

**Table 9.4.5 Sectional Improvements for Bus Corridors (Inside Ring Road No.2)**

Bus Corridor/ Section		Bus Traffic Demand				Proposed Bus Priority Arrangement	
		000pax/day		buses/day <sup>1)</sup>			
		2002	2010	2002	2010		
1. Ben Thanh - Saigon Bldg. Corridor	Section 1	Quach Thi Trang - Ton Duc Thang	2	38	256	1,065	- Service roads converted to bike lane and M/C lane. - Most outside lanes shall be converted to bus exclusive lanes. - Traffic control system at the terminal area and intersections.
	Section 2	Ton Duc Thang - Ton Duc Thang (Corner)	18	229	2,241	6,368	- Widen to 6 lanes within existing ROW - Most outside lanes for bus exclusive operations during peak hours - Pedestrian and bicycle path at Water Front Park and pedestrian Bridges as necessary.
	Section 3	Ton Duc Thang (Corner) - Rach Thi Nghe (Bridge)	11	177	1,301	4,912	- 4 lanes with service roads. - Service roads shall be for M/C only and outside lanes on the main carriageway for bus operation. - Bicycle path will be provided and the network will be extended to Zoo and other parks.
	Section 4	Rach Thi Nghe (Bridge) - Saigon Bridge	7	139	901	3,862	- New 6-lane highway with service roads. - Most outside traffic lane will reserve for bus exclusive lane. - Bicycle path will be provided.
2. Dien Bien Phu/3/2 Corridor	Section 1	Nguyen Huu Canh - Rach Thi Nghe (Bridge)	32	136	3,938	3,784	- New 6 to 8 lanes highway with 10m service roads and wide sidewalk (10m). - Bus exclusive lane either in the service road or outside lane of the main carriageway. - Pedestrian bridges along the corridor and roundabout intersection should be signalized.
	Section 2	Rach Thi Nghe - Dinh Tien Hoang	12	137	1,450	3,813	- Existing single carriageway will be divided into traffic lanes and service roads. - Bus priority lanes same as the previous section and pedestrian/bicycle facilities should be provided.
	Section 3	DTH - Cong Truong Dan Chu	12	137	1,450	3,813	- Those sections are running through the old urban areas in HCMC. Some sections have historical value.
	Section 4	CTDC - Nguyen Tri Phuong	10	64	1,218	1,774	- Due to the limited ROW (approximately 20m) in the old urban areas, one-way system will be employed.
	Section 5	Dinh Tien Hoang - CMTT	11	169	1,347	4,707	- One-way system will accommodate three lanes, which will divide into Bus, M/C and Motor Cars. - Improvement of signal system for the continuous intersections will be needed.
	Section 6	CMTT - Nguyen Tri Phuong	15	184	1,781	5,103	- Bicycle path will be provided at least one side of the roads. - The one-way system will be introduced and bus operation system redesigned.
	Section 7	Nguyen Tri Phuong - Cay Go	24	84	2,878	2,340	- Existing 4 lanes will be widened to 6 lanes within the ROW, reducing sidewalk width. - Insufficient ROW will require to control private vehicles from passing through the section. - Outside lane of 6 lane section will be bus exclusive lane and outside lane of 4 lane road for bus and M/C.
3. Ben Thanh - An Lac Corridor	Section 1	Quach Thi Trang - Tran Hung Dao	16	106	1,988	2,934	- 6-lane improved section with bicycle path. - Most outside lanes will be converted to bus exclusive lane. - Traffic management at the terminals and intersections shall be provided.
	Section 2	Tran Hung Dao - Nguyen Van Cu	8	27	993	758	- Insufficient ROW will require to control private vehicles from passing through the section. - Widening of the ROW will be a option when taking into consideration of the future rail system.
	Section 3	Nguyen Van Cu - Nguyen Tri Phuong	6	49	700	1,358	- Wider two lanes road and introduce one-way system (2 lanes). - Contra lane is provided for bus exclusive operation. - Wide sidewalk to accommodate bicycle path.
	Section 4	Nguyen Tri Phuong - Chau Van Liem	22	173	2,687	4,809	- 6 lanes improved sections. - Most outside lane will be used for the bus exclusive lane.
	Section 5	Chau Van Liem - 3 Thang 2	32	157	3,930	4,355	- Some sections have a wide park median. Bicycle path will be designed in the park. - Large volume of pedestrian is expected particularly in Cho Long area. Pedestrian bridge needed.
	Section 6	3 Thang 2 - An Lac Bus Terminal	82	208	9,989	5,769	- 8 lanes, wider ROW, outside lane used for the bus exclusive lane. - Bicycle path should be constructed. - Road side parking and passenger boarding area will be strictly control.
4. Ben Thanh - An Suong Corridor	Section 1	Quach Thi Trang - 3 Thang 2	14	194	1,660	5,386	- This four lanes section is in the city center and widening is difficult. - Outside lanes will share between Bus and M/C. - Alternative route for Bicycle will be required.
	Section 2	3 Thang 2 - Nga Tu Bay Hien	11	145	1,323	4,027	- Crowded with M/C, cars and peoples crossing, as well as parking vehicles. - Poor network configuration, through traffic should be bypassed from this sections.
	Section 3	Nga Tu Bay Hien - Nga Ba Ba Queo	3	127	349	3,541	- VR Saigon Station area is expected to redevelop for the urban environment improvement.
	Section 4	Nga Ba Ba Queo - NH1A	10	227	1,257	6,294	- Prior to the introduction of the bus priority lane, road improvement project should be carried out. - In the short term measures, bus stop areas and facilities will be improved.
5. Tan Thuan - Tan Thoi Hiep Corridor	Section 1	Cau Tan Thuan - Cau Khanh Hoi	43	99	5,241	2,740	- Bus and M/C lanes will be introduced during peak hours. - Bicycle path will be pushed into limited sidewalk space.
	Section 2	Ton Duc Thang - Vo Thi Sau	7	75	821	2,081	- Introduce 1-way system because of limited ROW and grid road pattern. - Strict enforcement of illegal roadside parking. - Bicycle paths shall be maintained and extended.
	Section 3	Vo Thi Sau - Nga Tu Phu Nhuan	6	24	687	656	- 4 lanes road, outside lanes used for Bus and M/C lane.
	Section 4	Nga Tu Phu Nhuan - Nga Sau Go Vap	9	81	1,160	2,244	- Road widening will be highly recommended.
	Section 5	Nga Sau Go Vap - Le Duc Tho	16	62	1,987	1,714	- These sections need to be improved, some are only 2-lanes at present.
	Section 6	Le Duc Tho - NH1A	3	51	423	1,426	- Prior to the introduction of bus priority measures, road improvement project is needed. - In the short term measures, bus stops and facilities will be improved.

Source: Study Team

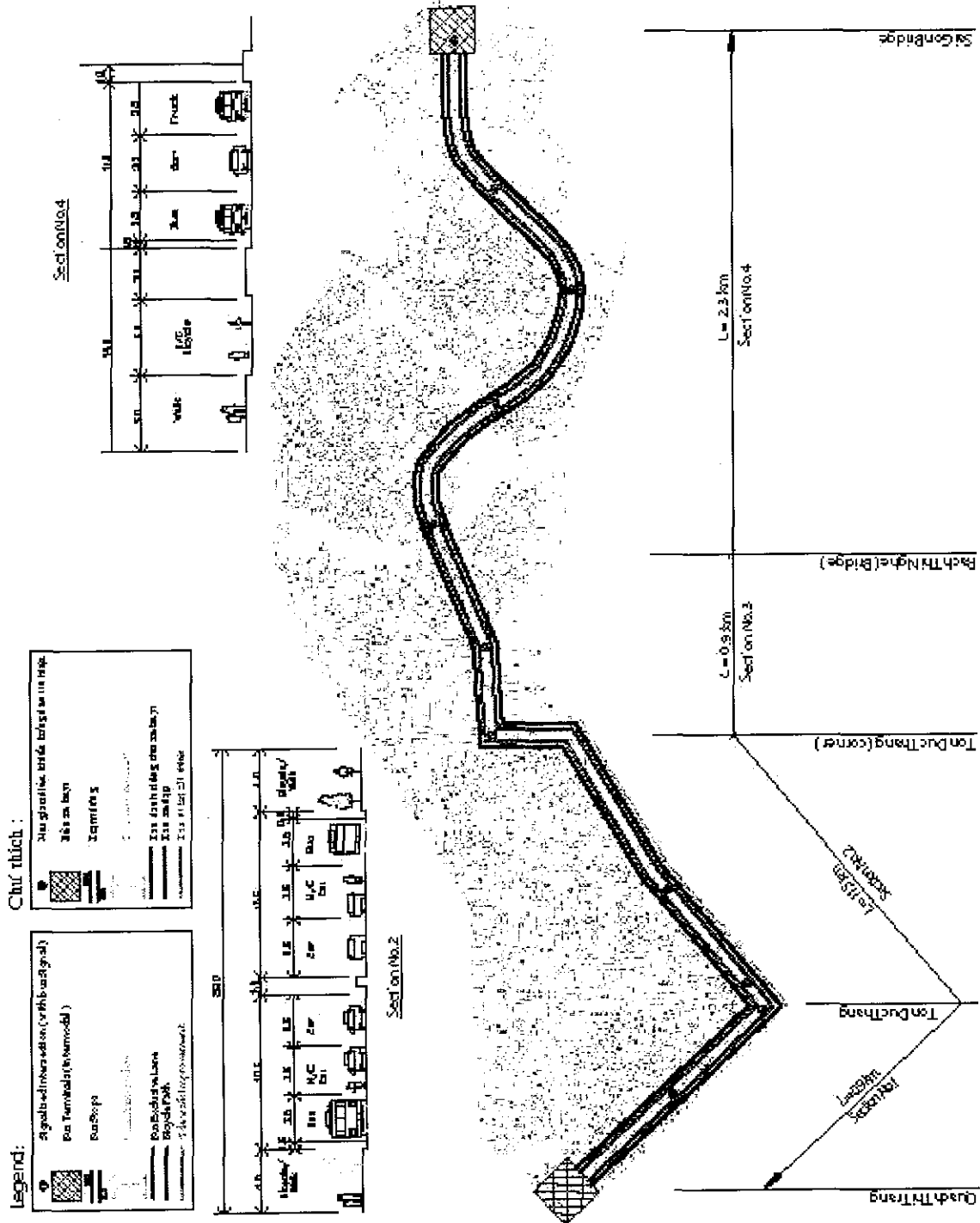
(Continuation of Table 9.4.5)

