
APPENDIX 12: ORGANISATIONS AND INSTITUTIONS

12.1 General

In order to enable an urban transport master plan to work well, it is prerequisite to have a well functioning institutional system from policy and plan making to implementation of various projects in transport sector.

In Bangladesh, organizations and institutions in transportation sector in the study area are manifold, including both directly and indirectly related to the sector. Land transport such as roads and bridges, railways are administered by Ministry of Communication, and inland water transportation by Ministry of Shipping. Dhaka City Corporation and Local Government Engineering Department under Ministry of Local Government, Rural Development and Cooperatives also serve in the sector in Dhaka. This chapter briefly describes the organizations and institutions in transport sector in the study area. In addition to them, Dhaka Metropolitan Police (DMP) has important roles in safety in transportation.

DHUTS will include a modern mass public transport system to alleviate chaotic traffic congestion, together with establishment of institutions to operate such a new public transport system and legal framework.

Dhaka Transportation Coordination Board (DTCB) under MOC was a major coordination board for transportation policy and plan making. It was officially approved by the Cabinet Meeting on 5th October 2009 that DTCB was renamed and reformed to "Dhaka Mass Transit Authority (DMTA)." This new organization will take the place of the former DTCB. DMTA covers so-called capital region of Dhaka, Munsigal, Narayanganj, Gajipur, Narsingdhi, Mymensingh and Manik Ganj.

12.2 Transport Sector Administration

Major public sector administrative organizations and institutions in transportation sector in the study area shown below are described in the sections that follow.

- a) Dhaka Metropolitan Transport Authority (DMTA) (Former Dhaka Transportation Coordination Board (DTCB)), MOC
- b) Road and Highway Department (RHD), MOC
- c) Bangladesh Road Transport Authority (BRTA), MOC
- d) Bangladesh Railways (BR), MOC
- e) Bangladesh Inland Water Transportation Authority (BIWTA), Ministry of Shipping
- f) Bangladesh Inland Water Transportation Corporation (BIWTC), Ministry of Shipping

- g) Dhaka City Corporation (DCC), Ministry of Local Government and Rural Development and Cooperatives (MLG)
- h) Local Government Engineering Department (LGED), MLG
- i) Dhaka Metropolitan Police (DMP)

12.2.1 Dhaka Metropolitan Transport Authority (DMTA)

(Renamed from Dhaka Transport Coordination Board : DTCCB)

(1) General

DMTA was recently established by renamed and reformed from Dhaka Transport Coordination Board (DTCCB) on 5th October 2009 which was officially approved by the Cabinet Meeting.

The DTCCB was created in MOC under Act No. 19 of 2001 and has been responsible for coordination of the planning and implementation of transport schemes in Dhaka City and its environs, that is, Munsigal, Narayanganj, Gajipur, Narsingdhi, Mymensingh and Manik Ganj.

(2) Aims and Objectives of DTCCB

The DTCCB is mainly responsible for the formulation of transport policy for the improvement of transport services in the public and private sectors and also for the coordination of transport sector-related activities of all agencies in the DMA. It is also responsible for the formulation of policies for the management of traffic, pedestrian safety etc.

Aims and Objectives of DTCCB as described in rule 19 of 2001 are as follows:

- a) To advise the concerned authority for a safe and integrated Transport system for Greater Dhaka and to take necessary steps for this.
- b) To Co-ordinate Vehicles, Transport and related infrastructure development planning with the overall improvement strategy of Greater Dhaka according to the structure plan.
- c) To formulate strategic plan for Transport sector in Dhaka and Inter Agency Cooperation.

(3) Activities

Major activities of DTCCB as described in rule 19 of 2001 are as follows:

- a) To formulate Transport regulations to ensure improved transport services with clear directions of Government and non-Government transport system.
- b) To coordinate transport system of Dhaka undertaken by concerned different authorities.
- c) To manage Transport, vehicles, road side place of Dhaka and formulate parking regulations considering the structure plan and Study concerned.
- d) To formulate safety regulations of the Pedestrians and coordinate to implement it.
- e) Coordinate and monitor the projects implemented by the concerned authority.
- f) To formulate policy and guidance related to improved transport service.

- g) To formulate policy to control all public transport and prepare guidelines related to implementation of that policy.
 - h) To formulate regulations for proper implementation of transport project.
 - i) To guide and assist with a view to evaluate the standard and safety of all classes and types of transport.
 - j) To advise tax and other financial matters to achieve the required standard.
 - k) To identify the location for Transport Engineering scheme.
 - l) To approve the drawing of different schemes related to parking facilities of different vehicles.
 - m) To prepare, approve and reconsider transport engineering scheme.
 - n) To prepare planning of transport infrastructure in Dhaka city and to advise about the implementation of that.
 - o) To formulate training policy in a view to create expert manpower in the transport sector.
 - p) To formulate regulations to prepare schemes related to transport.
 - q) To advise the fixation of number and type of different transports and ensure implementation of that advice.
 - r) To assist the application of vehicle and transport related rules.
 - s) To protect the environment pollution which is created by the movement of unfit vehicles
 - t) To carry out any work related to the above mentioned matters.
 - u) To assume other responsibility given by the Government
- (4) Organization structure

In order to achieve its objectives and activities, presently the organization structure of DTCCB was organized as shown in Figure 12.2-1. Originally, DTCCB had 112 posts to implement DUTP created in 1998, and the DTCCB members were paid by the project budget allocated by the Government. During DUTP, DTCCB tried to change the budget source for staff salary from the project budget to the revenue budget. When DUTP was finished, the budget source had not been changed. After 2006, most of the members of DTCCB were not paid and they left DTCCB dysfunctional. DTCCB has accordingly take measures to deputize some positions and have some members to take plural positions.

Current organization structure of DTCCB with 70 posts was approved on 3 September in 2007 and it was officially approved that DTCCB staffs are paid by Revenue budget.

As shown in Figure 12.2-1, only 9 out of 18 positions at officer level and above are filled with the rest vacant, because of rather low remuneration for expertise. In addition, only 17 out of 52 positions of office staffs like MLSS and drivers are filled. It is pressured by the Cabinet to functionalize DTCCB and it hastens to recruit its staff.

As the recruiting activity proceeds to fill posts with official staff, it is likely that DTCCB should

assume its responsibility and duty as designed. It is concerned that the approved payment level is not high enough to attract competent staff to the posts of DTCCB.

What’s worse, being a young organization without project budget, DTCCB cannot assume its responsibility as a coordination body, which requires capacity enhancement measures for DTCCB to work and carry out its responsibility and duty effectively and efficiently.

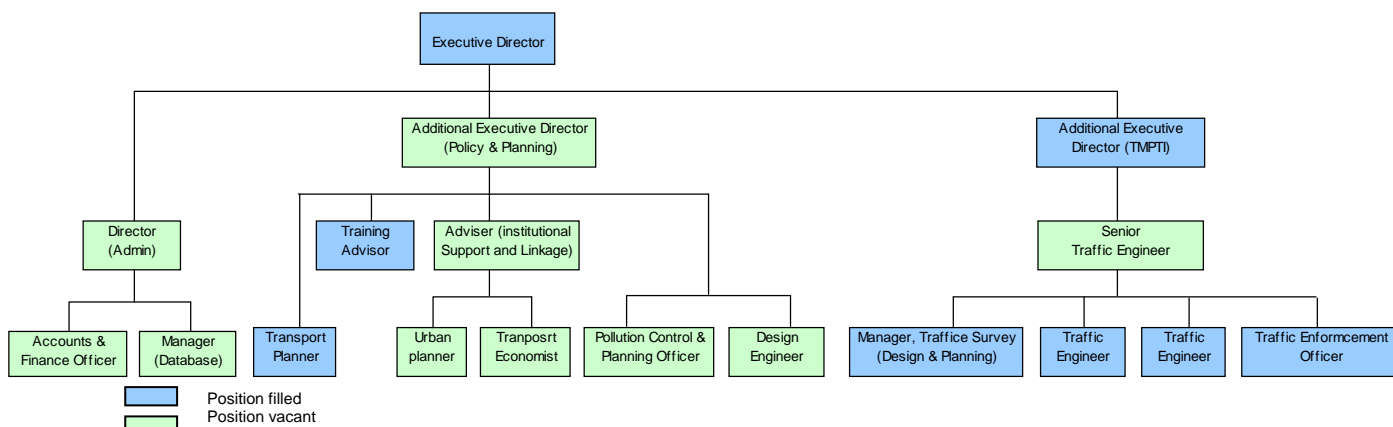


Figure 12.2-1 Organization Structure of DTCCB

Source: DTCCB

(5) Recent movement related to DTCCB

The STP has proposed that DTCCB be restructured and renewed into “a unitary authority” or a reconstructed DTCCB under Prime Minister instead of being under Ministry of Communication, in order to give more power to coordinate to formulate transport policy, plan and implement projects and programs. The proposal, however, seems not to have been accepted by the Bangladesh Government and there is no restructuring the DTCCB as proposed by the STP.

Meanwhile as it have already described above, the DTCCB has been reformed into DMTA.

Furthermore, in parallel with these movements, the DTCCB proposed a revision of the DTCCB Act to be amended the contents as shown in Table 12.2-1. Major amendment points are: 1) change Board members including to change Chairman from DCC Mayor to Minister of Communication, and 2) MRT, BRT and Route Franchise are included in Board activities in corporation with Bus, Railway, and inland water transport. The name of the present Act, “DTCCB Act 2001” is also proposed to be Dhaka Transport Coordination Board Modified Act 2009”.

Table 12.2-2 shows the proposal of amendment to Board Members of DTCCB, with increase of nine members from 24 to 33 including more stakeholders. It is proposed that Chairman be changed from Mayor of DCC to Minister of Communication, because DTCCB is under control of MOC, to avoid skewed power structure.

Table 12.2-1 describes the new inclusion to Article 8 of the DTCCB Act of Board activities to enhance operational capability and integrated inter-modal transportation services.

Table 12.2-1 Proposal of Additional Activities of the DTCB Board

Proposal	Remarks
<p>8 (21) In order to provide improved public transport system in greater Dhaka, introduction of MRT, BRT and Route Franchise are to be incorporated within the scope of operation of Bus, Railways and inland water transport.</p> <p>To accord approval for outsourcing operation of Bus/Rail/Inland water transport to Public, Private or Public-Private joint venture association/establishment and review of operation of these services.</p> <p>Previous Section 8 (21) to be replaced by 8 (22); 8 (22) Carrying out other responsibilities as assigned by the government</p>	<p><u>New inclusion</u></p> <p>Absence of any law pertaining to these issues is creating confusion.</p> <p>Besides, the donors are also insisting on formulation of these rules, as pre-condition for financial assistance</p>

Source: JICA Study Team's unofficial translation of the DTCB's proposal in Bengali

Even though this proposal is passed and realized, the function of the DTCB or the MTRA shall be dependent on integrated transport plan and capacity of the organization for implementation.

Table 12.2-2 The First DTTCB's Proposal for Amendment of Constitution of Board, Art 6 of the DTTCB Act

Constitution of the DTTCB 2001	Proposed Board Members	Remarks
<ol style="list-style-type: none"> 1. <u>Mayor of Dhaka City Corporation</u>, who shall also be the ex-officio Chairman; 2. Secretary of the Ministry for or Division of Roads and Railways, who shall also be the ex-officio Vice Chairman; 3. Two members of Parliament, nominated by the Government; 4. Divisional Chief of Infrastructure Division, Planning Commission, ex-officio; 5. Chief Engineer of RHD, ex-officio; 6. Director General of Bangladesh Railway, ex-officio; 7. Chairman of BRTC, ex-officio; 8. Divisional Commissioner of Dhaka, ex-officio; 9. Commissioner, DMP, ex-officio; 10. Chairman of RAJUK, ex-officio; 11. Chairman of BIWTA, ex-officio; 12. Chairman of BRTA, ex-officio; 13. Chief Engineer of LGED, ex-officio; 14. One representative nominated by the Ministry of LGRD and Cooperatives (Local Government Division), who must have the status of a Joint Secretary; 15. CEO of DCC, ex-officio; 16. Director General of Directorate of Environment, ex-officio; 17. President of BRTA, ex-officio; 18. President of Bangladesh Road Transport Workers Federation ex-officio; 	<ol style="list-style-type: none"> 1. <u>Minister, MOC</u>, who will also be the Chairman 2. Secretary, Roads & Railways Division, MOC, who will also be Vice-Chairman, by virtue of his post 3. Two Members of Parliament nominated by the Government 4. Chairman, Board of Investment (BoI), by virtue of his post 5. Division Chief, Physical Infrastructure Division, Planning Commission, by virtue of his post 6. Chief Engineer, RHD, by virtue of his post 7. Director General, Bangladesh Railways, by virtue of his post 8. Chairman, BRTC, by virtue of his post 9. Divisional Commissioner of Dhaka, by virtue of his post 10. Commissioner, DMP, by virtue of his post 11. Chairman, RAJUK, by virtue of his post 12. Chairman, BIWTA, by virtue of his post 13. Chairman, BRTA, by virtue of his post 14. Chief Engineer, LGED, by virtue of his post 15. An officer of the rank of Joint Secretary, nominated by the Local Government Division. Of the Ministry of LGRD and Cooperatives, by virtue of his post 16. CEO, DCC, by virtue of his post 17. Director General, Directorate of Environment, by virtue of his post 18. President, Bangladesh Sharak Paribahan Samity, by virtue of his post 	<ol style="list-style-type: none"> 1. Minister, MOC has been proposed as Chairman of the Board in place of the Mayor, DCC. 2. Secretary, R&RD, MOC has been proposed as Vice-Chairman, in place of Secretary, Roads & Railways Ministry/Division 4. <u>New Inclusion:</u> Foreign Investment is essential for implementation of STP. In order to involve BoI, the Chairman of BoI has been proposed to be included as a Member of the Board.

Constitution of the DTCB 2001	Proposed Board Members	Remarks
<p>19. President of DCCI, ex-officio;</p> <p>20. Chairman of Tongi Municipality, ex-officio;</p> <p>21. Chairman of Savar Municipality, ex-officio;</p> <p>22. Chairman of Narayanganj Municipality, ex-officio;</p> <p>23. Executive Director of the Board, who shall be the Member-Secretary of the Board.</p>	<p>19. President, Bangladesh Sharak Paribahan Sramik Federation, by virtue of his post</p> <p>20. President, DCCI, by virtue of his post</p> <p>21. Chairman, BTB (BTCL), by virtue of his post</p> <p>22. Chairman, Petrobangla, by virtue of his post</p> <p>23. Chairman, Dhaka WASA, by virtue of his post</p> <p>24. Chairman, DESA, by virtue of his post</p> <p>25. Chairman, DESCO, by virtue of his post</p> <p>26. One WARD Commissioner, nominated by Mayor, DCC</p> <p>27. Chairman, Tongi Municipality, by virtue of his post</p> <p>28. Chairman, Savar Municipality, by virtue of his post</p> <p>29. Chairman, Narayanganj Municipality, by virtue of his post</p> <p>30. Chairman, Manikganj Municipality, by virtue of his post</p> <p>31. Chairman, Munshiganj Municipality, by virtue of his post</p> <p>32. Executive Director of the Board, who will also be the Member-Secretary</p>	<p>21. New inclusion</p> <p>22. New inclusion</p> <p>23. New inclusion</p> <p>24. New inclusion</p> <p>25. New inclusion</p> <p>26. New inclusion</p> <p>30. New inclusion</p> <p>31. New inclusion</p>

Source: DTCB Act 2001 (true translation) and JICA Study Team's unofficial translation of the DTCB's proposal in Bengali.

12.2.2 Roads and Highways Department (RHD)

(1) General

Roads and Highways Department (RHD) is responsible for construction and maintenance of roads and bridges on the main road network of the country. RHD was created in 1962 when the old 'Construction & Building (C&B) organization was divided into two separate bodies (the other being Public Works Department). RHD is responsible for the construction and the maintenance of the major road and bridge network of Bangladesh.

(2) Objectives

The departmental goal is to provide the People of Bangladesh with a safe, cost effective and well maintained road network.

And the purpose of the RHD is stated as follows: "The Roads and Highways Department has a sustainable capacity to plan, manage and deliver its full range of responsibilities in respect of the main road and bridge network and to be accountable for these duties".

(3) Organization

Figure 12.2-2 shows the present organization structure of RHD. RHD has three Wings of Planning and Development, Bridge, and Mechanical, and eight Zonal Operations.

And the recently proposed structure for RHD, consists of five Headquarter Wings/Zones and seven Field Zones, each headed by an Additional Chief Engineer (ACE) who reports directly to the Chief Engineer. In addition, two ACEs will be assigned to manage foreign aid projects one for World Bank Projects and the other for Asian Development Bank Projects. This structure involves the formation of two new Head Quarter Wings, namely the "Bridge Management Wing" and the "Management Services Wing" and many more detailed changes to the existing organization.

12.2.3 Bangladesh Road Transport Authority (BRTA)

(1) General

Bangladesh Road Transport Authority (BRTA) was established in 1988 under the Motor Vehicles Ordinance, 1983, abolishing the former Directorate of Road Transport Maintenance (DRTM). BRTA is a regulatory body to control manages and ensures discipline in the road transport sector and road safety related areas in Bangladesh.

(2) Functions

The BRTA's main activities are as follows:

- a) Control and regulate road transport by executing motor vehicle acts,
- b) Route permits issuance and fixing rates and fares of buses and trucks
- c) Conduct regular activities like: Driving license issuance, fitness certificates, registration certificates and Driving Instructor's license
- d) Registering schools for motoring
- e) Organize and conduct workshop Seminars for delivering information regarding safe driving and traffic regulations
- f) Research, Planning and methodologies' setting for safe road transport and traffic system

(3) Organization Structure

Organization structure is as shown in Figure 12.2-3. The Chairman is the chief executive of the authority. He was assigned by the government to exercises his authority as prescribed by rules.

According to revised organization structure, the number of sanctioned office staff is 573 out of which 282 are working presently. The remaining posts are in the process of recruitment. Circle offices of BRTA are headed by Assistant Director (Engineering) and the divisional offices by Deputy Director (Engineering.).

- h) To contracting out and sub-contracting the buses to the able private owners to promote competition for quality services and co-existence of the public-private relationship in the road transport sector for greater private sector participation in the operation of BRTC buses.
- i) To research vehicle and engine types, safety for bringing harmony in operation of the bus and truck services, and countermeasure of the air pollution's for better environment.

12.2.5 Bangladesh Railways (BR)

(1) General

Bangladesh Railways (BR) is a Government owned and managed organization responsible for all aspects of railway development, operation and maintenance in Bangladesh.

The BR is at present mainly responsible for inter-city passengers and freight transport. It has a limited role in urban transportation system in Dhaka. Office of the Government Inspector of the Bangladesh Railways (GIBR) is responsible for inspections for Bangladesh Railway.

(2) Visions and Mission

BR's vision is to provide safe, reliable, and cost effective and time efficient rail transport service in the country through modernizing, expanding and maintaining rail system in a manner which supports government strategies for economic, social and environmental development.

BR has the following missions:

- a) Develop and maintain railway tracks and station infrastructures throughout the country.
- b) Maintain and upgrade locomotives, coaches and other rolling stocks.
- c) Maintain and modernize signaling and interlocking system and Telecom system of Bangladesh Railway.
- d) Ensure safe, speedy and efficient train operation.
- e) Implement Government transport policy in rail sector.
- f) Procure suitable modern technology related rolling stocks, track materials and signaling systems for Bangladesh Railway.
- g) Manage land asset of Bangladesh Railway.
- h) Ensure optimum utilization of development budget and revenue budget of Bangladesh Railway.

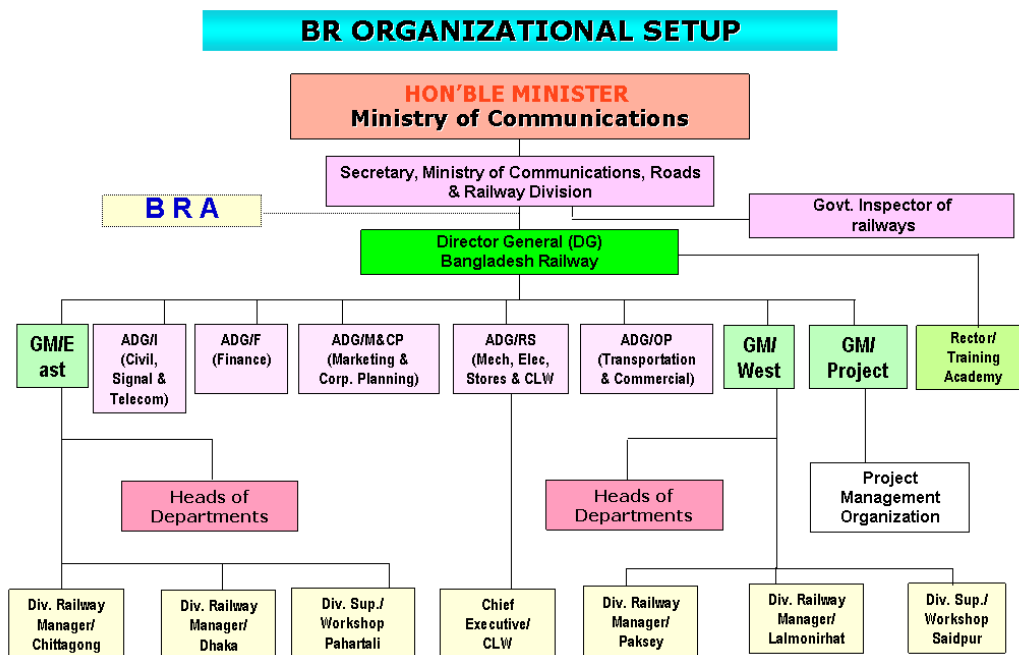


Figure 12.2-4 Organization Structure of Bangladesh Railways

Source: <http://www.railway.gov.bd/organogram.asp>

12.2.6 Inland Water Transportation

There are two major organizations pertinent to inland water transportation in Bangladesh. One is inland water transportation is managed by Ministry of Shipping, under which Bangladesh Inland Water Transport Authority (BIWTA), and the other is Bangladesh Inland Water Transport Corporation (BIWTC).

(1) BIWTA

BIWTA was established in 1958 to develop, maintain, and control inland water transport and certain inland navigable waterways including the circular waterways around Dhaka City. The circular waterway plays a significant role in transportation system in Dhaka to reduce burden on land transportation.

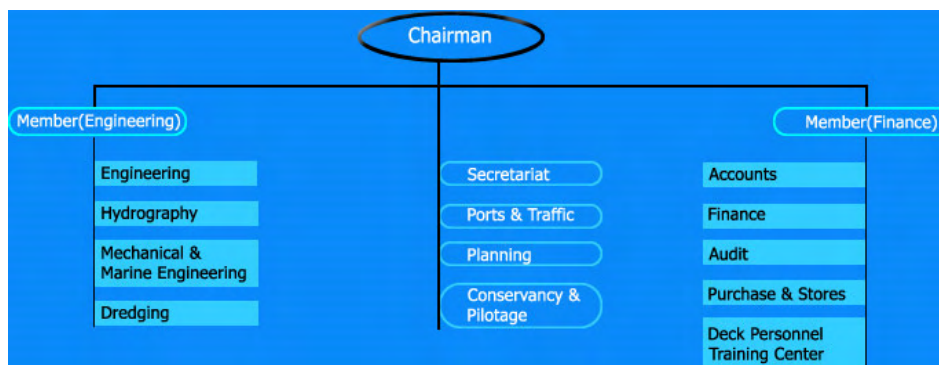


Figure 12.2-5 Organization Structure of BIWTA

Source: <http://www.mos.gov.bd/biwta.htm>

(2) BIWTC

BIWTC was established in 1972 as a government transport organization to serve for transport system for easy and safe transportation of passengers, cargo and vehicles both in Inland and coastal areas.

12.2.7 Dhaka City Corporation (DCC)

(1) General

Dhaka Municipality was established in 1 August 1864. After the partition of India, Dhaka became the provincial capital of the then East Pakistan in 1947. Dhaka became the capital of Bangladesh with the independence in the year 1971. City area was divided into 50 wards in 1977. In 1978, Dhaka Municipality was awarded the status of Corporation. In 1990, Dhaka Municipal Corporation was renamed as Dhaka City Corporation.

(2) Functions in transport sector

Major works for which Dhaka City Corporation is responsible in transport related are:

- a) Maintenance and development of the city streets, roads and lanes;
- b) Maintenance and operation of street lights and traffic signals;
- c) Sweeping and clearing of streets/roads/lanes, drains, markets and public places;
- d) Maintain, repair and improvement of bridges and culverts, footpaths and drains;
- e) Setting up and maintenance of traffic signals at all important road crossings of the city;
- f) Issuance of trade licenses, rickshaw licenses and rickshaw driver's licenses;
- g) Tree plantation on public streets and other public places;
- h) Construction and maintenance of bus terminals;
- i) Development and maintenance of car parking;
- j) Construction and maintenance of markets (of fish, vegetables and other merchandise);

(3) Organization

Dhaka City Corporation is headed by an elected Mayor with the rank and status of a Cabinet Minister. As shown in Figure 12.2-6 of the 16 departments, two departments of Transport and Engineering departments are directly related to transport sector administration.

Whereas the Mayor exercises overall control of some matters, some powers have been delegated to the heads of departments.

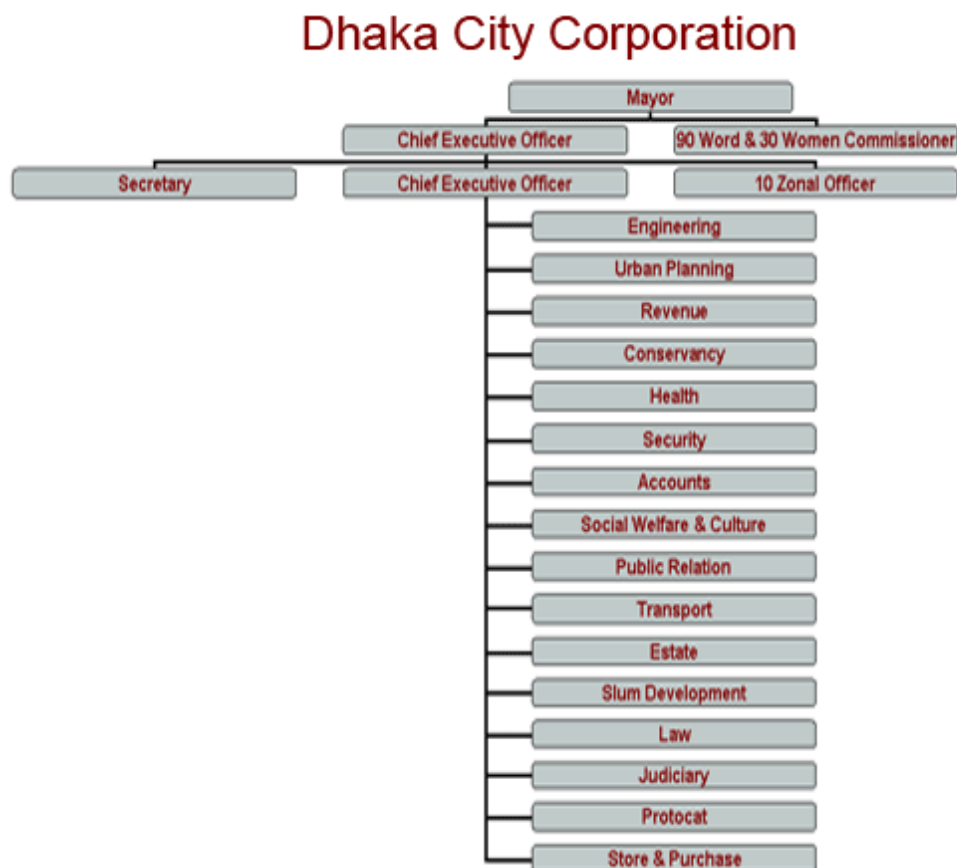


Figure 12.2-6 Organization Structure of Dhaka City Corporation

Source: http://www.dhakacity.org/Page/About/Link_1/2/List_id_1/21/Subid_1/197/Organ_gram

12.2.8 Local Government Engineering Department (LGED)

(1) Major Functions of LGED

The major functions of LGED related to transportation sector can be broadly categorized as follows:

- a) Rural infrastructure development
- b) Urban infrastructure development
- c) Rural infrastructure maintenance

(2) Rural Infrastructure Development Activities of LGED

Major activities related to transportation among the overall rural infrastructure development activities that LGED implement are listed below.

- a) Improvement of Upazila Roads, Union Roads and Village roads (classification of roads).
- b) Construction of Bridges and Culverts
- c) Development of Growth Centers (GC) and rural markets.
- d) Development of rural road master pan.
- e) Development of technical specifications and manuals for construction of rural infrastructures.

- f) Construction of Union Parishad (Council) Complex and Upazila (Sub-District) Complex
- g) Construction of Jetty and boat landing.
- h) Development of Upazila and Union plan book to facilitate local level planning and participation
- i) Development and updating infrastructure database and digital maps.

(3) Urban Infrastructure Development Activities of LGED

LGED provides technical and management support to Urban Local Government Institutions such as City Corporations and City Councils to implement urban infrastructure development programs. Major activities related to transportation among the overall activities are as follows:

- a) Planning and implementation of integrated town centre (bus terminals, markets etc.)
- b) Planning and implementation of municipal roads, bridges and culverts
- c) Housing and land development (pilot)
- d) Land use plan, survey and mapping
- e) Preparation of district town master plan.
- f) Preparation of Upazila town master plan.

12.2.9 Dhaka Metropolitan Police (DMP)

(1) General

Dhaka Metropolitan Police (DMP) was established in 1976 under Ordinance No. 3 of 1976. DMP is composed of five divisions as shown in Figure 12.2-7. There is a traffic division among the five divisions.

The prime duty of the traffic division is to control the traffic movement and enforcing the motor vehicle Act with a view to keeping the traffic gently flowing and smoothly plying.

The whole DMP is furcated into four traffic divisions, as East, West, North and South. Every division has 4 Zones, East has Sutrapur, Motizheel, Demra and Sobujbag, West has Mirpur, Pollobi, Tejgaon and Mohammadpur, North has Uttara, Gulshan, Mohakhali and Badda. South has Ramna, Dhanmondi, Kotowali and Kamrangirchar. Like the crime zones, an Assistant Police Commissioner (APC) is head of the each zone.

This department keeps rapport and liaison with the MOC, Dhaka City Corporation, BRTA and other concerned organizations and also keeps the statistical records pertaining to the violations of traffic law and accidents.

(2) Functions

DMP has the following functions:

- a) To ensure smooth traffic flow everyday,
- b) To take actions against traffic violations,

- c) To enhance comfort of the pedestrians and passengers,
- d) To take measures to reduce road accidents,
- e) To ensure safe and uninterrupted movement of VVIP and VIP, and
- f) To collect fines imposed for traffic violation & deposit it to the treasury.

(3) Organization

Organization structure of DMP is as shown below.

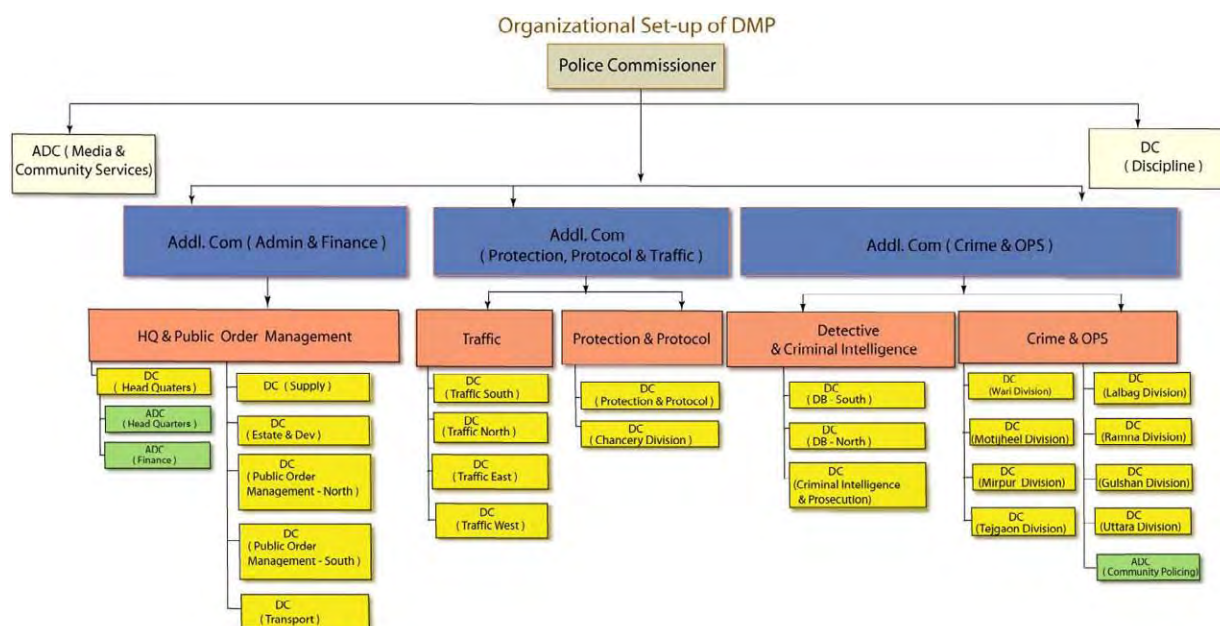


Figure 12.2-7 Organization Structure of DMP

Source: <http://www.dmp.gov.bd/static/organogram.php>

12.3 Issues related to Mass Rapid Transit Authority (MRTA)

12.3.1 General

The previous sections of this chapter describe the functions and activities of the organizations related directly to the transport sector in various transport modes in the Study Area. Introduction of MRT in Dhaka City is mandatory to solve current, chaotic traffic congestion tangled up by various transport modes.

The MRT system, however, will function well only when a comprehensive public transport network of various transportation modes operated in an integrated and seamless manner. For a well functioning operation of the MRT, an organization should assume responsibility of the operation of the MRT system.

Recently, the cabinet approved the amendment of DTCB Act 2001, renaming DTCB Dhaka Mass Transit Authority (DMTA). It was a significant initiative taken by the government toward the implementation of MRT project; however, its functions and organizational structure has not yet decided yet.

The present organization structure of DTCB is still understaffed and the staff recruitment based

on the previously approved organizational structure is under process. Restructuring of DTCB is required in order to strengthen the functions of planning and coordination for comprehensive urban transport network development and management, as well as to fulfill the responsibility of the management of MRT project and its operation. Or establishment of another competent organization should be considered according to phases of the development of MRT system. In addition, more issues to be addressed for functional and sustainable implementation and operation of Mass Rapid Transit.

12.3.2 Organizations settings for MRT projects

(1) Organizations for MRT

In general, with various systems of MRT development and operation, broadly the four functional organizations exist from policy making to actual operation, as shown below.

- a) **Governmental Organization for Public Transport Policy, Plan and Project Formation:** To formulate policy and plan and determine projects for public transportation system including MRT,
- b) **Governmental Regulatory organization.** To regulate the MRT system in safety, service level, fare, etc.,
- c) **MRT Operating Body (Mass Rapid Transit Authority).** To operate the MRT by formulating implementation Program, implement the project, and provide the MRT service.
- d) **Private sector Concessionaire.** To receive concession agreement with the MRT operator (MRTA) for various operation and maintenance of the MRT.

(2) Current Organization setting for MRT in Dhaka

The STP states that the DTCB plays a role as regulatory body in public transport operation, setting standards, fares, and service level, as well as plans the MRT systems. Furthermore, the STP proposes the establishment of a new organization separate from DTCB to operate the MRT system.

MRT system is new to Dhaka and the STP has not been decided which organization would assume responsibility of the MRT project implementation including construction and procurement of equipment.

There are two modes for the MRT system to be introduced in Dhaka, which is, Rail-based (MRT) and Bus-based MRT (BRT). However, it haven't decided yet whether one organization (the MRTA) would take responsibility of operating both modes of MRT or separate operating organization would be established for each mode.

Under such circumstances, there have been discussions on organization options among the stakeholders such as DTCB and MOC, and JICA and the Study Team. The major points discussed are as follows:

- a) **Whether a new organization, Mass Rapid Transit Authority (MRTA) to be established apart from the DMTA**—establishment of a new organization outside the DTCCB or sub-organization within the DTCCB.
- b) **What organizational formation in the future**—difficulty (time consuming process) of establishment a new organization in Bangladesh government system and difference in lead time for the start of BRT and MRT; it requires shorter time for the former, and longer time say more than 10 years, for the latter. A sub-organization (department) with the function of MRTA might be set up within the existing DTCCB's organization framework, and an independent organization will be established in the future. Furthermore, the future continuity of the BRT will influence the organizational framework, whether the BRT will be replaced by the MRT, or both will co-exist in complementary relation in the network. This must be discussed in the development framework of overall public transportation network system in Dhaka in the future. This also shall be discussed in relation to F/S of a BRT proposed by the STP.
- c) **Organizations for operation of BRT and MRT Systems.** At initial stage the implementation organization of MRT shall treat with both BRT and MRT; this will be separated into two exclusive organizations for BRT and MRT in the future as the operation size grows.

The Cabinet approved in 5 October 2009 on renaming of DTCCB to DMTA and reorganization of the Board. As a result, the chairperson of the board will be changed from Mayor of DCC to Minister of Communication; and additional authority of MRT projects will be given to DTCCB. Detailed functions of DMTA have not yet decided but this could direct the reformed DTCCB to fulfill its mandate with two major functions as coordinator of transport policy and plan making, and implementer and operator of MRT.

12.3.3 Issues related to MRTA

Based on the above-mentioned reformation of DTCCB to DMTA and on organization options of MRTA in a process of MRT system development, the following are thought to be major issues to be addressed in institutional set-up for MRTA as follows:

- a) Enhancement of capacity of DMTA as planning coordinator and MRT Implementation body
- b) Clear definition of DMTA as government organization for policy and plan in transport sector and as MRT implementation organization
- c) Clear demarcation of roles of regulatory body and MRT Implementation body
- d) Policy formulation and establishment of legal and institutional framework for DMTA
- e) Gradual (Staging) establishment of MRT implantation organization
- f) Consensus making among the Stakeholders

In addition, in order to secure the project viability, there are two more issues to be addressed.

- a) Mechanism for Realization of Integrated Intermodal Operation of Public Transport
- b) Non-rail business for financial viability

These issues are described below.

(1) Issues related to organizations pertinent to MRTA

- a) Enhancement of capacity of DMTA as planning coordinator and MRT implementer
DMTA (DTCB) has not functioned well in its planning and coordination mandates, because of being understaffed with less authority in coordination and decision making. DMTA has more function than what DTCB has had; it is concerned whether DMTA will fulfill the enlarged functions as expected.

Introduction of MRT System surely makes DMTA's task more complicated and extensive, with more planning work and coordination among the stakeholders of public transportation, roads, and urban development.

In order to functions DMTA as designed and expected, DMTA shall have to enhance its capacity by proper recruiting and allocation of qualified work force, strengthening of authority, etc.

- b) Policy formulation and establishment of legal and institutional framework for DMTA
Form the stages of preparation work of F/S, D/D, and Implementation programs of the MRT project, policy framework and resulting legal framework shall be established in the following, but not limited to:
 - i. DMTA Act and related regulations
 - ii. Asset ownership of the MRT
 - Infrastructure (including stations, depot)
 - Rolling stock and others
 - iii. MRT Operating Company
It is likely that the Government will outsource the operation of MRT to the private sector.
 - iv. Regulation related to private sector involvement, including concession
 - v. Regulation related subsidy by the government to the MRT project at operation phase
- c) Clear definition of DMTA as government organization for Policy and Plan in transport sector and as MRT implementation organization

As a result of the Cabinet Resolution, the new DMTA is provided with two functions of transport plan and coordination in transport sector, and MRT implementation, which will lead to creation of the two divisions as such.

Two functions of planning and implementation are different; that is why, as seen in examples of relation of MRTA and government in the several countries as shown in Section 8.3.4 Examples of MRTA and Government Involvement. Consequently, legal framework about MRTA shall be reviewed so that DMTA shall fulfill its double functions in a clear

manner.

d) Clear Demarcation of Roles of Regulatory Body and MRT Implementation Body

Project implementation and operation of MRT has been the central agenda to discuss, and there has not been much discussion on the function of regulatory body to MRT. The STP has proposed that the DTCCB plays a role as regulatory body.

MRT implementation body of the newly introduced MRT System shall comply with the rules and regulations in terms of safety operation, service level, fare structure which are to be set by the governmental regulatory body.

Even when DMTA contract out the operation of MRT to a private sector concessionaire, DMTA still shall be MRT operator. And the regulatory body and operator co-exist in the same organization if the DMTA is the regulatory body.

If the DTCCB's reformation into the new DMTA terminates DMTA's regulatory function, another organization must play a role as regulatory body. Or, at the stage of the implementation of the MRT project in the future, operation function shall be divided from DMTA and a new MRT implementing company shall be established.

e) Gradual development of MRT operation organization

MRT will be developed in both forms of BRT and Rail-MRT. Implementation and operation of these modes are different in character and it is unclear that an organization will be able to handle both modes of BRT and Rail-MRT. Accordingly, there will be option to separate the implementation organization for BRT and Rail-MRT as the size of the operation grows in the long-term plan.

f) Consensus making among the Stakeholders

Before giving a go-sign to the MRT project, there must be agreement among all the relevant stakeholders for a smooth commencement of the project. It is expected that the DMTA should take initiatives for consensus making among stakeholders.

The following are stakeholders:

1. MOC/ DMTA (the former DTCB)	<u>Overall transport policy, plan and coordination:</u> DMTA is a main coordination and policy/plan making body in transportation sector. Further it will be involved in MRT implementation and operation.
2. Bangladesh Railways (BR)	<u>Another railway operator, which may include commuter services.</u> BR provides railway services other than the DHUTS proposed MRT in the area, and commuter services will be expected by National Transport Policy. Relationship of the MRT and BR's train services must be comprehensively integrated into the Dhaka public transport system.
3. RAJUK	<u>Land use and urban development linking with transport system.</u> As a development management body, RAJUK must be heavily involved in MRT project in relation to its land use and urban development projects for consistent and sustainable development of the area.
4. BRTA/ BRTC/BIWTA/ BITWC/ Other public transport service operators	<u>Public transport operators to be integrated into comprehensive public transport system.</u> Public transport administrator and operators other than railway should be integrated into the comprehensive public transportation network in Dhaka, with smooth inter-modal connecting system in physical and operational points of view.
5. DCC & Upazilas' surrounding DCC	<u>Local governments influenced directly by the MRT development.</u> Local governments to whom the MRT will serve should be involved in the MRT development process.
6. DMP	<u>Transport safety.</u> The DMP will play a major role in passenger protection.
7. Ministry of Finance	<u>Finance for the MRT project.</u> For the MRT project, it is assumed that the Bangladesh Government should borrow a soft loan from donors, and Ministry of Finance is a stakeholder.

It is expected that DMTA shall coordinate and conclude the consensus among such stakeholders. In order for that, DMTA must analyze the status of stakeholders in the following aspects.

