

**THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF RAILWAYS AND TRANSPORT
MINISTRY OF HIGHWAYS
ROAD DEVELOPMENT AUTHORITY**

**THE STUDY ON
THE URBAN TRANSPORT DEVELOPMENT
OF THE COLOMBO METROPOLITAN
REGION**

FINAL REPORT

EXECUTIVE SUMMARY

October 2006

JAPAN INTERNATIONAL COOPERATION AGENCY

PADECO Co., Ltd.

Oriental Consultants Co., Ltd.

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PREFACE

In response to the request from the Government of Democratic Socialist Republic of Sri Lanka, the Government of Japan decided to conduct the Study on the Urban Transport Development of the Colombo Metropolitan Region and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent the study team headed by Dr. Chiaki Kuranami, PADECO Co., Ltd. to Sri Lanka three times during the study period from October, 2005 to October, 2006.

The team held discussions with the officials concerned of the Government of Sri Lanka and conducted field surveys, investigations, and also held seminars. In succession, the team made further study and the present report was prepared.

I hope that this report will contribute to the urban transport development in Colombo Metropolitan Region in Sri Lanka and to the enhancement of the friendly relationship that exists between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Sri Lanka for their close cooperation with the study.

October 2006

Yoshihisa Ueda,
Vice President
Japan International Cooperation Agency

October 2006

Mr. Yoshihisa Ueda
Vice President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

Dear Sir,

We are pleased to submit herewith the final report of “The Study on the Urban Transport Development of the Colombo Metropolitan Region”.

This report presents the results of the study, which was undertaken in the Democratic Socialist Republic of Sri Lanka, from October 2005 to October 2006 by the Study Team, organized jointly by PADECO Co., Ltd. and Oriental Consultants Co., Ltd.

This report analyses the present and future demand and conditions of urban transport in the Colombo Metropolitan Region. It comprehensively covers issues of urban transport including road, traffic management, public transport, institution, legislation, socio-environment considerations, and financing. The report proposes an integrated transport development program which can be accomplished by 2015, moreover, recommends establishment of a presidential committee for urban transport to coordinate project implementation. The outcome of the study concludes that proposed projects are technically, economically, environmentally and socially feasible and will contribute greatly to alleviation of traffic congestion in the region.

With regard to a feature of this study, the Study Team organized a total of 36 working group meetings and succeeded in involving officers and stakeholders in the planning process.

In view of the urgency of development of urban transport in the Colombo Metropolitan Region, we recommend that the Government of Sri Lanka implement the projects with top priority.

We owe a great deal to many people for the completion of this report. We are very much thankful to the officials. We would like to express our deep appreciation and sincere gratitude to all those who extended their kind assistance and cooperation to the Study Team, in particular, the concerned personnel of your agency and Embassy of Japan in Sri Lanka, as well as officials of the Ministry of Railways and Transport, Ministry of Highways, and Road Development Authority.

Very truly yours,



Chiaki Kuranami
Team Leader

The Study on the Urban Transport Development of the Colombo Metropolitan Region
in the Democratic Socialist Republic of Sri Lanka

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Exchange Rates Used 1 USD = Rs.102.5 Rs. 1 = 1.124 JPY (Average Rate during Jan to May 2006)

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1 Introduction

1.1 Project Background

As the capital of Sri Lanka, Colombo is the largest city with a metropolitan area population of 5.4 million (2004), which is expected to grow to 8.4 million by 2030. Traffic congestion is rising due to urban development and sprawl, as well as increased private vehicle use, a wide mix of vehicles on the road, inefficient use of road capacity, and undisciplined drivers and pedestrians. The increase in private vehicles originates from increased incomes, as well as minimal investments in public transport - both railways and road-based public transport. Buses and trains are overcrowded, and while capacity has increased somewhat, quality has remained the same or deteriorated. This has led to a modal shift from public to private vehicles, with the typical results of increased congestion, pollution, and accidents.¹

Several major studies have been conducted in the past ten years, and plans and proposals have been put forward in the past to try to improve the situation. These include: (i) the Colombo Metropolitan Regional Structural Plan (CMRSP); (ii) the Colombo Development Plan (CDP); (iii) the Colombo Urban Transport Study Stages 1 and 2 (CUTS1 and CUTS2); and (iv) the Western Regional Megapolis Plan (WRMP). Even with the substantial planning efforts undertaken previously to improve urban transport in the Colombo Metropolitan Region (CMR), few of the recommendations have been implemented. This initial part of this study is to conduct a detailed review of past plans and studies to analyze the reasons that have prevented a smooth implementation of recommended measures.

(1) Study Objectives

The objectives of the study are to:

1. Identify CMR's urbanization and urban transport issues and formulate a strategic urban transport framework for CMR;
2. Clarify the high priority urban transport issues in order to formulate a high priority improvement measures/projects for CMR; and
3. Propose implementation methodologies to ensure realization of the proposed high priority measures, including institutional, financial, regulatory, and legal aspects.

(2) Study Area

The study scope covers all aspects of transport including road development, intersection improvement, traffic management, public transport, and environmental measures. The study area covers an extended area as development along the major corridors, as well as other areas that are likely to increase in the next 20 years. Therefore, the general study area incorporates much of Western Province, including a radius of 40-50 km from Colombo's city center. This area incorporates Colombo Municipality, Gampaha District, and Kalutara District. However, when discussing specific measures to reduce traffic congestion in CMR, the outer boundary is

¹ It is worth noting that some officials indicated that the levels of congestion are causing some people to return to public transport.

the proposed Outer Circular Highway (OCH) alignment as this area contains the majority of traffic congestion.

1.2 Methodology

Figure 1.1 below shows the study flow and schedule. Phase I occurred from November 2005 to March 2006. A strategic framework was developed and high priority issues and improvement measures were identified. Phase II occurred from May to September 2006 and further developed the priority issues and improvement measures into implementable (practical) projects, with corresponding preliminary feasibility (pre-FS) studies, which can be executed and made operational by 2015. These projects cover institutions, capacity building, policy coordination, infrastructure, and facility development. The recommendation is that from 2007 to 2010 the focus should be on transport demand management (TDM) measures, capacity building, and urgent infrastructure projects that could possibly be eligible for grants or local funding, while projects from 2010 to 2015 will focus on larger infrastructure projects and more complicated measures that may require loans or a longer implementation period.

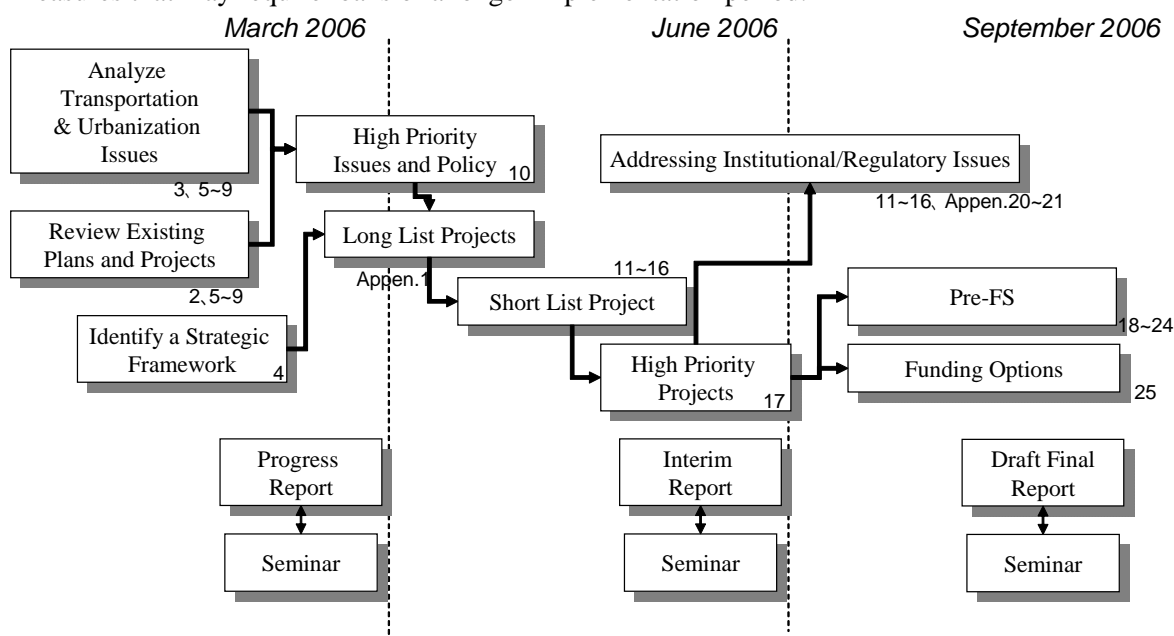


Figure 1.1 Study Flow and Schedule

Steering Committee and Working Groups

To obtain approval and ownership of the issues, recommendations, and methodologies for implementation, a formal Steering Committee was created that consisted of high-level decision makers from the relevant organizations. Working Groups (WG) were established so that the Study Team could work directly with the stakeholders to elicit opinions on and prioritization of issues, constraints, and possible solutions. The WGs were as follows: (i) Institutional and Policy Coordination (IPCWG); (ii) Road Development Planning (RDPWG); (iii) Public Transport (PTWG); (iv) Traffic Management and Safety (TMSWG); (v) Social and Natural Environment (SNEWG); and (vi) Area Traffic Control Institutions.² A total of thirty six meetings were held for the WGs between December 2005 and September 2006. Also, a Chairperson meeting was

² The Area Traffic Control Institutions Working Group only met in August during the pre-feasibility study to outline the institutional aspects of the ATC System.

organized in order to facilitate issues overarching among the working groups. The study organization is summarized in Figure 1.2.

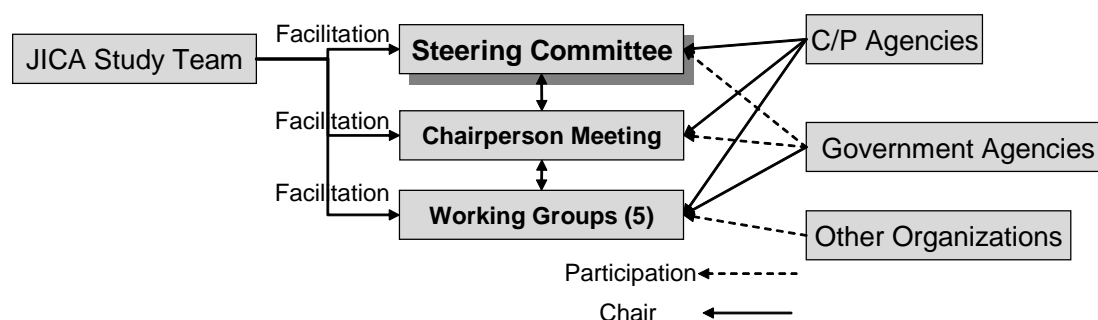


Figure 1.2 Study Organization

The following organizations comprise the Steering Committee:

- Ministry of Railways and Transport;
- Ministry of Highways;
- Road Development Authority;
- Urban Development Authority;
- Traffic Police, Sri Lanka Police;
- Colombo Municipal Council;
- National Transport Commission;
- Department of External Resources, Ministry of Finance;
- Department of National Planning, Ministry of Finance;
- Sri Lanka Railways;
- Central Environmental Authority;
- Western Provincial Council;
- Western Provincial Council Road Passenger Transport Authority; and
- Sri Lanka Transport Board.

Working Group Meetings

Five Working Groups (WGs) have been established as shown in Table 1.1. The WGs meetings were held for 36 times during the study period.

Table 1.1 Established Study Working Groups

Topic (Sector)	Counterpart Agency	Participating Agencies
Institutional and Policy Coordination	MoRT and MoH	NTC, UDA, WPRTA, WPC, CMC, Police, other local MC
Road Development Planning	RDA	MoH, MoRT, RDA, UDA, CMC, other local MC, freight operators, Chamber of Commerce
Public Transport	NTC	NTC, SLTB, SLR, CMC, WPRPTA, Bus/three wheeler operators/associations, NGOs representing poor, women, minorities
Traffic Management and Safety	CMC	CMC, Traffic Police, MoH, RDA, NGOs, WPC, MoRT, UDA, Ambulance Companies, Chamber of Commerce
Social and Natural	UDA	UDA, CEA, MoRT, MoH, RDA, NGOs, Chamber

Environment		of Commerce
Area Traffic Control Institutions ³	MoRT	WPC, CMC, Police, RDA

1.3 Report Structure

The Main Report consists of the following chapters as shown in Table 1.2:

Table 1.2 Main Report Structure

Parts/Chapters	Contents
PART I: Urban Transport Issues in CMR Chapter 2 to 10	Chapter 2: A review of the existing studies, plans, and projects in CMR, Chapter 3: Urban development trends and its impacts on transport and traffic, Chapter 4: A strategic framework for transport systems in CMR, Chapter 5 to 9: Review of urban traffic conditions on road network, traffic management, public transport systems, social systems, and institutional structures, and Chapter 10: Priority issues and policy directions for improvements.
PART II: High Priority Projects Chapter 10 to 17	Chapter 11: Selection process and results of short-list measures/projects, Chapter 12 to 16: Discussion on short-list measures/projects by sector (road, traffic management, public transport systems, institutional and policy coordination, and social systems, and Chapter 17: Selection procedure of High Priority Projects.
PART III: Pre Feasibility Studies Chapter 18 to 26	Chapter 18: Methodology for the pre-feasibility projects, Chapter 19: Traffic demand analysis and traffic growth projection, Chapter 20: Pre-FS on road widening and extension projects, Chapter 21: Pre-FS on flyover projects, Chapter 22: ATC System and the corridor improvement project, Chapter 23: Economic analysis, Chapter 24: negative impacts and potential mitigation measures, Chapter 25: Financing options, and Chapter 26: Conclusions

Appendix, Executive Summary, and Japanese Executive Summary were prepared as Final Report.

1.4 Technology Transfer

The Study Team provided a series of activities on capacity building and technology transfer as shown in Table 1.3.

Table 1.3 Activities on Capacity Building

Item	Dates	Activities
Class Room Training	March 2006	<ul style="list-style-type: none"> Provided training opportunities to clarify issues of urban transport, learn best-practices of urban transport planning, and discuss on roles of administrative.
Special Training	Feb. and Sept. 2006	<ul style="list-style-type: none"> Provided training opportunities of JICA STRADA (a software for network traffic assignments) and Net-SIM (a software for micro-simulation models of traffic analysis).

³ This Working Group was established in August 2006 to discuss the institutional issues of implementing the proposed ATC project.

Tele-conference using JICA-Net	6 September, 2006	<ul style="list-style-type: none">• A videoconference was scheduled to provide Sri Lankan counterparts with information on institutional coordination. The presenting agency was the Office of Transport and Traffic Policy and Planning of Thailand.
C/P training in Japan	April 2006	<ul style="list-style-type: none">• Observed and experience urban transport system in cities in Japan and learn its background of planning, design and implementation.• Compared current situation of Colombo and CMR with cities in Japan, and find what can be applicable to Colombo and CMR.• Studied on the theme specified by the Study Team in order to understand the background of urban transport proposals for the study.
Seminar	March, June, and September 2006	<ul style="list-style-type: none">• Involved C/P members and chairpersons of WGs in making presentations on the results of discussions and activities through the JICA Study.

