6 FORMULATION OF LONG-TERM TRANSPORT NETWORK

6.1 Methodology

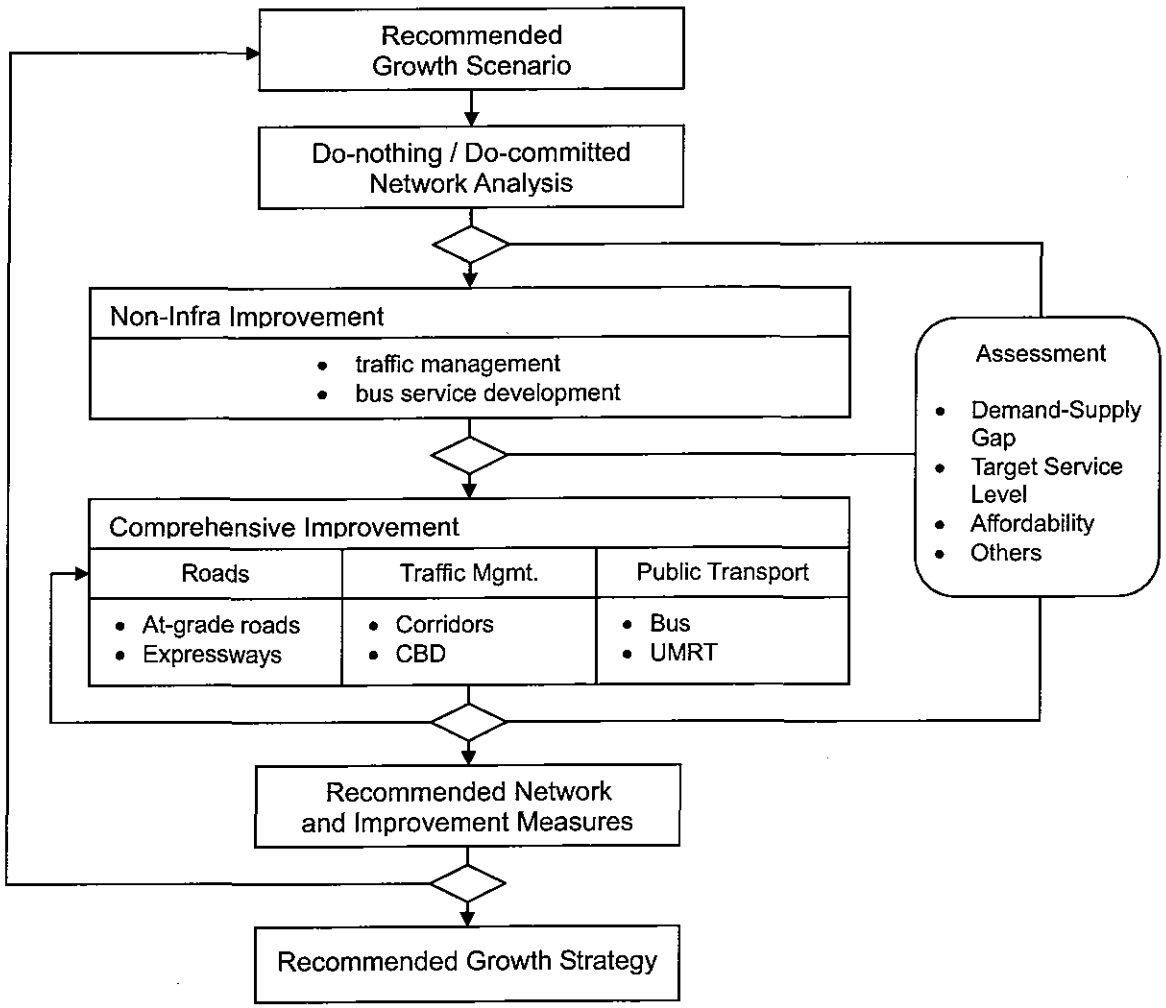
On the basis of the recommended growth scenario, the future transport network was developed in accordance with the following steps (refer to Figure 6.1.1):

(1) The "Do-nothing" / "Do-committed"[1] case was assumed to identify sections where there were capacity and network deficiencies. Impacts from capacity increases due to traffic management and bus capacity improvements were also tested.

(2) Then, basic at-grade roads were planned. These roads are needed to promote urban growth and development as shown in the recommended growth scenario.

(3) Once the core network was formulated, alternative networks, such as expressways and a UMRT system, were added and assessed. Impacts from other interventions, like bus efficiency and modal split policy, were also tested. Traffic impacts from alternative network plans were evaluated by corridor and classified area[2] (refer to Figure 6.1.2).

Figure 6.1.1 Network Analysis/Planning Framework



Source: Study Team

[1] The "Do-nothing" network refers to the existing network without any addition in the future, while the "Do-committed" network includes the completion of ongoing and committed projects.

[2] A total of eight corridors in the CBD and 4 areas alongside each corridor (32 classified areas).

Figure 6.1.2 Zoning and Mini Screen Lines for Transport Network Analysis/Planning

Source: Study Team

6.2 Assessment of "Do-nothing" and "Do-committed" Cases

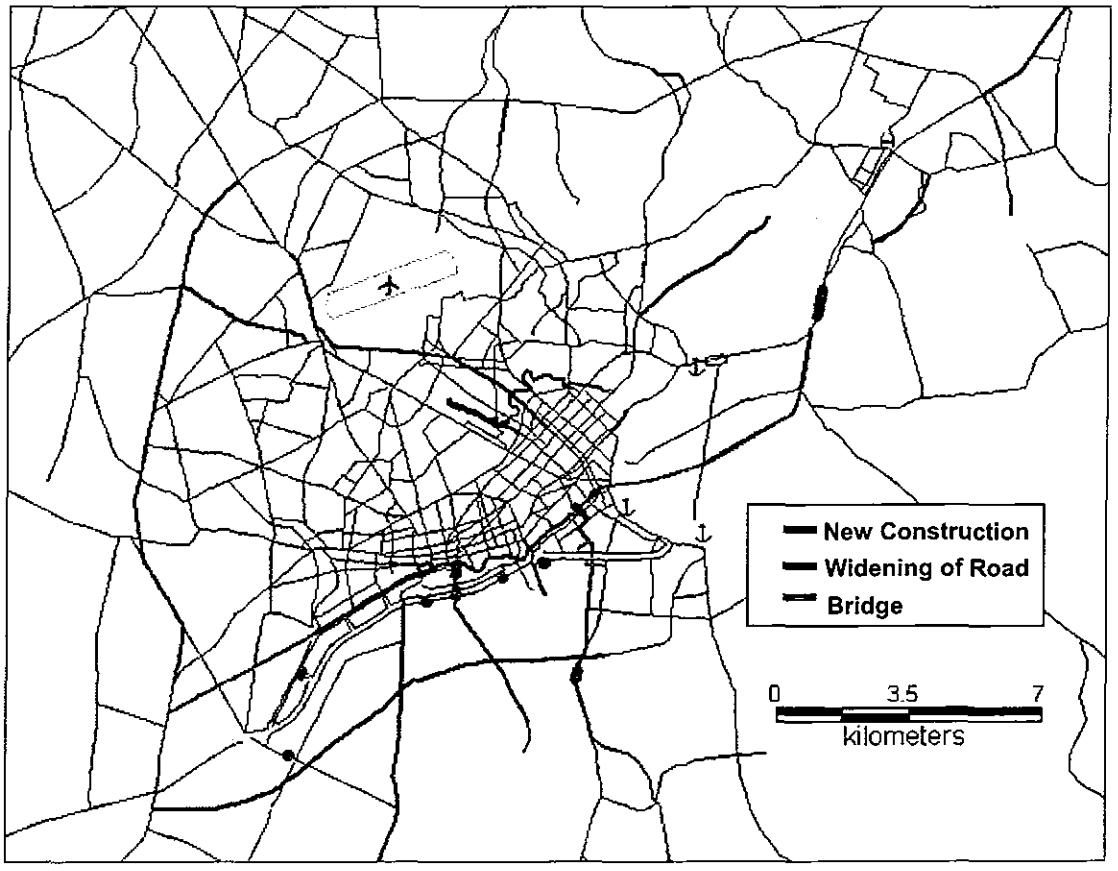
Analysis of "Do-nothing" Case

Overall traffic situation in the study area will be chaotic if no infrastructure is added to the existing network. Even if a good bus service is assured (refer to Tables 6.2.1 and 6.2.2), modal shares in 2020 among motorcycles, cars, and buses will be guaranteed at 50%, 20%, 30%, respectively, for one scenario and 30%, 20%, 50%, respectively, for another scenario.

Analysis of "Do-committed" Case

The city government has undertaken improvements and construction of roads at various locations (refer to Figure 6.2.1). However, even when these are completed but no additional road improvements or construction will be done until 2020, traffic will still get worse (refer to Table 6.2.1, Table 6.2.2 and Figure 6.2.2). Lack of traffic capacities is obvious all throughout the study area.

Figure 6.2.1 Location of Do-committed Projects



Source: TUPWS-HCMC, MOT

Table 6.2.1 Assessment of Transport Conditions by Corridor

Corridor/Area		Existing Condition (2002)					Do Nothing (2020)		Do Committed (2020)		
		No. of Roads	Total No. of Lanes	Capacity (000 PCU)	Traffic Vol. (000PCU)	V/CR	Traffic Volume (000PCU)[1]	V/CR[1]	Capacity (000 PCU)	Traffic Volume (000 PCU)[1]	V/CR[1]
CBD	Saigon	11	34	357	292	0.8	695 - 924	1.9 - 2.6	357	610 - 798	1.7 - 2.2
	Cho Lon	12	40	435	387	0.9	707 - 900	1.6 - 2.1	497	661 - 810	1.3 - 1.6
I. NH1 (East)	Area 1	1	6	59	89	1.5	323 - 410	5.4 - 6.9	205	391 - 488	1.9 - 2.4
	Area 2	2	8	83	108	1.3	311 - 382	3.7 - 4.6	83	300 - 374	3.6 - 4.5
	Area 3	2	12	119	114	1.0	251 - 305	2.1 - 2.6	129	260 - 322	2.0 - 2.5
	Area 4	1	4	49	66	1.4	66 - 77	1.4 - 1.6	49	66 - 77	1.4 - 1.6
II. NH13	Area 1	1	4	41	47	1.1	147 - 179	3.6 - 4.4	41	126 - 153	3.1 - 3.7
	Area 2	2	8	85	47	0.6	114 - 141	1.3 - 1.7	126	101 - 125	0.8 - 1.0
	Area 3	1	6	62	48	0.8	57 - 67	0.9 - 1.1	62	57 - 67	0.9 - 1.1
III. NH22	Area 1	3	12	150	148	1.0	400 - 496	2.7 - 3.3	253	377 - 476	1.5 - 1.9
	Area 2	2	8	90	76	0.8	244 - 301	2.7 - 3.4	139	347 - 427	2.5 - 3.1
	Area 3	1	8	81	37	0.5	132 - 164	1.6 - 2.0	81	120 - 148	1.5 - 1.8
	Area 4	2	10	95	27	0.3	65 - 69	0.7 - 0.7	100	74 - 84	0.7 - 0.8
VI. PR10	Area 1	1	2	24	20	0.9	89 - 126	3.8 - 5.4	53	115 - 160	2.2 - 3.0
	Area 2	1	2	12	20	1.6	75 - 95	6.3 - 7.9	12	72 - 94	6.0 - 7.9
	Area 3	1	2	17	10	0.6	27 - 33	1.6 - 1.9	32	46 - 56	1.4 - 1.8
	Area 4	1	2	20	3	0.1	12 - 14	0.6 - 0.7	20	12 - 14	0.6 - 0.7
V. NH1 (West)	Area 1	1	6	74	58	0.8	96 - 109	1.3 - 1.5	158	151 - 161	1.0 - 1.0
	Area 2	1	6	57	70	1.2	114 - 146	2.0 - 2.6	124	193 - 239	1.5 - 1.9
	Area 3	2	8	63	58	0.9	85 - 102	1.3 - 1.6	63	80 - 96	1.3 - 1.5
	Area 4	1	4	51	54	1.1	67 - 78	1.3 - 1.5	51	67 - 79	1.3 - 1.5
VI. NH50	Area 1	1	2	13	9	0.7	24 - 29	1.9 - 2.3	76	94 - 115	1.2 - 1.5
	Area 2	1	2	13	13	1.0	31 - 39	2.4 - 3.1	64	62 - 77	1.0 - 1.2
	Area 3	2	4	33	26	0.8	51 - 56	1.6 - 1.7	43	52 - 60	1.2 - 1.4
	Area 4	1	2	13	8	0.6	12 - 14	0.9 - 1.1	24	12 - 14	0.5 - 0.6
VII. PR15	Area 1	2	4	40	39	1.0	131 - 163	3.3 - 4.1	54	168 - 207	3.1 - 3.8
	Area 2	1	2	15	16	1.1	71 - 83	4.7 - 5.6	33	94 - 114	2.9 - 3.4
	Area 3	1	2	14	7	0.5	17 - 21	1.2 - 1.5	39	90 - 107	2.3 - 2.8
VIII. PR20 (NH51)	Area 1	1	2	6	7	1.0	41 - 66	6.6 - 10.5	35	139 - 177	3.9 - 5.0
	Area 2	1	2	11	1	0.1	10 - 14	1.0 - 1.3	11	11 - 15	1.0 - 1.4
	Area 3	1	2	11	3	0.2	18 - 18	1.6 - 1.7	11	18 - 18	1.6 - 1.7
	Area 4	2	6	59	21	0.4	33 - 39	0.6 - 0.7	59	33 - 39	0.6 - 0.7

Source: Study Team

[1] Assumed modal share (%) of M/C, car, bus: 50/20/30 (left) and 30/20/50 (right). Average occupancy: M/C - 1.3, car - 1.9, bus - 36/50.

