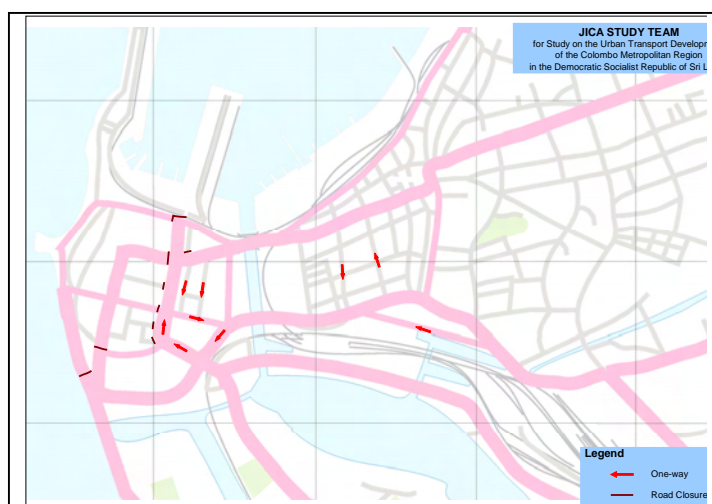


6.4 Current Traffic Control Practices

(1) One-way Systems

One-way systems are effective in improving operational efficiencies at intersections as they reduce the number of conflicts from no opposing flows. However, they require a set of parallel roads with similar standard to minimize increases in trip distance and avoid bottlenecks. As the road network in Colombo is not a grid type, there are few such pairs where one-way system can be applied.

Currently, a one-way system has only been adopted in the Fort and Pettah areas as shown in Figure 6.4. Another one-way is found on Hyde Park Corner, but there is no parallel road in the opposite direction. A one-way system was once tried along Galle and Duplication Roads between Sir M. M. Markar Mawatha and Bauddhaloka Mawatha. The scheme was abandoned after only one day due to insufficient preparation work which lacked a detailed traffic engineering study, minor improvements to road and road facilities, providing signage and markings, and an information campaign to road users.



Source: This Study

Figure 6.4 One-way System in Fort and Pettah Areas

(2) Turning Restrictions

Turning movement restrictions at intersections eliminates many movements and makes intersection operation more efficient. Alternatively, those vehicles wishing to make the prohibited movement must find an alternative route to get to the destination, which could increase the distance traveled. If the alternative route is inconvenient, the negative impacts become significant and could negate the benefit of the restriction. Thus, careful study on traffic volumes and available alternative routes are necessary before implementing turning restrictions. There are few intersections that impose turning restrictions, such as along Baseline Road and the intersection of Earnest De Silva Mawatha and Dharmapala Mawatha.

(3) Truck Ban

A truck ban was applied on some roads in Colombo. But drivers and others who were affected objected to the rule and it was repealed. Currently there is no truck ban, which allows large

trucks and container carriers to travel on any roads in Colombo at anytime. This lack of a truck ban is one of the factors causing congestion during peak times.

(4) Temporary Regulations

One-way systems have been introduced and turning movements restricted during peak hours on roads adjacent to school areas via temporary barriers and signs¹. Since these changes are temporary in time, but necessary everyday, it would seem logical to install traffic signs with the applicable time restricted in the restricted areas.

(5) Reversible Lanes

Although it is not regulated or controlled, reversible lanes are created along some roads that lack the necessary width for traffic capacity. When traffic is light, the roads operate with one lane in each direction. However, in peak times when traffic demand increases in one direction, three lanes are formed with two lanes in the peak direction and one lane in the off-peak direction. This situation reverses during the other peak period.

6.5 Review of Past, Ongoing, and Planned Traffic Management Projects

(1) Colombo Urban Transport Study Stage 1 (CUTS1)

20 Year Recommended Program

The Colombo Urban Transport Study 1 (CUTS1) formulated a 20-year program with projects to be implemented by 2017; however, it left the specifics of the programs to be identified in The Colombo Urban Transport Study 2 (CUTS2). The traffic management projects and parking project proposed in CUTS1 are summarized below.

Table 6.4 CUTS1 Projects and Programs to be Implemented by 2017

No.	Project	Priority	Specification/Comments
TSM1	Intersections	C	Program of improved roundabout or traffic signal control at critical junctions
TSM2	Corridor Improvement	B	Program to improve corridor capacity and safety (cf. Galle Road scheme). Involves re-designed cross-section of the road to increase effective road width, provision of footways and pedestrian crossings, street lighting, provision for buses, and improved traffic control
TSM3	City Center	C	The City Center Study will review the road network, the allocation of road space between competing uses, and traffic management. This investment will fund an anticipated traffic management plan for the City Center

¹ In Cinnamon Garden, an east-west one-way street is applied to Rajakeeya Mawatha in front of Royal College during the morning (7-8 am) and afternoon peak (11am-2:30pm). During the afternoon's highest demand period (1-2pm), 1,300 vehicles wait to pick up 6,000 students and the one-way regulations help to minimize conflicts between waiting and through traffic.

The other case is at Anula Vidyalaya and St Joseph Balika Vidyalaya in Nugegoda, which faces High Level Road. To minimize conflict along the corridor, the schools shifted their entrance gate for non-pedestrians from the corridors to a minor road behind the school. The Traffic Police enforce a one-way arrangement on the minor road between 7-8am and between 1-2:30pm.

No.	Project	Priority	Specification/Comments
TSM4	Area Traffic Control	C	As traffic signalization becomes more widespread, ATC will become necessary. It is recommended that Stage 2 reviews the case for, and timing of ATC. This investment will fund an anticipated ATC component.
P1	City Center Public Car Parks	C	A basic assumption is that the City Center should grow. Parking provision and control are central to securing accessibility to the Center. The City Center Study will develop this strategy. This investment is based on the expected increase in private parking that will be part of this strategy. Much will need to be off-street, in multi-storey parks. The CMC should control such car parks, but private ventures would be possible, with the public sector possibly providing the land. The investment shown is the estimated public section contribution.

Source: CUTS1 Report Volume III

Note: In CUTS1, priorities are defined as follows:

A: Committed projects: include five highway projects, the SLR Panadura and Kalutara Bridge replacement (ongoing), and the SLR Action Plan, which it is assumed will be implemented;

B: Expenditure requirements for maintenance and rehabilitation, both road and rail, and also for bus and rail subsidies. These items were identified in Chapter 3 and are considered to be of high priority, second only to actual commitments;

C: projects with a key role in the transport strategy, and projects promising very high economic returns; and

D: remaining highway, rail and other projects in the Recommended Strategy.

These projects were arranged into four 5-year periods for 3 different growth scenarios. The programs are equal for the high and medium growth scenarios, while the investment is smaller for the low growth scenario as shown below.

Table 6.5 CUTS1 20 Year Program - Medium and High Growth Scenario

No.	Project	Agency	Priority	Cost in RS. million (1995)				Recommended 20-year Program
				1998- 2003	2003- 07	2008- 12	2013- 17	
<i>Traffic Management</i>								
TSM1	Intersections	CMC	C	1,150	1,050	1,000	1,000	4,200
TSM2	Corridor improvements	CMC	B	1,100	1,013	950	888	3,950
TSM3	City Center	CMC	C	75				75
TSM4	Area Traffic Control	RDA	C	100	200	50	50	400
TSM5	Road Safety			125	100	100	100	425
<i>Parking</i>								
	City center public car park	UDA	C	750			250	1,000

Source: CUTS1 Report

Table 6.6 CUTS1 20-Year Program - Low Growth Scenario

No.	Project	Agency	Priority	Cost in RS. million at 1995 value				Recommended 20-year Program
				1998- 2003	2003- 2007	2008- 2012	2013- 2017	
<i>Traffic Management</i>								
TSM1	Intersections	CMC	C	600	1,200	1,200	1,200	4,200
TSM2	Corridor improvements	CMC	B	650	950	600	450	2,650
TSM3	City Center	CMC	C	75				75
TSM4	Area Traffic Control	RDA	C		300	50	50	400

No.	Project	Agency	Priority	Cost in RS. million at 1995 value				Recommended 20-year Program
				1998- 2003	2003- 2007	2008- 2012	2013- 2017	
TSM5	Road Safety			125	100	100	100	425
	<i>Parking</i>							
	City center public car park	UDA	C		750		250	1,000

Source: CUTS1 Report

As CUTS1 was purposely a planning study, with project formulation left to Stage 2, project locations and scopes of work were not identified. A review of the proposals above with regards to what was proposed in CUTS2 is below.

- TSM1: Progress and development of the CUTS1 intersection and roundabout proposals (TSM1) are summarized in Table 6.7 to 6.10.
- TSM2: Corridor improvements were studied in CUTS2, but few specific plans were prepared, except for a pilot project of corridor improvements along Galle Road. The improvement works were only partially implemented.
- TSM3: City-center improvements were further studied in CUTS2 and a conceptual plan was prepared that involved relocating the wholesale markets and rationalizing bus services, in addition to undertaking traffic management measures on some streets. Out of project components proposed, only minor improvement works including installation of signals were implemented along Olcott Mawatha.
- TSM4: No area traffic control system has been established, even though the number of traffic signals has increased from 18 locations to 50 locations (2005) because the signals are not connected. CUTS2 did not mention about area traffic control system.
- TSM5: No traffic safety projects were formulated in CUTS2.

Intersection and Roundabout Improvements

CUTS1 identified four types of locations with capacity problems, which are listed below, as well as improvements made.