Bus Corridor/ Sections			Bus Traffic Demand				Proposed Bus Priority Arrangements
			000pax/day		buses/day <sup>1)</sup>		
			2002	2010	2002	2010	
6. Tân Sơn Nhất-Chợ Lớn Corridor	Section 1	Cầu Nhi Thiên Duong - Hung Vuong	15	240	1,850	6,673	- Narrow road section, no space for the Bus priority measures. - Road improvement project should be implemented first, incl. parking control - Improvement of the bus stop facilities.
	Section 2	Hung Vuong - 3 Thang 2	25	41	3,035	1,141	- 4 lane road, Bus and M/C lanes are proposed on the curb side lane. - Strict traffic enforcement to minimize the conflict with roadside activities. - Bicycle path will be provided on the sidewalk and signals at the intersections.
	Section 3	3 Thang 2 - Nga Tu Bay Hien	8	202	999	5,600	- 4 lanes on the comparatively wider single carriageway. - Bus and M/C lane will be provided with bus bays and comfort facilities. - This section will play a alternative route of the bus corridor No.4, so that higher traffic function will be required.
	Section 4	Nga Tu Bay Hien - Lang Cha Ca	4	57	482	1,582	- Wide carriageway will accommodate 6 lanes for both direction, then bus exclusive lane will be provided.
	Section 5	Lang Cha Ca - Nga Tu Phu Nhuan	12	101	1,467	2,804	- Outside lanes will be shared by Bus and M/C. - Bicycle path will be provided and road side parking is strictly controlled.
7. Xo Viet Nghe Tinh Corridor	Section 1	Dien Bien Phu - Back Dang	15	213	1,881	5,907	- Channelization of the intersection with bus signal will be required. - Grade separation of the intersection will be proposed.
	Section 2	Back Dang - Xo Viet Nghe Tinh	9	188	1,041	5,227	- Narrow ROW and poor condition of the sidewalk. - New road has been constructed parallel to the section so that one-way system can be introduced.
	Section 3	Xo Viet Nghe Tinh - Xau Binh Trieu	10	145	1,169	4,026	- Traffic operation on the 3 lanes shall be bus exclusive lane, M/C lane and Cars lane.
	Section 4	Xo Viet Nghe Tinh - Back Dang	16	21	1,991	590	- Short and congested section and intersection traffic management is required. - Strict control of roadside parking.
	Section 5	Back Dang - Dinh Bo Linh	15	89	1,774	2,468	- Newly constructed as a bypass of the old road. - Bus exclusive lane, pedestrian and bicycle facilities will be provided.
	Section 6	Dinh Bo Linh - Nga Tu Binh Trieu	21	174	2,623	4,822	- On-going improvement project on these sections. - Presently some sections are only two lanes, difficult to introduce bus priority measures.
	Section 7	Nga Tu Binh Trieu - NH1A	21	88	2,551	2,438	- The implementation of the measures will be in conjunction with the road project.
8. Phan Dang Luu Corridor	Section 1	Lang Cha Ca - Nguyen Van Troi					- Reallocate road space to narrow wide travel lanes. - Bus exclusive lane and bike path on 1-way road.
	Section 2	NVT - Phan Ding Phung					- Inbound (eastbound) bus exclusive lane. - Outbound (westbound) bus operation mixed with MC.
	Section 3	PDP - Le Quang Dinh					- Median barrier recommended.
	Section 4	LQD - Xo Viet Nghe Tinh					- Heavily congested segment. - Same as the above Section 2 and 3.
9. Nam Ky Khoi Nghia Corridor	Section 1	Pasteur (Ham Nghi - Ly Tu Trong)					- Reallocate road space and establish bus exclusive lane. - Prohibit roadside parking and bicycle access.
	Section 2	Pasteur (Ly Tu Trong - Vo Thi Sau)					- Bus - M/C lane, with bus having priority. - Maintain bike path for 2-way bike traffic.
	Section 3	NKKN (Ham Nghi - Vo Thi Sau)					- Bus- M/C lanes, with bus having priority.
	Section 4	VTS-Cong Ly Bridge					- Bus priority lane with M/C. - Provide median barrier and stop improvements.
	Section 5	CLBr - Hoang Van Thu					- Bus exclusive lane inbound (southbound) and bus priority lane outbound. - Stop facilities improvement.
	Section 6	HVT - Airport					- Bus exclusive lane using outer lane in each direction. - Airport bus stop should be connected to airport terminal within short distance for convenient transfer.
10. Nguyen Thi Minh Khai Corridor	Section 1	Bach Dang - Thi Nghe Bridge					- Bus - M/C lanes, with bus having priority. - Provide median barrier and improve sidewalk condition. - Signalize intersections, including roundabout.
	Section 2	TH Br.-Phung Khac Khoan					- Bus - M/C lanes, with bus having priority. - Clear up sidewalk strictly for pedestrian only. - Provide median barrier and install left-turn signals.
	Section 3	Phung Khac Khoan - Ba Huyen Thanh Quan					- Inbound (into city): contra-flow bus exclusive lane, no M/C allowed in the lane. - Outbound: bus-mc lane with bus having priority. - Clear up sidewalk for pedestrian only.
	Section 4	BHTQ - Ly Thai To					- Same as section 2.
	Section 5	LTT - Hong Bang					- Bus exclusive lane in outer lane of 1-way road. - Stop facility improvement. - Bike path in the wide median.
	Section 6	An Duong Vuong -Tran Phu					- Bus exclusive lane in outer lane of 1-way road. - Convert 2-way section on An Duong Vuong to 1-way. - Stop facility improvement. - Bike path in the wide median.

Source: Study Team

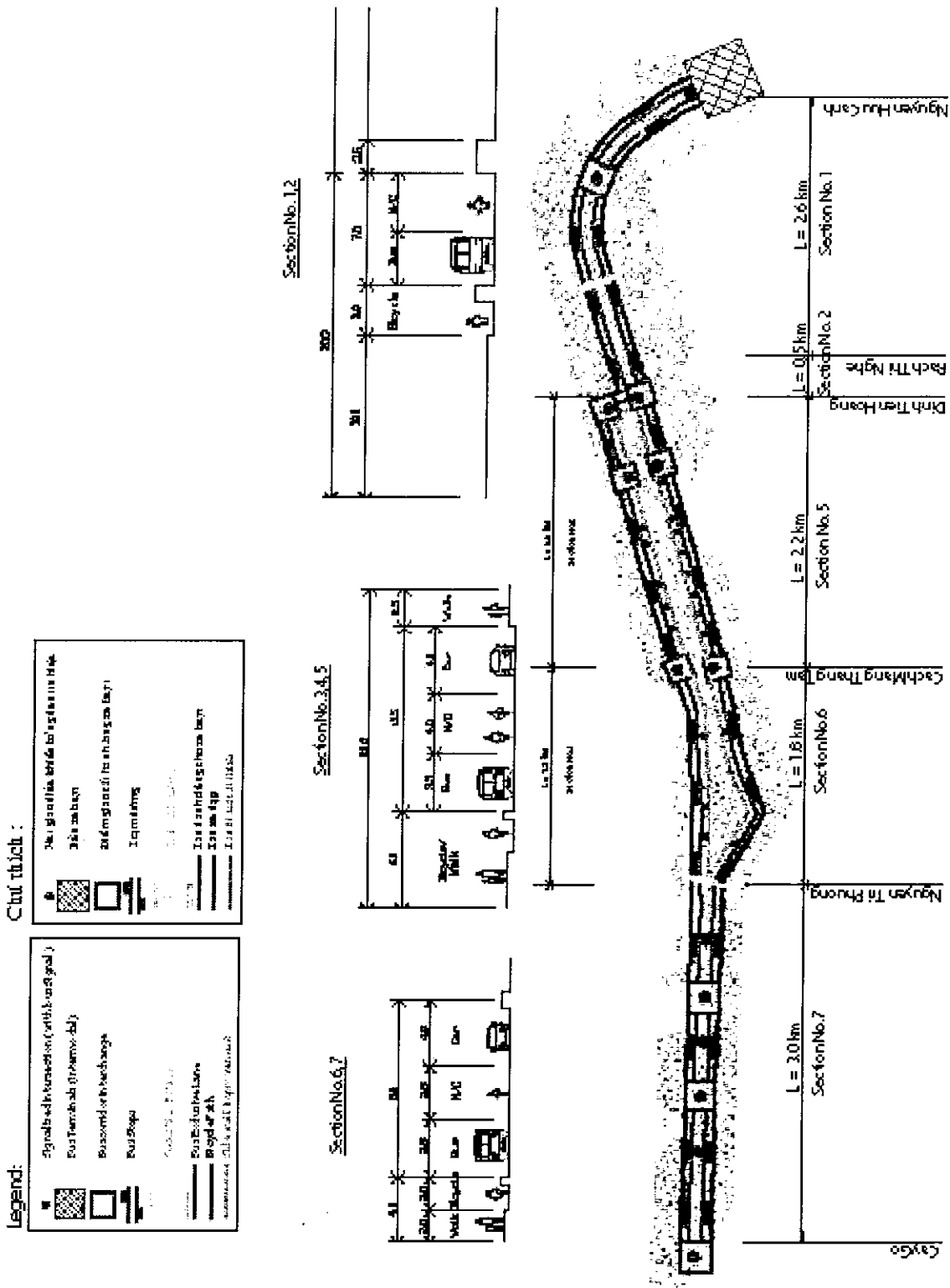
**Figure 9.4.25 Bus Corridor Improvement Plan (Within Ring Road No.2)**

**No.1. Ben Thanh – Saigon Bridge Corridor  
 (Ben Thanh – Ham Nghi – Ton Duc Thang – Nguyen Huu Canh – Sai Gon Bridge)**



Source: Study Team

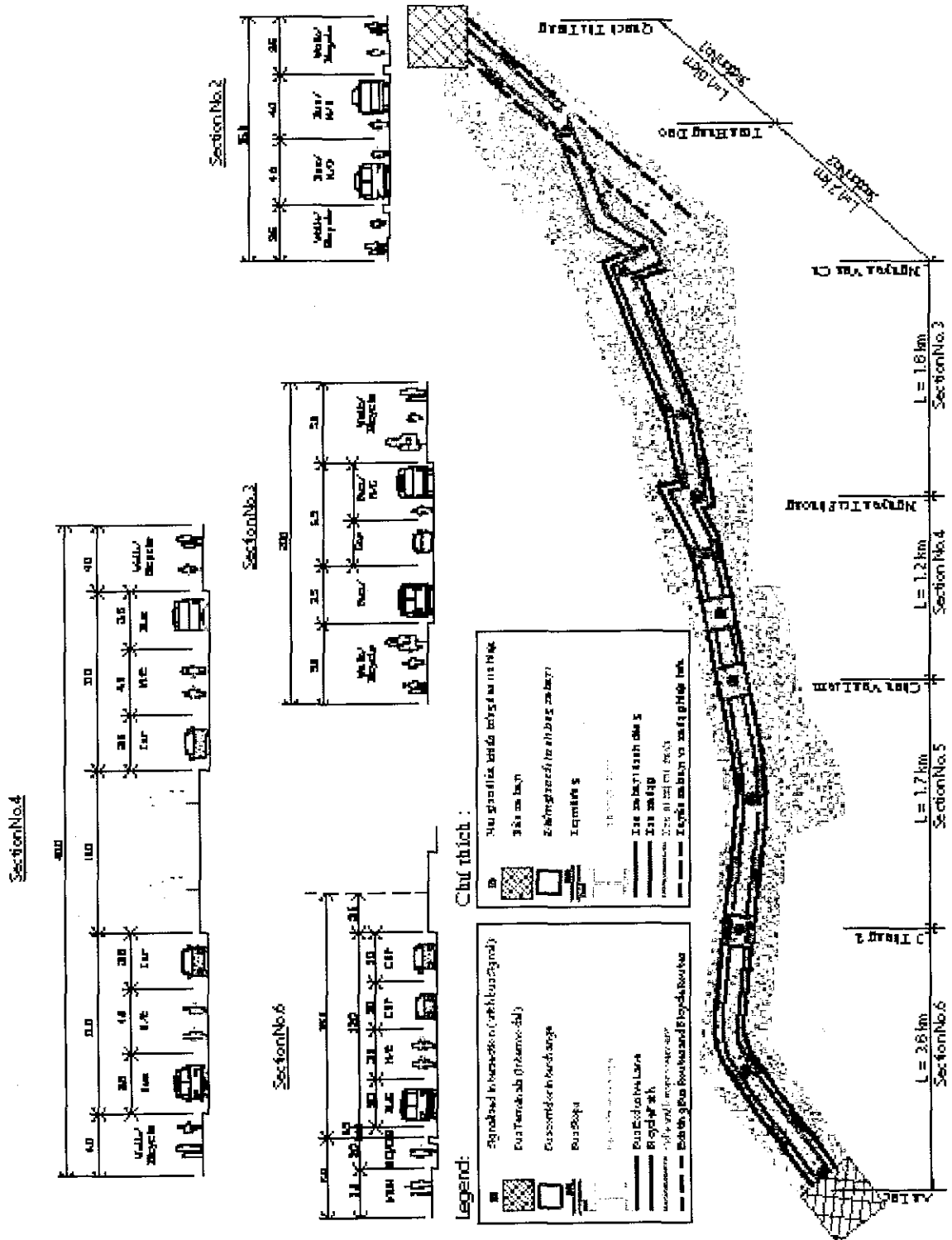
**Figure 9.4.26 Bus Corridor Improvement Plan (Within Ring Road No.2)**  
**No.2. Dien Bien Phu – 3 Thang 2 Corridor**  
 (Sai Gon Bridge – Dien Bien Phu – Dinh Tien Hoang – Vo Thi Sau – 3 Thang 2 – Cay Go/  
 Cay Go – 3 Thang 2 – Ly Thai To – Dien Bien Phu – Sai Gon Bridge)