Table 6.2.2 Assessment of Transport Conditions by Area

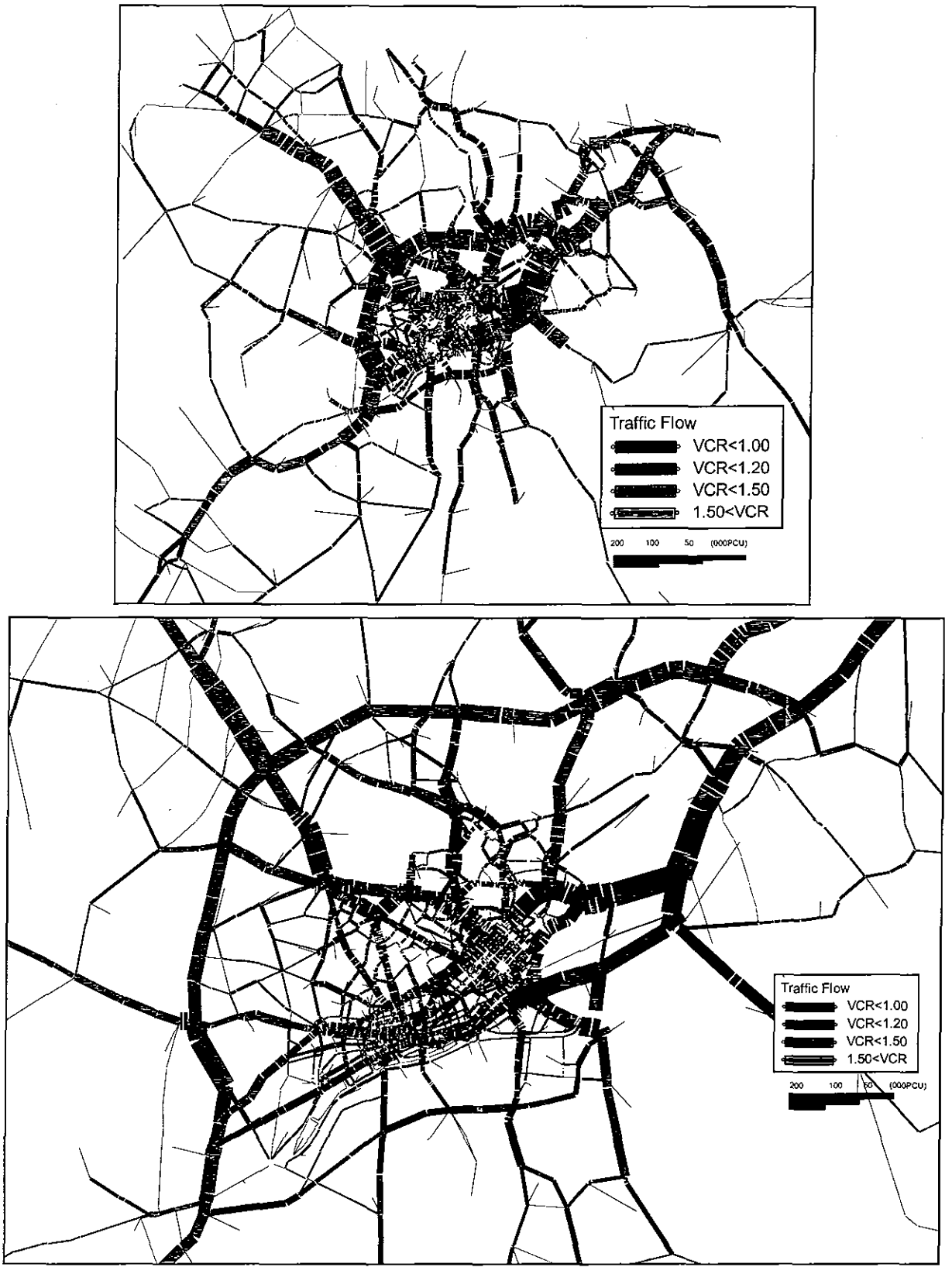
Corridor/Area		Existing Condition (2002)			Do Nothing (2020)		Do Committed (2020)		
		Capacity (000PCU-km)	Traffic Vol. (000PCU-km)	V/CR	Traffic Volume (000PCU-km)[1]	V/CR[1]	Capacity (000PCU-km)	Traffic Volume (000PCU-km)[1]	V/CR[1]
CBD	Saigon	2.824	2.202	0.8	4.583 - 5.553	1.6 - 2.0	3.262	4.715 - 5.708	1.4 - 1.7
	Cho Lon	2.436	1.796	0.7	3.398 - 4.050	1.4 - 1.7	2.849	3.296 - 3.962	1.2 - 1.4
I. NH1 (East)	Area 1	2.581	2.106	0.8	5.728 - 7.218	2.2 - 2.8	3.325	5.556 - 6.800	1.7 - 2.0
	Area 2	1.749	1.658	0.9	4.763 - 5.797	2.6 - 3.2	1.749	4.251 - 5.178	2.4 - 3.0
	Area 3	2.312	1.500	0.6	3.170 - 3.694	1.4 - 1.6	2.470	3.294 - 3.930	1.3 - 1.6
	Area 4	252	306	1.2	250 - 295	1.0 - 1.2	432	494 - 579	1.1 - 1.3
II. NH13	Area 1	427	435	1.0	1.199 - 1.461	2.8 - 3.4	427	1.058 - 1.295	2.5 - 3.0
	Area 2	1.576	786	0.5	2.031 - 2.429	1.3 - 1.5	1.669	2.140 - 2.617	1.3 - 1.6
	Area 3	1.181	737	0.6	1.166 - 1.384	0.9 - 1.1	1.181	1.060 - 1.271	0.9 - 1.1
III. NH22	Area 1	2.417	2.065	0.9	4.970 - 6.034	2.1 - 2.5	2.700	4.742 - 5.830	1.8 - 2.2
	Area 2	2.412	1.560	0.6	4.627 - 5.666	1.9 - 2.3	2.192	3.855 - 4.803	1.8 - 2.2
	Area 3	1.557	746	0.5	2.821 - 3.339	1.8 - 2.1	1.802	2.646 - 3.236	1.5 - 1.8
	Area 4	2.376	726	0.3	2.480 - 2.895	1.0 - 1.2	2.608	2.526 - 2.959	1.0 - 1.1
VI. PR10	Area 1	558	459	0.8	1.041 - 1.226	1.9 - 2.2	425	682 - 812	1.6 - 1.9
	Area 2	1.116	901	0.8	2.355 - 2.835	2.1 - 2.5	1.615	2.638 - 3.113	1.6 - 1.9
	Area 3	654	602	0.9	1.835 - 2.217	2.6 - 3.2	654	1.616 - 1.976	2.5 - 3.0
	Area 4	469	61	0.1	220 - 251	0.5 - 0.5	539	326 - 398	0.6 - 0.7
V. NH1 (West)	Area 1	339	203	0.6	337 - 393	1.0 - 1.2	424	366 - 433	0.9 - 1.0
	Area 2	669	696	1.0	1.388 - 1.713	2.1 - 2.6	999	1.460 - 1.715	1.5 - 1.7
	Area 3	1.238	1.389	1.1	2.243 - 2.644	1.8 - 2.1	1.405	2.231 - 2.687	1.6 - 1.9
	Area 4	2.193	1.757	0.8	2.317 - 2.690	1.1 - 1.2	2.591	2.307 - 2.682	0.9 - 1.0
VI. NH50	Area 1	616	555	0.9	1.145 - 1.313	1.9 - 2.1	997	1.187 - 1.403	1.2 - 1.4
	Area 2	327	223	0.7	408 - 486	1.2 - 1.5	633	589 - 710	0.9 - 1.1
	Area 3	902	510	0.6	1.158 - 1.337	1.3 - 1.5	1.278	1.289 - 1.449	1.0 - 1.1
	Area 4	169	94	0.6	144 - 168	0.9 - 1.0	259	152 - 177	0.6 - 0.7
VII. PR15	Area 1	1.195	813	0.7	2.485 - 3.075	2.1 - 2.6	1.691	2.820 - 3.325	1.7 - 2.0
	Area 2	112	96	0.9	523 - 562	4.7 - 5.0	128	348 - 426	2.7 - 3.3
	Area 3	856	705	0.8	1.745 - 2.128	2.0 - 2.5	878	1.648 - 1.992	1.9 - 2.3
VIII. PR20 (NH51)	Area 1	52[2]	57	1.1	302 - 449	5.8 - 8.6	171	668 - 844	3.9 - 4.9
	Area 2	310	104	0.3	448 - 473	1.4 - 1.5	303	438 - 533	1.4 - 1.8
	Area 3	1.180	653	0.6	2.226 - 2.524	1.4 - 1.6	1.180	1.527 - 1.758	1.3 - 1.5
	Area 4	1.056	318	0.3	483 - 567	0.5 - 0.5	1.144	547 - 642	0.5 - 0.6

Source: Study Team

[1] Assumed modal share (%) of M/C, car, bus: 50/20/30 (left) and 30/20/50 (right). Average occupancy: M/C - 1.3, car - 1.9, bus - 36.

[2] Ferry crossing.

Figure 6.2.2 Assignment of Future Traffic Demand on Do-committed Network



Source: Study Team

Note: Assumed modal share (%) of M/C, car and bus is 50, 20 and 30. Average occupancy: M/C - 1.3, car - 1.9, bus - 36.

6.3 Transport Network Development Planning

Network deficiencies were assessed by corridor (refer to Table 6.3.1). To meet future demands, the possibility of improvements/construction of existing at-grade roads was first examined. This was followed by the introduction of other measures like traffic management, further road development and development of an UMRT system. For network planning and assessment, important assumptions were made on similar future modal shares and load factors for each mode. These are as follows:

- Modal share: Motorcycle (50%), Car (20%), Bus (30%)
- Load factor: Motorcycle (1.3), Car (1.9), Bus (36)

Table 6.3.1 Transport Corridor Development Planning

Corridor/Area		Existing Roads		Required No. of Lanes[1]	Possibility of Road Development[2]		Alternative Solutions[3]					
		No. of Roads	Total No. of Lanes		Widening	New Road	Traffic Management		Road Development			UMRT
							Traffic Mgmt.	TDM	Widening	New Road (at-grade)	New Road (elevated)	
CBD	Saigon	11	34	80	C	C	A	A	B	B	A	A
	Cho Lon	12	40	81	C	C	A	A	B	B	A	A
I. NH1 (East)	Area 1	1	6	49	B	B	A	B	A	A	A	A
	Area 2	2	8	38	B	B	A	C	A	B	B	A
	Area 3	2	12	33	B	B	A	C	B	A	B	A
	Area 4	1	4	8	B	B	B	C	B	B	C	B
II. NH13	Area 1	1	4	16	B	B	A	C	A	B	A	B
	Area 2	2	8	13	B	A	B	C	B	A	C	C
	Area 3	1	6	7	C	B	B	C	C	A	C	C
III. NH22	Area 1	3	12	48	B	B	A	B	A	B	A	A
	Area 2	2	8	43	B	B	A	C	B	A	B	A
	Area 3	1	8	15	B	B	A	C	B	A	B	B
	Area 4	2	10	9	B	B	B	C	B	B	C	C
VI. PR10	Area 1	1	2	16	B	B	B	B	A	B	B	B
	Area 2	1	2	10	B	B	B	C	B	A	C	B
	Area 3	1	2	6	B	B	B	C	A	B	C	C
	Area 4	1	2	2	B	C	B	C	A	C	C	C
V. NH1 (West)	Area 1	1	6	17	B	B	A	B	B	B	B	B
	Area 2	1	6	24	B	B	A	C	A	B	B	B
	Area 3	2	8	10	B	A	A	C	B	A	C	C
	Area 4	1	4	8	C	B	A	C	C	A	C	C
VI. NH50	Area 1	1	2	12	B	B	B	B	B	B	C	C
	Area 2	1	2	8	B	B	B	C	B	B	C	C
	Area 3	2	4	6	B	B	B	C	B	B	C	C
	Area 4	1	2	2	B	C	B	C	B	C	C	C
VII. PR15	Area 1	2	4	21	B	B	A	B	B	A	A	C
	Area 2	1	2	12	B	B	B	C	A	B	C	C
	Area 3	1	2	11	B	C	B	C	A	C	C	C
VIII. PR20 (NH51)	Area 1	1	2	18	B	B	A	C	B	A	B	C
	Area 2	1	2	2	B	B	B	C	B	A	C	C
	Area 3	1	2	2	B	A	B	C	B	A	C	C
	Area 4	2	6	4	B	A	B	C	B	A	C	C

Source: Study Team

[1] Estimated based on the "Do-committed" situation, assuming a standard capacity of 10,000 PCU/lane/day.

[2] Assumed modal share of motorcycle, car, and bus (%): 50, 20 and 30.

[3] Average occupancy: motorcycle: 1.3, car: 1.9, bus: 36.

[4] Possibility of road development: A-Possible, B-Possible with some difficulty, C-Difficult.

[5] A: Recommended, B: For consideration, C: Not recommended.

6.4 Alternative Network Plans and Evaluation

The future transport network was tested by changing the assumptions on modal share and load factor (refer to Table 6.4.1). This resulted in different scenarios. Base Scenario (B), which includes an at-grade road network, urban expressway, and an UMRT system, showed overall improvements in traffic except in the CBD and some corridors near it. If bus operations were further strengthened (50% share with 50-passenger occupancy as shown in Alternative Scenario 3), the traffic situation will improve without any need for additional infrastructure (refer to Table 6.4.2 and Figure 6.4.1).

The disadvantages which will affect future traffic are as follows:

- Lack of bus services.
- Inefficient bus operations.
- Increase in car traffic.

Table 6.4.1 Description of Different Scenarios

Strategy		Description	Modal Policy		
			Mode	Share (%)	Average Occupancy
Base Scenario	A	At-grade Road Only	Motorcycle Car Bus/Rail	50 20 30	1.3 1.9 36
	B	At-grade Road + Urban Expressway[1] + UMRT[2]			
Alternative Scenario	1	Present Modal Share[3]	Motorcycle Car Bus	90 5 5	1.3 1.9 36
	2	Trend Modal Share[3]	Motorcycle Car Bus/Rail	65 25 10	1.3 1.9 36
	3	Strong Bus Improvement[3]	Motorcycle Car Bus/Rail	30 20 50	1.3 1.9 50
	4	Increase in Car Usage[3]	Motorcycle Car Bus/Rail	40 30 30	1.3 1.9 36

Source: Study Team
1) Toll fee on urban expressway: 15,000VND/ride; for interregional expressway: 1,000VND/km
2) Fare on UMRT: 5,000VND/ride +500VND/km
3) Network is the same as Base Scenario B.

In the above scenario, Base Scenario B and Alternative Scenario 3 (strong bus improvement) are the central cases in this study. The difference between the two cases is the share and average occupancy of buses. While the share and average occupancy of buses in the Base Scenario are 30% and 36 passengers, those in Alternative Scenario 3 are 50% and 50 passengers, respectively.