Table 6.7 Locations Where Junction Controls are Needed (CUTS1)

No.	Location	Action Taken
1	Danister De Silva Mawatha, Sri Saddharma Mawatha	Improved under Baseline Road Project
2	Danister De Silva Mawatha, Kolonnawa Road, Demattagoda Road	Improved under Baseline Road Project
3	Maradana Road, Symond's Road	Signalized and right turn from Symond's is banned
4	Danister De Silva Mawatha, Stace Road, Avissawella Road	Improved under Baseline Road Project
5	Galle Road, Hospital Road	Signalized
6	High Level Road, Kirillapone Avenue	Improvements are not required since Baseline Road was completed
7	High Level Road, Edmonton Road	Improved under Baseline Road Project
8	High Level Road, Subhadramma Road	Improving on-going
9	Sri Jayewardenepura Mawatha, Kotte Road	No improvement
10	Sri Jayewardenepura Mawatha, Nawala Road	No improvement

Source: CUTS1 Report and Study Team

Note: 1) Danister De Silva Mawatha is also called Baseline Road

Table 6.8 Roundabout Intersections with Low Efficiency (CUTS1)

No.	Location	Actions Taken
1	Borella Roundabout	Converted to signalized intersection with pedestrian underpass
2	Union Place, Sir James Pieris Mawatha, Kumaran Ratnam Road	Converted to signalized intersection with turn prohibition
3	New Kelani Bridge Road, Danister De Silva Mawatha	Converted to signalized intersection
4	Sri Jayewardenepura Mawatha, Bauddhaloka Mawatha	Planned to be converted to intersection. Schedule not clear
5	Ward Place, Deans Road, Kannangara Mawatha	Improvements were made and signal was installed
6	Havelock Road, Maya Avenue	Converted to signalized intersection
7	Havelock Road, Bauddhaloka Mawatha	No change
8	Sirimavo Bandaranaike Mawatha, Madampitiya Road	Converted to signalized intersection
9	Horton Place, C. W. W. Kannanga Mawatha	No change (already signalized at the time of CUT1)
10	Galle Road, Hill Street	Converted to a signalized intersection
11	Victoria Bridge, Kandy Road	Modification was made but ineffective due to site conditions
12	High Level Road, Church Street	Converted to signalized intersection

Source: CUTS1 Report and Study Team

Notes: 1) Danister De Silva Mawatha is also called Baseline Road

2) No. 5 roundabout is also called Lipton Circus.

Table 6.9 Inefficient Signalized Intersections (CUTS1)

No.	Location	Actions Taken
1	Galle Road, Lorensz Road	Signal was removed
2	Galle Road, Dickman's Road	Improvements are possible if signal is replaced with a new type with greater functionality
3	Galle Road, Bauddhaloka Mawatha	Improvements are possible if signal is replaced with a new type with greater functionality
4	Galle Road, Liberty Plaza	Improvements are possible if signal is replaced with a new type with greater functionality
5	Havelock Road, Dickman's Road	Improvements are possible if signal is replaced with a new type with greater functionality
6	Union Place, T. B. Jayah Mawatha	Improvements are possible if signal is replaced with a new type with greater functionality
7	Sri Sumanatissa Mawatha, Jethawana Road	Improvements are possible if signal is replaced with a new type with greater functionality

Source: CUTS1 Report and Study Team

Table 6.10 At-Grade Railway Crossing with Significant Traffic Congestion (CUTS1)

No.	Location	Actions Taken
1	Crossing of Main Line at Danister De Silva Mawatha	Grade separated
2	Crossing of Main Line at Kandy Road	No improvement

Source: CUTS1 Report and Study Team

Note: 1) Danister De Silva Mawatha is also called Baseline Road

(2) Colombo Urban Transport Study Stage 2 (CUTS2)

Among the 12 projects proposed in the second Colombo Urban Transport Study (CUTS2), the following projects contain traffic management schemes and measures as their component.

Table 6.11 CUTS2 Projects Related to Traffic Management

Project	Title	Principal Sector	Relevant Sector(s)
3	City center conceptual plan	Road	Rail/bus
6	Traffic management policy	Road	Bus
11	Design of pilot schemes	Road	Bus
12	Corridor improvement programs	Road	Bus

Source: CUTS2

Brief description of these projects is given below.

Project 3: City-Center Conceptual Plan

The main element was to develop a Pettah Transport Center, which would integrate rail and bus services. The proposal was a collection of short- and long term proposals and recommendations. Traffic management schemes such as pedestrian overpasses, bus lanes on Olcott Mawatha and Bodhiraja Mawatha, and new pavement markings were included. In the long-term, relocating and redeveloping bus terminals and relocating the wholesale markets was also included. Since the project involved politically and institutionally complex tasks of relocating the wholesale markets and rationalizing bus services, only minor physical improvements along Olcott Mawatha were implemented.

Project 6: Traffic Management Policy

The main components of the project were:

- Create Traffic Management Council (TMC); and
- Develop Parking Policy and Strategy Guidelines

TMC was slated to be a coordinating body with representatives from relevant organizations. Its objectives were to develop traffic management policies and ensure coordinated implementation of the policies. CUTS2 examined various organizational arrangements for TMC and prepared recommendations including capacity building for RDA, CMC, and Traffic Police. According to CMC and the traffic police, there has been no progress since CUTS2 was completed. Additionally, formulating the national and local parking policies was recommended and guidelines for the national policies were presented. Specific parking control implementation and enforcement strategies were presented in CUTS2, but no guidelines, measures, and projects were formulated in CUTS2 to bring about these policies and strategies.

Project 11: Design of Pilot Schemes

Pilot schemes that could be used as demonstration projects and provide opportunities to learn urban traffic management techniques were prepared. Lipton Circus-Eye Hospital Junction and Galle Road from Hill Street Junction to Kawdana Junction were selected.

- Lipton Circus-Eye Hospital Junction: The recommendation was to signalize the roundabout and introduce a one-way triangle with a contra-flow bus lane; and
- Galle Road: Detailed designed was prepared for the Galle Road Pilot Project, for a cost of Rs. 35.7 million. Traffic safety and economic benefits were reviewed and potential savings were estimated to RS. 6 million annually, assuming a 20% reduction in the number of accidents. The first year's economic rate of return was calculated to be 513%.

Neither of these schemes materialized, although Lipton Circus-Eye Hospital Junction was later improved by signalizing the roundabout.

Project 12: Corridor Improvement Programs

Eight corridors were defined as HMC in the Colombo Metropolitan Region Structure Plan (CMRSP). CUTS2 outlined procedures to prepare programs to improve HMCs and provided programs, actions and responsibilities for the two highest priority corridors - A1 (Colombo to Kandy) and A2 (Colombo to Galle) corridors. The procedure consisted of (i) prioritizing the eight corridors as well as prioritizing the corridor sections; (ii) identifying improvements required to elevate each corridor section to HMC status; and (iii) developing the required improvements for each corridor.

There were no improvement measures proposed since the project focused on procedures and programs for improvements. The first part of the procedure was completed for all of 8 HMC and the other two steps were completed for the two major corridors. The procedures were applied to a section of Galle Road and improvement measures are included in Project 11 above.

Other Projects

- *One-way System:* This was implemented along Galle Road and Duplication Road between Sir M. M. Markar Mawatha and Baudhaloka Mawatha, but it failed after one day, which can be attributed to insufficient planning, public campaigning, and enforcement.
- *Privatize On-Street Parking with Meters:* A project was planned to privatize on-street parking through using 2,500 meters. A Malaysian company was the successful bidder and it was originally planned that the operator would transfer 1/3 of the revenue to CMC, while recovering the initial investment in 5 years. After further review, it was established that the company could only pay CMC Rs. 5/day/meter for the first 5 years and 1/3 of their revenue after, with the total investment recovered in 15 years. Because of the possible unprofitability, the Malaysian company withdrew from the plan.

The Urban Development Authority (UDA) also planned parking facility projects including developing three off-street multi-story car parks as a public-private partnership. The proposed sites were:

- Next to the fish market to be developed as a ground level car park;
- Opposite the Lake House bounded by Beira Lake, D. R. Wijewardena Mawatha and Chittampalam Gardiner Mawatha; and
- Transworks site bounded by York Street, Chatham Street, and Lotus Road.

None materialized; however, because of disagreements regarding the construction of parking facilities at the proposed site.

(3) Ongoing Projects

Traffic Signals

In December 2005, RDA made a contractual agreement with SDCC to install signals at ten locations, using the PLC system, while RDA would provide a signal timing schedule after analyzing the junctions. Of the ten signal locations, five signals at Kottawa, Malabe, Gamsaba, Bellanthota and Delkanda, all of which are outside of Colombo in Western Province, have been

completed. The five remaining locations are still pending as of February 2006, most likely because payments for the first five signals have not yet been processed by RDA due to budget constraints. Therefore, SDCC is unwilling to proceed with additional work. Separately, a pedestrian signal was installed at Wellampitiya by SDCC in December 2005 and RDA has plans to install pedestrian signals at an additional 40 locations countrywide in 2006.

