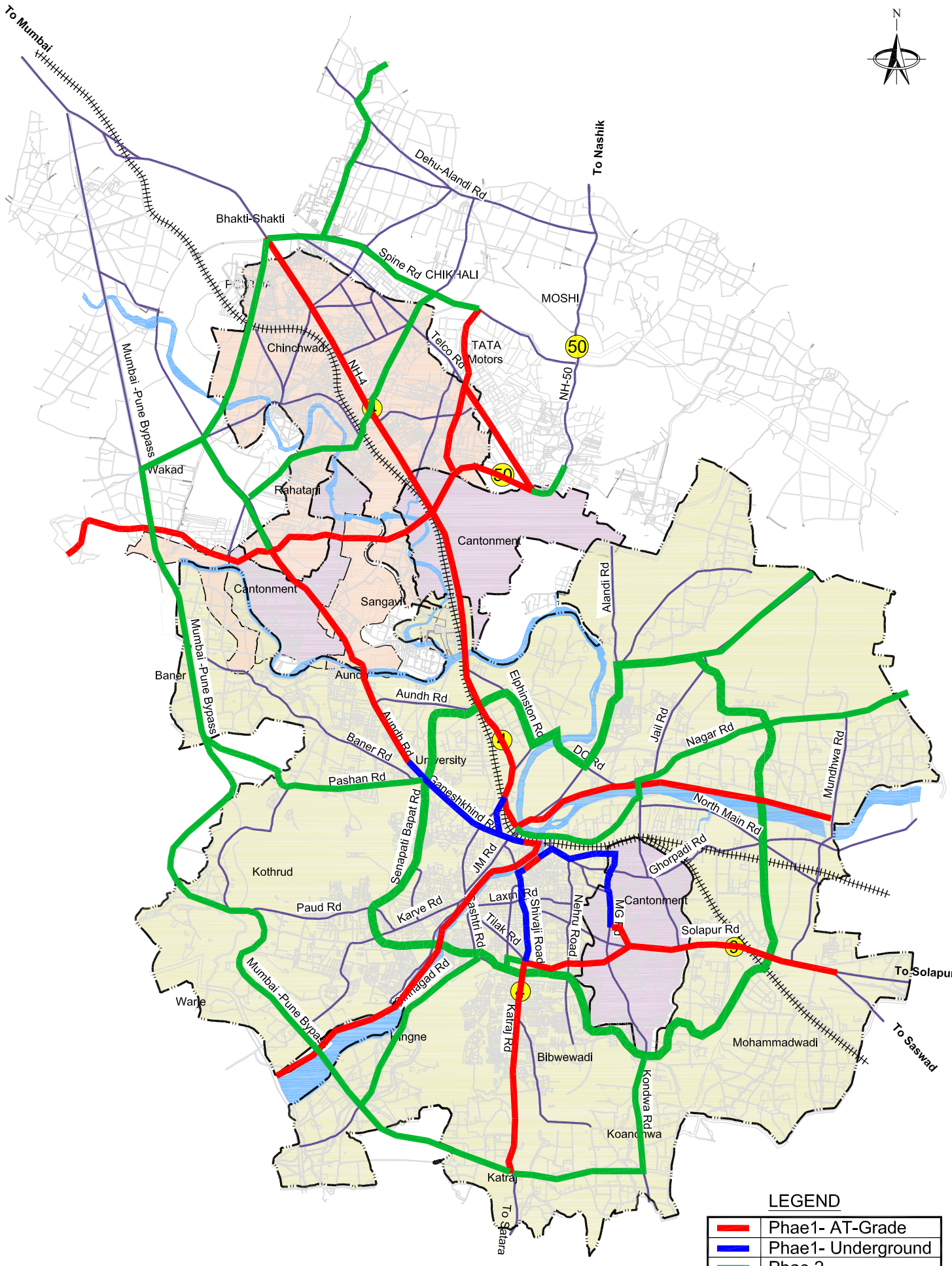
Tunnels

T1 ICC to Pashan
T2 Baramati Hostel to MIT
T3 Sahakar Nagar to Hingne Sinhagad Road