2 CMR Urban Transport Issues

2.1 CMR Development

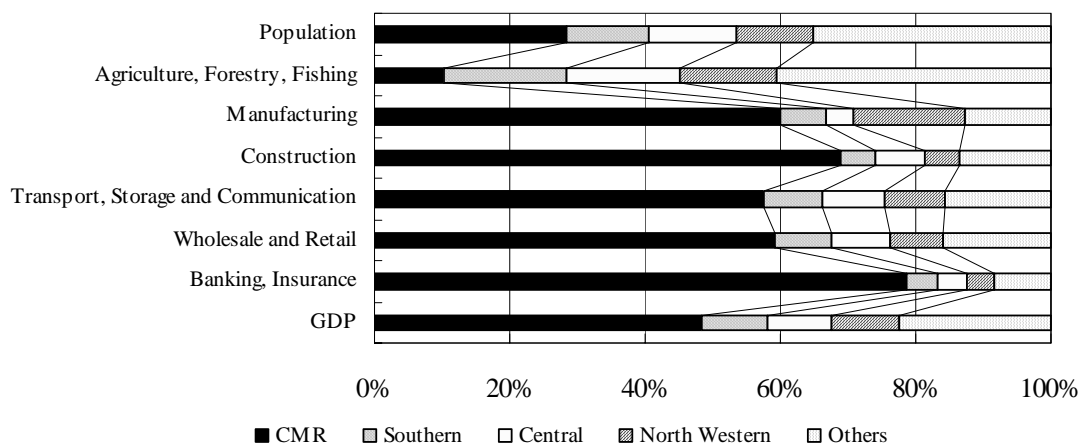
(1) Development Trends

The recent population growth in CMR is concentrated in Gampaha District and the suburban areas of Colombo District. Half of CMR is not urbanized based on population density calculations. In-migration from other provinces (Table 2.1) is attributed to the high concentration of economic activities, social services, and employment opportunities in CMR as shown in Figure 2.1. Although Colombo District has attracted migrants from other parts of the country, its population has also migrated out to Gampaha and Kalutara Districts, mainly due to housing costs.

Table 2.1 CMR In-Migration by District (1977-2001)

Districts	Population	Migration (share in pop)	From Colombo	From Gampaha	From Kalutara
Colombo	2,305,000	711,305 (30.9%)	-	41,857	64,438
Gampaha	2,089,000	606,461 (29.0%)	172,372	-	NA
Kalutara	1,077,000	181,793 (16.9%)	63,723	NA	-

Source: 2001 Population and Housing Census, Department of Census and Statistics



Source: Central Bank of Sri Lanka, Economic and Social Statistics of Sri Lanka 2005

Figure 2.1 Share of Industrial Output by Province (2003)

From 2001 to 2004, the annual growth of all vehicles has been between 8-12%. Motorcycles and three-wheelers account for over 50% of all vehicles and the growth rate has been between 10-15%. Private automobiles account for only 20% of the total, with a growth rate between 10-12% during the same period. According to an international comparison of Western Province (WP) and other countries based on the gross domestic product (GDP) per capita and the number of vehicles per thousand population, WP is at the early stages of motorization.

(2) Travel Patterns

In 2005, total trips at the Colombo Municipal Council (CMC) boundary amounted to 1.6 million/day. The total CMC passenger trips were around 1.7 million per day and bus passengers accounted for 57%, where as private vehicles accounted for 33%. Kandy, Galle, Negombo, High Level, and Kotte Roads are the major arterials based on passenger volume. The modal share of private vehicles to buses is 30:70 on the northern arterials and 70:30 on the southern arterials. Buses continue to provide the bulk of passenger movements within CMR, with 62% at the provincial boundary and 54% at the CMC boundary. The railway carries 18% at CMR boundary, but only 13% at the CMC boundary. School-based traffic comprises 15-17% of passenger trip along the CMC boundary. School van services are the most common mode used for school transport, with a modal share of about 35%. An additional 30% of the school transport modal share is provided by public transport.

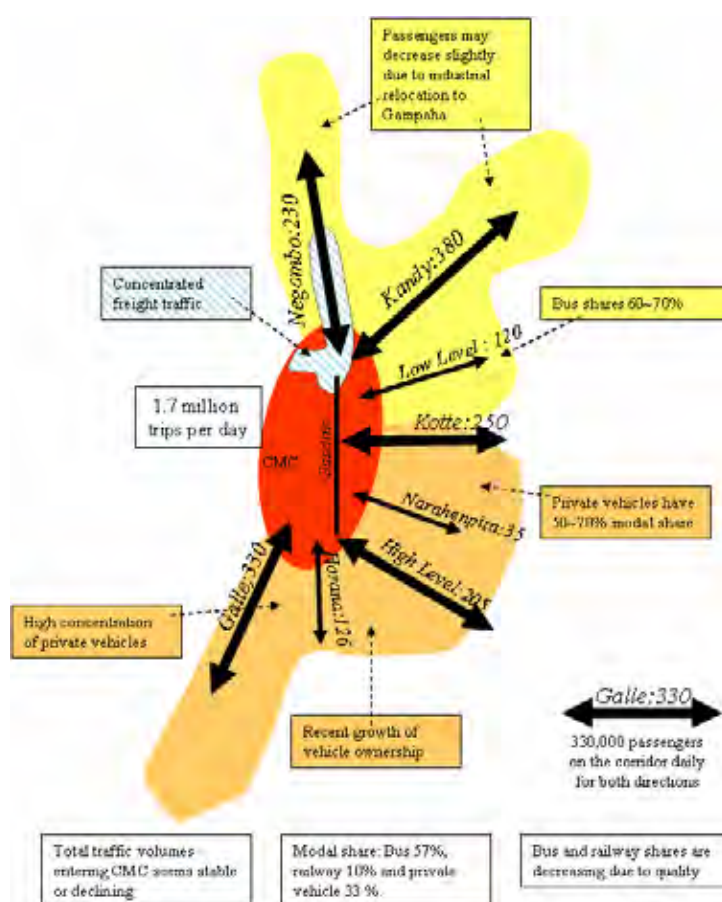


Figure 2.2 CMR Travel Patterns

2.2 Urban Transport Issues

The current state of urban transport practices was studied and high priority issues were identified in consultation with each sector's WG.

(1) Institutional and Policy Coordination

There is a serious problem in CMR with regards to urban transport policy coordination. There is no common framework or strategy among relevant regulatory/implementing institutions to approach traffic congestion problems in the region, which is preventing timely implementation of improvement measures. As urban transport involves a variety of stakeholders, implementation of certain projects faces barriers without improved coordination and political will. Shortage of funding sources and administrative capacity in relevant agencies are also preventing a smooth implementation of projects. As a result, many of the technically sound improvement measures are not implemented at all.

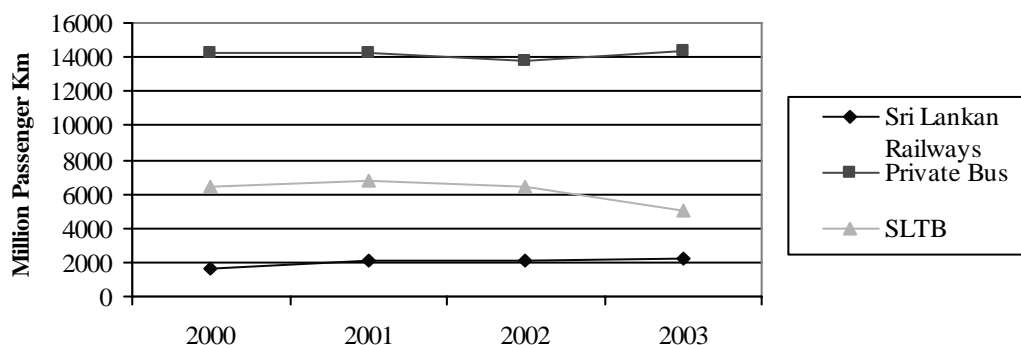
The following were specified as high priority issues:

- Lack of a Comprehensive Transport Policy;
- Numerous Institutions;
- Weak Coordination;
- Inadequate Performance of the Public Sector; and
- Politicization of Institutions.

(2) Public Transport

General View of Public Transport

The following figure shows the growth in passenger kilometers in the public transport sector from 2000 to 2003 for Western Province. It is clear that private sector buses provide the majority of passenger kilometers and that Sri Lanka Transport Board (SLTB) is on the decline.



Source: Sri Lanka Central Bank Economic and Social Statistics, 2004

Figure 2.3 Public Transport Passenger-Km in Western Province 2000-03

State of Practice of Bus System in CMR and High Priority Issues

Because the bus system involves both public buses, operated and regulated by the national government, and private buses, operated individually and regulated by the provincial governments and NTC, there are a number of institutions involved.

As the private sector is completely profit focused, they tend to operate the more profitable routes, leaving SLTB to cover the unprofitable routes. In 2005, a total of 11.9 billion passenger kilometers were carried by the private sector and 4.7 billion were carried by the public sector in

WP. One indicator of bus sector productivity is the average number of passenger km driven per bus per day. In comparing the private and public sector in 2005 in WP, the public sector averaged 11,866 passenger km per bus per day, which was significantly more productive than the performance of the private sector, which averaged 6,231 passenger km per bus per day.

**Table 2.2 Bus Passenger-km and Modal Share within WP
and inside Outer Circular Highway**

	2003		2004		2005	
	Passenger km (m)	Modal Share (%)	Passenger km (m)	Modal Share (%)	Passenger km (m)	Modal Share (%)
WP						
Public	5,075.9	29.8	4,983.9	30.4	4,749.4	28.5
Private	11,958.7	70.2	11,390.4	69.6	11,921.2	71.5

The Sri Lanka bus industry had gone through a full cycle for a bus industry. They began with state ownership under the notion of providing a public service, to decentralizing the sector and allowing the introduction of the private sector, to reestablishing mixed operations with state ownership and private involvement.

The number of highly qualified transport professionals has always been small and when the public bus sector was disaggregated into many smaller companies, there were an insufficient number of highly qualified managers to handle them.

Most private buses operating on the same route have formed a route association, which has joined one of the private bus operator federations. There are 452 private sector or jointly-operated intra-provincial routes and sub-routes within WP, although only 397 routes are currently functioning. Public and private buses are rarely coordinated with regards to timetables, even though they share the same routes, which increase competition among the operators.

The high-priority issues for bus systems were specified as follows:

- Lack of Private Driver/Conductor Skills and Discipline,
- Lack of Private Operator Management System,
- Lack of Intramodal Coordination,
- Oversupply of Bus Permits,
- Lack of Timetables on Bus Routes, and
- Lack of Bus Priority.

State of Practice of Railways in CMR and High Priority Issues

Along the four corridors in Colombo, the bus system does provide an important service during the peak periods as it acts as a commuter service from the outer suburbs to central Colombo. On the Coastal and Main Lines, the modal share in 1995 was estimated to be 18 and 24%. Trains operate over capacity and crowding is standard. Load factors in the mid-1990s were between 1.27 and 1.74, depending on the line. Additionally, although Sri Lanka Railways (SLR) only carries about 1-2% of all freight in the country, much of it is destined for Colombo.

SLR is the operator, and there are 94 of trade unions who represent members' issues to SLR management. They are strong, with political influence and support, which enables them to influence managerial decisions.

Over the past 20-30 years, fares have provided insufficient revenues and the government has provided varying levels of Treasury funds for railway investments, but this traditionally has been inadequate to cover investments for the future. The staff size and the severe discounts on seasonal passes continue to ensure that central government subsidies are necessary to continue the operation of SLR. Without a clear continuous government transport policy, it is difficult to prioritize needs and identify a direction to move forward to better provide services.

The high-priority issues for railways were specified as follows:

- Inadequate Railway Investments;
- Misdirected Rail Subsidies;
- Uncertainty of Future Role;
- Lack of Progressive Policies; and
- Strong Trade Unions.

State of Practice of Three Wheelers in CMR and High Priority Issues

Three-wheelers entered Sri Lanka in the early 1990s and there are over 100,000 vehicles, mainly individually owned and operated, in CMR. Three-wheeler owners initially register their vehicle with the Commission of Motor Traffic (CMT) under MoRT. Drivers also receive their license from CMT, although there are many unlicensed drivers.

Currently, there is no institution with sole responsibility for regulating three-wheelers, either within the central or provincial government. This has caused a problem in that there is no one overseeing the three-wheelers to make regulations to improve their service and use. The three-wheeler organizations operate quite differently. WP tried to implement the Three-Wheeler Service Statute. However, the act was not passed, mainly because the three-wheeler operators strongly opposed the development of an oversight body. As there are number of accidents that involve three-wheelers, drivers are not well-versed in the basic road rules. On the other hand, insufficient quantity of Three-Wheeler stands leads to further congestion on the roadways and sidewalks in already highly congested areas.

The high-priority issues of three wheelers were specified as follows:

- Lack of Enforcement of Road Rules;
- Lack of Institutional Regulator for Three-Wheelers;
- Oversupply of Three-Wheeler Permits; and
- Insufficient Three-Wheeler Infrastructure.

(3) Urban Road System

The high-priority issues of urban road systems were specified as follows:

- No Urban Street Concept;
- Lack of Pedestrian Facilities;
- Many Weaknesses in Road Network;
- Low Road Development in Suburban Colombo and Gampaha;
- Lack of Drainage Management;
- Lack of Coordination with Other Infrastructure;

- Delay of Implementing Land Acquisition System in Urban Areas;
- Insufficient Funds; and
- Unclear Road Hierarchy.

Representative issues are illustrated as follows;

Many Weaknesses in Road Network: There are many weaknesses in the urban and suburban road network including lack of connectivity, network obstructions, insufficient lanes, narrow bridges, and low intersection capacity. This results in reduced capacity and increased congestion throughout the entire network.

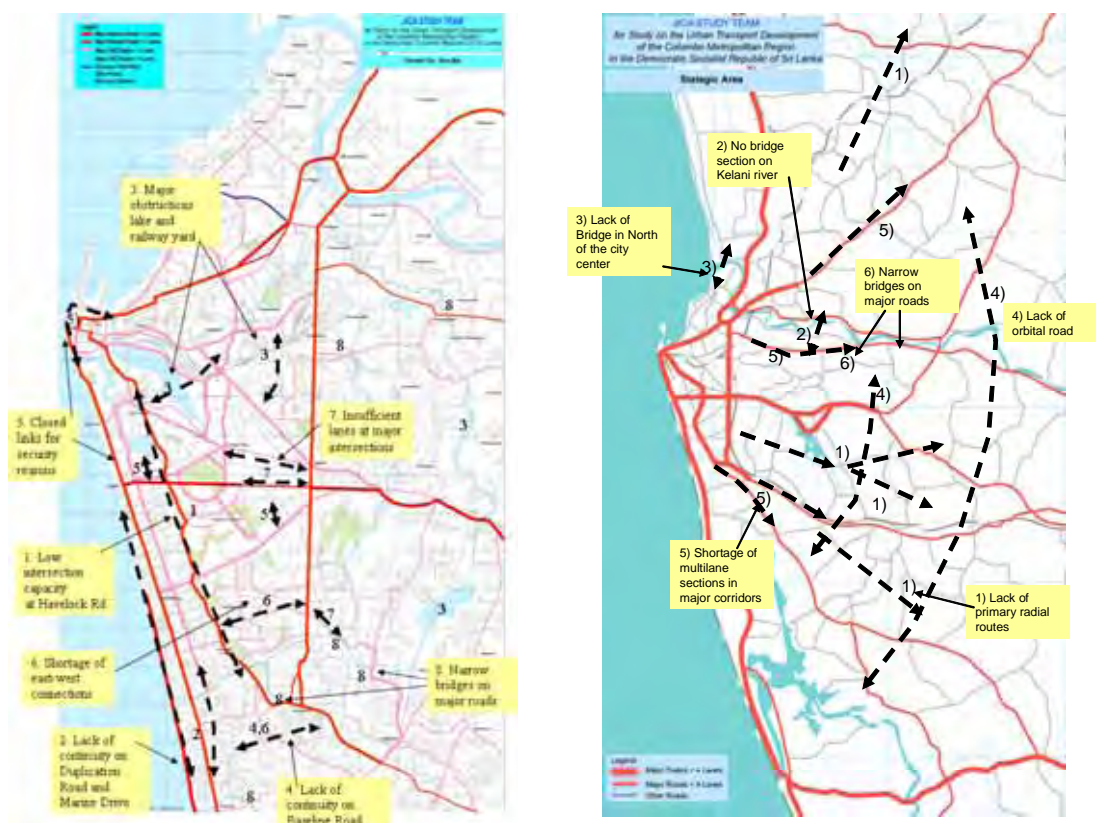


Figure 2.4 Weaknesses in Road Network

Low Road Development in Suburban Colombo and Gampaha: As shown in Table 2.2, CMR’s overall road development is lower than other Asian capital’s metropolitan areas. Particularly, the length and width per population in suburban Colombo District and Gampaha District are extremely low.