Table 6.4.2 Assessment of Future Network by Scenario based on V/CR

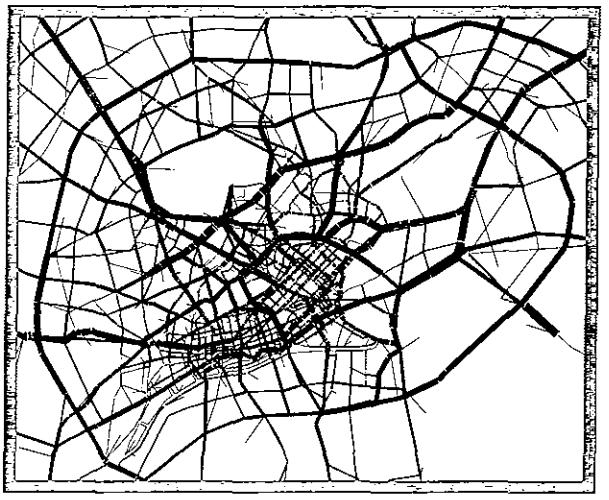
Corridor/Area		Section						Area					
		Base Scenario		Scenario				Base Scenario		Scenario			
		A	B	1	2	3	4	A	B	1	2	3	4
CBD	Saigon	1.4	1.3	1.3	1.6	1.0	1.5	1.1	1.0	1.1	1.3	0.9	1.2
	Cho Lon	1.1	1.0	1.0	1.1	0.8	1.1	1.0	0.9	0.9	1.0	0.7	1.0
I. NH1	Area 1	1.0	1.0	1.0	1.3	0.9	1.1	0.9	0.9	0.9	1.1	0.7	1.0
(East)	Area 2	1.2	1.1	1.1	1.6	1.0	1.3	1.0	1.0	1.0	1.2	0.8	1.1
	Area 3	1.1	1.1	1.1	1.4	0.9	1.2	0.7	0.7	0.7	0.9	0.6	0.8
	Area 4	1.1	1.1	1.1	1.2	1.0	1.2	0.7	0.7	0.7	0.8	0.5	0.8
II. NH13	Area 1	1.2	1.0	1.1	1.6	0.8	1.3	0.9	0.8	0.9	1.1	0.6	0.9
	Area 2	1.1	1.1	1.0	1.4	0.9	1.2	0.8	0.8	0.8	1.1	0.7	0.9
	Area 3	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.7	0.5	0.7
III. NH22	Area 1	1.1	1.0	1.0	1.3	0.9	1.1	1.0	0.9	0.9	1.1	0.7	1.0
	Area 2	1.2	1.2	1.2	1.5	1.0	1.3	0.9	0.8	0.9	1.1	0.7	1.0
	Area 3	0.9	0.9	0.9	1.2	0.7	1.0	0.8	0.8	0.8	1.1	0.6	0.9
	Area 4	0.6	0.7	0.6	0.7	0.5	0.8	0.7	0.7	0.7	0.8	0.6	0.8
VI. PR10	Area 1	0.8	0.7	0.7	0.8	0.6	0.8	0.8	0.7	0.7	0.9	0.5	0.8
	Area 2	1.0	1.0	1.0	1.2	0.8	1.1	0.9	0.8	0.8	1.0	0.6	0.9
	Area 3	0.6	0.5	0.5	0.7	0.4	0.6	0.7	0.7	0.7	0.9	0.5	0.8
	Area 4	0.6	0.6	0.6	0.7	0.5	0.7	0.5	0.4	0.4	0.6	0.4	0.5
V. NH1	Area 1	0.8	0.7	0.7	0.9	0.5	0.8	0.6	0.5	0.6	0.7	0.4	0.6
(West)	Area 2	0.4	0.3	0.4	0.5	0.3	0.4	0.8	0.7	0.8	0.9	0.6	0.8
	Area 3	0.5	0.5	0.5	0.6	0.4	0.6	0.6	0.6	0.6	0.7	0.5	0.7
	Area 4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.6	0.4	0.5
VI. NH50	Area 1	0.7	0.6	0.6	0.8	0.5	0.7	0.9	0.8	0.8	1.0	0.6	0.9
	Area 2	0.8	0.8	0.8	1.0	0.6	0.9	0.7	0.6	0.7	0.8	0.5	0.7
	Area 3	1.0	1.0	1.0	1.1	0.9	1.1	0.5	0.5	0.5	0.7	0.4	0.6
	Area 4	0.6	0.6	0.6	0.7	0.5	0.6	0.6	0.6	0.6	0.7	0.5	0.7
VII. PR15	Area 1	1.2	1.1	1.2	1.4	0.9	1.3	1.0	0.9	0.9	1.1	0.7	1.0
	Area 2	0.9	0.9	0.9	1.1	0.8	1.0	0.9	0.9	0.9	1.1	0.8	1.0
	Area 3	0.8	0.8	0.8	1.0	0.7	0.9	0.6	0.6	0.6	0.7	0.5	0.7
VIII. PR20	Area 1	0.9	0.9	0.9	1.1	0.8	1.0	0.9	0.9	0.9	1.0	0.7	0.9
(NH51)	Area 2	0.8	0.8	0.8	1.0	0.6	0.9	0.7	0.7	0.7	0.8	0.5	0.8
	Area 3	0.4	0.4	0.3	0.5	0.3	0.4	0.4	0.4	0.4	0.5	0.3	0.5
	Area 4	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.3

Source: Study Team

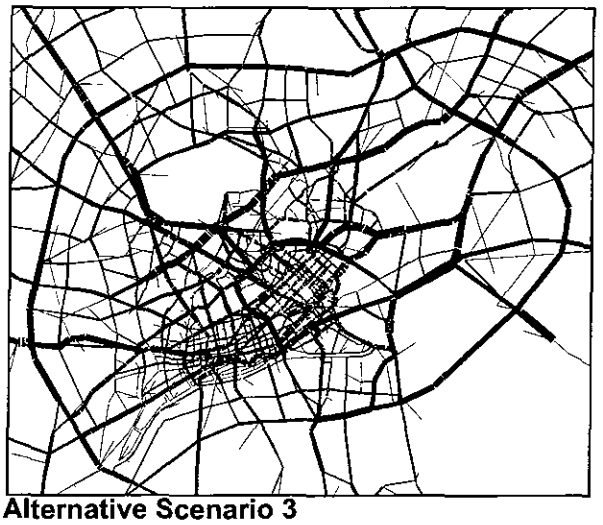
Figure 6.4.1 Traffic Assignment on Future Network by Scenario

Base Scenario (A)

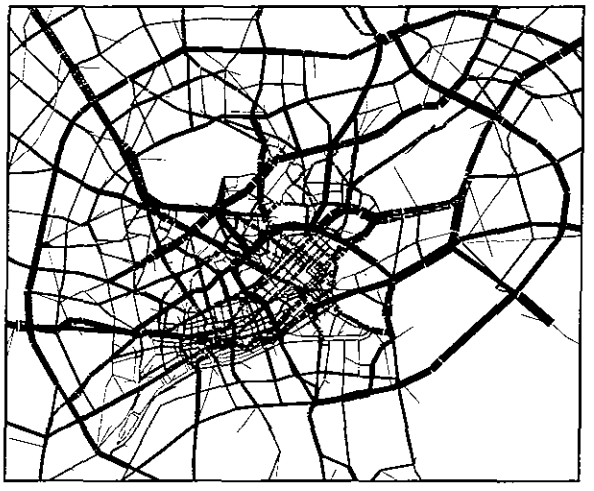
Base Scenario (B)



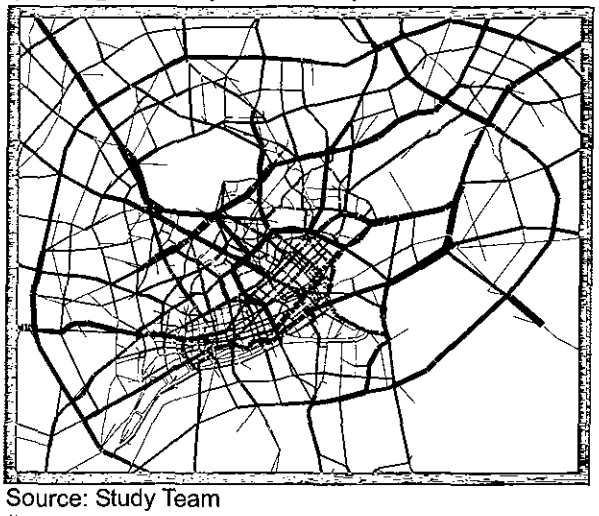
Alternative Scenario 1
(Present modal share)



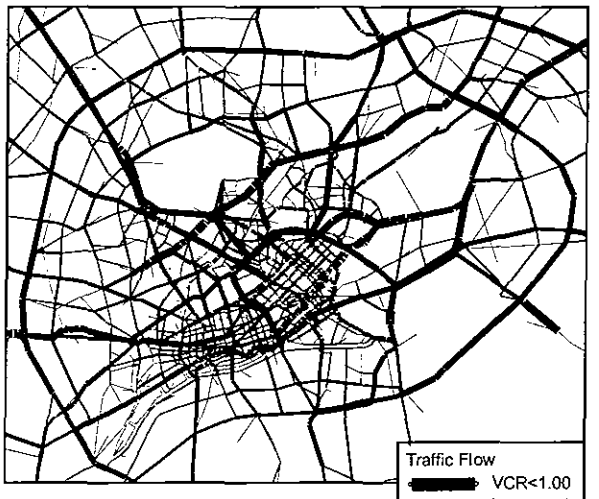
Alternative Scenario 2
(Trend modal share)



Alternative Scenario 3
(Strong bus improvement)



Alternative Scenario 4
(Increased car use)



Source: Study Team

[1] Refer to Table 6.4.1 for further description of alternative scenarios.

6.5 Recommended Network

1) Network Profile

Based on the series of network analysis laid down in the previous sections, the Study Team recommends the 2020 network which comprises the following (refer to Figure 6.5.1):

(1) At-grade roads: Comprising primary and secondary roads with a total length of 771km and 1,216km, respectively.

(2) An urban expressway (elevated) with a total length of 46km.

(3) A regional expressway (at-grade) with a total of 207km.

(4) A UMRT system comprising an urban railway and a busway system with a total length of 138km.

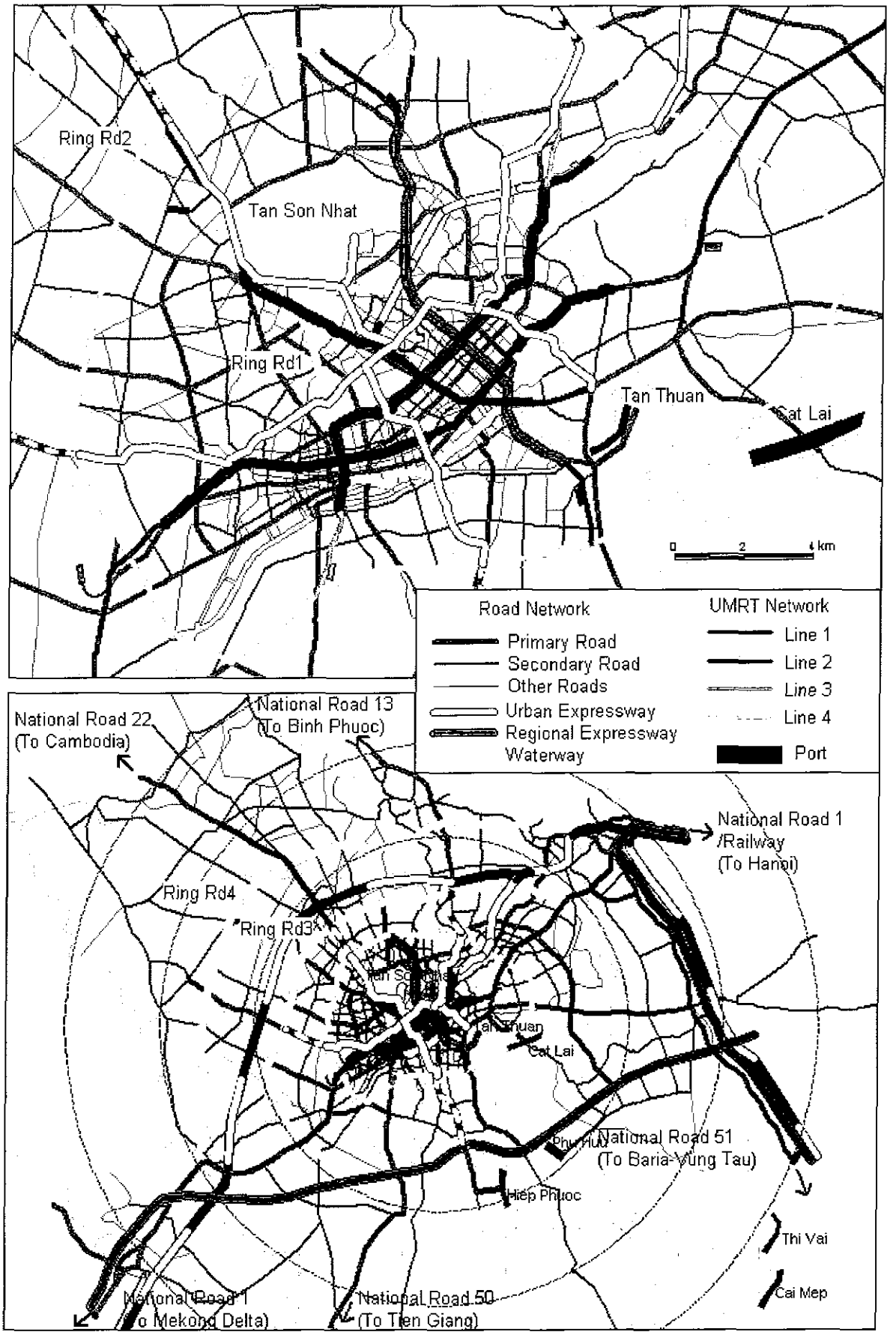
Table 6.5.1 Road and UMRT Development by 2020

	Total (2002)	New Construction	Total	
			(2020)	2020/2002
Roads: Primary	391	380	771	2.0
Secondary	606	610	1,216	2.0
Urban Expressway	0	46	46	-
Regional Expressway	0	(207)[1)]	(207)[1)]	-
UMRT	0	138	138	-

Source: Study Team
[1)] Including the section to Vung Tau and My Tho.