- a) Overall stance on the MRT project: Alignment, relation with land use and urban development projects
- b) Financial Sharing: Financial burdens among the stakeholders
- c) Asset ownership: Infrastructure and rolling stock
- d) Operational relation: Among various public transport service providers

Furthermore, public transport users' opinion shall be reflected to the MRT project. Their opinions are to be collected and reflected in the MRA project by conducting a survey to public transport users by the Study Team.

(2) Issues related to Measure to Improve Viability of MRT project

In addition to the issues directly related to MRTA settings discussed above, there are some more issues to be addressed in relation to MRT project viability.

a) Mechanism for Realization of Integrated Intermodal Operation of Public Transport

Improved intermodal transfer system or connection of public transport modes with the Dhaka MRT, based on the users needs, is vital to facilitate people's modal shift to the MRT. The intermodal mobility is improved by not merely physical improvement of transport facilities but soft components such as a common ticketing system, an integrated timely operation for easier and shorter transfer among the modes.

Furthermore, in respect to rail-based commuter system, National Transport Policy (April 2004), provides in section 9.5.2, a development policy for a rail commuter services on Bangladesh Railways, between Joydebpur and Narayanganji, which aims to serve by the year 2012, 200,000 persons per day. This is also a part of comprehensive public transport network of the Study area.

It needs a mechanism or an organization to promote such soft components among the public transport modes to realize such an integrated intermodal operation, although this may be a part of coordination work of DMTA. To facilitate this, the idea of Public Transport Alliance, which is popular in France and Germany becomes a good reference for improvement of the service level of the overall public transportation. The major function of the Alliance is to facilitate joint efforts with public transport operators to optimize their profits and modernize the management while maximizing user's benefits.

The Concept of **Transport Alliance** is popular in France and Germany. Most public transport operators had suffered from chronic, financial deficits because of increase in operation cost and reduction of users, by lack of government policies on how to integrate and make coherent public transport systems and urban development. Along with environment-friendly city, *Transport Alliance* will contribute to materialization of such policy.

Transport Alliance will tackle the following issues:

- i. Rational fare structure for each public transportation mode,
- ii. Introduction of joint-ticketing system,
- iii. Reviewing of rational and efficient bus service routes with MRT system,
- iv. Adjustment of operation timetables to minimize transferring time loss,
- v. Joint campaign for promotion of users' manners,
- vi. Proposal of justifiable subsidies and various support from the government,
- vii. Other issues arising in the operation

The following chart illustrates a concept of Transport Alliance in Dhaka

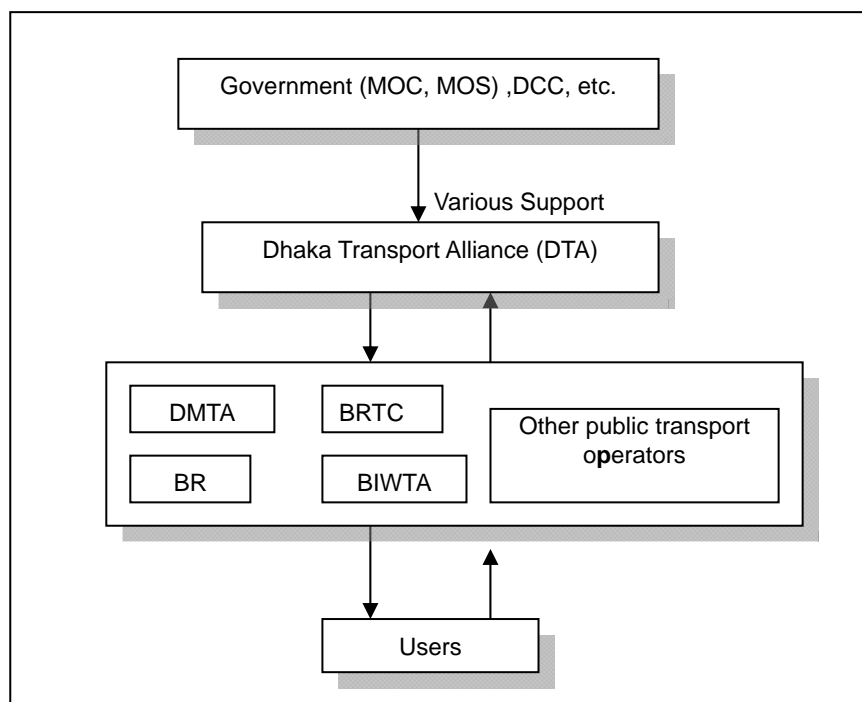


Figure 12.3-1 Functional Framework for Integrated Management System of Public Transport

Source: JICA Study Team

b) Non-rail business for financial viability

Financial viability is crucial for a sustainable project operation of the MRT. Most of MRT projects have financial difficulties in revenue with only fare-box revenue. Furthermore, in Dhaka, the affordable fare level of potential users of the MRT is expected low taking account of the current fares of various public transport modes, rickshaws to route buses in Dhaka.

Under such circumstances, urban development along the MRT and around its stations is considered to be a good financial source for the project. Such non-rail business should be incorporated in the project scheme of the MRT project through development by RAJUK, DMTA, and the private sector who will be involved in the MRT project.

12.3.4 Actions to be taken by the Government, DMTA, for the MRT Project

The following actions shall be taken by DMTA or the Preparatory Committee organized by DMTA.

- (1) Determination of the MRT project framework:
 - a) Determine the future MRT network (the framework for project identification)
 - b) Determine the project development process, and how those affected can participate
 - c) Define the MRT role (its target market and tariff) and how it is to interface with buses/ other rail services
 - d) Determine the route - key station locations, vertical alignment and environmental acceptability, impact on road network, integration with other lines

- e) Determine the purpose of engaging with the private sector (improving planning effectiveness, raising private finance, operational efficiency)
- (2) Conduct Feasibility Study
- a) Determine the maximum scale of public investment on the basis of external benefits
 - b) Determine the subsidies that are justified (e.g. to classes of users), and how target these efficiently and acceptably
 - c) Establish an implementation program
- (3) Consensus making and coordination among Stakeholders
- a) Overall stance for Mass Rapid Transit Project
 - b) Financial burden share
 - c) Assent ownership
- (4) Financial detailed scheme design
- a) Refine impact of enhancement measures by obtaining commitment from stakeholders
 - b) Formulate roles among stakeholders and risk allocation
 - c) Define financial allocation and budget
 - d) Define equity allocation among relevant governments and private sector
- (5) Project Preparation
- Study organizational settings and institutional and legal framework at each of the development phases of preparation, plan, design construction, operation and maintain, and manage the project,
- (6) Detailed Enhancement measures
- a) Plan development of surrounding area
 - b) Review integration of public transport network with MRT
 - c) Fare integration with other public transportation
- (7) Preparation of MRT implementing company setup
- a) Design mission/vision
 - b) Define responsibility and scope
 - c) Organization design
 - d) Select management people and build management capability
- (8) Formulate Project scheme for Public-Private Partnership
- a) Project scheme
 - b) Structure the concession contract to meet government objectives
 - c) Implementation body
 - d) Legal settings

- (9) Monitoring of regulatory revision
 - a) Monitor the progress of revision of related laws and regulation
 - b) Define MRT performance specification (including capacity requirements) – that provides the basis for regulation
 - c) Regulate by administering the concession contract/ otherwise

12.3.5 Examples of MRTA

- (1) Examples of MRTA and government organizational framework

MRT projects are implemented and operated mostly by government initiatives. Table 12.3-1 shows roles and involvement of central and local government in implementation and operation of MRT projects in several countries in Asia.

MRT implementing organizations generally are government bodies, such as government-owned corporations or authorities, regardless of the types of involvement of governments, that is, central government, local government or both. Some of the MRT implementing organizations, as shown in the cases in India in Table 12.3-1, involve the private sector as Special Purpose Vehicle (SPV). They are under control and supervise of the pertinent government organization.

Table 12.3-1 Summary of Mass Transit Operation and Involvement of Government in Selected Countries

Mass Rapid Transit	Implementation organization	Central Government Involvement	Local Government Involvement	Features
Delhi Metro Rail Corporation (DMRC) Phase 1	Delhi Metro Rail Corporation (DMRC); est Mrch 1995	Government of India (GOI) (50% capital share)	Gov. of National Capital Territory of Delhi (GNCTD) (50% capital share)	<ul style="list-style-type: none"> - DMRC was established under Company Act 1956 - The Metro Railways (Construction of Works) Act of 1978 - Board chairman from GNCTD - Metropolitan Transport Projects started in 1969, Master Plan formulated in 1971; approved in 1972.
Metro Railway, Kolkata	Metro Railway, Kolkata (Open in 1984)	Under the control of Railway Board, under Ministry of Railway		<ul style="list-style-type: none"> - SPV: Kolkota Metro Rail Corporation (KMRC)
Kolkata Metro Rail System	Kolkota Metro Rail Corporation (KMRC) (To be open in 2014)			
Chennai Metro Phase 1	To be open in 2014	SPV capital by Indian Government (50%)	SPV capital by Tamil Nadu State Gov. (50%)	<ul style="list-style-type: none"> - Implementation by SPV: Chennai Metro Rail Ltd. (CMRL) - Incorporated on 03.12.2007 under the Companies Act. - It has now been converted into a Joint Venture of Government of India and Government of Tamil Nadu with equal equity holding. - SPV's Board Chairman is Secretary to Ministry of Urban Development
Mumbai Metro	To be open in 2011		Mumbai Metropolitan Region Development Authority (MMRDA)	<ul style="list-style-type: none"> - Project Implementation Agency (PIA) is MMRDA; est. in 1975 under the MMRDA Act 1974 - Mumbai Metro One Private Limited is a SPV incorporated under the Companies Act, 1956 to implement the Versova- Andheri- Ghatkopar (VAG) Metro corridor in Mumbai. It is a Joint Venture Company formed by Reliance Energy Limited, a Reliance ADA Group Company, Veolia Transport, France and MMRDA - BOOT (Build-Own-Operation-Transfer)
Mumbai Monorail	To be open in 2011		MMRDA/Government of Maharashtra	<ul style="list-style-type: none"> - A Consortium of Larsen & Toubro Ltd. India and Scomi Engineering Bhd. Malaysia appointed as implementing agency
Hyderabad Metro Rail	To be open in 2011		Hyderabad Metro Rail (HMR, Government	<ul style="list-style-type: none"> - Chairman of Board: Principal Secretary to Government, Municipal Administration & Urban

				corporation) established by Andhra Pradesh State Gov.	Development Department
Bangalore Metro Rail Phase 1	To be open in 2011			Bangalore Mass Rapid Transit Ltd. (BMRTL), established by Karnataka State Gov.	<ul style="list-style-type: none"> - BOT - BMRTL was incorporated by the State Government to implement the mass rapid transit system in 1994 - Board Chairman is Secretary of Ministry of Urban Development, Government of India. - LRTA manages construction, operation, maintenance and lease of light rail system - LRTA is a wholly owned government corporation created on July 12, 1980 under Executive Order (EO) No. 603 - Board Chairman: Secretary, DOTC
Manila Light Rail Transit	Light Rail Transit Authority (LRTA)	Under Dept. of Transportation and Communications (DOTC)			<ul style="list-style-type: none"> - MRTA is a private consortium responsible for the maintenance of the Manila Metro Rail Transit System - MRTA was awarded a Build-Operate-Transfer (BLT) contract by the DOTC. The DOTC would have ownership of the system and assume all administrative functions, such as the regulation of fares and operations.
Manila Metrostar Express	The Metro Rail Transit Corporation (MRTC)	Under Dept. of Transportation and Communications (DOTC)			<ul style="list-style-type: none"> - PT Kereta Api is Indonesian Railway Company
KRL JABODETABEK	PT Kereta Api Commuter PABODETABEK				<ul style="list-style-type: none"> - PT MRT Jakarta shareholders composition is, Provincial Government of DKI Jakarta 99%; and PD Pasar Jaya 1% (PD Pasar Jaya is Regional Owned Government Company which managed all the public market in Jakarta) - Amendment of the Railway Act allows local government owned company to manage and operate railway infrastructure. - Finance is under both Jakarta gov. and state government. - PT MRT Jakarta was designed and born based on recommendation from the study conducted by JBIC and agreements between JBIC and Government of Indonesia to become a single window of activities to make sure the completion of the project
Jakarta MRT	To be open in 2016 PT MRT Jakarta			Under Jakarta DKI	

Bangkok Skytrain	Bangkok Mass Transit System Public Company Ltd.			
Bangkok MRT	Bangkok Metro Public Company Ltd. (BMCL)	Under MRTA (Mass Rapid Transit Authority) under Prime Ministry's Office		<ul style="list-style-type: none"> - BMCL was established in 1998 - MRTA is a state corporation - BMCL has become the first metro operator in Thailand since MRTA has given BMCL a confidence to be the concessionaire of operating The M. R. T. Chaloen Ratchamongkhon Line Project (The MRT System) on August 1, 2000. - MRTA is authorized to operate Mass Rapid Transit Systems within the Greater Bangkok Area and other provinces - Rapid KL is a state owned company under the control of Ministry of Finance
Kuala Lumpur Rapid KL Light Rail Transit	Rapid KL	Under Ministry of Finance		<ul style="list-style-type: none"> - Rapid KL is a state owned company under the control of Ministry of Finance
KL Monorail	KL Star Rail Sdn Bhd,			<ul style="list-style-type: none"> - KL Star Rail Sdn Bhd is a wholly-owned subsidiary of Syarikat Prasarana Negara Gerhad (SPNB) - SPNB is a 100% government-owned company which was set up to own the assets of several public transport services in KL
KTM Komuter	Keretapi Tanah Melayu Bhd (KTMB: Malaysian Railways Limited)			<ul style="list-style-type: none"> - Malayan Railway Administration (a corporate sole established under Section 4 of the repealed Railway Ordinance 1948), it came to be known as KTMB after the government-led corporation in 1992. However, it remained wholly owned by the federal government

(2) Examples of Organization Structure of MRTA

Figure 12.3-2 to Figure 12.3-5 shows some examples of MRTA in Asian countries. Generally, the MRT implementing organizations have the following functions. In designing MRTA's organization structure, these functions are referred.

- a) **Planning**
- b) **Engineering**
- c) **Operation and Maintenance**
- d) **Administration** (Accounting, Finance, Human resource, general administration, Audit, Legal Affairs)
- e) Construction
- f) Public relations
- g) Business (commercial) development
- h) Land acquisition, if any
- i) Concession
- j) Others

ORGANISATIONAL CHART OF DELHI METRO RAIL CORPORATION

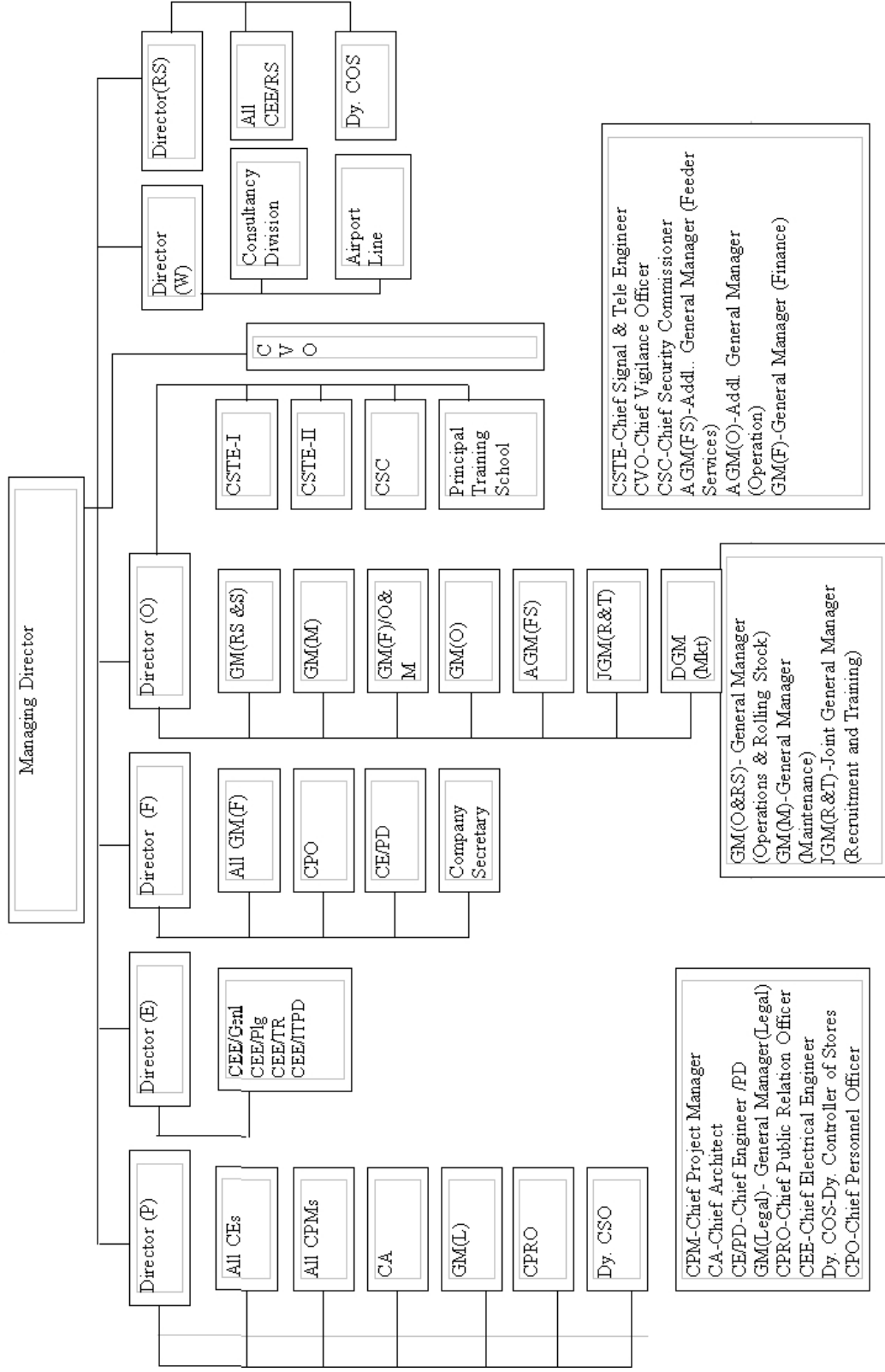


Figure 12.3-2 Organization Structure of Delhi Metro Rail Corporation

Source: Delhi Metro Rail Corporation

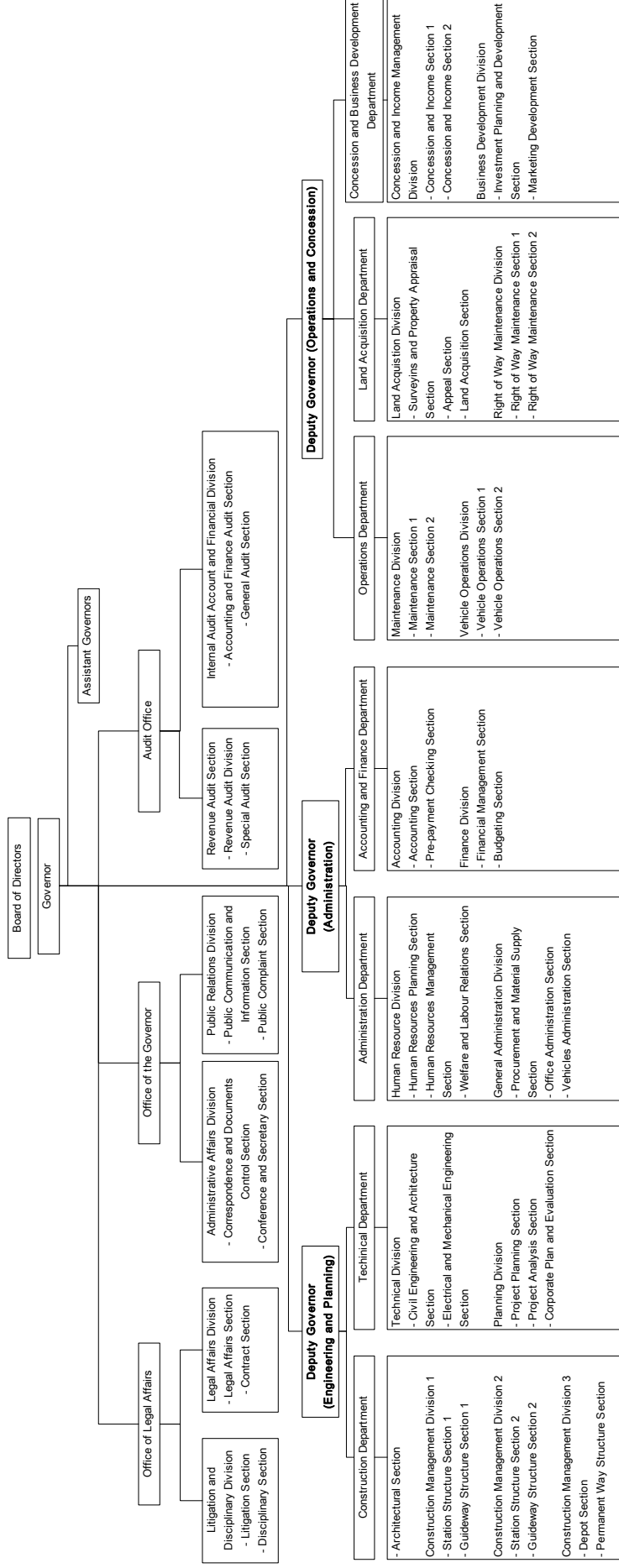


Figure 12.3-3 Organization Structure of Bangkok Metro Public Company Ltd. (BMCL)

Source: Bangkok Metro Public Company Ltd. (BMCL)

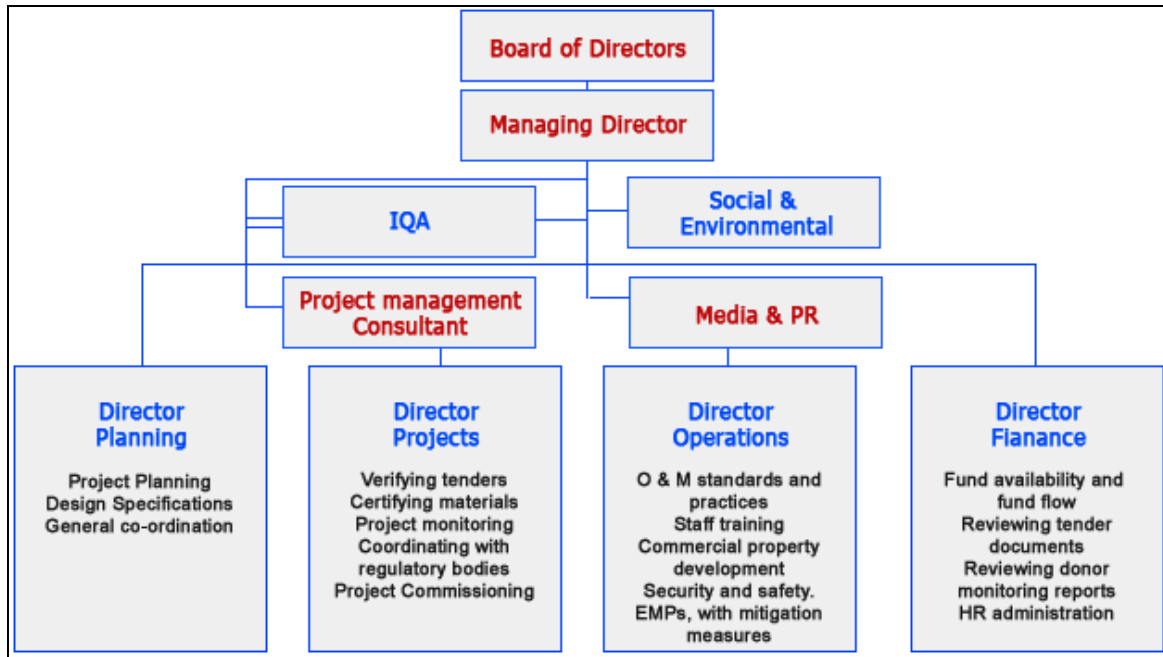


Figure 12.3-4 Organization Structure of Kolkata Metro Rail Corporation

Source: Kolkata Metro Rail Corporation

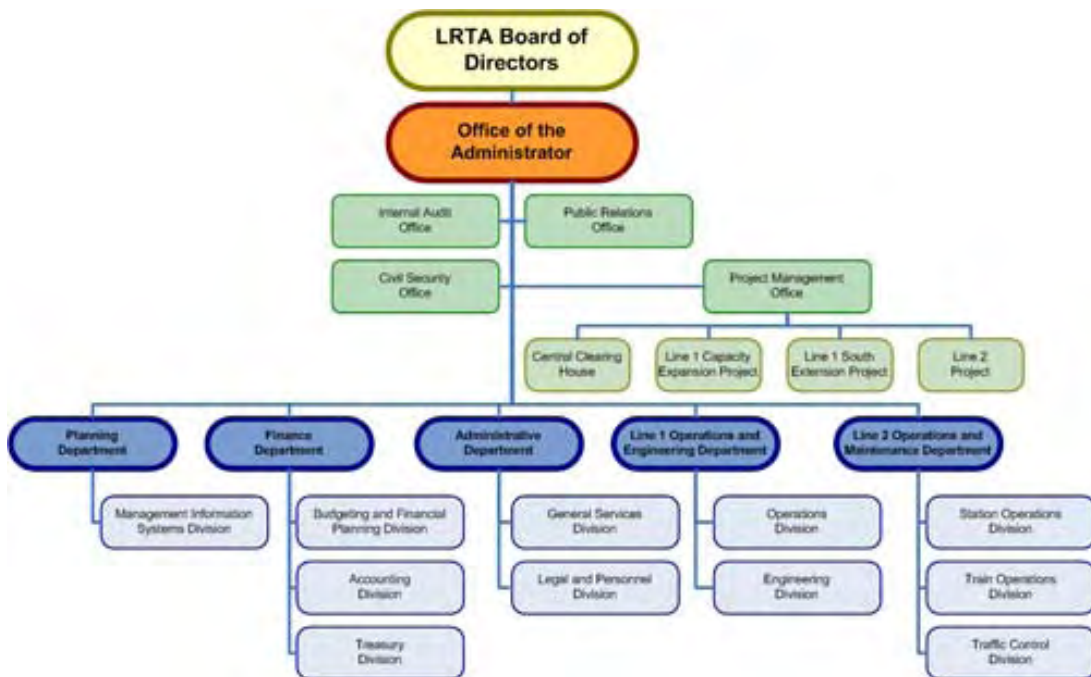


Figure 12.3-5 Manila LRTA

Source: Manila LRTA

APPENDIX 13: INSTITUTIONAL DEVELOPMENT FOR MASS RAPID TRANSIT (MRT)

13.1 Introduction

In this chapter, a discussion is focused on organizational and institutional development to provide the conditions for the realization of rail-based MRT project and its sustainable operation in Dhaka.

MRT is composed of two transport systems in Dhaka: one is rail-based MRT and the other is BRT. The organization for BRT operation was also considered to some extent in relation to the overall framework of the institutional development. Rail-based MRT is hereinafter referred to as MRT.

Introduction of MRT in Dhaka City is mandatory to solve current chaotic traffic congestion tangled up by various transport modes. However, the MRT system will function well only when a comprehensive public transport network of various transportation modes operated and integrated in seamless manner. For a well functioning operation of the MRT, an organization should assume responsibility of the operation of MRT system, while the government organization must play important roles such as comprehensive transport planning, project identification, determination of project development process, definition of MRT role, integration of MRT system with other transport modes, determination of subsidies, definition of MRT performance specification and regulations, etc.

Recently, the cabinet approved the amendment of DTCA Act 2001, renaming DTCA as Dhaka Mass Transit Authority (DMTA). It was a significant initiative taken by the government toward the implementation of MRT project. However, its functions have not yet decided. The JICA Study Team analyzed the cases of MRT development and operation in foreign cities, and identified the key issues in the current institutional system and discussed those issues among the relevant bodies.

The overall institutional development framework was proposed in this chapter as a result of discussions held with various stakeholders. Furthermore, according to the framework, detailed organizational structures of two key organizations, DMTA and the operating company (DMTC) were proposed, as well as the regulatory frameworks including laws and regulations.

13.2 Issues Related to Mass Rapid Transit Organizations

13.2.1 Organizations Settings for MRT projects

In general, with various systems of MRT development and operation, broadly the four functional organizations exist from policy making to operation, as shown below.

- **Governmental Organization for Public Transport Policy, Plan and Project Formation:** To formulate policy and plan and determine projects for public transportation system including MRT,
- **Governmental Regulatory organization:** To regulate the MRT system in safety, service level, fare, etc.,
- **MRT Operating Body:** To operate the MRT by formulating implementation Program, project implementation, and provide the MRT service.
- **Private sector Concessionaire:** To receive concession agreement with the MRT operating company for various operation and maintenance of the MRT.

13.2.2 Current Organization Setting for MRT in Dhaka

The STP states that the DTCB plays a role as the regulatory body in public transport operation, setting standards, fares, and service level, as well as plans the MRT systems. Furthermore, the STP proposes the establishment of a new organization separate from DTCB to operate the MRT system.

MRT system is new to Dhaka and the STP does not mention which organization would assume responsibility of the MRT project implementation including construction and procurement of equipment.

There are two modes for the MRT system to be introduced in Dhaka, rail-based (MRT) and bus-based MRT (BRT). However, it haven't decided yet whether one organization would take responsibility of operating both the modes of MRT or separate operating organization would be established for each mode.

Under such circumstances, there have been discussions on organization options among the stakeholders such as DTCB and MOC, JICA and the Study Team. The major points discussed were as follows:

- **Whether a new organization should be established apart from the DTCB (to be renamed to DMTA)**—establishment of a new organization outside the DTCB or sub-organization within the DTCB.
- **Future organizational formation**—difficulty (time consuming process) of establishing a new organization in Bangladesh government system and difference in lead time for

the start of BRT and MRT; it requires shorter time for the former, and more than 10 years for the latter. A sub-organization (department) with the function of the MRT operating company might be set up within the existing DTCB's organization framework at the initial stage, and then an independent organization will be established in the future. Furthermore, the future continuity of the BRT will influence the organizational framework, whether the BRT will be replaced by the MRT, or both will co-exist in complementary relation in the network. This must be discussed in the development framework of overall Dhaka public transportation network system in the future. This shall also be discussed in relation to F/S of BRT by STP.

- **Organizations for operation of BRT and MRT Systems.** At initial stage the MRT operating company might treat with both BRT and MRT; this will be separated into two exclusive organizations for BRT and MRT in the future as the operation size grows.

The Cabinet approved renaming of DTCB to DMTA and reorganization of the Board in 5 October 2009. As a result, the chairperson of the Board will be changed from Mayor of DCC to Minister of MOC; and additional authority of MRT projects will be given to DTCB. This could direct reformation of DTCB to fulfill its mandate with two major functions as coordinator of overall transport policy and plan making, and MRT. However, the detailed roles of DMTA in terms of MRT were not clarified at the Cabinet's approval. Since it's named as Dhaka Mass Transit Authority, it seems some government officials consider that DMTA would be in charge of MRT development and operation.

13.2.3 Issues related to Organizations pertinent to MRTA

Based on the above-mentioned reformation of DTCB to DMTA and organization options in a process of MRT system development, the following are thought to be major issues to be addressed in institutional set-up for MRT.

(1) Enhancement of Capacity of DMTA as Planning Coordinator

DMTA (DTCB) has not functioned well in its planning and coordination mandates because of being understaffed with less authority in coordination and decision making. DMTA must have more function than what DTCB has had. Concerning issue is to develop the capacity of DMTA to fulfill the enlarged functions as expected.

Currently, DTCB is implementing some projects such as CASE and DHUTS by donor assistance and the Study for Institutional Strengthening and Capacity Enhancement of Transport Related Agencies by the Government's own budget. There are two committees in which DTCB is involved: 1) the Traffic Management Committee (TMC) to coordinate among the stakeholders on traffic management; and 2) the Traffic Circulation Examination Committee to examine traffic circulation and car parking of existing/planned buildings and housing

developments.

Future urban transport network will become more complicated, which includes roads and expressways, BRT, Rail-based MRT and other public transportation. It surely makes DMTA's task more complicated and extensive, such as increasing of planning work and coordination among the stakeholders of public transportation, roads and urban development. DMTA has to be involved in decision making process such as project approval by Planning Commission. More careful coordination with stakeholders and monitoring of all projects are necessary not only for the organizations under MOC but also of those outside the MOC especially RAJUK and DCC.

In order to functionalize DMTA as expected to be, DMTA shall have to enhance its capacity by proper recruiting and allocation of qualified work force, and strengthening of the authority.

(2) Policy Formulation and Establishment of Legal and Institutional Framework for MRT Development and Operation

Formation of the each stage of preparation work in F/S, D/D, and Implementation programs of the MRT project, policy framework and resulting legal framework shall be established in the following.

- 1) DMTA Act as regulatory body (Revision of DTCA Act, 2001)
- 2) Act of MRT Operating Company
- 3) Asset ownership of the MRT
 - Infrastructure (including stations, depots)
 - Rolling stock and others
- 4) MRT Act and related regulations
- 5) Regulation related to private sector involvement, including concession for MRT operation
- 6) Regulation related subsidy by the government to the MRT project at operation phase

(3) Clear definition of DMTA as Government Organization for Policy and Plan in Transport Sector, not as MRT Implementation Organization

As a result of the Cabinet Resolution, it seems that the new DMTA is expected to cover two functions of transport planning and coordination in transport sector, and MRT implementation, which will lead to creation of the two divisions as such.

The functions of comprehensive transport planning and policy making, and operation of transport services are different, as seen in examples of relation of the MRT operating companies and government in the several countries. Consequently, it is difficult for DMTA to fulfill its double functions in a clear manner, even with the option of setting up two separate divisions in DMTA. Legal framework about DTMA shall be reviewed among the stakeholders

to clear its functions of policy making and planning.

(4) Clear Demarcation of Roles of Regulatory Body and MRT Implementation Organization

Project implementation and operation of MRT has been the central agenda to discuss, and there has not been much discussion on the function of Regulatory Body to MRT. The STP has proposed that the DTCCB plays a role as regulatory body.

MRT implementation and operating body of the newly introduced MRT System shall comply with the rules and regulations in terms of safety operation, service level, fare structure which are to be set by the governmental regulatory body.

Even when the MRT operating organization contracts out the operation of MRT to a private sector concessionaire, the organization still shall be MRT operator. And the regulatory body and operator should not co-exist in the same organization.

If the DTCCB's reformation into the new DMTA terminates DMTA's regulatory function, another organization must play a role as regulatory body. Or, at the stage of the implementation of the MRT project in the future, new MRT operating company shall be established.

(5) Phased Development of MRT Operating Organization

MRT will be developed in both forms of BRT and rail-based MRT. Implementation and operation of these modes are different in character and it is unclear that an organization will be able to handle both modes of BRT and rail-based MRT. Accordingly, there will be option to separate the implementation organizations for BRT and rail-based MRT as the size of the operation grows in the future.

(6) Consensus making among the Stakeholders

Before giving a go-sign to the MRT project, there must be agreement among all the relevant stakeholders for a smooth commencement of the project. It is expected that the DMTA should take initiatives for consensus making among stakeholders.

The following are stakeholders:

- MOC/DMTA
(The former DTCCB) Overall transport policy, plan and coordination: DMTA is a main coordination and policy/plan making body in transportation sector. Further it will be involved in MRT implementation and operation.
- Bangladesh Railways
(BR) Another railway operator, which may include commuter services. BR provides railway services other than the DHUTS proposed MRT in the area, and commuter services will be expected by National Transport Policy. Partnership of the MRT and BR's train services must be comprehensively integrated into the Dhaka public transport system.

- RAJUK Land use and urban development linking with transport system: As a development management body, RAJUK must be heavily involved in MRT project in relation to its land use and urban development projects for consistent and sustainable development of the area.
- BRTA/
BRTC/BIWTA/
BITWC/ Other public
transport service
operators Public transport operators to be integrated into comprehensive public transport system: Public transport administrator and operators other than railway should be integrated into the comprehensive public transportation network in Dhaka, with smooth inter-modal connecting system in physical and operational points of view.
- DCC and Upazilas
surrounding DCC Local governments influenced directly by the MRT development: Local governments to whom the MRT will serve should be involved in the MRT development process.
- DMP Transport safety: The DMP will play a major role in passenger protection.
- Ministry of Finance Finance for the MRT project: For the MRT project, it is assumed that the Bangladesh Government should borrow a soft loan from donors, and Ministry of Finance is a stakeholder.

It is expected that DMTA shall coordinate and conclude the consensus among such stakeholders. In order for that, DMTA must analyze the status of stakeholders in the following aspects.

- Overall stance on the MRT project : Alignment, relation with land use and urban development projects
- Financial Sharing : Financial burdens among the stakeholders
- Asset ownership : Infrastructure and rolling stock
- Operational relation : Among various public transport service providers

Furthermore, public transport users' opinion shall be reflected to the MRT project. Their opinions are to be collected and reflected in the MRA project by conducting a survey to public transport users by the Study Team.

13.2.4 Issues related to Measure to Improve Viability of MRT project

In addition, in order to secure the project viability, there are more issues to be addressed as follows:

13.2.4.1 Mechanism for Realization of Integrated Intermodal Operation of Public Transport

Improved intermodal transfer system or connection of public transport modes with the Dhaka MRT, based on the user needs, is vital to facilitate people's modal shift to the MRT. The

intermodal mobility is improved by not merely physical improvement of transport facilities but soft components such as a common ticketing system, an integrated timely operation for easier and shorter transfer among the modes.

Furthermore, in respect to rail-based commuter system, National Transport Policy (April 2004), provides in section 9.5.2, a development policy for a rail commuter services on Bangladesh Railways expected 200,000 persons per day in between Joydebpur and Narayanganji which aims to serve by the year 2012. This is also a part of comprehensive public transport network of the Study area.

It needs a mechanism or an organization to promote such soft components among the public transport modes to realize such an integrated intermodal operation, although this may be a part of coordination work of DMTA. To facilitate this, the idea of Public Transport Alliance, which is popular in France and Germany becomes a good reference for improvement of the service level of the overall public transportation. The major function of the Alliance is to facilitate joint efforts with public transport operators to optimize their profits and modernize the management while maximizing user's benefits.

For integrated intermodal operation, the relevant organizations and public transportation operators should be cooperate to take the following measures:

- Rational fare structure for each public transportation mode,
- Introduction of joint-ticketing system,
- Reviewing of rational and efficient bus service routes with MRT system,
- Adjustment of operation timetables to minimize transferring time loss,
- Joint campaign for promotion of users' manners,
- Proposal of justifiable subsidies and various support from the government, and
- Other issues arising in the operation

13.2.4.2 Non-rail business for financial viability

Financial viability is crucial for a sustainable project operation of the MRT. Most of MRT projects have financial difficulties in revenue with only fare-box revenue. Furthermore, the affordable fare level of potential users of the MRT is expected low taking account of the current fares of various public transport modes, rickshaws to route buses in Dhaka.

Under such circumstances, urban development along the MRT and around its stations is considered to be a good financial source for the project. Such non-rail business should be incorporated in the project scheme of the MRT project through development by RAJUK, DMTA, and the private sector who will be involved in the MRT project.

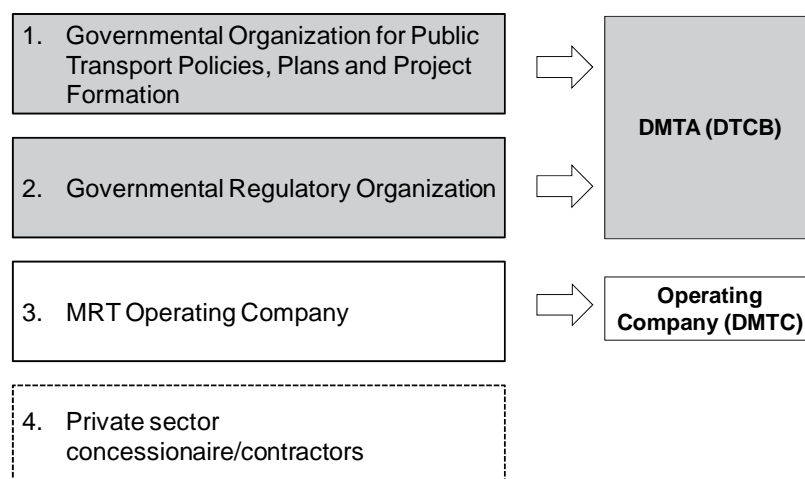
13.3 Overall institutional setup for MRT

13.3.1 Major Organizations to be established for MRT Project Implementation and Operation: DMTA and DMTC

The JICA Study Team held discussions on necessary institutional setup options with the stakeholders including DTCCB and MOC, which would realize the MRT project in Dhaka and to sustain the MRT operation. As a conclusion, the JICA Study Team came up with two organizations to be setup for MRT; one is the DMTA (Dhaka Mass Transit Authority) to be established by restructuring of DTCCB, and another is MRT operating company, DMTC (Dhaka Mass Transit Corporation), to be newly established.

DMTA should keep and strengthen the functions that DTCCB was supposed to fulfill. These functions include the formulation of policies and plans and the coordination among the related organizations. In addition, DMTA is expected to determine projects to develop public transportation system including MRT and BRT, and to assume the roles as a regulatory organization for the operations of the public transportation systems. It could be considered that DMTA itself implement the MRT projects partly, e.g. only infrastructure part, in accordance with the appropriate financial sharing between DMTA and DMTC (see below sections). DMTC is the independent organization in charge of MRT project implementation and operation.

Major functional organizations for MRT



Source: JICA Study Team

Figure 13.3-1 Basic Role Demarcation between DMTA and DMTC

13.3.2 Other Stakeholders Related to MRT Development and Operation

In addition to DMTA and DMTC mentioned above, the following organizations have important functions for MRT development and operation.

- Executive Committee on National Economic Council (ECNEC), Ministry of Planning

- Economic Relations Division (ERD), Ministry of Finance
- Ministry of Communications (MOC)
- GIBR (Government Inspector of Bangladesh Railway)

(1) Executive Committee on National Economic Council (ECNEC), Planning Commission, Ministry of Planning

Planning Commission of the Ministry of Planning and ECNEC are the organizations which will approve the MRT project. In the project approval system in Bangladesh, the implementing agency of the development project has to submit a Development Project Proposal (DPP) through respective minister to the Planning Division of Planning Commission. The proposal, which is considered viable, is submitted to the Executive committee on National Economic Council (ECNEC) for consideration and final approval. ECNEC is composed of Prime Minister as Chairman, Minister of Ministry of Finance as Alternate Chairman, and Ministers of the Council of Ministers as members.

(2) Economic Relations Division (ERD), Ministry of Finance

Economic Relations Division (ERD) of the Ministry of Finance is the Government's aid coordinating authority, reasonable for mobilization of external resources. For implementing MRT project with foreign assistance, ERD will take charge of loan request and management.

ERD assesses the needs of external assistance, negotiate for mobilizing foreign assistance, and formalize the aid mobilization through signing of loans. ERD undertakes foreign debt management including debt profiling and budgeting, debt servicing and maintenance of accounts.

(3) Ministry of Communications (MOC)

In the MRT development and operation Ministry of Communications (MOC) is in charge of administrative services, decision making at the ministry level, coordination with higher authorities, coordination among the related government agencies/organizations, and supervision of the activities of DMTA and DTCCB.