Table 2.3 An International Comparison of Road Density

	Population (million)	Total Area (sq km)	Road Length (km)	Length/Area (km/sq km)	Road Area / Total Area (%)
WP	5.471	3,684	3,451	0.94	0.58
Colombo Dist	2.305	699	823	1.18	0.75**
Gampaha Dist	2.089	1,387	1,578	1.14	0.71**
Kalutara Dist	1.077	1,598	1,050	0.66	0.40**
CMC	0.647	37.31	480	12.87	12.52*

Singapore	4.24	699	3,188	4.56	6.0 ^{***}
Delhi NCT	13.85	1,483	30,949	20.9	--
Tokyo CBD	8.35	621	11,817	19.0	15.8

Source: Sri Lanka; Population data-2001 from Dept. of Census and Statistic, Road length data-2003 from RDA, Road area for A and B class in District Level were prepared by RDA.

* Assumed 18.0m for average width of A&B class in CMC, and 9.0 m for average width of other class roads.

** Assumed 6.0 m for average width of other class roads.

Singapore; Land Transport Authority (2004), *** estimated based on Lane-Length data.

Delhi National Capital Territory; Government of NCT of Delhi (2004),

Tokyo CBD; Tokyo Metropolitan Government (2004)

(4) Traffic Management and Safety

The high-priority issues of traffic management and safety were summarized as follows:

- High Demand;
- Insufficient and Inadequate Traffic Control Devices;
- Mixed Traffic;
- Undisciplined Road Users;
- Weak Enforcement;
- Limited Traffic Engineering and Management Capacity;
- Lack of Policy and Master Plan;
- Indiscriminate On-street Parking;
- Inefficient Fee Collection System;
- Insufficient Supply of Off-street Parking;
- Inconsistent Design Standards;
- Poor Pedestrian Environment; and
- Lack of Safety Awareness.

Representative issues are illustrated as follows:

Insufficient and Inadequate Traffic Control Devices: Traffic signs, pavement markings, delineators, medians 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.

Limited Traffic Engineering and Management Capacity: Traffic signals perform their intended function only when they are properly designed, installed, operated, and maintained. 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.

(5) Natural and Social Environment

The high-priority issues of traffic management and safety were summarized as follows:

- Inadequate Vehicle Inspection System;
- Adulteration of Fuel;
- Lack of Pedestrian Facilities;
- Lack of Considerations of Vulnerable Groups;
- High Pollution Levels from Three-Wheelers;
- Inadequate Regulations;
- Inadequate Operational Monitoring;
- Lack of Consideration of Microclimate;
- Poor Environmental and Landscape Planning in Road Design; and
- Lack of Consideration of Wetlands and Productive Agricultural Lands.

Representative issues are illustrated as follows;

Inadequate Vehicle Inspection System: Vehicle inspection is carried out by the Ministry of Transport's Commission of Motor Traffic (CMT). The current vehicle inspection system in Sri Lanka does not include vehicle emissions checks, as it is mainly aimed to ensure road safety as opposed to meeting environmental standards. Additionally, the primary purpose of vehicle inspections is to collect revenue, as opposed to controlling emissions.

Lack of Consideration of Microclimate: With the focus on climate change, there should be an increased focus on preventing the creation of microclimates, which results in greater discomfort among citizens. Respiratory disease is the second leading cause of hospitalization in Sri Lanka, and asthma is on the rise as a major respiratory disease. This has been largely attributed to the explosive growth of 2-stroke engines, which are prevalent in three-wheelers and motorcycles.

3 Urban Transport Improvement Projects

3.1 Improvement Measures

(1) Basic Strategy

The main overarching issues that contribute to traffic congestion in CMR are as follows:

- Rapid urban growth;
- Increasing income and car ownership;
- Low quality of public transport;
- Incomplete road network;
- Inadequate traffic management measures; and
- Weak policy coordination.

As can be seen in many developing country cities, the transport environment is undergoing a downward spiral, whereby declining service in public transport results in greater car use and dependence, thereby impacting the urban structure as it is designed for private vehicles, furthering the decline of public transport. This is very evident in Colombo as the public transport system continues its poor levels of service, driving more and more people to purchase private vehicles (automobiles or motorcycles), and allowing the planners and developers to build a city that is accessible only by private vehicle, as its density is too low for foot or public transport viability. Figure 3.1 shows the typical decline of transport.

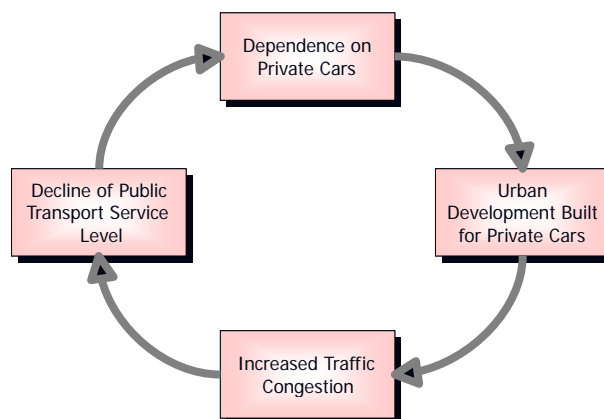


Figure 3.1 Decline of Public Transport and its Affect on Traffic Congestion

The purpose of this project is therefore to stem that decline and reverse the downward spiral. Improvements in public transport service would increase pressure on planners and developers to build a city for people not vehicles, which would then increase the likelihood that citizens would be less dependent on their private vehicles and more dependent on public transport. This can be seen in Figure 3.2.

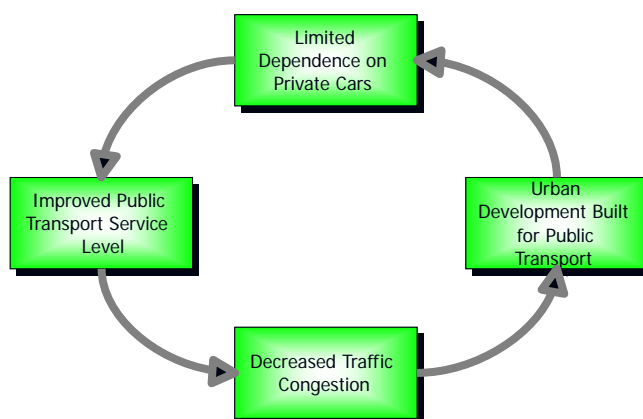


Figure 3.2 Improvement in Public Transport and its Affect on Traffic Congestion

This requires a multi-faceted approach to public transport, traffic management, and road development. The issues identified above further support this assertion and the subsequent improvement measures (below) show the wide range of policies that need to be addressed.

- Improve policy coordination and administrative capacity;
- Promote transit-oriented urban development;
- Promote public transport system development and use;
- Improve urban road systems particularly arterials; and
- Utilize existing infrastructures and facilities better.

3.2 Long List Preparation

The Study Team prepared a “Long List of Projects” to extract existing project ideas to achieve the five improvement measures. The Study Team reviewed past studies and extracted 161 project proposals. Additionally, the WGs had proposed 48 projects which had been developed in government organizations.

The Study Team reviewed past studies for Colombo Urban Transport as shown in Table 3.1. As shown in Figure 3.3, of the 161 proposed/existing projects that resulted from these studies, only 4.3 % were implemented.

Table 3.1 Summary of Past Studies

Study	Details
Colombo Metropolitan Regional Structural Plan (CMRSP)	<ul style="list-style-type: none"> • Recommended expanding the boundaries of Colombo city; establish six growth centers; and develop a north-south highway to connect all the growth centers; and • CMRSP was discussed by senior officials, but was not approved due to a change in government and because UDA prepared the plan, which does not have the authority to prepare regional plans.
Colombo Development Plan (CDP)	<ul style="list-style-type: none"> • Recommended expanding the boundaries of Colombo city as proposed in CMRSP; and • CDP is the only plan at this time to have a legal basis and replaces the previous CDP of 1985.
Colombo Urban Transport Study 1 and 2 (CUTS1 and CUTS2)	<ul style="list-style-type: none"> • Promoted short-term measures using existing resources to increase capacity and identified medium- and long-term measures to satisfy transport needs due to urban growth • CUTS2 proposed twelve project categories including bus, rail service, traffic management, inland container depot, etc.

Western Regional Megapolis Plan (WRMP)	<ul style="list-style-type: none"> • Transform Colombo into a modern megalopolis to accommodate 8.4 million people with the city of Colombo as the nucleus. • Proposed development of two radial/circular roads (inner and outer necklace); and • Variable density development.
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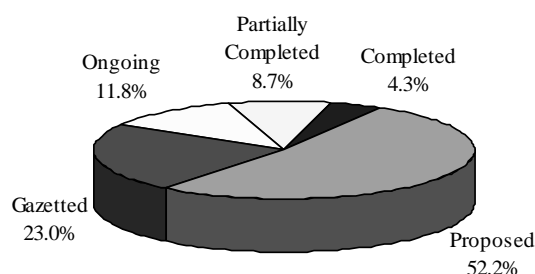


Figure 3.3 Implementation Status

3.3 Project Long List

The Project Long List can be classified into the five subsequent improvement measures. The tables (Table 3.2 to 3.6) below provide a summary of the Long List of Projects in the five improvement measures. The Project Long combines projects from the previous studies, as well as projects identified by the WGs. The tables also show the result of the selection of short-listed projects (as shown in SL) and high priority projects (HPP).

The components of the Long List can be described in the following chart (Figure 3.4), with the majority of projects categorized as Road and public transport (bus, rail, three-wheelers, and intermodal) making up another 25.6% of the projects. The improvement measures listed above are an aggregate of this list, as Appendix 1 has more specific projects.

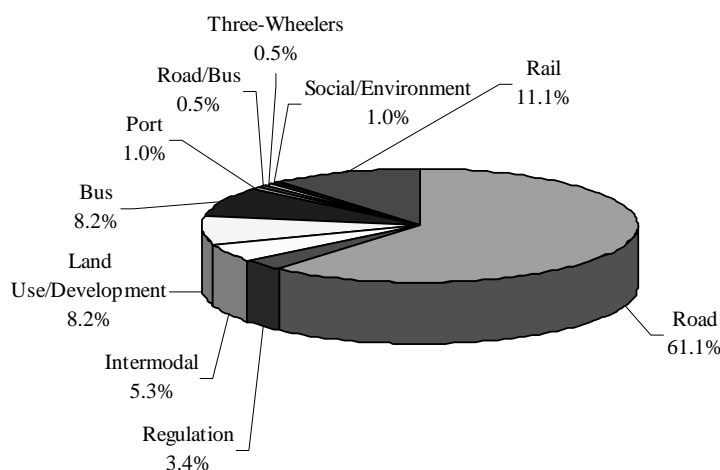


Figure 3.4 Project Category Breakdown for Project Long List

(1) Projects to Improve Policy Coordination and Administrative Capacity

There were two projects related to policy coordination improvement.

**Table 3.2 Project Long List
(Policy Coordination and Administrative Capacity)**

Source	Project Name	SL	HPP
IPCWG	Establish a Coordinating Body for Urban Transportation Development in CMR	√	√
CDP	Creation of a Colombo Development Authority		

(2) Projects to Promote Transit-Oriented Urban Development

The CMRSP proposed a concept of developing six growth centers in Colombo's surrounding areas, and these projects were related to this concept.

Table 3.3 Summary of Project Long List (Transit-Oriented Urban Development)

Source	Project Name	SL	HPP
CMRSP	Development of Negombo/Katunayake Growth Center		
CMRSP	Development of Gampaha/Nittambuwa Growth Center		
CMRSP	Development of Biyagama/Sapugaskanda Center		
CMRSP	Development of Homagama/Padukka Growth Center		
CMRSP	Development of Horana/Bandaragama Growth Center		
CMRSP	Development of Matugama Growth Center		
CMRSP	Development of Kalutara Urban Center		
CMRSP	Development of Moratuwa Urban Center		
CMRSP	Development of Avissawella Urban Center		
CMRSP	Development of Dehiwela-Mt. Lavinia Agglomeration		
CMRSP	Improvement of Schools Outside City		
CMRSP	Relocation of Manning Market and Part of Pettah Dry Goods Wholesale Market		
CUTS2	Improve and Develop Fort and Pettah Areas		
CDP	Introduction of New Building Limits/Lines		
CDP	Improvements in Fort		
CDP	Create Concentrated Development Areas		
WRMP	Land Use Controls		

(3) Promote Public Transport System Development and Use

Projects were classified into sub categories; bus, railways, three-wheelers and intermodal.

Table 3.4 Project Long List (Public Transport System Development)

Source	Sub-Category	Project Name	SL	HPP
WRMP	Bus	Develop Bus Stand Facilities		
WRMP	Bus	Remove Central Bus Stands and Develop Bus Interchanges at Periphery of City		
WRMP	Bus	Bus Infrastructure Improvements		
PTWG	Bus	Project to Improve School Transport Services	√	√
PTWG	Bus	Strengthening of NTC on Transport Planning and Operations/Management	√	√
PTWG	Bus	Strengthening of SLTB on Operations/Management	√	√
PTWG	Bus	Develop a Training Center at Western Province Road Passenger Transport Authority and Undertake Strengthening of WPRPTA	√	√
CMRSP	Rail	Rehabilitation of Rail Track	√	√
CMRSP/ CDP	Rail	Development of Rail Signaling System	√	√

Source	Sub-Category	Project Name	SL	HPP
CMRSP/CDP/ WRMP	Rail	Improvements to Rail Stations		
CMRSP/ CDP	Rail	Systematic Replacement of Rail Rolling Stock		
CMRSP	Rail	Triple Track on Main Line from Colombo to Ragama		
CMRSP	Rail	Double Track Coastal Line from Colombo to Kalutara		
CMRSP	Rail	Double Track between Ragama and Negombo		
CMRSP/ WRMP	Rail	New Rail Link (Dematagoda-Kotte-Ratmalana)		
CMRSP	Rail	Electrification of Railway		
CMRSP	Rail	Demand Responsive Suburban Rail Routing and Scheduling		
CMRSP/CDP	Rail	Develop People Mover System		
CMRSP/CDP	Rail	Extend People Mover System to Suburbs		
CMRSP	Rail	Develop Long-Term Strategic Plan for SLR		
CUTS2	Rail	Study Rail's Future Supply and Demand to Increase Modal Share		
CUTS2	Rail	Increase Progressive Practices Used at SLR		
CUTS2	Rail	Develop Strategies for Signaling, Rolling Stock, and Asset Management		
CUTS2	Rail	Improve SLR Timetabling and Service Delivery	√	√
CUTS2	Rail	Quantify Structural Integrity of Kelani Rail Bridge		
CUTS2	Rail	Determine Viable Mass Rapid Transit Options for Colombo		
WRMP	Rail	Remove Coastal Line		
WRMP	Rail	Develop Circle Line Railway		
WRMP	Rail	Develop Southern Line Railway		
PTWG	Rail	Strengthening of Sri Lank Railways on Planning and Operations/Management	√	√
RDPWG	Road/Bus	Develop BRT between Dematagoda and Battaramulla	√	√
PTWG	Three Wheelers	Strengthen WPRPTA to Implement and Strengthen the Three-Wheeler Services Bureau and Outline Three-Wheeler Regulations	√	√
CMRSP	Intermodal	Intermodal Access and Park and Ride (Bus/Rail and Rail/Private Vehicle)		
CMRSP/CDP	Intermodal	Develop Intermodal Pettah Transport Center		
CMRSP	Intermodal	Develop Ragama Intermodal Transport Center	√	√
CMRSP	Intermodal	Develop Kottawa Intermodal Transport Center	√	√
CMRSP	Intermodal	Develop Ratmalana Intermodal Transport Center	√	√
CMRSP	Intermodal	Develop Orugodawatte Intermodal Transport Center	√	√
CMRSP	Intermodal	Intermodal Facilities at Each Railway Station	√	√
CMRSP	Intermodal	Upgrade Traffic/Land Use Model for CMR to a Full Transport Model		
CMRSP	Intermodal	Conduct a Multi-Modal Analysis of Transport Requirements within CMR		
CUTS2	Intermodal	Develop, Approve, and Expand Transport Master Plan for CMR		
WRMP	Intermodal	Integration of Public Transport Fares and Schedules		

(4) Projects to Improve Urban Road Systems Particularly Arterials

There were 97 projects focused on the road sector because widening projects need specification of section. Flyovers and grade separation were proposed for 11 intersections.