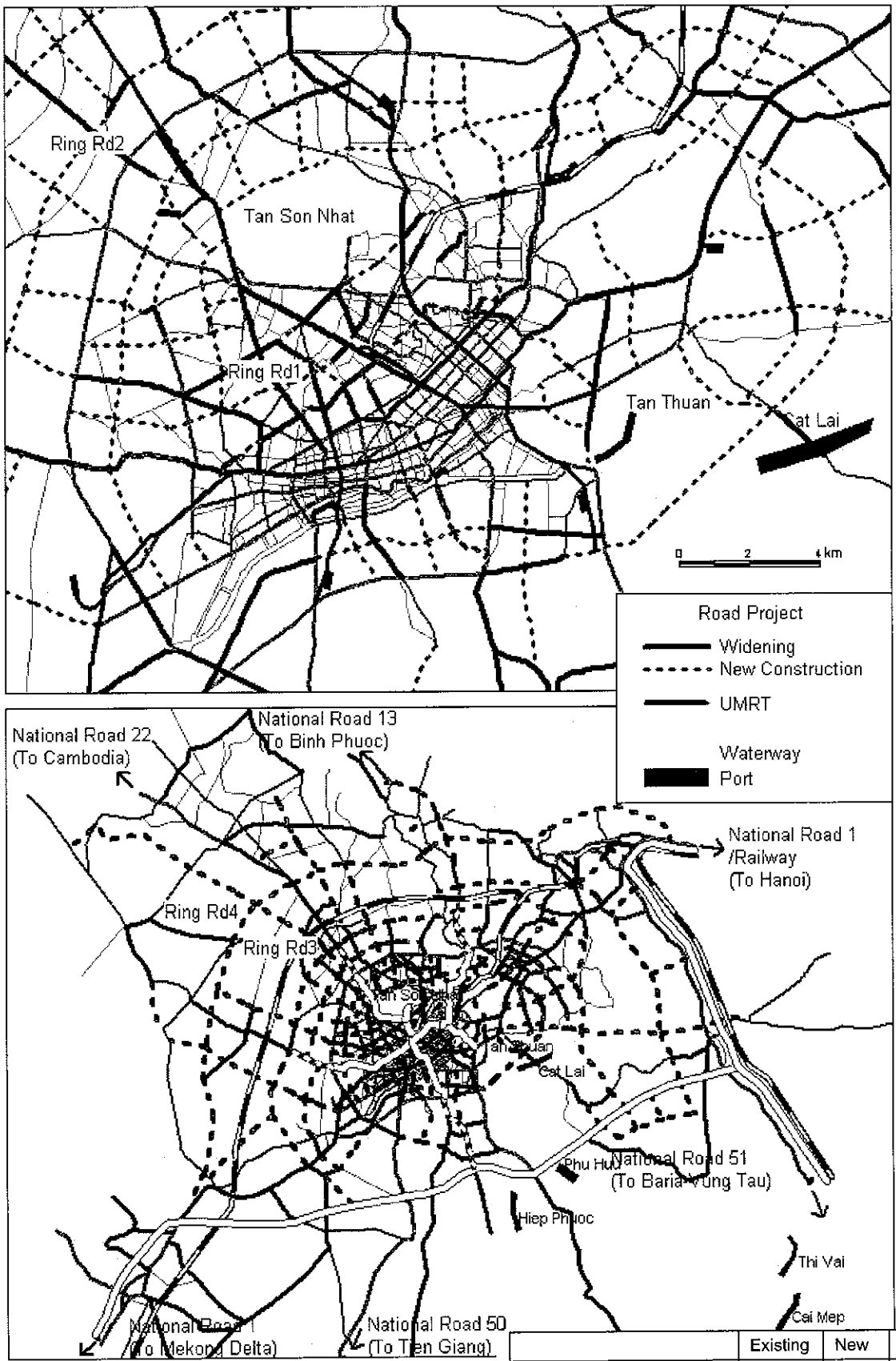
The locations of the road projects by type of improvement, such as new construction and widening, are shown in Figure 6.5.2.

Figure 6.5.1 Master Plan Network, 2020



Source: Study Team

Figure 6.5.2 Recommended Future Network



	Existing	New	Total
Primary Roads	391	380	771
Secondary Roads	606	610	1,216
Urban Expressway	0	46	46
Regional Expressway[1)]	0	207	207
UMRT (urban rail+busway)	0	138	138

Source: Study Team
[1)] Including outside the study area.

2) Network Performance

Future demand was assigned on the Master Plan network to assess its performance. Results showed that future traffic will be relatively evenly distributed and there will only be a limited number of critical sections in the network (see Figure 6.5.3). The M/P network's V/CR was further assessed by corridor and classified area (see Table 6.5.2). In 2020, traffic congestions will be seen in the CBD and the urban peripheries of some major corridors, which, however, can be managed by introducing additional TDM measures rather than developing new roads and infrastructure.

Table 6.5.2 Assessment of Recommended Network

Corridor/Area		By Section					By Area				
		M/P: Bus/Rail-30%[1]			M/P: Bus/Rail-50%[1]		M/P: Bus/Rail-30%[1]			M/P: Bus/Rail-50%[1]	
		Capacity (000 PCU)	Traffic Volume 000 PCU	V/CR	Traffic Volume (000 PCU)	V/CR	Capacity (000 PCU-km)	Traffic Volume (000 PCU-km)	V/CR	Traffic Volume (000 PCU-km)	V/CR
CBD	Saigon	382	485	1.3	401	1.0	4,036	4,157	1.0	3,436	0.9
	Cho Lon	555	534	1.0	457	0.8	3,893	3,346	0.9	2,728	0.7
I. NH1 (East)	Area 1	319	320	1.0	273	0.9	6,407	5,636	0.9	4,521	0.7
	Area 2	94	106	1.1	90	1.0	3,169	3,143	1.0	2,566	0.8
	Area 3	98	104	1.1	90	0.9	3,479	2,502	0.7	2,075	0.6
	Area 4	49	54	1.1	48	1.0	996	662	0.7	544	0.5
II. NH13	Area 1	41	42	1.0	32	0.8	1,551	1,265	0.8	981	0.6
	Area 2	126	134	1.1	109	0.9	3,960	3,327	0.8	2,578	0.7
	Area 3	121	65	0.5	56	0.5	2,358	1,324	0.6	1,102	0.5
III. NH22	Area 1	247	243	1.0	213	0.9	5,883	5,298	0.9	4,277	0.7
	Area 2	159	191	1.2	158	1.0	5,080	4,271	0.8	3,423	0.7
	Area 3	152	134	0.9	111	0.7	3,189	2,599	0.8	2,032	0.6
	Area 4	146	97	0.7	78	0.5	3,825	2,661	0.7	2,220	0.6
VI. PR10	Area 1	246	172	0.7	144	0.6	1,914	1,291	0.7	1,001	0.5
	Area 2	143	140	1.0	107	0.8	3,914	3,144	0.8	2,506	0.6
	Area 3	133	69	0.5	52	0.4	4,118	2,841	0.7	2,153	0.5
	Area 4	20	11	0.6	10	0.5	769	318	0.4	279	0.4
V. NH1 (West)	Area 1	162	108	0.7	87	0.5	564	303	0.5	237	0.4
	Area 2	78	26	0.3	20	0.3	1,461	1,083	0.7	854	0.6
	Area 3	143	68	0.5	56	0.4	2,143	1,243	0.6	987	0.5
	Area 4	51	25	0.5	20	0.4	5,631	2,670	0.5	2,230	0.4
VI. NH50	Area 1	212	127	0.6	98	0.5	1,650	1,259	0.8	979	0.6
	Area 2	78	62	0.8	46	0.6	1,017	658	0.6	508	0.5
	Area 3	49	50	1.0	42	0.9	5,268	2,729	0.5	2,228	0.4
	Area 4	24	14	0.6	12	0.5	259	164	0.6	141	0.5
VII. PR15	Area 1	116	131	1.1	106	0.9	3,277	2,830	0.9	2,235	0.7
	Area 2	69	62	0.9	54	0.8	453	414	0.9	348	0.8
	Area 3	133	107	0.8	90	0.7	3,831	2,215	0.6	1,805	0.5
VIII. PR20 (NH51)	Area 1	19	18	0.9	15	0.8	1,075	921	0.9	699	0.7
	Area 2	81	66	0.8	52	0.6	1,243	838	0.7	654	0.5
	Area 3	152	54	0.4	40	0.3	7,197	2,808	0.4	2,246	0.3
	Area 4	59	13	0.2	10	0.2	4,443	1,067	0.2	880	0.2

Source: Study Team

[1] Ave. occupancy: motorcycle - 1.3, car - 1.9, bus – 36 (bus/rail: 30%) / 50 (bus/rail: 50%).

[2] Toll fee on urban expressway: 15,000VND/ride; on interregional expressway: 1,000VND/km. Fare on UMRT: 5,000 VND/ride + 500VND/km.

Figure 6.5.3 Traffic Assignment on Recommended Network: PT 30% Case

Source: Study Team

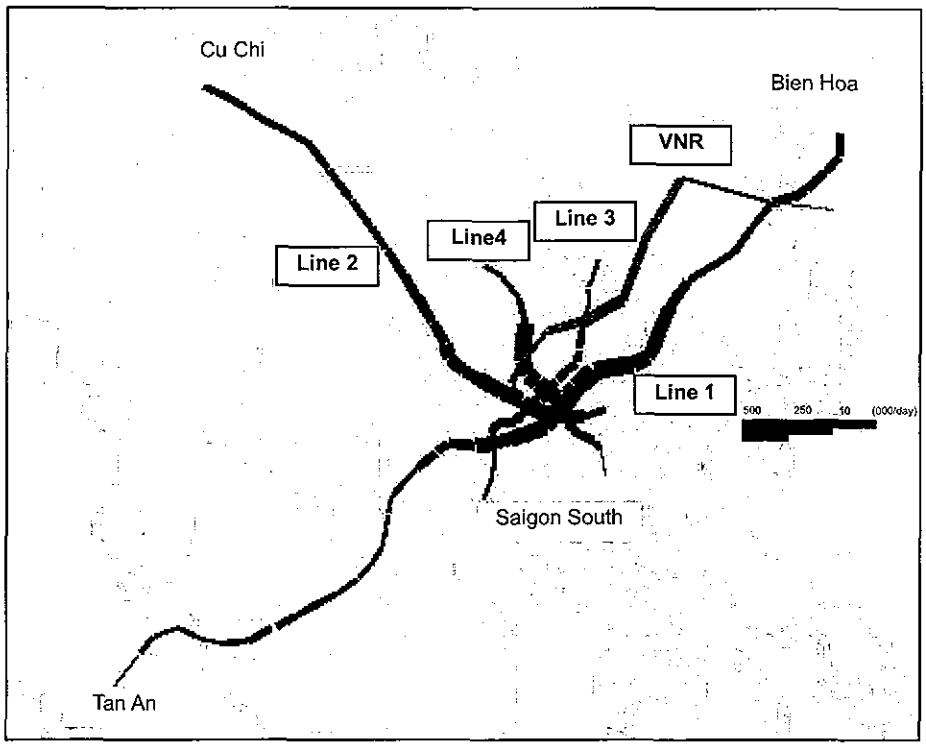
Note: Assumed modal share (%) of M/C, car, and bus is 50, 20 and 30. Average occupancy: M/C - 1.3, car - 1.9, bus - 36.

Figure 6.5.4 Traffic Assignment on Recommended Network: PT 50% Case

Source: Study Team

Note: Assumed modal share (%) of M/C, car, and bus is 30, 20 and 50. Average occupancy: M/C - 1.3, car - 1.9, bus - 50.

Figure 6.5.5 Passenger Volume on Proposed UMRT



Source: Study Team

Note: Assumed modal share (%) of M/C, car, bus: 30/20/50. Average occupancy: M/C1.3, car1.9, bus50. Fare on UMRT: 5,000VND/ride+500VND/km. Travel Speed (km/h): rail - 30, busway - 25, ordinary bus - 15.

Table 6.5.3 Estimated Ridership of UMRT[1)]

		Bus/Rail: 50%[1)]		Bus/Rail: 30%[2)]	
		No. of Passengers (000/day)	Ave. Trip Length (km)	No. of Passengers (000/day)	Ave. Trip Length (km)
Line 1	Rail	956	8.0	612	8.2
	Busway (east)	230	9.3	154	9.8
	Busway (west)	189	11.1	119	11.4
	Total	1,375	8.6	885	8.9
Line 2	Rail	828	5.4	538	5.5
	Busway	208	12.5	140	13.4
	Total	1,036	6.8	678	7.1
	Line 3	489	5.0	318	5.1
	Line 4	700	4.9	430	4.9
Total	Rail	2,973	6.6	1,898	6.8
	Busway	627	10.9	413	11.1
	Total	3,600	7.3	2,311	7.6
	(VRN)[3)]	357	10.6	250	11.5

Source: Study Team

[1)] Fare on UMRT: 5,000VND/ride + 500VND/km. Travel speed (km/h): rail - 30, busway - 25, ordinary bus - 15.

[2)] Assumed modal share (%) of M/C, car, bus: 30/20/50. Average occupancy: M/C - 1.3, car - 1.9, bus - 50.

[3)] Assumed modal share (%) of M/C, car, bus: 50/20/30. Average occupancy: M/C - 1.3, car - 1.9, bus - 36.

[4)] Considering VNR development plan (Trang Bong- Hoa Hung).

Table 6.5.4 Resultant Modal Share [1)]

(%)

		Whole Study Area	HCMC excluding Cu Chi & Can Gio
Bus/Rail: 50% [2)]	Rail/Busway	11.0	16.3
	Ordinary Bus	39.0	33.7
	Total	**50.0**	**50.0**
Bus/Rail: 30% [3)]	Rail/Busway	7.1	10.6
	Ordinary Bus	22.9	19.4
	Total	**30.0**	**30.0**

Source: Study Team

[1)] Fare on UMRT: 5,000VND/ride + 500VND/km. Travel speed (km/h): rail - 30, busway - 25, ordinary bus - 15.

[2)] Assumed modal share (%) of M/C, car, bus: 30/20/50. Average occupancy: M/C - 1.3, car - 1.9, bus - 50.

[3)] Assumed modal share (%) of M/C, car, bus: 50/20/30. Average occupancy: M/C - 1.3, car - 1.9, bus - 36.