(4) Planned Projects

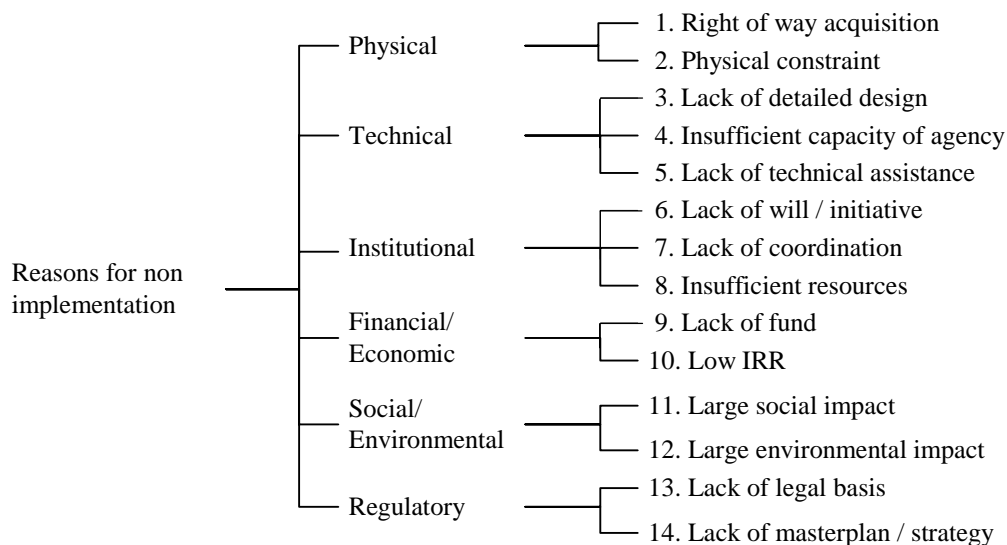
CMC has plans to install traffic signals at a number of intersections, as well as to install a countdown display at the roundabout at Dudley Senanayake Mawatha and Bauddhaloka once it is converted to an intersection. This will show the time remaining for vehicles waiting for a green light, although the completion date is not clear.

(5) Implementation Barriers

As described above, some traffic management projects were implemented, while others were partially implemented, while others are still at the proposal stage. There are various reasons for delays and inaction. Traffic management projects cover a wide range of physical measures, as well as softer measures such as regulations and institutional strengthening. The traffic management projects previously proposed can be classified into the following 5 categories, with the first two as physical, the middle both physical and soft, and the last two as purely soft measures:

- Physical improvements to roads and intersections;
- Construction of traffic control facilities;
- Introduction of new traffic regulations;
- Development of policies and strategies; and
- Institutional reform, capacity building, and strengthening coordination.

Within these categories, there are physical, technical, institutional, economic, social, regulatory reasons for a lack of implementation, as shown in Figure 6.5. The categorization of the failure of CUTS2 recommendations can be seen in Table 6.13.



Source: This Study

Figure 6.5 Reasons that CUTS2 Projects Were Not Implemented

- Project 3 (City Center Conceptual Plan): Relocating the wholesale markets was a prerequisite, which had large social and economic implications. Additionally, security measures would have to have been relaxed in Fort, which was difficult given the security climate at that time. Detailed design was needed and lastly, the project required strong political will, leadership, and coordination;
- Project 6 (Traffic Management Policy): All tasks required strong political will and leadership from RDA, CMC, and the Traffic Police backed by legislative and coordination measures. Capacity building was lacking to ensure the technical skills necessary;
- Project 11 (Design of Pilot Scheme): This was partially implemented, but budget constraints affected the detailed designs. Additionally, the Lipton Circus proposal was deemed too drastic; and
- Project 12 (Corridor Improvement Programs): This project required a large amount of design work and strong political will and initiative from the implementation agency.

Table 6.12 Reasons for Non-Implementation of CUTS2 Projects

Project	Title	Physical			Technical			Institutional			Financial			Social			Regulatory		
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.				
3	City center conceptual plan	-	-	?	X	X	-	X	X	-	-	X	-	-	-	-	-	-	
	Pedestrian and public transport facilities	-	-	?	X	X	-	X	X	-	-	X	-	-	-	-	-	-	
6	Traffic management policy	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	
a	Traffic Management Council	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	X	
b	Strengthening of RDA	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	
c	Strengthening of CMC	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	
d	Strengthening of Traffic Police	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	
e	Development of parking policy and strategy	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	X	
11	Design of pilot schemes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
a	Galle Road Pilot Scheme implementation	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-	-	-	
b	Lipton Circus Pilot Scheme implementation	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-	-	-	
12	Corridor improvement programs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Design and implementation of corridor scheme	-	?	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	

Source: CUTS2 and Study Team

Notes: 1) Numbers correspond to reason in Figure 6.5.

2) X: Applicable -: Not applicable ?; Unknown

3) Two schemes under Project 11 were partially implemented with modification to original proposals.

6.6 Parking Management

(1) Organizational Arrangement

Four agencies are involved in parking management in the CMR, including: (i) UDA manages land use, outlines parking requirements for new building development, and oversees local urban development; (ii) RDA constructs and manages major roads and has authority to identify road sections as no-parking, but cannot specify on-street parking areas or collect fees; (iii) CMC organizes roadside parking and collects parking fees; and (iv) Traffic Police, who enforce on-street parking regulations.

UDA's parking management policy is stated in the Colombo Development Plan, section 1.7.4 and includes: (i) provide parking spaces to the maximum extent possible in given area (zone); (ii) determine parking fees according to building regulations in the area and availability of off-street parking facilities; and (iii) on-street parking fees should be higher in areas where there is substantial off-street parking. RDA has very limited functions with regards to parking management, as most urban roads are not under their jurisdiction. CMC manages and operates on-street parking in addition to other traffic management tasks. Coordination occurs between UDA and RDA when reviewing applications for development and Traffic Impact Assessments (TIA). Each application is examined by the Traffic Planning Committee, which consists of representatives from CMC, UDA and the Traffic Police.

(2) New Building Requirements

Specific new building parking requirements are stipulated in Planning and Building Regulations (1999), Clause 34, which refers to Schedule III Parking and Traffic Control. The schedule contains detailed design requirements for parking spaces together with review and approval procedures. It has two annexes - Annex I outlines plans to be prepared by developers and a parking summary and Annex II tabulates parking space requirements for each building and vehicle type. The requirements apply to all buildings and houses within Colombo Municipality and are shown in Appendix 10. According to UDA, only standard vehicle requirements are implemented currently. Building designs are reviewed by the Traffic Planning Committee before development permits are issued. Completed buildings are inspected by CMC and a Certificate of Conformity is issued if the building has no defects or violations. Building alterations after the Certificate of Conformity is issued is beyond CMC's control.

(3) Parking Demand and Supply Estimates

Parking demand information is not readily available for CMR and the only data available is from CUTS1 (December 1995) for Fort and Pettah. The table demonstrates satisfied demand (often illegally), which is well in excess of the available supply. It also shows that total demand is about 10% higher than total supply. Comparing supply and demand for each parking space type shows that demand for on-street parking far exceeds supply, while demand for off-street is well under supply. This can be attributed to the fact that on-street parking is convenient and cheap as opposed to off-street private parking. It is expected that demand and supply imbalance has widened since CUTS1 since the quantity of vehicles has doubled since 1995, but supply has not.

Table 6.13 Estimated Parking Supply and Demand in Fort and Pettah

Parking type	Supply	Demand
On-street curbside space	950	1,630
Off-street public space	500	500
Off-street private space	2,150	1,850
Total	3,600	3,980

Source: CUTS1 Working Paper No. 15

Notes: The figure excludes the 550 spaces at the World Trade Center, which would increase the total supply to 3,850 spaces. The figure for on-street curbside demand excludes 390 three-wheelers and 620 motor cycles parked on-street at the time of the occupancy survey.

(4) Parking Facilities

Public parking spaces are on-street provided and managed by CMC, while UDA manages off-street public parking, which is directly operated by UDA or outsourced. Private parking facilities are found at large business areas such as the World Trade Center, hotels, and hospitals. In addition, all new buildings are required to comply with UDA's parking requirements.

On-street Parking

CMC on-street parking is located in mainly in Fort and Pettah. They are managed manually and each of the 180-190 parking wardens is assigned to a block of on-street parking. The wardens record each vehicle's plate number when it parks and collects the parking fee when it leaves. The fee is proportional to the time parked and is currently Rs. 10/hour. There is substantial leakage since nearly half of each day's collection is pocketed by the wardens. No fees are collected at parking bays along Galle Road and Baseline Road. As described earlier, there was a plan to eliminate the wardens and use meters, but that project failed to materialize.

Off street parking

UDA manages the following off-street parking facilities:

- Chalmer's Grainary (Outsourced);
- Colombo Central Market (Fish Market) (Outsourced);
- Sancharachchi Garden (Operated by UDA); and
- Sir James Pieris (Operated by UDA).

There are other off-street parking facilities operated by either independent operators (at Majestic Shopping Center) or by building owners (at World Trade Center, shopping malls, and hospitals).

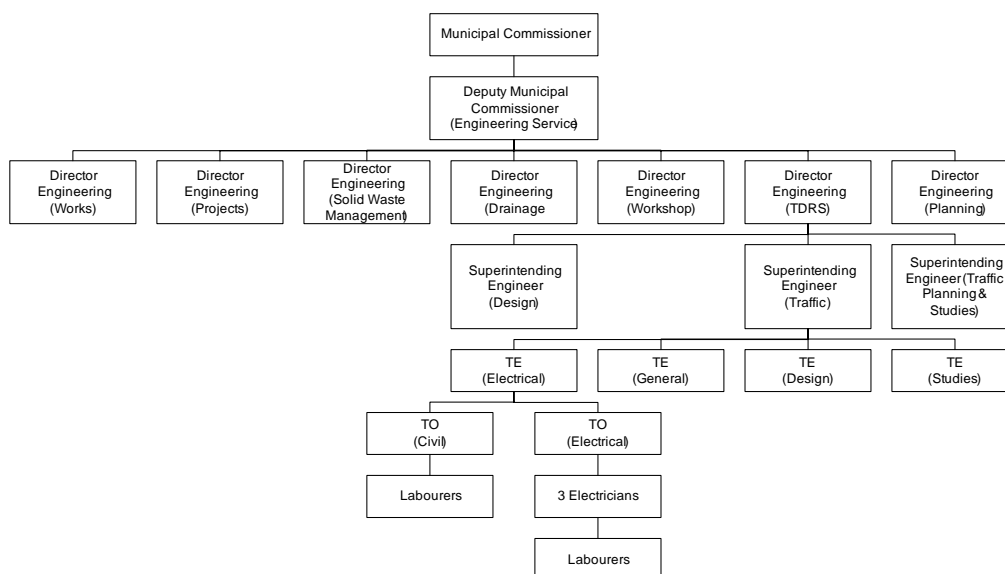
(i) Chalmer's Grainary: Operated by Tenaga Car Parks Pvt. Ltd, with details located in Appendix 11.