Table 3.5 Project Long List (Urban Road Systems)

Source	Project Name	SL	HPP
CMRSP	North South Highway (NSH) within CMR		
CMRSP	North Eastern Highway (NEH) within CMR		
CMRSP	South Eastern Highway (SEH)		
CMRSP	Moratuwa-Polgasowita Link		
CMRSP	Southward Extension to NSH		
CMRSP	Northward Extension to NSH		
CMRSP	Trincomalee Extension to NEH		
CMRSP	Kandy Extension from NEH		
CMRSP	Connection to Asian Highway		
CMRSP	Investigate and Develop Parallel Roads		
CMRSP	Widen and Re-Define Road Cross-sections		
CMRSP	Implement Coordinated System of Construction, Maintenance, and Improvements	√	√
CMRSP	Improve Paving Quality		
CMRSP	Overpasses at Railway Crossings	√	√
CMRSP	Control Access on CMR's A and B Class Roads		
CMRSP	Develop CMR's C and D Class Roads	√	√
CMRSP	Introduce Street Line Schemes		
CMRSP/CDP	Baseline Road Extension	√	√
CMRSP/CDP	Develop Marine Drive	√	√
CMRSP/CDP	Extension of Duplication Road	√	√
CMRSP/CDP	Mattakkuliya Bridge		
CMRSP/CDP	Katunayake Expressway		
CMRSP	Pedestrianize the Fort Area		
CMRSP	Research Requirements for an Inter-Regional Expressway System		
CMRSP	Study Conversion of Roads to High Mobility Corridors		
CMRSP/CDP	Improve Kollupitiya-Belumhara (State Drive)		
CMRSP/CDP	Improve Parliament Drive	√	√
CMRSP/CDP	Improve Kollupitiya-Moratuwa (Marine Drive + Railway strip)	√	
CMRSP/CDP	Improve Road from Colombo-Galle	√	√
CMRSP/CDP	Improve Road from Colombo-Horana	√	√
CMRSP/CDP	Improve Road from Colombo-Ratnapura	√	√
/ WRMP			
CMRSP/CDP	Improve Road from Colombo-Kandy	√	√
CMRSP/CDP	Improve Road from Colombo-Negombo	√	
CMRSP/CDP	Improve Baseline Road	√	√
CMRSP/CDP	Improve Road from Fort-Maradana		
CMRSP/CDP	Improve Road from Fort-Borella		
CMRSP/CDP	Improve Dharmapala Mawatha		
CMRSP/CDP	Improve Road from Dehiwala-Maharagama		
CMRSP/CDP	Improve Road from Rajagiriya-Ratmalana	√	√
CMRSP/CDP	Improve Road from Pannipitiya-Battaramulla	√	√
CMRSP/CDP	Improve Road from Malabe-Athurugiriya		
CMRSP/CDP	Improve Road from Koswatte-Kelanimulla (Dalugama (proposed))		
CMRSP/CDP	Improve Kirimandala Mawatha		
CMRSP	Improve Road from Nugegoda-Delkanda		
CMRSP	Improve Port Access Road		
CMRSP/CDP	Improve Duplication Road	√	
CMRSP	Improve Road from Bambalapitiya-Ratmalana		
CMRSP/CDP	Improve Road from Thimbirigasyaya-Narahenpita		
CMRSP/CDP	Improve Road from Nugegoda, Jubili Post-Etul Kotte	√	
CMRSP/CDP	Improve Road from Gas Paha-Mattakkuliya		

Source	Project Name	SL	HPP
CMRSP	Improve Road from Delkanda-Rattanapitiya		
CMRSP	Improve Road from Koswatte-Etul Kotte (proposed)		
CMRSP	Improve Road from Udahamulla-Polwatta		
CMRSP	Improve Lake Drive State D R Kirimandala Mawatha		
CDP	Improve Road from Dehiwala-Hokandara		
CDP	Improve Road from Thimbrigasyaya-Nawela		
CDP	Improve Road from Maharagama-Nugegoda		
CDP	Road Construction along Kelani River		
WRMP	Outer Necklace Semi-Expressway		
WRMP	Inner Necklace Expressway	√	√
WRMP	City Semi Expressway		
WRMP	Kandy Expressway		
WRMP	Semi Expressways		
WRMP	Upgrade A1	√	√
WRMP	Upgrade A4	√	√
WRMP	Upgrade B84/Colombo Horana Road	√	√
WRMP	Upgrade B214/Kelaniya-Mudungoda Road		
RDPWG	Fourth Bridge at Kelaniya (Keranisiri Bridge)		
RDPWG	B152 Widening	√	√
RDPWG	Improve Road from Yakkala-Biyagama-Malabe	√	
RDPWG	Improve Road from Panadura-Bandaragama (A8)		
RDPWG	Improve Road from Waskaduwa-Bandaragama (B454-455)		
RDPWG	Maradana-Galle Face Link		
RDPWG	Independence Square pedestrian footpath development		
RDPWG	Beira Lake pedestrian footpath development		
RDPWG	Pelawatta-Malabe-Kahantota Road (7 Km)	√	
RDPWG	Pittakotte-Thalawatugoda-Hokandara-Koskadawila Road (8.4.Km)	√	√
RDPWG	Thalangama-Aggona-Angoda-Kelaniya-Kiribathgoda Road		
RDPWG	Pannipitiya-Moralatiya-Tuumbowila-Wewala-Suwarapola Road (7.4 km)	√	√
RDPWG	Piliyandala-Henemulla (5.65 Km) + Bridge 150m span	√	
RDPWG	Biyagama-Malwana-Walgama-Malwana-Walgama-Ulhitwala-Pananwala-Keragala-Henegama-Wanaluwawa Road		
RDPWG	Kottawa-Pitipana Road (5.1 Km)		
RDPWG	Homagama-Thalagala-Olaboduwa-Palanoruwa-Kahatapitiya-Kedalpitiya sections		
RDPWG	Flyover Construction for Railway crossing at Kelaniya on Kandy Road	√	√
RDPWG	Flyover Construction for Kohuwala Intersection	√	√
RDPWG	Flyover Construction for Kirulapone Intersection		
RDPWG	Flyover Construction for Nugegoda Intersection on High Level Road		
RDPWG	Flyover Construction for Dehiwala Junction on Galle Road	√	
RDPWG	Flyover Construction for Railway crossing at Duplication Road across the Coastal Railway Line at Slave Island		
RDPWG	Flyover Construction for Boralesgamuwa Roundabout		
RDPWG	Flyover Construction for Orugodawatta Railway Crossing		
RDPWG	Grade separated interchange construction for Rajagiriya Intersection	√	
RDPWG	Construct grade separated interchange at Panchikawatte Roundabout	√	√
RDPWG	Construct grade separated interchange at Orugodawatte Intersection	√	√
RDPWG	Lipton Circle extending over the roundabout at Alexandra Place on the State Drive to Parliament		
RDPWG	Liberty Roundabout at Dharmapala Mawatta and Duplication Road		
RDPWG	Capacity Development for Drainage maintenance for Colombo Municipality	√	√

(5) Projects to Better Utilize Existing Infrastructures and Facilities

Proposals for pedestrian facility improvement and vehicle inspection were included here.

Table 3.6 Project Long List (Better Utilize Existing Facilities)

Source	Project Name	SL	HPP
CMRSP	Progressively Ban All On-Street Parking		
CMRSP	Provide Bus Bays	√	√
CMRSP	Signalization of Intersections and Possible Synchronization	√	√
CMRSP	Reduce Abutting Access		
CMRSP	Prohibit Right Turns		
CMRSP	Signalize Pedestrian Crossings		
CMRSP/CDP	Transport Demand Management (TDM) Measures (City of Colombo)	√	√
CMRSP/CDP	Bicycle Lanes		
CMRSP	Research Traffic Restraint/TDM Measures	√	√
CUTS2	Create Traffic Management Policy and Body	√	√
CUTS2	Strengthen RDA Implementation Capabilities	√	√
CUTS2	Strengthen CMC Traffic Management Capabilities	√	√
CUTS2	Strengthen Police Traffic Management Capabilities	√	√
CUTS2	Develop Parking Policies and Strategies		
CUTS2	Undertake Detailed Design of WA Silva Junction Improvements and Extension (Duplication Road)		
CUTS2	Implement Galle Road Pilot Scheme		
CUTS2	Implement Lipton Circus Pilot Scheme		
CUTS2	Prepare Kandy Road and Galle Road Corridor Schemes		
WRMP	Traffic Management Proposals		
WRMP	Pedestrian Facilities	√	√
WRMP	Road Signage		
WRMP	Implement Traffic Calming Measures		
WRMP	Phase Out Three-Wheelers		
TMSWG	Area Traffic Control (ATC) System	√	√
TMSWG	Traffic Signal Rehabilitation	√	√
TMSWG	CCTV Traffic Monitoring System		
TMSWG	Pedestrian Overpass/underpass	√	√
TMSWG	Road User Education Program	√	√
TMSWG	Traffic Safety Improvement	√	√
TMSWG	Traffic Safety Awareness Program	√	√
SNEWG	Capacity Building for equipment and training of personnel	√	√
SNEWG	Landscaping and Road Design	√	√

4 Short-Listed Projects and High Priority Projects

4.1 Short-Listed Projects

As described earlier, the Study Team extensively reviewed existing master plans and studies and produced a list of 161 projects for consideration. Additionally, the WGs proposed 48 more projects that resulted in a Long List of 209 projects. Each WG reviewed and evaluated their sector-specific projects, although the capacity building projects (12 in total) were put forth as high priority projects without further screening. The Short List was derived based on (i) the evaluation criteria where projects scoring high with regards to positive criteria and low to negative criteria were short-listed and (ii) projects falling beneath the cut-off line but having a high interdependency with projects above the line were also added to the short list. A description of the common and sector-specific evaluation criteria are described below.

Common evaluation criteria:

- Technical Feasibility;
- Impact on Reducing Congestion;
- Impact on Promoting Public Transport;
- Institutional Barriers;
- Social Impacts; and
- Environmental Impacts.

Sector specific evaluation criteria:

- Road Development Planning Working Group: Improvement of Network Connectivity and Consistency with Urban Development Plans;
- Public Transport Working Group: Level of Cooperation Regarding Rationalization and Lack of Policy Consistency; and
- Traffic Management and Safety Working Group: Impact on Enhancing Traffic Safety.

Applying the above criteria, the Study Team developed a Project Short List that consisted of 46 projects, as shown below in Tables.4.1. The Study Team believes that all 46 short-listed projects can be finished by 2015. From this list, 29 infrastructure projects were considered for further screening in order to derive high priority infrastructure projects for pre-FS level analysis. The infrastructure projects are mapped in Figure 4.1, which follows the Short List of projects.

Table 4.1 Short List Projects

Project	Implementing Agency
<i>Policy Coordination and Administrative Capacity</i>	
1. Inst-1 Technical Assistance to Establish the Presidential Committee on Urban Transport (PCUT) and Secondary Coordination Mechanisms	MoRT
<i>Public Transport System Development</i>	
2. Bus-1 Technical Assistance to Lay Groundwork for Bus Route Concessioning and Undertake a Pilot Concessioning Project	NTC, WPRPTA
3. Bus-2 Project to Increase Intermodal and Intramodal Coordination by Timetable Creation, Implementation and Enforcement	WPRPTA
4. Bus-3 Strengthening of NTC on Transport Planning and Operations/Management	NTC
5. Bus-4 Strengthening of SLTB on Operations/ Management	SLTB
6. Bus-5 Develop a Training Center at WPRPTA and Undertake Strengthening of WPRPTA, Private Bus Owners/Operators, and Crew	WPRPTA
7. Bus-8 Develop Bus Stop Facilities on High Demand Corridors	CMC, RDA
8. BRT-1 Bus Rapid Transit System	UDA
9. Rail-1 Rehabilitation of Rail Siding and Rail Facilities	SLR
10. Rail-2 Rehabilitation of Signaling and Communications Systems	SLR
11. Rail-3: Strengthening of SLR on Management and Operations and Development of a Strategic Business Unit to Implement Pilot Projects	SLR
12. 3W-1: Strengthen the WPRPTA to Implement and Strengthen the Three-Wheeler Services Bureau and Outline Three-Wheeler Regulations	WPRPTA
13. PT-1 Project to Improve School Transport Services	NTC
<i>Urban Road Systems</i>	
14. Road-1 Outer Circular Highway (OCH) Construction	RDA
15. Road-6 Baseline Road Construction Phase III & Existing Baseline Road Improvement	RDA
16. Road-7 Marine Drive Extension Construction (including 1 flyover)	RDA
17. Road-10 Duplication Road Extension Construction	RDA
18. Road-14 B152 Widening & Improvement of Access Roads B425 and Eppamulla-Panunugama Road	RDA
19. Road-15 Improvement of Colombo-Horana Road (including Kohuwala Flyover construction)	RDA
20. Road-16 Improvement of Kirulapone-Kottawa Road (A4 Road)	RDA
21. Road-17 Improvement of Kandy Road – Phase I (construction of 1 flyover & 1 interchange)	RDA
22. Road-18 Improvement of Kandy Road – Phase II	RDA
23. Road-20 Improvement of Rajagiriya-Ratmalana Road	RDA
24. Road-21 Improvement of Road from Pannipitiya to Battaramulla	RDA
25. Road-26 Improvement of Nugegoda-Ethul Kotte Road via Jubili Post	RDA
26. Road-33 Improvement of Balummahara – Biyagama - Malabe Road	RDA
27. Road-43 Grade-Separated Interchange Construction at Rajagiriya Intersection	RDA
28. Road-48: Capacity Building of CMC - Drainage Maintenance	CMC
29. Road-49 Intermodal Transport Center [Suburb Area]	UDA
30. Road-50 Intermodal Transport Center [CMC Area]	UDA
31. Road-54: Capacity Building of RDA – Land Acquisition & Resettlement	RDA
32. Road-55: Capacity Building of RDA – Road Design Standards and Maintenance Coordination	RDA
33. Road-WP1 Improvement of Pelawatta – Malabe – Kahantota Road	WPRDA
34. Road-WP2 Improvement of Pittakotte – Thalawathugoda – Hokandara - Kokadawila Road	WPRDA
35. Road-WP4 Improvement of Pannipitiya – Moralatiya - Tumbowila Road	WPRDA

Project	Implementing Agency
36. Road-WP5 Improvement of Piliyandala - Henamulla Road	WPRDA
<i>Existing Infrastructures Utilization</i>	
37. TM-1 Intersection Geometric Improvement Project	CMC and RDA
38. TM-2 Area Traffic Control System Project	CMC and Traffic Police
39. TM-3 Traffic Signal Rehabilitation	CMC and RDA
40. TM-6 Corridor Traffic Management Improvement	CMC and RDA
41. TM-11 Implement Staggering and Traffic Management Options of School/Office Start Times	MORT, NTC and Traffic Police
42. TM-13 Road User Education Program	National Council for Traffic Safety, MoRT, and CMC
43. TM-14 Traffic Safety Improvement Project	National Council for Traffic Safety, MoRT
44. TM-17: Capacity Building of CMC and RDA - Traffic Management & Safety	CMC, RDA
45. TM-19: Capacity Building of Traffic Police	Traffic Police
46. Env-1: Cross-Sector Capacity Building - For Personnel and Equipment for Vehicle Inspection, Roadside Inspection, Emission Inspection, & Monitoring	CMT, Police, RDA, CPC, CEA

Note: Projects in italics are pipeline projects.