3) Impact of Master Plan Network

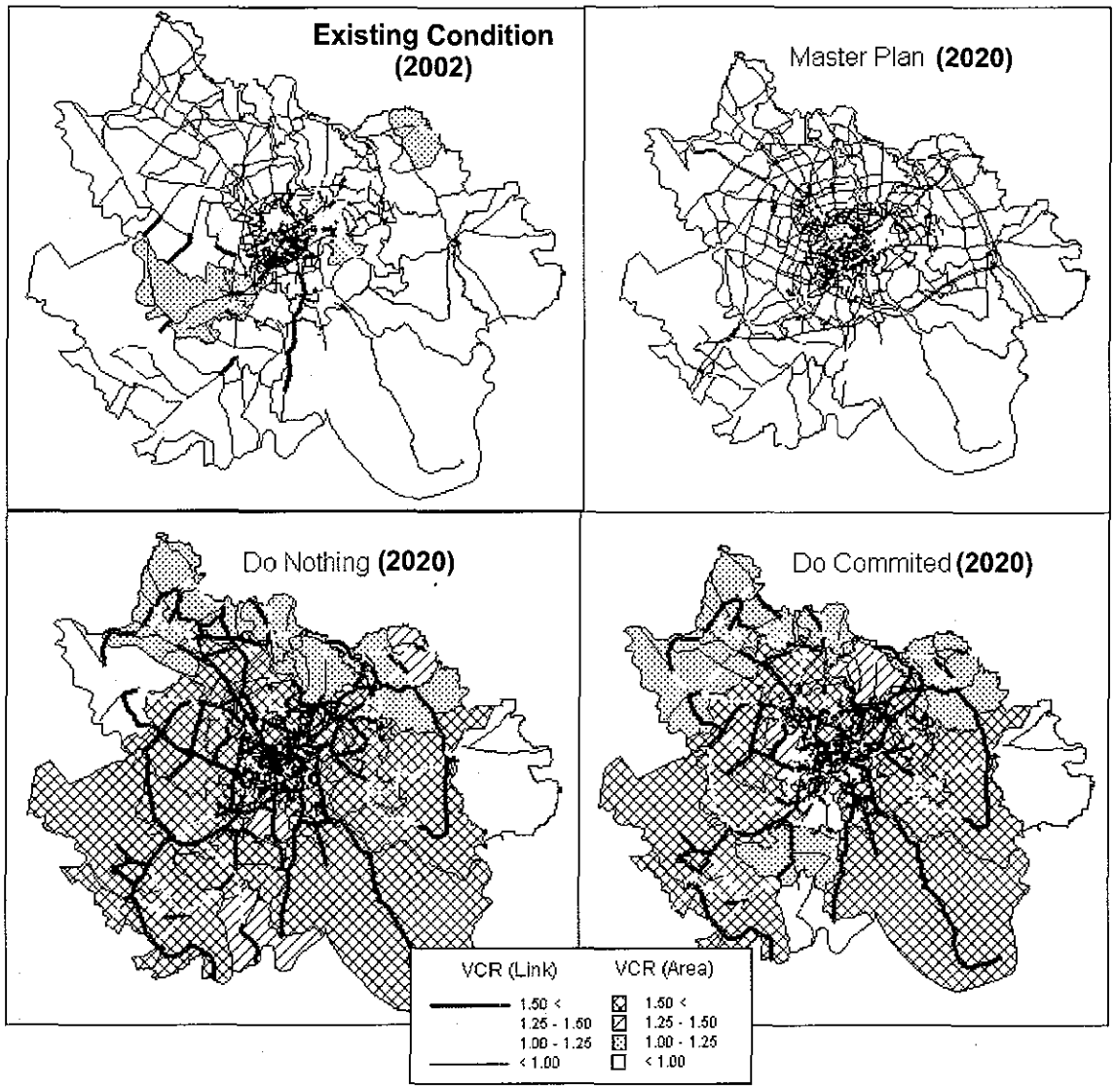
Future traffic situation was analyzed under the following four different scenarios:

- Existing situation (2002)
- Do Nothing (2020): If no infrastructure will be constructed, what will be the traffic situation in 2020?
- Do Committed (2020): if ongoing projects will be completed but no more projects will be implemented, what will be the traffic situation in 2020?
- Master Plan Network (2020): If the M/P will be implemented, what will be the likely traffic situation in 2020?

The analysis showed that the effects of the Master Plan will be very obvious both along major corridors as well as in the corridors' surrounding areas. Overall traffic situation will be better than now and society can save about US$ 8.6 million/day and US$ 23.6 million/day in 2020 and 2020, respectively (see Table 6.5.3).

Another interesting indicator is the distance traveled. At present, the people can reach a pretty long range within an hour's travel. However, under the "Do-nothing" and "Do-committed" situations, the areas accessible within an hour's travel will become very small. On the other hand, the M/P network can considerably expand the distance the people can reach within an hour (see Figure 6.5.4).

Figure 6.5.6 Impact of Recommended Network on Future Traffic



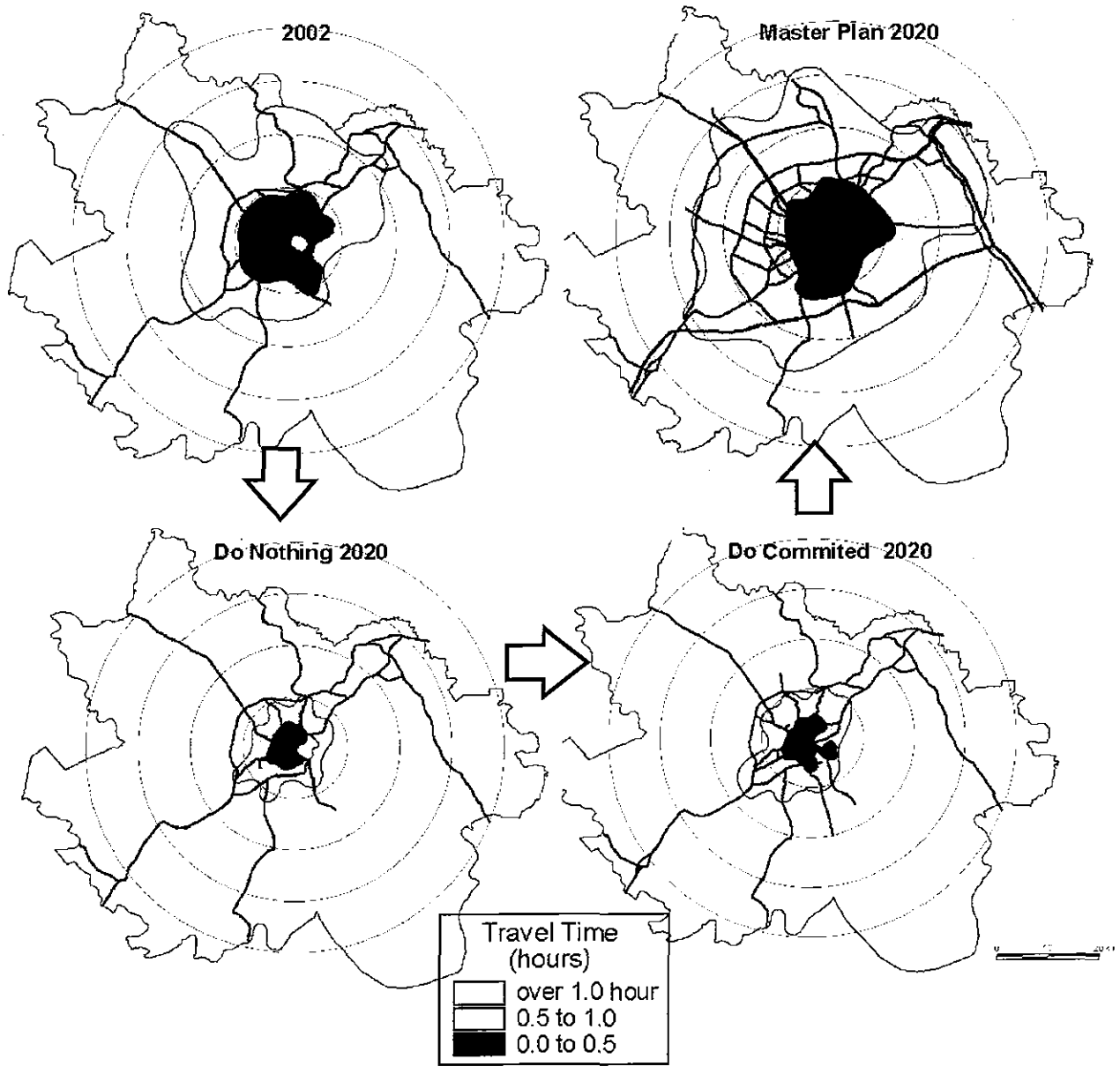
Source: Study Team
Note: Assumed modal share (%) of M/C, car, bus: 50/20/30, Average occupancy: M/C1.3, car1.9, bus36

Table 6.5.5 Comparison of Network Performance by Scenario

		2002	2020			2020/2002		
			Do Nothing[1)]	Do Committed[1)]	M/P[1,2)]	Do Nothing	Do Committed	M/P
Traffic Demand (mil. PCU)		3.1	7.3	7.3	7.3	2.4	2.4	2.4
Traffic Load	PCU-km (mil.)	26.9	77.2	77.8	75.6	2.9	2.9	2.8
	PCU-hrs (mil.)	1.1	6.7	5.9	2.7	6.1	5.4	2.5
Travel Features	Ave. Travel Speed (kph)	23.8	11.4	13.3	28.4	0.5	0.6	1.2
	Ave. V/C Ratio	0.7	2.1	1.8	0.9	3.0	2.6	1.3
Transport Cost (mil US$)	VOC	2.6	11.0	10.2	6.2	4.2	3.9	2.4
	Passenger Time Cost	4.7	53.6	46.0	20.9	11.4	9.8	4.4
	Total	7.3	64.6	56.2	27.1	8.8	7.7	3.7

Source: Study Team
[1)] Assumed modal share (%) of M/C, car, bus: 50/20/30. Average occupancy: M/C - 1.3, car - 1.9, bus - 36.
[2)] Toll fee on urban expressway: 15,000 VND/ride, on interregional expressway: 1,000 VND/km. Fare on UMRT: 5,000 + 500/kmVND.

Figure 6.5.7 Impact of Recommended Network on Future Travel Coverage [1), 2)]



Source: Study Team

[1)] *This diagram shows the area that can be reached within 30 minutes and an hour to/from the People's Committee office located in the city center.*

[2)] Assumed modal share (%) of M/C, car, bus: 50/20/30. Average occupancy: M/C - 1.3, car - 1.9, bus - 36.

7 DEVELOPMENT AND PROMOTION OF PUBLIC TRANSPORT SERVICES

7.1 Policy Commitment

1) The Road to Year 2020

In the preceding chapter, the number of daily trips in the study area was forecast to grow from 19 million to 26 million (in 2010) and 36 million (in 2020).

The vision is for this expanding trip market to be served by a diversity of transport modes and services in a more balanced fashion, where each mode operates according to its inherent strengths. A significant increase in the usage of buses (from 1.7% to 25% by year 2010, thence to 25%-30% by year 2020) is envisaged. These buses would range from small to large in size, offering regular, air-conditioned, express, and shuttle services.

The government has jumpstarted the bus expansion with the acquisition of 1,318 new buses expected to go into service from 2002 to 2005 on new routes as well as existing ones. In addition, it has decided to provide operating subsidy to bridge the gap between low fares and high operating costs. This subsidy has to be phased out as fares get adjusted to more realistic levels and the private sector picks up the bulk of the investments required. To enable bus operators to scale up, existing small operators will be re-organized[1] to form fewer but better-managed fleet operators that can tap the credit and equity markets.

Farther down the road, the government has to change the 'rules of the game' to create a level playing field for both the SOEs and private bus operators. It should initiate the commercialization of Saigon PTC, and the conversion of Saigon Star into a distinct and autonomous entity on the way to year 2010. As a further comfort to the other bus operators the government should move to privatize its interests in these two companies, as well as separate the regulatory functions from the operating responsibilities over Saigon PTC. These moves are necessary stepping stones for private sector to invest in a big way in the urban transit business.

Inland waterway transport will continue to provide niche services in the medium- to long-term horizon, but its modal share is not expected to be significant. The core demand will be borne by the cross-river ferry (between Thu Tiem and the central districts), and the interprovincial vessels to the southern provinces.

2) Guideposts Along the Way

A strategy serves as a compass to get from the present to a desired future condition. While there are many possibilities, and many options for HCMC authorities, the one controlling factor that will shape the final strategy is the amount of available funds.

If current trend continues, the share of public transport in the daily trips of residents will be insignificant by 2010 and 2020. Trips would rely mostly on private modes of transport – cars (much higher than at present) and motorcycles (lower than today but still a sizeable share).. The road space requirements of a car-based city would be very high, and the

[1] As of September 2003, two unions were being formed out of 26 cooperatives.

corollary investments to support it would fall short of what can realistically be provided by HCMC. With more users and less roads, severe traffic congestion would ensue, at great cost to the economy and to the habitability of the city.

To avoid such a dismal fate, HCMC must develop its public transport system - principally, buses in the medium term and rail-based mass transit in the long term. However, even these solutions would entail investments at a scale that may also be unsustainable from a pure business point of view.

The following sections set out the strategic choices toward the realization of a public-transport-oriented city.

7.2 Sector Structure and Strategies

1) Fundamental Choices

There are three basic choices or policy regimes for public transport development, viz: (a) through a monopoly, either by a public agency or a private entity; (b) regulated competition of several operators; and, (c) free-market deregulated transport regime. These choices are amplified further in Table 7.2.1. Only the first two paths offer any hope of achieving the ambitious goals set out for urban transport.

The third path is a non-starter under present conditions in HCMC. It is also equivalent to a private-transport-oriented urban transport strategy. The demand for public transport market is weak, and will remain so, unless government intervenes. Private bus operators have no access to capital for expansion, or the wherewithal to transform themselves to a different business model. However, this strategy represents a "no-pain-no-gain" alternative to HCMC. The demands on the resources of the city will then be for an expanded road network, but virtually none for bus transit. The strategy also forecloses any decent hope for a future rail-based mass transit since private investments will not be available.

Public transport development by a public sector monopoly, or by a few large private operators (complemented by small operators on secondary and feeder lines) under a regulated competition regime, offer the potentials to reach a target of 50% market share. These two strategies are consistent with the "public-transport-oriented" flank of the master plan, but they differ in their short-term and long-term pains and gains. The second path – controlled competition regime – entails painful (but less costly) adjustments on the part of the government in the short-term period, but promises minimal pains afterwards. It also has the best chances of reaching the target modal share. On the other hand, the public monopoly regime postpones the pain to a future time, but at a higher cost. Moreover, it has a higher risk of not achieving the higher modal share targets because it is dependent on the scarce funds of the city. Bangkok followed this 'monopoly strategy' in 1975, but was forced to retreat into the second option when losses mounted amid government funding shortages.

2) Public Transit Vision and Vision

Hanoi has opted to follow the public-monopoly strategy of developing its urban transit system. It has merged four entities into a single state enterprise, Transerco. But Hanoi, following the "European" tradition, never went as far as HCMC on the road to privatization and, therefore, has a much more favorable situation today.

HCMC has a much more difficult and complex situation to start with. Similar to most cities in developing countries, there is in HCMC a class of hundreds of small bus operators that has to be recognized somehow. The small transport operators are now being merged into two unions in an attempt to concentrate and create larger operating units. The recommended strategy takes off from this decision.