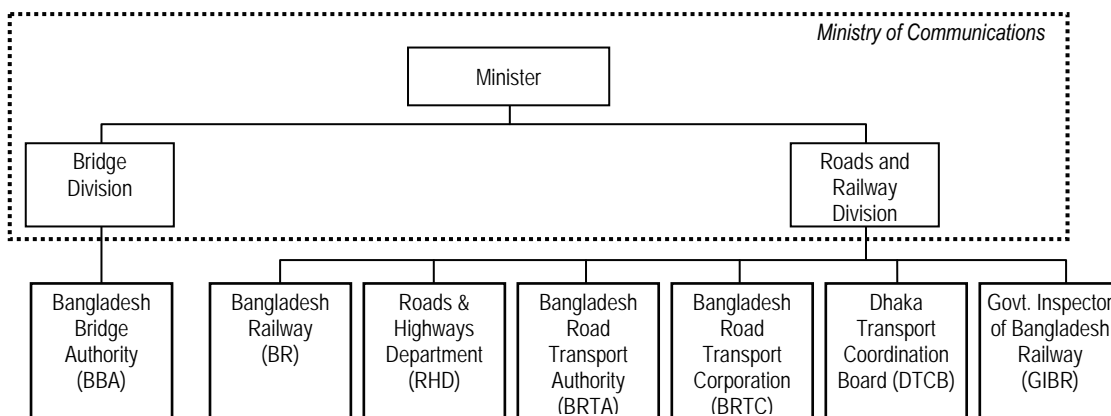
At present, there are two divisions in MOC, i.e. Bridge Division and Roads and Railways Division. DTCCB is attached to the Roads and Railways Division. Each Division is headed by the Secretary, who is the channel of the connecting the attached organizations with the Minister. The Secretary of Roads and Railways Division governs six attached organizations, dealing with both road and railway transport in urban and rural areas. The Division is overloaded with broad duties.

Urban transport issue is becoming significantly serious in these recent years, not only in Dhaka but also in other cities in Bangladesh such as Chittagong. The Government is considering the issue as one of top priorities and trying to take actions to solve the problems urgently. As a long term solution, the MRT projects, which needs huge investment, has to be smoothly prepared and implemented in coordination of various stakeholders related to the urban transport sector.

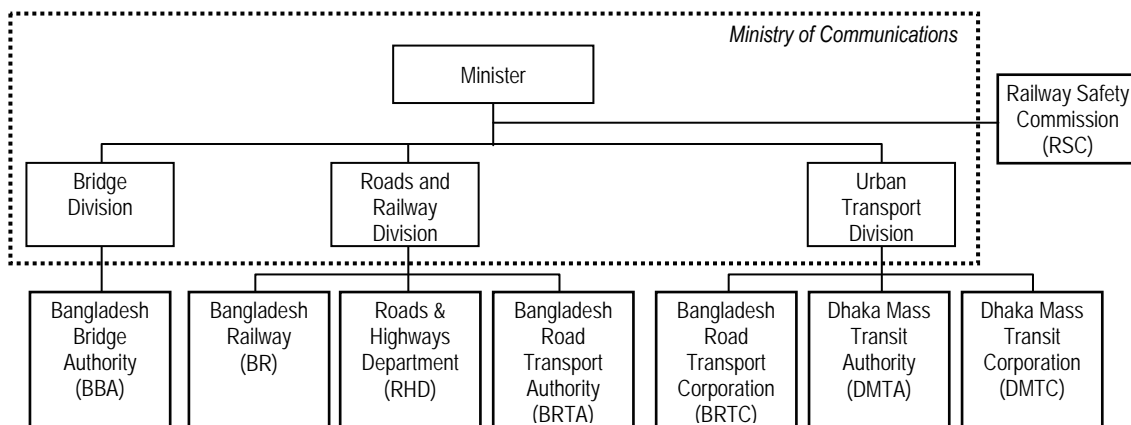
To tackle the current traffic congestion and to improve the urban transport networks, MOC has to manage and supervise various projects and activities in accordance with the national policies and the STP. The JICA Study Team proposed on the idea of establishing new Urban Transport Division in MOC headed by a Secretary, and exchanged opinions on it with the Secretary and the Joint Secretary of MOC, DTCB officials and other stakeholders.

Based on the discussions, the proposal on the organization structure of the Urban Transport Division and its jurisdiction in term of attached organizations was prepared (See Figures 13.3-2 and 13.3-3). The Urban Transport Division will deal with the urban transport development and management in Dhaka by guiding DMTA, BRTC and, in future, DMTC. A BRT operating company, which would be established in Dhaka, will also work under the Urban Transport Division. Furthermore, the Division is expected to cover other cities by establishing organizations such as DMTA.

Current Structure

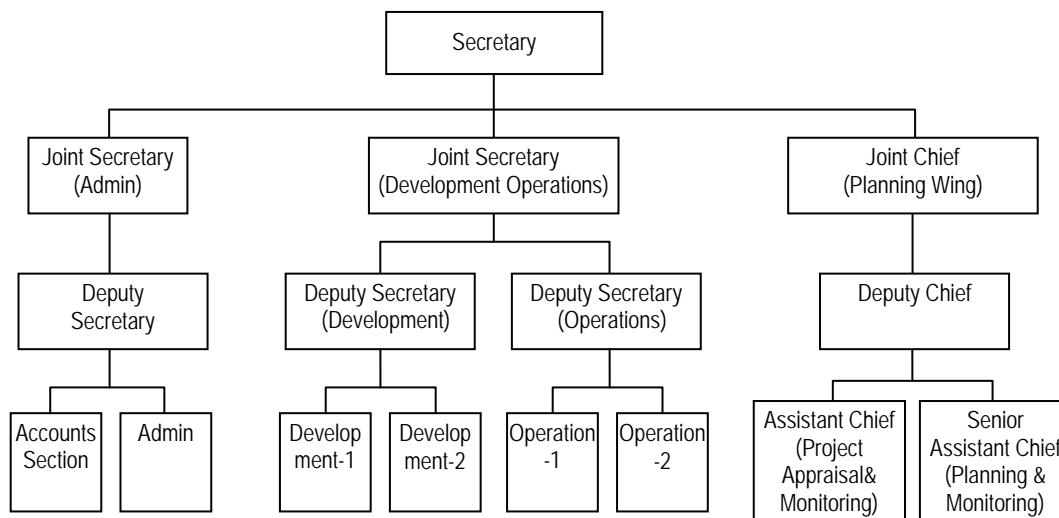


Proposed Structure



Source: JICA Study Team

Figure 13.3-2 Current and Proposed Organization Structure of MOC and its Relationship with the Organizations Attached to MOC



Source: JICA Study Team

Figure 13.3-3 Proposed Organization Structure of Urban Transport Division, MOC

(4) GIBR (Government Inspector of Bangladesh Railway)

GIBR is the organization under MOC responsible for inspecting all sections of railways of BR. The position of GIBR is the Joint Secretary level, which is lower than the General Director of the BR. The post is usually filled by an official sent from BR, and the person is supposed to return to BR in several years. Both BR and GIBR are governed by the Secretary of Roads and Railways Division of MOC. In the conditions, the GIBR is depending on the BR, so that the safety measures are not always prioritized and properly taken.

BR has been conducting Railway Sector Investment Program with the assistance of ADB loan. Attached to the Program, Technical Assistance on Institutional Support for Railway Reforms is being carried out. The strengthening of GIBR is one of the targets of the TA. In the draft report of the TA, it was recommended that GIBR should be renamed to RSC (Railway Safety Commission) headed by the Chief Commissioner Railway Safety (CCRS) at the Additional Secretary level, and RSC will work directly under the Minister.

The JICA Study Team supports the recommendations made by the TA. It is expected that the Government will make decisions to strengthen GIBR as independent organization. Furthermore, it should be considered in the reorganization that the upgraded GIBR will expand their duties to cover the safety inspection of MRT as well.

13.4 Institutional Setup Options of DMTA and DMTC for MRT

Based on the discussions above, the JICA Study Team came up with two options in terms of the positions of MRT operating company, DMTC, to be established for MRT project implementation and operation. The options are shown in Figure 13.4 1.

Option 1:

Option 1 assumes that DMTC are setup under the MOC at the same level of DMTA.

- Positive Factor: DMTC, which would have heavy reasonability, will be stronger organization than Option 2. MOC can take care on both organizations of DMTA and DMTC to properly fulfill the duties of them.
- Negative Factor: Communication, coordination and administrative procedures between DMTA and DMTC are made through the MOC. Therefore, the process will be complicated and time consuming. There is a possibility that decisions are made between the DMTC and MOC without consultation with DMTA. DMTA might face difficulties in supervising DMTC activities.

Option 2:

Option 2 assumes that DMTC is setup under DMTA.

- Positive Factor: DMTA can supervise the DMTC activities easily, since DMTA can

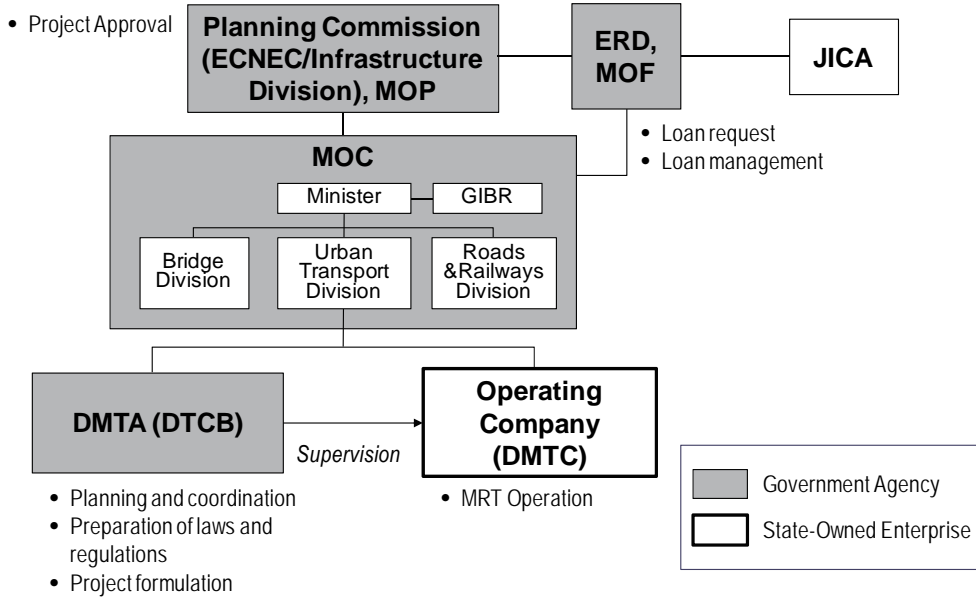
communicate with DMTC directly without MOC.

- Negative Factor: DMTC will become weaker and lower level organization. DMTC's views and opinions from the commercial viewpoints would not be fully considered in the top level decision making.

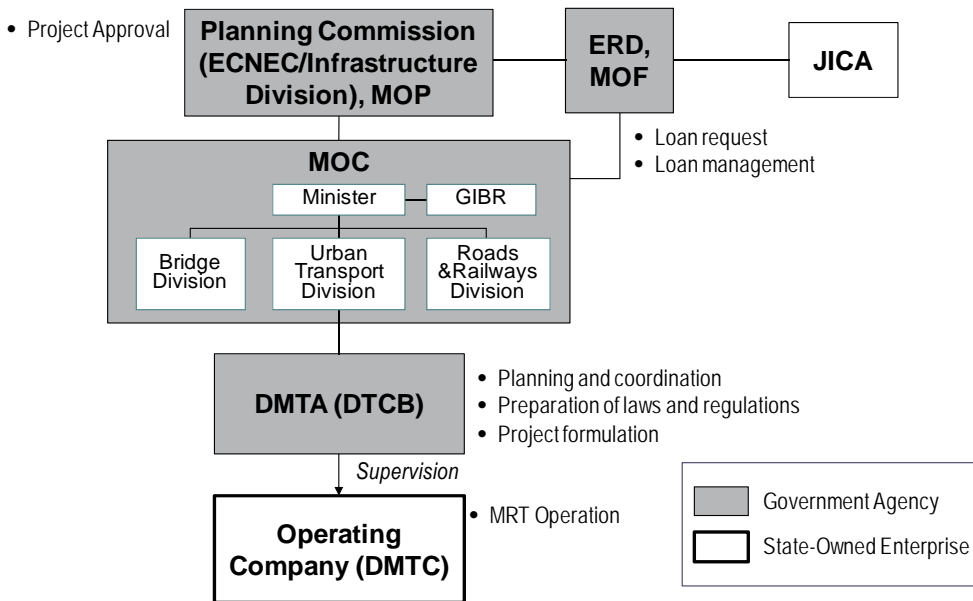
The JICA Study Team has intensive discussions with the Secretary of MOC and DTCCB officials. As the conclusion, Option 1 was selected as a recommended option. Even under the structure of Option 1, it is possible for DMTA to assume the responsibility of regulating and supervising MRT operations according to the DMTA Act, in which DMTA's functions are clearly mentioned.

For each of two organizations, DMTA and DMTC, to fulfill their duties properly, and to communicate each other smoothly and effectively under the structure of Option 1, establishment of the Urban Transport Division in MOC is the key. In order to make the cooperation between the two organizations function, close supervision by the Secretary of the Urban Transport Division is necessary.

Option 1



Option 2



Source: JICA Study Team

Figure 13.4-1 Institutional Setup Options for MRT

13.5 Project Execution Agencies

13.5.1 Roles and Responsibility of DMTA and DMTC

The JICA Study Team reviewed the cases of executing agencies of MRT in foreign countries in terms of construction, and operation and maintenance (O&M), and came up with three options according to the framework of organizational setup for MRT in Dhaka. The options determine the demarcation of responsibilities between DMTA and DMTC (See Figure 13.5-1).

Option A: Full Responsibility by DMTC

Option A assumes a single responsibility throughout the phases of construction and O&M. DMTC, the MRT operating company, will be responsible for entire works during the construction and O&M phases including construction and maintenance of infrastructure, development and maintenance of E&M, and procurement and maintenance of rolling stock.

- Positive Factor: A single executing agency is clearly responsible for the entire MRT project. Construction/procurement and O&M are consistently done by DMTC.

- Negative Factor: All cost and risks will come under responsibilities of DMTC, although the subsidy from the government has to be allocated to DMTC.

Option B: Division of Assets - Infrastructure by DMTA and Rolling Stock and E&M by DMTC

Option B assumes division of the responsibility between DMTA and DMTC for Infrastructure, and Rolling Stock and E&M. Infrastructure construction and O&M will be provided and maintained by DMTA, while E&M and rolling stock will be provided and maintained by DMTC. The infrastructure maintenance could be contracted out to DMTC during O&M phase, though the responsibility should be under DMTA.

- Positive Factor: Huge amount of cost for infrastructure construction and the maintenance cost will be clearly separated from the responsibilities of DMTC, which is supposed to operate on a commercial basis.

- Negative Factor: Coordination between the two executing entities is necessary during construction phase. It might increase the difficulties in project implementation.

Option C: Phased Shift of Responsibility to DMTC

Option C assumes division of the responsibility between DMTA and DMTC by project phases. During the construction phase, DMTA will be responsible for entire works including construction of infrastructure and E&M and procurement of rolling stock. During the O&M phase, DMTA will be responsible for only the infrastructure maintenance, although it can be contracted out to DMTC. The assets of E&M and rolling stock will be transferred to DMTC, and DMTC will be responsible for the maintenance.

This Option will be applicable only at first introducing MRT in Dhaka when DMTC newly is established. For the extension of MRT afterward in future, DMTC would take responsibilities not only during the O&M phase but also during the construction phase as Option B.

- Positive Factor: Phased development of DMTC is possible in this option, by establishing a special project organization under DMTA during the phases of project preparation and implementation, and shifting the human resources and assets to DMTC later on when it is completely established (See Source: JICA Team Source JICA Team).
- Negative Factor: Consistency between construction and O&M is ensured only for infrastructure. The transfer of assets and staff from DMTA to DMTC might create complexity in the procedure.

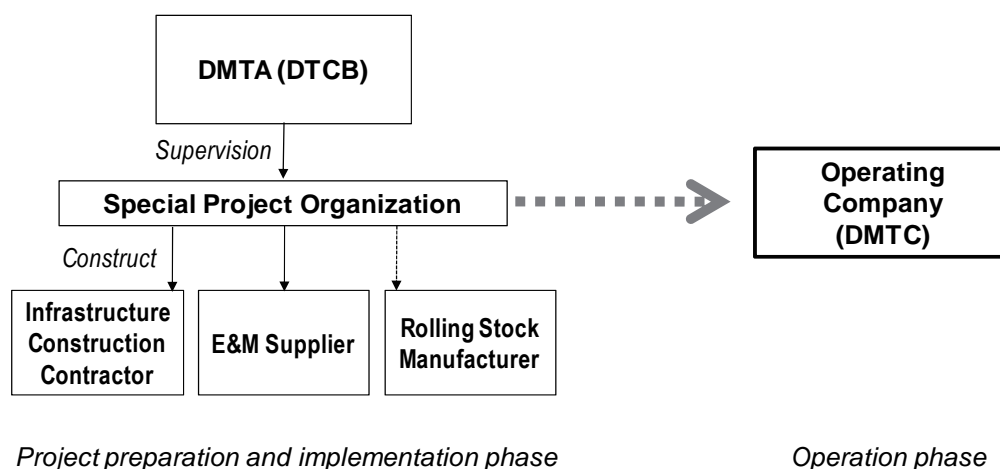
In Option B and C, in which DMTA will take responsibility as an executing agency, the Special Project Organization should be established temporally under DMTA during the project implementation, without hiring permanent work force in DMTA (See Source: JICA Team Figure 13.5-2). It would ensure transparent financial flow for the project implementation. This scheme is practiced in many cases of project implementation in Bangladesh. The maintenance work of infrastructure under the responsibility of DMTA can be contracted out to DMTC based on the agreement between the organizations.

		DMTA (DTCB)	Operating Company (DMTC)
Option A	Construction	(not execute the project)	<ul style="list-style-type: none"> • Infrastructure construction (Structure, Track) • Development of E&M • Procurement of rolling stock
Delhi Metro Bangkok MRT Manila LRT	O&M		<ul style="list-style-type: none"> • MRT operation and maintenance of infrastructure, E&M and rolling stock
Option B	Construction	<ul style="list-style-type: none"> • Infrastructure construction (Structure, Track) 	<ul style="list-style-type: none"> • Procurement of rolling stock • Development of E&M*
Singapore MRT	O&M	<ul style="list-style-type: none"> • Maintenance of infrastructure 	<ul style="list-style-type: none"> • MRT operation • Rolling stock maintenance • Maintenance of E&M
Option C	Construction	<ul style="list-style-type: none"> • Infrastructure construction (Structure, Track) • Development of E&M • Procurement of rolling stock 	(Assets to be transferred or leased to Operating Company.)
Bangkok SRT Airport Rail Link Jakarta MRT	O&M	<ul style="list-style-type: none"> • Maintenance of infrastructure 	<ul style="list-style-type: none"> • MRT operation • Maintenance of rolling stock

*E&M may be developed together with infrastructure by DMTA(DTCB), depending on the evaluation of financial sharing.

Source: JICA Study Team

Figure 13.5-1 Options of Responsibility Demarcation between DMTA and DMTC



Source: JICA Study Team

Figure 13.5-2 Demarcation of Responsibilities for MRT Construction and O&M between DMTA and Operating Company (DMTC)

The options of the project executing agencies should be decided together with the financial and risk sharing between the government and the operating company. Government’s subsidy scheme, risk sharing, track access charges, DMTC’s business development, and other financial matters should be analyzed and determined in a feasibility study, with the detailed determination of the project and the cost estimation.

13.5.2 Establishment of DMTA

13.5.2.1 Progress of establishing DMTA Act, 2009

The Cabinet approved on 5th October, 2009 on renaming of DTCB to DMTA and its reorganization. It was decided that the chairperson of the Board would be changed from Mayor of DCC to Minister of Communication, and new board members would be added.

After the approval of the Cabinet, DTCB organized an internal Committee chaired by the Director (Admin) of DTCB in November 2009, for restructuring of DTCB as DMTA. The Committee held intensive meetings and discussed the revision of DTCB Act, 2001. During discussion, the JICA Study Team emphasized the importance of strengthening the functions of planning and coordination which DTCB was supposed to fulfill, and clarified the DMTA's new function in MRT development and operation.

In the end of December, the Committee completed the drafting of the act as DMTA Act, 2009, and submitted it to MOC. MOC distributed the draft act to related organizations, BRTA, DCC, RHD, BR, RAJUK, BRTC and DMP, to obtain their comments on it. The draft DMTA Act, 2009 will be finalized at the ministry level after incorporating the comments from the organizations.

13.5.2.2 Major changes of the DTCB Act included in the draft DMTA Act, 2009

The followings were the major points included in the DMTA Act, 2009:

- The Board of the DTCB was not functioning well. In the draft DMTA Act, 2009, the functions of the board and frequency of the board meetings were clearly mentioned.
- In Dhaka, various organizations are implementing transport-related projects. In order to avoid the duplication of the measures, as well as the physical overlapping of the structures, DMTA has to coordinate well the project executing agencies. In the DMTA Act, it is stipulated that all transport-related organizations have to implement projects and/or take measures according to the directions provided by the DMTA.
- The following new functions related to MRT (including both rail-based MRT and BRT) were mentioned in the DMTA Act:
 - Preparation of standards, regulations and guidelines related to MRT
 - Determination and formulation of MRT projects
 - Implementation of the MRT project partly by organizing Special Project Organization.
 - Monitoring and supervision of MRT operating organizations

13.5.2.3 Further procedure for the establishment of DMTA

There are two major steps in the procedure to establish DMTA; that are Step 1: Enactment of DMTA Act, 2009, and Step 2: Authorization of DMTA organizational structure and staffing.

Step 1: Enactment of DMTA Act, 2009 (Revision of DTCB Act, 2001)

- 1) Finalization of the draft DMTA Act, 2009 at the ministry level by incorporating the comments made by the related organizations
- 2) Review of the draft DMTA Act and its approval by the Ministry of Law
- 3) Review of the draft DMTA Act and its approval by the Cabinet
- 4) Final approval by the Parliament

Step 2: Authorization of DMTA organization structure and staffing

- 1) Preparation of the draft DMTA organization structure and staffing including the required posts and grades, job descriptions, qualifications, and salary scale.
- 2) Review and approval by the Ministry of Communications
- 3) Review and approval by the Ministry of Establishment
- 4) Review and approval by the Ministry of Finance
- 5) Review and approval by the NICAR (National Implementation Committee for Administrative Reforms/ Reorganization)

According to the Secretary of the MOC, the first step will be completed by July 2010, when the Parliament will be held. After the approval on the DMTA Act, 2009, it will take several months to complete the Step 2. Staff recruitment will start after the completion of the Step 2. Since the urban transport issue in Dhaka is one of top priorities of the Government, it is expected that the procedure will be smoothly followed and completed faster than the usual practices in Bangladesh.

13.5.2.4 Organization Structure of DMTA

The proposal of the DMTA organization structure was prepared by reviewing the original plan of DTCB when the DUTP was implemented. The proposal was discussed with DTCB officials and revised. The developed DMTA organogram is shown in Figure 13.5-3.

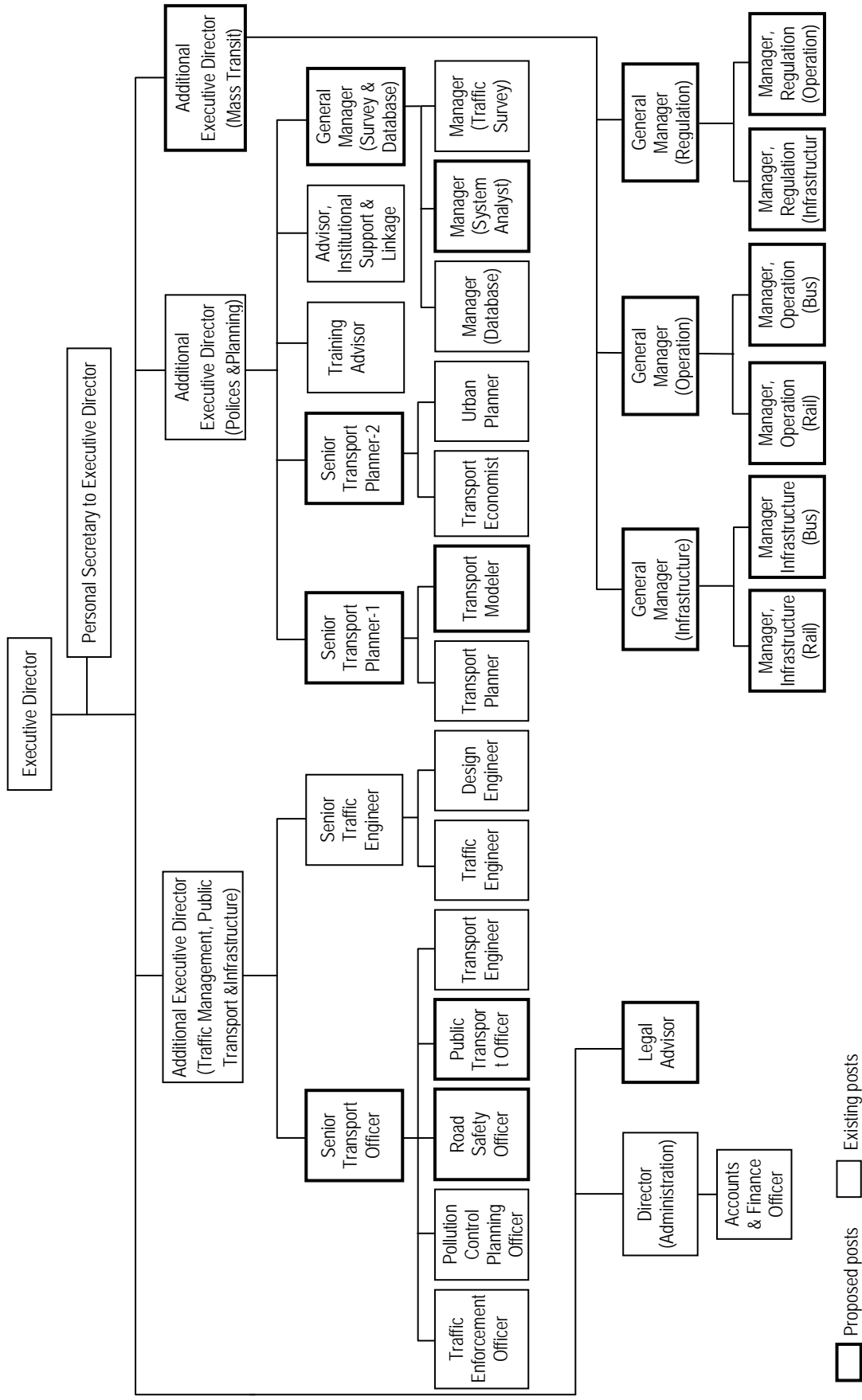


Figure 13.5-3 DMTA Organizational Structure (Proposed)

□ Proposed posts □ Existing posts

13.6 Establishment of MRT Operating Company (DMTC) and the Operation Plan

13.6.1 Functions of DMTC

Functions of DMTC should be determined based on the decision on the demarcation of responsibilities between DMTA and DMTC, discussed in Section 13.5 above. In this section, full scale functions of DMTC according to Option A, a single full responsibility throughout the phases of construction and O&M, is assumed. The major functions of DMTC are as follows:

- (1) Development and maintenance of infrastructure including civil engineering structures and track;
- (2) Development/procurement, operation and maintenance of facilities including E&M, rolling stock, stations and station facilities, and depots; and
- (3) Business development and management at stations and surrounding areas.

13.6.2 Nature of MRT Operating Company (DMTC)

In the legal framework of Bangladesh, the following four types of entity can be considered for DMTC.

- Type 1: Government organization (e.g. BR)
- Type 2: Government corporation, known as statutory organization (e.g. BRTC)
- Type 3: State-owned enterprise (e.g. DPDC, DESCO)
- Type 4: Private enterprise

Type 1 and Type 2 are an entity to be established according to the government administrative system, while Type 3 and 4 are incorporated under the Companies Act.

As for Type 3, Dhaka Power Distribution Company Limited (DPDC) and Dhaka Electric Supply Company Limited (DESCO), established under the policy on Power Sector Reforms in Bangladesh (PSRB), are the best practice in Bangladesh. Initially, DESCO was 100% owned by the government, but later on, a part of the shares were offered to the private sector. Management of these companies has been significantly improved after the corporatization.

Considering that DMTC should pursue its operation in a commercial-orientated manner, and learning from current efforts to corporatize BR, Type 1 should be avoided for the selection.

Furthermore, considering MRTs in other countries facing difficulties in operation on a self-supporting basis, it is essential that the public sector shoulders responsibility and risks in operation to ensure the public benefit and sustainability. For the reason, Type 4 would not be a successful option in Bangladesh.

Consequently, Type 2 and Type 3 are selected as potential options. Out of two options, the JICA Study Team selected Type 3, state-owned enterprise as a recommendable option for DMTC. MRTA

for Bangkok MRT and DMRC for Delhi Metro are state-owned enterprises. The reasons of the selection are as follows:

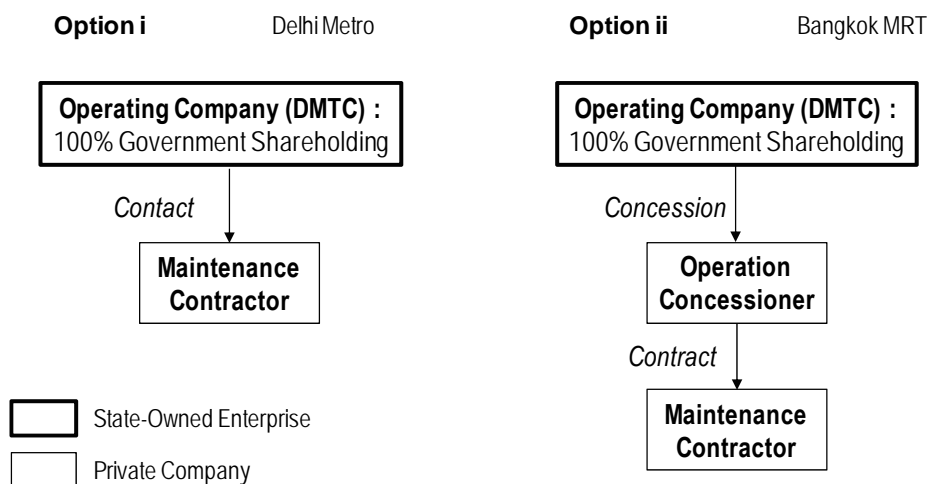
- Staffing and salary structure can be decided by its own decision, not influenced by the government system. It will enable easier recruitment of capable staff;
- Governance is more transparent under shareholder's monitoring;
- Decision making is quick, since the state-owned enterprise would follow its own Memorandum and Articles of Association, not the government administrative procedure;
- Management becomes more efficient with better business capacity and more freedom in commercial activities than the government corporation; and
- Flexibility in fundraising is ensured by utilizing the private sector investment. It will enhance the effectiveness of the non-rail business and development along the MRT and around the stations.

The state-owned enterprise could start as a 100% government-owned enterprise and then part of the share could be transformed to the private sector as the case of DESCO. Or there is a chance that the share would be held by public and private sector at the startup of the enterprise. The share holding of the enterprise by the public and private sectors shall be studied further in the next step.

13.6.3 Operation Options

There are two options for MRT operation in terms of private sector involvement. Option 1 assumes direct operation by DMTC such as Delhi Metro. Option 2 assumes a concession contract with a private company for the operation such as Bangkok MRT (See Figure 13.6-1).

The possibility of the private sector involvement in MRT operation should be examined in the feasibility study by determining the detailed project costs and the rational fare structure. The possibility of non-rail business development should be also considered. At this stage, two options should be kept for further analysis.



Source: JICA Study Team

Figure 13.6-1 Operation Options

13.6.4 Types of MRT operation

13.6.4.1 MRT business models

As mentioned above, the MRT will be executed by DMTC. MRT business models broadly are thought to be the following types: (1) integrated management and implementation of construction, management and maintenance by DMTC, (2) separate management and implementation of Construction, operation and maintenance by DMTC, and (3) Full-contract out to the private sector (reference :Table 13.6-1).

There are many cases where the integrated business models are applied by both public and private operators like Japan; however, the separate business type also have been applied so that the huge capital investment for infrastructure are burdened by the operating company invested by the public sector and for the operation and maintenance are contracted out for efficient operation.

The MRT system is a comprehensive system which requires an integrated management. To make this work, considerable preparation, experience, know-how, and competent and pertinent human resources are indispensable. Such management resources are desirable to be accumulated and internalized in the MRT operating company, especially in case of expansion of the MRT business.

Such accumulation and internalization of experience and know-how generally takes time; accordingly, adopting a separate business system in which a private party operates the MRT is an option for the MRT business, making best user of operation already accumulated know-how and experience of the private operator.

Table 13.6-1 Form of MRT Business

Classification	Characteristics (Positive Factor)	Remarks (Requirement and Issue)
<p><u>Integrated type</u></p> <ul style="list-style-type: none"> ▪ Integrated implementation of all projects from construction to management and maintenance 	<ul style="list-style-type: none"> ▪ Possible to internalize all know-how and technologies required for the business and to utilize them for further development ▪ Rational operation due to integrated management of all businesses 	<ul style="list-style-type: none"> ▪ <u>A high level of management ability is required</u> because all elements, including human resource training and fund-raising, are involved.
<p><u>Separation type</u></p> <ul style="list-style-type: none"> ▪ Separate construction from management/operation <p>(Examples of separation)</p> <ul style="list-style-type: none"> ▪ Construction and ownership/management and maintenance ▪ Ownership/construction, management and maintenance ▪ Construction, ownership and maintenance/management 	<ul style="list-style-type: none"> ▪ Sound management can be maintained because the operating company will not carry burden of huge construction cost and interest. ▪ The operating company may be either private or public. ▪ A private company may streamline the business, taking advantage of its know-how efficiency. 	<ul style="list-style-type: none"> ▪ It takes time to adjust cost burden among maintenance, repair and rehabilitation ▪ If the operator is a private company, the selection is difficult.
<p><u>Private consignment</u></p> <ul style="list-style-type: none"> ▪ A private party is in charge of all elements from construction to management and maintenance. 	<ul style="list-style-type: none"> ▪ The business risk is entirely borne by the trustee and trustor's responsibility is light. ▪ Streamlining is possible by using the know-how the trustee company. 	<ul style="list-style-type: none"> ▪ Business know-how cannot be internalized and kept by the trustor. ▪ It is possible that no private operators show interest in the business.

Source: JICA Study Team

13.6.4.2 Examples of MRT business models in Japan

Business types of a MRT operation company can be roughly divided into the following four in Japan (Refer to Table 13.6-2):

- (1) Direct implementation by the government or other administrative unit;
- (2) Implementation by a public enterprise (public company) whose shares are owned by the government;
- (3) Implementation by an operational company whose shares are jointly held by the government and the private sector; and
- (4) Implementation by private companies

Table 13.6-2 Railway Operations by Type in Japan

Type	Operator Classification	Construction	Operation	Maintenance	Rehabilitation	Operational Structure (public/private)	Number in introduction
METRO System	Direct Management by Local (City) Government	○	○	○	○	Public Agency	9 cities
	Semi-public sector	△	○	○	○	PPP	2 Semi - public sector operators
	Autonomous body (corporation)	○	○	○	○	Public corporation	1 corporation
Urban Railway (incl. inter-urban)	Japan Railway (JR)	○	○	○	○	Public	Privatized from public corporation
	Private sector	○	○	○	○	Private	More than 100 private operators

Source: JICA Study Team

Note: ○ indicates that operators are responsible for the work of construction, operation, maintenance, and rehabilitation; △ Outsourcing

As shown above, in Japan's cases, Integrated Business Type is dominant. However, in studying the formation of an MRT operation company in Dhaka, it is necessary to closely analyze the characteristics of the various modes based on the characteristics of the MRT business and to select the optimal mode by fully considering the business environment and schedule in the city.

The business mode to be selected will be different depending on how the business will be expanded and routes extended. If the routes will be extended, the operating body itself should manage and maintain the MRT system to acquire necessary know-how. It also should get involved in construction as much as possible, and acquire the expertise the company will need for further plan implementation.

13.6.5 Organizational structure of DMTC

13.6.5.1 Basic organizational structure

(1) Business mode and organizational structure

The organization of an MRT company may vary extensively depending on how the company is involved and plays roles in the construction, management and maintenance work required for a MRT business. The organization also depends on how to carry out individual business components and how to use external resources for them.

(2) A case of Integrated Business model of MRT organization

In this section, a case of *integrated business method* is in considering the MRT company organization for the reasons provided below.

Railway requires rolling stock, various facilities of stations, rail, signal, power, electrical and so on to transport passengers; the MRT running underground requires more facilities such as facilities of tunnel ventilation, drainage, and disaster prevention than railways running at grade do. And it is very important to constantly inspect, maintain and repair those facilities, and staff should be allocated appropriately for this purpose.

As described above, a railway is a huge system, which requires many facilities and staff, and to assure efficient and stable management, it is desirable to manage all works relative to the railway business in a united and integrated manner.

The JICA Study Team first provides organizational structure of the MRT operation company in case of the integrated business method as the most general form, in which method the MRT Company is involved in all works from construction to management.

(3) Basic structure of the organization

Generally, a railway company has an *administrative division* to control the overall company business, a *facility division* in charge of management and maintenance of facilities and vehicles, and a *transportation division* in charge of train and station services, supervised by executives.

In addition, it should be better to study setting up divisions to handle advertising in stations and on rail vehicles, and kiosks. Plans should be made for non-rail business like parking business, urban development businesses on land adjacent to the stations, or others in order to improve profits.

The mission of a railway company is, as mentioned above, to maintain and use many facilities to safely and efficiently transport passengers. For efficient management, it is desirable to outsource infrequent work and simple work such as cleaning work, safety, etc. as much as possible. Such functions can be outsourced to *Special companies* as shown below, if available.

- Rail maintenance
- Electric equipment maintenance
- Vehicle cleaning
- Station cleaning
- Building maintenance
- Kiosks and advertising
- Cafeteria / meal service for Employees

- Security
- Others

In this section, the organization of a subway company has been described; however, if a mode other than the integrated business mode is selected, the organization should be different structure with these divisions eliminated or downsized as a matter of course. Further planning of the organization will be required according to the mode adopted.

13.6.5.2 Contents and characteristics of each business division

In the company organization, work during construction and after commencement of operation is totally different and the content of the work of each division changes extensively.

(1) Work of each division

Work of each division after commencement of service is described in the table below.

Table 13.6-3 Work of Divisions of MRT Company

Division	Work item
Administrative Division	<ul style="list-style-type: none"> • Corporate control (organization, rules, ceremonies, support for executives) • Personnel management (recruitment, transfer, salary, welfare, training) • Finance and planning (budget, accounting, funds, property control, procurement of goods, management plan) • Public relations (press affairs, advertising, external relations)
Facilities Division	<ul style="list-style-type: none"> • Maintenance of electrical facilities (power, ventilation, drainage, disaster prevention, station equipment, etc.) • Maintenance of signal and communication facilities (signal facilities, communication facilities, information facilities) • Maintenance of construction facilities • Maintenance of vehicles (body and operation) • Maintenance of rail facilities and civil engineering structures
Transportation Division	<ul style="list-style-type: none"> • Train service (driving and service control) • Station control work (passenger relations, station maintenance, control of fare revenue) • Safety control work (emergency response, safety education and training)

Source: JICA Study Team

(2) Major tasks of Divisions and Sections

While external arrangements are included in the public relations work of the Management Division, the work related to core management, including communications with the supervisory government agency is done by the Planning Department.

The major service of the Facilities Division is inspection, maintenance and maintaining normal operation of the many facilities. During the limited time late at night after completion of daily service, the division performs service work to prevent troubles from occurring and to ensure smooth service

and safety.

The Transportation Division provides direct service to users and responds to any dissatisfaction or complaints. It is very important that good service is provided.

Safety is at the core of good railway operation. Abnormal situations must be adequately responded to, and safety education and training must be carried out. The Transportation Division and Facilities Division must work closely in a system enabling prompt responses to emergencies.

13.6.5.3 Staffing plan for each division

Staffing of a railway largely depends on the facilities to be developed and functions of the machinery, but it is also affected by the abilities of allocated personnel.

This is the first MRT for the country, which means the personnel will be inexperienced. Therefore, plans call for the allocation of more personnel than usual in other cities.

Therefore, it will be desirable to later rationalize the staff after reviewing the number and scope of personnel needs, while closely observing the service level.

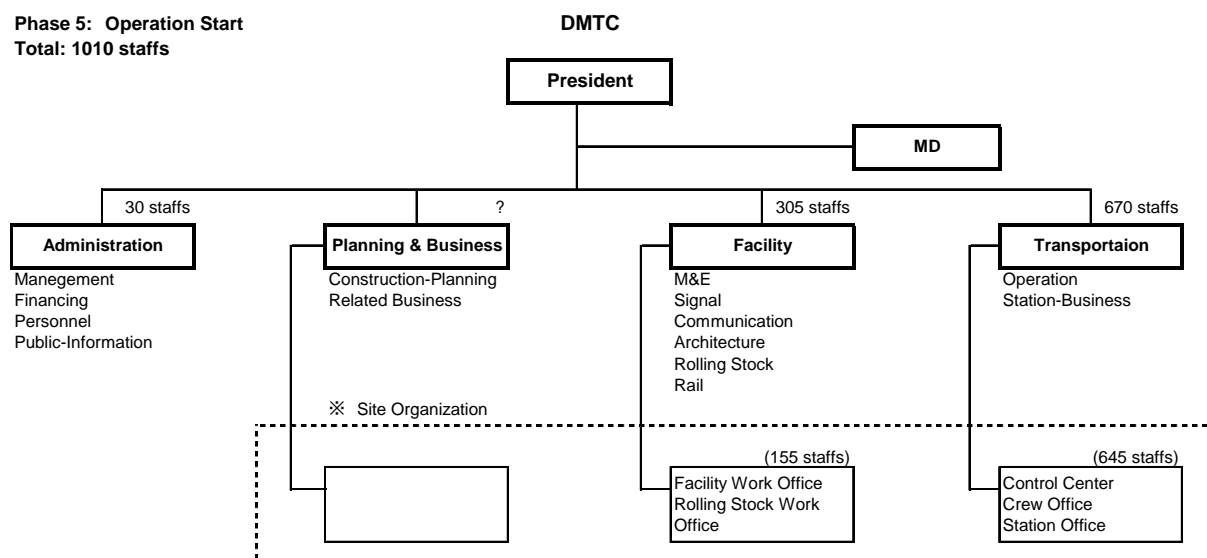
Based on this idea, there will be 30 personnel in the Management Division, 20 at the headquarters, and 275 in Facilities Division operations, along with 25 in the headquarters and 645 in the operation in the Transportation Division, for a total of approximately 1,010 (reference: Figure 13.6-2).