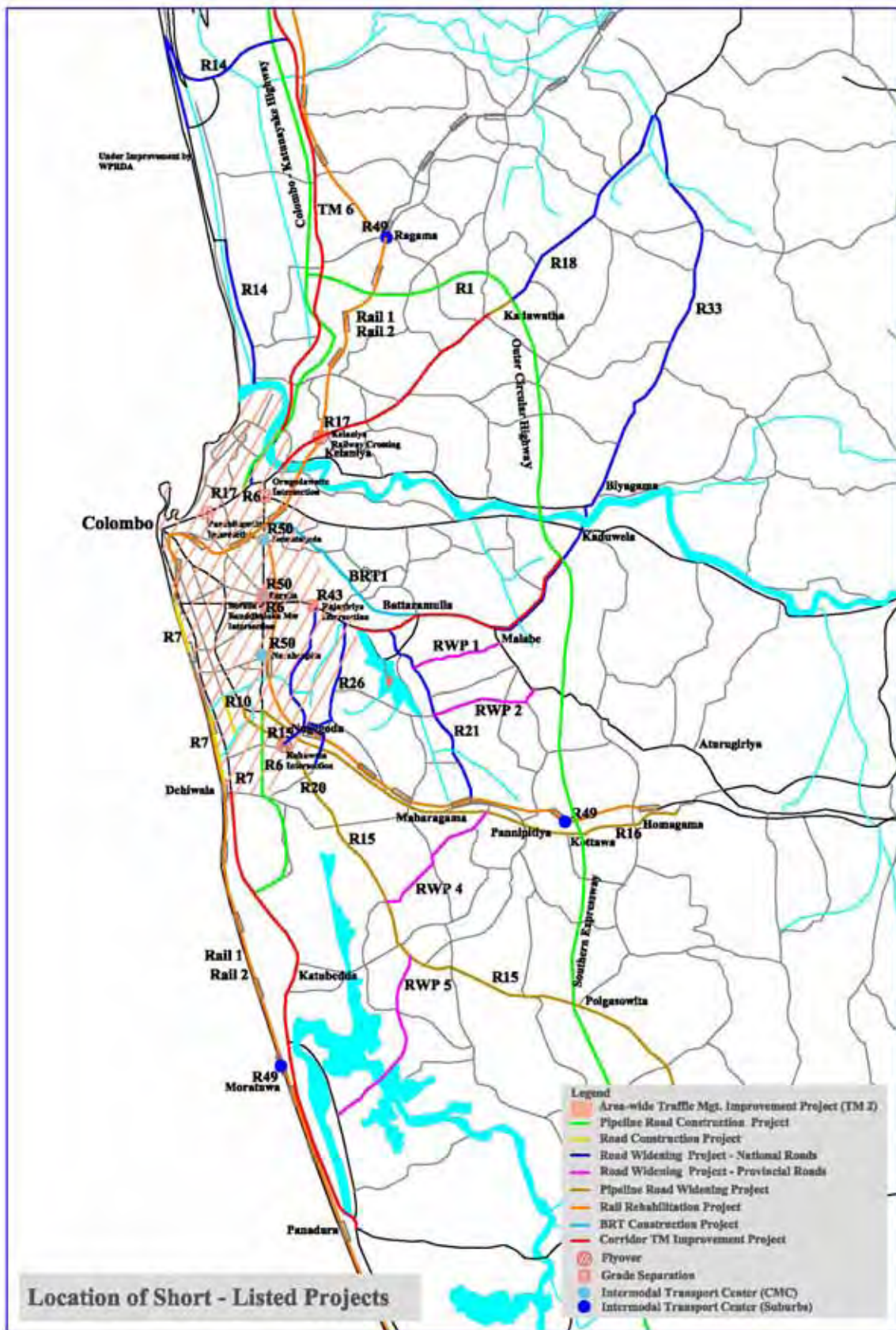


Figure 4.1 Location of Short-Listed Projects (for projects that can be shown on a map)

4.2 High Priority Projects

The Study Team discussed at the Chairperson’s meeting on the selection process of high priority projects, and finalized the process as follows:

- All short-listed capacity building and soft projects (18 projects) be included as high priority projects, as they are relatively inexpensive and contribute either to improving coordination or quality of transport services.
- Other infrastructure projects should be defined as provisional high priority projects, and their economic feasibility and social and natural environmental impacts should be assessed in through pre-feasibility studies.
- In the screening process, a number of projects were eliminated from the infrastructure high priority project list. The projects and the reasons for their elimination are as described in Table 4.2 below.

Table 4.2 Short-Listed Infrastructure Projects not Considered as High Priority

Project	Reasons for Elimination
Traffic Management and Safety	
1. TM-3: Traffic Signal Rehabilitation	With the implementation of ATC, which is strongly recommended by the Study Team, this project is unnecessary.
Road Improvement	
2. Road-10: Duplication Road Extension Construction	Social impacts are relatively high in comparison to expected benefits.
3. Road-26: Improvement of Road from Nugegoda-Ethul Kotte Road via Jubili Post	Social impacts are relatively high in comparison to expected benefits.
4. Road-33: Improvement of Balummahara-Biyagama-Malabe Road	Class B roads outside of the OCH area.
5. Road WP1 Improvement of Pelawatta-Malabe-Kahantota Road	The alignment runs parallel to Road WP2 project.
6. Road-WP5 Improvement of Piliyandala-Henamulla Road	Implementation cost are relatively high in comparison to expected benefits because it contains new bridge construction

Hereafter, details of high priority projects are illustrated by policy objectives.

All projects were selected and designed aiming to realize the following policy objectives⁴.

- (1) Improve policy coordination and administrative capacity;
- (2) Promote public transport system development and use;
- (3) Improve urban road systems particularly arterials; and
- (4) Utilize existing infrastructures and facilities better.

Explanation of major projects and how they could contribute to the reduction of traffic congestion in CMR along with their implementation strategies are briefly explained below:

⁴ Another objective, i.e. “Promote transit-oriented urban development”, was not discussed in this section because it covers long-term projects which do not fit to the project scheme.

(1) Projects to Improve Policy Coordination and Administrative Capacity

Technical Assistance to Establish the Presidential Committee on Urban Transport (PCUT) and Secondary Coordination Mechanisms (Inst-1), which is a representative project under the first objective, aims at establishing a policy coordination body to enhance project implementation under the leadership of the Presidential Office. It is designated to establish a central high-level body that represents the main political decision makers in urban transportation, including Western Provincial Council (WPC). It should be chaired by a high-level official with direct access to the President. A Secretariat will support PCUT and will be located in the Ministry of Railways and Transport (MoRT). The PCUT will alleviate the existing bottlenecks of policy coordination, i.e. too many institutions involved, little harmonization of policies, etc.

Establishing PCUT and commencing the Secretariat and its activities is vital to the effective implementation of many of the high priority projects of this study. Therefore, PCUT should start its activities within the 2007 fiscal year. However, delays in passing laws for establishment, policy changes, and acceptance of operational changes by stakeholders will be considered as risks for implementation. Policy coordination will be particularly beneficial for these projects. PCUT can also be utilized to handle the more delicate issues of transport sector coordination, bus concessions, trade unions, and other politically challenging topics such that clear policies and directives can be issued and the challenges of the transport sector addressed.

Table 4.3 Institutional and Policy Coordination High Priority Project

Title	Implementing Agency	Short Project Description
Inst-1: Technical Assistance to Establish the Presidential Committee on Urban Transport (PCUT) and Secondary Coordination Mechanisms	MoRT	Establish a central high-level body that represents the main political decision makers in urban transportation, including Western Provincial Council (WPC). It should be chaired by a high-level official with direct access to the President. A Secretariat will support PCUT and will be located in the Ministry of Railways and Transport (MoRT).

(2) Projects to Promote Public Transport System Development and Use

As discussed in Chapter 10, there are several issues regarding the weaknesses of operations and institutions in public transport sector. Therefore, half of projects were designated for institutional strengthening to accomplish this objective. Note that the PCUT establishment is also vital to this objective. The others are related to facility improvement, including terminals, a new transport system, and railway facility improvement, are necessary to keep present modal share.

Regulatory Improvements and Capacity Development

Technical Assistance to Lay Groundwork for Bus Route Concessioning and Undertake a Pilot Concessioning Project (Bus-1), prepared for WPRPTA, aims to restructure the bus system, as has been highlighted in a number of previous reports and studies. It is critical to improving the transport environment in CMR. It will improve quality of service and reduce the number of buses on the road, thereby reducing overall traffic congestion. Successfully undertaking a pilot project to concession a few bus routes, recommended by the Study Team, will provide the necessary incentives to encourage other operators to participate in full concessions in the future. However, there will be potential dissatisfaction of private sector operators and crews as a risk

associated with the pilot project's implementation. It is envisaged that 3 years are expected for the pilot project, 5 and half years are expected for the concessioning of whole routes.

Develop a Training Center at Western Province Road Passenger Transport Authority and Undertake Strengthening of WPRPTA, Private Bus Owners/Operators, and Crew (Bus-5), also prepared for WPRPTA, will support education programs for concessioning, marketing, intermodalism, service level improvement, owner and operator education and private crew training. It will minimize the risk of the Bus-1 project and make it easier to disseminate concessioning schemes to other routes in the future.

Strengthen the WPRPTA to Implement and Strengthen the Three-Wheeler Services Bureau and Outline Three-Wheeler Regulations (3W-1), will assist WPRPTA to form a task force to implement and strengthen the Three-Wheeler Services Bureau, which was formed under WPRPTA. The Three-Wheeler Services Bureau, which is primarily responsible for the registration of vehicles as well as drivers' licenses and enforcing PTSP conditions, was created under the Three-Wheeler Act of 2002. Three-wheelers operate unsafely – swerving into and out of traffic to pick up passengers, making illegal turns, allowing passengers to disembark from the right side – and increase congestions levels. Currently, the three-wheelers are almost completely unregulated. The outcome of this project will help to increase the capacity for oversight.

**Table 4.4 Regulatory Improvements and Capacity Development
-High Priority Project**

Title	Implementing Agency	Short Project Description
Bus-1: Technical Assistance to Lay Groundwork for Bus Route Concessioning and Undertake a Pilot Concessioning Project	NTC, WPRPTA	Develop pilot concessioning project on routes 103, 148, 119, and 138 and undertake the necessary steps to make full urban bus route concessioning successful, including legalizing concessioning, route rationalization, tender document development, and education
Bus-3: Strengthening of NTC on Transport Planning and Operations/Management	NTC	The training would include (i) Develop Regulatory System for Concessioning; (ii) Develop Analytical/Quantitative Skills in form of Surveys and Data Analysis; (iii) Develop Information System; (iv) Develop Costing and Pricing System; (v) Develop Clear Understanding of Concessioning; (vi) Develop Understanding of Route Network Design; and (vii) Create Service Level Improvements
Bus-4: Strengthening of SLTB on Operations/Management	SLTB	The training would include (i) Develop Strategy (Short, Medium, and Long-Term) Strategy; (ii) Develop Marketing Plan; (iii) Develop Costing System; (iv) Develop Analytical/Quantitative Skills in form of Surveys and Data Analysis; (v) Develop Crew and Vehicle Assignment and Maintenance Methodology/Skills; (vi) Develop Clear Understanding of Concessioning; (vii) Develop Human Resources Management; and (viii) Modernize Crew Training
Bus-5: Develop a Training Center at WPRPTA and Undertake Strengthening of WPRPTA, Private Bus Owners/Operators, and Crew	WPRPTA	The training would include (i) Develop Human Resources Management; (ii) Develop Clear Understanding of Concessioning; (iii) Develop Analytical/Quantitative Skills in form of Surveys and Data Analysis; (iv) Develop Information System; (v) Develop Marketing Plan; (vi) Incorporate Intermodalism, including Intermodal Centers; and (vii) Develop Understanding of Route Network Design; (viii) Create Service Level Improvements; (ix) Strengthen Private Owners and Operators; and (x) Strengthen Private Crews
Rail-3: Strengthening of Sri Lank Railways on Planning and Operations/Management	SLR	The training would include (i) Develop a Costing System; (ii) Create Operational Improvements ; (iii) Improve Use of Intermodal Centers ; (iv) Develop Maintenance Plan for

		Rehabilitated Rail; (v) Improve Data Collection and Analysis Skills and Develop an Information System; and (vi) Develop Human Resources Management. Develop a Strategic Business Unit with the purpose of implementing the knowledge gained in the training, specifically drafting new legal framework, identifying pilot projects for progressive policies, developing marketing campaign(s), etc.
3W-1: Strengthen the WPRPTA to Implement and Strengthen the Three-Wheeler Services Bureau and Outline Three-Wheeler Regulations	WPRPTA	This project will focus on assisting WPRPTA in forming a task force to implement and strengthen the Three-Wheeler Services Bureau under WPRPTA. If a new regulation is needed, support to create a viable regulation would be provided. Capacity Building topics would include (i) Develop Marketing System; (ii) Develop Regulatory System; (iii) Develop General Management Knowledge; (iv) Develop Analytical/Quantitative Skills in form of Surveys and Data Analysis; (v) Develop Information System; and (vi) Develop Driving Training System.

BRT and Rail System Improvements for Faster/Reliable Service

Bus Rapid Transit System Development (BRT-1), will develop bus rapid transport from Galle Road (Dehiwala)- Pettah- Battaramulla over a 20 km alignment that will include 24 intermediate stops under a PPP scheme. This project will covers detail planning portion only and UDA will handle the main implementation portion.

Construction of a BRT system is especially relevant for developing public transport corridors within the city center, thereby reducing traffic congestion in CMR. Modern technology enables BRT systems to carry passenger loads comparable to LRT systems with substantially lower costs; although, the corridor should be built taking into account the long-term possibility of upgrading when demand increases. As no feasibility studies or surveys have been undertaken, the high priority project for the BRT is to fund a feasibility study to assess the best corridor(s) and implementation method for such a system. As has been seen in Latin America, BRT development can also be used as a catalyst to bring about the restructuring of the regular bus system, but creating a trunk and feeder network, integrated ticketing, and other higher service level provisions. This project will assist in accommodating future travel demand and overcoming pertinent issues passengers are facing, such as overcrowding on buses, irregular or unpredictable service frequencies particularly during off-peak hours, lack of interchange facilities for the efficient transfer of passengers from bus to rail and vice versa, and lack of adequate regulation to ensure that services are operated in line with government policy.

The two rail high priority infrastructure projects (i.e. Rail-1: Rehabilitation of Rail Siding and Rail Facilities and Rail-2: Rehabilitation of Rail Signaling and Communications System) are also important to reducing traffic congestion in CMR. As shown in Chapter 3, the railway shares 20 to 30% of passengers on major arterials, therefore, it is necessary to maintain its level of service in order to keep up its share. However, the rail sector has suffered from insufficient investment over the past twenty to thirty years, which has led to a severe reduction in regular maintenance and postponement of facility and communications upgrades as well as reduced safety and reliability. With the introduction of these high priority rail projects, railways in CMR will maintain – if not surpass – their share of passengers which will ultimately result in the reduction of congestion on urban roads.

It is important to note that the feasibility of these projects was not evaluated, because without capacity building (which is recommended in Chapter 14) and reform of the rail sector, the impacts of these projects would most likely not be sustainable. Although the rail sector is crucial

to the smooth operation of urban transport, capacity building should first be achieved and then the feasibility of these projects revisited in a separate study.

**Table 4.5 BRT and Rail System Improvements for Faster/Reliable Service
-High Priority Project**

Title	Implementing Agency	Short Project Description
BRT-1: Bus Rapid Transit System	UDA	Develop bus rapid transport from the Dematagoda Railway Station to Battaramulla over a 6.5km alignment that will include 6 intermediate stops under a PPP scheme.
Rail-1: Rehabilitation of Rail Siding and Rail Facilities	SLR	Rehabilitate the Main, Coastal, KV, and Puttlam Lines within the suburban area with regards to rail siding and rail facilities
Rail-2: Rehabilitation of Signaling, and Communications Systems	SLR	Rehabilitate the Main, Coastal, KV, and Puttlam Lines within the suburban area with regards to signaling, and communications systems. There are 2 proposals with regards to improving the signaling system.

Increased Intermodal Coordination

Project to Increase Intermodal and Intramodal Coordination by Timetable Creation, Implementation and Enforcement (Bus-2), will be undertaken by WPRPTA and aims to create timetables for both privately operated and jointly operated bus routes, with a focus on high demand corridors and those routes that have high transfer rates with SLR. This will be implemented within 2 years. Political interference for timetable creation will be handled under the PCUT scheme. The importance of this project lies in the fact that the availability, cost and frequency of services and information as to how passengers can connect is essential for a journey to be made on time and with the maximum convenience.

Intermodal Transport Center (Road-49 and Road-50), undertaken by UDA, aims to develop intermodal facilities. Road-49 will cover intra-city traffic at three locations along Baseline Road. The Road-50 will develop Intermodal Transfer Center (ITC) facilities at Moratuwa, Kottawa, and Ragama locating within 15 to 20 km radius of CMR to realize a gradual modal shift towards public transport and create a rail-based polycentric urban and regional structure. This project will fundamentally encourage ease and efficiency of transfer between different transport modes, such as rail to bus and vice versa, and lead to an overall reduction in traffic congestion. P&R or K&R parking facilities, taxi stops, motorcycle parking will be developed and land acquisition is required. This project is expected take three and half years.