Source: Study Team

Figure 9.4.27 Bus Corridor Improvement Plan (Within Ring Road No.2)

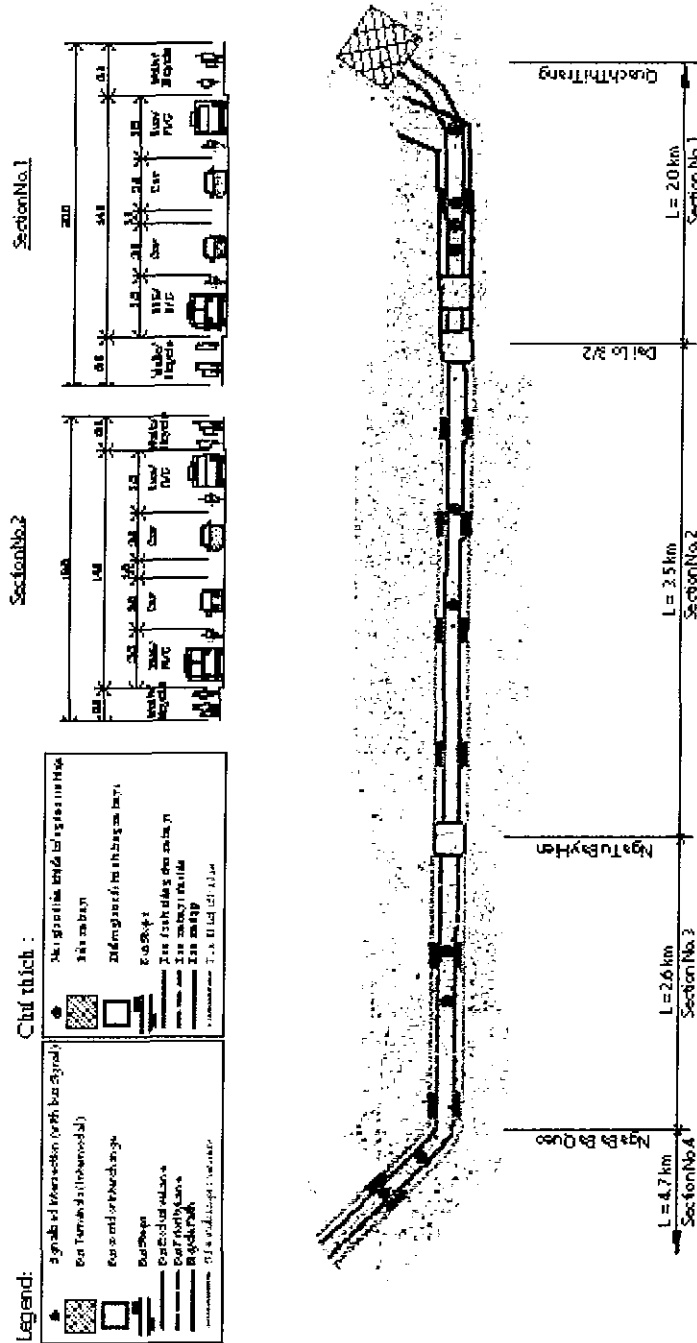
**No.3. Ben Thanh – An Lac Corridor**  
 (Ben Thanh – Tran Hung Dao – Nguyen Cu Trinh – Nguyen Trai – Nguyen Van Cu – An Duong Vuong – Hung Vuong – Hong Bang – Mien Tay Terminal)



Source: Study Team

Figure 9.4.28 Bus Corridor Improvement Plan (Within Ring Road No.2)

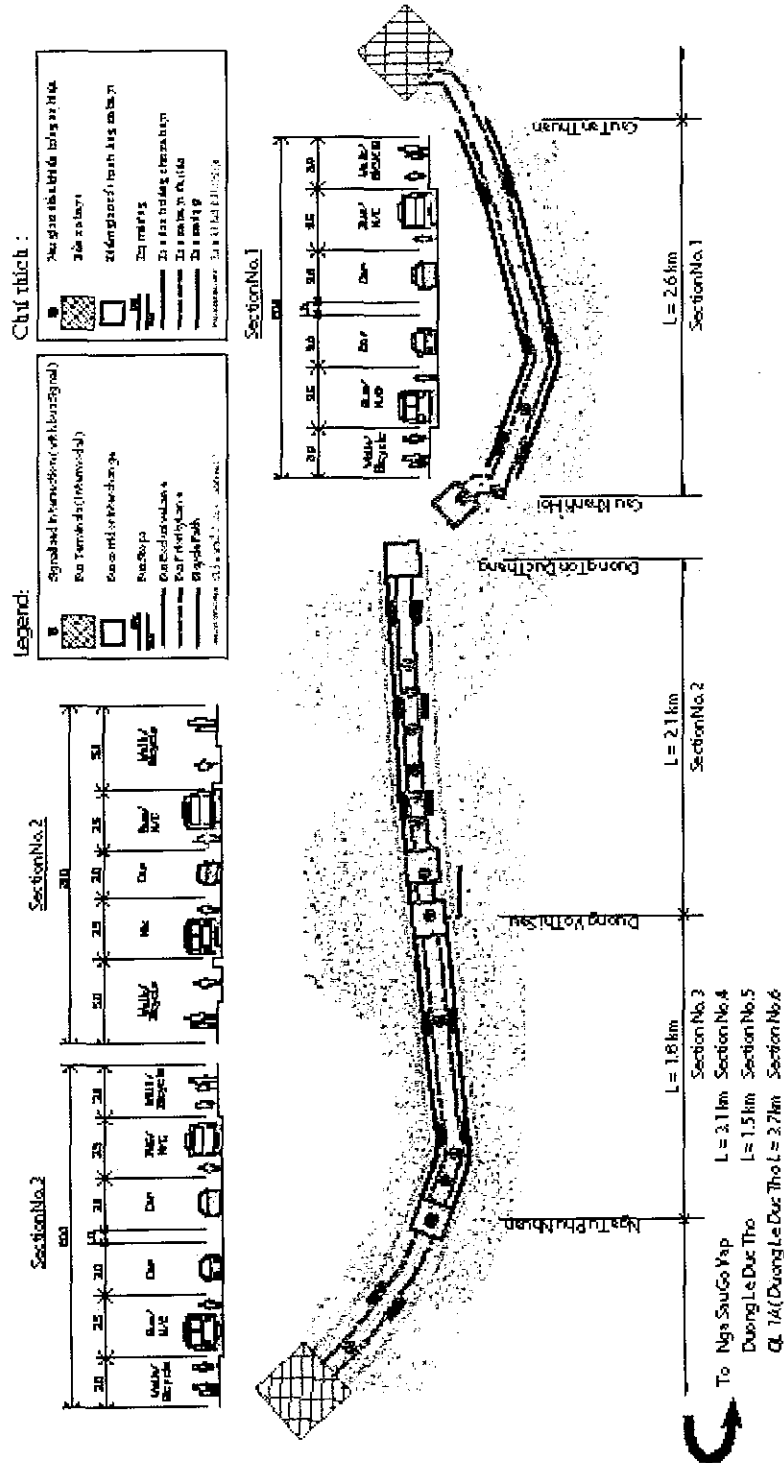
**No.4. Ben Thanh – An Suong Corridor**  
 (Ben Thanh – Le Lai – Pham Hong Thai – Cach Mang Thang Tam – Nga Ba Queo – Trung Chinh – NH 1A)