It is envisaged that HCMC will move toward a multi-operator strategy with eventual tendering for routes. Under this regime, a maximum of seven[2] large fleet bus operators will be franchised to provide diversified services on fixed set of routes (herein called, Tier 1 market). Once the franchises have been defined, no competition within this set of trunk or primary routes will be required. The system is thus based on competition ***for*** the market rather than ***in*** the market. . Buses would have colors representing their function (as in e.g. Curitiba) but could also have a sign identifying the operator.[3] Small, individual operators shall be allowed to operate in separate areas of their own (i.e. Tier 2 market) under the umbrella of a cooperative, which shall assume more functions – in behalf of its members and in behalf of the government – than currently undertaken.

Table 7.2.1 Fundamental Choices in Public Transit

		Public Monopoly	Controlled Competition	Deregulated Regime
Externalities and Cost to Oher Sectors	Short term	HIGH Adverse effects on existing private operators and their investments.	MEDIUM Restructuring of existing private sector operators, to affect only those on trunk routes (Tier 1 market).	LOW No change in existing structure of the bus industry.
	Long term	LOW Traffic impact is minimized through proper sizing and mix of vehicle fleet.	LOW Traffic impact is minimized through proper sizing and mix of vehicle fleet.	HIGH Congestion to affect all sectors. Dominance of small buses even on trunk routes.
Demand for Public or Gov't Funds	Short term	HIGH Government must allocate budget for new fleet, as well as to buy out existing operators.	MEDIUM Government must allocate seed capital to build up fleet, or take risks through leasing.	NONE No investments required.
	Long term	HIGH Capital and operating subsidies likely to be high. Amounts exceed budget envelope.	LOW Minimal demands for public subsidy – either capital or operational.	NONE No investments required.
Demands on Public Institutions	Short term	MEDIUM Bureaucracy needs to sharpen its skills in all aspects of bus transit management.	HIGH Reform of the public sector needed to foster private sector participation.	MEDIUM No more reason for existing SOE to continue, and get government funding.
	Long term	HIGH Size of the bureaucracy has to be enlarged. Operational efficiency is likely to be low & costly.	LOW Only a small bureaucracy is needed, with focus on regulation and support facilities.	LOW Only a small bureaucracy is needed to oversee private operators.

Source: Study Team

[2] Seven is proposed as the maximum number to relate to the seven definable transport corridors. The actual number can be less.

[3] Direct competition is not necessary to achieve a 'contestable market', but distinction among producers could possibly exist since it could facilitate regulation and provide a performance benchmark.

Table 7.2.2 sets out the context for bus transit in relation to other public transport modes. It outlines a family of transport modes, co-existing and working together, in accordance with its particular technological characteristics, strengths, and factor conditions. Instead of focusing only on large buses or rail transit as some advocates of public transport system do, the development strategy for HCMC recognizes and integrates various transport modes of different capacities and operational characteristics.

Table 7.2.2 Long-term Structure for Public Transport

Mode	Current Role and Situation	Problem & Issue	Option for the Medium Term	Long-term Outlook
Cyclo/ M.Cyclo	About 120,000 trips/day in HCMC are still carried by cyclo, although it is now declining in shares. Becoming a niche tourist service. Rates negotiated.	Man-propelled cyclo deemed inhuman. Unsafe to mix with cars and other vehicles.	**O1**: Let it be. Technology and market will decide what will happen, but restrict their areas of operations. O2: Organize them into clusters or groups to serve specific 'pedestrian-only' zones/blocks.	By 2010 onwards, this form of transport will become a relic of a bygone era, but would probably remain as a tourist or cultural icon.
Xe Om	Motorcycles operating as personalized taxis, for hire on-demand. Rates negotiated between driver & passenger. At least 160,000 trips/day in study area (very uncertain figure).	Unlicensed. No protection to riders in case of accidents or default in carriage. Taxation impossible.	**O1**: Legalize and regulate. Require prior license and impose unique color markings to identify them. O2: Let it be. It meets special trip demands and provides extra income to bike owners. Difficult to control anyway. But if kept formally illegal this would erode the respect for government's ability to uphold laws and regulations.	Will remain as a reliever, informal, free-market service, as long as HCMC residents retain their love affair with motorcycles. If traffic congestion worsens, demand for it may increase like in Bangkok.
Taxi	More than 3,000 4-wheeled car service on-demand. Appears to be profitable. Private taxis operating in competition with SOE-owned taxis. Trips/day=51,000 in study area.	Complaints about unlicensed taxi operators.	O1: No action or change required. Current glut maybe temporary, part of market cycle. **O2**: Legalize. Crack down on those operating outside the law but allow new establishment. O3: Regulate – stipulate desirable number of taxis and impose moratorium on new taxi operators.	Taxi services should be completely in the hands of private sector with minimum regulation of operations but strict service standards (taximeters). Supply will respond to demand.

Source: Study Team

(continuation of Table7.2.2)

Mode	Current Role and Situation	Problem & Issue	Option for the Medium Term	Long-term Outlook
Lambro	Approximately 1,700 units are still operating in several routes, providing service at no cost to the city. New version in the form of microbus, based on Suzuki minivans.	Classified under new law as 'unsuitable' mode for public transport. All microbus (12 seat or less) are to be phased out by 2005.	O1: Phase out immediately, according to law. This will displace livelihood of several owners and drivers, aside from cutting back services to commuters. Xe om and unlicensed taxis may increase. **O2**: Transfer to short intradistrict routes, if and when old routes are taken over by fleet-size operators under model bus project. O3: Maintain the microbus concept by replacing with new microbus vehicles, and allow them to compete with fleet operators.	In present form, will become extinct, by force of technology. It was based on the old scooter, which is no longer manufactured. Without regulation, however, concept will remain and grow since modern substitutes are already in the market. Microbus should remain a local service, restricted away from primary roads and from areas where bus fleet operators are present.
Water Transport	Cross-river ferry operated by HCMC provides good service. High-level hydrofoil services for inter-urban trips, also patronized. About 9,000 trips/day.	Only a few sections of the network are suitable for passenger transport.	**O1**: Focus on enhancing existing services. Waterway unlikely to get higher share of transport demand, because of time and access problems. O2: Develop the inland waterway network over and beyond current scale, to capture more intra-urban commuting trips.	Not significant mode for intra-urban commuting. Cross-river ferry will remain a viable option, despite existence of more bridges across Saigon River. Waterway will carry bulk of freight transport in the city.
Rail Transit	Urban rail service not yet existent in HCMC. Inter-urban services of Vietnam Railways between HCMC and neighboring provinces also undeveloped.	Small passenger demand can not support rail yet; unlikely to occur earlier than 2010.	**O1**: Consider rail, if and when threshold volume (>100,000 pax/day) on a major bus corridor is reached. O2:Proceed with feasibility studies now, since it will take about 10 years to bring a new rail line into commercial service. O3: Modify VR line to add a commuter line service towards the south and north.	A backbone service on high-density corridor beyond 2010, but share of daily trip markets unlikely to be significant or to exceed 5% of total demand. Permanent subsidy from government, route and fare integration with bus services, essential.

Source: Study Team

(continuation of Table7.2.2)

Mode	Current Role and Situation	Problem & Issue	Option for the Medium Term	Long-term Outlook
Bus Transit	Hundreds of bus operators organized into about 31 units, with ~2,300 vehicles of various sizes and age, are serving about 74 routes in HCMC. Of the 31 units, 27 are cooperatives and 21 of them own small vehicles only. Total trips/day = 326,000 for study area.	Small market share, poor route coverage, aging fleet (~2/3 >20 years old). Decree 92/CP seeks to phase out buses <17 seats.	O1: Merge all operators into 1 SOE, managed by Saigon PTS. O2: Create 3 to 7 large fleet operators from among the 31 operators to cover all kinds of routes and phase out small cooperatives. **O3**: Create 2 classes of routes and operators: primary and fixed routes to be assigned to 3-7 fleet operators; secondary and feeder routes to be assigned to existing small, individual-type, operators. Latter shall be assigned specific districts or zones, with flexible routes.	About 15% of total daily trips are likely to be carried by buses. Bus operations – whether big, medium, or small – to be done by the private sector under the umbrella of a strong regulatory agency providing competition for the market. Operating subsidy to be considered **if** contributing to overall development goals and **if** more efficient than other solutions (e.g. subsidies to other modes), but should be budgeted and built into the economy to ensure long-term continuity. . Bus infrastructure to be provided by city government to ensure efficiency and integration of services with rail and with other modes.

Source: Study Team

Table 7.2.3 provides additional details on how the bus mode will evolve under the proposed strategy.

Table 7.2.3 Evolution of Bus Transit in HCMC

Aspect of Bus Operations	Short Term	Medium Term	Long Term
Industry Structure	Consolidation of small cooperatives, and formation of 3-4 large fleet companies.	Entry of 3 new large fleet operators, possibly by splitting existing ones, and relocation of affected small operators to feeder routes.	Possible addition of another fleet operator, depending on circumstances.
Regulatory Body	MOCPT with reinforced staff.	MOCPT.	Autonomous body, with appreciation of commercial culture.
Procurement of Buses	Decided by government and parceled out to operators.	Quantity, type, and supplier to be decided by operators under general specifications by the regulatory body.	Quantity, type, and supplier to be decided by operators under general specifications by the regulatory body.
Ticketing	Printed, issued and controlled by MOCPT.	Printed, issued and controlled by MOCPT.	Use of smart card or RFID for ticketing, acceptable across all operators, including rail transit.
Fares	Flat, at VND 1,000 and set below cost. Raise to VND 2,000. Introduce transfer schemes.	Adopt distance-related or zonal fare, adjusted periodically to approximate cost.	Same as in medium term. However, introduce transfer schemes, with use of smart card.
Method of Paying Operating Subsidy	Paid out according to standard cost per bus-trip.	Paid out according to bus-space-kilometer (bus-seat-km).	Suitable mix based on both production and passengers attracted.
Market Entry	Route licensing via service contracts of 1 year tenor.	Franchising for specific corridors, with 3-5-year tenor, renewable depending on performance.	Franchising, with tendering, among the established fleet operators, 3-5-year tenor.
Route Planning	Initiated by MOCPT, results allocated to operators.	Tier 1 routes set by gov't; Tier 2 routes shared by operators and government.	Tier 1 routes set by gov't; Tier 2 routes shared by operators and government.
Service Type and Scheduling	Largely specified by MOCPT. Mainly regular and basic bus.	Minimum specifications from government, but details left to operators. Air-con and premium services.	Minimum specifications from government, but details left to operators. Diversity of services at discretion of operators.
Passenger Information	Principally by government.	Principally by government.	Principally by government since coordinated with e.g. rail and other modes.
ITS Applications	Use of cellular phones.	Radio communication.	Smart card, GPS for bus location & spacing, traffic signal priority, passenger information in vehicles and at stops, internet information RFID technology.

Source: Study Team

7.3 Mass Transit Development Opportunity and Strategy

1) General Considerations

Mass transit has often been associated with rail transit systems and the size of the city. This is an expensive misconception, perpetrated by the 'rail lobby', as a bus system could very well perform this role – even for cities with a population in excess of 5 million. The land-use pattern of the city, as well as its density, determines when and where such a system can be justified.

Capacity on a transport corridor is not always the primary determinant since urban public transport, by definition, has the task to cover an area, not a corridor Often, many smaller vehicles operating on many streets can provide the same total capacity as fewer larger vehicles in one corridor. In certain cases, however, such as connecting two urban areas, the corridor concept is relevant, and, a strategic network of mass transit corridors can provide speed, efficiency, and comfort in the same way as a highway network. The technology with which to operate such a corridor can vary from high-capacity buses to different types of rail services. The emphasis is thus not on steel wheels on rail versus rubber wheels on asphalt but on the concept itself of a separate space for public transport. However, in a case where there is but one possible corridor, where demand exceeds 10,000 passengers per hour per direction, where opportunity for road widening or additional lanes is not possible and where additional buses can not be accommodated, then a rail option may be promising. It must be noted, however, that introducing a rail transit system by itself will not produce a high demand in one single corridor since this may not be the "natural" way for people to travel.

A dispersed pattern of low-density urban development is not conducive to rail service. Hence, an evolving city could deliberately manage its land development and configuration to fit a lower-capacity mode of transport. Urban sprawl and absence of a dominant city center would characterize such an urban structure. Conversely, a city could plan for a concentrated development so as to conserve land space, and support this with a high-capacity transit line. A city with a linear configuration, for example, is suited to corridor-type mass transit of which rail is one. In practice, however, city governments are often unable to control land use and dictate the city pattern.

The main argument against rail for developing countries is cost. The technology is often imported, and the capital cost requires scarce foreign exchange. With few exceptions, they require continuing subsidy – and therefore a permanent burden on the public coffers. If the subsidy comes from the national government, it then raises the issue of social equity as even non-riders (and rural households) would be saddled with its upkeep. This is particularly serious if, as regularly happens, the rail line is introduced as a "stand-alone" system without integration with other modes. Then the whole population has to pay for a system which can be used only by the few people who are lucky enough to live and work within reach of the rail line. Hence, the rail option should be the mass transit mode of last resort from the fiscal standpoint.

Risk is another consideration. Unlike other modes, a railway entails a fixed guide-way. In this sense, it has no flexibility. If the demand fails to materialize, or declines, the line can not be relocated. It would end up as an unproductive investment. It is for this reason that

rail should be considered only on a corridor with established high volumes of passenger flows. Where demand is speculative, or forecast as to capture incremental growths, then the investment is very risky.

2) Nurturing a Mass Transit Corridor

The situation of HCMC is quite unique. The modal share of public transport is less than 3%, a level that is not yet adequate for rail-based mass transit. Also, there are few corridor-type travel flows in the city today. Hence, a proposed strategy is to identify a core set of bus routes that can grow into the mass transit corridors of the future. This will be a by-product of route re-structuring. Two of the initial bus routes are along the future Urban Mass Rapid Transit (UMRT) Line 1 and Line 2 corridors.

These two corridors, as recommended in other sections of this report, should be developed over the next six years into busways – either with dedicated or bus priority lanes – at the first stage (up to year 2010). Feeder lines and station developments should be implemented to boost passenger volumes on these lines. It must be treated as the backbone of the transport network. If and when the volume approaches the upper limits of a bus rapid transit system, then a conversion into the second stage (a rail mode) could be entertained. This represents a low-risk and low investment strategy, which also preserve future rights-of-way for mass transit.