Table 4.6 Increased Intermodal Coordination - High Priority Project

Title	Implementing Agency	Short Project Description
Bus-2 Project to Increase Intermodal and Intramodal Coordination by Timetable Creation, Implementation and Enforcement	WPRPTA	Create timetables for both privately operated and jointly operated bus routes, with a focus on High Demand Corridors and those routes that have high transfer rates with SLR
Bus-8: Develop Bus Stop Facilities on High Demand Corridors	CMC, RDA	Improve bus stop facilities including bus bays, shelters, lights, and passenger information for all stops along major routes starting on high demand corridors
Road-50: Intermodal Transport Center [CMC Area]	UDA	Develop Intermodal Transport Centers in Dematagoda, Borella, and Narahenpita to realize a gradual modal shift towards public transport and create a rail-based polycentric urban and regional structure

Road-54: Capacity Development for Land Acquisition of Road Projects	RDA	The Study Team proposes to provide equipment for daily use and a training program for land acquisition process improvement. The project includes sending several experts to an awareness development program as well as budget for training.
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(3) Projects to Improve Urban Road Systems Particularly Arterials

Importance of Completing Pipeline Projects at an Early Stage

The network of major arterials is still incomplete and there are insufficient links with its capacity. The Outer Circular Highway (OCH) Construction (Road-1), Baseline Phase-III Construction (Road-6) and other three widening projects on Kandy, A4 and Horana Road (Road-15, 16, 18), all of which are pipeline projects, are designated to form a complete major road network with sufficient capacity. The construction of the OCH will result in a continuous expressway extending from the International Airport to the southern part of the country through connections with both the Colombo – Katunayake Expressway and the Southern Highway, and has potential to reduce incoming traffic to Colombo and alleviate existing traffic congestion. The Study Team strongly recommends it should be arranged to start immediately.

Additional Road Widening and Flyover Projects to Reduce Traffic Congestion

Three widening improvements and five flyover constructions projects, which were assessed their feasibility, will support the projects above. Note that the improvements can benefit both private and public transport vehicles due to increases in capacity and throughput.

Thalawatugoda-Pannipitiya Widening (Road-21), Thalawatugoda-Koskadwila Widening (Road-WP2) and Pannipitiya-Tumbowil Widening (Road-WP4) are projects involving the widening of four-lane or two-lane roads for sequential 14km sections in the growing southeastern suburb of CMR. The road widening projects will reduce running time and save vehicle operation cost, which will be reflected in the overall reduction in traffic congestion along these roads. It will take 4.5 years for the implementation of Road-21 which will be undertaken by RDA. There is no implementation risk but relocation, therefore, Resettlement Action Plan (RAP) and stakeholder meetings prior to implementation to avoid conflict of the project. For the other two sections, it will take 2.5 years and be managed by WPRDA. These two projects not require relocation because width of the road widening was designated to avoid any resettlement. (Please see Section 26.4 for economic feasibility)

There are five flyovers, Orugodawatte Flyover (Baseline Road) (Road-6), Borella-Kanata Flyover (Baseline Road) (Road-6), Kohuwala Flyover (Road-15), Armour Street Flyover (Road-17), and Kelaniya Railway Flyover (Road-17), recommended to be accomplished by 2015. These projects will be undertaken by RDA and will take 4 to 6 years to complete. The Study Team designated specific conditions for the flyovers to minimize social and environmental impacts (i.e., the alignment was shifted to avoid cutting of sacred Bo trees along intersections, and steel infrastructure was selected instead of reinforced concrete in order to minimize construction period). The Study Team also recommends preparing a Resettlement Action Plan (RAP) and holding stakeholder meetings prior to the implementation to avoid conflicts during the actual project implementation period. The outcome of these projects will ensure sufficient capacity for future traffic flows. (Please see Section 26.4 for economic feasibility)

**Table 4.7 Pipeline Road Projects, Road Widening and Flyover
-High Priority Project**

Title	Implementing Agency	Short Project Description
Road-1: Outer Circular Highway [OCH] Construction	RDA	Construction of the 29.1 km long OCH will divert through traffic from Colombo and increase network connectivity via the linking of major transport corridors.
Road-6: Base Line Road Construction Phase III & Existing Baseline Road Improvement	RDA	Baseline Road construction to consist of extending and/or widening (inclusive of bridge/culvert construction) from High Level Road at Kirulapone to Ratmalana on Galle Road (7.42km). Note improvement of the existing Baseline Road consists of building an interchange at Orugodawatta and a flyover to cross over the intersections between Borella-Buddahalaoka.
Road-7: Marine Drive Extension Construction (including 1 flyover)	RDA	Marine Drive (2km to the north & 1.75km to the south) to be extended to alleviate congestion on Galle Road by providing a viable alternative route along the coastline. A flyover to be built at Dehiwala to provide better access to Marine Drive from Galle Road.
Road-14: B152 Widening & Improvement of Access Roads B425 and Eppamulla-Panunugama Road	RDA	B152 to be widened to a standard 2-lane road for a distance of 5.2km, together with upgrading of access roads B425 and Eppamulla-Panunugama Road to a standard 2-lane structure, to provide an alternative route to A3 and thereby reduce congestion.
Road-15: Improvement of Colombo-Horana Road (including Kohuwala Flyover Construction)	RDA	15km section from Pamankada Bridge to Kahathuduwa to be widened to a 4-lane road and 12.6km section from Kahathuduwa to Horana to be widened to a standard 2-lane road facility for a total of 27.6km. Will serve as an important access route to the Southern Highway. Construction of a flyover at Kohuwara is also proposed as part of this improvement.
Road-16: Improvement of Kirulapone-Kottawa Road (A4 Road)	RDA	Section from Kirulapone to the Southern Highway to be widened to 4 lanes and the section thereafter to Godagama to a standard 2-lane road facility. Work will complement completion of the Southern Highway and serve as an important access route that will also stimulate economic development..
Road-17: Improvement of Kandy Road – Phase I (construction of 1 flyover & 1 interchange)	RDA	Construction of a flyover at Kelaniya Rail Crossing and an interchange at Panchikawatte Intersection on Kandy Road to eliminate two serious bottlenecks to substantially reduce delay times.
Road-18: Improvement of Kandy Road – Phase II	RDA	Improvement to consist of widening a 4.78km section road north of Kadawatha from Kadawatha to Ibulgoda to four lanes, which will provide greater capacity and thereby reduce congestion and produce time savings.
Road-20: Improvement of Rajagiriya-Ratmalana Road	RDA	Widening of existing road either to a standard 4-lane or standard 2-lane road facility & will increase accessibility between the three important arterials of Horana Road, A4, and Parliament Road. This road after its improvement could become an attractive alternative to Baseline Road.
Road-21: Improvement of Road from Pannipitiya to Battaramulla	RDA	Widening of this 7.5km road to a 4-lane road facility to increase accessibility between A4 and Parliament Road.
Road-43: Grade-Separated Interchange Construction at Rajagiriya Intersection	RDA	Construction of an interchange to efficiently channel multi-directional traffic and thereby reduce delays on the important Parliament Road.
Road-WP2: Improvement of Pittakotte – Thalawathugoda – Hokandara - Kokadawila Road	WPRDA	Right-of-way (ROW) to be increased from 10m to 13m and cross-sections redefined with lane markings starting from Pittakotte on (B-120) and ending at Koskadawila (B-263) for a

		total length of 8.4 km
Road-WP4: Improvement of Pannipitiya – Moralatiya - Tumbowila Road	WPRDA	Right-of-way (ROW) to be increased from 10m to 13m and cross-sections redefine with lane markings starting from Moratuwa and going to Battaramulla and Suwarapola (B-295), bypassing Piliyandala and Maharagama (B-47) for a total length of 7.4 km
Road-54: Capacity Development for Land Acquisition of Road Projects	RDA	The Study Team proposes to provide equipment for daily use and a training program for land acquisition process improvement. The project includes sending several experts to an awareness development program as well as budget for training.

Reducing Congestion Caused by Maintenance Problems

Maintenance capacity is another critical issue of road development in CMR. The two capacity building projects related to road maintenance (Road-48 for Drainage Maintenance and Road-55 for Utility Maintenance and Road Design) should be implemented at an early stage. In order to maintain drainage for storm water overflows, the methods, skills, and equipment necessary to do this effectively will be provided through capacity building. The successful implementation of these projects will undoubtedly lead to a significant decrease in traffic congestions, particularly during the rainy season.

**Table 4.8 Reducing Congestion Caused by Maintenance Problems
-High Priority Project**

Title	Implementing Agency	Short Project Description
Road-48: Capacity Development for Colombo Municipal Council's (CMC) Drainage Maintenance	CMC	Improve CMC's capacity in drainage maintenance and surface maintenance in order to minimize flooding that result in traffic jams
Road-55: Capacity Development for Road Design and Maintenance Coordination	RDA	The purpose of this project is to develop urban road standard design and provide technical assistance for maintenance coordination

(4) Projects to Better Utilize Existing Infrastructures and Facilities

To accomplish this policy objective, the Study Team proposed a traffic management improvement package and demand management measures as well as safety and environmental projects.

ATC and Corridor Improvement

The biggest project in this sub section is Area Traffic Control System Project (TM-2) which introduces an area traffic control (ATC) system to Colombo. The objectives of the ATC system are to realize smooth and safe traffic and prevent congestion where possible through the use of sensory technology at key locations in the road network. To attain these goals, an ATC system maximizes intersection capacity and creates balanced and predictable traffic conditions. On its implementation, a Project Management Unit (PMU) will be setup in the Western Provincial Council to implement the project. PMU staff will be manned by CMC, Traffic Police and possibly RDA in addition to WPC staff. This project will take 2.5 to 3 years to complete.

Intersection Geometric Improvement (TM-1), which builds the capacity of traffic engineering and management staff while at the same time improves the intersection flow at 120 intersections,

should be implemented keeping accordance with the ATC project. The project also includes regulatory measures such as banning right turns and implementing one-way, no parking, or no parking and stopping near intersections. These measures are necessary to increase the effective capacity of intersections and prevent traffic congestion. This project will be handled by CMC and RDA. It is estimated that this project will take 1.5 years.

Capacity Building of CMC and RDA - Traffic Management and Safety (TM-17) is vital to implementing TM-1 and TM-2. This portion is designated to strengthen the capacity of CMC and RDA in traffic management and safety by increasing manpower, conducting training and providing the necessary facilities to operate the proposed ATC system. According to the result of pre-FS, the ATC system is highly viable. It should be put into place as quickly as possible.

Corridor Traffic Management Improvement (TM-6) will cover two arterials of CMR, i.e. A0 Road and Galle Road, which involve comprehensive improvements to traffic management. Major components of the improvement include: intersection geometric improvements; sidewalk construction/improvements; signalization; pedestrian overpasses/underpasses installation; pelican crossings installation. It will be undertaken by RDA and is expected to take 1 year to complete. (Please see Section 26.4 for economic feasibility)

There are no implementation risks from these projects under the fourth objective because all projects will be installed within the right-of-way.

Table 4.9 ATC and Corridor Improvement-High Priority Project

Title	Implementing Agency	Short Project Description
TM-1: Intersection Geometric Improvement Project	CMC and RDA	Improve intersection geometry to enhance both efficiency and safety. Conversion of roundabout into intersection is included, as well as construction/removal of medians, construction/removal of corner islands, provision of right/left turn lane, alignment improvements, pavement improvements, sidewalk improvements, and pavement marking and traffic sign. The target intersections are those where ATC will be installed.
TM-2: Area Traffic Control System Project	CMC and Traffic Police	Introduce an area traffic control (ATC) system to Colombo
TM-6: Corridor Traffic Management Improvement	CMC and RDA	Implement Intersection geometric improvement, Sidewalk construction / improvement, Signalization, Pedestrian overpass / underpass, Pelican crossing, Bus bay and bus halt improvement, Street lighting, Drainage construction / improvement, and Parking controls along major corridors (A1, A2, A3, A4, A1 Special)
TM-17: Capacity Building of CMC - Traffic Management and Safety	CMC	Strengthen the capacity of CMC in traffic management and safety by establishing a traffic management and road safety unit, increasing manpower, conducting training and providing necessary facilities

Addressing Congestion Caused by School Traffic

School traffic concentration in peak hours brings chaos and congestion to the traffic environment in CMR. To alleviate the congestion associated with school traffic, the Study Team proposes the following two projects: the Project to Improve School Transport Services (PT-1), and the Study on Staggering School/Office Start Times and Traffic Management Options (TM-11). Both projects aim to alleviate concentration of traffic during peak periods. The PT-1 envisages shifting private vehicle users and van users to school buses, and the TM-11 plans to expand time staggering and apply physical traffic management measures in the areas

surrounding schools. The PT-1 will be directed by NTC, and MoRT and the TM-11 will be led by Police.

**Table 4.10 Addressing Congestion Caused by School Traffic
-High Priority Project**

Title	Implementing Agency	Short Project Description
TM-11: Study on Staggering School/Office Start Times and Traffic Management Options (TM-11)	MoRT, Traffic Police, and CMC	Prepare comprehensive office and school time staggering strategies; prepare proposals for minor traffic management approaches at schools and offices, and implement proposals under PCUT initiative.
PT-1: Project to Improve School Transport Services	NTC	(i) Develop regulations for school transport drivers and vehicles, as well as identify the process for implementation and (ii) assist NTC in further implementing large capacity school services.
TM-19: Capacity Building of Traffic Police	Traffic Police	The project will establish a Police Driver Training School, where police drivers will be trained on driving rules and manner. Once the training program is established, general drivers will be invited. Frequent violators of traffic regulation and those who have caused severe traffic accident will also be trained.

Improving Traffic Safety and Vehicle Inspection Systems

To sustain a better transport environment, it is necessary to implement and apply safety measures and emissions controls.

Traffic Safety Improvement Project (TM-14) aims at eliminating the existing and potential hazardous accident-prone locations by conducting a safety audit and implementing physical as well as regulatory measures. Accident records indicate that there are safety issues in the design and conditions of existing roads and therefore, the project will investigate accident records, identify accident prone locations, identify causes of accidents, conduct a safety audit of accident prone locations and sections, develop improvement programs, and implement improvement measures. An accident database kept by the Traffic Police will be utilized in the identification and analysis of accidents. Capacity Building of Traffic Police (TM-19) and the TM-17 contain capacity building components for safety improvements in road design and traffic control. These projects emphasize the role safer roads play in decreasing conflicts to traffic through improvements in traffic flow and reductions in traffic accidents.

Cross-Sector Capacity Building - for Personnel and Equipment for Vehicle Inspection, Roadside Inspection, Emissions Inspection, & Monitoring (Env-1) aims at managing manage the urban environment. The proposed capacity building measures include vehicle inspection; roadside inspection; emissions inspection; and monitoring of transport operations will be facilitated for vehicle increase in near future. The Center for Motor Traffic (CMT), Police, RDA, CPC, and CEA are the major stakeholders in this project, which should be initiated and consequently coordinated under PCUT's direction. The project period will take 1 year to implement.

Table 4.11 Traffic Safety and Vehicle Inspection Systems - High Priority Project

Title	Implementing Agency	Short Project Description
TM-13: Road User Education Program	National Council for Traffic Safety, MoRT	Provide knowledge and understanding of traffic rules and manners to road users. Several programs will be developed each focusing on different theme and for different road user groups such as pedestrian, cyclist, motorcycle rider, van driver, and bus driver.
TM-14: Traffic Safety Improvement Project	National Council for Traffic Safety, MoRT	Investigate the accident records, identify accident prone locations, identify cause of accident, conduct safety audit of accident prone location / section, develop improvement program and implement improvement measures
TM-19: Capacity Building of Traffic Police	Traffic Police	The project will establish a Police Driver Training School, where police drivers will be trained on driving rules and manner. Once the training program is established, general drivers will be invited. Frequent violators of traffic regulation and those who have caused severe traffic accident will also be trained.
Env-1: Institutional Strengthening to Increase Capacity of Vehicle Inspection, Roadside Inspection, Emission Inspection, and Monitoring	CMT, Police, RDA, CPC, CEA	The purpose of this project is to provide equipment and increase capacity of personnel at CMT, CPC, CEA, and Traffic Police in terms of vehicle, roadside, emissions, and noise inspection, as well as monitoring.