Source: Study Team

**Figure 9.4.29 Bus Corridor Improvement Plan (Within Ring Road No.2)**

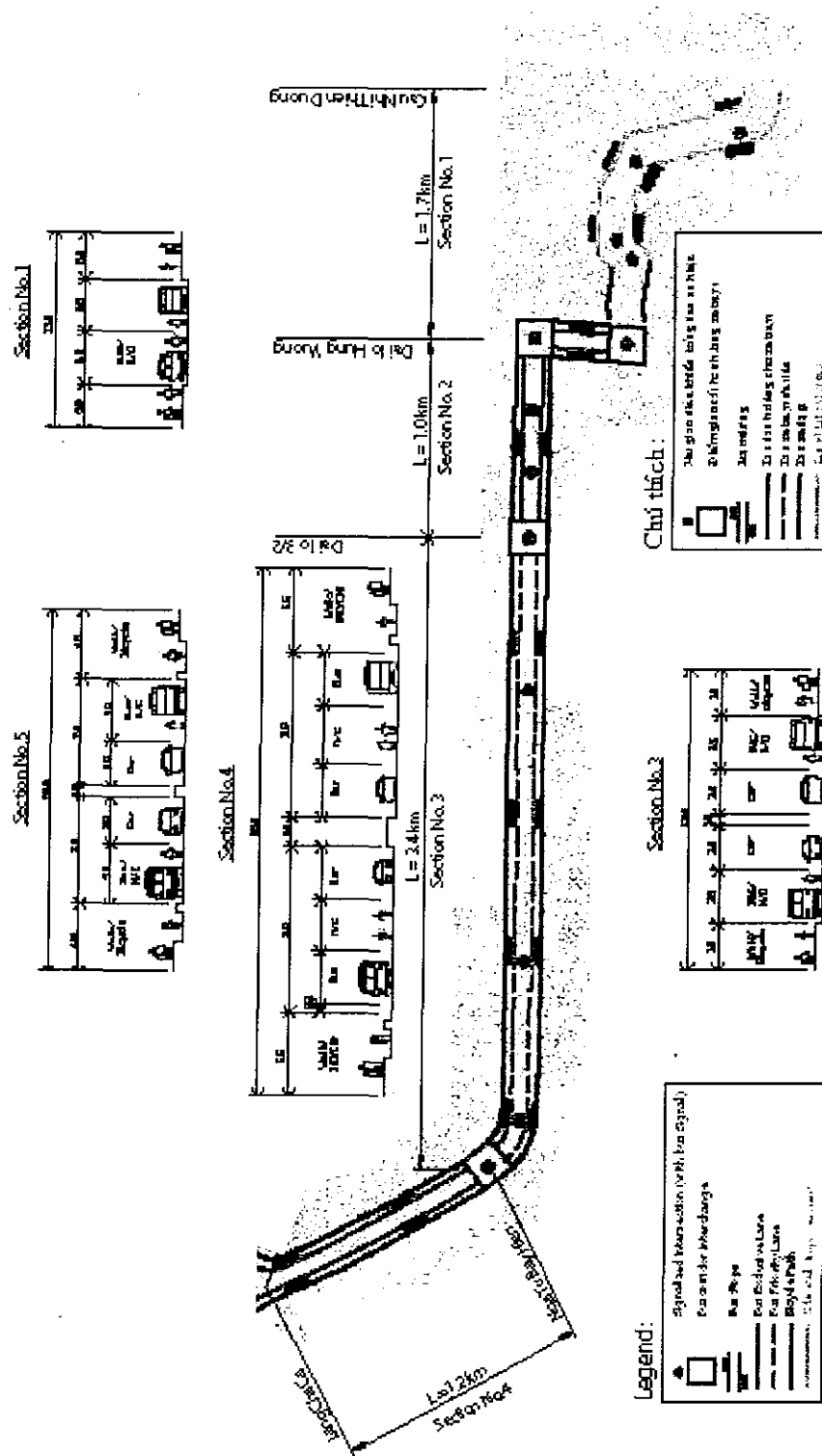
**No.5. Tan Thuan – Tan Thoi Hiep Corridor  
 (Tan Thuan Bridge – Nguyen Tat Thanh,  
 Hai Ba Trung – Phan Dinh Phung – Nguyen Kiem – Nga Sau Go Vap – Le Duc Tho – NH 1A)**



Source: Study Team

Figure 9.4.30 Bus Corridor Improvement Plan (Within Ring Road No.2)

No.6. Tan Son Nhat – Cho Lon Corridor  
 (Nhi Thien Duong Bridge – Tung Thien Vuong – Van Kiep – Chau Van Liem – Hung Vuong  
 – Ly Thuong Kiet – Hoang Van Thu – Lang Cha Ca)



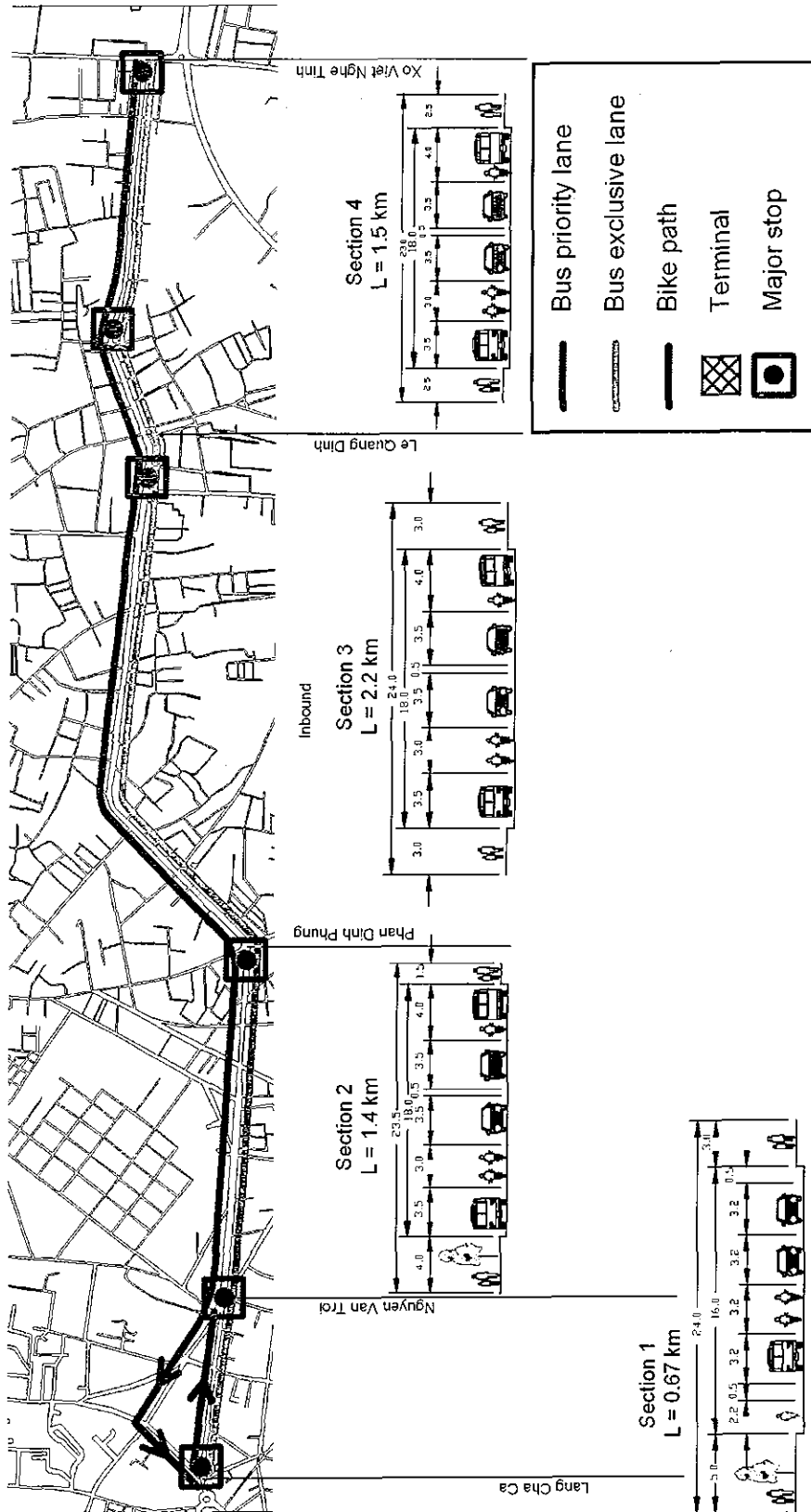
Source: Study Team





Figure 9.4.32 Bus Corridor Improvement Plan (Within Ring Road No.2)

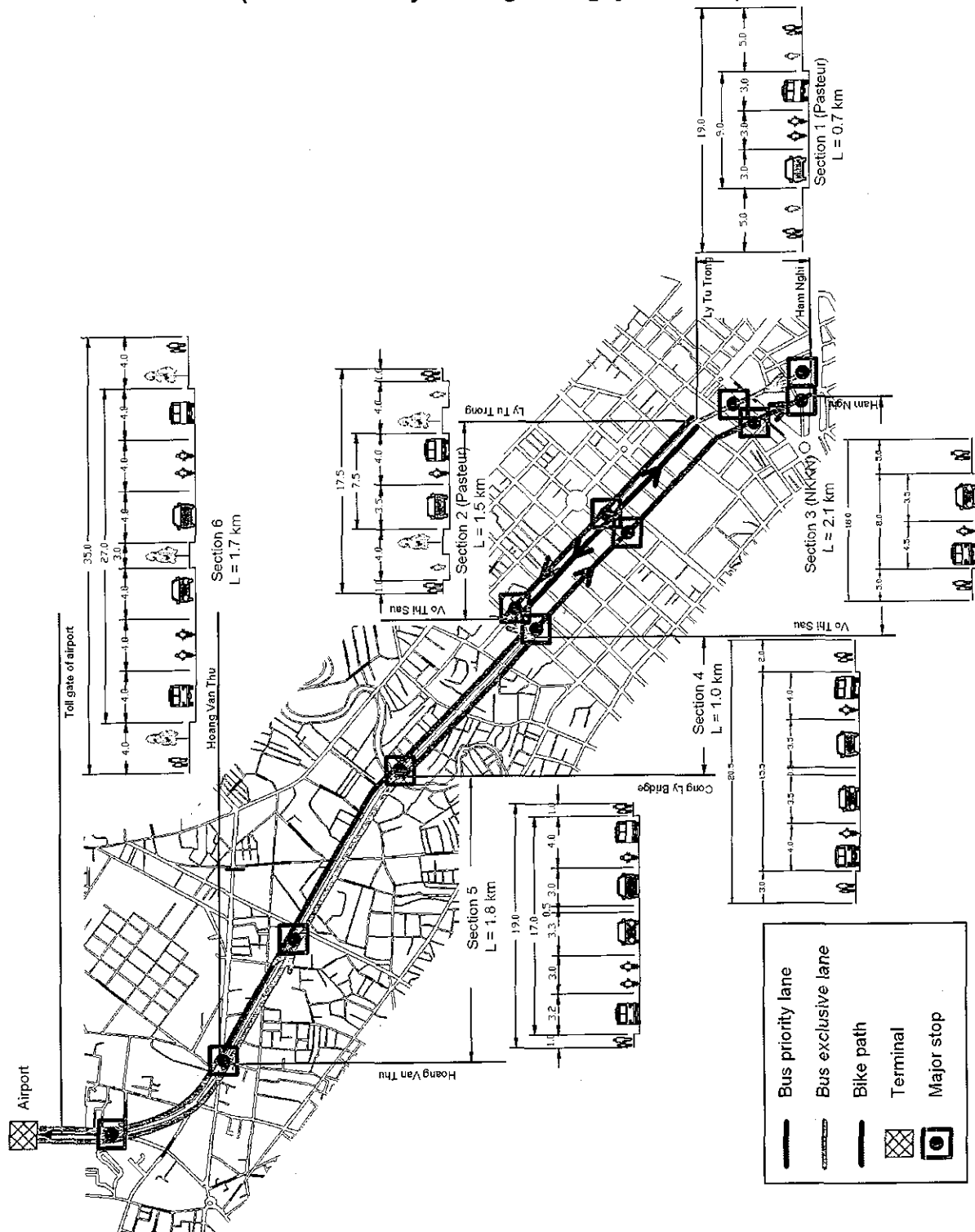
No.8. Phan Dang Luu Corridor  
 (Hoang Van Thu – Phan Dang Luu – Bach Dang)