3) Land Banking

Because of the agglomeration effects of mass transit, the land closer to the lines, or those within walking distance from stations, becomes more valuable. The development gains from mass transit are captured by those property owners. Ideally, those gains should be re-captured to support rail operations. The private railway lines in Japan, as well as the Hong Kong MRT, are generating surpluses because of the integration of property developments with mass transit system. HCMC, as part of its long-term strategy, should therefore acquire those lands intended for transit stations. If it owns those lands (as in the case of the Ben Thanh bus terminal and market), then it can preserve and progressively develop them to their intended future status. If it does not own the land, then the city should initiate discussions with current owners or leaseholders for a possible expropriation or joint-venture arrangement. In this manner, the future sustainability of the yet-to-be-built mass transit system can be assured.

Compared to other Asian cities, the advantage of HCMC on this aspect is that it has the time to prepare and secure the needed properties in advance.

4) Learning from Other Asian Cities

The increasingly global world makes it possible for a city like HCMC to draw from the experiences of other cities. These could include European cities but also cities in emerging economies, like Brazil, and in particular other Asian cities. From 2004 to 2010, HCMC can study the experiences of other Asian cities in developing and constructing their mass transit systems. Some of these cities are Singapore, Manila, Bangkok, and Kuala Lumpur. While the success stories or good elements of these systems should be emulated, the "failures" or bad practices will perhaps be more valuable to HCMC. The costly mistakes can, therefore, be avoided by HCMC, without paying the price. Of the four examples mentioned above, the Singapore case alone is generally considered to

represent a serious and responsible long-term approach to urban transport. It may not be possible to replicate the Singapore experience (continuous development, full government funding, car restrictions, etc.) because of differences in factor conditions. However, the integration of the stations with urban developments does offer valuable lessons.

HCMC can learn a lot about the perils of badly structured and badly managed PSP from the cases of STAR 1 in Kuala Lumpur, the MRT 3 in Manila, and the Skytrain of Bangkok. It is highly recommended that HCMC also takes note of the development in China where the concept of bus rapid transit (BRT) is now taken very seriously.

7.4 Bus System Modernization and Development

At a lower and more modest ambition level for the market share of public transport, say 10% or lower, a benign neglect of leaving the market free to respond to demands would perhaps be sufficient. With a desired market share target of 50% by 2020, the only feasible strategy is by strong government intervention attempting to tap private capital and expertise in providing the bus transit services for a huge market.

The recommended strategy, therefore, aims to improve the quality and quantity of bus transport through the middle way of controlled competition with operators on clearly defined playing fields, with the following components and features:

1) Market Segmentation and Industry Restructuring

- Segmentation of the bus transport market into two: Tier 1 for trunk routes to be served by fleet operators, and Tier 2 for secondary and feeder routes to be served by single-unit operators belonging to cooperatives.
- Each operator will have his own corridor or zone of responsibility, where competition shall be curtailed. A Tier 1 operator will be assigned a set of contiguous and fixed routes in two to three corridors, while a Tier 2 operator will have a zone or area within which it can operate but with no fixed routes.
- In the Tier 1 market, a maximum of seven large-fleet bus operators will be franchised – on a long-term basis. The road network indicates seven corridors, hence, this upper ceiling. In all likelihood, only two to three operators will be at the starting line in 2003. Only medium and standard buses, and later high-capacity buses, will be allowed on these corridors.
- The basis of the Tier 1 system is an integrated route network developed and continuously maintained by the regulatory agency (MOCPT). Packages of routes will be designed for operation by one of the operators. The city will initially be divided into zones or areas which will to a certain extent coincide with the route network. However, heavy trunk routes will connect between such areas and there will always be some overlap between routes.
- Capability for a modern and systematic fleet management shall be developed among Tier 1 operators. Cooperatives who wish to be in the Tier 1 market segment shall be assisted in their fleet acquisition, as well as in their conversion into joint-stock cooperatives or limited liability companies. New players (and investments) will be encouraged to enter the Tier 1 market.

- An expanded role for Tier 2 operators, especially cooperatives, shall be fostered so that they can perform self-regulation and secure more benefits (e.g. joint fuel supply, volume discounts in spare parts procurement, etc.) for their respective members.
- The route network is to be seen as one single system albeit operated by different operators. For this reason, the identity of buses will reflect their role in the system – express buses for example could have a specific color as in Brazil. For ease of identification by passengers, and to facilitate control, each operator can add an identification sign.
- To the extent possible, the route network packages will be designed so as to avoid a mix of different operators along the same route. On many segments, however, this can not be avoided as passengers will have a multiple choice of routes. If compensation to the operator is based purely on production this is not a problem but when, as recommended, this compensation is also based on the number of passengers, then competition will occur. This will be controlled by monitoring timetables and frequencies.

2) Service Improvements

- The bus route network shall be redesigned or reconfigured to reflect more closely the locations of demand as well as position the industry towards capturing a bigger share of the market. This will also support the proposed segmentation of the market into Tier 1 (primary routes) and Tier 2 (all other routes).
- Higher frequencies – preferably less than 10 minutes – shall be operated on trunk routes to make buses more ubiquitous and noticeable among the riding public, and thereby attract more passengers. If the economics so dictate, medium-size buses should be employed if only to achieve higher frequencies of service during the market build-up period. Feeder routes in Tier 2 zones shall be expanded to penetrate more areas of the study area and improve accessibility to the public transport network.
- To enable bus transit to respond more closely to travel demand and the changing requirements of its customers, operators on Tier 2 market shall be given the flexibility to plan and decide on their routes within defined parameters. Operators in Tier 1 market should also be given the freedom to increase their frequencies beyond a minimum.

3) Public Sector Reforms

- A level playing field between government and private operators shall be established. This means that bus operators, whether government-owned or private, whether with foreign or local equity, shall be treated equally, and be entitled to subsidy (at least, to Tier 1 operators) equitably and without discrimination.
- Restructuring in the private sector will require corresponding reforms in the public sector. These will include, among others, the future transformation of the MOCPT into an impartial transport regulatory and planning body, the equitization of the urban bus operations of Saigon PTC[4], and its eventual privatization.
- Operating responsibilities shall be separated from regulatory functions. The long-term goal is to leave bus operation to the private sector, with the government concentrating

[4] Based on interviews, Saigon PTC has five fields of businesses, with urban bus operations as only one of them.

on system and network planning, regulations, and monitoring. Accordingly, the government shall gradually desist from making decisions that rightfully belong to operators – such as rostering, scheduling, and choice of bus suppliers.

- The regulatory system shall be simplified. Instead of the current 1-year service contract, long-term franchises shall be granted to operators, which would involve *tendering at some future time. A fare-setting and adjustment mechanism shall be* introduced to bring fares closer towards eventual full-cost cost recovery.
- Changes in laws and regulations to level the playing field, to permit organization of joint-stock companies or 'equitization' of SOE without prior record of profitability, to remove the 17-seat minimum requirement for bus transport operators, to grant of longer-term franchises, and the like.

4) Government Support

- Government shall extend financial assistance in the formation, fleet acquisition, and acquisition of site for depot/garage, of Tier 1 operators, during the short to medium term. Where required, technical assistance will be provided in fostering a modern and commercial system of fleet management.
- The operating subsidy being extended at present shall be continued over the medium-term period, but its application shall be modified to provide incentives to efficient operations and to be fair to all service providers.
- Users' pay and cost recovery principles shall be followed to the extent feasible, so that the level of subsidies can be reduced and winded down as much as possible in the long term. Direct subsidies to bus operators will continue in the short term, while coverage is being expanded, but converted into direct subsidies to passengers in the medium term.
- The provision of common-user facilities, such as passenger interchange stations, bus lanes, busways, bus stops, bus shelters, passenger information system, and on-street signals shall be provided by government.
- To ensure that travel time on buses remain attractive, bus priority measures shall be introduced and continuously improved in all Tier 1 routes. Where appropriate, traffic restraints and other traffic demand management schemes affecting private transport shall be implemented in the future.

7.5 Supplementary Public Transport Services

1) A Family of Transport Modes

Public transport encompasses modes other than rail transit and buses. There are other lower-capacity modes that the city will require. Nearly all of these are already present in HCMC, although some are looked down as backward, but all have roles to play and to contribute to the vibrancy of the metropolis. The xe om, lambro, bon banh, and shuttle van provide supplementary transport services.

Smaller-capacity modes could act as feeder to the big bus (and eventually to rail). They are efficient in short trips, lower unit loads that characterized neighborhoods, and in narrow streets. Without them, ridership on the bigger modes will be lower, or the overall coverage becomes sparse and inadequate, or trips on private cars and motorcycles will go up. They often operate without public subsidy, provide a means of livelihood to many, and respond to market changes sooner.

What has given this class a bad reputation is that they are difficult to regulate. They tend to operate outside their routes, and their traffic behavior poses a headache to traffic enforcers. For these reasons, some cities attempted to ban them (without much success). It is preferable for HCMC to harness the strengths and comparative advantage of this mode. Hence, the recommendation is to recognize (and regulate) them under the Tier 2 market.

Another type of public transport service that caters to a special but small market segment in HCMC is the river ferry that connects Thu Tiem to the city center. For inter-urban trips, especially to the southern delta regions, large boats and high-speed (hydrofoil) boats provide alternative services to provincial buses.

2) Small is Beautiful?

Para-transit is the term used by more developed countries to describe this supplementary mode of public transport. In the Asian context, supplementary transport carries different labels. They are known as lambro in Vietnam, jeepneys and tricycles in the Philippines, *tuk tuk* in Thailand.

Their capacity is generally below 15 passengers, and they are converted from standard model vehicles to assume a distinctly local profile. As a business, they are, in the ideal case, described as privately owned, single proprietorship, family-managed, small enterprises and are thus admired by many Western economists.

However, in many cases the picture is less rosy as unidentified investors lease vehicles on a daily basis to unemployed drivers which are forced to struggle hard to make a living. The winner is the owner, not the driver, and with untraceable money this is one of the classical sectors for Mafia intervention and control – effectively working against "free" competition. The "taxi wars" in South Africa is a good example.

For HCMC, the long-term direction for paratransit can be gleaned from Table 7.2.3. This means accepting the reality of xe oms by legalizing them and applying regulation focusing on safety and a distinguishing color. For lambro and bon banh, a new lease on life by redeploying them in Tier 2 market for intradistrict trips.

8 MASTER PLAN

8.1 Role and Components of the Transport Master Plan

1) Role of the Master Plan

The Transport Master Plan up to 2020 for HCMC not only depicts what the city should be by year 2020, but also lays down the path towards that future with the transport sector as the main driver. A set of coherent strategies is formulated to make the journey from the present to the future in a logical and sustainable manner.

The Transport Master Plan comprises a long-term structural plan, a five-year short-term action plan, and a 10-year medium-term investment plan. The long-term plan provides the overall development direction, the short-term plan includes definite projects/programs for implementation, and the medium-term plan provides a bridge to ensure consistency between the two. Necessarily, the Master Plan needs to be revisited periodically, at least every five years for refinements/adjustments and to reflect major changes in conditions and policies.

Although the Master Plan is usually de-composed into a set of projects and programs with intended implementation schedules, the projects are subject to further planning and feasibility studies, especially those that require large investments. Inclusion in the Master Plan is not a guarantee of subsequent implementation, but carries a *prima facie* justification. Therefore, the Transport Master Plan should be considered as a shared vision, a common agenda, among various stakeholders that should guide the development of the sector, address critical issues, promote coordination of subsector policies, and dictate priorities in resource allocation. It is also contemplated in the study that the Transport Master Plan should be workable and usable not only for officials and professionals but also for a wider range of stakeholders including ordinary people. This will facilitate their *participation in planning and implementation.*

2) Structure of the Master Plan

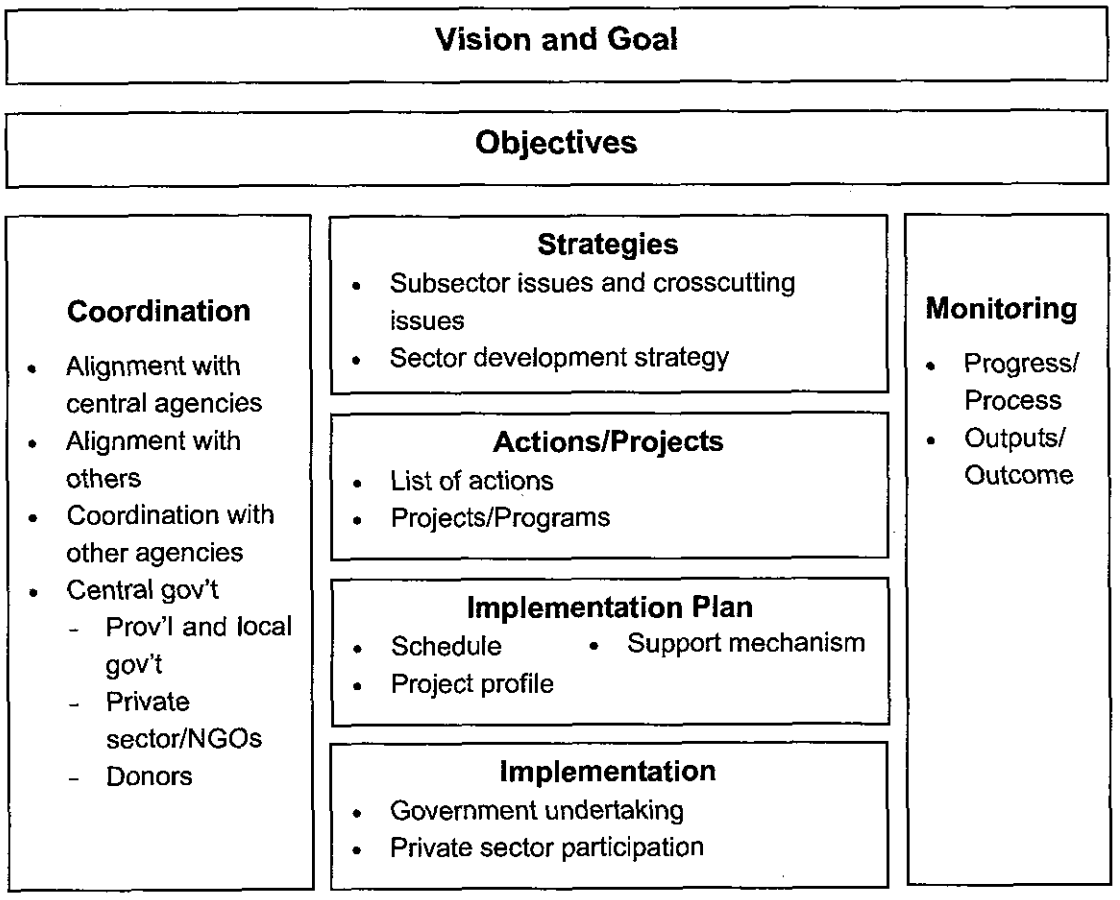
The Master Plan will lay down procedures in the implementation of concrete actions in achieving long-term objectives. A potential lack of continuity and relationship between long-term objectives and project/action plan implementation has been noted. The Master Plan's framework is hierarchical: from the future basic objective (Vision), detailed *objectives (Basic Objective), basic direction to achieve objectives (Strategy), action* to implement strategies (Projects/Programs), to the implementation plan covering measures for project implementation (Modality). This process must be provided with working and coordination mechanisms to ensure effective implementation in a coordinated and participatory manner (see Figure 8.1.1).