(ii) Colombo Central Market (Fish Market): Parking spaces are provided along the corridor surrounding the Fish Market and managed by Tenaga Car Parks Pvt. Ltd. The number of spaces is not sufficient to meet demand resulting in overcrowding. Fees are collected when exiting, so there is no control of incoming vehicles.

6.7 Traffic Management Organizations

(1) Colombo Municipal Council

CMC's is the main local authority and its organizational chart is shown in Figure 6.6. The Traffic Design and Road Safety Department (TDRSD) is responsible for traffic management and road safety on all roads within CMC except for Olcott Mawatha and Baseline Road, which are managed by RDA. CMC also manages on-street parking.



Source: CMC

Figure 6.6 CMC Organizational Chart

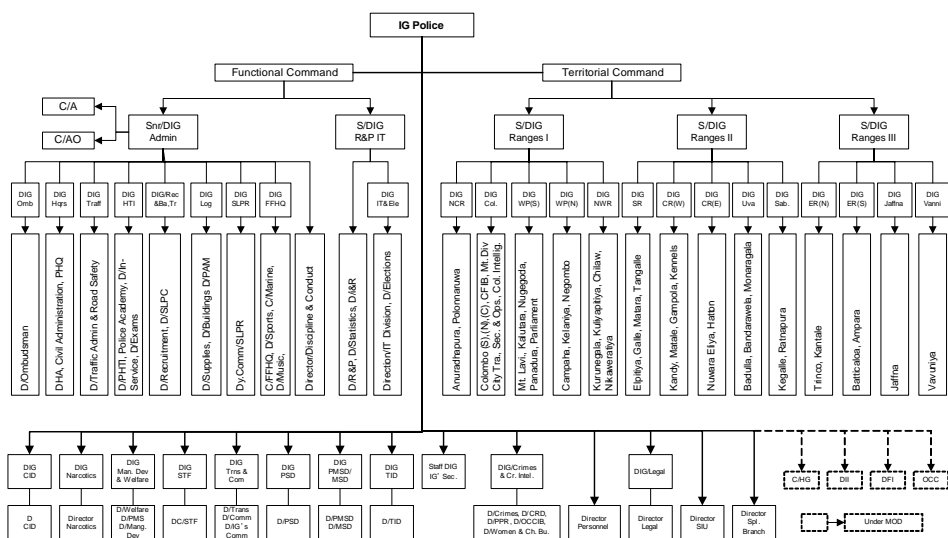
Budgetary allocations are insufficient, with TDRSD receiving only Rs. 1-2 million for signals and Rs. 12 million for markings. A road cleaning/brushing unit is necessary, but is too costly at Rs. 10 million.

(2) Traffic Police

The Sri Lanka Police organizational chart is shown in Figure 6.7. As of December 2005, there were 64,000 police, of which 3,700 were traffic police. Of the traffic police, 1,148 are located in Western Province (WP) and they are assigned to critical intersections as shown in Figure 6.8.

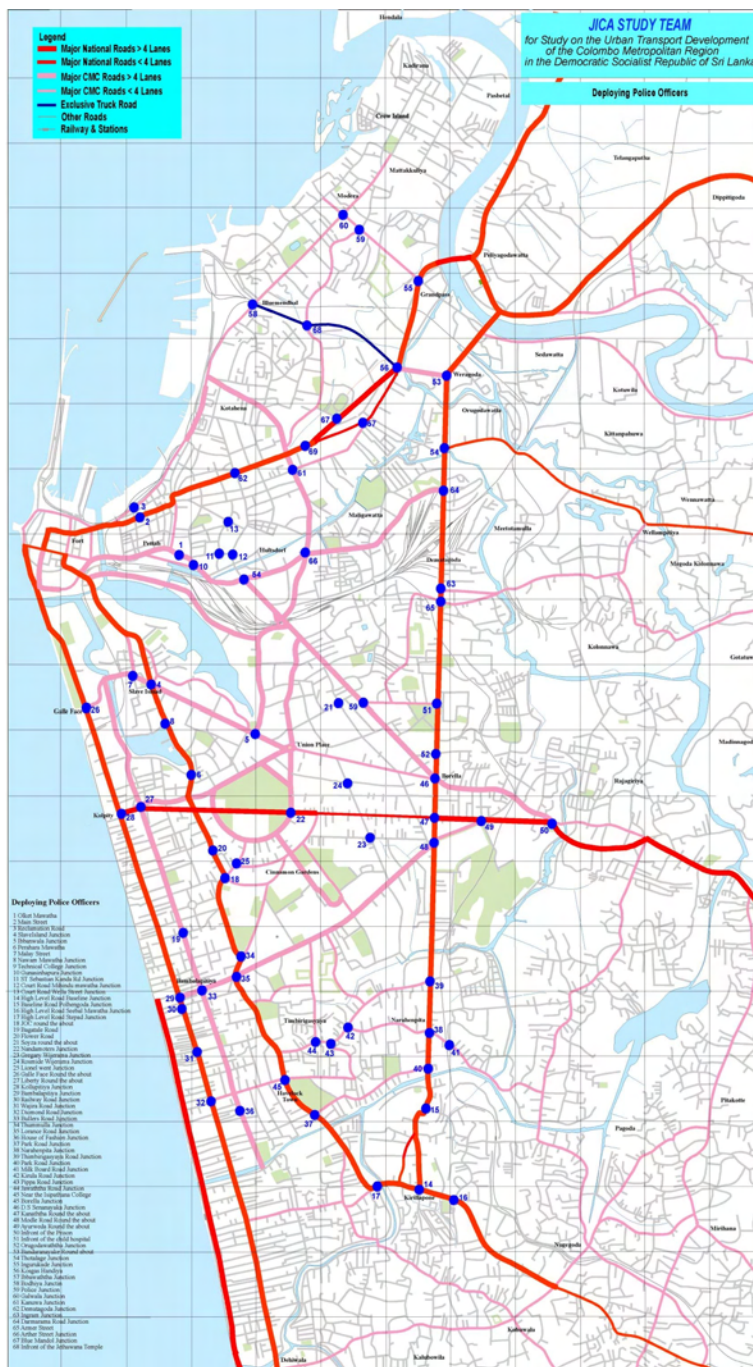
Traffic policemen are often deployed at intersections and engage in traffic control, enforcement, accident disposal, and investigation. Additionally, police who belong to other divisions are also sometimes assigned to traffic management work. The police have one command center for traffic and emergencies, which is poorly equipped due to resources. They have a communication system with 158 walkie-talkie units and base stations at eight locations.

Newly recruited policemen undergo six months of training, during which basic knowledge on all aspects of police activities are taught and there is no distinction as to their specialty. After training, police are assigned to each division and subsequently receive training on specific topics. For traffic police, they receive traffic control, traffic violation, and accident investigation training. Traffic police have undertaken several traffic safety campaigns, but they were undertaken without proper coordination with other relevant agencies.



Source: Traffic Police

Figure 6.7 Traffic Police Organizational Chart



Source: Traffic Police

Figure 6.8 Traffic Police Intersection Assignments

(3) Road Development Authority (RDA)

RDA is a statutory body under the Ministry of Highways (MoH). It was incorporated under the RDA Act No.73 (1981). The functions of the RDA were expanded in 1986 when it became the successor to the Department of Highways. It is the premier highway authority in the country and is responsible for developing and maintaining the national highway network, which is comprised of A and B Class roads, as well as planning, designing and constructing new highways, bridges, and expressways to augment the existing network. RDA's tasks involve

preparing and implementing traffic management measures including installation, operation, and maintenance work. Within CMC, RDA is responsible for operating 25 traffic signals along Olcott Mawatha and Baseline Road.

(4) Urban Development Authority (UDA)

UDA is the urban planning agency under the Ministry of Western Region Development, Housing, and Construction (MoWRDHC) and was established under the UDA Act No 48 (1978). UDA is responsible for planning and developing urban areas throughout the country. The main activities of UDA are:

- Undertake integrated planning and physical development of declared urban areas;
- Formulate and submit development plans, including capital investment plans;
- Execute development projects and schemes;
- Formulate and implement urban land use policies;
- Develop environmental standards and prepare schemes for the environmental improvement of urban areas; and
- Provide technical planning services.

With regards to traffic management, UDA outlines parking space guidelines for new building construction, which are in CDP (1999). UDA is not involved in implementing transport projects.

(5) Signal Equipment Suppliers and Maintenance Contractors

DCS and SDCC manufacture and maintain traffic signals and signal heads in the country. The other supplier, RCDC, has gone out of business. DCS is a private company specializing in traffic signal equipment which started operations in 1997. The controllers are equipped with time-of-day controls, but any other more sophisticated functions such as actuation control, phase skipping, and central control. They also manufacture and provide signal lanterns. The latest model of signal lantern developed three years ago uses LED. SDCC entered this business after RCDC stopped operation. They also developed controllers using PLC.