BRT Corridors
HCMTR
Tunnels

Appendix : 5.1
Figure : e

CYG Reports

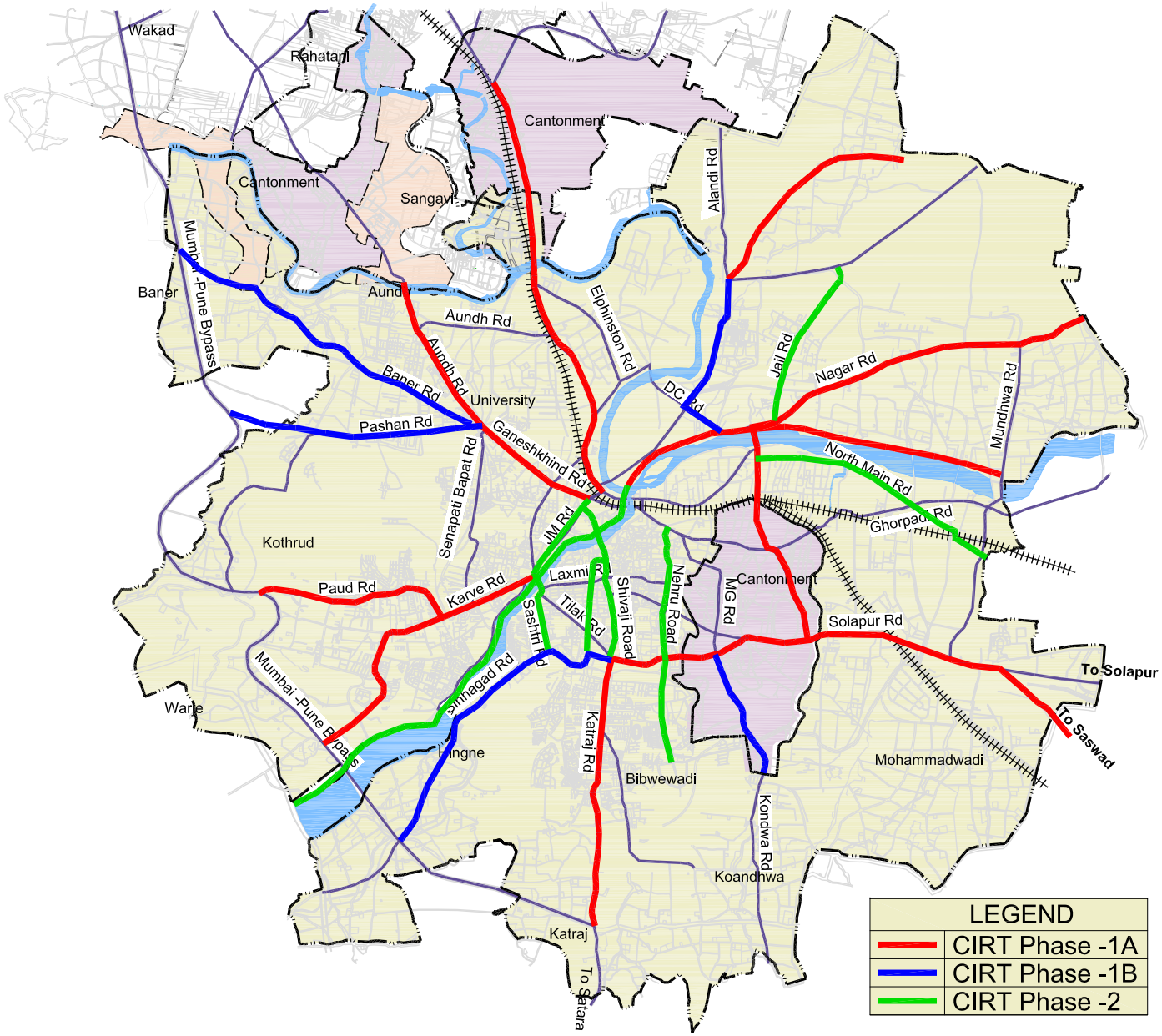


Appendix : 5.1

Figure : f

DPR- Tramways, Consult Team Bramen

Scale : Not To Scale



Appendix : 5.1

Figure : g

Master Plan for BRTS, CIRT

Appendix 6.1

Generalized Cost

Annexure 6.1

Generalized Cost

The Vehicle operating cost (VoC) and Value of travel time (VoT) are estimated as follows:

Vehicle Operating Cost (Rs./Km) for personal modes: The values are estimated based on Road User Cost Study (RUCS) - 2001, by Dr. Kadiyali which is widely used for similar projects in India. The VoC has two components, namely, fuel cost and other costs, in which the fuel cost constitutes the major component. The inputs that are required for estimating VoC are:

- Price of selected (popular) models, by vehicle type
- Tyre prices
- Fuel cost including oil price
- Crew cost (wages of Drivers / Assistants), etc

These inputs pertaining to Pune has been collected through secondary survey. Using these inputs in the RUCS model and applying appropriate congestion factor to reflect the peak hour traffic condition during peak hours, VoC (Rs./Km.) estimated for various modes are for Car- 6.5, for Two Wheelers - 1.9 and for Auto Rickshaw - 3.7.

The trend in fuel price in India for past 15 years shown that fuel price is increasing almost at inflation level (5%). But in real terms, considering the improved engine efficiency, VoC is assumed to reduce at 1% per annum in the future.

Value of Travel Time (VoT- Rs. / Min.): The average income of full-time employed people in the study region was computed from published macroeconomic and demographic data. Based on these data, VoT (Rs/min.) has been worked out as for Bus - 0.30, for Car- 0.72, for Two Wheeler – 0.42, and Auto rickshaw- 0.43. There will be increase in VoT due to increase in income, changes in working hours and increase in the relative utility of the time spent on working. Average trip distance increases over years and this affects Value of travel time. It is assumed that VoT will grow at 1% on inflation /annum.

The fare taken for various modes of transport is presented in Table 1. It is assumed that public transport fare and auto rickshaw fare will increase @ 2 % per annum.

Table 1 Current Fare for various modes

Mode	Min. Fare (Rs.)	Additional Rs.
Bus	Initial board fare : 3.0	1 .0 per Km
Auto rickshaw	Initial Board fare: 8.0	6.0 per km