5 Pre-Feasibility Study

5.1 Pre-Feasibility Projects

Of the 22 high priority infrastructure projects, twelve were selected for pre-feasibility (pre-FS) studies. Infrastructure projects that were either already in the Government's pipeline or faced implementation or serious sustainability problems were eliminated from the pre-FS study list. For each pre-FS project, the following aspects were studied: (1) design specifications and costing; (2) funding and implementation coordination including environmental/social impacts consideration; and (3) Benefit and economic analysis. According to the result of economic analysis and environmental/social impacts, the study team finalized feasibility of each project.

(1) Design Specification and Costing

The Study Team prepared basic designs for each project and estimated costs for the following: (i) resettlement and land acquisition, (ii) construction, (iii) engineering, and (iv) operations and maintenance.

(2) Funding and Implementation Coordination

The Study Team studied potential funding methodologies, including, better use of existing revenue, road user charges, tolling, private sector financing, and foreign funding, the latter of which the Study Team recommends to be suitable for large scale infrastructure development. The Study Team also considered environmental/social impacts and estimated the number of potential resettlements.

(3) Benefit and Economic Analysis

The Study Team forecasted future traffic demand by applying a traffic demand model based on socioeconomic trends. JICA STRADA was used to conduct the network assignment. Based on the outputs of this model, reductions in the indices of travel time and vehicle operating cost (VOC), due to improvements brought about by the implementation of the pre-FS projects, were calculated and utilized to estimate economic benefits.

The Study Team also estimated EIRR and NPV using result of the costing. The EIRR and NPV were calculated for the period from beginning of project implementation to year 2030

5.2 Summary of Pre-Feasibility Study

(1) Road Extension and Widening Projects

Among six road project evaluated in pre-FS, three projects (Road-21, Road-WP2, and Road-WP4) were evaluated as feasible in Table 26.7. Their EIRR is 17.50 % and NPV is 940 million Rs. for all sections. The EIRR value remains in feasibility position even with a 20 % decrease in benefits or 20 % increase in costs.

The other three projects were evaluated as unfeasible, as expensive resettlement and land acquisition costs thwarted their feasibilities. However, for Marine Drive, the Study Team recommends amending the engineering specifications to reduce/minimize land acquisition, or create another land acquisition scheme like value-capturing.

Likewise, the Study Team recommends a revision of engineering specifications for B152/B425. Since B152/B425 runs along the canal bank, improvements will have to be made to increase the level of the road bed, thereby increasing the engineering costs of the project. As a result, the benefits of flood-proofing should be evaluated and engineering specifications should be revised. According to sensitivity analysis, the EIRR will increase up to 9.98 in the case of a 20% decrease in costs, and up to 9.60 in the case of a 20% increase in benefits.

On the other hand, Road-20 can simply be altered by implementation of Road-15 and Road-16 projects. Therefore, the Study Team does not find it necessary to reevaluate the feasibility of this project.

Table 5.1 Feasibility of Road Extension and Widening Projects (1/2)

Item	Road-7: Marine Drive Extension Construction	Road-14: B152/B425 Widening	Road-20: Nugegoda-Katiya Junction-Pepiliyana Widening
1.Implementation Bodies	RDA	RDA, WPRDA	RDA
2. Project Outline	Marine Drive (2km to the north & 1.75km to the south) to be extended to alleviate congestion on Galle Road by providing a viable alternative route along the coastline	To increase the connectivity of the coastal industrialized area of Gampaha District with Colombo Port, and to provide an alternative route for local traffic accessing Colombo from coastal Gampaha	Widening of existing road either to a standard 4-lane or standard 2-lane road facility will increase accessibility between the three important arterials of Horana Road, and A4
3.Implementation Cost (Construction cost)	3,444 Million Rs (226)	2,708 Million Rs (1,049)	1,470 Million Rs (100)
4. Timeframe	4 to 4.5 years	4 to 4.5 years	4 to 4.5 years
5.Economic Analysis	EIRR = 0.75%, NPV = -1,648.5 mil. Rs.	EIRR = 7.94%, NPV = -608.1 mil. Rs.	Not calculated due to its low effect of time saving
6. Implementation Risks	Residential relocation for over 100 households; noise, vibration and waste management during construction period	Residential relocation for over 100 households; major utility relocation	Residential relocation for over 100 households; major religious relocation of religious facilities
7. Final Recommendation	Not feasible due to low return in economic aspects. Biggest issue is some type of value-capture scheme which would be necessary, where land owners would relinquish a certain portion of their land based on future increases in property prices owing to development	Not feasible due to low returns in economic aspects. Project scope should be revised because the development of this section will play an important role for congestion alleviation of Negombo Road	Not feasible due to low return in economic aspects. Road-15 and -16 improvements may control the role of this road section

Table 5.1 Feasibility of Road Extension and Widening Projects (2/2)

Item	Road-21: Thalawatugoda-Pannipitiya Widening	Road-WP2: Thalawatugoda-Koskadwila Widening	Road-WP4: Pannipitiya-Tumbowil Widening
1.Implementation Bodies	RDA	WPRDA	WPRDA
2. Project Outline	4 lane widening for 3.2km between two growth centers (Pannipitiya and Battaramulla) in Eastern area of CMC	Proper two lane widening of collective road for 4.2km in growing Thalawatugoda area	Proper two lane widening of collective road for 7.2km in growing Pannipitiya area
3.Implementation Cost (Construction cost)	1,195 (220)	259 (112)	508 (185)
4. Timeframe	4 to 4.5 years	2.5 years	2.5 years
5.Economic Analysis	EIRR = 17.50%*, NPV = 940.4 mil. Rs. *	EIRR = 17.50%*, NPV = 940. mil. Rs. *	EIRR = 17.50%*, NPV = 940.4 mil. Rs. *
6. Implementation Risks	Residential relocation for over 100 households	No implementation risk because it was designated to minimize land acquisition	No implementation risk because it was designated to minimize land acquisition
7. Final Recommendation	Feasible. Recommended as high priority project due to its high value of return; Should be implemented quickly if funds are available	Feasible. Recommended as high priority project due to its high value of return; Should be implemented quickly if funds are available	Feasible. Recommended as high priority project due to its high value of return; Should be implemented quickly if funds are available

* The three project scopes (Road-21, Road-WP2: Road-WP4) are evaluated as one road project because they can form a continuous link.

(2) Flyover Projects

Among six flyovers, five were found its feasibility. Regarding sensitivity analysis, four projects remain in feasible positions even with a 20% decrease in benefits or a 20% increase in costs, though the Borella-Kanata Flyover (Road-6) will be unfeasible due to a 10% decrease in benefits or a 10% increase in costs. It is recommended to monitor its implementation carefully.

The other unfeasible project is Rajagiriya Flyover (Road-43). Its benefit was smaller than expected because the cross traffic is not enough to install a flyover even though the traffic on A0 Road exceeds 60 thousand PCU per day. The EIRR increases up to 8.24 in case of a 20% decrease in costs and up to 7.88 in the case of a 20% increase in benefits. The Study Team recommends that ATC and geometric shape improvement (TM-1 and TM-2) should be implemented.

Table 5.2 Feasibility of Flyover Projects (1/2)

Item	Road-6: Orugodawatte Flyover (Baseline Road)	Road-6: Borella-Kanata Flyover (Baseline Road)	Road-15: Kohuwala Flyover
1. Implementation Bodies	RDA	RDA	RDA
2. Project Outline	Flyover construction at Orugodawatte (Baseline Road-Avissawella Road) crossing, where attract freight traffic from Northern corridor; put a viaduct (4lanes for 435m) on Baseline Road	Over-bridging for three intersections of Ward Place, Horton Place, and Bauddhaloka Mw on Baseline Road; put a viaduct (4lanes for 1.4 km) on Baseline Road	Over-bridging of Kohuwala intersection, which is operated without traffic signals; put a viaduct (2lanes for 175m) on Horana Road
3. Implementation Cost (Construction cost)	1,339 (1,091)	5,996 (4915)	930 (269)
4. Timeframe	5.5 to 6 years	5.5 to 6 years	4 to 4.5 years
5. Economic Analysis	EIRR = 19.38%, NPV = 631.3 mil. Rs.	EIRR = 12.74%, NPV = 212.8 mil. Rs.	EIRR = 21.75%, NPV = 846.6 mil. Rs.
6. Implementation Risks	Sacred Bo tree located near the intersection; land acquisition is easy as it is surrounded by public space	Residential relocation for over 100 households; sacred tree cutting; use steel viaduct and basement to minimize working period	Construction in density area; the bridge length can be minimized due to vertical geometric condition of intersection
7. Final Recommendation	Feasible. Recommended as high priority project due to its high value of return	Feasible. Recommended as high priority project due to its high value of return; recommended to monitor implementation carefully as it becomes unfeasible in case of a 10 % decrease in benefits or a 10 % increase in costs	Feasible. Recommended as high priority project due to its high value of return

Table 5.2 Feasibility of Flyover Projects (2/2)

Item	Road-17: Armour Street Flyover	Road-17: Kelaniya Railway Flyover	Road-43: Rajagiriya Flyover
1. Implementation Bodies	RDA	RDA	RDA
2. Project Outline	Flyover construction on Kandy Road intersection at port access road; put a viaduct (2lanes for 280m) for right turning movement from South to East	Flyover construction on Kandy Road and SLR main line crossing; put an over-bridge (4lanes for 330m) on Kandy Road	Flyover construction on A0; Road and Nawala Road crossing; put an over-bridge (4lanes for 200m) on A0 Road
3. Implementation Cost (Construction cost)	1,812 (525)	1,381 (744)	1,499 (918)
4. Timeframe	5 to 5.5 years	5 to 5.5 years	4 years
5. Economic Analysis	EIRR = 20.61%, NPV = 1,364.5 mil. Rs.	EIRR = 16.31%, NPV = 336.9 mil. Rs.	EIRR = 6.35%, NPV = -401.6 mil. Rs.
6. Implementation Risks	Residential relocation for over 100 households; sacred tree cutting; use steel viaduct and basement to minimize working period and traffic congestion	Worker safety is an issue due to the proximity of the railway; existing utility infrastructure such as telephone and power lines, as well as some water supply lines, will need to be relocated	Sacred Bo tree located near the intersection
7. Final Recommendation	Feasible. Recommended as high priority project due to its high value of return	Feasible. Recommended as high priority project due to its high value of return	Not feasible due to low return in economic aspects; ATC installation and geometric shape improvement should be installed to solve existing problems

(3) Area Traffic Control and Geometric Improvements of Intersections

Three projects were evaluated as shown in Table 5.3. The ATC system is highly viable and should be put into place as quickly as possible. The corridor improvement looks positive, however, the EIRR will be unfeasible in the case of a 10% decrease in benefits or a 10% increase in costs. It is recommended to monitor its implementation carefully.

Table 5.3 Feasibility of ATC and Intersection Improvement Projects

Item	TM-2 Area Traffic Control System Project	TM-6: Corridor Traffic Management Improvement (A0)	TM-6: Corridor Traffic Management Improvement (A2)
1. Implementation Bodies	A PMU will be setup in Western Provincial Council to implement the project; PMU staff will be manned by CMC, Traffic Police and possibly RDA in addition to WPC staff	RDA	RDA
2. Project Outline	Introduce an area traffic control (ATC) system to Colombo; the objectives of area traffic control (ATC) system are to realize smooth and safe traffic and prevent congestion where possible.	Comprehensive improvement of traffic management from Baseline Road to Battaramulla (5.2 km)	Comprehensive improvement of traffic management from Dehiwala to Ratmalana (3.6 km)
3. Implementation Cost (Construction cost)	207 (207)	114 (114)	72 (72)
4. Timeframe	2.5 to 3 years	1.5 years	1.5 years
5. Economic Analysis	EIRR = 41.30%, NPV = 1,904.2 mil. Rs.	EIRR = 14.27%, NPV = 9.9 mil. Rs.	EIRR = 13.70 %, NPV = 11.5 mil. Rs.
6. Implementation Risks	No implementation risk	No implementation risk	No implementation risk
7. Final Recommendation	Feasible. Recommended as high priority project due to its high value of return	Feasible. Recommended as high priority project due to its high value of return; recommended to monitor implementation carefully as it becomes unfeasible in the case of a 10% decrease in benefits or a 10% increase in costs	Feasible. Recommended as high priority project due to its high value of return; recommended to monitor implementation carefully as it becomes unfeasible in the case of a 10 % decrease in benefits or a 10 % increase in costs.

6 Conclusions

6.1 Introduction

The overall objectives of this study were threefold: (i) identify the Colombo Metropolitan Region's (CMR) urbanization and urban transport issues; (ii) formulate a high priority improvement measures/projects for CMR; and (iii) conduct pre-feasibility (pre-FS) studies for projects to be funded by international donor agencies and propose implementation methodologies to ensure realization of the proposed high priority measures. The study was divided into two phases in accordance with the objectives. Phase I occurred from November 2005 to March 2006 wherein high priority issues and improvement measures were identified. Phase II occurred from May to September 2006 and involved proposing improvement measures for high priority projects, with corresponding pre-FS studies, which can be executed and made operational by 2015.

Based on the findings presented in the previous chapters, the following conclusions can be made regarding the *high priority projects* and *pre-FS projects* considered in this study.

6.2 High Priority Projects

First, the Study Team summarized six high priority issues of urbanization and urban transport in CMR through discussion with the working groups and local experts. In order to alleviate these issues, the Study Team proposed five policy objectives under the overall approach, which was to “improve the public transport system in order to be less dependent on private vehicle use.”

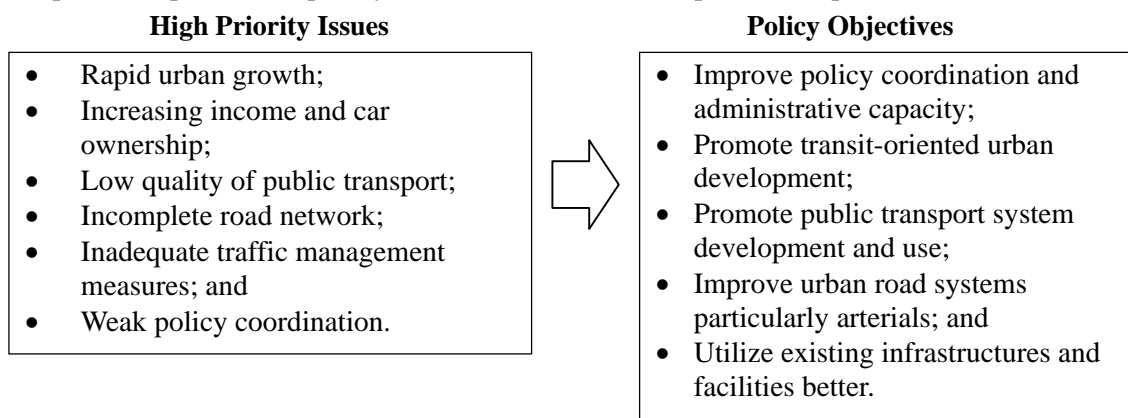


Figure 6.1 High Priority Issues and Policy Objectives for CMR

Secondly, the Study Team reviewed existing proposals for CMR and formulated a long list of projects (209 projects) and selected 46 shortlist projects. Among the 46 short list projects, the Study Team finalized a list of 36 high priority projects as shown in Table 6.1. The selection process was designated to realize the policy objectives⁵.

⁵ Another objective, i.e. “Promote transit-oriented urban development”, was not discussed in this section because it covers long-term projects which do not fit to the project scheme.

The total amount of implementation costs are 32.29 billion Rs. (315.0 million USD)⁶. The Study Team recommends setting up necessary funding arrangement including foreign funding taking domestic financial capacity into consideration.