(6) Non-Governmental Organizations

St. John Ambulance (SJA) is a non-profit organization (NPO) headquartered in the UK. Its mission is to provide first aid and medical support services for communities and education, training, and personal development to young people. SJA Sri Lanka was established in 1906 and they provide medical service training and hospital volunteers. An emergency call system was established in 2005 by SJA in cooperation with CMC, in which an emergency call can be made by calling 110 and ambulance will be dispatched if necessary. No service fee is charged to the users. The service is limited to injuries including those by traffic accidents. SJA donated four ambulances for this purpose, as well as an initial set of supplies and consumables. SJA also provided training program to CMC staff. CMC hired additional staff for the services. All operating expenses will be shouldered by CMC. The system started operation in August 2005, but demand is not that high.

6.8 Traffic Related Laws, Regulations, and Standards

(1) Motor Traffic Act (1990)

The Motor Traffic Act 1990 consists of fourteen parts and two schedules as shown in Table 6.14. Part III does not exist and Part V was repealed. Among the parts, Part VIII (use of motor vehicles on highways) is directly related to traffic management. It contains a total of 53 sections, although some have been repealed. It covers many aspects of the road rules such as speed limits and drunk driving, but it still lacks some basic road traffic provisions such as:

- Priority at intersection;
- Overtaking procedures;
- Traffic signals;
- Pedestrian and pedestrian crossing; and
- Traffic signs and pavement marking

The first schedule outlines points given for traffic violations, although this was never adopted. The second schedule lists traffic violations and equivalent fines, which range from Rs. 20-200.

Table 6.14 Motor Traffic Act, 1990

PART	Title
I	Registration of motor vehicles
II	Construction and Equipment of Motor Vehicle
III	Revenue Licenses
IV	Passenger carriage permits
V	Repealed
VI	Insurance against third-party risks
VII	Driving Licenses
VIII	Use of Motor Vehicles on Highways
IX	Examination, Inspection and Testing of Motor Vehicles
X	Administration and Procedure
XI	Offences, Penalties and Proceedings in Court
XII	Supplementary
XIII	Interpretation
XIV	Transitional Provisions
Schedule	
First	Demerit points
Second	Amount of fine

Source: Motor Traffic Act

(2) Increase of Fine Act, No. 12 of 2005

Fines were raised in September 2005 as per the Increase of Fine Act, No. 12 (2005), which is outlined in Appendix 12. This has resulted in a 20% reduction of traffic violations according to the Traffic Police, although no statistics are available.

(3) Enforcement

Traffic Police issue citations to traffic law violators, who must pay the fine within two weeks. For serious offences, violators may be jailed. A countrywide summary of road rule violations for 2003 can be found in Table 6.16. Violations of other road rules was the most common, although it is not clear what constitutes “other.” The second and third most common violation was driving without a driver’s license and violation of road rules (although again, this is not clearly defined).

Table 6.15 Number of Violations Nationwide (2003)

	Buses	Private Buses	Lorries	Containers	Cars/Jeps	Dual Purpose Vehicles	Motor Cycles	Three Wheelers	Light Buses	Light Lorries	Tractors	Land Vehicles	Other	Pedal Cycles	Total
Dangerous/Reckless Driving	868	3,399	2,637	273	1,985	2,183	2,855	3,395	324	272	235	159	499		19,084
Driving at Excessive Speeds	3,220	21,136	20,244	1,936	24,920	33,968	6,538	15,636	6,266	4,604	368	598	4,953		144,387
Negligent Driving	723	5,444	1,891	204	2,811	2,781	2,485	4,178	369	257	83	69	578		21,873
Violation of Road Rules	7,281	47,549	31,496	4,226	20,905	36,822	24,696	47,061	7,393	4,885	1,510	1,239	4,751		239,814
Disobey Traffic Signs & Markings	501	3,490	3,164	209	4,868	5,569	5,616	10,605	583	407	150	99	1,088		36,349
Drunk Driving	101	409	729	52	786	895	1,819	1,492	101	107	66	28	109		6,694
Unroadworthy Vehicles	82	816	614	13	42	536	59	298	64	49	14	7	20		2,614
Belching Vehicles	171	1,328	2,250	289	338	1,283	61	112	219	209	11	13	151		6,435
Violation of Other Road Rules	9,761	80,522	80,499	8,255	55,095	92,356	121,597	121,183	12,494	8,934	7,890	3,091	13,764		615,441
Pedal Cycle Offences	0	0	0	0	0	0	0	0	0	0	0	0	0	25,993	25,993
Failure to stop at Pedestrian Crossing	373	2,248	1,343	171	1,499	2,118	2,784	3,760	381	311	164	134	384		15,670
Driving without a License	3,595	22,627	37,889	2,255	18,301	37,075	123,123	110,690	8,774	7,540	4,866	2,779	6,060		385,574
Driving without a Helmet	0	0	0	0	0	0	63,268	0	0	0	0	0	0		63,268
Total	26,676	188,968	182,756	17,883	131,550	215,586	354,901	318,410	36,968	27,575	15,357	8,216	32,357	25,993	1,583,196

(4) Motor Traffic Signs, Gazette No. 444/18 (13 March 1987)

This provides accompanying schedules to the Motor Traffic (Signs) Regulation (1984) under the Motor Traffic Act. It consists of four schedules that cover signs (warning, regulatory, information, and miscellaneous signs), road markings, and traffic light signals. Design and layouts generally conform to the Vienna Convention of Road Signs and Signals (1968) as amended, although international standards include Give Way and Stop signs, neither of which is used in Colombo.

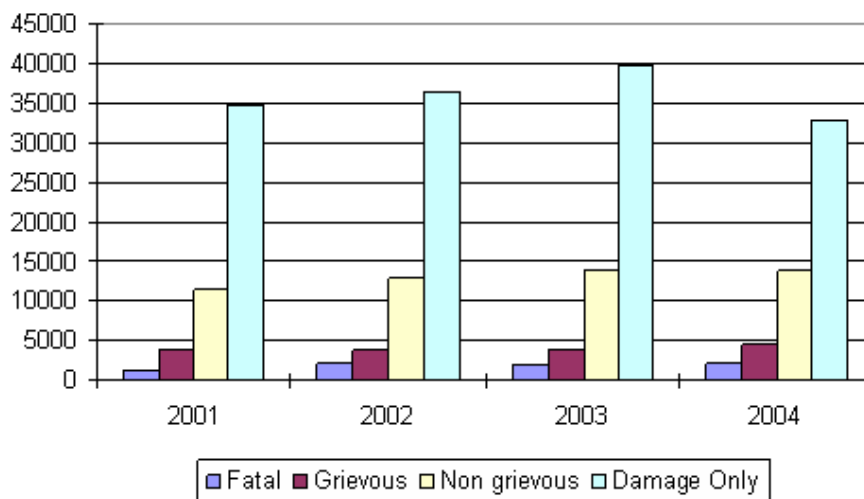
(5) Manual on Traffic Control Devices (Second Edition)

The manual was issued jointly by the National Road Safety Secretariat, Ministry of Transport, Highways and Civil Aviation and RDA in February 2003. The manual consists of two volumes: Part I contains standards for traffic signs, road markings and traffic signals and Part II pertains to traffic control devices for road works. In the second edition, amendments and additions were made to the text and diagrams. A series of new signs were added in the second edition for the expressways. As the manual conforms to the provisions of the Vienna Convention (1995), it is a revised version of Motor Traffic Signs mentioned above.

6.9 Traffic Safety

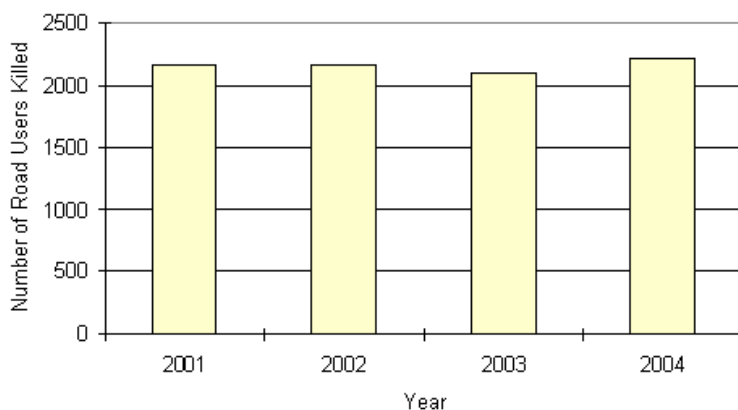
(1) Nationwide Traffic Accidents Statistics

According to the Traffic Police, in 2004, 2,116 persons died in traffic accidents nationwide. The first six months of 2005 are similar. Other traffic accident statistics are in Figures 6.9-6.14. Because Traffic Police data does not coincide with the study area, the following data is for the whole of Sri Lanka.