However, the staff mentioned above is for opening all sections of the 22km of lines. It is based on the assumptions of one-man operation by ATO and a total of 260 vehicles. Partial inauguration and recruitment of conductors will lead to a change in this number.

Divisions to be set up to manage related businesses are excluded from the staffing plan because it is difficult to specify the content and volume of work at present.

CASE-1 (Integrated Business Type)

Phase 5: Operation Start
Total: 1010 staffs



Source: JICA Study Team

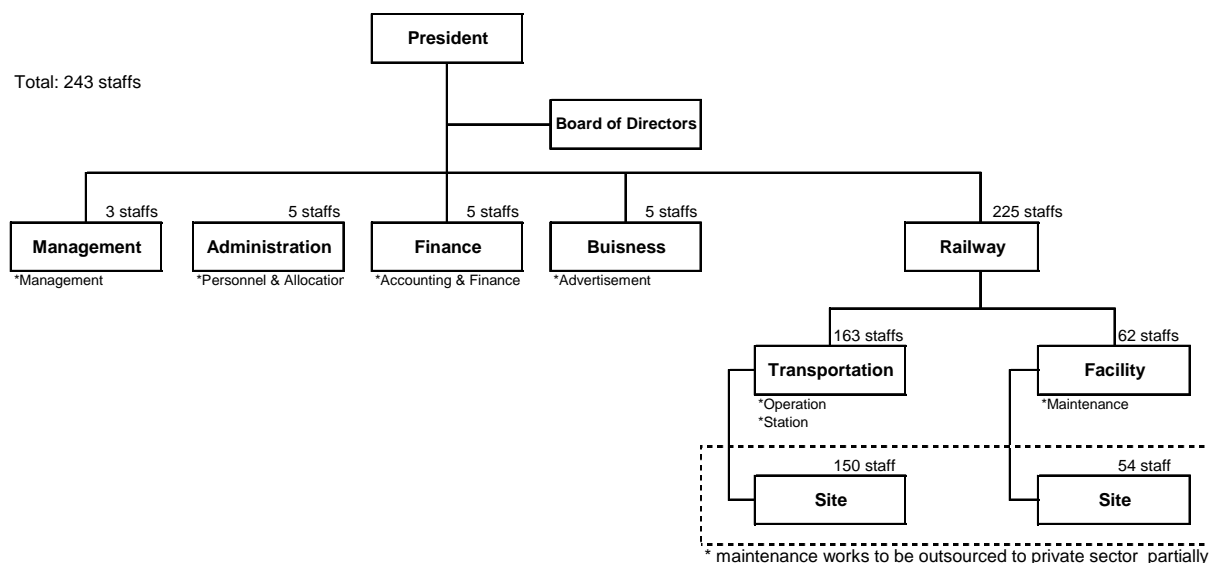
Figure 13.6-2 Staffing Plan for Each Division of MRTC

Table 13.6-4 and Figure 13.6-3 show, as example, the company profile and organizational structure of a Railway Company in Japan.

Table 13.6-4 Example of a Railway Company in Japan

Item	Description
Route	Akabane (Tokyo Metropolitan) – Urawa (Saitama pref.)
Establishment	March 1992
License	December 1992
Start of operation	March 2001
No. of Staff	243
Length of railway	14.6km (Underground: 14.2km; Elevated 0.4km)
No. of stations	8 stations
No. of trains	60 cars (6 cars x 10 trains)
Implementation body for construction	Outsourced to Tokyo Metro & Japan Railway Construction Agency

Source: JICA Study Team



Source: JICA Study Team

Figure 13.6-3 Example of Organizational Structure of a Railway Company in Japan

13.6.5.4 Types of rules needed for organizational development

To functionalize as a company, it is necessary to have basic rules on organization and authority, and work implementation methods must be established to be sure employees perform their duties in accordance with the rules. In railway operations in particular, each person in charge basically performs exactly what is called for according to specified methods. The work rules are very important and should be carefully developed. The rules are classified into those related to the entire company and those related to the work of each division.

Major rules pertaining to the entire company include the Articles of Incorporation, and rules covering work duties, authorizations, pay and personnel affairs, safety management, and document control.

Major rules covering the work of each division include those related to service, passenger affairs, fare handling, accident response, facility standards and design specifications. It is necessary to develop manuals on work details based on rules.

Railways are not free from accidents and facility troubles. Therefore, emergency drills are necessary to be prepared for prompt and precise responses. It is also necessary to have methods, systems and capabilities for emergency communication.

It is important to constantly improve the rules. The person responsible for work at each division should be constantly aware of this.

13.6.5.5 Phased development of DMTC work

(1) Organization and staffing until commencement of service

The organization shall be gradually expanded for each business phase and devised to enable efficient processing of work. The contents of company work will be totally different before and after commencement of service. Further, the contents of the work will gradual change with the commencement of each phase of service, which means the work should be flexibly and precisely changed along with staffing.

The steps in the development of the work before commencement of service can be roughly divided into four phase as shown.

- Phase 1- Preparation for establishment of the company
- Phase 2- Surveys and planning after establishment of the company
- Phase 3 -Preparation of work focusing on design
- Phase 4 - Construction including civil engineering and facility work

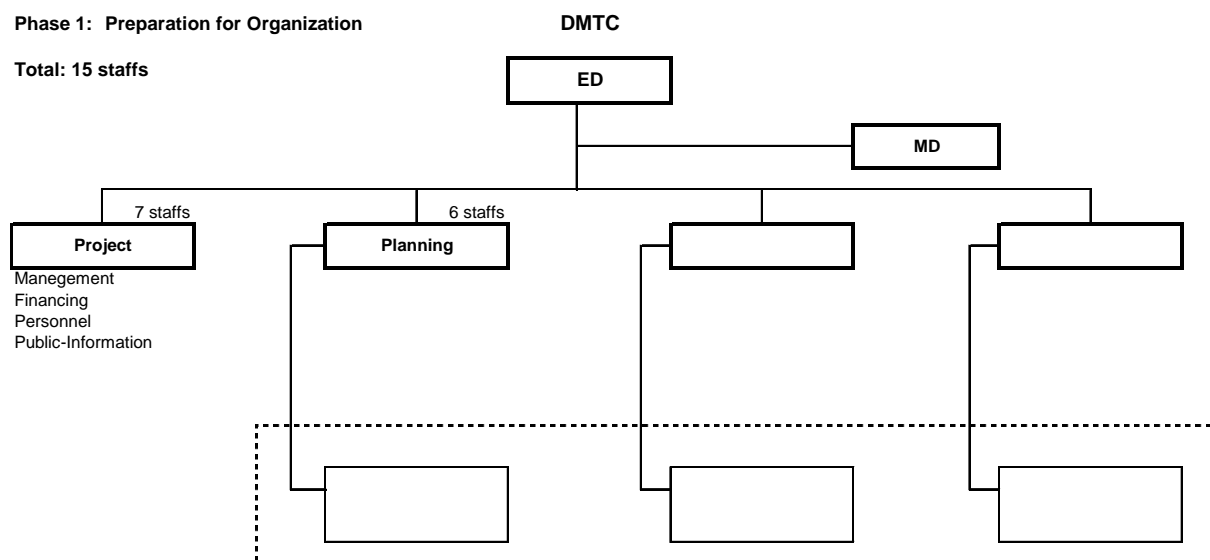
i) Phase 1 - Preparation for establishing the company

The major work in this phase is arranging an environment for establishment of the company. This includes institutional adjustments reflecting related laws and regulations to advance the project, examination of company mechanisms and organization, development of project schedules and fund planning, preparation of a basic plan for the lines to be constructed, and deciding on basic specifications. Staffing needed for starting the company should be advanced.

In this phase, a few teams of about 15 persons each should appropriately respond as project teams leading the way for the establishment of the company, comprising mainly of administrative and technical staff (reference: Figure 13.6-4).

CASE-1 (Integrated Business Type)**Phase 1: Preparation for Organization**

Total: 15 staffs

**Figure 13.6-4 Organizational Structure at Phase 1 (Preparation Phase)****ii) Phase 2 - Survey and planning**

This is the first organization after establishment of the company, composed of Design Division and Planning Division.

The main work of the Design Division includes provision of rules required for company operation, negotiation with the supervising government agency, determining business plans, and fund raising.

The major work of the Planning Division includes deciding on subway specifications and standards, conducting detailed surveys, and planning routes. Prior adjustments with external organizations will be conducted as needed for construction.

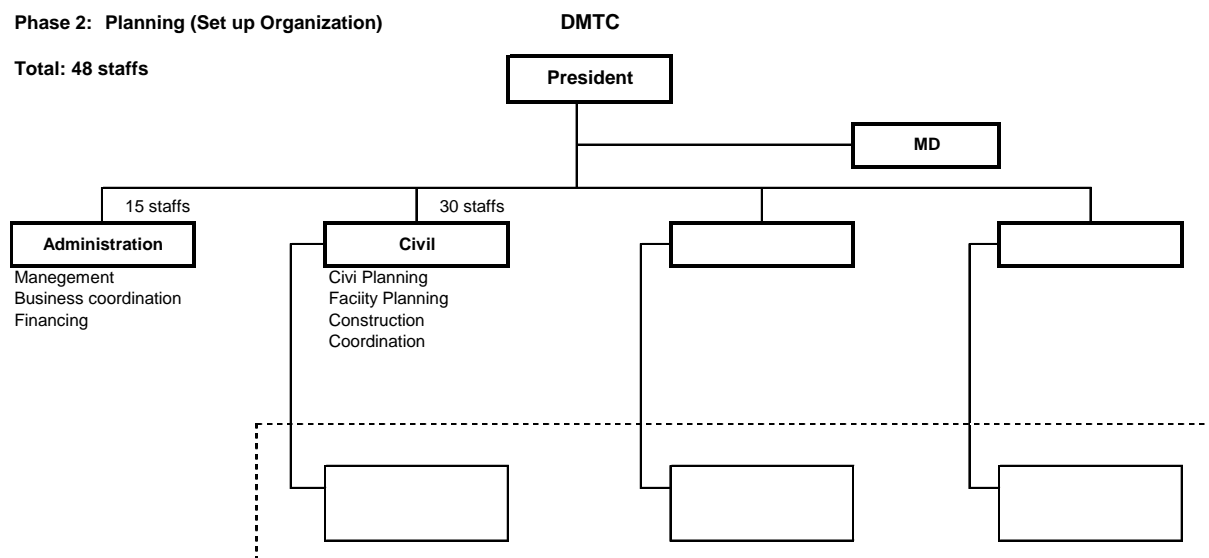
As the work of the Planning Division significantly affects construction costs, avoiding excessive investment through due diligence of demand forecast and appropriate planning is necessary.

The staff will include 15 persons in the Design Division and 30 in the Planning Division. The latter staff will mainly comprise civil engineers as well as persons in charge of facilities. As a result, there will be about 48 persons in the entire company (reference: Figure 13.6-5).

CASE-1 (Integrated Business Type)

Phase 2: Planning (Set up Organization)

Total: 48 staffs



Source: JICA Study Team

Figure 13.6-5 Organization Structure at Phase 2

iii) Phase 3 - Work preparation phase

In this phase, the Design Division will be in the Management Division and the Technical Planning Division will be divided into Civil Engineering and Facilities Departments.

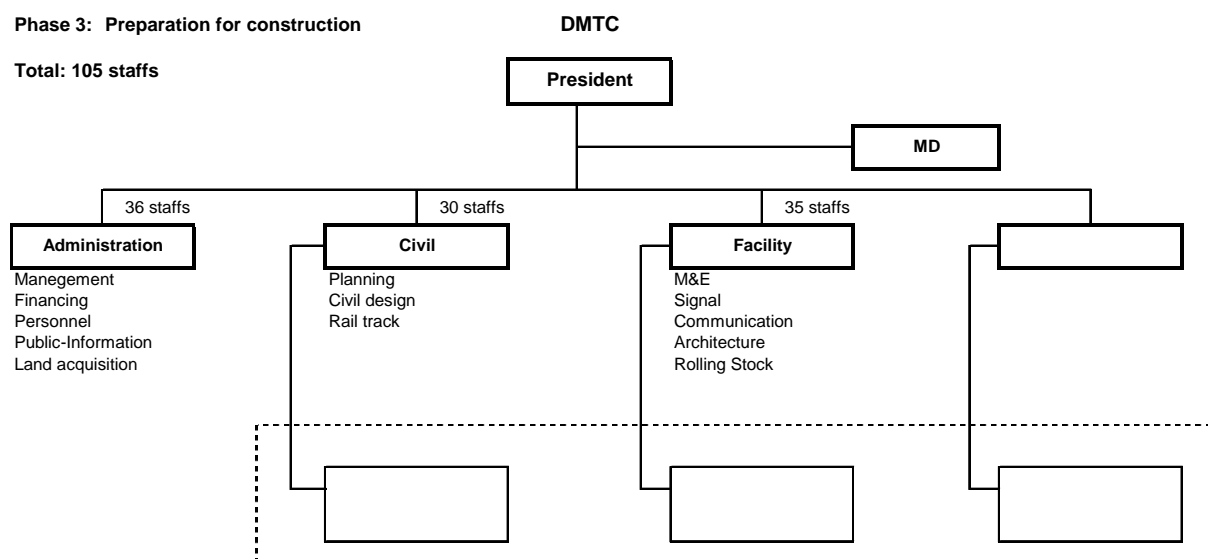
The Management Division shall have persons in charge of personnel affairs and persons in charge of public relations to respond to an expansion of the organization. It will also start acquisition of construction sites.

The technical division shall prepare materials for ordering construction in accordance with the designs and estimates of needs of civil engineering and facility work, including vehicles. The Civil Engineering Department shall move ahead with adjustments with external parties in accordance with design needs.

For staffing, 20 persons or more will be added to the Management Division to provide about 36 clerical employees. Civil Engineering will have about 30 persons and Facilities will have about 35. As a result, the entire company will have about 105 persons (reference: Figure 13.6-6).

CASE-1 (Integrated Business Type)**Phase 3: Preparation for construction**

Total: 105 staffs



Source: JICA Study Team

Figure 13.6-6 Organization Structure at Phase 3**iv) Phase 4 - Construction phase**

In this phase, the Civil Engineering and the Facilities departments will have operating teams (for on-site management) to oversee construction.

To prepare for the establishment of the Transportation Division as the core unit after commencement of operations, sections in charge of planning will be set up to study station operations and driving operations. Station facilities will be constructed, manuals will be prepared, and education and drill plans will be worked out.

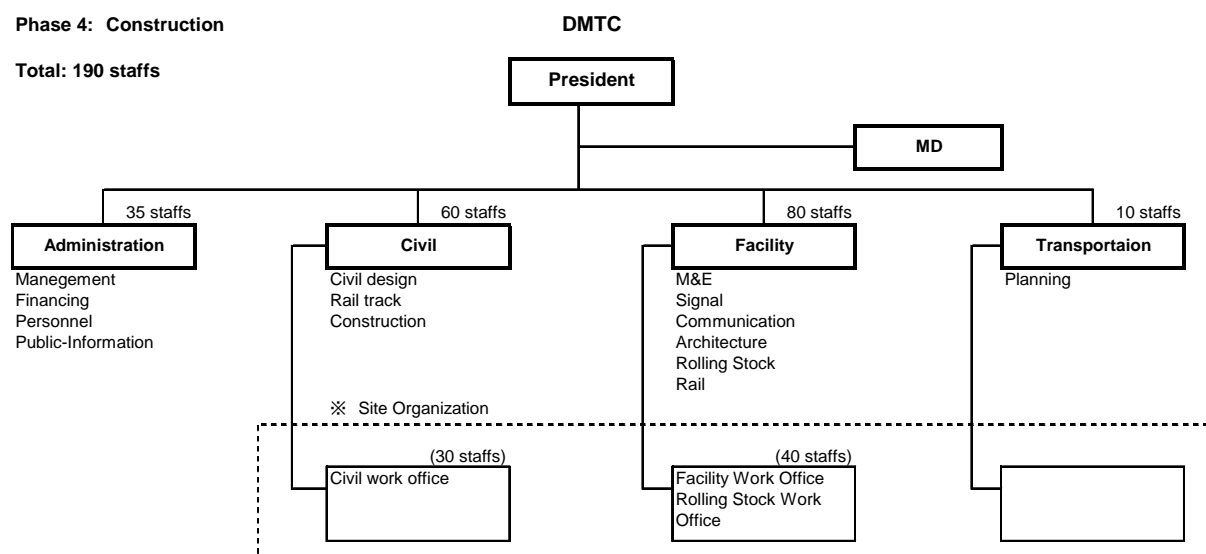
In the final stage, comprehensive tests and drills of the operating staff will be conducted to prepare for the commencement of service.

The Management Division will have 36 clerical employees as before. Technical Departments for each operation will have additional personnel. In total, the Civil Engineering Department will have 60 persons and the Facilities Department will have about 80. The company will have about 190 employees as a result (reference: Figure 13.6-7).

CASE-1 (Integrated Business Type)

Phase 4: Construction

Total: 190 staffs



Source: JICA Study Team

Figure 13.6-7 Organization Structure at Phase 4

The organization up to commencement of service is as described above. This time, land acquisition in the work preparation phase is included in the Management Division, but it may be included in the Civil Engineering Department as it is closely related to design and execution, and the progress of site acquisition greatly affects design and construction processes.

It should be fully kept in mind in actual operation that the adjustments with external parties conducted by the Civil Engineering Department significantly affect project schedules and construction costs just as site acquisition does.

(2) Utilization of external staff

The work during the construction phase has the character of a project completed over a relatively short period of time until commencement of service. The contents are diverse and experienced workers will be needed for many highly professional tasks. Therefore it is necessary to efficiently conduct work and reduce the number of staff by actively utilizing external personnel, including consultants.

13.6.5.6 Developing the abilities of employees

(1) Abilities and skills of staff required for the projects

1) General skills needed at the divisions

The abilities and skills needed may vary according to particular work requirements and the project

phase in question.

Generally, administrative work requires clerical skills. On the other hand, the civil engineering and the facilities departments are involved in technical work, subdivisions exist for each type, and expert employees shall be allocated corresponding to the subdivisions.

The Transportation Division is roughly divided into station management and service. The workers are not professionals, as human resources are developed by in-house education after recruitment. However, aptitude is important for drivers working alone (reference: Table 13.6-5).

Table 13.6-5 Functions and Skill Requirement for Each Section

Section	Major Function	Skill Requirement
Administration	<ul style="list-style-type: none"> - Institution, Personnel, Coordination with Management - Coordination with Stakeholders, Public relations, and Land Acquisition 	<ul style="list-style-type: none"> - Management - Relevant legal system - Accounting
Civil	<ul style="list-style-type: none"> - Civil Structure, Track design, Cost estimation, and Supervision - Civil design, coordination with stakeholders during construction 	<ul style="list-style-type: none"> - Civil engineering
Facility	<ul style="list-style-type: none"> - Facility M&E, Signal, Communication, Station design, Cost estimation - Rolling stock design, Cost estimation, Procurement, Inspection, and Repairing 	<ul style="list-style-type: none"> - Electrical engineering - Mechanical engineering - Architecture
Transportation	<ul style="list-style-type: none"> - Operation of Train - Operation of Station services, Fare collection - Traffic control, Information control (Safety, Security, etc.) 	<ul style="list-style-type: none"> - General skill

Source: JICA Study Team

2) Securing candidates for executive positions

The employees who are engaged in construction will have acquired knowledge and know-how. It is appropriate to treat them as supervisor for maintenance after commencement of service. To this end, it is desirable to select and hire and allocate some highly educated personnel during construction.

(2) Content and methods of education and training

Employees who will work in railway operations should be recruited, educated and trained to prepare for commencement of service. Regular training should be pursued to raise the capabilities of employees.

(3) Project schedule and recruitment plan

Employees will be recruited pursuant to the staffing plan, and the period should be determined with full consideration given to periods needed for education and training.

It is desirable to hire staff with job experience of construction related work in a relatively limited time. For example, those with experience of construction of building structures may be good at construction and electrical engineering.

1) Transportation Division

Drivers will be hired one year before commencement of service to be trained. Station staff will be recruited six months before commencement of service.

2) Facilities Division

Employees for vehicle-related work will be recruited one year before commencement of service, take classes and then practice operation for six months.

Employees related to electricity and rails will be recruited six months before commencement of service.

A recruitment plan will be created based on the conditions outlined above. As a result, more than 640 employees will have to be hired within a year before the commencement of service for education and training at each division (reference: Figure 13.6-8).

The core employees, who supposed to guide the general employees, should be recruited in earlier stage, in consideration of the period of advance training, or be secured by transferring staff from the Construction Division.

Item		2010	2011	2012	2013	2014	2015	2016	2017	2018
Business schedule	Preparation for incorporation	★ Establishment							
	Route survey		————							
	Design and work ordering			————	————					
	Work (civil engineering)					————	————	————		
	Work (facilities)						————	————	————	
	Preparation for opening									————
	Start business									★ Start
Staff Recruitment schedule										
No. of recruited staff			15 33	57	30	55			820	
Grand total (Accum.)			15 48	105	135	190			1010	

Source: JICA Study Team

Figure 13.6-8 Schedule of Staff Recruitment and Business

13.6.6 Organization of Separated Business Type of MRT

13.6.6.1 Business Contents of the Separate Type

It is preferable for the operating company to construct and manage a railway system in an integrated way which is not easy to be acquired, accumulated and internalized, but requires time consuming process and pertinent human resources. Accordingly, one option is to entrust operation of the railway system to a competent private entity.

The contents and the manner of the entrusting operations may vary. It is necessary to select an appropriate form after carefully considering local fund raising, the business outlook after commencement of service, and the project schedule.

13.6.6.2 Organization and Staff Requirement of the Separated Type

Organization of a MRT operation company will depend on the business type, i.e. the integrated or separated type. It will require about 180 persons during construction, if the company is responsible for all the construction work. After construction, the number of staff required will be reduced to about 20 as because the major work of the company is the coordination with the trustee or the administrative work of MRT operations.

On the other hand, the operation company in charge of operation and maintenance will need about 1,000 personnel, which is almost the same size as needed for the integrated type.

It is desirable to utilize external workers and consultants during construction period in order to curb the number of employees of the organization unless there are further projects afterward.

Depending on the situation, transferring construction personnel to the operation company or receiving assistance from the entrusted operation company must be studied. And it is necessary to consider restricting recruitment and sharing of construction know-how.

The separate business model in which operation and maintenance are outsourced has been described above. It will be necessary to review the organizational form based on it. However, the manner of entrustment (concession) may vary.

Furthermore, the integrated business model and the business separation model were considered while focusing on the subway business company of DMTC. If a totally different scheme is to be considered, an extensive review should be conducted, taking into account the results of this review.

13.6.7 Business Plan

Business plan for MRT should be drafted taking account of effective and efficient operation of MRT business by the DMTC. This section points out phased business operation plan to set up the MRTC.

13.6.7.1 Phased Development Plan of the DMTC

Table 13.6-7 summarizes business form of the DMTC at each of the four development phases of (1) Planning, (2) Preparation of Construction, (3) Construction, and (4) Operation.

Table 13.6-7 Form of Business Operation in Each Phase

Phase	Planning	Preparation of Construction	Construction/Commissioning	Operation
Target Year	2011-2012	2013	2014-2018	2018
Source of Funds for Operation	National Budget	National Budget /Loan	National Budget /Loan	Operating Revenue /Subsidy
Operating Asset	None	None	Rolling Stock E & M Facilities	Rolling Stock E & M Facilities
Department/ Number of Employment	Planning: Administration:	Civil Facility Administration	Civil Facility Transport Administration	Civil Facility Transport Administration
Key Output	1.Preparation of Establishment (Regulation) 2. Action Plan to obtain the loan	Role & Responsibility in accordance with Regulation	1. Employee Training Program 2. Business Plan	Detailed Business Plan & Management Structure

Source: JICA Study Team

13.6.7.2 Key Points of the Business Operation

The business plan should articulate the following points, which mission and policy statements will be followed by programs to realize them

- *Vision and Mission* of business
- Policy for *Customer Satisfaction (CS)* of railway users
- Policy for *Corporate Social Responsibility (CRS)*
- Policy for *Corporate Governance* to secure good management and responsibility
- Policy for *Recruitment and Training of Employees*

13.6.7.3 Management Plans

The following table is described the management structure to implement the practical operation.

Table 13.6-8 Practical Plan and Management

Category	Plan	Description
Funding/ Accounting/Financial	- Cash Flow Plan	Fund Management
		Accounting Control
		Revenue Management
		Cost Management
		Repayment Schedule
Fixed Assets	- Procurement Plan - Investment Program	Procurement Control
		Maintenance Structure
		Schedule Control
	- Business Plan (Short, Medium, and Long term)	Business Progress Management
		Risk Management
	- Train Transportation Plan	Train Operation Control
Market Research		
- Disaster Management Plan	Safety Control	
Personnel/Sub Contracting	- Recruitment Plan	Personnel Management (Employ, Welfare)
	- Training Program	
	- Sub-contracting Plan	Management of Performance
		Schedule Control

Source: JICA Study Team

13.6.7.4 Preliminary Ideas for Well-managed Operation

The following are preliminary ideas are raised for better management of the MRTC

(1) Funding/Accounting / Financial

- To maintain a proper fund management based on cash flow plan
- To enhance cost consciousness
- To seek the affiliated (non-rail) business to improve financial viability
- To establish clear fare structure
- To properly manage the usage of subsidy and revenue

(2) Fixed Assets

- To proper procurement taking account of the rate of return on Investment (ROI)
- To maintain the asset appropriately
- To prepare an operation plan, taking into account of safety first

(3) Personnel/Subcontracting

- To equip personnel properly taking into consideration place, time, cost and work load
- To develop a training program for staff of each section
- To control the subcontracting organization appropriately

13.6.8 Issues of Railway Business

13.6.8.1 Improvement of Financial Viability

The following are several issues in financial viability related to implementing the MRT business.

- MRT construction requires a *huge capital investment* of capita, which becomes a heavy burden to the railway operator in financing and repayment by fare-box revenue. Consequently, it is better to *cover the whole construction cost with public funds* as is normally practiced in Europe and the United States. This will help financially viable railway business.
- Despite facility automation and mechanization, railway operations are relatively labor-intensive, with many employees required for station operation and maintenance. It is also required to secure satisfactory levels of maintenance which will be needed after the commencement of service on.
- Financial viability is important to run the MRT business, and at the same time, to provide mobility for those transport vulnerable group who do not have private cars, the *fare for the MRT must be affordable* to them, taking account of the prevalent buss fares and living expenses of ordinary citizens.
- Accordingly, it is highly likely that public subsidies or management assistance will be required to cover operating costs. It is necessary to establish a *subsidy system* in advance of construction and after full validation by a feasibility study.

13.6.8.2 Public Service Obligation (PSO)

In transport sector, public service obligation (PSO) is an arrangement in which a governing body or other authority offers for an auction of subsidies and permit the winning company exclusively to operate a specified service for a specified period of time for the subsidy. This is implementing in public transport cases where the operation is not profitable but is a socially desirable being available for users. In Dhaka's MRT case, it might not be profitable enough because of fare setting to meet the affordability of users while the need for MRT Line 6 is thought to be huge.

The use of PSO can be applied to railway. In many cases, PSO has been introduced a way to

privatize former government owned transport. The infrastructure is often separated from the operation, and may be owned by the governing body or by a third party. The authority may also maintain the ownership of the vehicles, such as ferries or rolling stock.

Traditionally, public transport has been operated through a company wholly owned by the state with monopoly, like a national railway company. Alternatively, private companies were granted privileges (with or without subsidies) granting them an unfair monopoly. In later years many markets have been deregulated, especially in Europe, paying the lowest bidding operator to carry out the traffic at regular auctions.

13.6.8.3 Improvement of ridership

To maintain a good operating balance of payments situation, it is necessary to secure revenue by creating new demand and by attracting as a great transition as possible from existing transportation means.

To do this, it is necessary to make plans to attract maximum numbers of passengers through optimal planning of routes. It is also necessary to raise passenger demand and increase revenue in cooperation with those involved in transportation and urban planning.

Specific measures include the following:

- i) Rearrange existing bus routes centered on stations;
- ii) Develop traffic nodes for easy transfers;
- iii) Revitalization and redevelopment along the line; and
- iv) Examples: Placement of universities in suburbs; making efficient use of vacant lots; attracting stadiums, redevelopment of city centers as mixtures of offices and residences (separation of highly advanced office areas and residential areas).

13.7 Regulatory Framework

13.7.1 Laws related to Railway operation

The legal system regulating railways in Bangladesh includes the Railways Act, 1890 (Act IX 1890), revised 20 times or more to date. The Railways Act includes the following chapters.

Chapter 1: Preliminary

Chapter 2: Inspection of Railways

Chapter 3: Construction and Maintenance of works

Chapter 4: Opening of Railways

Chapter 5: Railway Facilities and Equipment

Chapter 6: Working of Railways

Chapter 7: Responsibility of Railway Administrations as Carriers

Chapter 8: Accidents

Chapter 9: Offences and Penalties

This Act provides the framework for implementation, and the related codes, rules and manuals are listed in Table 13.7-1.

These rules and codes cover management and service of the Bangladesh Railway and are not related to railways for metropolitan rapid transit (MRT) to be constructed.

The MRT is basically an electrified railway, the first in Bangladesh. Laws and regulations should be enacted newly to assure safety and convenience of transportation by electrified railway, and it is necessary to establish new technical standards to comply with the railway operator. In addition, standard specifications should be provided as a model.

An outline of laws, regulations and standards required for construction of MRT is described in Table 13.7-1.

Table 13.7-1 Bangladesh Railway Codes and Manuals

No.	Category	Title	Year Latest reprinted/ updated	Remarks
	Rules			
2		General and Subsidiary Rules	June 1981	
3		Opening of New Railways/Section (Rules 1993)		
4		Fundamental and Subsidiary Rules for Interchange traffic & Annex VIII	1973 & Jan 1962	
	Codes			
5		State Railway General Code vol-1	1987	
6		State Railway General Code vol-2	1954	
7		Railway Establishment Code vol-1	Oct. 1952	
8		Railway Establishment Code vol-2	Oct. 1952	
9		Railway Code for Engineering Department	Feb. 1962	
10		Railway Code for Mechanical Department	Nov. 1955	
11		Railway Code for Stores Department	Sep. 1952	
12		Railway Code for Accounts Department-Part-I	Nov. 1953	
13		Railway Code for Accounts Department-Part-II	Nov. 1953	
	Manuals			
14		Mechanical Workshop Manual	July 1962	
15		Way and Works Manual	Jan. 1959	
16		Signal Engineering Manual	Jan. 1955	
17		Traffic Manual Part-I	Apr. 1943	
18		Traffic Manual Part-II	Aug. 1929	
19		Locomotive Running Shed Manual	Feb. 1964	
20		Carriage and Wagon Manual	Feb. 1964	
21		Medical Manual	Feb. 1967	
22		Statistical Manual		
23		Nirapatta Bahiny (Security) Ordinance	1976	BR CCRNB
24		Accounts Office Manuals (9 No.)		BR Tr. Academy
25		P Way Manual		BR Tr. Academy
26		Bridge Manual		BR Ch. Engineer
27		Railway Operation Manual		BR Tr. Academy
28		Personnel Manual		BR Tr. Academy
	Others			
29		Schedule of Dimensions (BG & MG)	1980	
30		BR Goods Tariff	Oct. 1976	
31		BR Coaching Tariff	Oct. 1977	

Source: Bangladesh Railway

13.7.2 Laws and regulations required for MRT

The following laws and regulations are required for MRT. Some of them have already been existed and some should be enacted newly.

(1) Existing Laws and regulations related to city plan and transportation system

The MRT plan should be consistent with the STP and RAJUK plans.

(2) Provisions related to land utilization and land expropriation

There exist laws and regulations pertinent laws and regulations on land use and land expropriation of private land in Bangladesh. Provisions are needed for cases involving occupancy of public owned land (surface and underground) when MRT runs other than the strip of land dedicated to railways and underground.

(3) Coordination organ related to use of underground space

Coordination organization is required to adjust facilities to be introduced below public land, location, scale and depth of buried objects.

(4) Provisions related to the public organization to be the MRT construction entity

MRTA Act: Purpose, investors, articles of incorporation, administration committee, officers and employees, accounting, supervision and subsidy, and penalties etc.

(5) Provisions related to environmental impact assessments *

Assessment items and standards are necessary in each stage of planning, construction and completion, and thereafter for the city railway.

(6) Provisions related to railway business operations

Urban Rapid Railway Business Act: Provisions on the railway operator, license application, licensing standards, approval of construction, inspection of railway facilities, confirmation of vehicles, use of rails, and fares etc.

(7) Provisions related to railway facilities and vehicles

Urban Rapid Railway Structure Rules: Rails and structures, electric facilities, and safe driving

facilities, and vehicles etc.

Railway Technical Standards: Construction structure, track structure, electric facilities, signal and communication facilities, electric railway machinery facilities, depots, underground substation and ventilation facilities.

(8) Provisions for driving and safety

Driving Rules:

13.7.3 The laws, ordinances, technical standards and operating regulations

The laws, ordinance, technical standards and operating regulations are to be enacted in each phase of the MRT construction. They include the following:

Step 1: Organization and Institution Set Up

- MRTA Act
- Act on land utilization
- Designation and construction of desirable traffic network
- Establishment of organization to coordinate use of underground space
- Basic specifications of revenue and expense requirements for MRT No. 6:
 - Structural mode (elevated and underground),
 - Alignment and track standards,
 - Ratings of electricity to be used,
 - Electricity plan,
 - Power collection method,
 - Vehicle standard,
 - Signal system,
 - Rough service plan,
 - Anti-disaster plan (natural disaster, etc.),
 - Station facilities,
 - Facility plan (underground ventilation method), and
 - Depot plan

Step 2: Pre-Feasibility Study

- Urban Railway Structure Regulations
- Driving Regulations

Step 3: Detailed Design and Tender Document

- Urban Rapid Railway Business Act
- Technical standards for civil engineering structures
(Design standards for railway structures)
- Design specifications (loads, earthquakes, anti-flood measures, train protection, etc.)
- Regulations on placing substations
- Railway technical standards
- Minimum technical standards to be complied with in executing construction

Step 4: Construction and Implementation

- Safety measures to be complied with to prevent industrial accidents
- Provisions on treatment of road facilities and buried objects

Step 5: Planning Operations and Training

- Fares and driving rules
- Standards for vehicle inspection and track maintenance

13.8 Next Steps for Realization of MRT

13.8.1 Establishment of MRT Steering Committee

To move forward the realization of the MRT development in Dhaka, it will be the first step to fully establish DMTA and complete the staff recruitment. It is expected that the procedure for the approval of the DMTA Act, 2009 as well as the organization and staffing structure will be carried out smoothly. DTCB can start drafting the organization structure and staffing so that it would be submitted to MOC immediately after the approval on the DMTA Act, 2009.

To make a basis for the information sharing and consensus building among the stakeholders for establishing legal frameworks and institutional setup, the JICA Study Team proposes the organization of MRT Steering Committee. The chairman, members and the member secretary of the MRT Steering Committee are as follows:

- Secretary, Roads and Railways Division, Ministry of Communication- **Chairman**
- Secretary, Bridge Division, Ministry of Communication
- Secretary, Local Government Division, Ministry of Local Government, Rural Development and Cooperatives
- Member, Planning Commission, Ministry of Planning
- Member, Economic Relations Division, Ministry of Finance
- Chief Engineer, Bangladesh Bridge Authority

- Police Commissioner, Dhaka Metropolitan Police (DMP)
- Director General, Department of Environment, Ministry of Forest and Environment
- Chairman, RAJUK
- Director General, Bangladesh Railway
- GIBR (Government Inspector of Bangladesh Railway)
- Representative (Prof. MD. Alamgir Mozibur Haque, Department of Civil Engineer), BUET
- Chief Executive Officer, DCC
- Managing Director, DPDC
- Managing Director, DESCO
- Executive Director, DTCB (future DMTA)- **Member Secretary**

13.8.2 Actions to be taken by the Steering Committee

The Steering Committee shall take the following actions for the realization of the MRT.

1. Determination of the MRT project framework:
 - Determine the future MRT network (the framework for project identification)
 - Determine the project development process, and how those affected can participate
 - Define the MRT role (its target market and tariff) and how it is to interface with buses/ other rail services
 - Determine the route - key station locations, vertical alignment and environmental acceptability, impact on road network, integration with other lines
 - Determine the purpose of engaging with the private sector (improving planning effectiveness, raising private finance, operational efficiency)
2. Conduct Feasibility Study
 - Determine the maximum scale of public investment on the basis of external benefits
 - Determine the subsidies that are justified (e.g. to classes of users), and how target these efficiently and acceptably
 - Establish an Implementation Program
3. Consensus making and coordination among Stakeholders
 - Overall stance for Mass Rapid Transit Project
 - Financial burden share
 - Assent ownership
4. Financial detailed scheme design
 - Refine impact of enhancement measures by obtaining commitment from stakeholders
 - Formulate roles among stakeholders and risk allocation
 - Define financial allocation and budget
 - Define equity allocation among relevant governments and private sector

5. Project Preparation
 - Study organizational settings and institutional and legal framework at each of the development phases of preparation, plan, design construction, operation and maintenance, management of the project.
6. Detailed Enhancement measures
 - Plan development of surrounding area
 - Review integration of public transport network with MRT
 - Fare integration with other public transportation
7. Preparation of DMTC setup
 - Design mission/vision
 - Define responsibility and scope
 - Organization design
 - Select management people and build management capability
8. Formulate Project scheme for Public-Private Partnership, if necessary
 - Project scheme
 - Structure the concession contract to meet government objectives
 - Implementation body
 - Legal settings
9. Monitoring of regulatory revision
 - Monitor the progress of revision of related laws and regulation
 - Define MRT performance specification (including capacity requirements) – that provides the basis for regulation
 - Regulate by administering the concession contract/ otherwise

Attachment A: The Draft DMTA Act, 2009, prepared by DTCB and sent to Ministry of Communications on 27 December 2009

TRUE TRANSLATION OF DHAKA MASS TRANSIT AUTHORITY ACT 2009

1. **Short Title.**

- (1) This Act may be called the **“Dhaka Mass Transit Authority DMTA Act, 2009”**;
- (2) **It shall come into force on such date as the Government may be notification in the Official Gazette, appoint.**

2. **Definition:** In this Act, unless there is anything repugnant in the subject or context.

- (a) "Authority" means Dhaka Mass Transit Authority constituted under section 4;
- (b) "Dhaka" means Dhaka City within the meaning of section 1(2) of Town Improvement Act, 1953 (E.B. Act XIII of 1953) and **Dhaka, Narayanganj, Narsingdi, Munshiganj, Gazipur and Manikganj Districts** shall include;
- (c) **“Mass Transit” means mass transit system, which has high level passenger carrying capacity and speed;**
- (d) "Executive Director" means Executive Director of the **Authority** and it shall include such person as discharging the responsibilities of Executive Director under section 12;
- (e) **“Board” means the Dhaka Mass Transit Authority established under section 6;**
- (f) "Chairman" means Chairman of the Board under section 7;
- (e) **"Vice Chairman" means Vice Chairman of the Board under section 7;**
- (g) **“Parikalpa” means planning and project;**
- (f) "Secretary" means Secretary of the **Board under section 7;**
- (g) "Member" means member of the Board **under section 7.**

3. **Overriding power of the Act:** Notwithstanding anything contained in any other law, rules, regulations, contract of any other document having the force of law for the time being, the provisions of this Act shall prevail.

1. (1) All the Department/Organization under the jurisdiction of the Act owes responsibility of transport, traffic and traffic management measures as direction by the Authority.

4. Establishment of the Authority.

- (1) As soon as possible after the commencement of this Act, the Government shall establish an **Authority** to be called the **Dhaka Mass Transit Authority** for carrying out the purposes of this Act.
- (2) The **Authority** shall be a statutory body having perpetual succession and a common seal, with power to acquire, hold and dispose of property, both movable and immovable and shall by its name sue and would be sued.

5. Head Office.

The **Authority** shall have its Head Office in Dhaka and it may establish, if necessary any branch-office at any place in Dhaka.