Source: Study Team

**Figure 9.4.33 Bus Corridor Improvement Plan (Within Ring Road No.2)**

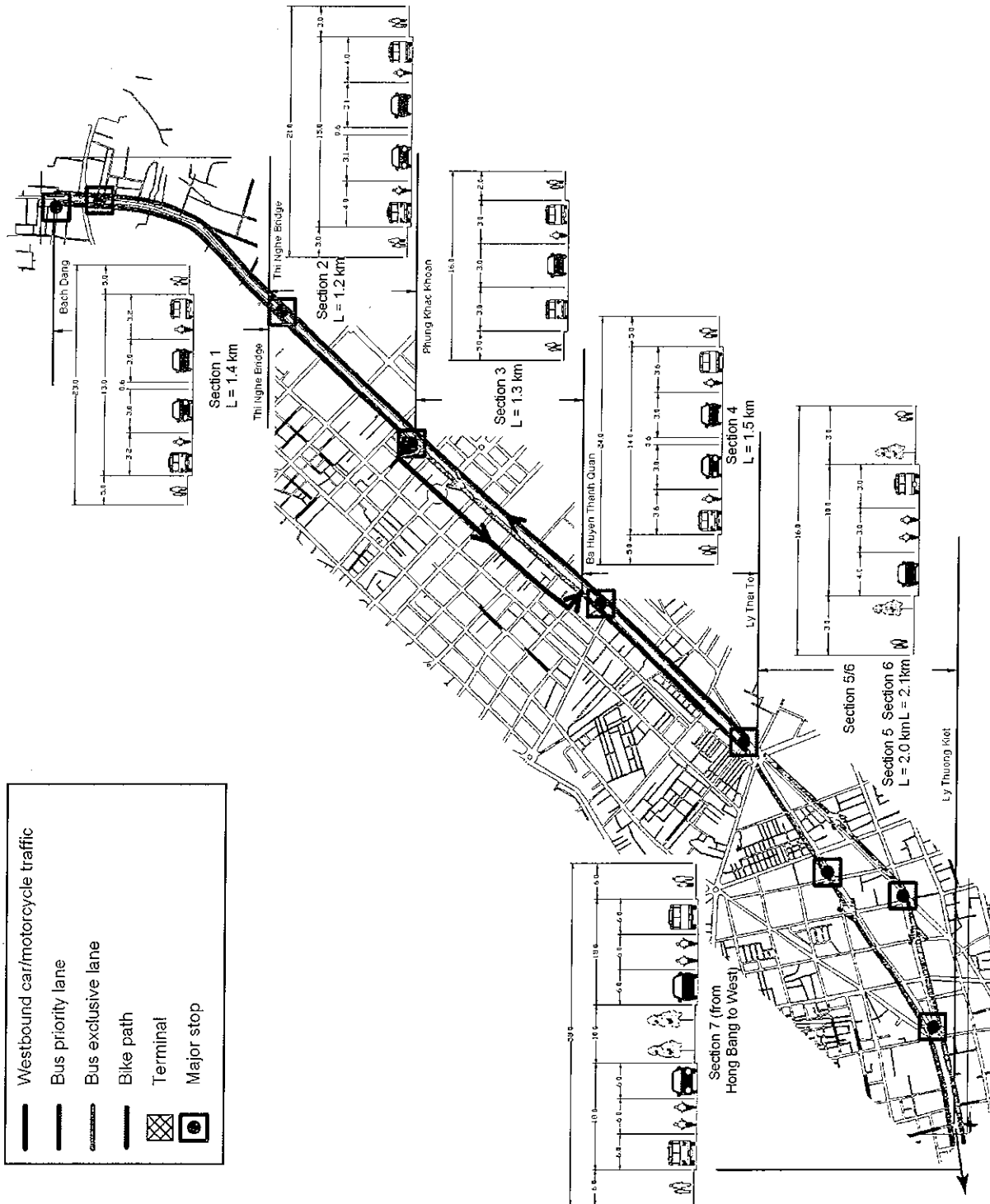
**No.9. Nam Ky Khoi Nghia Corridor  
 (Pasteur/Nam Ky Khoi Nghia - Nguyen Van Tri)**



Source: Study Team

Figure 9.4.34 Bus Corridor Improvement Plan (Within Ring Road No.2)

**No.10. Nguyen Thi Minh Khai Corridor**  
 (Xo Viet Nghe Tinh – Nguyen Thi Minh Khai / Vo Van Tan – Hung Vuong  
 – An Duong Vuong – Tran Phu)



Source: Study Team

## 9.5 Traffic Safety Improvement

Traffic accidents in the HCM metropolitan area have been on the rise in recent years. In HCMC alone, fatalities resulting from traffic accidents doubled from 1996 to 2001. Poor infrastructure engineering, weak traffic enforcement, and low driver awareness are the key causes of accidents. Safety design has not been fully recognized in infrastructure development and management; little police enforcement is done on traffic rules and regulations; and drivers, in particular motorcyclists, have little appreciation for traffic rules.

The Master Plan's Traffic Safety Improvement Project outlines actions in road safety planning, infrastructure improvement, enforcement and education. The tasks and programs herein are feasible for the city to undertake within the short term. Nonetheless, continuation of actions into a longer timeframe is a necessity to sustain safety improvements. Adjustment would also be needed over time to respond to changes in traffic conditions.

### 1) Road Safety Planning

The current basis for road safety planning is considerably weak. The discontinuation of the computerized traffic accident database a few years ago reverted the work to manual handling. The absence of accident database and analysis has deterred traffic engineers and traffic police from diagnosing complex factors involved in road accidents, thereby constraining the development of safety measures.

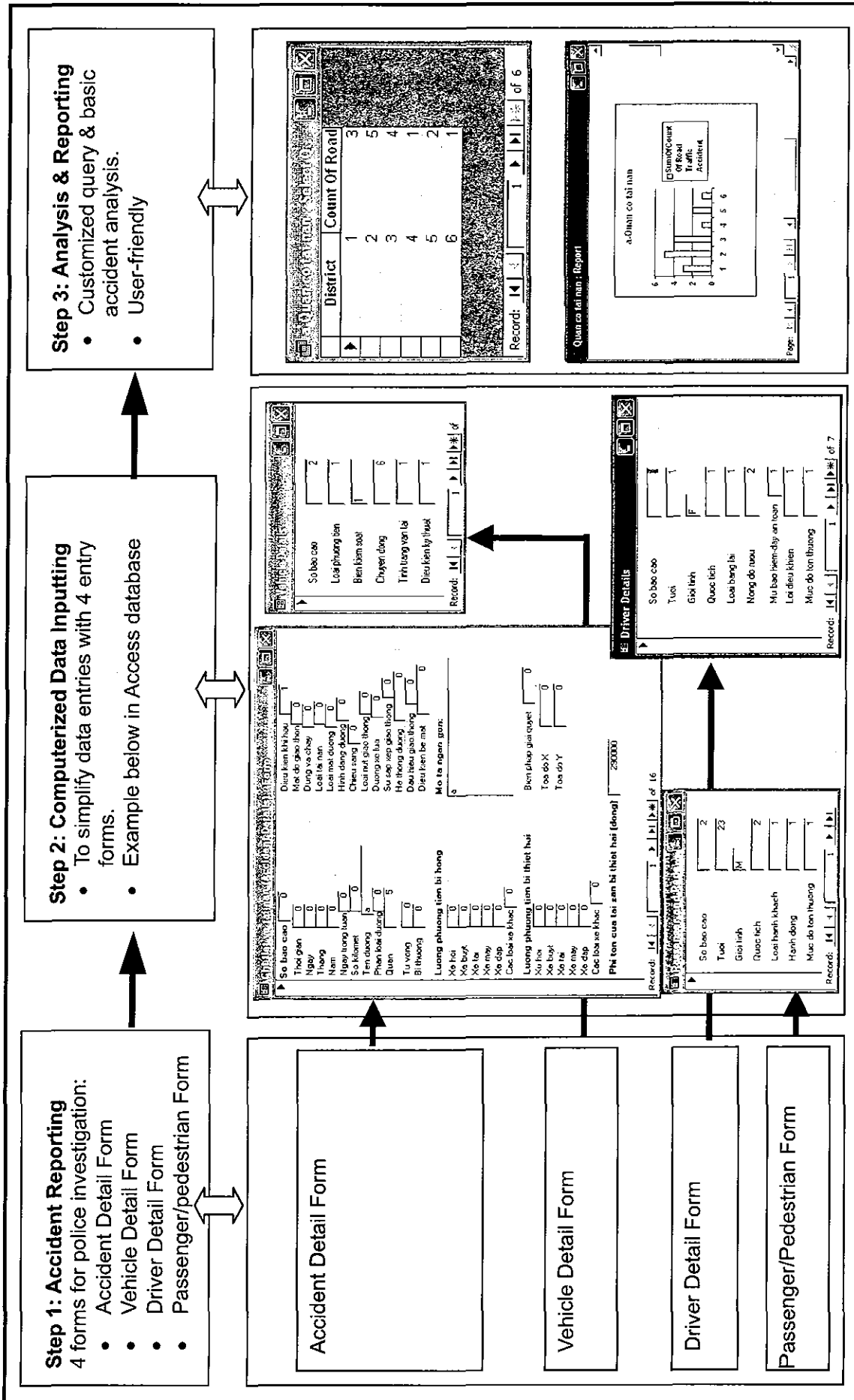
#### (1) Revival of Computerized Accident Database

Reliable data and statistics on accidents are the bases in understanding how the HCMC transportation system works. There must be wholehearted commitment to improve traffic accident investigation, reporting and analysis. The development of a computer database on traffic accidents which was initiated by MVA a few years ago ought to be revived. Complete reporting of traffic accidents and better use of accident records will prove very useful in planning preventive activities.

**A model road accident database** was developed to illustrate the process of computerizing accident database and reporting (refer to Figure 9.5.1). This database is patterned after the existing traffic accident report form and is primarily intended for the use of the Traffic Police. The program is organized into three steps, from accident investigation, data input, to analysis and reporting.

In parallel to the revival of the accident database, improvement of analysis and planning capacity is also necessary, which can be obtained through training of personnel and provision of facilities.

Figure 9.5.1 Illustration of Traffic Accident Database



Source: Study Team

## (2) Formulation of Multi-year Traffic Accident Reduction Plan

Once a reliable database becomes available, a multi-year traffic accident plan should be prepared with realistic and clear indicators, such as reduction in the number of accidents and fatalities. The plan would enable HCMC to define local policies in traffic safety. It would also provide an opportunity to integrate multiple aspects and elements that contribute to traffic safety improvement, including transport infrastructure design and operation, traffic regulation, enforcement, and public education.

## 2) Infrastructure Improvement

Good road infrastructure design assures traffic safety. Improvements that bring in safety benefits range from classification of road hierarchy at a comprehensive planning level to location-specific solutions through engineering designs. While road classification defines the operating environment, proper infrastructure designs put far more consideration on signal control, intersection approach, mid-block traffic management, and facilities for pedestrians and nonmotorized vehicles. The principles and examples of road infrastructure designs have also been elaborated in the section on Bus Corridor Management in the previous section. These, altogether, form the basis of infrastructure improvement actions from the short to the long term.

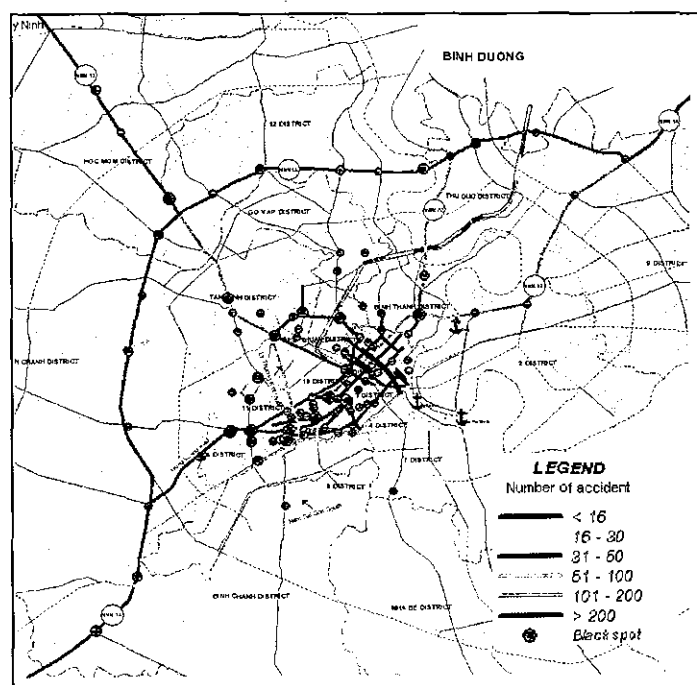
### (1) Traffic Safety Audit

Traffic safety audit should be institutionalized in the design process of roads, bridges, and other traffic facilities. When traffic safety audit is carried out prior to construction, the chances of traffic accidents at the new facilities could be limited or even prevented. For existing traffic facilities, a safety review would identify areas for improvement.