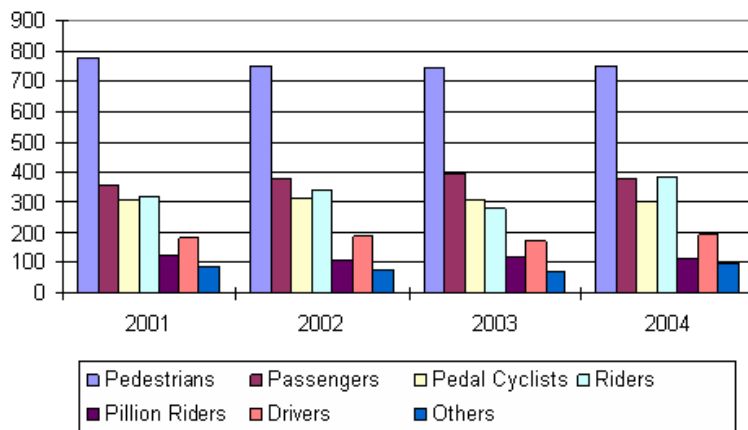
Source: Traffic Police

Figure 6.9 Number of Accidents Nationwide



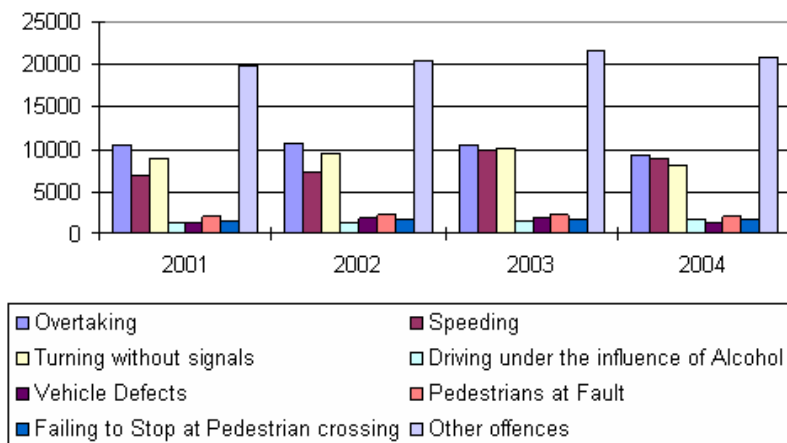
Source: Traffic Police

Figure 6.10 Number of Road Users Killed Nationwide



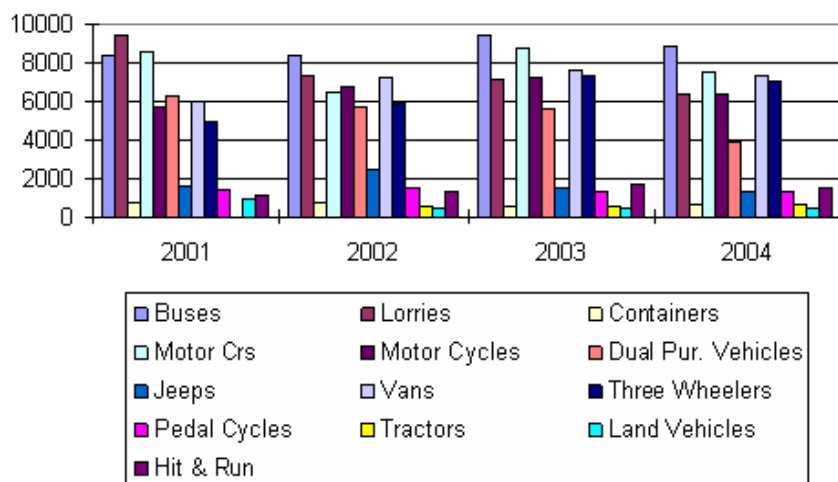
Source: Traffic Police

Figure 6.11 Type of Road Users Killed Nationwide



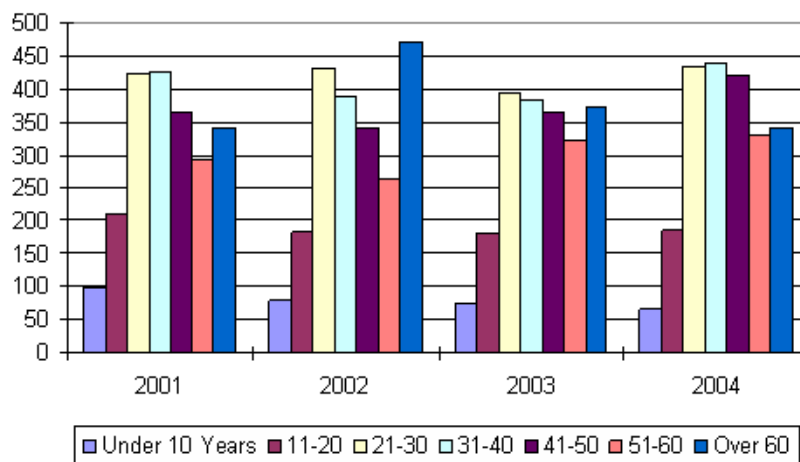
Source: Traffic Police

Figure 6.12 Cause of Accidents Nationwide



Source: Traffic Police

Figure 6.13 Vehicles Responsible for Traffic Accidents Nationwide



Source: Traffic Police

Figure 6.14 Age of Fatalities Nationwide

In most developing countries, minor accidents are not reported and Sri Lanka is no exception. As a result, the number of accidents and injuries is likely to be larger than what is shown here. The following conclusions can be drawn regarding Sri Lanka accidents and fatalities, which should also apply to the study area.

- The number of fatalities/100,000 population is 10.0 for 2004, which is comparable to with other Southeast Asian countries. Fatalities/100,000 population averages at 14.0 for ten ASEAN countries;
- Accident risk must be compared with the fatality rate/100 million vehicle-kilometers traveled, but this data is not available. It is estimated though that the risk is large in Sri Lanka as there are only 2.3 million vehicles in the country;
- Alarmingly, more than 1/3 of road uses killed are pedestrians indicating that pedestrian facilities are poor and walking is dangerous;

- Overtaking, speeding, and turning without signaling are the major causes of accidents. Lack of discipline leads to this behavior;
- Considering the number of vehicles in each category, buses and lorries cause more accidents than other types of vehicles, although the accident rate of vans and three-wheelers is also very high;
- Majority of victims are between 20 and 50 years old, which is detrimental from an economic point of view as this is the age group with the largest economic potential; and
- Fatalities of those over 60 years old are high considering their size of the population.

This data provides guidelines for formulating traffic safety policies for certain measures and target groups.

(2) Black Spots

Black spots are locations or road sections where accidents are common. Reasons for black spots include inadequate alignment, sudden change in width, and poor pavement. Therefore, traffic safety measures should focus on these locations to enhance traffic safety. Traffic Police identified black spots for Colombo and WP, respectively in Figures 6.15 and 6.16, respectively.

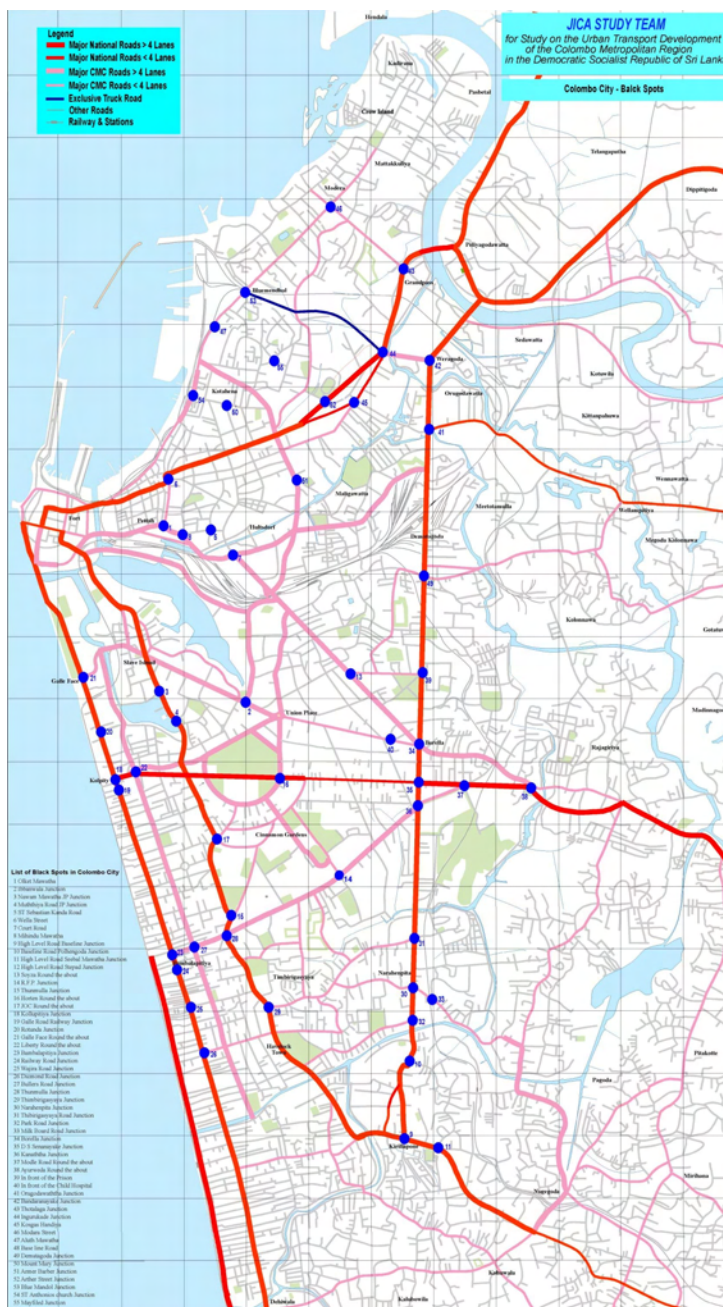
(3) Existing Traffic Accident Reporting System

Accidents are recorded in a Road Accident Report, which was developed by the Transport Research Laboratory (TRL) of England. It consists of: (i) accident description; (ii) other details (vehicle, driver, pedestrian, and cause of accident); (iii) casualty details; and (iv) a site sketch. Accident data is also sent to the Traffic Police Headquarters to be added to the Microcomputer Accident Analysis Package (MAAP) for compilation. The reporting system is functioning reasonably well and annual accident statistics were made available quickly. There are shortcomings in the present system in that the computer system is not powerful enough and the database is not effectively utilized except to prepare statistics. Instead, accident analysis is conducted by non-Traffic Police to identify black spots and major causes of accidents.