6. Guideline.

- (1) **The Authority shall follow the guideline of the Board under section 7;**
- (2) **Board shall follow time to time the guidance of the Government to implement its functions.**

7. Constitution of the Board: The Board shall comprise the following members, such as:

- (a) **Minister, Ministry of Communications, who shall also be the ex-officio Chairman;**
- (b) **Mayor, Dhaka City Corporation, who shall also be the ex-officio Vice-Chairman;**
- (c) Two members of Parliament (Greater Dhaka) nominated by the Government;
- (d) **Secretary, Roads and Railways Division, Ministry of Communications, ex-officio;**
- (e) Divisional Chief, Infrastructure Division, Planning Commission, ex-officio;
- (f) Chief Engineer, Department of Roads and Highways, ex-officio;
- (g) Director General, Bangladesh Railway, ex-officio;
- (h) **Chief Engineer, Bridge Division, ex-officio;**
- (i) Chairman, Bangladesh Road Transport Corporation, ex-officio;
- (j) **Divisional Commissioner, Dhaka Division, ex-officio;**
- (k) Police Commissioner, Dhaka Metropolitan Police, ex-officio;
- (l) Chief Executive Officer, Dhaka City Corporation, ex-officio
- (m) Director General, Department of Environment, ex-officio;
- (n) Chairman, Rajdhani Unnayan Kartripaksha (RAJUK), ex-officio;

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- (o) Chairman, Bangladesh Inland Water Transport Authority, ex-officio;
 - (p) Chairman, Bangladesh Road Transport Authority, ex-officio;
 - (q) Chief Engineer, Department of Local Government Engineering, ex-officio;
 - (r) One representative nominated by the Ministry of Local Government, Rural Development and Cooperatives (Local Government Division), who must have the status of a Joint Secretary;
 - (s) **One representative nominated by the Ministry of Home Affairs, who must have the status of a Joint Secretary;**
 - (t) **One representative nominated by the Ministry of Shipping, who must have the status of a Joint Secretary;**
 - (u) President, Bangladesh Road Transport Owners Association, ex-officio;
 - (v) President, Bangladesh Road Transport Workers Federation, ex-officio;
 - (w) President, Dhaka Chamber of Commerce, ex-officio;
 - (x) Mayor, Narayanganj Municipality, ex-officio;
 - (y) Mayor, Manikganj Municipality, ex-officio;
 - (z) Mayor, Munshiganj Municipality, ex-officio;
 - (aa) Mayor, Narsingdi Municipality, ex-officio;
 - (ab) Mayor, Gazipur Municipality, ex-officio;
 - (ac) Executive Director, Dhaka Mass Transit Authority, who shall be the Member-Secretary of the Authority.
- 8. Function of the Board. -- to coordinate all the private and public sector transport related activities for improved transport services and advise and guideline to the Authority to remove traffic congestion in the Greater Dhaka.**
- 9. Aims and objectives of the Authority.** - The aims and objectives of the **Authority shall** be as follows, namely:
- (a) To advise the concerned agencies on an integrated and safe traffic and transportation system for Dhaka and to make necessary arrangements with that purpose;
 - (b) To co-ordinate the traffic and transportation infrastructure development plan with the overall development strategy plan for Dhaka as envisaged in the Structure Plan (Town Improvement Act, 1953 section 74 (1));

- (c) To formulate strategic planning for traffic and transport sector of Dhaka and to co-ordinate inter agency co-operation;
 - (d) **To formulate rules, regulation and guideline for Mass Transit.**
10. **Functions of the Authority:** The **functions and authority** of the Authority shall be as follows, namely:
- (a) To formulate a transport policy with clear guidelines for improved transport services in public and private sector;
 - (b) To co-ordinate **the transport** system of Dhaka taken up by various concerned authorities;
 - (c) To formulate a policy for management of traffic, transportation, roadside-space and parking in the **light of Structure Plan (Town Improvement Act, 1953 section 74 (1)) and related studies;**
 - (d) **To formulate Mass Transit project and implementation of special project;**
 - (e) **To advise, monitoring and supervision related to Mass Transit Organizations**
 - (f) To formulate a policy for pedestrian safety and to co-ordinate its **implementation;**
 - (g) To monitor and co-ordinate **transport projects** under implementation by concerned agencies;
 - (h) To set up a policy and guidelines for an improved transport services;
 - (i) To formulate a policy for control of all public transportation and to prepare guidelines for policy implementation;
 - (j) To assist and give guidelines in the preparation of environmental and safety standards for all classes and kinds of vehicles;
 - (k) To advise on imposition of taxes and other fiscal measures in achieving the standard specified in the guidelines under clause (j)
 - (l) To select site for engineering schemes;
 - (m) To grant approval for plans of various schemes relating to parking facilities etc. of various transports;
 - (n) To prepare, approve and review transport engineering schemes;
 - (o) To prepare plans for transport establishments for the Dhaka and to advice on the matters related to the implementation of such plans;
 - (p) To formulate training plans **and implementation** for human resource development of traffic and transport sector;

- (q) To formulate a policy for making transport and traffic schemes;
 - (r) To advise the concerned on the number and nature of vehicles of various classes and to ensure the compliance of such advise;
 - (s) To assist in applying the law relating to transport and traffic **to concern organizations/authorities;**
 - (t) To assist for **preventing of pollution arising** out of the use of faulty vehicles;
 - (u) To prepare policy and implementation of route and lane for smooth vehicle operation in Dhaka;
 - (v) To carry out contract with others to activate the objective of the Act;
 - (w) To carry on any other responsibility given by the Government.
11. Board Meeting:
- (1) Subject to other provisions of this section, the **Board** may decide on the proceedings of its meetings.
 - (2) The **Board** shall meet at least three times in a year and the meeting shall be convened by the Secretary in consultation with the Chairman regarding the date, time and venue of the meeting.
 - (3) The Chairman shall preside over the **Board** meetings and in case of his absence the Vice-Chairman shall preside over.
 - (4) **Ten members** shall form the Quorum of the **Board** meeting, but no quorum shall be necessary for a meeting that has been adjourned.
 - (5) Every member **of the Board** shall have one vote and in the event of equal votes, the Chairman shall have a Second or Casting vote.
 - (6) No Act or proceeding of the Board shall be invalid merely on the ground of any vacancy in or any defect in constituting the **Board** and no question shall be raised on this matter.
12. Invited Members: Notwithstanding anything contained in sections 7 and 9, a person concerned or having experience in the matters of discussion in the meeting may remain present in the Board meeting if invited by the Secretary and participate in the discussions, but that person shall have no power to vote.

13. Executive Director:
- (1) There shall be an Executive Director of **the Authority**.
 - (2) The Executive Director shall be appointed by the Government and the terms and conditions of his service shall be determined by the Government.
 - (3) The Executive Director shall be the full time Chief Executive Officer of **the Authority** and shall be responsible for implementation the decisions of the Board.
 - (4) In the event of the post of Executive Director falling vacant or in the absence or failure of the Executive Director to discharge his responsibilities due to illness or for other reasons, a person nominated by the Government shall perform the duties of the Executive Director until the Executive Director resumes his duties or the newly appointed Executive Director takes the charge.
14. Officers and Staff of the Authority: **The Authority** may appoint such officials and other employees as it may consider necessary for ensuring proper discharge of its functions and the terms and conditions of their service shall be determined by regulations.
15. Committee: **The Authority** may constitute one or more committees for discharging specific duties for the purpose of this Act.
16. **Fund of the Authority:** The **Authority** shall have a fund and the following money shall be deposited to it, as:
- (a) **Fund**/grant from the Government;
 - (b) Grant from local authorities;
 - (c) **Loan assistance** obtained with the prior approval of the Government;
 - (d) Sale proceeds of property of the **Authority**;
 - (e) Contribution received from any other source.
- (2) The fund shall be kept in any Schedule-Bank in the name of the **Authority** and money may be withdrawn from this fund in the prescribed manner by the Executive Director.
 - (3) Required expenses of the Authority shall be met out of the said fund.
 - (4) The **Authority** may invest its fund or part thereof in any sector approved by the

Government.

17. Yearly Budget Statement: The **Authority** shall before the commencement of every financial year and by such date as the Government may direct, submit to the Government for approval a budget for each financial year showing the estimated receipts and expenditure of the sums which are likely to be required from the Government during that financial year.
18. Accounts and Audit:
 - (1) The **Authority** shall maintain its accounts properly and prepare yearly financial statements.
 - (2) The Comptroller and Auditor General of Bangladesh hereinafter referred to as the Comptroller and Auditor General shall audit the funds of the **Authority** and shall submit a copy of its report to the Government and to the Board.
 - (3) For the purpose of an audit under sub sections (2) the Comptroller and Auditor General or any person authorized by him in this behalf, shall have access to all records, documents, cash or balance in bank, securities stores and any other property of the **Authority** and may examine any Members, Executive Director or other employees of the Authority.
 - (4) The Executive Director shall, within three months after the end of every financial year, place an internal audit report before the Board for approval.
19. Protection of works done in good faith: No suit or proceeding shall lay against the Board any Members, Executive Director or other employees of the Board for anything done in good faith under this Act or rules or regulation of which any person is aggrieved or is likely to be aggrieved.
20. Delegation of power: The Authority may, if required and subject to prescribed conditions, delegate any of its powers to the Chairman, Vice-Chairman or any other Member, Executive Director or to any other officer of the Board.
21. Power to make rules: The Government may by notification in the official gazette, make rules for carrying out the purpose of this Act.
22. Power to make regulations: The Authority may with the prior approval of the Government and by notification in the official gazette, make regulations not inconsistent with the provisions of this Act or any rules, for carrying out the purpose of this Act.

23. Repeal and saving:

- (1) **As soon as the Authority is established in 16 April, 2001 Baishak Gazette Act Dhaka Transport Coordination Act, 2001 (Act no. 19 year 2001) shall stand repealed.**
- (2) Soon after the repeal of the said notification-
 - (a) **The Dhaka Transport Coordination Board (Act no. 19 year 2001)** constituted under the said notification, hereinafter referred to be the defunct board, shall be abolished;
 - (b) All the assets, rights, powers, authority, facilities and properties, movable and immovable, cash and bank deposit and all claims and rights of the **defunct Board (DTCB)** shall stand transferred to and vested in the Authority;
 - (c) All the assets, loans, liabilities and claims of the defunct board shall be transferred to and deemed to have been the loans, liabilities and claims of the Authority;
 - (d) All the officials and staff of the **defunct Board (GDTPCB/DTCB)** shall be transferred to the Board and shall continue to serve in the Board on such terms and conditions of service as were applicable before their transfer unless such terms and conditions are altered **Authority.**

Attachment B: Job Descriptions of the DMTA Officials**Table: Job Descriptions of the DMTA Officials**

Position	Job Descriptions	Qualifications and Experiences
Additional Executive Director (Traffic Management, Public Transport and Infrastructure)	Provide direction, guidance and give advice the concerned agencies in formulating traffic management, integrated transportation development, development of public transport service, transport regulation and management, and transport and the environment in Dhaka. Formulate policy for pedestrian safety and its implementation. Assist in the preparation of environmental and safety standards for all class and kinds of public transport. Select sites for transport engineering schemes. Prepare policy for routes and lanes and its implantation for smooth vehicle operation in Dhaka.	Qualifications: Graduate in Engineering or Masters in Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering is desirable or equivalent. Experience: Minimum 15 years professional experience with at least 5 years experience in transport infrastructure design and construction or traffic engineering and road safety or public transport regulation and management or transport and the environment.
Additional Executive Director (P&P)	Provide direction, guidance and coordinate the traffic and transportation infrastructure development plan in Dhaka. Formulate strategic transport plan, policy and guidelines for improved transport services, advice on transport pricing, taxes and financial measures. Approve and review transport studies and projects. Formulate training plans and implementation.	Qualifications: Graduate in Engineering or Masters in Transport Economics/Economics/Transportation/Traffic Engineering/Transport Planning and Engineering/Mathematics/Geography is desirable or equivalent. Experience: Minimum 15 years professional experience with at least 5 years experience in transport planning or urban planning or transport modelling or traffic survey and database.
Additional Executive Director (Mass Transit)	Formulate rules, regulations and guidelines for mass transit in Dhaka. Formulate mass transit plans, projects and its mode of implementation. Provide direction, guidance and advise of mass transit projects. Coordination, monitoring and supervision of mass transit projects. Establishment of new mass transit organisations, making guideline for fare structure, subsidy and public private partnership.	Qualifications: Graduate in Engineering or Masters in Transport Economics/Economics/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering is desirable or equivalent. Experience: Minimum 17 years professional experience with at least 3 years experience in mass transit transport planning and regulation or mass transit construction and operation.
Senior Transport officer	Conduct research on vehicle design and its sizes. Make guidelines for different types of vehicles and rolling stocks. Formulate regulations for road safety and enforcement, pollution control plan, and estimate demand for public transport services.	Qualifications: Masters in Mechanical Engineering/Automobile Engineering/Traffic Engineering/Transport Planning and Engineering/Transport Economics is desirable or equivalent. Experience: Minimum 12 years professional experience with at least 5 years experience in vehicle design and regulation or public transport management and road safety or transport and the environment.

Position	Job Descriptions	Qualifications and Experiences
Senior Traffic Engineer	Design traffic survey manual, road inventory manual and classification of roads in Dhaka. Review transport infrastructure projects and making traffic forecast. Plan for traffic management, monitor traffic flow and performance of traffic system. Advise to intersection capacity enhancement and making lane by category of vehicles.	<p>Qualifications: Masters in Traffic Engineering or Transport Planning and Engineering or Transportation.</p> <p>Experience: Minimum 12 years professional experience with at least 5 years experience in traffic engineering and traffic forecast or urban transport infrastructure design and construction.</p>
Senior Transport Planner-1	Direct different studies relating to transport service, data requirement for the purpose of transport modelling, assess the transport performance of proposed policy and infrastructure investment by using model.	<p>Qualifications: Masters in Transport Planning and Engineering/Transport Planning/Urban Planning/Transportation/Transport Economics/Economics/Geography.</p> <p>Experience: Minimum 12 years professional experience with at least 5 years experience in transport planning or transport modelling or urban transport infrastructure.</p>
Senior Transport Planner-2	Direct different studies relating to integration of urban development and transport plan. Guide preparation of urban growth scenario and transport needs, and evaluation of infrastructure projects.	<p>Qualifications: Masters in Transport Planning and Engineering/Transport Planning/Urban Planning/Transportation/Transport Economics/ Geography/Economics.</p> <p>Experience: Minimum 12 years professional experience with at least 5 years experience in transport planning or urban transport infrastructure or economic and financial analysis of transport infrastructure.</p>
General Manager (Infrastructure)	Responsible for all aspects of Metro, Bus Rapid Transit (BRT), urban rail/commuter service and transport studies, economic evaluation, forecasting, modelling, traffic management, environmental assessment, public consultation and management. Specialist rail advisor on multi-modal infrastructure projects including master plans and the transport assessment for project planning applications. Bid management including knowledge on Third Rail Electrification Metro. Resource planning and management including career development. Specialist input to projects, checking and review of project deliverables.	<p>Qualifications: Masters in Engineering (Civil/Electrical/Mechanical) or Masters in Traffic Engineering/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 12 years professional experience with at least 5 years experience in transport planning or urban transport infrastructure or construction of transport infrastructure.</p>

Position	Job Descriptions	Qualifications and Experiences
General Manager (Operation)	Operational management of Metro and Bus Rapid Transit (BRT) includes planning, business development, performance management and skills/careers development and client liaison. Responsible for timely delivery of business cases ranging from forecasts of revenues and economic benefits and operating costs. Project overview and management for development of transport demand model. Metro and railway sector operations and economic advice to support Government Plan on a range of proposed metro and urban rail/commuter service infrastructure expansions.	<p>Qualifications: Masters in Engineering (Civil/Electrical/Mechanical) or Masters in Transport Economics/Economics/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 12 years professional experience with at least 5 years experience in transport planning, operation and management.</p>
General Manager (Regulation)	Manage and coordinate the rail safety requirements and activities of metro operating in Dhaka in accordance with all relevant Bangladesh legislation including the railway safety, health & safety provisions under Railway Act and Metro Railway Act and in accordance with the good industry practices and international benchmark in order to obtain and maintain the license for operating the metro system according to the required safety standards. Responsible for coordinating and implementing strategies in a dynamic business environment to ensure that legislative requirements and business needs are met. Manage the investigation and handling of Metro and Bus Rapid Transit (BRT) safety incidents and accidents or incidents involving death or injury to customers, employees and members of the public occurring on the metro property including common law litigation and public risk matters. Liaison with the Government Agencies, the GIBR or any authority nominated for the purpose.	<p>Qualifications: Masters in Engineering (Civil/Electrical/Mechanical) or Masters in Transport Economics/Economics/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering, LLM or equivalent.</p> <p>Experience: Minimum 12 years professional experience with at least 5 years experience in transport regulation or preparation of transport operation rules, regulation and guidance of mass transit.</p>
General Manager (Survey and database)	Undertake studies and surveys. Facilitate database, data analysis and preparation of GIS output. Prepare necessary formats and survey tools.	<p>Qualifications: Masters in Engineering/Transport Economics/Economics/Urban Planning/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 12 years professional experience with at least 5 years experience in traffic and inventory surveys, and preparation of transport database.</p>

Position	Job Descriptions	Qualifications and Experiences
Advisor (Institutional, Support Services and Linkage)	Provide technical and professional support to the planning and implementing agencies in Dhaka on transport and traffic related issues. Establish linkage and contact with concerned agencies and stakeholders including ministries, cabinet as well as parliament. Establish data exchange sharing with concerned agencies. Coordination of transport studies in Dhaka and dissemination of better transport service ideas.	<p>Qualifications: Graduate in Engineering or Masters in Transport Economics/Economics/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering/Geography/Business Administration or equivalent.</p> <p>Experience: Minimum 12 years professional experience with at least 5 years experience in general administration including Cabinet and Parliament procedures, preparation of document for the Government, road safety campaign, coordination of Dhaka City's concerned agencies activities, public campaign, and conducting seminar and symposium.</p>
Training Advisor	Preparation of training programme and training schedule. Selection of trainees and training institutions. Study on training needs assessment and evaluation of training programme. Monitor proper placement of trained officials. Liaison with transport institutions at home and in abroad.	<p>Qualifications: Graduate in Engineering or Masters in Transport Economics/Economics/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering/Geography/Business Administration or equivalent.</p> <p>Experience: Minimum 12 years professional experience with at least 5 years experience in training of transport officials, preparation of training programme and selection of trainers, training needs assessment of Dhaka City's concerned organisations, and liaison with transport institutions at home and in abroad.</p>
Legal Advisor	Act as a legal advisor of the Authority and mass transit operation organisations. Solicit any legal issues relating to transport infrastructures and transport operations.	<p>Qualifications: Masters in Law or Bar at law or equivalent</p> <p>Experience: Minimum 12 years professional experience with at least 3 years experience in land requisition and acquisition, soliciting resettlement of displaced people by the project, preparation of draft for Public Private Partnership agreement, and general administration of Ministry of Law and Ministry of Land.</p>
Director (Administration)	General administration and office management, human resource and personnel management, financial administration, procurement of office equipment, maintenance of vehicles, office management and liaison with concerned offices.	<p>Qualifications: Master Degree or equivalent</p> <p>Experience: Minimum 12 years experience in general administration and office management with at least 5 years experience in human resource and personnel management, financial administration, procurement of office equipment, maintenance of vehicles, office management and liaison with concerned offices.</p>

Position	Job Descriptions	Qualifications and Experiences
Transport Engineer	Undertake vehicle and rolling stock related studies. Assist for making of rule, regulation and guideline for vehicle fleet and rolling stocks.	<p>Qualifications: Masters in Mechanical Engineering or Automobile Engineering</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in vehicle and rolling stock design suitable for public transport, preparation of vehicle and rolling stock related rules and regulation.</p>
Public Transport Officer	Undertake studies of the demand for public transport, and develop policies and programme to improve public transport services in Dhaka.	<p>Qualifications: Masters in Engineering/Economics/Transport Economics or equivalent</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in public transport management, and rules and regulations.</p>
Road Safety Officer	Undertake studies to monitor road safety situation, identification of causes for road accident, and findings integration with transport infrastructure and transport operation.	<p>Qualifications: Masters in Traffic Engineering/Transport Planning and Engineering or equivalent</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in road safety engineering, preparation of road safety rules and regulations, and road safety related data collection and analysis.</p>
Pollution Control Planning Officer	Undertake studies and collection of available data on vehicle emission. Assist preparation of anti pollution regulation and guidelines. Checking and preservation of air quality data and sharing with other organisations.	<p>Qualifications: Masters in Mechanical Engineering/Environmental Engineering/Transport Planning and Environment or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in vehicle pollution (SO_x, NO_x, CO, HC) and PM survey and analysis, and preparation of emission control plan and regulations.</p>
Traffic Engineer	Undertake traffic studies, road inventory, intersection capacity, and vehicle fleet. Assist for estimation of traffic demand forecast.	<p>Qualifications: Masters in Transport Engineering/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in traffic engineering, traffic data collection, traffic forecast and traffic demand analysis.</p>
Design Engineer	Review the design of transport infrastructure projects and monitor the implementation of traffic engineering schemes.	<p>Qualifications: Graduate in Civil Engineering or Masters in Traffic Engineering/Transport Planning and Engineering is desirable or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in urban transport infrastructure planning and construction, and geo-technical data analysis.</p>

Position	Job Descriptions	Qualifications and Experiences
Transport Planner	Undertake investigations and surveys into the performance, operation and development of transport services.	<p>Qualifications: Masters in Transport Planning and Engineering/Transport Planning/Urban Planning/Transportation/Transport Economics/Economics/Geography.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in transport planning and urban transport infrastructure.</p>
Transport Modeller	Undertake necessary surveys for model calibration, data collection and model run. Making detail transport networks in Dhaka.	<p>Qualifications: Masters in Transport Planning and Engineering/Traffic Engineering/Urban Planning/Transportation/Transport Economics/Geography/Mathematics.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in transport modelling, transport data analysis, model calibration and GIS based transport network preparation.</p>
Transport Economist	Undertake evaluation of transport projects, making guidelines for economic appraisal of urban transport projects. Inputs for transport model calibration. Updating road users costs in Dhaka. Assist preparation of transport policies and guidelines.	<p>Qualifications: Masters in Transport Economics or Economics.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in transport planning, macro-economic data analysis, data input for transport model, economic and financial analysis.</p>
Urban Planner	Undertake studies and investigation of urban development, making of alternative scenarios, and input for model calibration.	<p>Qualifications: Masters in Urban Planning.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in urban planning, land use planning, Traffic Impact Assessment (TIA) and data input for transport model.</p>
Manager, Infrastructure (Rail)	Undertake metro, urban rail/commuter service and transport studies, economic evaluation, forecasting, modelling, traffic management, environmental assessment, and survey and data collection/processing. Review of multi-modal infrastructure projects including master plans and the transport assessment for project planning applications. Bid management including knowledge on Third Rail Electrification Metro. Checking and review of project deliverables.	<p>Qualifications: Masters in Engineering (Civil/Electrical/Mechanical) or Masters in Traffic Engineering/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in transport planning or urban transport infrastructure or construction of transport infrastructure.</p>

Position	Job Descriptions	Qualifications and Experiences
Manager, Infrastructure (Bus)	Undertake Bus Rapid Transit (BRT), Bus Franchise Route and transport studies, economic evaluation, forecasting, modelling, traffic management, environmental assessment, and survey and data collection/processing. Review of multi-modal infrastructure projects including master plans, transport assessment for project planning applications and bid management including checking and review of project deliverables.	<p>Qualifications: Masters in Engineering (Civil/Electrical/Mechanical) or Masters in Traffic Engineering/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in transport planning or urban transport infrastructure or construction of transport infrastructure.</p>
Manager, Operation (Rail)	Undertake metro studies and review of operational management includes planning, business development, and performance management. Undertake timely delivery of business cases ranging from forecasts of revenues and economic benefits and operating costs. Project overview and management for development of transport demand model. Metro and railway sector operations and economic advice to support Government Plan on a range of proposed metro and urban rail/commuter service infrastructure expansions.	<p>Qualifications: Masters in Engineering (Civil/Electrical/Mechanical) or Masters in Transport Economics/Economics/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in transport planning, operation and management</p>
Manager, Operation (Bus)	Undertake BRT studies and review of operational management includes planning, business development, and performance management. Undertake timely delivery of business cases ranging from forecasts of revenues and economic benefits and operating costs. Project overview and management for development of transport demand model. Metro and railway sector operations and economic advice to support Government Plan on a range of proposed metro and urban rail/commuter service infrastructure expansions.	<p>Qualifications: Masters in Engineering (Civil/Electrical/Mechanical) or Masters in Transport Economics/Economics/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in transport planning, operation and management</p>
Manager (Regulation)	Undertake review, studies and data collection of Metro and Bus Rapid Transit (BRT) safety requirements and activities of metro operating in Dhaka in accordance with all relevant Bangladesh legislation including the railway safety, health & safety provisions under Railway Act and Metro Railway Act and in accordance with the good industry practices and international benchmark in order to obtain and maintain the license for	<p>Qualifications: Masters in Engineering (Civil/Electrical/Mechanical) of Masters Transport Economics/Economics/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering, LLM or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in transport regulation or preparation of transport operation rules, regulation and</p>

Position	Job Descriptions	Qualifications and Experiences
	operating the metro system according to the required safety standards. Preparation of strategies in a dynamic business environment to ensure that legislative requirements and business needs are met. Manage the investigation and handling of rail safety incidents and accidents or incidents involving death or injury to customers, employees and members of the public occurring on the metro property including common law litigation and public risk matters. Liaison with the Government Agencies, the GIBR or any authority nominated for the purpose.	guidance of mass transit.
Manager (Database)	Preparation of database and data sharing with other organisation. Updating of collected data by the organisation and other concerned organisations in Dhaka.	<p>Qualifications: Masters in Engineering/Transport Economics/Economics/Urban Planning/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in traffic and inventory surveys, and preparation of transport database.</p>
Manager (System Analyst)	Installation, maintenance and management of the central database and computer support services.	<p>Qualifications: Masters in Engineering/Transport Economics/Economics/Urban Planning/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in preparation of transport database, system management and networking.</p>
Manager (Traffic Survey)	Prepare survey design and necessary traffic survey formats. Undertake traffic surveys and household survey.	<p>Qualifications: Masters in Engineering/Transport Economics/Economics/Urban Planning/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in traffic and inventory surveys.</p>

Position	Job Descriptions	Qualifications and Experiences
Traffic Enforcement Officer	Undertake traffic enforcement studies, making enforcement rules, regulations and guidelines. Monitor enforcement programmes, and coordination with Dhaka Metropolitan Police for implementation of traffic rules.	<p>Qualifications: Masters in Engineering or Masters in Transport Economics/Economics/Urban Planning/Transportation/Traffic Engineering/Transport Planning/Transport Planning and Engineering/Law or equivalent.</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in traffic rules and regulation. Monitoring of traffic enforcement plan.</p>
Accounts and Finance Officer	Personnel management, day to day accounts maintain, financial administration, procurement of office equipment, maintenance of vehicles and office management.	<p>Qualifications: Masters in Business Administration or Masters in Commerce</p> <p>Experience: Minimum 7 years professional experience with at least 3 years experience in accounts and financial management.</p>

APPENDIX 14: PUBLIC EXPERIMENT (TRAFFIC DATA)

The following traffic data were collected and analyzed before and during the public experiment.

1. Vehicle traffic flow of various intersections
2. Traffic flow of short listed intersections prior public experiment (Baseline survey)
3. Traffic flow of short listed intersections during public experiment
4. Travel speed survey prior public experiment
5. Travel speed survey during public experiment
6. Queue length prior public experiment
7. Queue length during public experiment
8. Signal cycle prior public experiment
9. Signal cycle during public experiment
10. Distribution of traffic volume, signal cycle, and queue length prior public experiment
11. Distribution of traffic volume, signal cycle, and queue length during public experiment

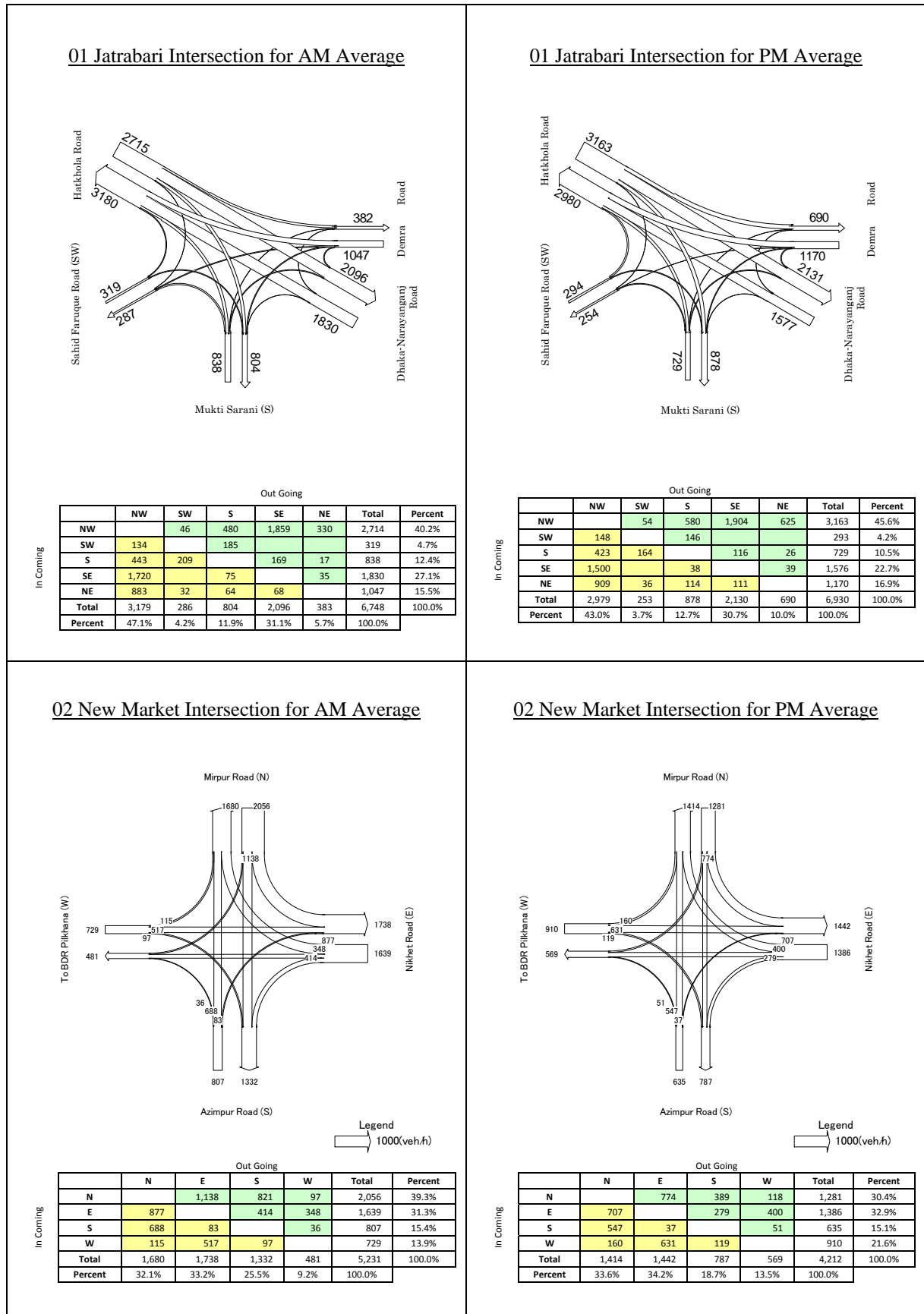


Figure 14-1 Vehicle Traffic Flow of Various Intersections in DCC (1)

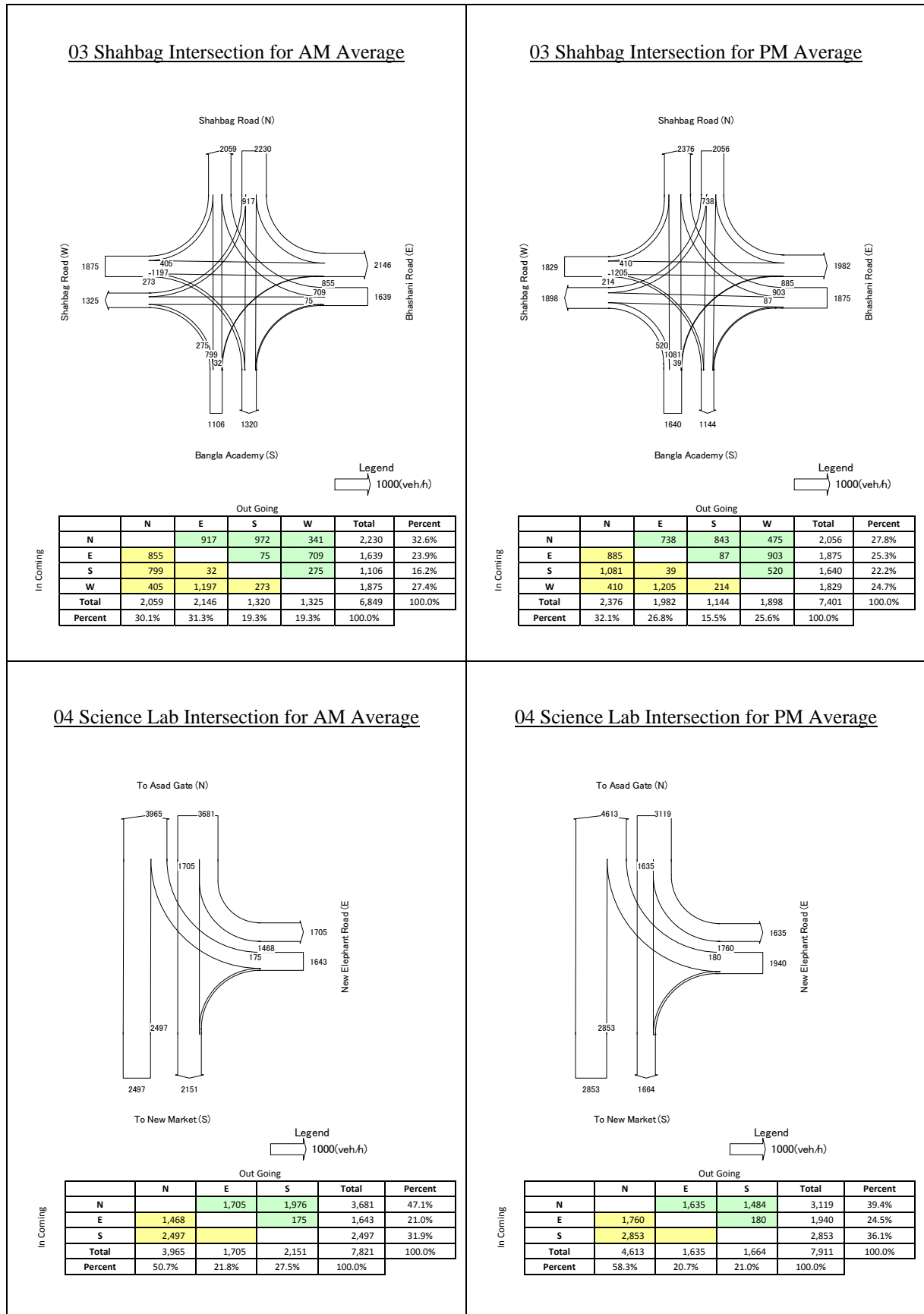


Figure 14-2 Vehicle Traffic Flow of Various Intersections in DCC (2)

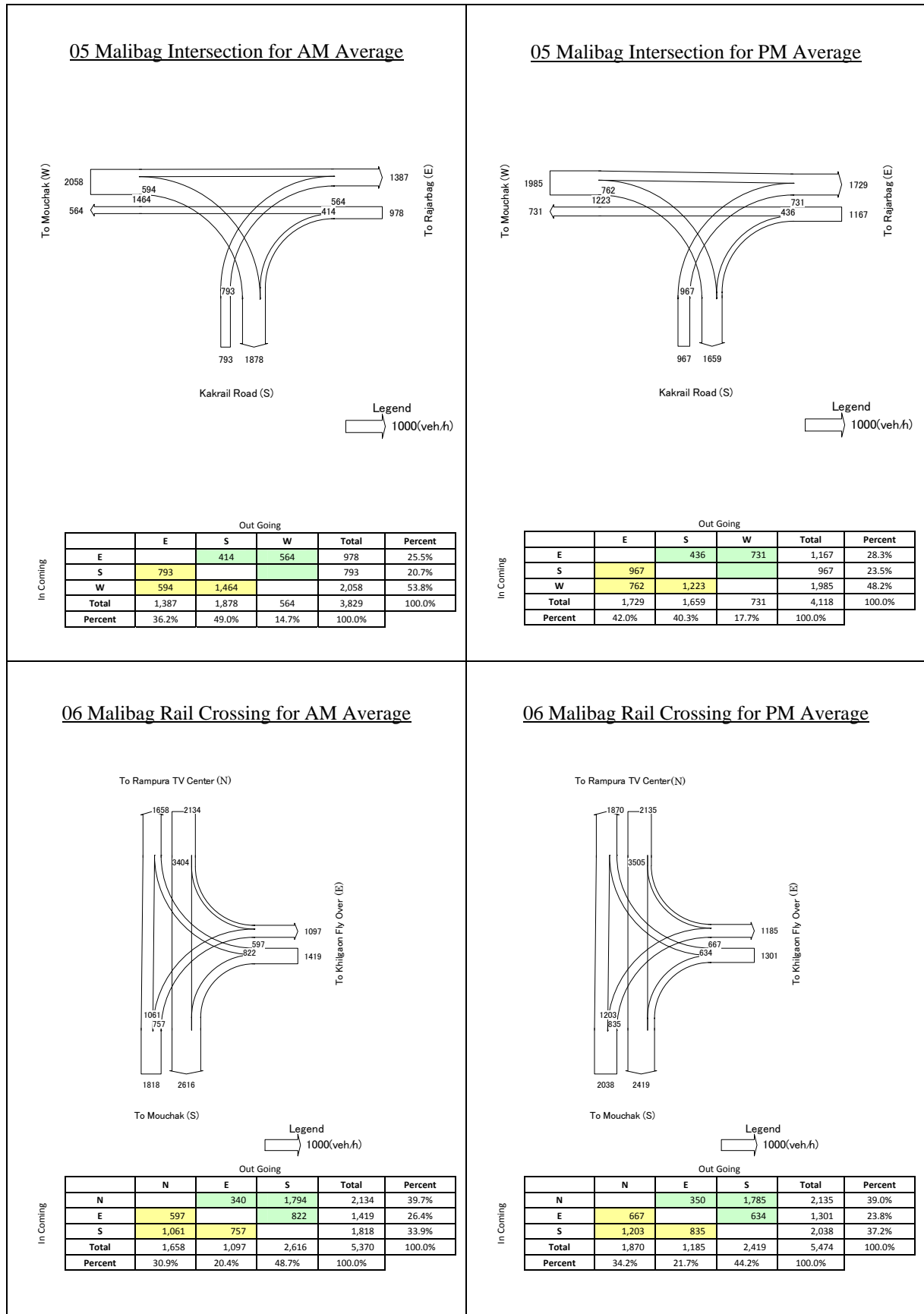


Figure 14-3 Vehicle Traffic Flow of Various Intersections in DCC (3)

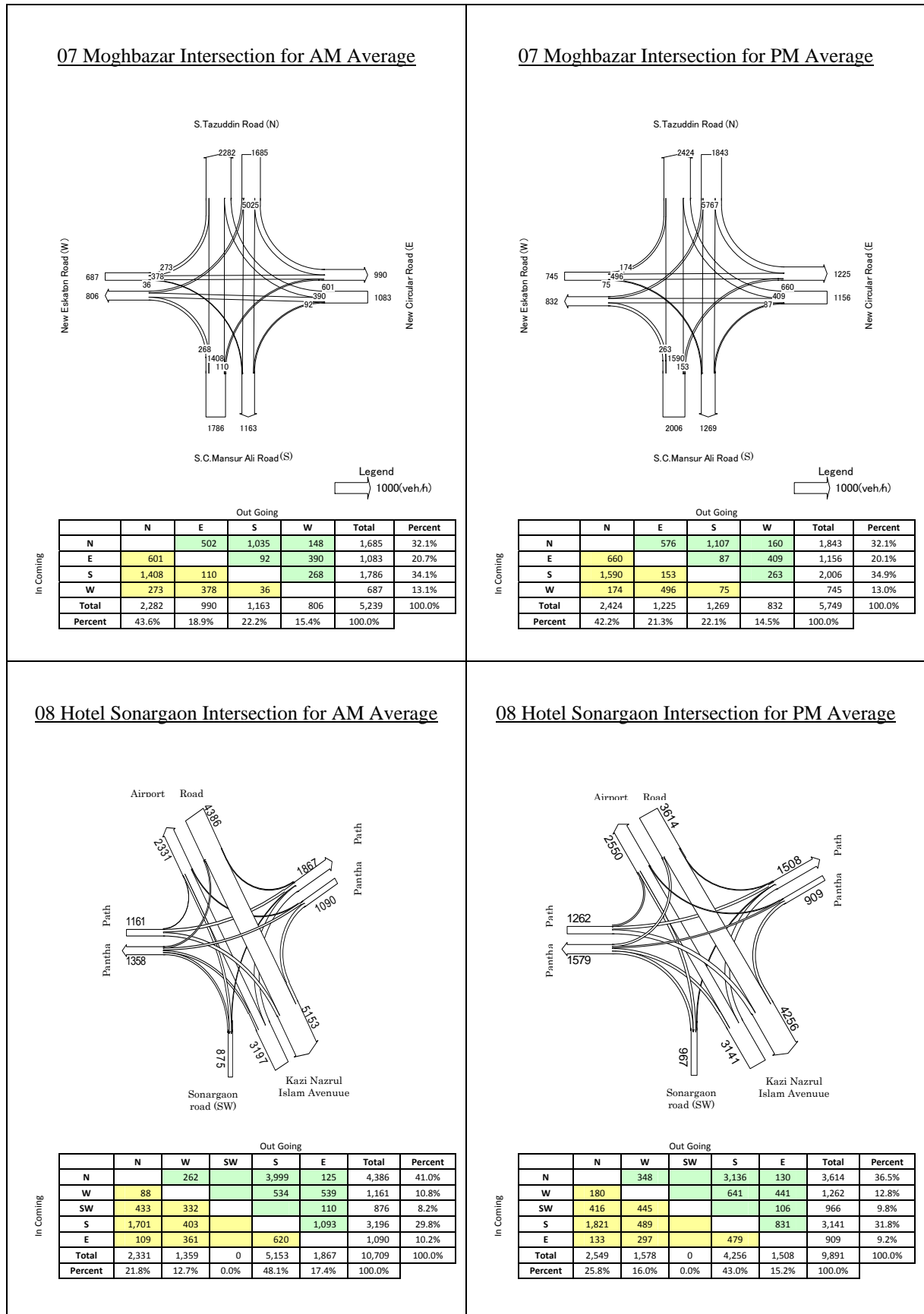


Figure 14-4 Vehicle Traffic Flow of Various Intersections in DCC (4)

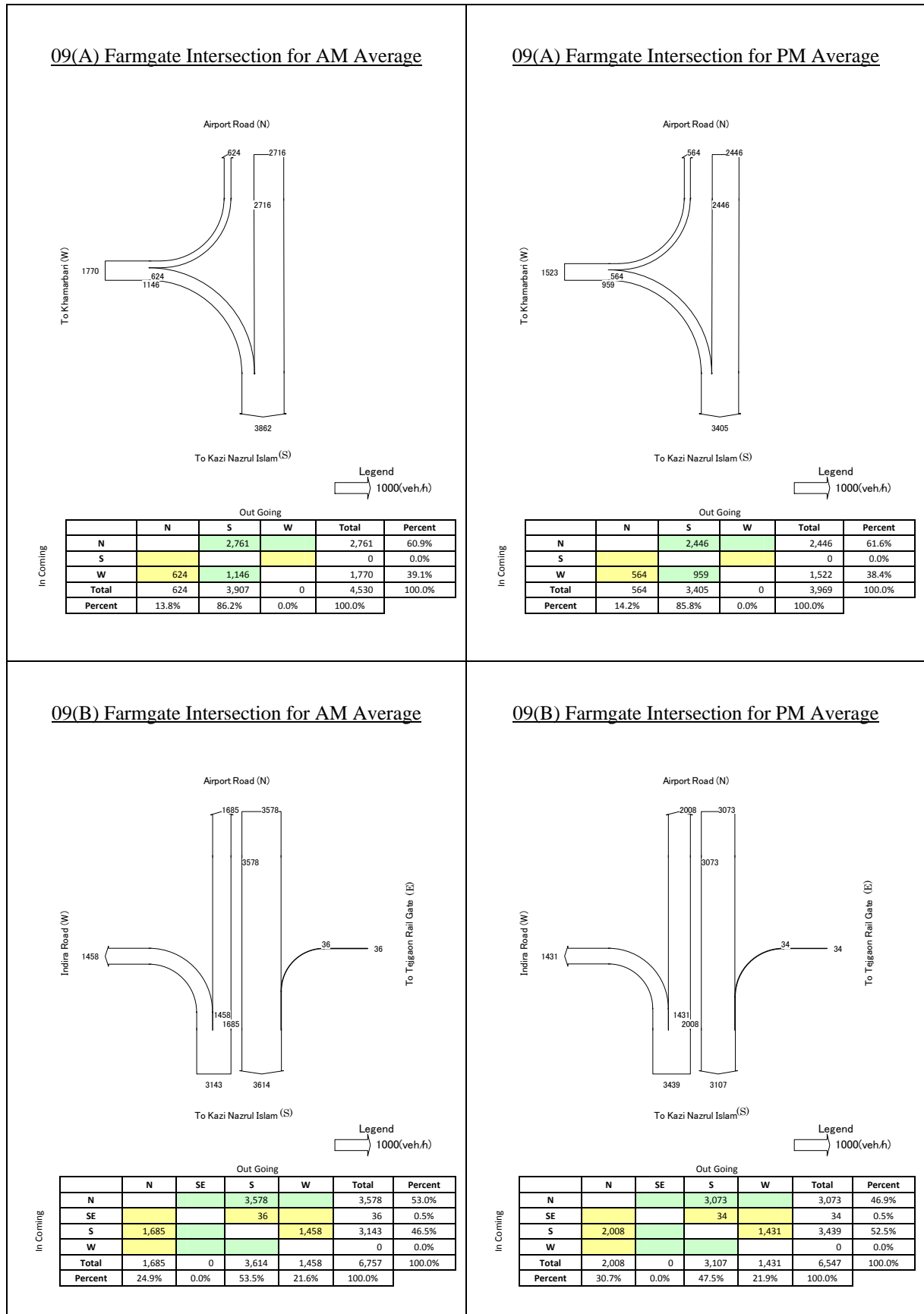


Figure 14-5 Vehicle Traffic Flow of Various Intersections in DCC (5)