Table 6.1 List of High Priority Projects

	Project	Implementation Agency	Cost (million USD)
<i>Institutional</i>			
1.	Inst-1 Technical Assistance to Establish the Presidential Committee on Urban Transport (PCUT) and Secondary Coordination Mechanisms	MoRT	0.3
<i>Public Transport</i>			
2.	Bus-1 Technical Assistance to Lay Groundwork for Bus Route Concessioning and Undertake a Pilot Concessioning Project	NTC, WPRPTA	0.4
3.	Bus-2 Project to Increase Intermodal and Intramodal Coordination by Timetable Creation, Implementation and Enforcement	WPRPTA	0.8
4.	Bus-3: Strengthening of NTC on Transport Planning and Operations/ Management	NTC	1.5
5.	Bus-4: Strengthening of SLTB on Operations/ Management	SLTB	1.9
6.	Bus-5: Develop a Training Center at WPRPTA and Undertake Strengthening of WPRPTA	WPRPTA	1.7
7.	Bus-8: Develop Bus Stop Facilities on High Demand Corridors	CMC, RDA	0.8
8.	BRT-1: Develop Bus Rapid Transit System	UDA	0.8
9.	Rail-1: Rehabilitation of Rail Siding & Rail Facilities on the Coastal, Main, KV, and Puttlam Lines	SLR	51.4
10.	Rail-2: Rehabilitation of Signaling, and Communications System on the Coastal, Main, KV, and Puttlam Lines	SLR	67.8
11.	Rail-3: Strengthening of Sri Lank Railways on Planning and Operations/Management	SLR	4.0
12.	PT-1 Project to Improve School Transport Services	NTC	0.2
13.	Road-49: Intermodal Transport Center [Suburban Area]	UDA	12.2
14.	Road-50: Intermodal Transport Center [CMC Area]	UDA	
15.	3W-1: Strengthen the Western Province Road Passenger Transport Authority to Implement and Strengthen the Three-Wheeler Services Bureau and Outline Three-Wheeler Regulations	WPRPTA	0.9
<i>Road Improvement</i>			
16.	Road-1: Outer Circular Highway (OCH) Construction – Pipeline	RDA	--
17.	Road-6: Baseline Road Improvement - Construction Phase III – Pipeline - Orugodawatte Flyover and Borella-Kanatta Flyover	RDA	71.4
18.	Road-15: Improvement of Colombo-Horana Road - Road Improvement - Pipeline - Kohuwala Flyover	RDA	9.1
19.	Road-16 Improvement of Kirulapone-Kottawa Road (A4 Road) – Pipeline	RDA	--
20.	Road-17: Improvement of Kandy Road - Phase I (Kelani Railway Flyover and Armour Street Flyover)	RDA	30.5
21.	Road -18 Improvement of Kandy Road – Phase II – Pipeline	RDA	--
22.	Road-21: Improvement of Road from Pannipitiya to Battaramulla	RDA	11.7
23.	Road 48: Capacity Building of CMC - Drainage Maintenance	CMC	7.5

⁶ Excluding pipeline projects and pipeline portions.

	Project	Implementation Agency	Cost (million USD)
24.	Road-54: Capacity Building of RDA – Land Acquisition & Resettlement	RDA	0.2
25.	Road-55: Capacity Building of RDA – Road Design Standards and Maintenance Coordination	RDA	0.8
26.	Road-WP2 Improvement of Pittakotte–Thalawathugoda–Hokandara–Kokadawila Road	WPRDA	7.5
27.	Road-WP4 Improvement of Pannipitiya–Moralatiya–Tumbowila Road	WPRDA	
<i>Traffic Management and Safety</i>			
28.	TM-1: Intersection Geometric Improvement	CMC, RDA	3.7
29.	TM-2: Area Traffic Control System	CMC, Traffic Police	16.5
30.	TM-6: Corridor Traffic Mgt Improvement	CMC, RDA	2.1
31.	TM-11: Study on Staged School/Office Start Times and Traffic Management Options	MoRT, Traffic Police, and CMC	0.1
32.	TM-13 Road User Education Program	National Council for Traffic Safety, MoRT, and CMC	0.2
33.	TM-14 Traffic Safety Improvement Project	National Council for Traffic Safety, MoRT	0.6
34.	TM-17: Capacity Building of CMC and RDA - Traffic Management & Safety	CMC	0.4
35.	TM-19: Capacity Building of Traffic Police	Traffic Police	1.0
<i>Social and Natural Environment</i>			
36.	Env-1: Cross-Sector Capacity Building - For Personnel and Equipment for Vehicle Inspection, Roadside Inspection, Emission Inspection, & Monitoring	CMT, Police, RDA, CPC, CEA	0.7

Note: Pipelined projects and pipelined portions are shown in Italics

Of the 36 high priority projects, there are three categories, i.e. 11 for capacity building, 7 for non-infrastructure, and 18 for infrastructure development. It is recommended the high priority capacity building and non-infrastructure projects should be fully implemented by 2010 because they are highly cost-effective and necessary for creating the environment to move forward, and they are also vital to implement infrastructure projects. The total cost of these projects is Rs.2.6 billion, which would require Rs.0.66 billion annually, therefore, some of portion can be implemented by domestic budget arrangement and private funding.

6.3 Implementation Strategy

(1) Funding Options

In theory, all the high priority infrastructure projects should be completed by 2015 at the latest. However, the Study Team recognizes the ambitiousness of this plan and recommends that, at a minimum, feasibility studies be undertaken and those projects deemed feasible be implemented. Capacity building and non-infrastructure high priority projects, however, should be finished by the end of 2010 as they set the basis for implementing the large infrastructure projects and they are relatively inexpensive (Total Rs. 2.6 billion or Rs. 0.66 billion annually). Given this time

frame, if all feasible high priority projects are to be implemented, approximately Rs.4.04 billion will be required annually – 25.7% of the annual capital expenditures in the transport sector.

Clearly, the amount of investment required for transport infrastructure is substantial and the lack of resources to meet the needs of the sector is a common problem shared by many countries. Some countries have found a solution to this problem by establishing appropriate mechanisms, such as road funds, to recover costs from road users for the costs of road maintenance, rehabilitation and sometimes even new construction. Others utilize the private sector to play an active role in infrastructure development, operations, and maintenance through public-private partnerships. Neither of these options is currently extensively used in Sri Lanka, although they have been widely discussed. External funding sources are heavily utilized to support the transport sector – about Rs. 7.8 billion annually. Therefore, alternative funding mechanisms need to be found, including better use of existing revenue, tolling, private sector finance, and earmarking funds for transport use.

- **Foreign Funding:** This has and will have to continue to be one of the country's main sources for reliable funding, as Sri Lanka does not have the resources to fund large-scale infrastructure entirely on its own.
- **Better Use of Existing Revenue:** Existing revenue could be more efficiently utilized to produce greater impacts and could consist of a number of measures
- **Increase Road User Charges:** Raising road user charges, especially on heavy vehicles.
- **Tolling:** The use of some sort of tolling is common throughout the world to generate revenue for road maintenance and construction.
- **Private Sector Finance:** Utilizing the know-how of the private sector to help in the construction and operation of transport infrastructure
- **Earmarking:** This mechanism tries to ensure that a certain proportion of road related taxes and charges go directly to an earmarked fund such as a Roads Fund to ensure proper road upkeep.

(2) Political Interference and Institutional Bottleneck

In order to alleviate political interference to the development of the transport sector, the Study Team proposed a mechanism of combining top-down and bottom-up approaches. The former is a PCUT proposal which realize interministeral coordination and project implementation under leadership of Presidential Office. The latter is a series of proposals for capacity building.

(3) Socio and Environmental Issues

Land acquisition/resettlement

Resettlement for over 100 families will be expected at three sites: Thalawatugoda-Pannipitiya widening, Borella-Kanata Flyover construction, and Armour Street Flyover construction. It is highly recommended that RDA consult with the Ministry of Land about the necessity of a RAP for the selected projects as early as possible.

Environment Impact during Execution and Operation

Environmental impacts including air pollution, noise and vibration, road blockage, utility relocation, social conflict, etc, can be expected for all sites of the projects. Therefore, the study team proposed to carry out necessary mitigation measures; on-site training for workers,

periodical wetting for construction materials, installation of low emission vehicles and noise reduction devices, garbage control, etc. There are also 'religious' trees around the site. The Study Team adjusted the alignment to minimize branch pruning of such trees.

During the operation period, it is that expected traffic accidents, air pollution and noise will increase, therefore, the Study Team recommended to introduce pedestrian safety measures, signs, and crossings, and to maintain road conditions.

Stakeholder Meeting

RDA should hold stakeholder meetings to ensure that information about the proposed projects and their environmental implications are understood by the public. The meetings may include government officials, religious leaders, and representatives from non-governmental organizations. It is recommended that RDA prepare a concise packet of information to distribute to participants prior to gathering or be prepared to devote a considerable amount of time in the meetings to provide background information and to answer questions.

6.4 Implementation Schedule

Explanation of implementation strategies are briefly illustrated below.

(1) Projects to Improve Policy Coordination and Administrative Capacity

Establishing PCUT and commencing the Secretariat and its activities is vital to the effective implementation of many of the high priority projects of this study. Therefore, PCUT should start its activities within the 2007 fiscal year. However, delays in passing laws for establishment, policy changes, and acceptance of operational changes by stakeholders will be considered as risks for implementation. Policy coordination will be particularly beneficial for these projects. PCUT can also be utilized to handle the more delicate issues of transport sector coordination, bus concessions, trade unions, and other politically challenging topics such that clear policies and directives can be issued and the challenges of the transport sector addressed.

(2) Promote Public Transport System Development and Use

There are several issues regarding the weaknesses of operations and institutions in public transport sector. Therefore, half of projects were designated for institutional strengthening to accomplish this objective. Note that the PCUT establishment is also vital of this perspective. The others are related to facility improvement, including terminal, new transport system, and railway facility improvement; are necessary to keep present modal share.

An implementation schedule (2007-08 and after 2009) can be summarized as follows;

Table 6.2 Implementation Schedule for Projects to Promote Public Transport System

Year	Projects to be Implemented and Required Actions
2007 to 2008	<ul style="list-style-type: none"> Capacity building projects (Bus-3, 4, and 5), the route concessioning project (Bus-1), and the timetable development project (Bus-2) are to be implemented; they will contribute to improve operational quality and ineffective operation. Also funding coordination for bus infrastructure projects should be started. Capacity building project (Rail-3), the timetable development project (Bus-2) and intermodal terminal development (Road-49 and 50) should be arranged to implement. Implement the consulting service (3W-1) to rationalize regulation of the three-wheeler services
After 2009	<ul style="list-style-type: none"> Implement the bus infrastructure projects (intermodal terminal development (Road-49 and 50), bus stop development (Bus-8, TM-6), and BRT development (BRT-1) Expand route concession activities (Bus-1) into other routes Railway infrastructure improvement projects (Rail-1 and 2) should be coordinated to implement.

(3) Projects to Improve Urban Road Systems Particularly Arterials

Table 6.3 shows scheme for urban road system improvement perspective.

Table 6.3 Implementation Schedule for Projects to Improve Urban Road System

Year	Projects to be Implemented and Required Actions
2007 to 2008	<ul style="list-style-type: none"> Pipeline projects (Road-1 for OCH, Road-6 for baseline extension, and Road 15, 16, 17 for arterial improvement should be arranged to start. Capacity building project (Road 48,54 and 55) should be implemented Land acquisition and resettlement, stakeholder meetings, foreign funds arrangement and D/D implementation funds arrangement should be prepared for flyovers and widening projects.
After 2009	<ul style="list-style-type: none"> D/D for flyovers and widening projects should be implemented when the appropriate funds are available. Infrastructure projects should be accomplished by 2015.

(4) Projects to Better Utilize Existing Infrastructures and Facilities

This study recommends an implementation timeframe (2007-08 and after 2009) as follows:

Table 6.4 Implementation Schedule for Projects to Better Utilize Existing Facilities

Year	Projects to be Implemented and Required Actions
2007 to 2008	<ul style="list-style-type: none"> Capacity building project (TM-17 and 19, Env-1) should be implemented. Funding arrangement for ATC project (TM-2) should be started. Funding by domestic resources should be considered for the small-scale improvements (TM-1 for intersection improvement and TM-6 for corridors)
After 2009	<ul style="list-style-type: none"> ATC project (TM-2) should be started when funds are available.

PROJECT PARTICIPANTS

Steering Committee

Mr. P.M. Leelaratne, Chairperson	Secretary, Ministry of Railways and Transport (MoRT)
Mr. S. Amarasekera, Vice Chairperson	Secretary, Ministry of Highways (MoH)
Mr. M. B. S. Fernando, Vice Chairperson	Chairman, Road Development Authority (RDA)
Mr. Chandra Fernando	Inspector General of Police, Sri Lanka Police
Mr. K. A. Premasiri	General Manager, Sri Lanka Railways
Ms. Sujatha Cooray	Director General, Department of External Resource (ERD), Ministry of Finance and Planning
Mr. B Abegunawardena	Director General, Department of National Planning, Ministry of Finance and Planning
Dr D. S. Jayaweera	Advisor of Planning, Ministry of Finance and Planning
Ms. Ramani Ellepola	Director General, Central Environment Authority (CEA)
Mr. M.A. Jeffrey	Director General, National Transport Commission (NTC)
Mr. Harry Jayathunga	General Manager, Western Province Road Passenger Transport Authority (WPRPTA)
Mr. Nihal Wickramaratne	Director of Traffic, Colombo Municipal Council (CMC)

Working Groups

	WG Chairperson	WG Secretariat
Institutional and Policy Coordination WG (20 members)	Dr. S. Arsecularatne, Additional Secretary, MoRT	Mr. U. N. Mallawaarachchi Director of Planning, MoRT
Public Transport WG (17 members)	Mrs. D.N. Siyambalapitiya Director (Planning and Research), NTC	Mr. B.M. Ifthikar Executive Officer, NTC
Road Development Planning WG (13 members)	Mr. R.M. Amarasekera, Director Planning, RDA	Mr. R.A. Sudath Chief Engineer / Planning, RDA
Traffic Management and Safety WG (20 members)	Mr. Jayantha Guruge Superintending Engineer, CMC	Mr. Lucky Peiris Director, Traffic Admin. & Road Safety, Police Dept
Social and Natural Environment WG (17 members)	Mr. Prasanna Silva Addl. Director General, UDA	Mrs. H. Basnayaka, Director (Environment and LS), UDA

JICA Representatives

Mr. Nobuhiro Koyama	Senior Advisor, Social Development Department, JICA Headquarters
Mr. Naofumi Yamamura	Group III, Social Development Department, JICA Headquarters
Mr. Takumi Ueshima	Resident Representative, JICA Sri Lanka Office
Mr. Hideki Sakata	Deputy Director, JICA Sri Lanka Office
Ms. Miki Inaoka	Assistant Resident Representative, JICA Sri Lanka Office
Mr. Kosuke Odawara	Assistant Resident Representative, JICA Sri Lanka Office
Dr. Tatsuo Takano	JICA Expert, Planning Division, Road Development Authority
Mr. G.W. Kaveendraja	JICA Sri Lanka Office

JICA Study Team (International and Local)

Dr. Chiaki Kuranami	Team Leader / Urban Transport Planner	Mr. Austin Fernando	Institutional Specialist
Dr. William Hayes	Transport Planner (1)	Mr. Hemantha Jayasundera	Urban Planner
Mr. Yoshiya Nakagawa	Transport Planner (2)	Ms. M J Sahabandu	Public Transport Specialist
Mr. Seiya Matsuoka	Traffic Control Planner	Mr. Pradeep Perera	Road Planner
Ms. Allison Davis	Public Transport Planner / Institutional Issues Specialist	Mr. S P Goonatileke	Social/Natural Issue
Mr. Sigeru Sai	Social and Environmental Assessment Specialist	Ms. N J G Jayaweera	Social Specialist
Mr. Takeshi Yoshida	Structural Engineer and Cost Estimator	Bandara	
Mr. Tsuyoshi Nakajima	Highway Engineer	Mr. K W Fernando	Coordinator/
Mr. Alan Cannell	Bus Rapid Transit Specialist	Mr. Roshan Rajith Silva	CAD/GIS Coordinator
		Dr. M M M Najim	Research Assistant
		Ms. E. Chandima N. Silva	Research Assistant
		Ms. Meepage D S Anushka	Secretary/Office Assistant
		Ms. S Wasantha Malei	Office Assistant