### (2) Mitigation of Black Spots

The Master Plan calls for immediate attention to improving accident-prone locations, commonly called black spots. Although causes vary by location, they normally require infrastructure modification and improvement (Figure 9.5.2 and Table 9.5.1).

**Figure 9.5.2 Accident-prone Locations in HCMC**



Source: Study Team

**Table 9.5.1 Accident Counts at Accident-prone Locations in HCMC**

No	Road Name	Accident		Fatality		Injury		Damage	
		2000	2001	2000	2001	2000	2001	2000	2001
1	Ton Duc Thang	12	13	6	6	15	14	15	20
2	Nguyen Van Troi	12	8	1	1	14	14	18	16
3	Cong Hoa	16	13	9	10	17	9	24	17
4	Nguyen Thi Minh Khai	14	16	4	8	16	10	24	22
5	Xo Viet Nghe Tinh	30	15	8	7	26	12	31	20
6	Tran Hung Dao	20	24	9	10	29	31	30	36
7	An Duong Vuong	9	17	2	6	12	20	11	20
8	Hung Vuong	26	13	10	8	33	14	33	5
9	Dien Bien Phu	41	76	16	26	40	77	47	92
10	3 thang 2	5	32	1	12	4	43	7	39
11	Bach Dang	9	16	3	7	11	21	13	22
12	Phan Dang Luu	16	11	5	2	13	12	19	16
13	Hoang Van Thu	22	19	10	9	21	14	34	28
14	Ly Thuong Kiet	26	25	7	8	24	34	31	36
15	Cach Mang Thang 8	17	16	6	5	15	17	17	20
16	Truong Chinh	-	60	-	26	-	59	-	77
17	Nguyen Tri Phuong	8	11	2	1	8	14	13	17
18	Hanoi Road (NR52)	67	81	36	30	40	81	82	101
19	NH1	322	330	145	175	323	301	381	422
20	NH22	152	116	52	74	190	140	200	179
21	NH13	39	39	26	23	38	39	49	52
22	South of Saigon (Nguyen Van Linh)	13	9	9	10	10	9	16	12

Source: HCMC Traffic Police

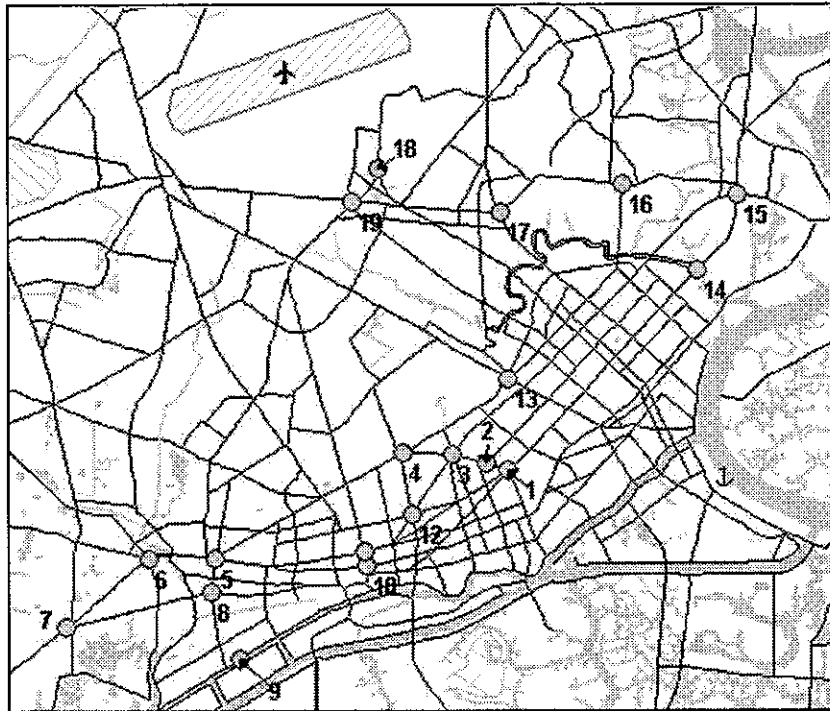


### **Selection of Critical Black Spots**

However, there is no sufficient information to be derived from the provided accident data for all the locations (refer to Table 9.5.1). This study surveyed 19 critical black spots in the list, identified issues, and formulated mitigation plans. The notion was for the city to experience implementing these urgently needed improvements and then to apply the principles and approaches to other accident-prone locations in the short term.

The 19 intersections identified, not surprisingly, are on the city's major roads where traffic volume is heavy, as shown in Figure 9.5.3. The existing conditions of each intersection are shown in Table 9.5.2.

**Figure 9.5.3 Locations of Selected Accident-prone Locations**



Source: Study Team

Table 9.5.2 Existing Conditions of Selected Locations

No	Name	District	Type <sup>1)</sup>	No. of legs	Type of Control <sup>2)</sup>	Traffic Signals			
						Make <sup>3)</sup>	Operation Type <sup>4)</sup>	Phase	Cycle Length (sec.)
1	NTMK – NVC – LTT - LTP	1/3/5/10	R	5	U				
2	Ly Thai To – Nguyen Dinh Chieu	3/10	T	3	S	L	F	2	~60
3	Nga Bay (DBP-LHP-LTT-NGT)	3/10	R	6					
4	LTT - 3Thang2 – NTP	10	RS	5	S	F	F	2	~60
5	Cay Go (3Thang2-HV-MP)	6/11	R	5	U				
6	Phu Lam	6	R	5					
7	Phu Dinh (KD Vuong-Hau Giang)	6	R	5					
8	Hau Gaing - Thap Muoi - Minh Phung	6	N	4	S	F	F	2	~60
9	Pham Phu Thu - Tran Van Kieu	6	T	3	U				
10	Ly Thuong Kiet - Nguyen Trai	5	T	3	S	F	F	2	~60
11	Hung Vuong – Ly Thuong Kiet	5	N	4	S	L	F	2	~60
12	Ngo Gia Tu – Chi Tanh	5/10	R	6					
13	Cong Truong Dan Chu	3/10	R	7					
14	Thi Nghe Bridge	1	Y	3	U				
15	Nga Tu Hang Xanh	BT	R	4	S	F	F	2	~60
16	Bach Dang – Phan Dang Luu - Dinh Tien Hoang	BT	T	3	S	F			
17	Nga Tu Phu Nhuan	PN	N	4	S	F	M	2	~60
18	Cong Hoa-Trung Son-Pho Quang	TB	R	4					
19	Nga Tu Bay Hien	TB	N	4	S	L	F	2	~60

Source: HCMC Traffic Police

- 1) Type of Intersection    2) Type of Control:    3) Make of Signal:    4) Operation Type:
- N – Normal 4-leg        S – Signalized        F – French            F – Fixed time
- T – T intersection        U – Unsignalized        J – Japanese        A – Actuated
- Y – Y intersection        M – Manual by Police    L – Local            M – Manual by Police
- R – Roundabout            O – Others
- S – Skewed intersection

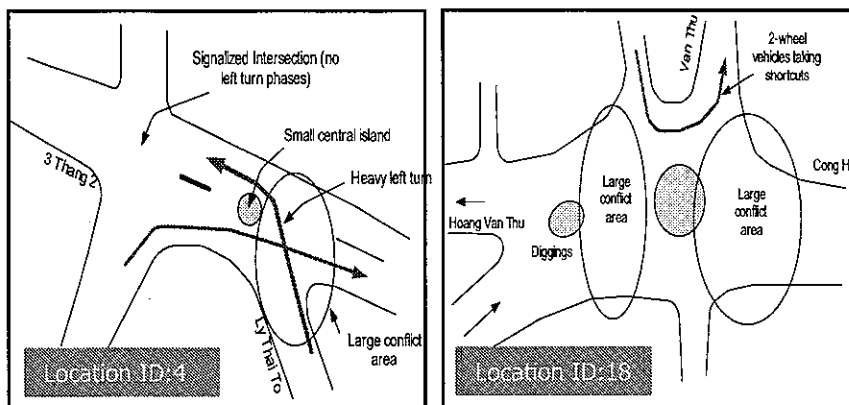
### **Improvements of critical black spots**

Safety problems associated with each of the 19 intersections are analyzed at great length in the Technical Report on Traffic Safety. Roundabouts accounted for half of the 19 black spots and the rest were shared by four-leg and three-leg intersections.

**Roundabouts:** Almost all roundabouts have similar safety problems as illustrated in Figure 9.5.4. There is no observed clear priority over which movement has the right of way. Chaotic movements occur in the large conflict areas. Many riders of motorbikes and bicycles take short cuts at roundabouts. Instead of going around the central island, they take left turns and run against the traffic stream. This risky maneuver further aggravates the already low safety levels at roundabouts. Pedestrians also have a hard time crossing. Because of the very large intersection area, pedestrians do not go around the perimeter of roundabouts but cross them, mixing with the traffic.

In consideration of infrastructure deficiencies, large open areas and lack of weaving space are the most crucial factors leading to unsafe operations.

**Figure 9.5.4 Typical Problems at Roundabouts**

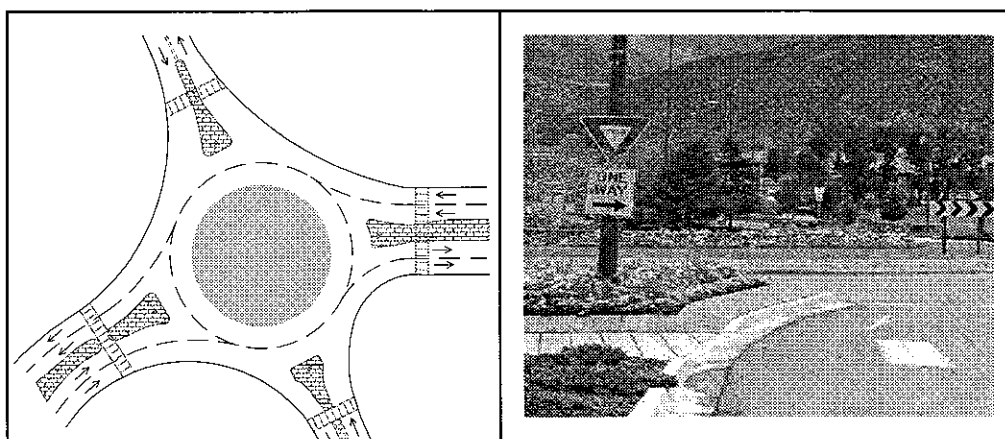


Source: Study Team

There is a law in place regarding roundabout operation (Article 40 of the “Decree No. 36/2001/ND-CP on Ensuring Land-Road Traffic Order and Safety”), which defines vehicles already inside the roundabout as having the right of way. However, in reality many road users are not aware of this rule or choose not to observe it.