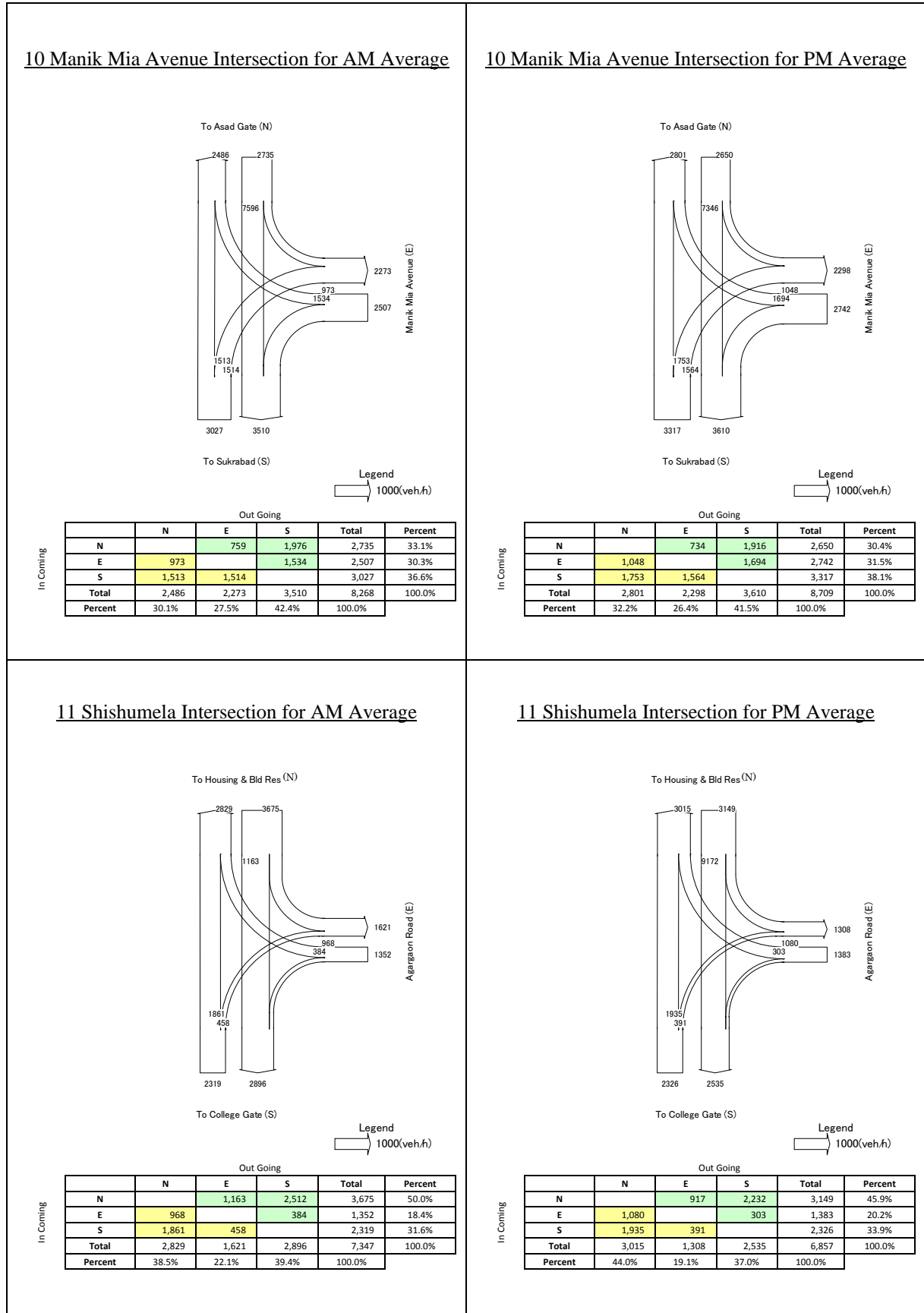


Figure 14-6 Vehicle Traffic Flow of Various Intersections in DCC (6)

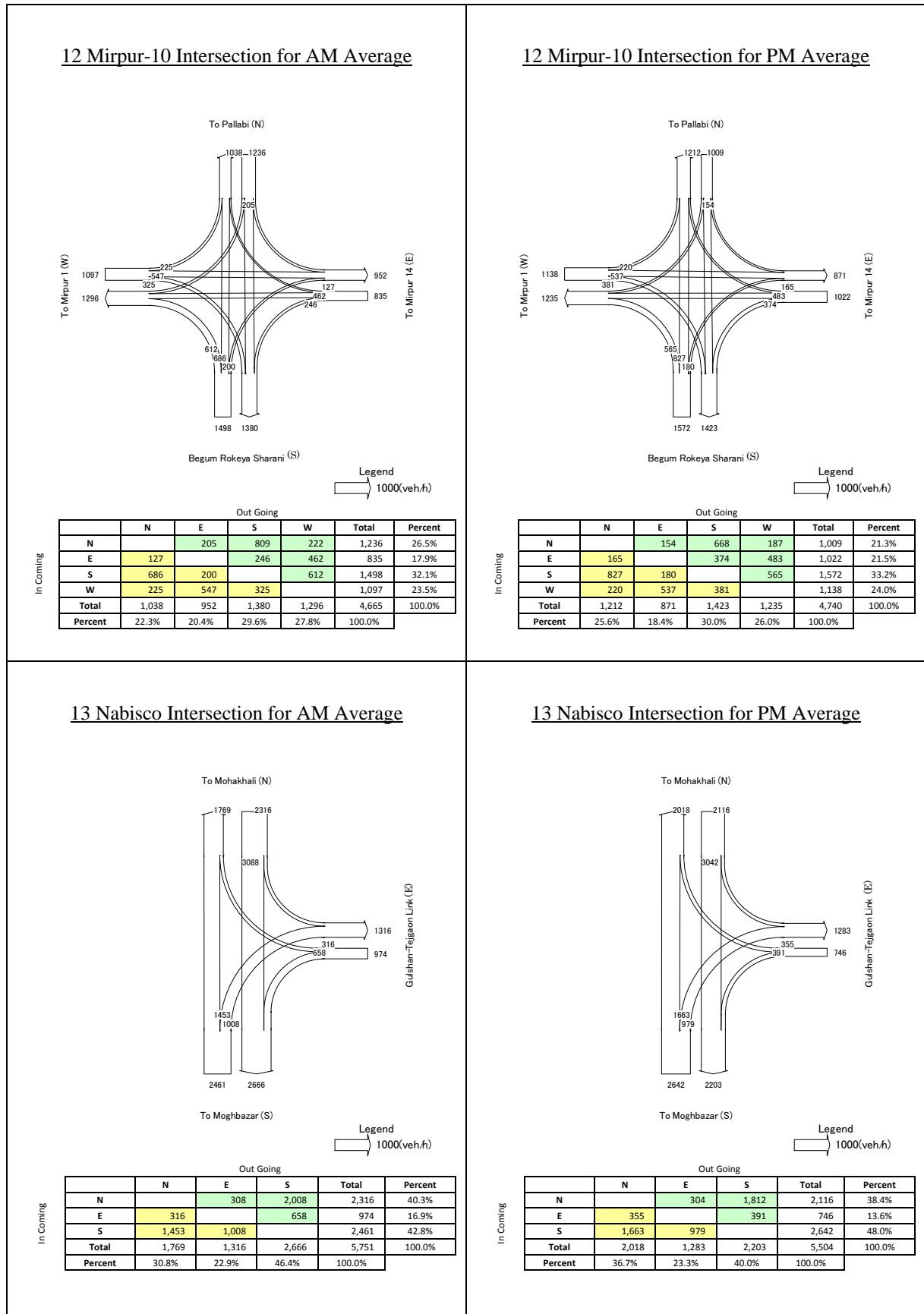


Figure 14-7 Vehicle Traffic Flow of Various Intersections in DCC (7)

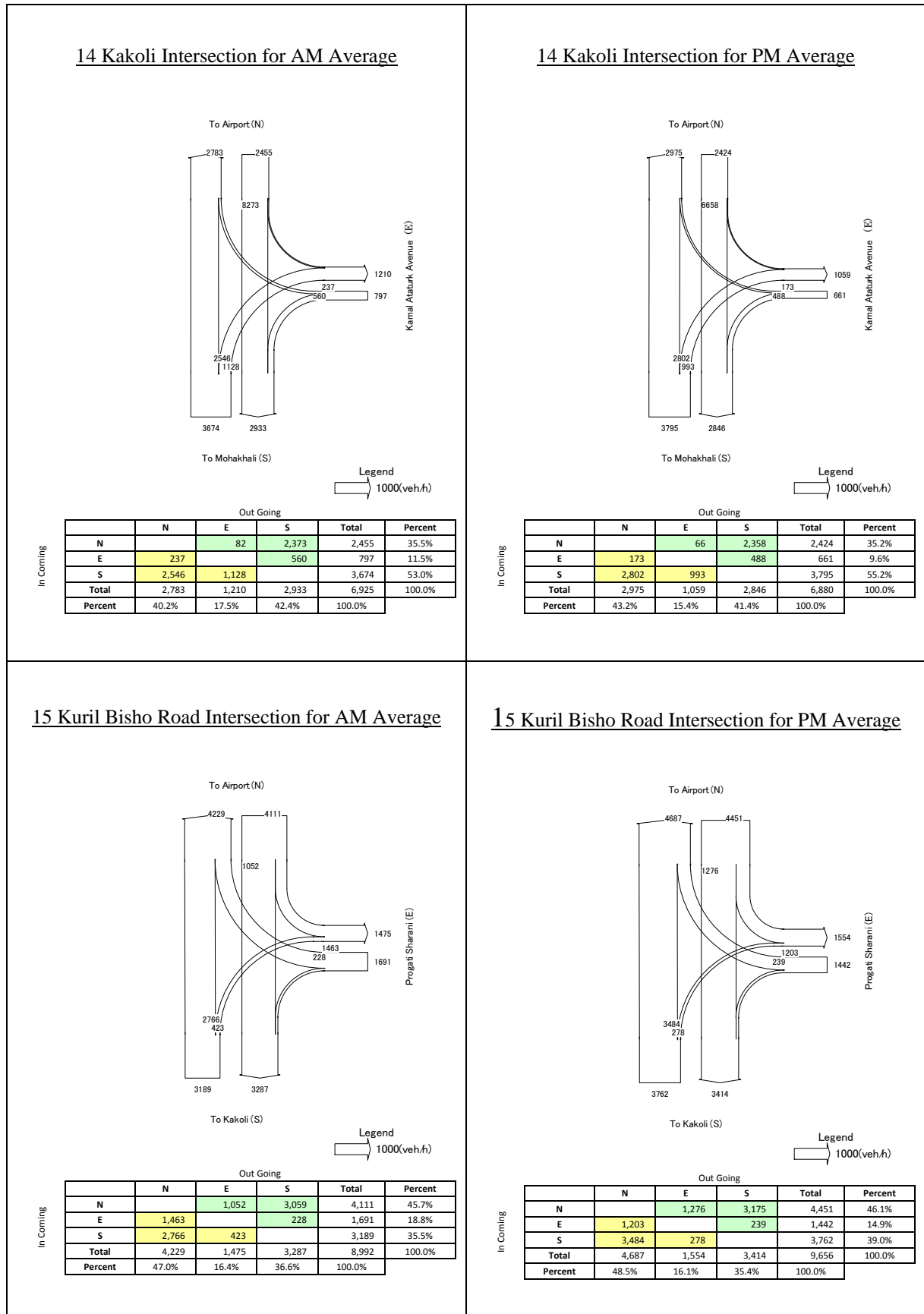


Figure 14-8 Vehicle Traffic Flow of Various Intersections in DCC (8)

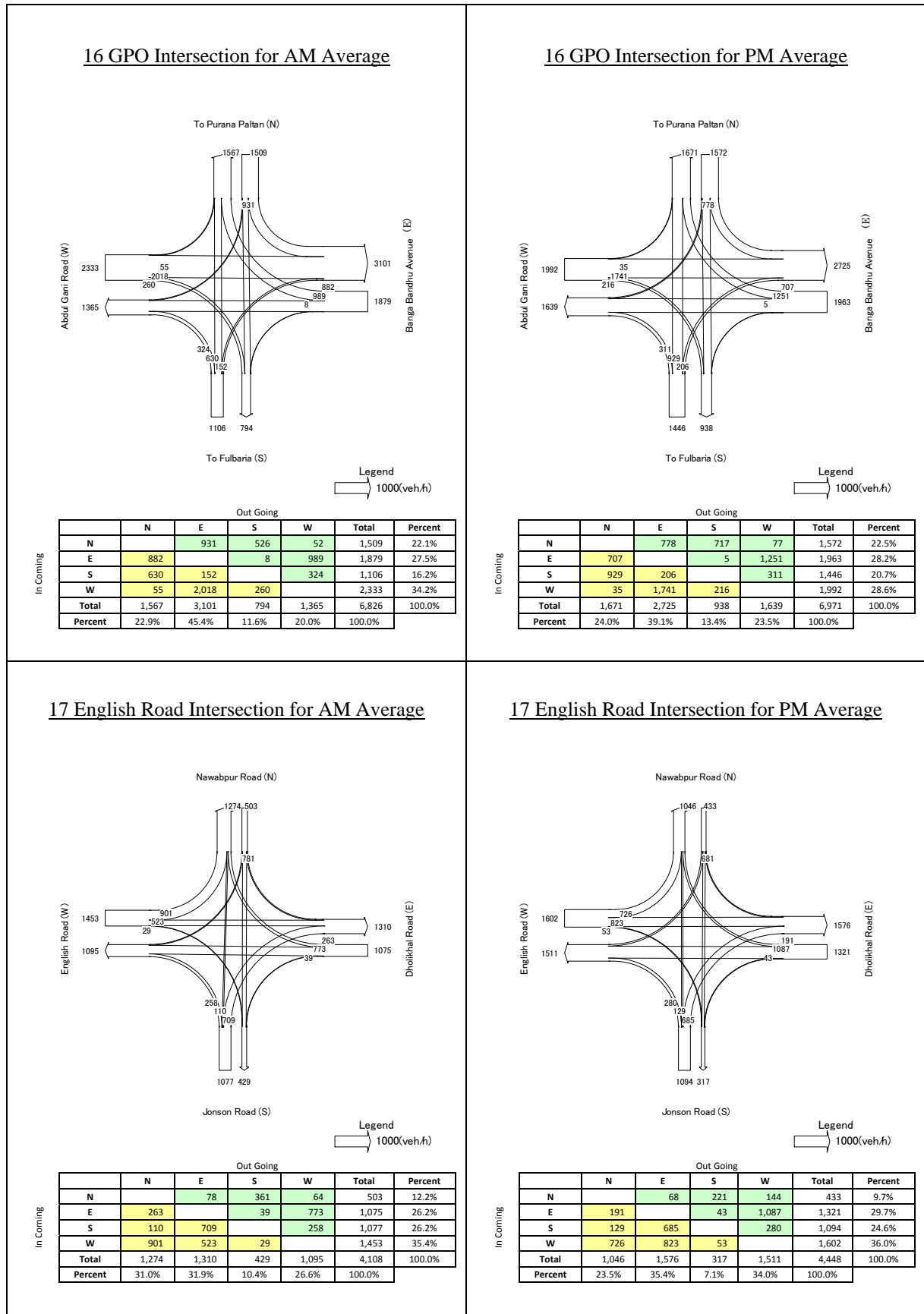


Figure 14-9 Vehicle Traffic Flow of Various Intersections in DCC (9)

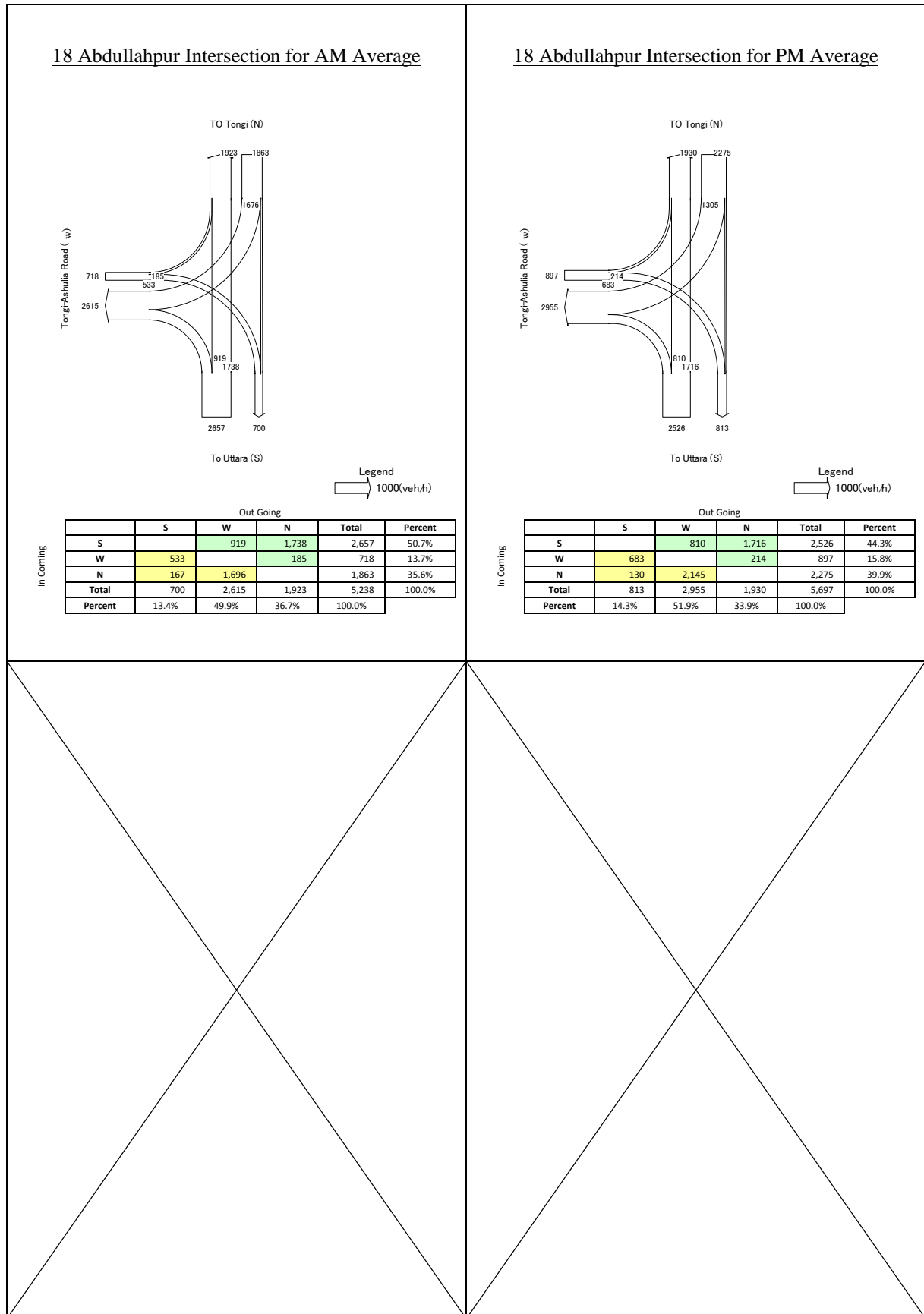


Figure 14-10 Vehicle Traffic Flow of Various Intersections in DCC (10)

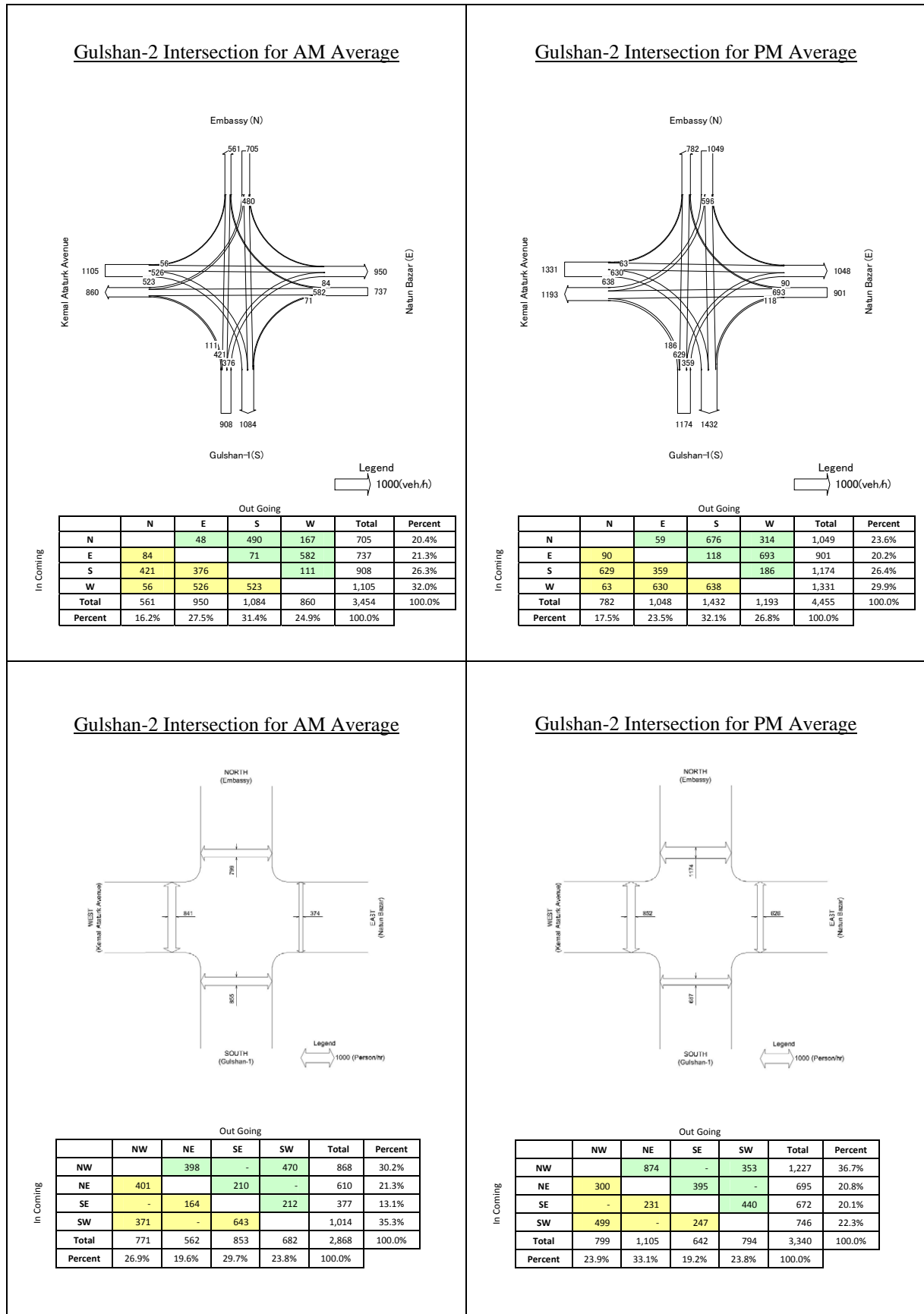


Figure 14-11 Traffic Flow of Short Listed Intersections prior Public Experiment (1) (Baseline Survey)

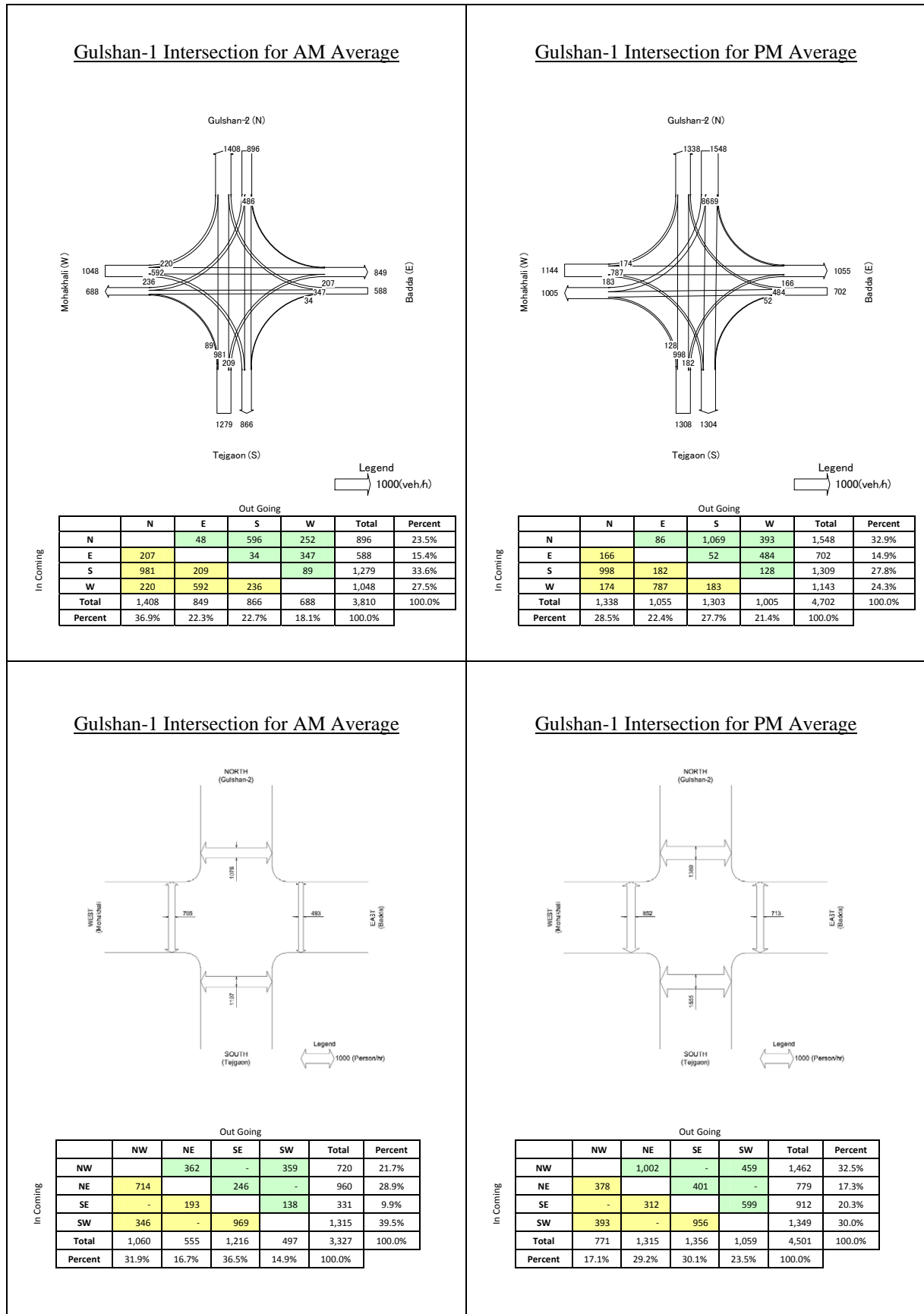


Figure 14-12 Traffic Flow of Short Listed Intersections prior Public Experiment (2) (Baseline Survey)

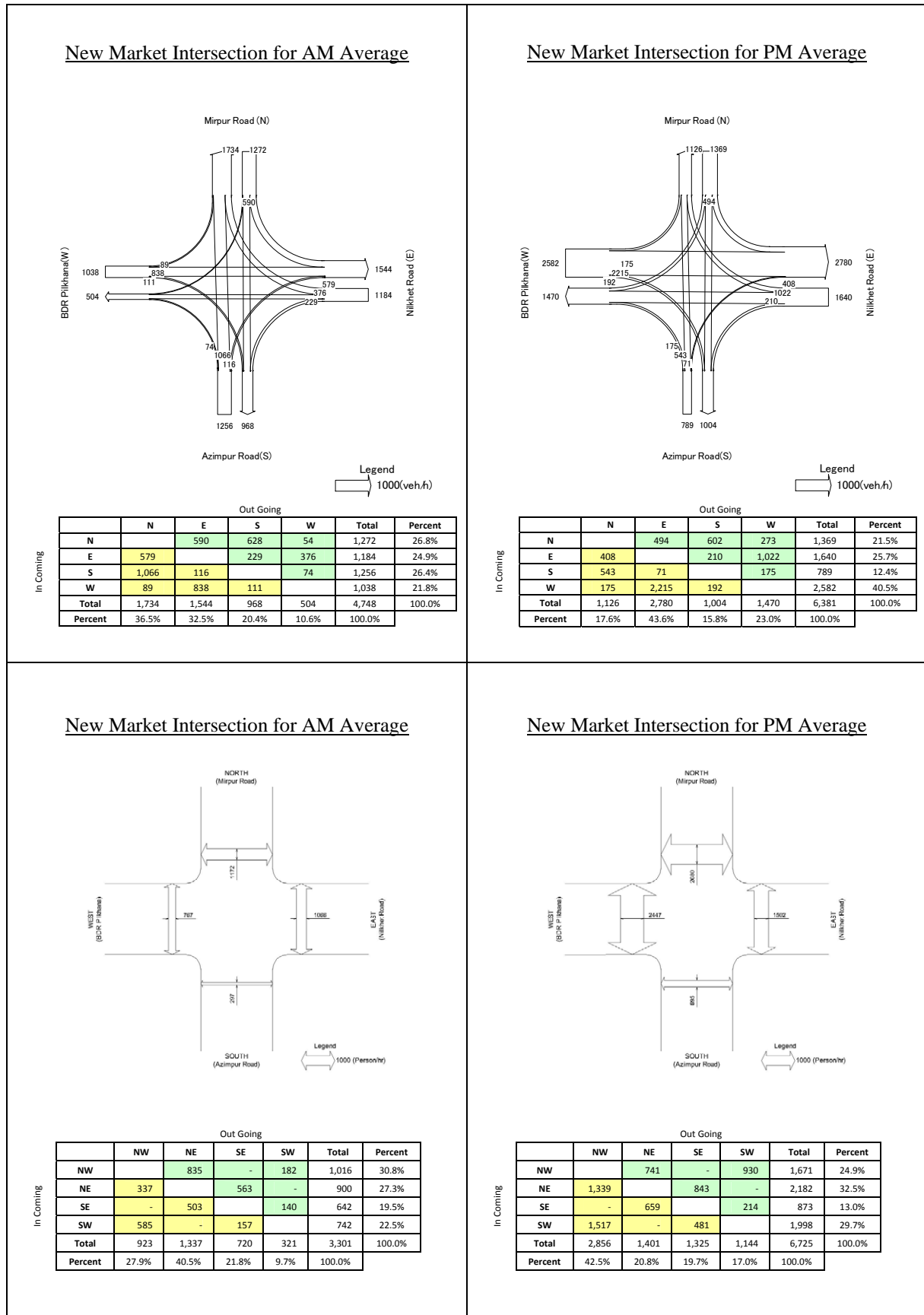


Figure 14-13 Traffic Flow of Short Listed Intersections prior Public Experiment (3) (Baseline Survey)

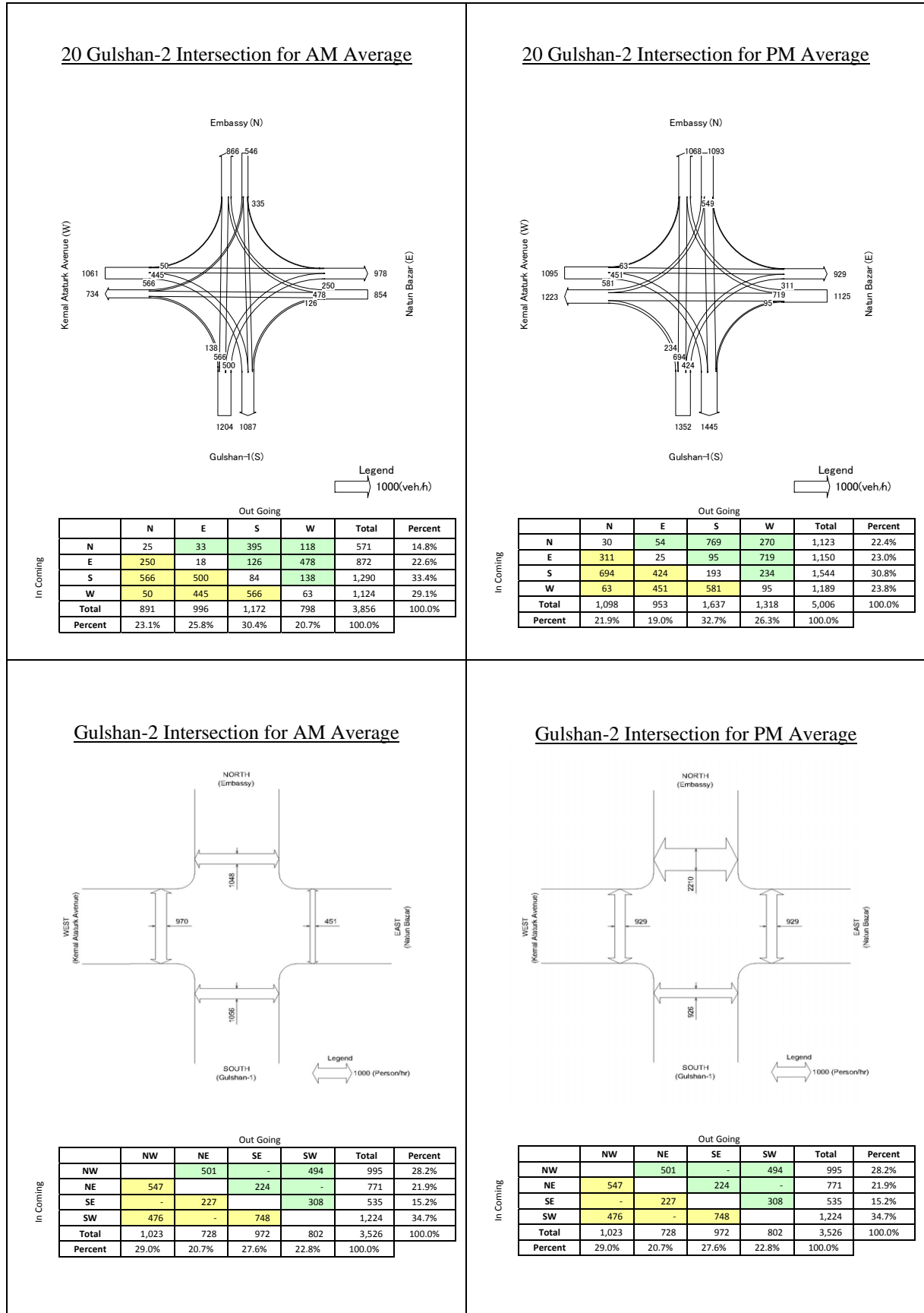


Figure 14-14 Traffic Flow of Short Listed Intersections during Public Experiment (1) (Monitoring Survey)

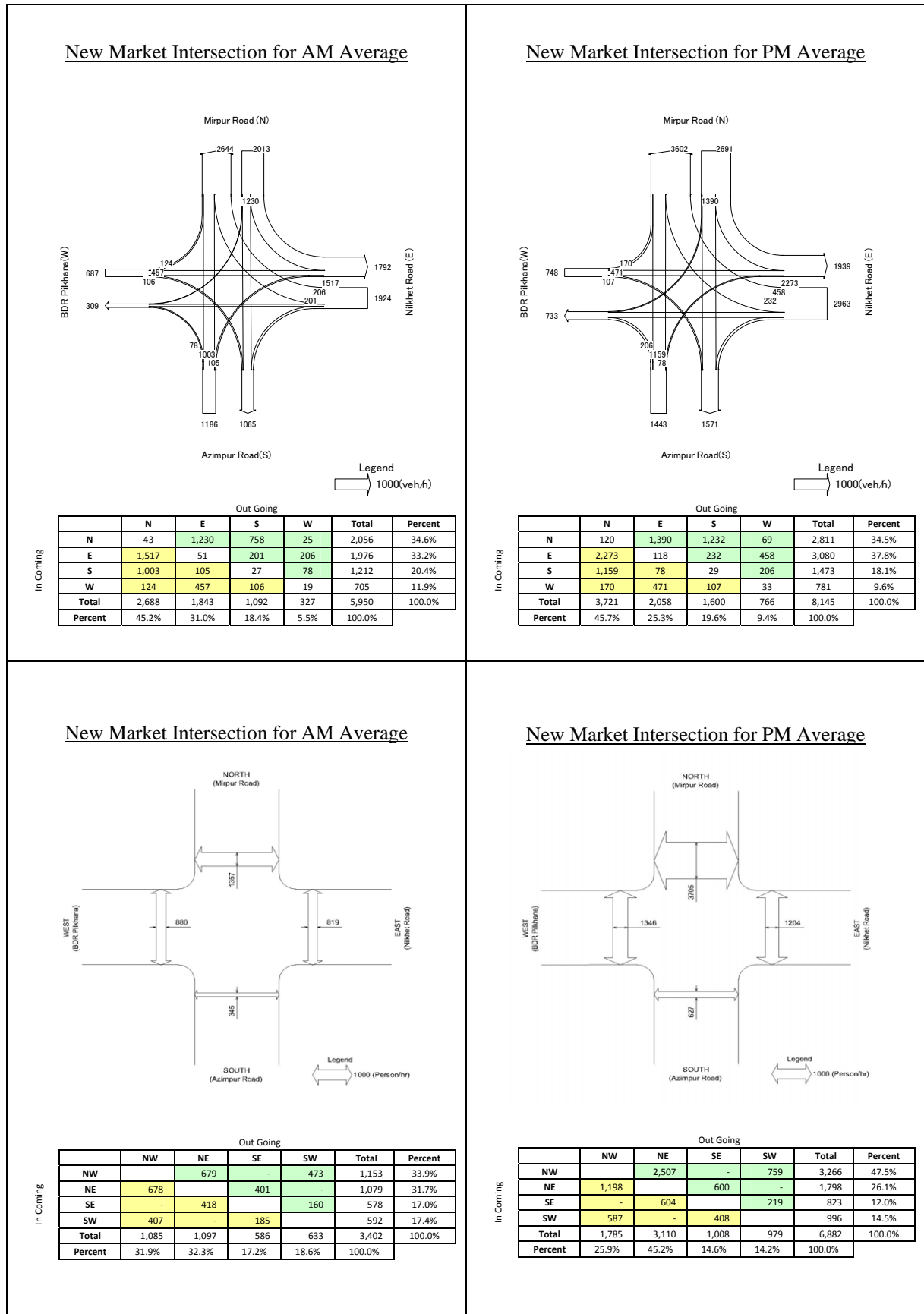


Figure 14-15 Traffic Flow of Short Listed Intersections during Public Experiment (2) (Monitoring Survey)

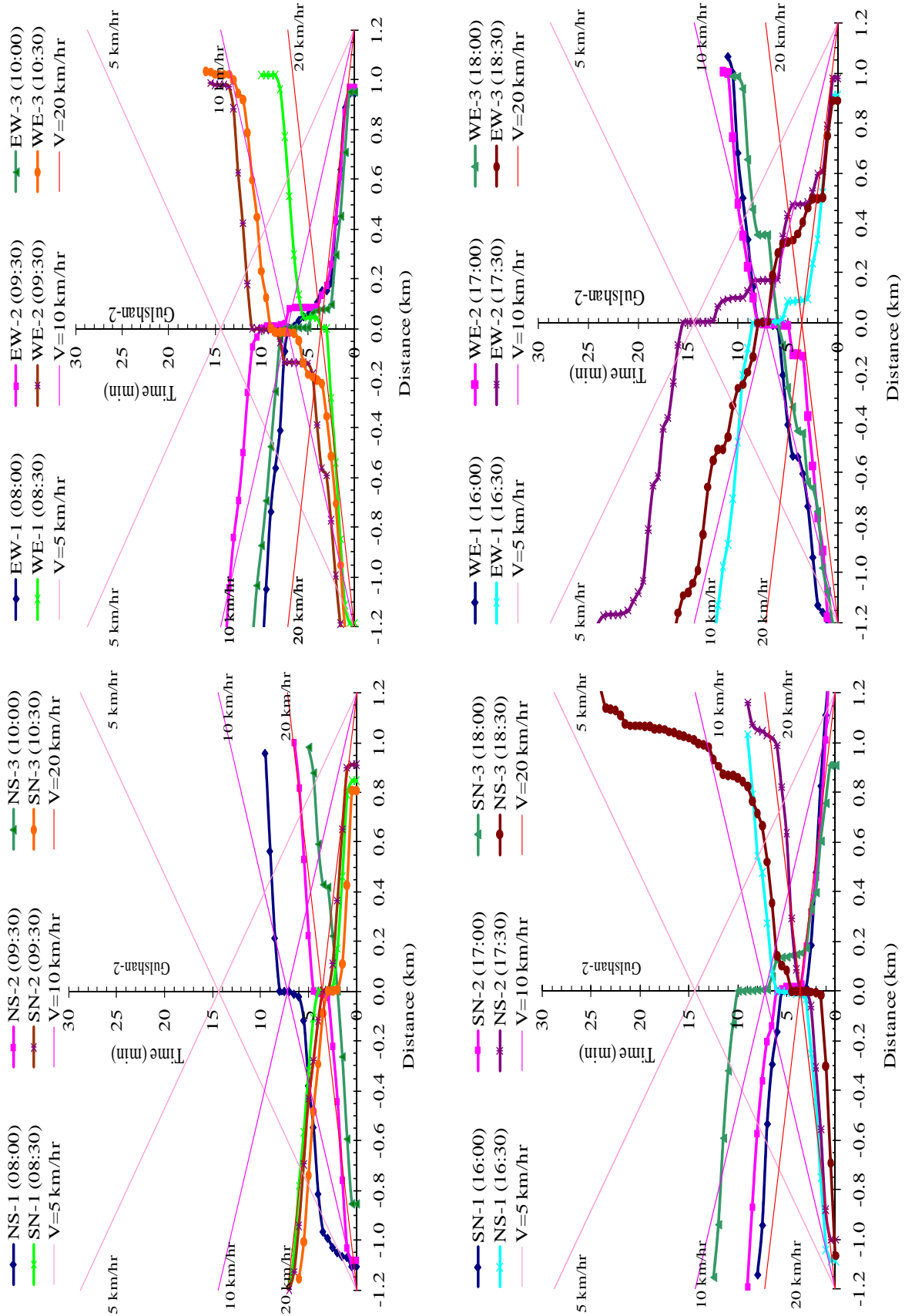


Figure 14-16 Travel Speed prior Public Experiment (Gulshan-2 Circle Intersection)