(4) Traffic Safety Education and Campaigns

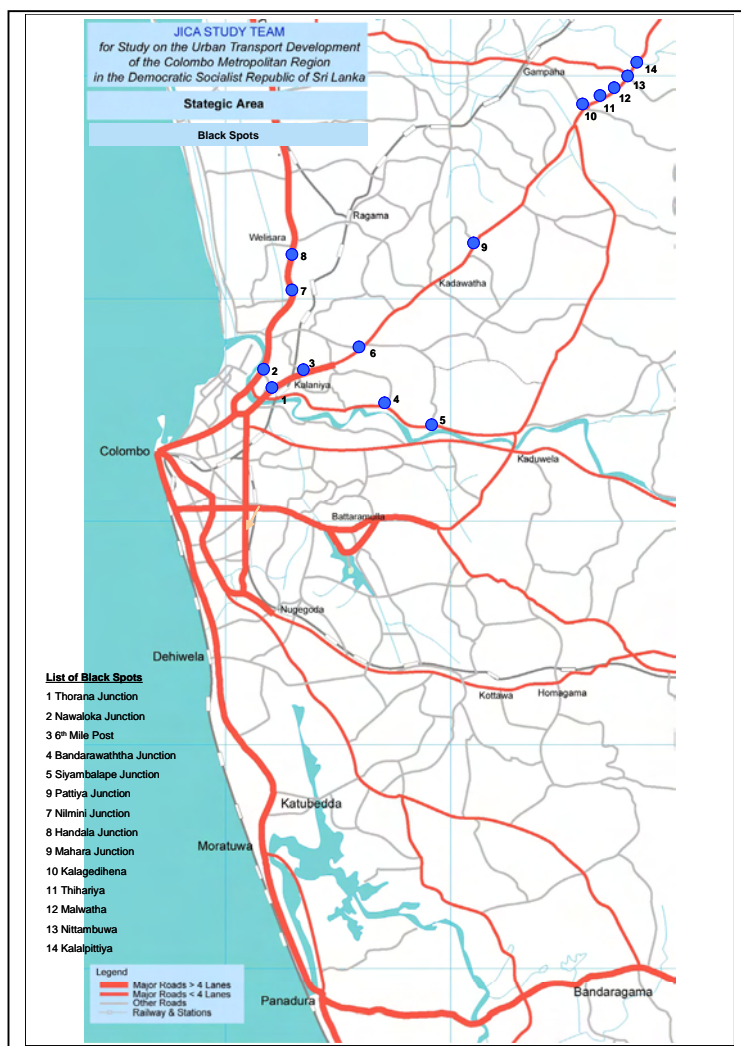
Few traffic safety educational and safety campaigns have been undertaken. One notable effort is the Road Safety Education Park operated by CMC, opened in 2004. It is located inside Vihara Mahadevi Park opposite Town Hall. About 50 classes are held per year and operating expenses are supported by Shell Sri Lanka. Traffic safety classes are held every Wednesday and Friday from 10:00 to 12:30 for 40-50 students. There are three classes: (i) basic classes for 7-10 year olds; (ii) intermediate classes for 10-12 year olds; and (iii) advanced classes for 13-16 year olds. CMC has promoted the park and invited all public and private schools in Colombo to attend.

There used to be a National Council for Traffic Safety, but as no one has been appointed since the 2005 election, it has ceased to operate. However, it was not very active and only held an annual National Transportation Day, which consisted of awarding a prize to the best driver. Other than this, no other activities were held, although there was Traffic Safety Fund, which is funded by insurance companies as a percentage of automobile insurance premiums.



Source: Traffic Police

Figure 6.15 Black Spots in Colombo



Source: Traffic Police

Figure 6.16 Black Spots in Western Province

6.10 Traffic Management and Safety Issues

The issues cover traffic management, parking management and traffic safety. Within traffic management, the issues cover road and road network, facilities, traffic operation, and institutional arrangements and coordination. An issue matrix in Figure 6.17 has been prepared as a summary of the issues. The figure also shows the results of the TMSWG's prioritization, which is explained at the end of the chapter.

(1) Traffic Congestion Issues

High Demand

Due to increases in the number of vehicles on the roadway, particularly private vehicles, congestion is spreading both geographically-wise and time-wise, increasing the delays and deterioration of air quality.

Lack of Road Hierarchy

The road network in the study area does not have a functional hierarchy; thus the functions of each road are unclear. Primary roads that are expected to serve long distance traffic with relatively high traveling speed also act as access roads. Alternatively, some roads in residential areas are used as primary roads due to a lack of other roads, even though their design standards are not compatible.

Inadequate Network Configuration

The road network in Colombo has a radial and circumferential configuration, but its formation is incomplete with uncovered areas, missing links, multi-leg intersections with more than four approaches, and irregular shaped intersections. All contribute to traffic concentration and congestion. In a comparison of congested locations identified in CUTS1 with site observations today, it is obvious that traffic conditions have worsened in the last ten years. Congestion has also spread towards the CMC boundary and beyond, where the road network is weak and road density is low.

Inconsistent Design Standards

Except few recently improved roads, most roads are not constructed under consistent design standards. The carriageway and sidewalk width vary section by section and vertical and horizontal alignments are not kept within accepted limits, resulting in providing poor visibility and lower road capacity.

Poor Intersection Geometry and Saturated Roundabouts

Many intersections developed without traffic engineering considerations, such as intersection design, connecting angles, corner radii, lane widths, and islands. This has rendered these intersections both inefficient and unsafe. The layout of pavement markings, which is an important component of intersection design, is also not optimized.

Roundabouts work efficiently with little delay as long as the total volume entering it is below a certain level. But congestion occurs if the volume exceeds a certain threshold. Some roundabouts already receive higher volumes than can be processed. Signals have been installed at some roundabouts, but there are still roundabouts that have excess traffic and need improvement.

High Side Friction

Many roads do not have sidewalks of adequate width and the existing sidewalk is used for parking, retail, stockyards, workshops, and garbage dumps. A sidewalk is an important space for pedestrians and it serves as buffer zone between moving vehicles and roadside activities. Because of narrow and poorly maintained sidewalks, roadside friction is high resulting in a reduced road capacity.

Inefficient Traffic Signals

The existing traffic signals are old and their functions are limited. They do not respond to changing traffic demand, nor are there coordinated signals. They are also not very reliable and the contractor is required to visit each controller daily to verify its operation. This would not be necessary if local controllers were more reliable. Traffic signals are warranted at several intersections and roundabouts, but they have not been installed. This is causing unnecessary

delays and queues to develop as the non-signalized intersections operate on a first-in first-served basis, reducing efficiency and jeopardizing safety.

Insufficient and Inadequate Traffic Control Devices

Traffic signs, pavement markings, delineators, median and sidewalk barriers, and other traffic control devices are inexpensive yet effective tools of traffic management. Application of these devices is neither consistent nor sufficient at the moment.

Mixed Traffic

Traffic is a mixture of vehicles ranging from lorries, buses, passenger cars, and three-wheelers, to motorcycles, tractors, bicycles, and pedestrians. Each vehicle type has different operating characteristics and maneuverability and therefore, it is accepted best practice to segregate different types of vehicles as much as possible for efficient and safe traffic.

No Priority Rule

Priority rule has not been established at signalized intersections, roundabouts, or non-signalized intersections. At signalized intersection, conflict occurs between right-turning vehicles and through traffic. The latter should have higher priority. At roundabouts, vehicles already circulating inside roundabout should have priority over approaching vehicles. At non-signalized intersections, there are no traffic signs indicating which road has priority, thus vehicles always compete.

Undisciplined Drivers

Drivers require adequate knowledge of traffic rules; however, inefficient and unsafe operations can be partly attributed to ignoring traffic rules and lack of discipline on the part of drivers. For example, lane markings are not followed and priority rule is not respected.

Traffic Regulations

Various traffic management regulations and schemes such as one-way, right-turn prohibition, parking prohibition, truck bans, and reversible lane are effective tools for making traffic flow smoothly and safely if they are adequately designed, implemented and enforced. However, in Colombo, these tools are not effectively utilized.

Traffic Engineering and Management Capacity

Traffic signals perform their intended function only when they are properly designed, installed, operated, and maintained. High quality hardware, as well as functional software and adequate timing parameter sets are vital for their efficient and safe operation. In particular, the importance of good signal phase design and timing parameter sets cannot be overstated. As traffic demand changes its volume and pattern, periodic reviews and adjustments of timing parameter sets will be crucial to maintaining the high performance of traffic signals. Both of the organizations managing traffic signals do not have sufficient capabilities for undertaking these tasks. Likewise, capacity is still weak in other traffic engineering and management components like intersection design, traffic control devices, and traffic regulation.

Weak Enforcement

Qualified and competent police and adequate facilities are necessary for effective enforcement. Although data shows a large quantity of violations, illegal behavior and traffic violations are

still frequently observed. Training of police officers is required and facilities (speed gun, communication equipment, motorcycle and other vehicles) must be improved. Upgrading the driving license system to a computerized system is also needed for effective enforcement.

Insufficient Coordination

Coordination among the agencies involved in traffic management is minimal and there is no regular coordination mechanism established. Currently, it is informal and they meet each other only when there is a need. However, today's traffic management issues are complicated and require concerted efforts by all parties concerned.

Insufficient Human Resources

Traffic Police have 3,700 traffic policemen countrywide, of which 1,150 are assigned to WP. This is insufficient considering the nature of work and necessary shift system. As a result, the Traffic Police do not enforce parking regulations because of a lack of human resources.