As roundabouts have been a popular measure in HCMC, it should be understood that roundabouts are not a panacea to cure all intersection problems. From the traffic engineering perspective, a roundabout is only suitable in locations where turning movements are as high as the through movements. If through movements are very dominant, signalized intersections are far more effective. Creating an adequate length of weaving section and conversion to signalized intersections are two major infrastructure measures in mitigating such black spots. The figures below illustrate good design concepts for roundabouts.

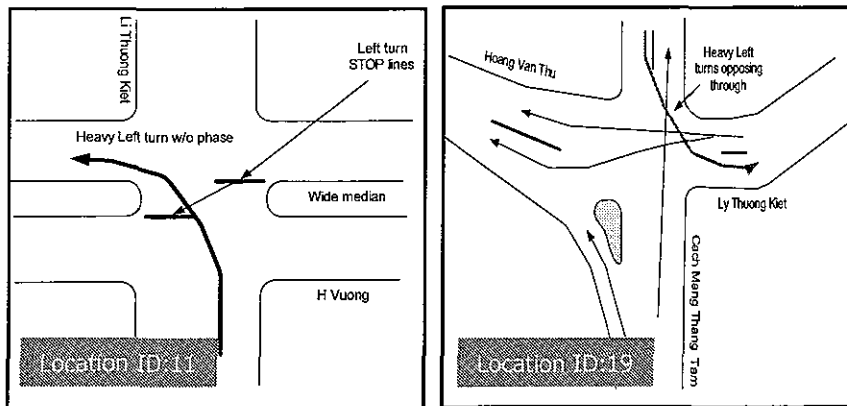
**Figure 9.5.5 Good Practice in Roundabout Design**



Source: Study Team

**Intersections:** The absence of left-turn phases and vehicles running a red light are the common causes of accidents at intersections. The typical examples below show that a heavy left-turn flow is often in direct conflict with through traffic in the opposite direction (refer to Figure 9.5.6). Another major cause of accidents is that the median is placed relatively far. This creates a large area of conflict at the intersection. Motorists often take an acute angle when seeking an opportunity to turn left. It is quite noticeable that there is lack of police presence to oversee the traffic flow and/or apprehend errant drivers.

**Figure 9.5.6 Problems at Signalized Intersections**



Source: Study Team

Installing left-turn phases at locations where left-turn volume warrants them, improving geometry and markings, and regulating road users by the Traffic Police are the basics to mitigate the effects of these black spots.

A list of proposed improvements was developed to initiate timely actions at the selected 19 critical black spots (refer to Table 9.5.3).

**Table 9.5.3 Proposed Improvements at Critical Black Spots**

ID	Intersection	Safety Problem	Improvement Plan
1	NTMK-NVC-LTT-LTP	<ul style="list-style-type: none"> <li>Large conflicts at roundabout.</li> <li>MC taking shortcuts.</li> </ul>	<ul style="list-style-type: none"> <li>Channelizing roundabout.</li> <li>Increasing central island area to lengthen weaving section.</li> </ul>
2	Ly Thai To-Nguyen Dinh Chieu	<ul style="list-style-type: none"> <li>Left turns and U turns in conflict with through traffic.</li> <li>User unclear whether NDC 1-way or 2-way.</li> <li>Vehicles running red phase.</li> </ul>	<ul style="list-style-type: none"> <li>Adding left turn phase.</li> <li>Providing signal lantern facing NDC approach.</li> <li>Police presence.</li> </ul>
3	Nga Bay (DBP-LHP -LTT-NGT)	<ul style="list-style-type: none"> <li>Large conflicts and congested.</li> <li>Large no. trucks and buses.</li> <li>Difficult for pedestrians to cross.</li> </ul>	<ul style="list-style-type: none"> <li>Channelizing roundabout.</li> <li>Police presence.</li> </ul>
4	LTT-3Thang2-NTP	<ul style="list-style-type: none"> <li>2 intersections in one location- 1 roundabout &amp; 1 signalized intersection.</li> <li>Large conflicts at roundabout.</li> </ul>	<ul style="list-style-type: none"> <li>Geometric improvement at roundabout.</li> <li>Adding left turn phase.</li> </ul>
5	Cay Go (3Thang2-HV-MP)	<ul style="list-style-type: none"> <li>Little weaving area with large conflicts.</li> <li>Opening at Minh Phung allows premature left turn.</li> <li>Conflicts at roundabout.</li> </ul>	<ul style="list-style-type: none"> <li>Geometric improvement.</li> <li>Closure of opening at Minh Phung approach.</li> </ul>
6	Phu Lam	<ul style="list-style-type: none"> <li>Large conflicts at roundabout.</li> <li>Little weaving area.</li> <li>Pedestrians crossing within roundabout.</li> </ul>	<ul style="list-style-type: none"> <li>Geometric improvements.</li> <li>Removing vendor stalls inside roundabout.</li> <li>Police presence.</li> </ul>
7	Phu Dinh (Kinh Duong Vuong-Hau Giang)	<ul style="list-style-type: none"> <li>Large conflicts at roundabout.</li> <li>Left-turn vehicles taking short cuts.</li> </ul>	<ul style="list-style-type: none"> <li>Channelizing roundabout.</li> <li>Police controlling left turn from Duong Vuong.</li> </ul>

## (Continuation of Table 9.5.3)

ID	Intersection	Safety Problem	Improvement Plan
8	Hau Giang - Thap Muoi - Minh Phung	<ul style="list-style-type: none"> <li>▪ Large intersection and stop line too far.</li> <li>▪ Left-turn from Minh Phung at acute angle.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Geometric improvement.</li> <li>▪ Installing left turn phase.</li> </ul>
9	Pham Phu Thu - Tran Van Kieu	<ul style="list-style-type: none"> <li>▪ Poor sight distance by corner building.</li> <li>▪ Sharp turn to and from the wooden bridge.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Providing STOP sign.</li> </ul>
10	Ly Thuong Kiet - Nguyen Trai	<ul style="list-style-type: none"> <li>▪ Vendors occupying intersection and roadway.</li> <li>▪ 2-way traffic on 1-way road of Nguyen Trai.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Police enforcing one-way.</li> <li>▪ Prohibiting vendors from occupying road space.</li> </ul>
11	Hung Vuong - Ly Thuong Kiet	<ul style="list-style-type: none"> <li>▪ Left-turn vehicles from LTK causing conflicts.</li> <li>▪ Over use of stop line at intersection.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adding left turn phase.</li> </ul>
12	Ngo Gia Tu – Chi Tanh	<ul style="list-style-type: none"> <li>▪ Large conflicts at roundabout.</li> <li>▪ No waiving area.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Channelizing roundabout to reduce area of conflicts.</li> <li>▪ Police presence.</li> </ul>
13	Cong Truong Dan Chu	<ul style="list-style-type: none"> <li>▪ Complex roundabout.</li> <li>▪ Large number of 2-wheelers moving against 1-way traffic.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Channelizing roundabout.</li> <li>▪ Police presence.</li> </ul>
14	Thi Nghe Bridge	<ul style="list-style-type: none"> <li>▪ Intersection right at foot of bridge.</li> <li>▪ Left turn vehicles taking premature turns.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Police regulating left-turn movements.</li> <li>▪ Considering eliminating left turns.</li> </ul>
15	Nga Tu Hang Xanh	<ul style="list-style-type: none"> <li>▪ Large conflicts at roundabout.</li> <li>▪ Bottleneck area.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adding signal at Bach Dang-Xo Viet Nghe Tinh intersection.</li> <li>▪ Police enforcement on 2-wheelers going against 1-way traffic.</li> </ul>
16	Bach Dang-Phan Dang Luu-Dinh Tien Hoang	<ul style="list-style-type: none"> <li>▪ Dead traffic signal.</li> <li>▪ Left turn from DTH causing conflicts.</li> <li>▪ Median too far from intersection, causing acute left turn from DTH.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Extending median of PDL approach into intersection.</li> </ul>
17	Nga Tu Phu Nhuan	<ul style="list-style-type: none"> <li>▪ Acute left turn from District Phung to N Kiem.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adding left-turn phase.</li> </ul>
18	Cong Hoa-Trung Son -Pho Quang	<ul style="list-style-type: none"> <li>▪ Large conflicts at roundabout.</li> <li>▪ Little weaving.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Removing roundabout and replacing with signalized intersection.</li> <li>▪ Providing left-turn bay for turns from T Son to P Quang.</li> <li>▪ Assigning U turns from D Giot and P Quang 200m away from intersection.</li> </ul>
19	Nga Tu Bay Hien	<ul style="list-style-type: none"> <li>▪ Incorrect signal phase (yellow after red).</li> <li>▪ Left turns from CMTT to LTK causing conflicts.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adding left turn phase.</li> </ul>

Source: Study Team

### **3) Enforcement**

#### **(1) Strict Enforcement of Traffic Rules**

The current traffic situation in the study area requires resolute changes to people's safety awareness. Attitudes of drivers, passengers, and pedestrians often do not conform to traffic rules or traffic manners and lax enforcement amplifies the situation. Strict enforcement is just as urgently needed to change the situation. The actions below were devised to target the leading factors involved in motor vehicle accidents in HCMC: excessive speeding, drunk driving, and driving on the opposite lane.

##### **Monitoring of Speeding**

As with all other traffic laws, speed laws must be enforced and speed limits imposed through installation of speed signs.

Even without speed guns, speed checks can still be done. The real intention is not to apprehend violators but to refrain road users from excessive speeding. At hazardous locations, continuous patrolling has to be carried out by clearly marked police vehicles. The mere presence of patrol vehicles can reduce the speeds of fast cars or motorbikes, at least temporarily.

The effectiveness of speed enforcement depends on the disposition of cases after apprehension and issuance of citation tickets. Speed limit violations must be punished with substantial fines and possible license suspension for recurrent offenders.

A visual warning with the image of a wrecked motorcycle or car at hazardous locations may effectively convey the message to all road users. Construction of humps or speed tables may be implemented in residential areas to curtail excessive speeding.

##### **Reduction in Drunk Driving**

Based on limited accident data, the highest number of fatal and serious accidents occurred on Sundays with the worst period from 20:00 to 23:00. There appears a strong correlation between drunk driving and accidents.

The Traffic Police must have a way of enforcing the law. Instruments are necessary to measure alcohol content, albeit costly. In the absence of measuring equipment, the Traffic Police must be innovative enough to know if somebody is under the influence of liquor or not. A simple test, like 'toeing the line', can serve the purpose.

##### **Limiting Encroachment on Opposite Lane**

Most of the two-way roads in the HCM area are four lanes undivided, often with white line marking to define the center line. Driving into the opposite traffic is not uncommon on the roads of HCMC. Accidents resulting from this dangerous behavior tend to be more severe due to the potential of head-on collisions between opposing vehicles.

Traffic Police enforcement is critical in changing the habit of lane encroachment. Mid-block infrastructure improvement is equally important. Installing signages and providing median dividers will prevent vehicles from encroaching on opposite lanes. These measures are subject to location condition and should be jointly worked out by the Traffic Police and the traffic engineering unit.