3) Monitoring of and Coordination for the Master Plan

Progress in the realization of the Master Plan should be assessed and measured along the way. This means regular monitoring by the government, as well as by various stakeholders, on how the Master Plan is unfolding in reality. This necessitates the preparation of a set of performance indicators to represent progress and status. Public involvement in transport planning and policy formation is expected to become a hallmark of Vietnam's governance,

as the public gets to share more of the costs of services and infrastructure development, and is made to adjust commuting lifestyles in exchange for better mobility, improved accessibility, and safer travels.

Figure 8.1.1 Structure and Components of the Transport Master Plan



Source: Study Team

4) Transport Master Plan and Urban Master Plan

The M/P 2020 is an official document approved by the Prime Minister. By its very nature, it does not fully incorporate the transport sector's development plan and strategies. Nevertheless, one cannot stand alone without the other. Especially for large cities, the two should be considered as "wheels of a motorcycle". Land use drives travel demand; conversely, transport shapes land uses and property developments. The basic urban structure will follow the contours of the primary transport network. Effective management of urban growth will therefore require coordinated interventions on transport and land use. The locations and timing of such transport infrastructure as primary roads, mass transit routes, and major transport terminals (e.g. international ports and airports, etc.) should be part and parcel of the M/P 2020. Hence, the Transport Master Plan should also be given the *imprimatur* of the Prime Minister as the twin document of the M/P 2020. Accordingly, mechanisms for harmonizing the transport and urban planning process should be established.

8.2 Vision, Goal, Objectives, and Strategies

1) *Vision and Goal*

A bleak future can be expected for the study area, unless some strategic interventions are made along the way. Free-wheeling use of motorcycles and road space may still be tolerable for a small city, but is not tenable in a conurbation of more than 10 million people with heightened expectations, active social lives, and diversified activities. An aging urban population will also demand a different quality of transport services. HCMC of the future should be livable as well as globally competitive and attractive for industries, leading Vietnam's international trade, and the transport sector must be designed to make that possible.

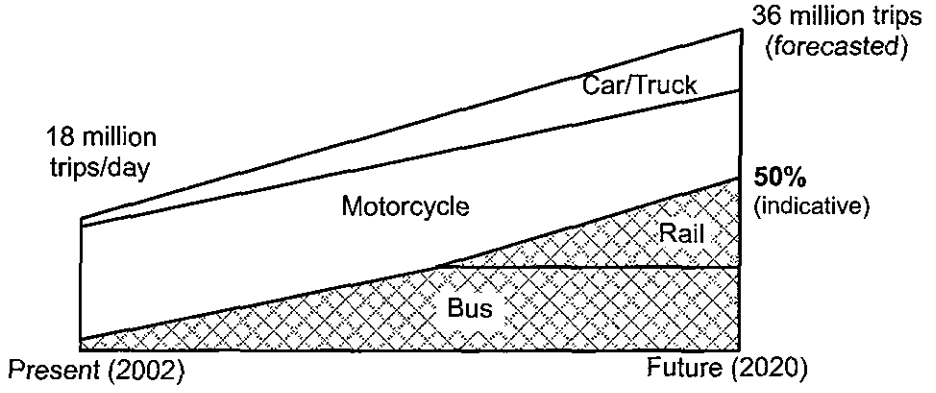
The overall goal of urban transport is the following:

"Ensure mobility and accessibility to urban services that are vital for the people and the society by providing a transport system characterized by safety, amenity, and equity and sustained by an efficient public transport system"

A combination of supply-type and demand-type strategies is required to alter, radically, the modal shares of transport along the lines of the conceptual diagram shown below (see Figure 8.2.1).

It should be noted that the modal shift is indicative. If the 50% share for public transport is not attainable, the resulting plan would overestimate the requirement for bus-rail capacity, but underestimate vehicular volume on roads, thereby affecting feasibility of many road projects.

Figure 8.2.1 Indicative Target for Modal Share for 2020



Source: Study Team

2) Objectives and Strategies

The overall goal has been restated into seven specific objectives and strategies, as follows:

A. Promotion of Social Understanding on Present and Future Urban Transport

Without even mentioning the current disorder and traffic behavior on roads, no policy and project would work effectively unless a wide and profound understanding of transport problems, issues and future directions is shared by the society.

To achieve this objective the following five strategies are suggested:

A1 Conduct of consecutive transport campaigns

A2 Expansion of transport education

A3 Strengthening of transport studies

A4 Implementation of Policy Test Project

A5 Information disclosure

B. Management of Sustainable Urban Growth and Development

How to define a vision of the future is highly important in the study area because a fast increasing population and economy will have huge impact on urban development and the people's life. The transport sector must be a critical part of urban growth and management. To achieve this objective, the following five strategies are suggested:

B1 Policy coordination within metropolitan area

B2 Integration of City M/P and Transport M/P

B3 Development of systematic road network

B4 Promotion of integrated urban and transport development

B5 Guidance for ideal urban development

C. Promotion and Development of Attractive Public Transport

Without public transport, the city's future is unthinkable. Future transport must be provided in sufficient quantity and quality. Attractive public transport system is the only solution which both city authorities and the people expect.

C1 Development of mass transit system

C2 Development of bus transport system

C3 Exploitation of para-transit and nonmotorized vehicles (NMVs)

C4 Exploitation of water transport system

C5 Promotion of public transport use and expansion of services

D. Effective Management of Traffic and Demand

Infrastructure is costly and requires proper maintenance and management. Capacities of infrastructure are largely dependent on how it is operated. The importance of traffic management is not only for the efficiency of traffic but also for the safety, amenity, and environment of the people and society. To ensure smooth traffic as well as share in a more equitable manner the cost and benefit of traffic and transport among

stakeholders, various demand management measures are also to be introduced.

D1 Establishment of comprehensive management system for motorized vehicles

D2 Strengthening of traffic regulation & management

D3 Effective response to freight transport

D4 Establishment of parking policy

D5 Introduction of TDM (traffic demand management)

E. Comprehensive Development of Transport Space and Environment

Transport infrastructure provides important public space for the use of traffic – comprising different modes including walking – and for various urban services and activities. For this, it is important to design and develop transport infrastructure and services comprehensively to enhance the quality of urban areas and activities.

E1 Management of transport corridors

E2 Improvement of transport environment for pedestrians and bicycle users

E3 Redistribution of transport space & improvement of traffic environment in city center

E4 Alleviation of air pollution

E5 Establishment of district transport development strategy

F. Enhancement of Traffic Safety

The people and the city are in danger due to increasing traffic accidents. The current condition of traffic safety in the city is unacceptable and a great threat to the city's future sustainability. The safety issue is a priority at national government level, too.

F1 Establishment of traffic safety audit system

F2 Elimination of traffic accident black spots

F3 Improvement of licensing & vehicle inspection system

F4 Strengthening of traffic enforcement system

F5 Strengthening of first aid system

G. Strengthening of Transport Sector Administration and Management Capacity

The tasks to be accomplished for the city's present and future are enormous and require a more comprehensive and coordinated approach involving a wider range of players. The role of the city authorities in leading the process is very important.

G1 Reform of transport- related organizations

G2 Promotion of private sector participation

G3 Improvement of Infrastructure development & management system

G4 Strengthening of planning capacity

G5 Securing of development fund

8.3 Actions

A total of 105 actions were worked out to implement 35 strategies (see Table 8.1.1).

Table 8.3.1 Proposed Strategies and Actions of HOUTRANS

Objective	Strategy	Actions
A. Promotion of social understanding on present and future urban transport problems and issues at	A1 Conduct of consecutive transport campaigns	A11: Identification of stakeholders on key transport policies (traffic safety, bus promotion)
		A12: Establishment of implementation system in coordination with NGOs, civic groups and communities
		A13: Campaign on key policies and its monitoring
	A2 Expansion of transport education	A21: Traffic safety education at primary/secondary schools
		A22: Traffic safety campaign at community level
		A23: Expansion of traffic education to drivers
	A3 Strengthening of transport studies	A31: Strengthening of Transport Science Society of Vietnam (TSSV) and its activities
		A32: Strengthening of transport study in colleges and research institutes
		A33: Holding of domestic and international symposia and seminars on transport issues
	A4 Implementation of Policy Test Project	A41: Extension of policy test project (bus corridor development)
		A42: Conduct of Policy Test Project on TDM (D53)
		A43: Model program on integrated urban & transport development (B43)
	A5 Information disclosure	A51: Establishment of transport information system
		A52: Establishment and operation of website
		A53: Publicity through mass media
B. Management of sustainable urban growth and development	B1 Policy coordination within metropolitan area	B11: Establishment of Metropolitan Transport Conference (tentative)
		B12: Integration of planning between regional and urban transport
		B13: Integration of spatial planning between HCMC and adjoining provinces
	B2 Integration of city M/P and transport M/P	B21: Establishment of urban planning system
		B22: Integration of city M/P and transport M/P
		B23: Institutionalization of integrated M/P
	B3 Development of systematic road network	B31: Establishment of hierarchical road system
		B32: Strategic development of arterial road system (RRs, expressways, primary and secondary roads)
		B33: Establishment of effective development method for road projects
	B4 Promotion of integrated urban & transport development	B41: Establishment of development method
		B42: Integrated urban development with mass transit development
		B43: Conduct of pilot projects (A43)
	B5 Guidance for ideal urban development	B51: Improvement of development permission system
		B52: Introduction of traffic impact assessment
		B53: Establishment of method to improve residential environment in high-density built-up area

(Continuation of Table 8.3.1)

Objective	Strategy	Actions
C. Promotion and development of attractive public transport	C1 Development of mass transit system	C11: Formulation of long-term mass transit development plan
		C12: Establishment of modal policy
		C13: Establishment of development method of mass transit system
	C2 Development Bus transport system	C21: Establishment of bus operating business system
		C22: Development of bus corridors
		C23: Strengthening of bus operation and management capacity
	C3 Exploitation of para-transit and NMVs	C31: Establishment of management system
		C32: Improvement of supporting infrastructure/facilities
		C33: Supporting system for small-scale operators/drivers
	C4 Exploitation of water transport system	C41: Actual condition survey and database development
		C42: Improvement of water transport infrastructures and river environment
		C43: Promotion of water transport for local and tourism transport
	C5 Promotion of public transport use and expansion of services	C51: Formulation of subsidiary policy for public transport users
		C52: Expansion of bus services for students and workers
		C53: Introduction of new services
D. Effective Management of Traffic and Demand	D1 Establishment of comprehensive management system for motorized vehicles	D11: Improvement of vehicle registry system and introduction of information technology (IT)
		D12: Review of registration fee and user charges
		D13: Adjustment of production quantity
	D2 Strengthening of traffic regulation & management	D21: Improvement of traffic regulation and management
		D22: Strengthening of capacity of traffic enforcers (training system)
		D23: Strengthening of coordination with communities and NGOs
	D3 Effective response to freight transport	D31: Actual condition survey and database preparation
		D32: Formulation of measures for port-related transport
		D33: Formulation of measures on overloaded trucks
	D4 Establishment of parking policy	D41: Conduct of actual condition survey and database preparation
		D42: Establishment of provision mechanism for parking space
		D43: Establishment of policy on parking fee
	D5 Introduction of TDM	D51: Specification of TDM measures
		D52: Establishment of organizational setup for implementation of TDM
		D53: Conduct of Policy Test Project on TDM (A42)
E. Comprehensive development of transport space and environment	E1 Management of transport corridors	E11: Preparation of planning manual
		E12: Regulation of roadside use and development
		E13: Establishment of corridor management system
	E2 Improvement of transport environment for pedestrian and bicycle users	E21: Actual condition survey and database preparation
		E22: Formulation of Green Network Plan
		E23: Specification for facility and design standards
	E3 Redistribution of transport space & improvement of traffic environment in city center	E31: Transport system planning for the city center
		E32: Establishment of transport management system for the city center
		E33: Pilot project on transport management in the city center
	E4 Alleviation of air pollution	E41: Establishment of environmental guidelines
		E42: Formulation of measures to reduce air pollution sources
		E43: Improvement of fuel quality
	E5 Establishment of district transport development strategy	E51: Establishment of District Transport Plan
		E52: Development and management system for intradistrict transport infrastructures
		E53: Establishment of provision system for intradistrict transport services

(Continuation of Table 8.3.1)

Objective	Strategy	Actions
F. Enhancement of traffic safety	F1 Establishment of traffic safety audit system	F11: Preparation of guidelines
		F12: Human resource development for audit system operation
		F13: Establishment of Traffic Safety Audit System
	F2 Improvement of traffic accident black spots	F21: Establishment of traffic accident database
		F22: Identification of black spots and improvement guideline preparation
		F23: Improvement and monitoring of black spots
	F3 Improvement of licensing & vehicle inspection system	F31: Conduct of actual condition survey
		F32: Improvement of licensing system
		F33: Improvement of vehicle inspection system
	F4 Strengthening of traffic enforcement system	F41: Improvement of enforcement skills
		F42: Strengthening of penalty and fine systems
		F43: Strengthening of coordination with NGOs and NPOs
	F5 Strengthening of first aid system	F51: Conduct of actual condition survey
		F52: Strengthening of emergency contact and communication system
		F53: Strengthening of transport and receiving system for emergency patients by emergency care service
G. Strengthening of transport sector administration and management capacity	G1 Reform of transport-related organizations	G11: Implementation of institutional reform
		G12: Conduct of personnel training program
		G13: Introduction of IT
	G2 Promotion of private sector participation	G21: Improvement of competitive conditions
		G22: Expansion of project area for private sector
		G23: Establishment of support system for private sector
	G3 Improvement of Infrastructure development & management system	G31: Establishment of public-private partnership (PPP) scheme
		G32: Expansion of maintenance system
		G33: Fostering of local consulting firms and construction industry
	G4 Strengthening of planning capacity	G41: Conduct of transport surveys and update of Karte
		G42: Fostering of transport planners
		G43: Review of planning and design standards
	G5 Securing of development fund	G51: Dissemination of user's pay principle
		G52: Expansion of public funding capacity
		G53: Effective use of ODA

Source: Study Team