(2) Parking Management Issues

Lack of Policy and Master Plan

Although parking policies and strategies were studied and recommendations were made in CUTS1 and CUTS2, there is still no policy or parking management master plan endorsed by concerned agencies. There is no current or future data on parking demand and existing supply. Without policy and master plan, it is impossible to prepare and implement improvement measures.

A parking master plan should address parking demand including measures to curb increases in demand, while adequately providing parking spaces. Demand controls include various measures such as higher parking fees, limiting parking times, and controlling the use of vehicles. A master plan then prepares the measures to meet the various kinds of demand (long-stay or short-stay, and parking purpose) by different types of parking facilities. The role of the public and private sector in managing parking must also be examined.

Fragmented Approach

Four agencies are involved in parking management in the study area, but there is little coordination among these agencies except for a Traffic Planning Committee, which reviews and approves new development permits. Each agency undertakes a particular aspect of parking management and there is no coordinated and comprehensive approach.

Insufficient Supply of Off-street Parking

Parking management helps to attain a balance between demand and supply. Therefore, there must be some controls over the demand, while an adequate amount of supply must be provided. On-street parking must be allowed only where its effect on road capacity and traffic flow is minimal. Thus, most parking should be provided off-street; however, there is currently an acute shortage of such parking.

Inadequate Regulations and Lack of Enforcement

Roadside parking is allowed on many roads in Colombo. However, parking should not be allowed there in order to maximize throughput, particularly during the day and peak periods.

Additionally, it is seemingly the norm for sidewalks to be used for parking. On-street parking areas should be clearly marked by traffic signs and pavement markings. There is lack of enforcement by the Traffic Police due to lack of human resources, proper signage, and initiative.

Indiscriminate On-street Parking

Due to insufficient off-street parking, on-street parking is rampant. In some areas, regulations banning parking are ignored or sidewalks are used as parking spaces. Parking bays provided on Galle Road, Baseline Road, and other roads attract more vehicles than they can accommodate.

Low Parking Fees and Inefficient Fee Collection System

The current parking fee of Rs. 10/hour for on-street parking is too low, particularly for long term parking. This is especially true considering the prime location and scarcity of parking spaces. It does not act as a disincentive to control demand or use of private vehicles. The manual fee collection method CMC currently adopts is also not efficient, especially with the high level of leakage.

Parking Information

There are two types of parking information, static and real-time. Static information refers to parking location, hours of operation, and parking fees. Real-time information identifies the availability of parking spaces at each facility. If information is provided, the result should be less traffic circulating to find parking and therefore, the parking facility performance should be improved. Currently no such information exists in Colombo.

(3) Traffic Safety Issues

Inadequate Road Design

Accident-prone locations (black spots) are often the result of inadequate road design, such as sudden changes in road width, short sightlines, and blind corners. Accident rates in the study area are high considering the population and the number of vehicles on the road, which indicates a dangerous state of road traffic. In particular, close attention should be paid to pedestrians, who occupy 1/3 of all fatalities.

Poor Pedestrian Environment

Walking is the most basic mode of transport and the pedestrian environment is an important factor for a good mobility and accessibility in a community. But Colombo's pedestrian environment is poor due to narrow sidewalks, uneven pavement, parked vehicles, and many other obstacles. This is further exemplified by the pedestrian fatality rate. Pedestrian facilities, which refer to facilities that are used to enhance pedestrian safety and include traffic signs, pavement markings, signalized pedestrian crossings, street lighting, and overpasses and underpasses, are insufficient.

Lack of Traffic Safety Facilities

Traffic safety facilities are used to control traffic movement and include traffic signals, traffic signs, pavement markings, delineators, and pedestrian barriers are not sufficient. More traffic signals are needed and they must have pedestrian signals. Pedestrian barriers or guardrails should also be provided to prevent jaywalking.

Lack of Safety Awareness

Traffic accidents are a serious social and economic problem; however, people seem not to recognize this as much unsafe behavior occurs, such as speeding, swerving, and jaywalking. Awareness includes knowledge for drivers and pedestrians on basic traffic safety rules.

Lack of Respect for Pedestrians

Pedestrians are the most vulnerable road users and they are typically the most severely hurt in an accident. However, current driving practices indicate that drivers do not respect pedestrians on the road.

Unclear Institutional Setup

Currently, the Traffic Police keep records of traffic accidents, but they do not initiate a traffic safety program. RDA and local government design and install traffic safety facilities, but they are not directly responsible for reducing traffic accidents. Therefore, it is not clear which ministry or department is the primary agency to formulate traffic safety policy and strategy and design and implement traffic safety measures. However, even the primary agency must coordinate its efforts with other agencies and organizations to promote traffic safety. Additionally, a possible coordinating body, the National Council for Traffic Safety, is not functioning as of February 2006. So, the outcome is an unclear institutional arrangement.

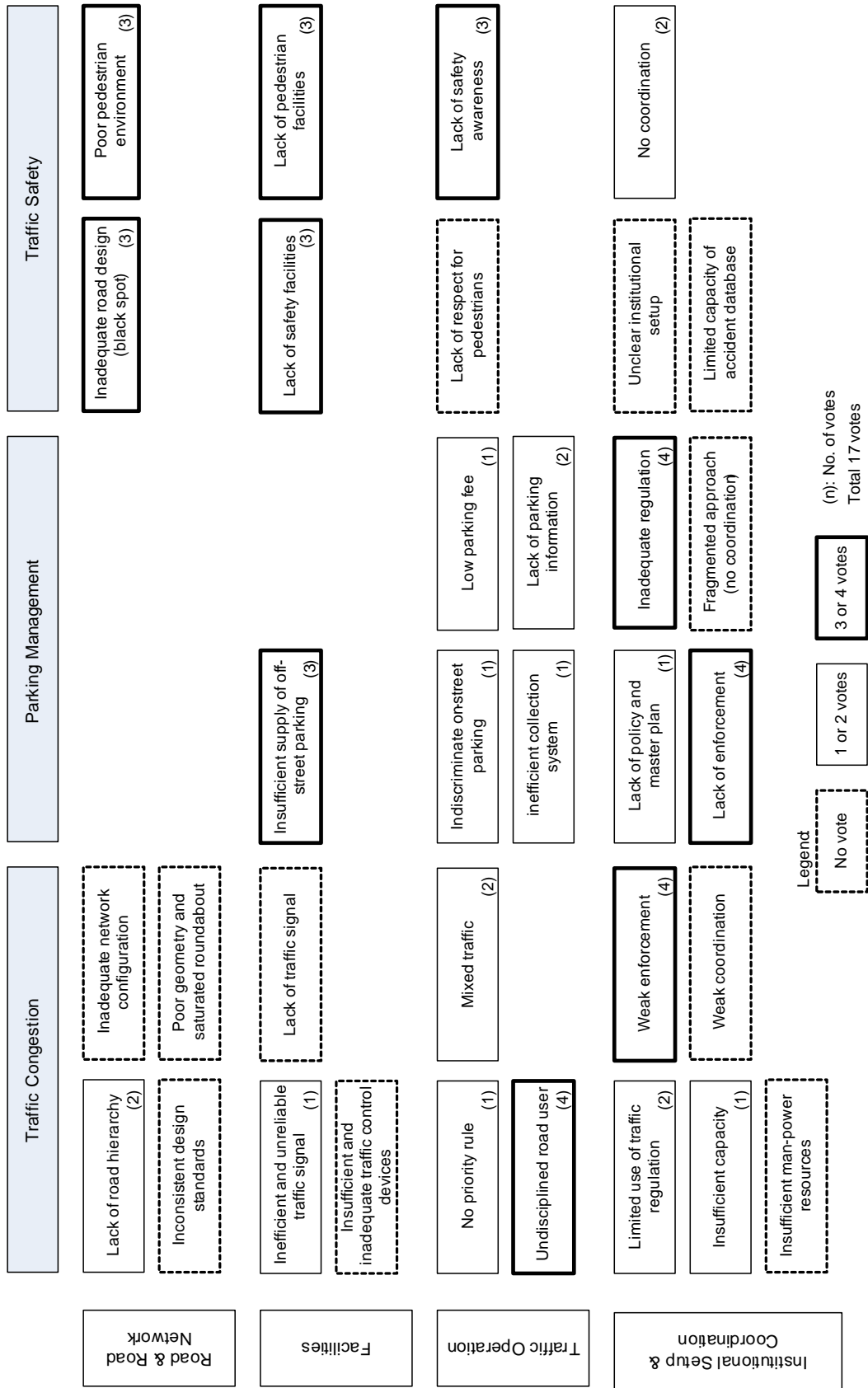
Limited Capacity of Accident Database

The Traffic Police use MAAP, which offers a range of tools to identify and analyze problems as well as to isolate common accident features. However, the computer which runs the package is not powerful enough and the system's configuration is not optimized as the backup system is not sufficient.

(4) Prioritization of Issues

The TMSWG discussed the above issues and the participants were requested to select the three most serious issues that need immediate attention for each category (traffic congestion, parking management, and traffic safety). The results of prioritization are shown in Figure 6.17. The priorities shown are a collective indicator of the opinions and perceptions of those who attended the meeting. As such, it is a good reference for formulating future projects. However, they do not necessarily dictate the importance of any project as the relationship of issues and improvement measures is not straightforward.

With regards to traffic congestion, TMSWG members considered undisciplined road users, both drivers and pedestrians, and weak enforcement as the two major traffic management issues. High-priority parking management issues were insufficient supply of off-street parking, inadequate regulations, and lack of enforcement. High-priority traffic safety issues were defined as infrastructure focused, such as road and traffic facilities, as opposed to operational and institutional issues.



Source: This Study

Figure 6.17 Traffic Management and Safety Issues