## **(2) Training Program for the Police**

Training the Traffic Police in enforcement, traffic flow management, and accident analysis has been stressed in almost all ODA projects conducted in HCMC in the past. Training is not only for personal development or honing one's skills; it can also boost the morale of the policeman in performing his duties.

A training program in traffic management for the Traffic Police has to be developed and offered on a regular basis. The program should cover profession appreciation, traffic laws, enforcement procedures, traffic control and surveillance, and other pertinent topics. The specifics of the training curriculum are described in the Master Plan Project on Traffic Management Capacity Building.

## **(3) Traffic Education and Campaign**

As the number one cause of traffic accidents is human error, it is a must to establish a concrete mechanism to educate drivers and other affected road users.

**Improvement of licensing system:** Although the current driver's licensing system is being strengthened, there are still many drivers without a license. The existing license system also needs improvement in paper and driving tests as well as penalty for repeated violators.

**Expansion of safety education in primary schools:** Education is effective for the children and the young. While safety education in primary schools has been introduced recently in some areas, the program should be expanded citywide.

**Conduct of frequent safety campaigns:** Various aspects related to safety need to be communicated to the public constantly, such as laws and regulations, accident causes, and driving manners. Actions include safety campaigns through media, organization of community volunteer groups, publication of traffic rules and regulations, and initiation of various model programs involving relevant sectors.

## **(4) Institutional Arrangements for Traffic Safety**

The establishment of an adequate traffic safety system requires a set of legal and institutional arrangements. Two key aspects are defined below.

**Rationalization of road traffic law:** Many violators seem to be ignorant of traffic laws and regulations. The Road Traffic Law should be reviewed and simplified, then publicized through the media and distributed as handouts. These can be expanded to cover the entire country based upon HCMC's experience.

**Strengthening of organizations:** The current police force is understaffed as compared to the increasing load of work on traffic management and safety. A staff expansion plan at both city headquarter and district police offices should be prepared and budgeted.

## 10 CONCLUSION AND RECOMMENDATIONS

### 1) Challenge to Sustainable Urban Transport Development

The urban transport situation in the study area has not yet reached the level that many other large urban areas in Southeast Asia suffer from. People can still move relatively freely in HCMC but the time will soon come when, if the current trend continues, the urban transport problem will grow to a level which the society can only manage with great difficulty. However, in guaranteeing a sustainable urban transport envisioned by city authorities and the people, the transport sector must not be dealt with independently of other sectors. Rather, urban transport planning must be part of an integrated approach, intertwined with urban planning and economic development. For this reason, it is vital to enhance people's understanding of the importance of the urban transport sector in guiding the future direction of the city's development. The city's competitiveness and livability of in the future depend on actions taken – or not taken – today.

### 2) Shared Vision, Common Agenda

With so many governmental bodies, organizations, and individuals involved in the transport planning process, implementation is facilitated when there is unanimity and consistency of actions – especially between national, provincial, and city governments. This can only occur when all, or most, of them share a common vision about HCMC. A Master Plan articulates that vision in various ways.

A Master Plan involves several trade-offs and choices which are essentially political processes. There will be competition from other sectors for the funds and resources required to implement the plan. Resolving these competing requirements will be a major task, which can only be handled at the political level, guided by technical information. The implementation of schemes and proposals will also require an assessment to be made of the political implications and priorities. The aim of the political processes is to produce a consensus on the plan and its components.

### 3) Sector Management

Effective urban transport sector management will require improved management systems focused on core functions, with the systems executed by well-trained personnel. This will involve: the withdrawal of the public sector from commercial activities, the development of human resources toward those activities that remain within the public sector, and the adoption of modern management systems

#### **Possible Areas where Divestment can Start**

The city can start shedding off less controversial functions first, such as:

- Motor vehicle inspections which can be done by private companies, rather than directly by the city government;
- Subcontracting of road and bridge maintenance and repairs;
- Conversion of existing maintenance SOEs into independent contractors competing for government business.



### **Training in Key Aspects of the Sector**

Ultimately, it is the human resources that will drive implementation. There is a general lack of trained staff, compounded by lack of a systematic human resource development program. Since the city government has limited resources to attract skilled manpower for the foreseeable future, it should attempt to out-source. Construction, infrastructure maintenance, local planning/engineering consultancies, and a variety of other services can be contracted out.

### **Management Systems**

It is said that with a good system, below-average workers can perform better; but a bad system can turn even good employees into errant workers. Management system involves the following:

- Organizational changes to ensure that each organization has the appropriate authority and manpower to fulfill its mandates;
- Standardization of tasks and procedures to carry out organizational processes, from policymaking, to planning, programming, budgeting, execution and control, as well as identification of tools required at each stage; and,
- Implementation of these systems using guidance documents, monitoring and feedback mechanisms, and information technologies.

### **New Channels for Consensus-building**

To strengthen the TUPWS' hand in promoting a broad constituency for transport plans and programs, it is recommended that the following channels be pursued:

- Establishment of liaison groups with representatives from transport users (from the private and state sectors of industry, voluntary associations or representatives of large and small transport operators in all modes, provincial and national government departments) to engage in dialogue on the key issues;
- Conduct of periodic workshops, similar to what the HOUTRANS did, with liaison group members and other interested organizations, to work out potential bugs in a solution and to monitor views about obstacles to be encountered;
- Establishment of consultation procedures for coordinating organizations, such as the National Traffic Safety Committee, to support their activities in urban areas;

### **Timing is Important**

A clear distinction is needed between short-term missions, such as for the Short-term Action Plan (STAP), and those for which the timing is some way in the future (LTDP or Transport Master Plan). In this manner, institutional support and strengthening can be prioritized. For example, the execution of ports relocation may be hampered, unless the problem of coordinating 25 ports managed by 15 companies and 10 government agencies is resolved in advance. In terms of road transport, the TUPWS' ability to assess road-user needs is to be improved further because it lacks rudimentary information, such as the characteristics of the vehicle fleet, due to a lack of an effective computer database. Hence, future effectiveness will depend on early development of data systems.

#### 4) Financing Strategy

##### Ensure Funding First before Implementation

Implementation can only proceed if the required resources had been earmarked or secured beforehand. A capital budget, distinct from annual operating budget, should be considered because project construction usually extends beyond a year and actual disbursements stretch over several years. Implementation could suffer if funding for subsequent years dries up, or is stopped.

##### Expand the Budget Envelope

The capital budget envelope for the Transport Master Plan can be enlarged in a variety of ways. The most promising tack is to identify new sources of revenues – such as charges for renewal of vehicle registration and also driving licenses – and earmarking the amounts collected into a transport development fund.

While borrowings and PSP schemes are politically expedient and acceptable, they cannot always substitute for sound fiscal management involving a broad range of revenue instruments, unless a proper institutional framework is provided.

An exercise was made to estimate possible funding capability of the city in the transport sector based on a number of probable assumptions. The results are positive although they are largely dependent on the feasibility of introducing such measures<sup>1</sup> (see Table 10.1).

**Table 10.1 Fund Requirement**

	Item	US\$ billion
Estimated Fund Requirement 2004-2020	1) HOUTRANS Master Plan	14.0
	2) Other work (30% of 1)	4.2
	Total	18.2
Possible Fund Source 2004-2020	1) Existing Funding Mechanism <sup>1)</sup>	1.9-4.7
	2) Private Sector Participation	
	• Urban expressway (40%)	0.7
	• UMRTs (40%)	1.2
	• Secondary roads (20%)	0.5
	3) Economic Measures on TDM	
	• Increase in vehicle registration fee	
	US\$ 300 for motorcycles	1.0
	US\$ 3000 for cars	7.9
	• Increase in parking fee <sup>2)</sup>	
VND 3,500 for motorcycle	3.9	
VND 6,000 for cars	1.9	
• Area licensing <sup>3)</sup>		
VND 7,500/entry for motorcycles	0.3	
VND 15,000/entry for cars	0.8	
• Increase in fuel price (1.5 times) <sup>4)</sup>	2.1	
	Total	21.3-24.1

Source: Study Team

<sup>1)</sup> 1.25% of HCMC's GDP (2004-2020)..

<sup>2)</sup> ½ of motorcycles and cars.

<sup>3)</sup> The area includes 11 districts in the city center (districts 1,3,5,10,11, and a part of 6).

<sup>4)</sup> From US\$ 0.37/liter to US\$ 0.56/liter.

<sup>1</sup> All of them are practiced in many countries and cities in the world.

### **Improve Project Design and Priority-setting**

Effective implementation is also the by-product of good project design and good selection. Dividing a project into stages can lower initial budget hurdle, and be easier to implement. Good selection among a portfolio of the "right" projects also sets the stage for higher economic growth, and with it, more robust revenues in the future. On the other hand, poor resource allocation creates a vicious spiral of wasted funds and anaemic revenues.

### **5) Improving Private Sector Participation**

One way to expand the budget envelope for transport infrastructure is through private sector participation. It is a non-traditional way that Vietnam has already opened; a number of projects were reported to have been implemented under BOT arrangement, such as the following:

- Interprovincial Road No. 15, Phase 2, by Petrol Construction Company, at a cost of VND 186 billion (~US\$ 12m);
- Passage Bridge of Binh Trieu, Phase 2, by Traffic Construction Corporation No. 5, at a cost of VND 340 billion (~US\$ 21.9M).

While the legal foundation (Decree 62/1998/ND-CP) for PSP/BOT exists, it is not sufficient to entice private sector investors who are equally concerned about the stability of the contracts as well as the impartiality of the country's judicial system in enforcing them.

There are several lessons from other countries that HCMC can adopt to improve PSP, and these are:

- Project development cannot be left alone to the private sector; the government has to prepare the project studies before handing out the concession or contract.
- In the selection of concessionaire, an open and impartial tender provides greater assurance to lenders, as well as lend long-term stability to the contract.
- Government support is necessary, especially in the provision of ROWs in advance of project construction.
- A regulatory framework should be established to take advantage of the "market" to provide the associated benefits and to ensure that the concessionaire is delivering what is required and getting compensated in a fair manner.
- A long-term strategic plan should be pursued, mainly because urban transport projects (like toll roads and railways) function as part of a network, and therefore demand could be disrupted or altered in the future as the network evolves.
- While toll roads and bridges are relatively straightforward types of projects suitable for BOT, mass transit systems are much more complex and governments often have to accept the bottom line financial responsibility

### **6) Land Acquisition, Resettlement and Environment**

In the implementation of development initiatives, resettlement cannot always be avoided. As such, measures and guidelines on resettlement are necessary to mitigate adverse impacts. Resettlement becomes an obstacle to effective implementation of transport projects when it is considered only as an afterthought and at the tail-end of the development cycle. This means the preparation of an effective resettlement action plan

(RAP) as an intrinsic part of the project including its financing. Similarly, the requirements of environmental impact assessment could slow down project implementation, if not properly addressed at the outset.

While the sole objective to construct transport infrastructure is not only to develop transport infrastructure but to increase mobility, accessibility to services, improve the people's lives, and enhance the city's livability, equally importantly is to promote the development of organized urban areas. Toward these ends, a new approach to develop infrastructure integrated with urban and environmental development wherein an alternative mechanism for land acquisition and resettlement must be established.