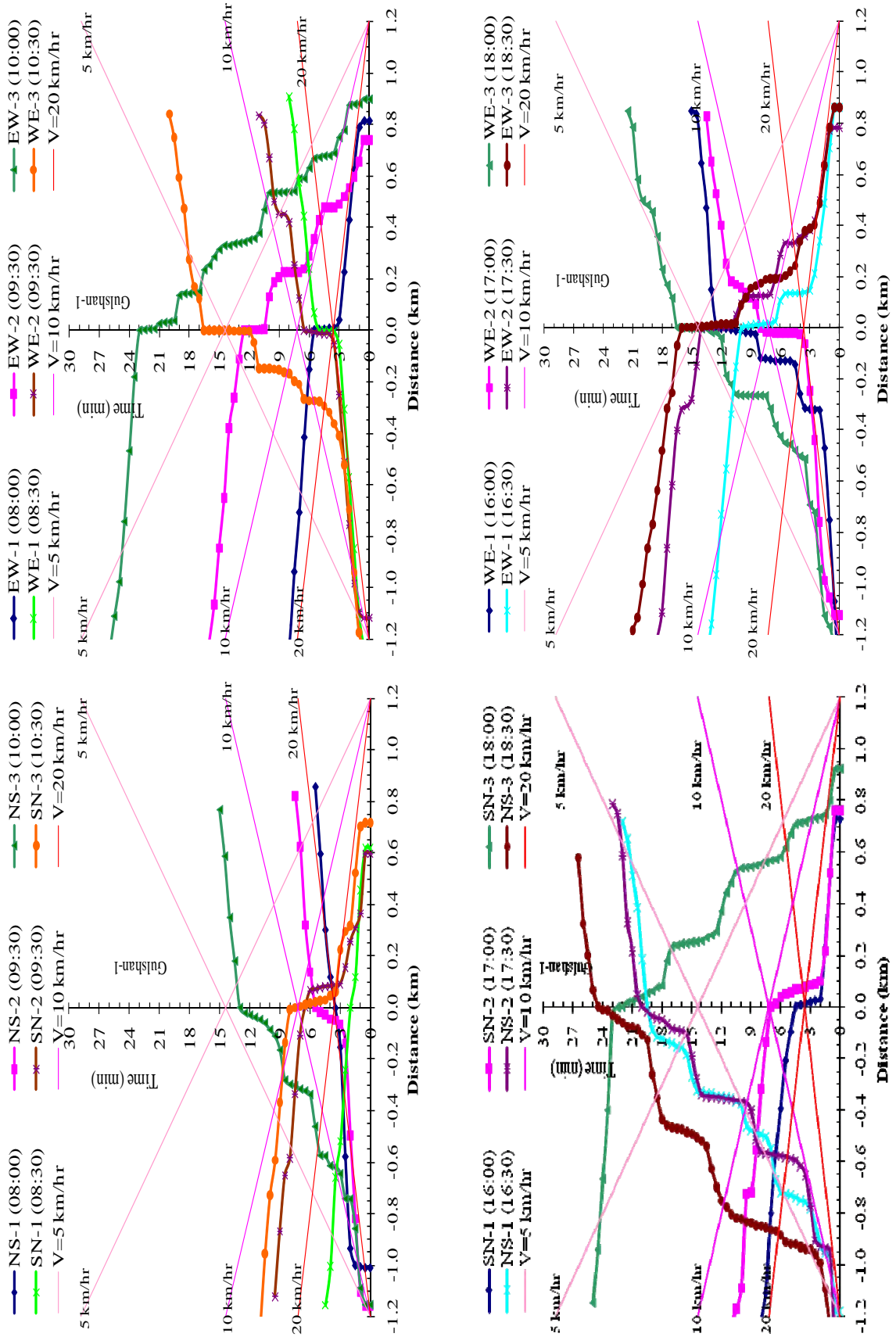


Figure 14-17 Travel Speed prior Public Experiment (Gulshan-1 Circle Intersection)

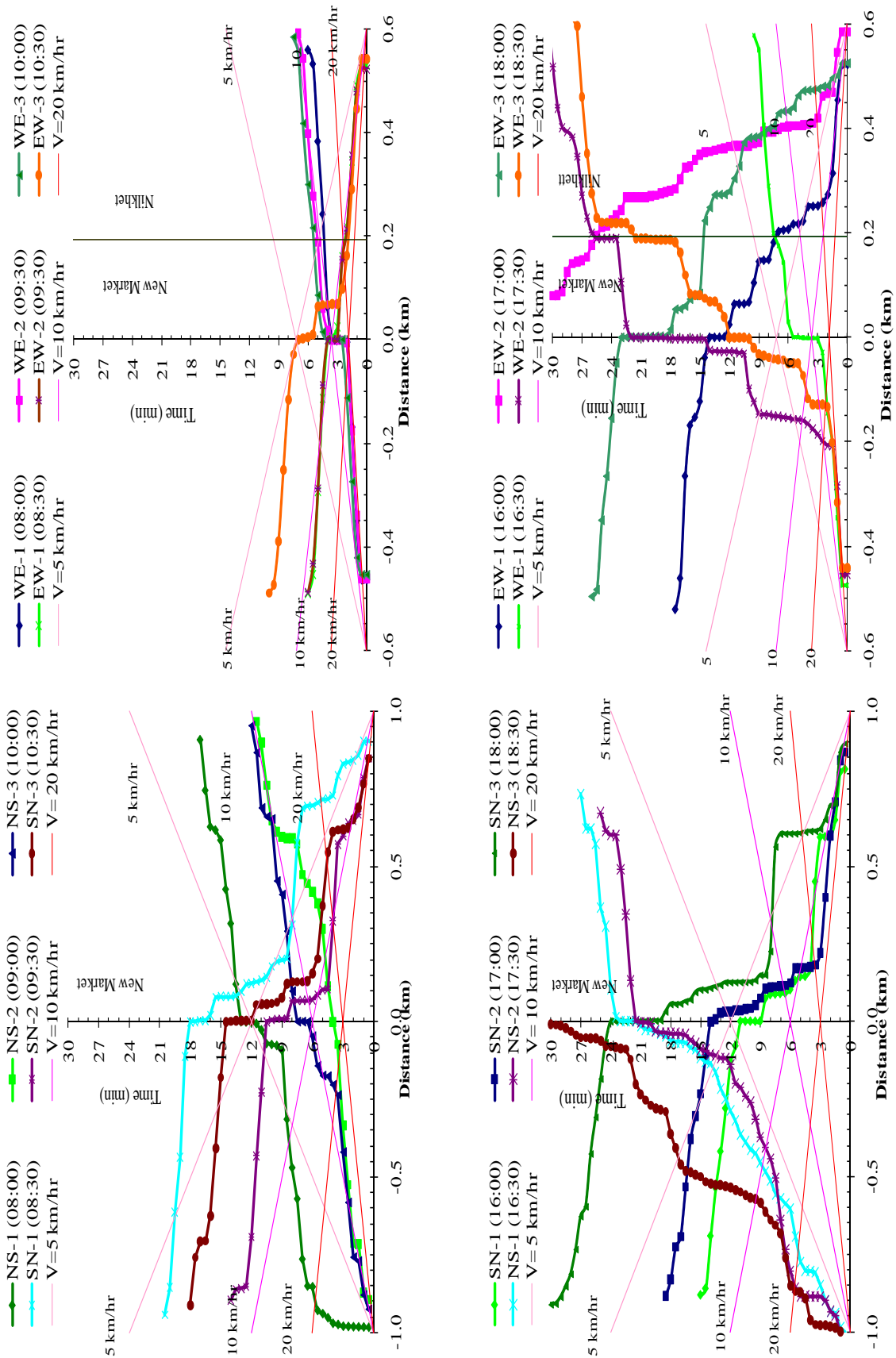


Figure 14-18 Travel Speed prior Public Experiment (New Market Intersection)

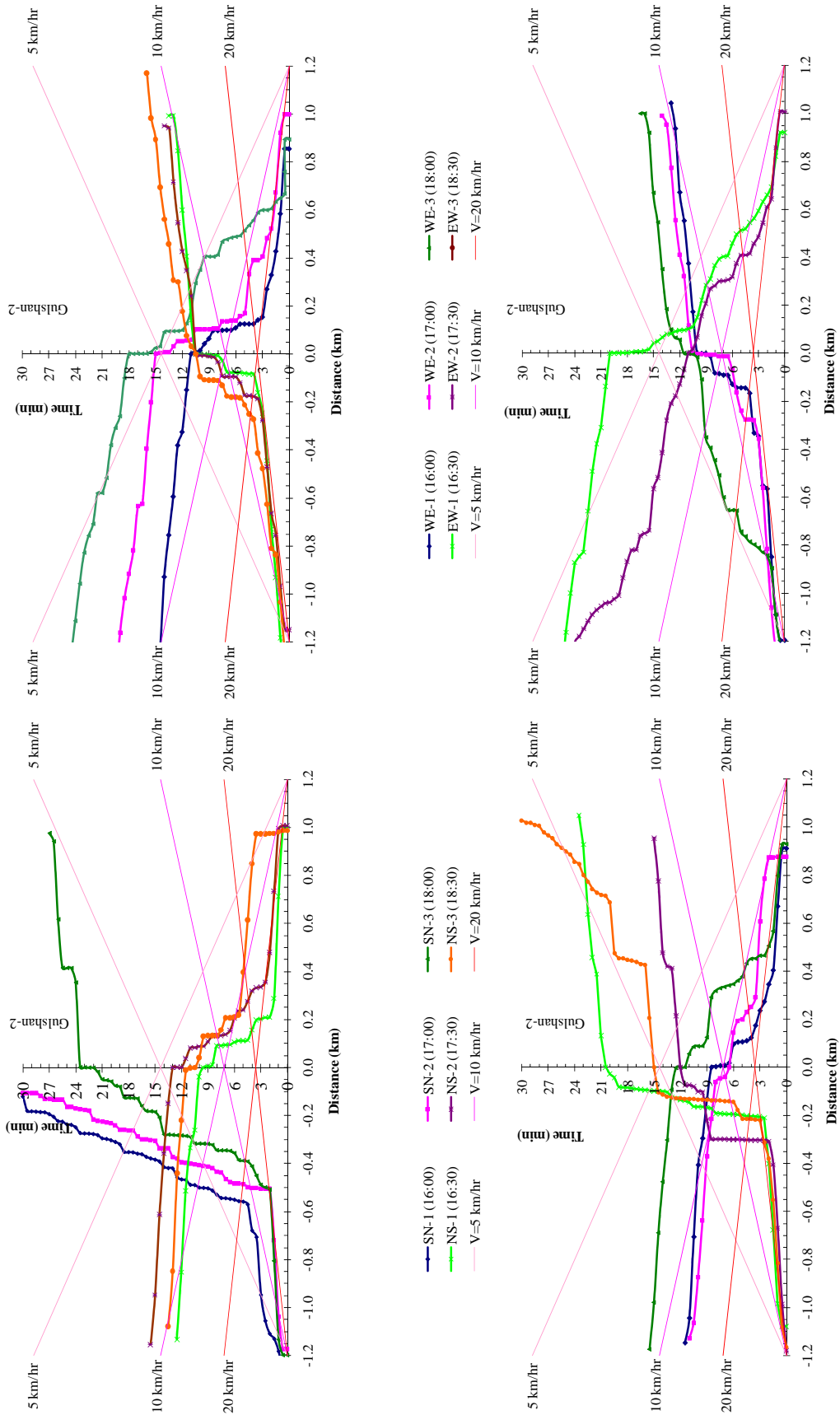


Figure 14-19 Travel Speed during Public Experiment (Gulshan-2 Circle Intersection)

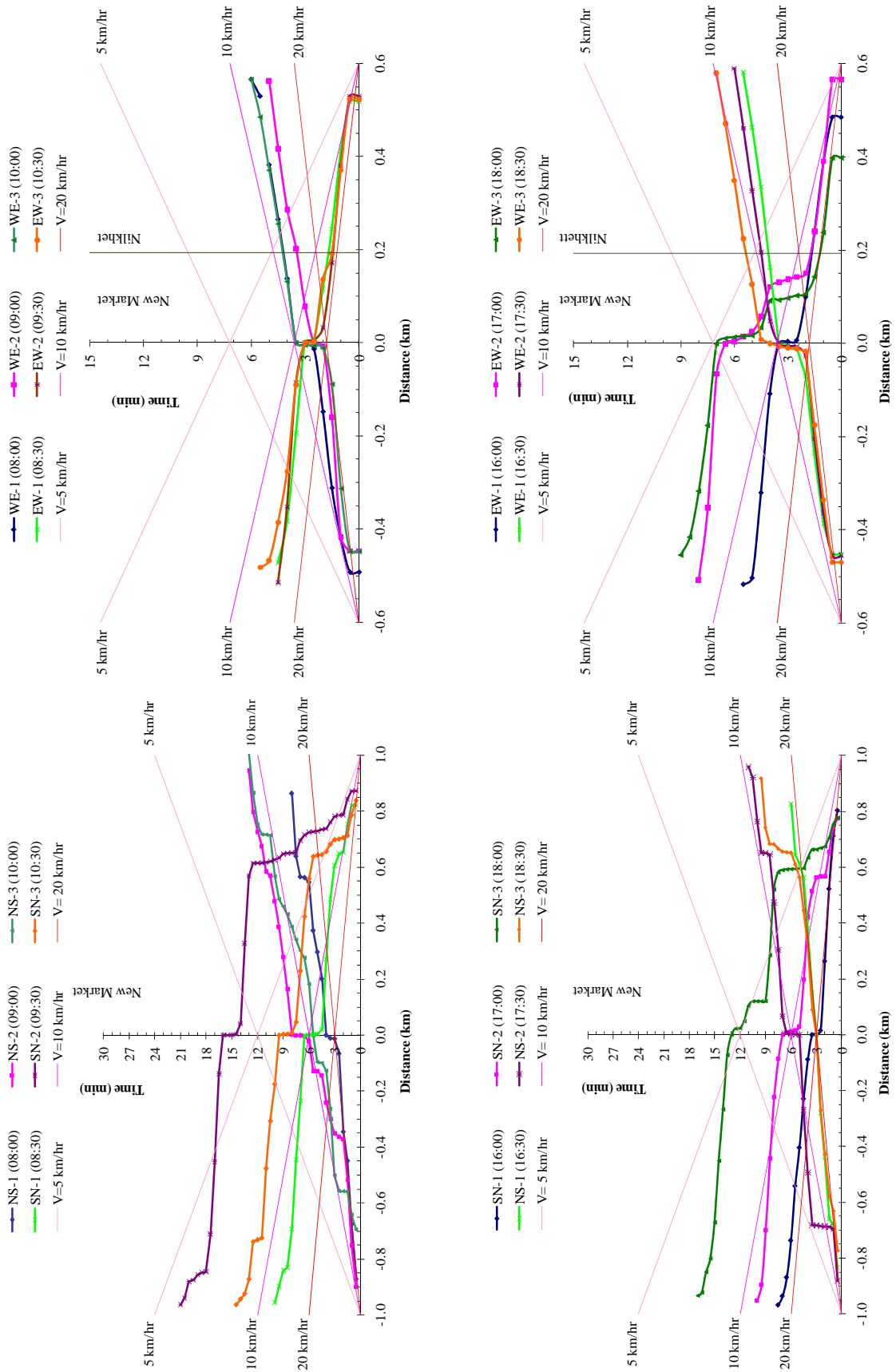
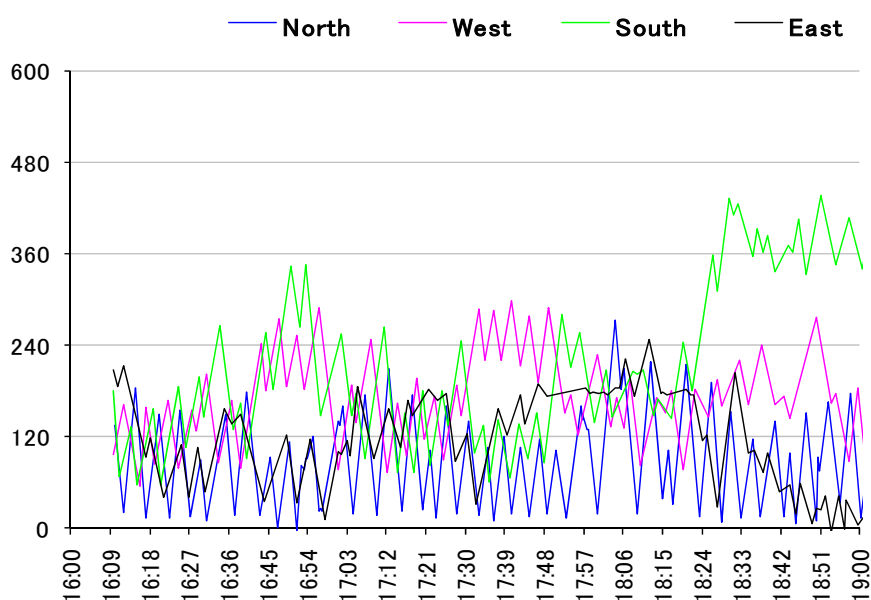
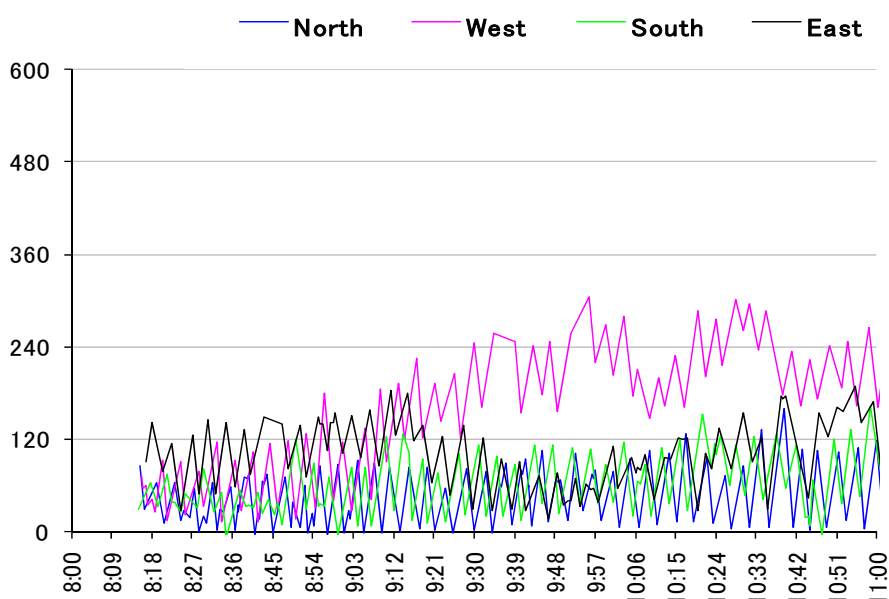
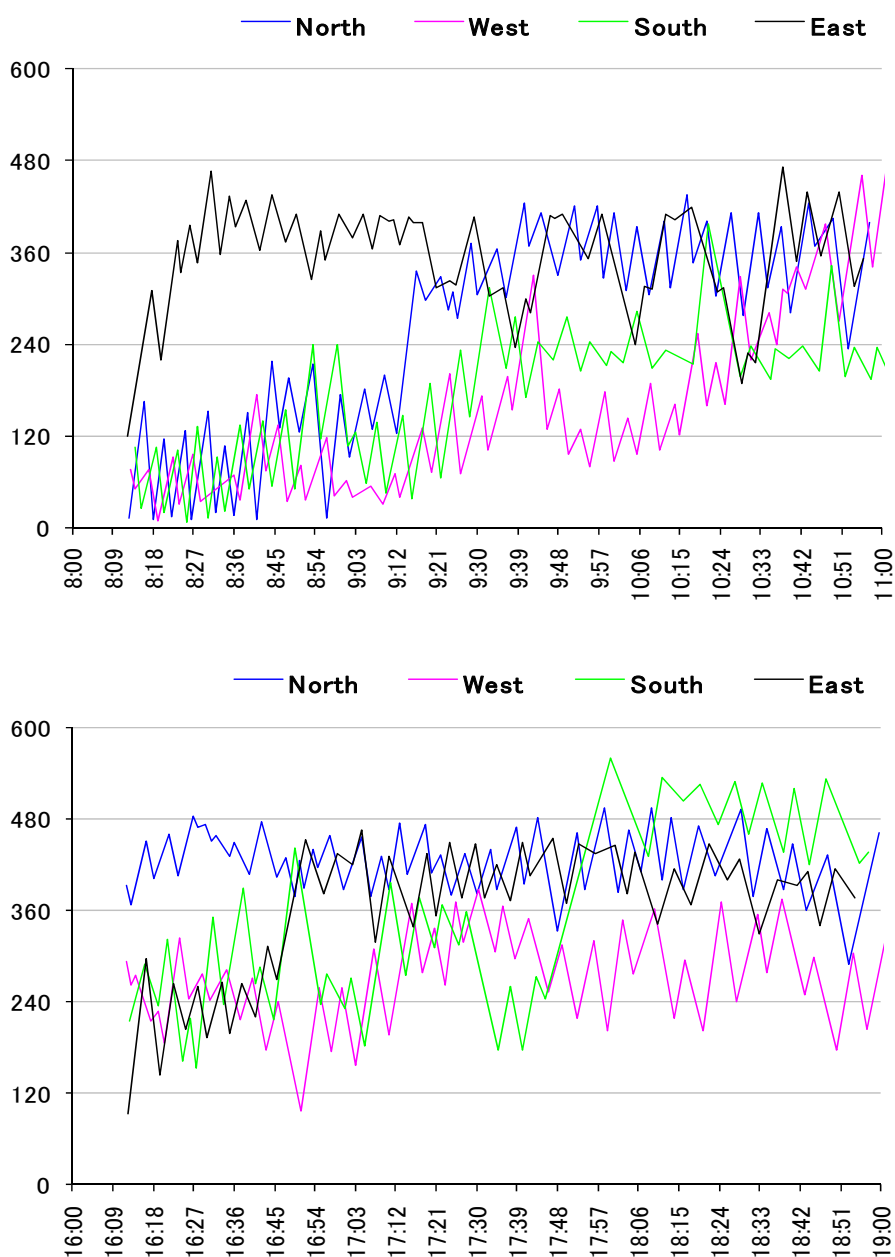


Figure 14-20 Travel Speed during Public Experiment (New Market Intersection)



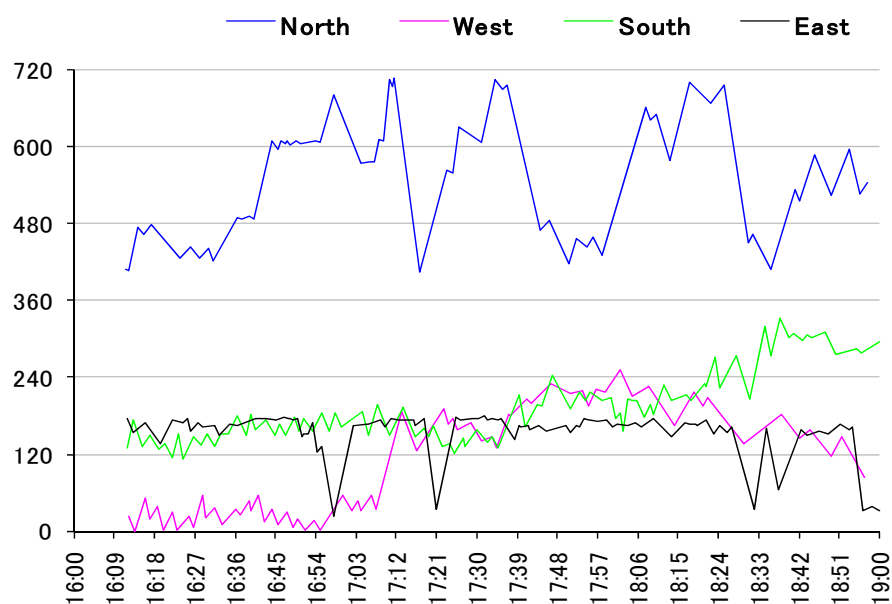
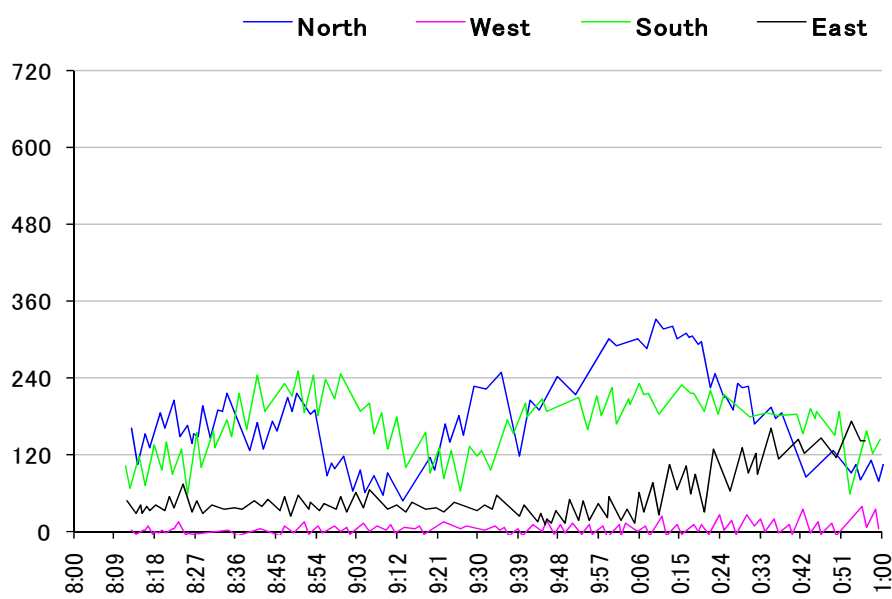
Gulshan-2	AM (0800-1100)				PM (1600-1900)				Remarks
	Max (m)	Min (m)	Ave (m)	Ave (unit)	Max (m)	Min (m)	Ave (m)	Ave (unit)	
04 Jan 10									6.0
North	77	15	46	23	140	34	87	44	
West	195	117	156	78	213	130	171	86	
South	92	30	61	30	258	178	218	109	
East	124	71	98	49	139	95	117	59	
Average	122	58	90	45	188	110	149	74	

Figure 14-21 Queue Length prior Public Experiment (Gulshan-2 Circle Intersection)



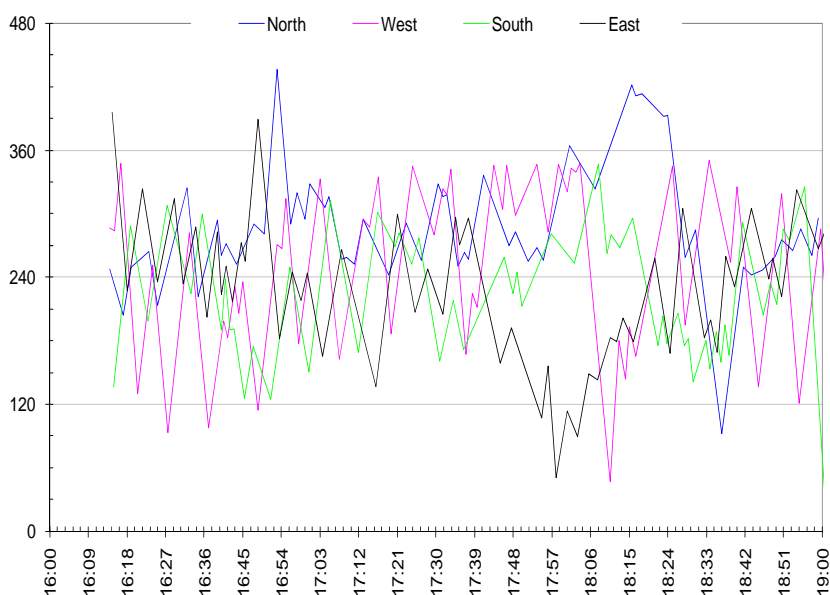
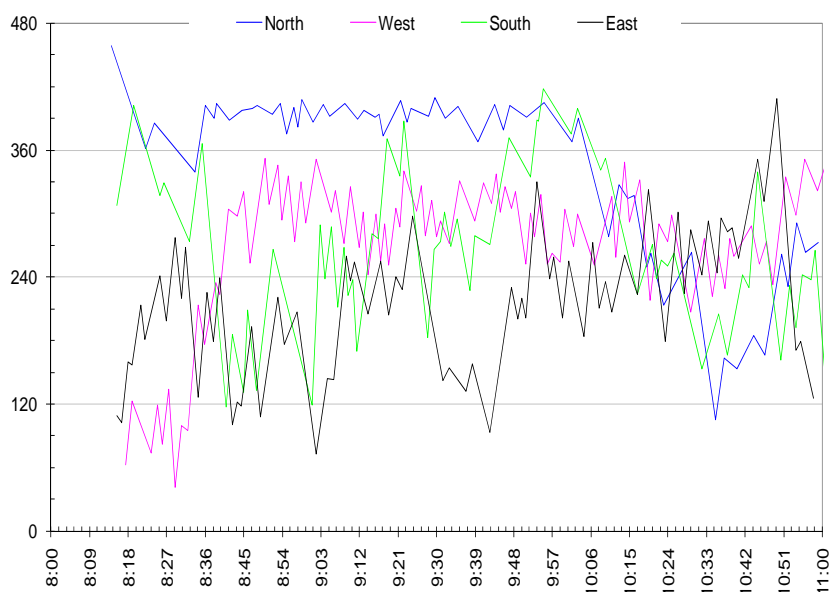
GL-1	AM (0800-1100)				PM (1600-1900)				Remarks
	Max (m)	Min (m)	Ave (m)	Ave (unit)	Max (m)	Min (m)	Ave (m)	Ave (unit)	
05 Jan 10									6.0
North	303	206	254	127	458	392	425	213	
West	193	115	154	77	317	228	273	136	
South	209	128	169	84	391	295	343	172	
East	388	322	355	178	398	321	359	180	
Average	273	193	233	117	391	309	350	175	

Figure 14-22 Queue Length prior Public Experiment (Gulshn-1 Circle Intersection)



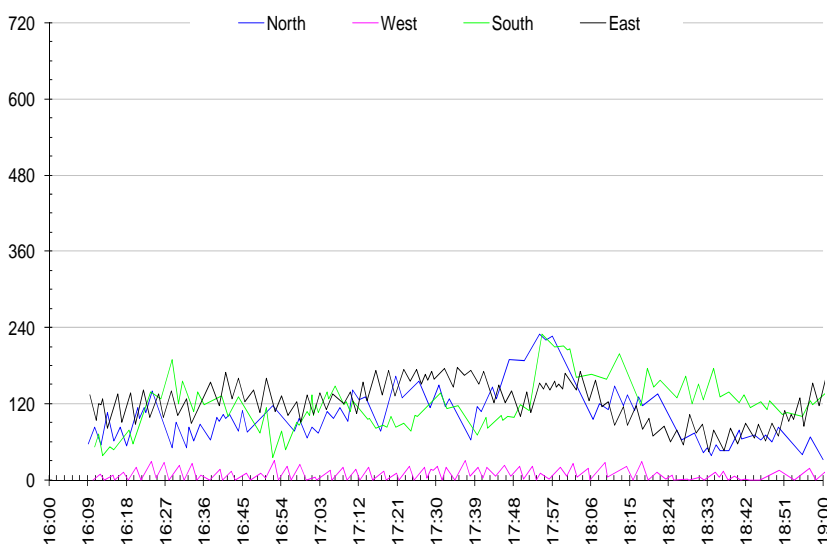
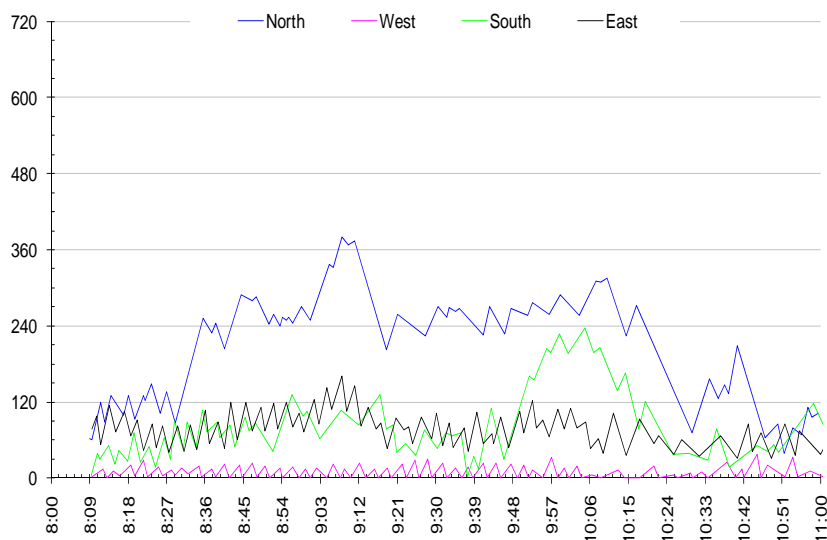
NM	AM (0800-1100)				PM (1600-1900)				Remarks
	Max (m)	Min (m)	Ave (m)	Ave (unit)	Max (m)	Min (m)	Ave (m)	Ave (unit)	
North	195	163	179	89	575	529	552	276	6.0
West	13	1	7	3	117	89	103	52	
South	187	147	167	83	205	178	191	96	
East	68	42	55	27	167	146	156	78	
Average	116	88	102	51	266	235	251	125	

Figure 14-23 Queue Length prior Public Experiment (New Market Intersection)



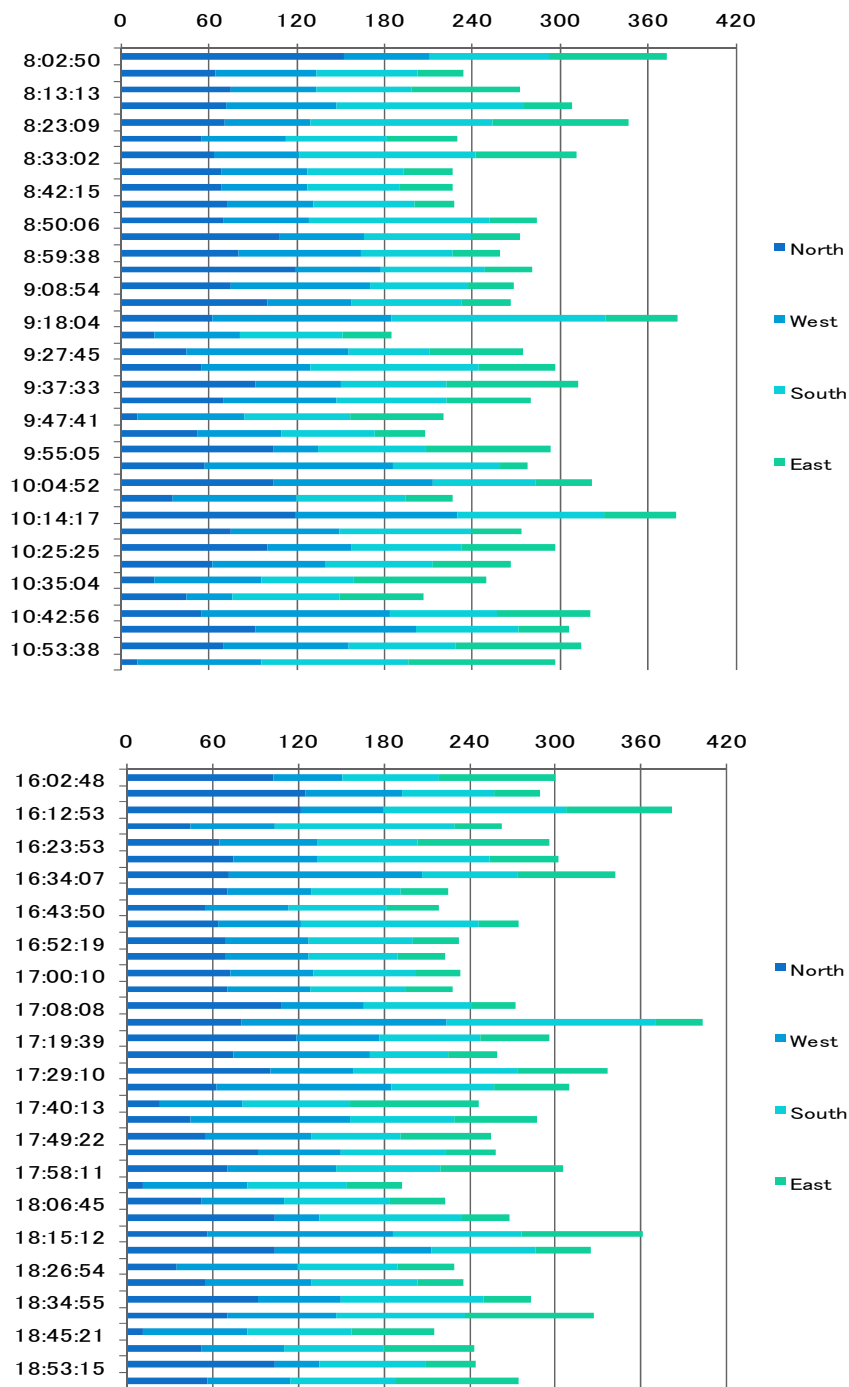
GL-2	AM (08:00-11:00)				PM (16:00-19:00)				Remarks
4-Jan-10	Max (m)	Min (m)	Ave (m)	Ave (unit)	Max (m)	Min (m)	Ave (m)	Ave (unit)	Unit Length
North	360	331	346	173	307	265	286	143	6.0
West	289	237	263	132	292	200	246	123	
South	291	223	257	129	255	187	221	111	
East	244	185	214	107	262	192	227	113	
Average	296	244	270	135	279	211	245	123	

Figure 14-24 Queue Length during Public Experiment (Gulshan-2 Circle Intersection)



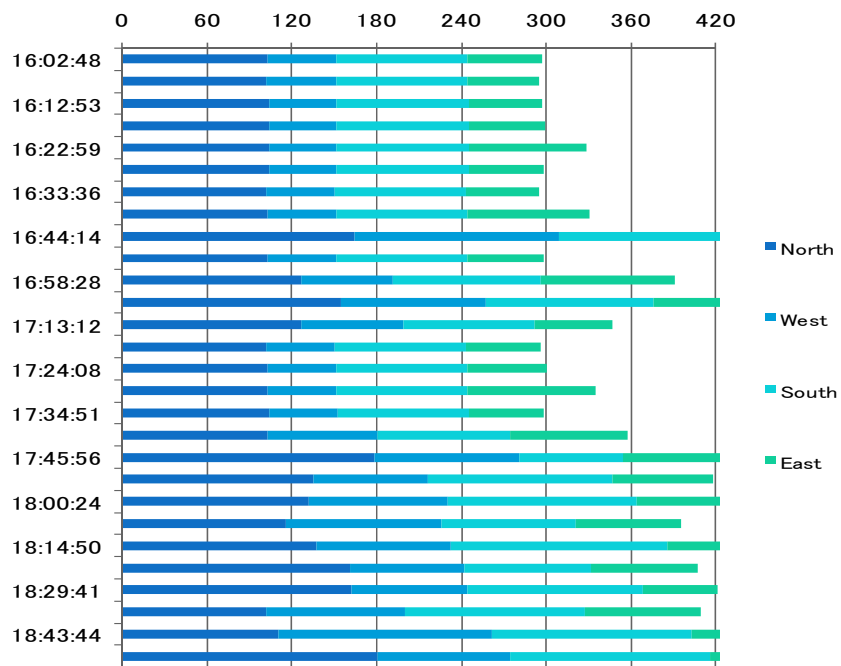
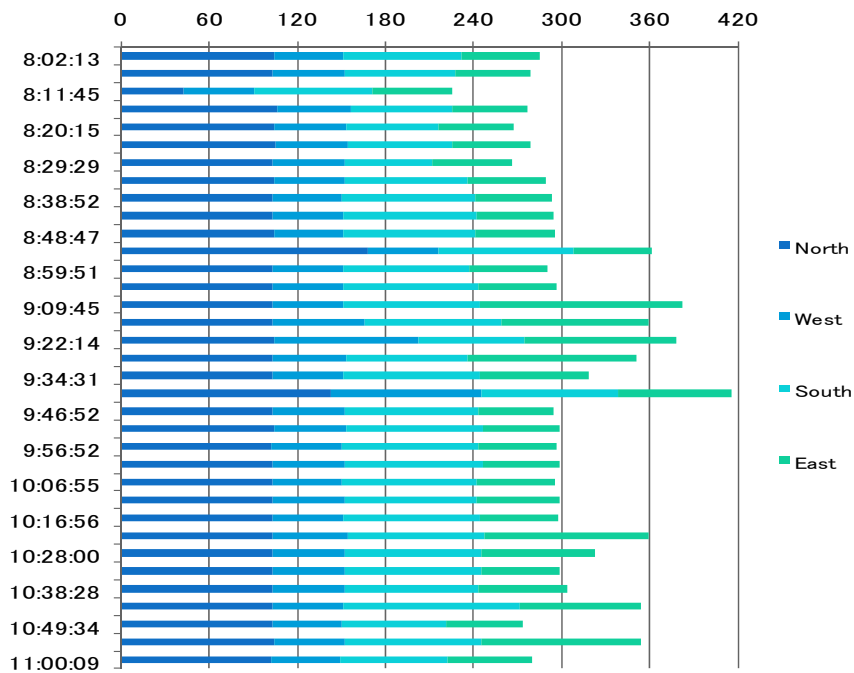
NM	AM (08:00–11:00)				PM (16:00–19:00)				Remarks
	Max (m)	Min (m)	Ave (m)	Ave (unit)	Max (m)	Min (m)	Ave (m)	Ave (unit)	
North	222	188	205	103	113	84	99	49	6.0
West	18	1	10	5	16	1	9	4	
South	100	61	81	40	128	101	115	57	
East	97	59	78	39	137	105	121	60	
Average	110	77	93	47	99	73	86	43	

Figure 14-25 Queue Length during Public Experiment (New Market Intersection)



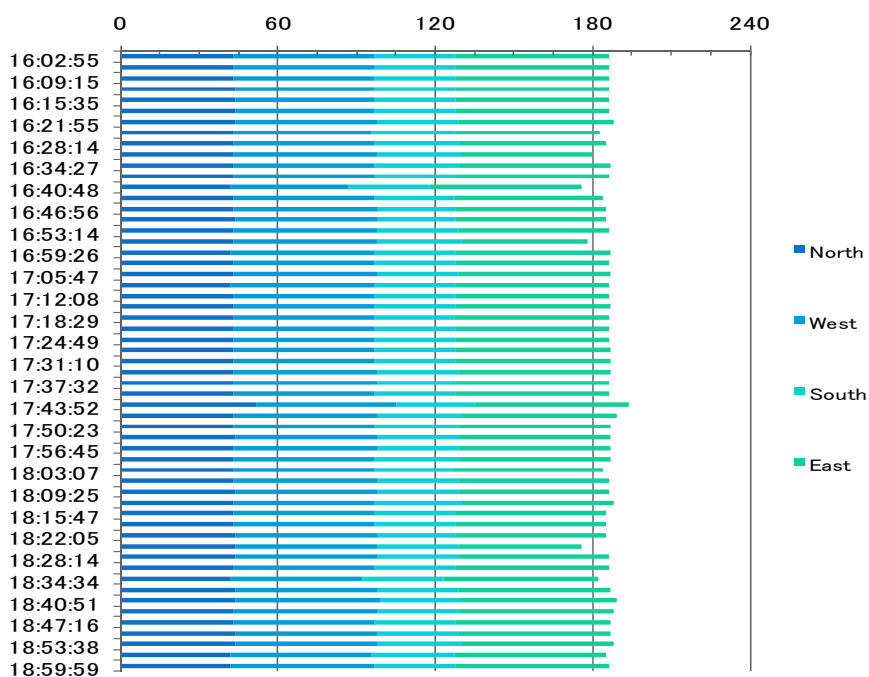
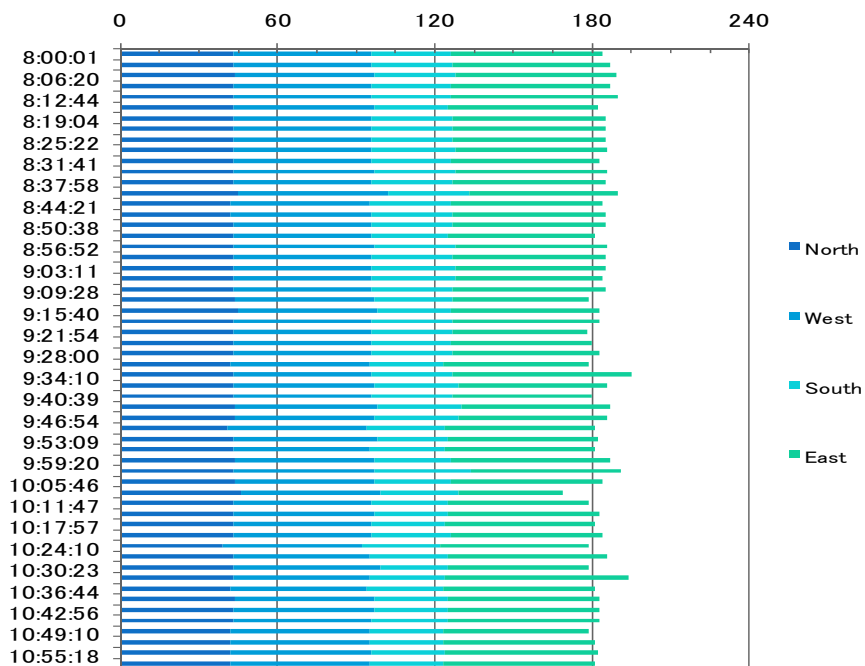
Leg	N	W	S	E	Gap	Cycle
AM Average (sec)	70	74	82	52	8	286
PM Average (sec)	71	72	82	51	8	283

Figure 14-26 Signal Cycle prior Public Experiment (Gulshan-2 Circle Intersection)



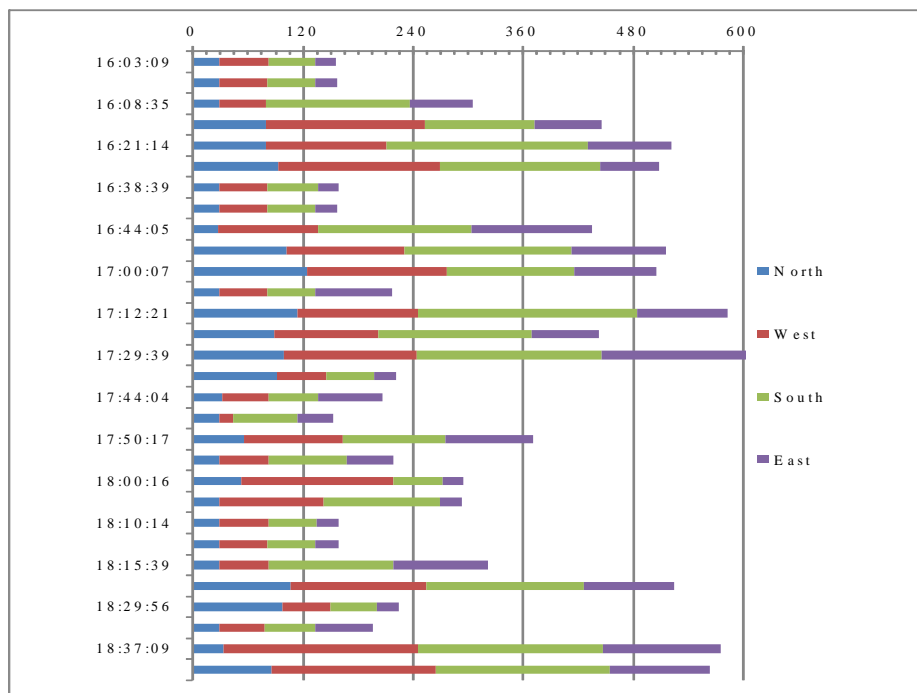
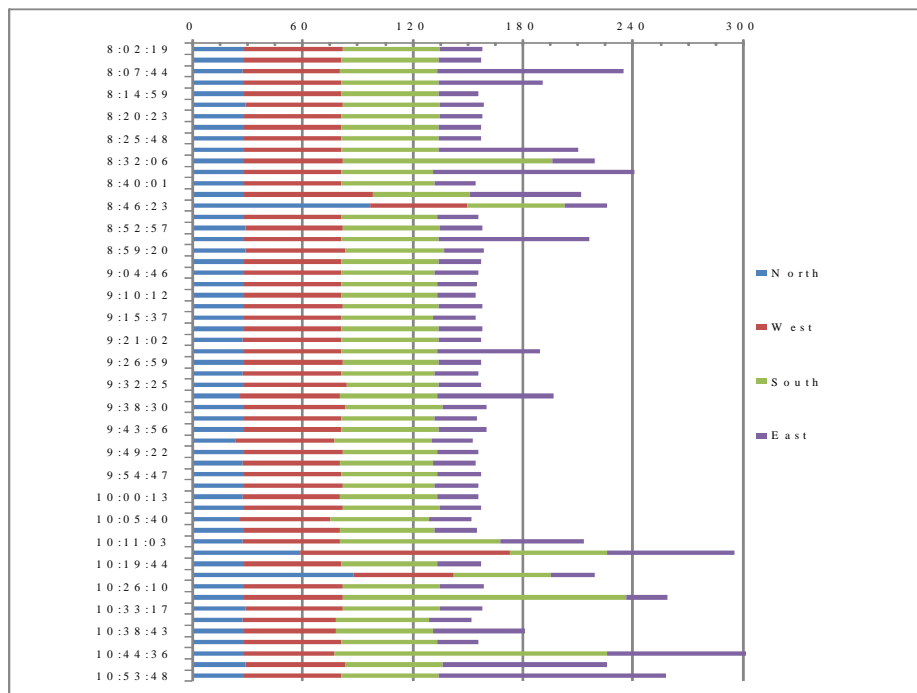
Leg	N	W	S	E	Gap	Cycle
AM Average (sec)	105	52	86	67	4	314
PM Average (sec)	123	75	107	69	6	380

Figure 14-27 Signal Cycle prior Public Experiment (Gulshan-1 Circle Intersection)



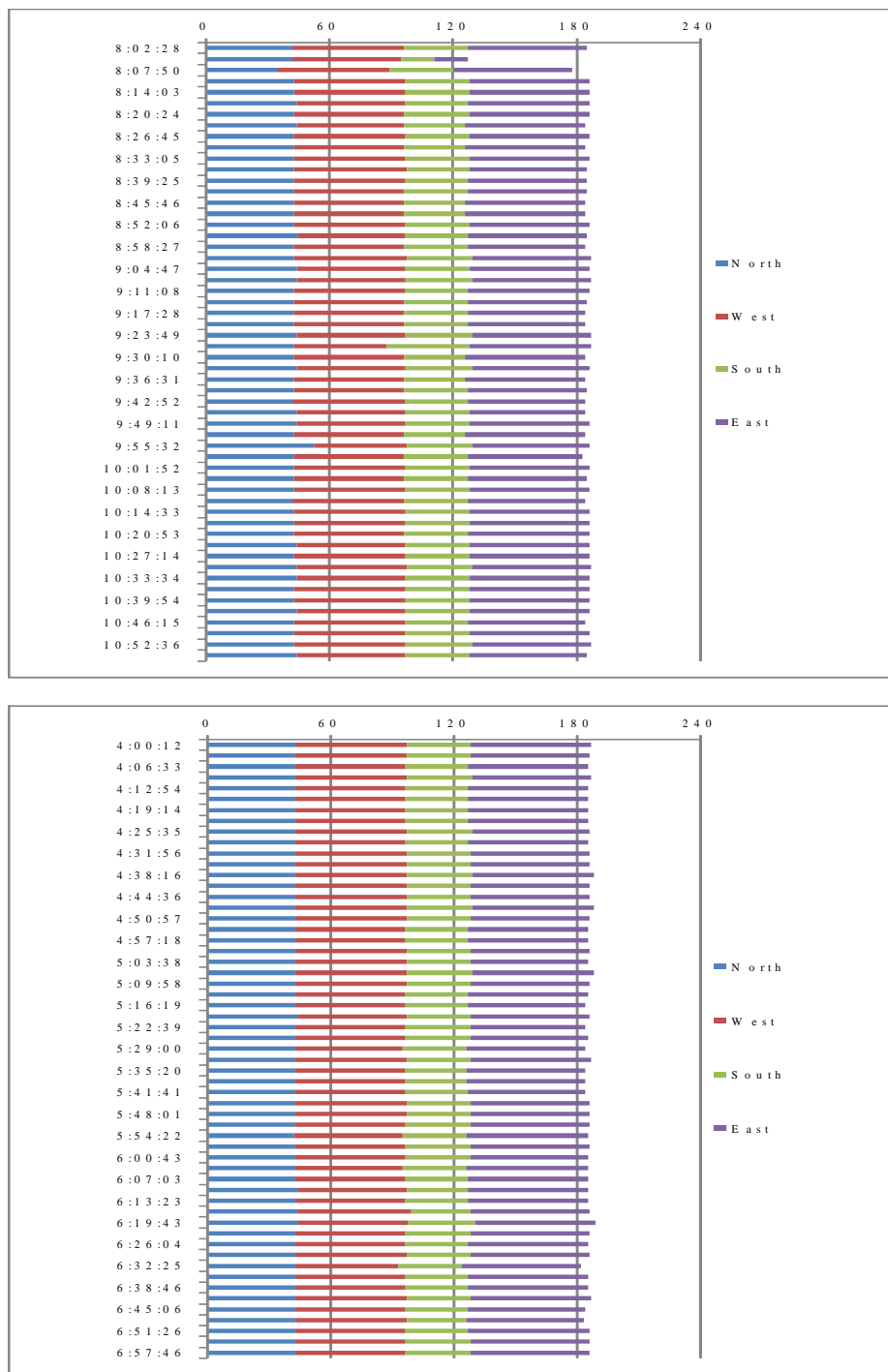
Leg	N	W	S	E	Gap	Cycle
AM Average (sec)	43	53	30	57	4	188
PM Average (sec)	43	54	31	57	4	190

Figure 14-28 Signal Cycle prior Public Experiment (New Market Intersection)



Leg	N	W	S	E	Gap	Cycle
AM	31	54	57	36	6	185
PM	57	98	115	67	5	346

Figure 14-29 Signal Cycle during Public Experiment (Gulshan-2 Circle Intersection)



Leg	N	W	S	E	Gap	Cycle
AM	43	53	31	57	5	189
PM	43	53	31	58	5	190

Figure 14-30 Signal Cycle during Public Experiment (New Market Intersection)

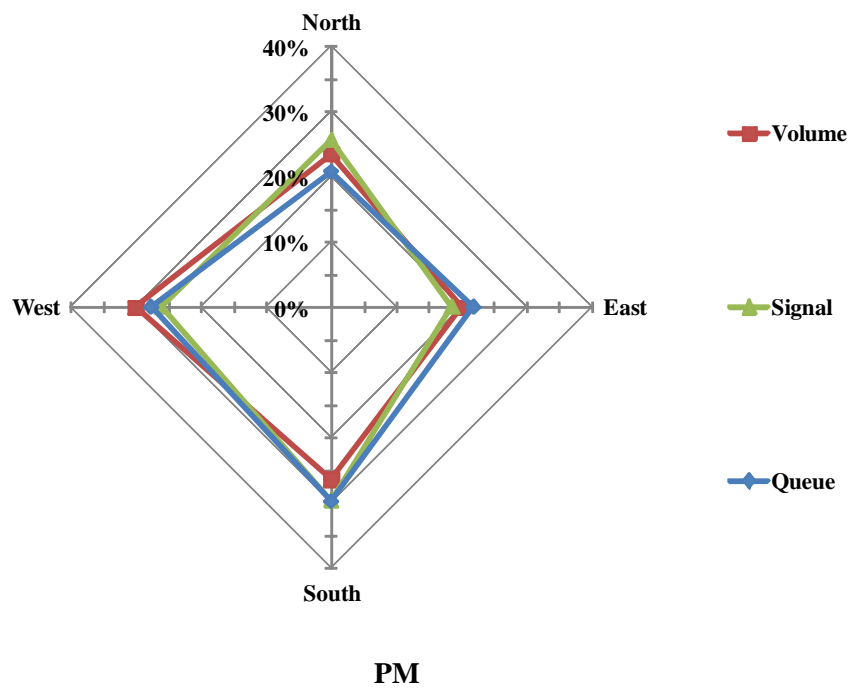
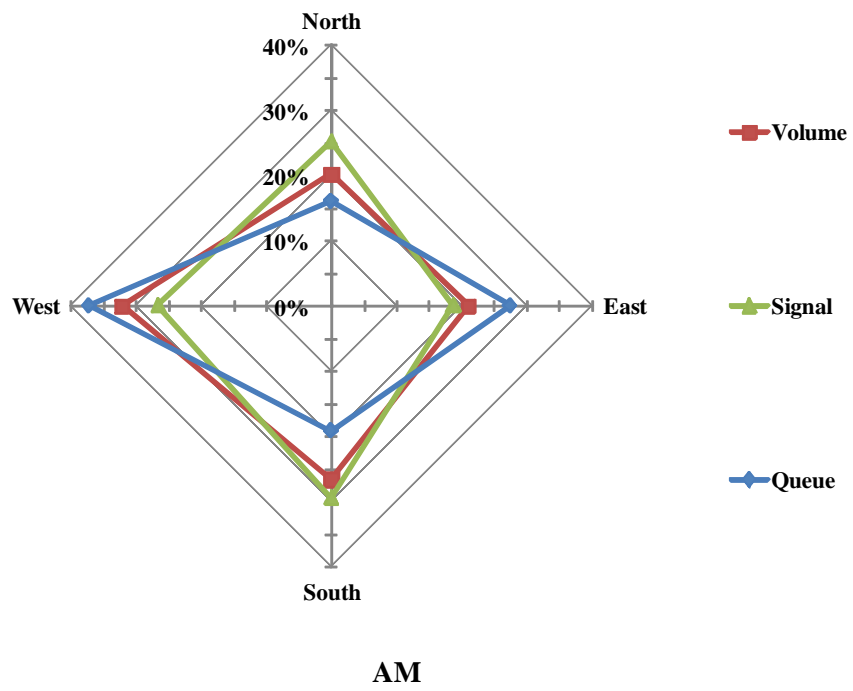


Figure 14-31 Distributions of Traffic Volume, Signal Cycle and Queue Length prior Public Experiment (Gulshan-2 Circle Intersection)

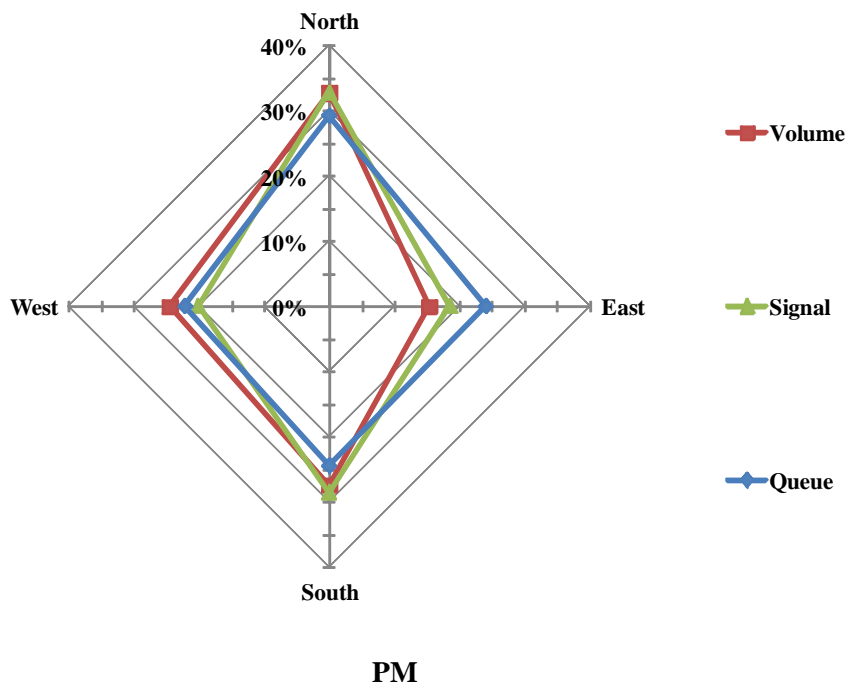
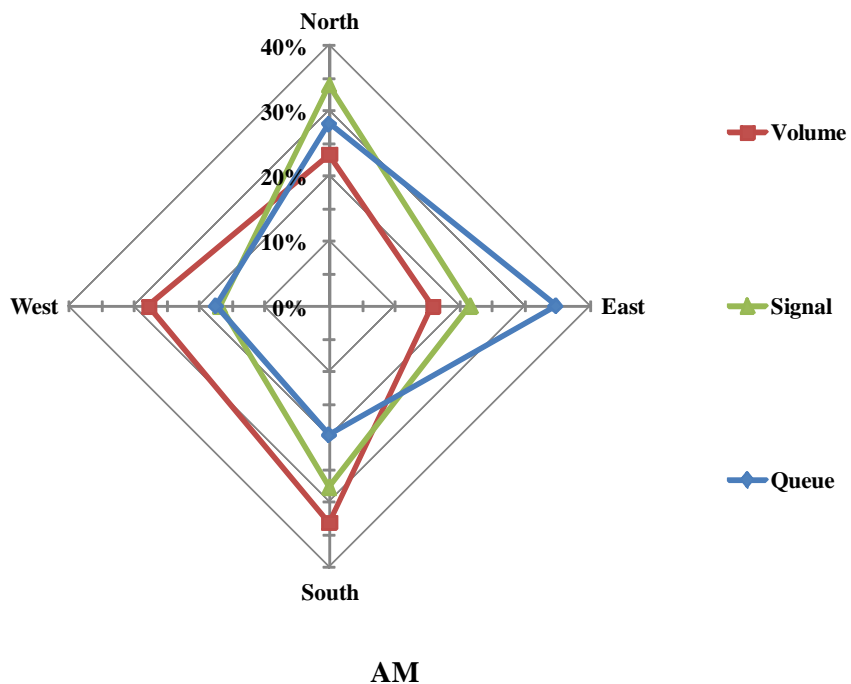


Figure 14-32 Distributions of Traffic Volume, Signal Cycle and Queue Length prior Public Experiment (Gulshan-1 Circle Intersection)

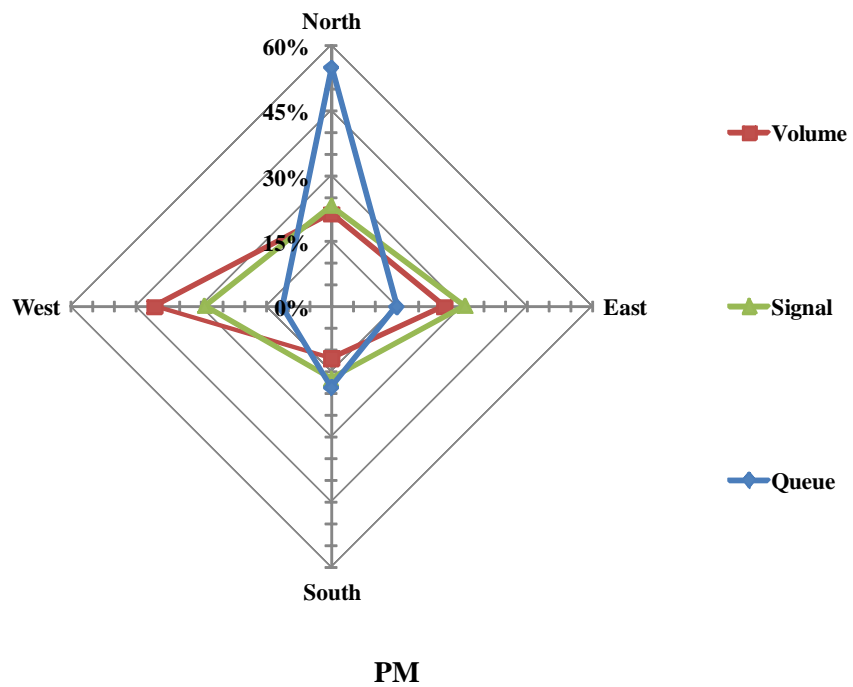
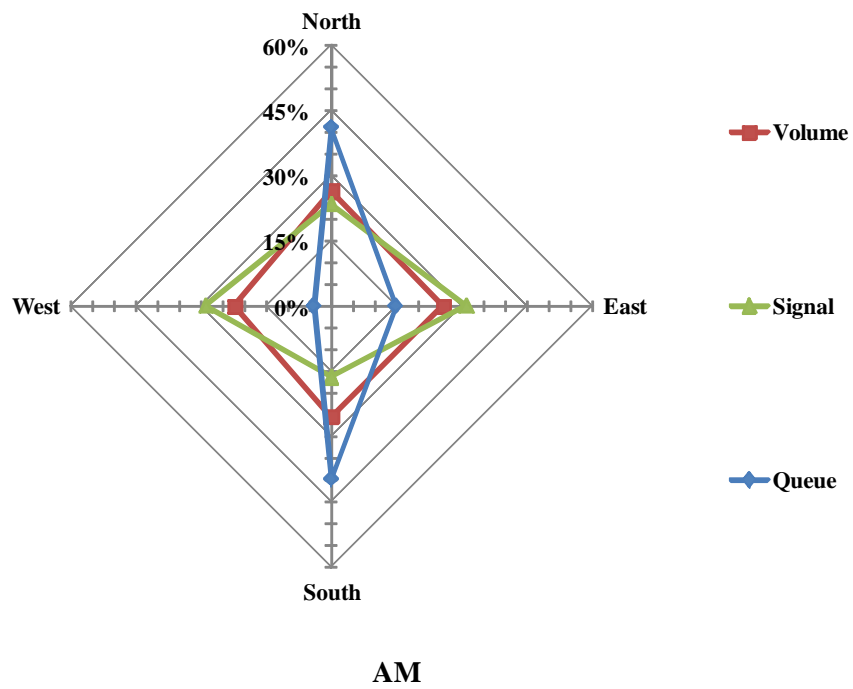


Figure 14-33 Distributions of Traffic Volume, Signal Cycle and Queue Length prior Public Experiment (New Market Intersection)

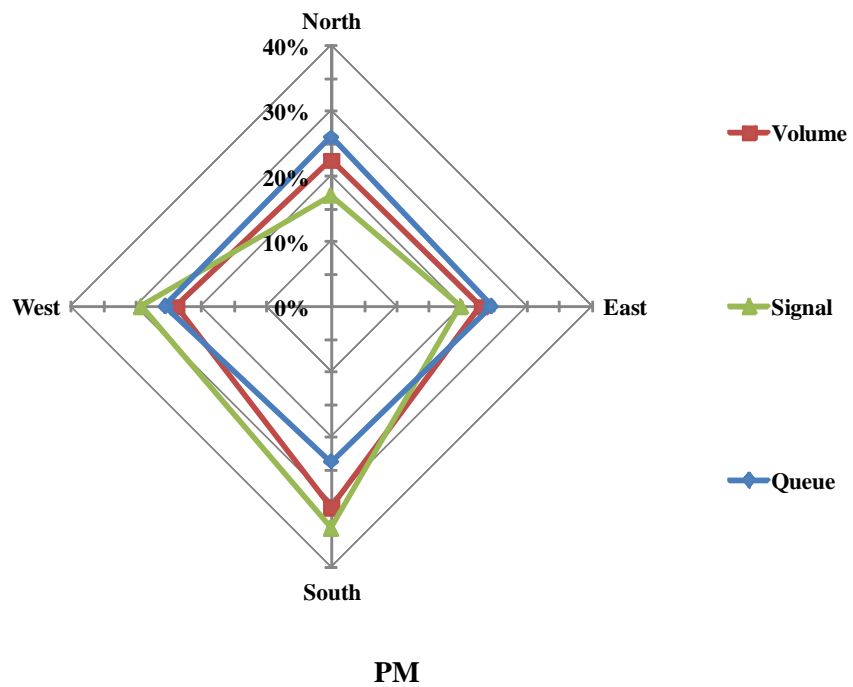
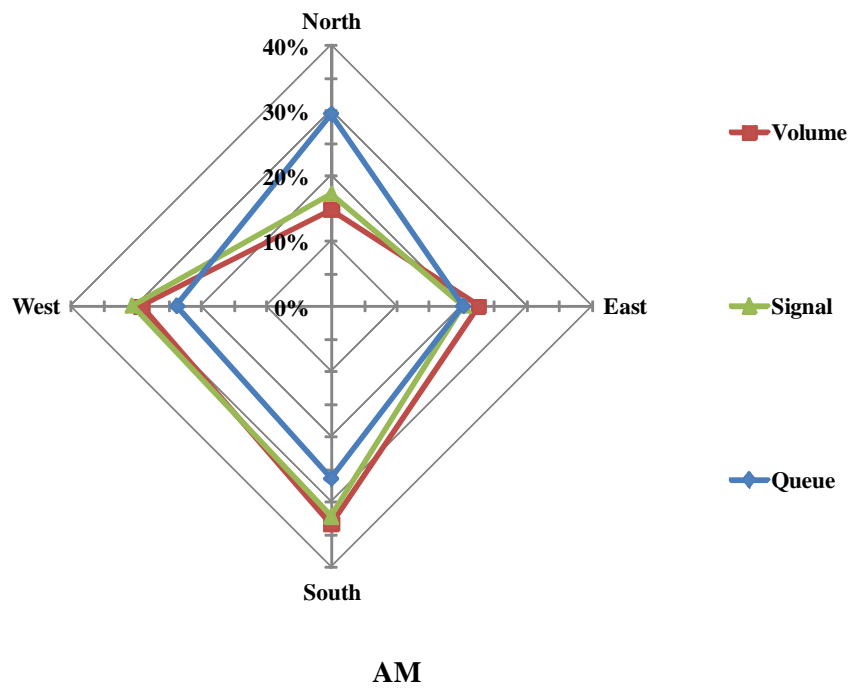


Figure 14-34 Distributions of Traffic Volume, Signal Cycle and Queue Length during Public Experiment (Gulshan-2 Circle Intersection)

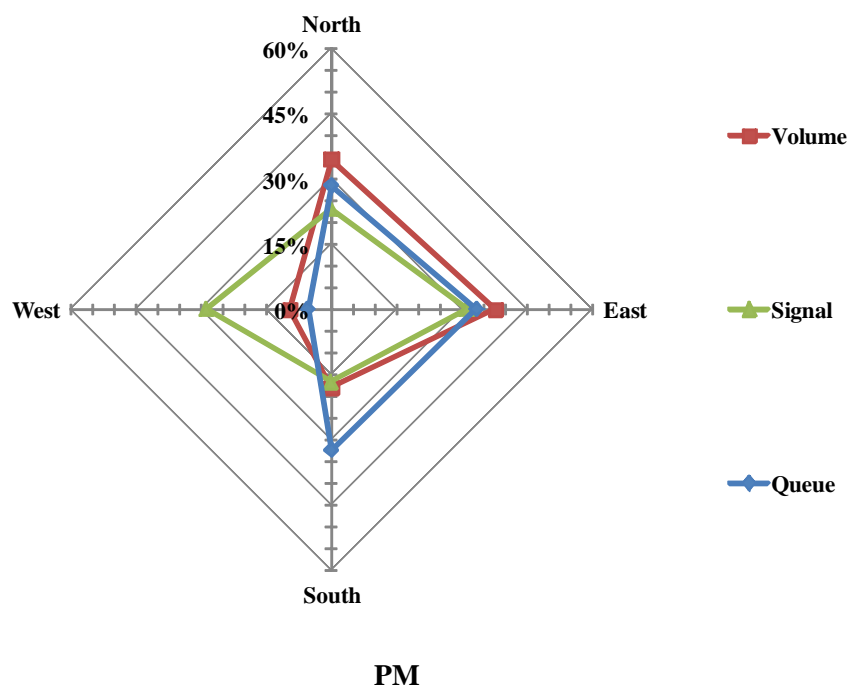
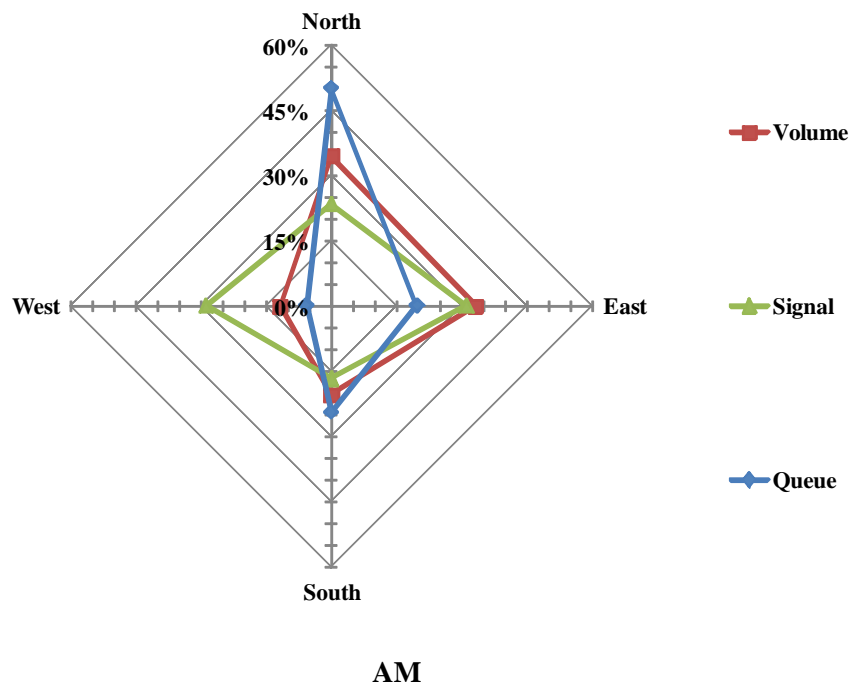


Figure 14-35 Distributions of Traffic Volume, Signal Cycle and Queue Length during Public Experiment (New Market Intersection)

APPENDIX 15: PUBLIC PRIVATE PARTNERSHIPS

15.1 Facts about PPP in Bangladesh

15.1.1 Recent Status of PPP in Bangladesh

In recently years, the Government of Bangladesh (GOB) has shown higher interests in Public Private Partnerships (PPP) and the movements concerning PPP have been very active. Currently, Private Sector Infrastructure Guidelines (PSIG) forms the regulatory basis for PPP in Bangladesh. GOB considers utilizing this guideline as the pillar of regulatory framework of PPP, instead of establishing a new law.

Regarding the budgetary aspect, GOB allocated totally BDT 2,500 crore (or 2.2% of total budget) for PPP in the budget for BFY 2009-2010. Among them, BDT 100 crore is used for fund for technical assistance (TA), and BDT 300 crore for viability gap funding (VGF), and the rest, for an infrastructure investment fund as loan and equity.

Officials of GOB have been actively participated in the seminars and workshops for PPP. The followings are the main events that GOB official have participated.

Table 15.1-1 Recent events regarding PPP in Bangladesh

Time	Event	Venue
October 2007	Korea-Bangladesh High-level Expert Group Meeting on PPP for Infrastructure Development	Seoul
January 2008	Three-day Workshop on PPP in infrastructure jointly organized by UNESCAP and IIFC	Dhaka
February 2009	Interregional Expert Group Meeting on PPPs in Infrastructure Development	Bangkok
August 2009	Joint Seminar on PPP was held by American Chamber of Commerce in Bangladesh and Eastern Bank Ltd.	Dhaka

Source: JICA Study Team

The high officials of GOB have been visited Japan, Korea, UK, and other countries to study their system and experience of PPP/PFI.

15.1.2 PPP Projects in Bangladesh

According to PSIG, following sectors are listed as eligible PPP sectors:

- Telecommunication
- Power

- Port Development
- Highways and Expressways
- Oil and Gas
- Airports, Terminals
- Tourism
- Water supply, Sewerage and Drainage
- Industrial Estates and Parks, City and Property Development
- Land Reclamation, Dredging, etc
- Service sectors e.g. Health and Educational Facilities
- Environmental, Industrial and Solid Waste Management
- Railways
- Other Urban, Municipal and Rural Infrastructure, etc.

So far, GOB has implemented PPP projects in sectors, such as power, telecom, and transport (land port). The following table shows the list of those projects.

Table 15.1-2 PPP Projects in Bangladesh

SECTOR/PROJECT		Capacity	Investment (\$m)
POWER			
1	CDC Meghnaghat Ltd.	450 MW	300
2	CDC Haripur Ltd.	360 MW	183
3	Khulna Power Company Limited	110 MW	110
4	Haripur EI Paso Barge Mounted Power Plant	115 MW	115
5	Westmont Baghabari Power Barge	130 MW	162
6	BEPZA Power Plant at CEPZ	40 MW	28
7	BEPZA Power Plant at DEPZ	35 MW	23
8	Power Plant at Savar	44 MW	30
9	Power Plant at Narsingdi	35 MW	23
10	Power Plant at Comilla	25 MW	17
11	Small Power Plants (10 to 33 MW) -- 12 stations	230 MW	115
TELECOMMUNICATION			Investment (\$m)
1	Public Switched Telephone Network (PSTN) Fixed Line		~300
2	PGCB's Optic Fiber Cable (Phase-I) (Dhk-Ctg)		1.2
3	PGCB's Optic Fiber Cable (Phase-II) (Ctg-Cox'bzr)		11
PORT			Investment (\$m)
1	Land Port at Sonamasjid		2.2
2	Land Port at Banglabandha		1
3	Land Port at Hili		2.2
4	Land Port at Birol		0.71
5	Land Port at Bibirbazar		0.71
6	Land Port at Teknaf		4
7	New mooring Container Terminal		167

Source: Presentation Material at Bangkok Seminar in February 2009

The World Bank Database indicates there are XXXX PPP projects in Bangladesh since 2000.

Table 15.1-3 PPP Projects in Bangladesh (PPI Data)

Financial Closure Year	Energy	Telecom	Transport	Water and sewage	Total
2000	1	0	0	0	1
2001	2	1	0	0	3
2002	0	0	0	0	0
2003	0	0	0	0	0
2004	0	3	1	0	4
2005	0	1	1	0	2
2006	2	1	1	0	4
2007	0	1	0	0	1
Total	5	7	3	0	15

Source: World Bank PPI Database

According to an interview to a high official of Board of Investment (BOI) of the Prime Minister's Office, there are three plans of PPP projects in Dhaka Metropolitan Area (DMA) as of October 2009. They are:

- Metro Subway (Unsolicited project)
- Flyover (Jafrabari – Gulistan) 8.5km (Solicited project initiated by Belhasa Accom and Associates Ltd.)
- Dhaka City Elevated Expressway (Unsolicited project initiated by ItalThai)

There is also Dhaka-Chittagong express highway project (unsolicited project of 250km), which is promote by a Malaysian consortium. Besides transport sector, there is a plan of flat building/housing project. The authority in charge is RAJUK and the concessionaire is Metro Akran, a Malaysian company.

15.1.3 Legal System of PPP in Bangladesh

As mentioned above, there is no law which governs PPP in Bangladesh at present. In terms of public procurement, there are Public Procurement Act (PPA) 2006 and Public Procurement Rules (PPR) 2008. However, they do not have prescriptions, which are specific to PPP procurements. Therefore, PSIG forms the basis of PPP in Bangladesh.

PSIG was approved by GOB in October 2004, and is the first official policy document adopted by GOB providing a framework for private sector investments in infrastructure. The main contents of the guideline is as follows:

- 1) Background
- 2) Development of Private Infrastructure Projects

- 3) Institutional Framework
- 4) Feasibility Study
- 5) Commercial Considerations in a Private Infrastructure Project
- 6) Tender and Award Process

Under PSIG, the Ministry of Finance (MOF) recently formed a “seven-member core group”, to formulate following three separate guidelines for PPP.

- Guideline for Loan and Equity Fund
- Guideline for VGF (Viability Gap Fund)
- Guidelines for Allocation for Technical Assistance

MOF asked the group to submit the draft regulations by the end of August, 2009. The core group is expected to formulate eligibility criteria for getting allocation from each of the three funds, identify priority sectors for PPP allocation, conditions for resource disbursement, outline method and mechanism in sanctioning allocation and recommend the highest ceiling for government's allocation under the new initiative.

According to a high official of BOI, GOB has no plan to establish new act for PPP, but plans to revise PSIG to promote PPP. PICOM (Private Infrastructure Committee) prepared a recommendation paper for revision of current PSIG with a support of a Technical Consultant, “Infrastructure Investment Facilitation Center (IIFC)”. The report is to be submitted to the Cabinet in November 2009.

15.1.4 Key Organization to PPP

The key institutional framework for PPP in Bangladesh is centered on PICOM. It was established under the Prime Minister’s Office. The chairman of PICOM is the Principal Secretary. BOI is entrusted with the responsibilities of the Secretariat. IIFC (Infrastructure Investment Facilitation Center) is appointed as the Technical Advisor for the committee.

The objective of PICOM is to:

- 1) Co-ordinate, monitor and expedite the resources, strengths and capabilities of both the private and public sectors through the implementation of private infrastructure project.
- 2) PCOM is the focal point for promoting and progressing private infrastructure projects across all infrastructure sectors in the country.

The main functions of PICOM are as follows:

- Promoting private sector participation in infrastructure projects;
- Preparing and implementing capacity building plans

- Preparing and implementing awareness creation plans
- Overseeing and monitoring the actual progress of the Projects;
- Sharing activities with concerned stakeholders and the media in a transparent manner.
- Assisting in negotiations with Investors of Large Infrastructure Projects
- Expediting decisions in the investment process by resolving complex inter-ministerial issues;
- Promoting new Laws, Regulations and Policies by creating enabling conditions and supportive framework;
- Monitoring the contingent liabilities of Private Infrastructure Projects

BOI functions as the Secretariat to PICOM. BOI was established by the Investment Board Act of 1989 to promote and facilitate investment in the private sector both from domestic and overseas sources with a view to contribute to the socio-economic development of Bangladesh. It is headed by the Prime Minister and is a part of the Prime Minister's Office. Its membership includes representatives (at the highest level) of the relevant ministries - industry, finance, planning, textiles, et.al. - as well as others, such as the Governor of Bangladesh Bank, heads of some business associations.

Major Functions of BOI include:

- Providing necessary facilities and assistance in the establishment of industries.
- Implementing investment related GOB policies.
- Preparing investment schedule.
- Registering private sector industrial projects; and identifying competitive investment sectors and facilitating investment by providing information and services.

Besides, PICOM, there are two key financial organizations, Bangladesh Bank (BB) and Infrastructure Development Company Limited (IDCOL).

BB is the central bank of Bangladesh. BB supports the project development function and PICOM and also has a function as a project financier. BB is partly providing financial support in implementing PSIG through a project titled, "Investment Promotion and Financing Facility (IPFF)." The facility is provided IDA (International Development Association) and has provisions for lending to infrastructure projects and for technical assistance in awareness creation and capacity building on PPP.

IDCOL was established under ERD (Economic Relation Division) of MOF by the GOB in May 1997. The organization was licensed by Bangladesh Bank as a non-bank financial institution in January 1998. Since its establishment, IDCOL is playing a major role in bridging the financing gap

for developing medium and large-scale infrastructure and renewable energy projects in Bangladesh. IDCOL now stands as the market leader in private sector energy and infrastructure financing in Bangladesh.

IDCOL provides long-term senior and subordinated debt financing to viable privately-owned and operated infrastructure projects. To be eligible for IDCOL funding, the project must meet the Government priority plan. Infrastructure sectors in the current priority list are as follows:

- Power Generation
- Renewable Energy
- Telecommunications
- Ports
- Toll Roads and Bridges
- Urban Environmental Services
- Gas and Gas-related Infrastructure
- Water Supply
- Information Technology

In October 2008, IDCOL has entered into a loan agreement with ADB. The total amount of loan is USD 165 million. The amount of 82 million will be lent to IDCOL from the Ordinary Capital Resources (OCR) of ADB for investing into large infrastructure projects in the private sector by making sub-loans to Qualified Enterprises for Qualified Projects. The amount of USD 50 million will be for investing into small and medium infrastructure loans and USD 33 million for Renewable energy projects.

15.2 Study on Application of PPP to MRT Project

15.2.1 Scope and Preconditions of the Study

In this section, possibility of application of PPP to MRT project is studied. As the preconditions of the study, the analysis on project scheme, including some organizational analysis, needs to be made. The study in this section is principally based on the results and assumptions of organizational analysis in this chapter.

The study in this section focuses on the following four aspects:

- Legal Status of the MRT Operating Entity (DMTC)
- Relation between DMTA/MOC and DMTC
- Scope of works of DMTC
- Room for Private Participation

It should be also noted that the study in this section assumes “public” MRT project. There are many examples of MRT projects run as “private businesses.” But the discussion in this section assumes MRT project as “public business.”

15.2.2 Project Scheme Analysis

(1) Legal Status of the MRT Operating Entity (DMTC)

Basic PPP Project schemes, which can be applied to MRT project is shown in the following table:

Table 15.2-1 Basic PPP Project Schemes of MRT Projects

	Description
Concession	Contracting Authority gives concessions to a project company. It can take forms, such as BOT (Build-Operate-Transfer), BTO (Build-Transfer-Operate), BTL (Build-Transfer-Lease).
Outsourcing	A public project operating entity or SOE (State Owned Enterprise) outsources some of its works individually or collectively to private companies. The work items can include E&M procurements and O&M of railway facilities.

Source: JICA Study Team

To be specific to the MRT project in Dhaka, DMTC is planned to be established as the operator of the MRT. As for legal status of DMTC organization, following options can be considered logically:

Table 15.2-2 Possible Legal Status of DMTC

	Description
Option A	Part of Governmental Organization
Option B	Independent Public Corporation, established on a specific law
Option C	Independent Company, established on the Companies Act

Source: Study Team

Regarding to above options, “Option A” is an option adopted for Bangladesh Railway (BR). But as for the MRT project, this would not be a realistic option because of the following three reasons.

Firstly, if the project was run by a government organization, the independence of management would be weaker and the entity may not be able to behave flexibly, depending on the social and economic conditions. Also, since it is in fact run by public entities, the motivation for efficient management or increase of profit would not work well. Moreover, when the business goes worse, the existence of responsibility tends to be unclear.

Secondly, the aspect of profitability needs to be considered. There is a fundamental difference of characters between “national railway project” and “metropolitan MRT project”. The former sees high importance to build and maintain a network across the country. And it often is not commercially viable. On the other hand, the latter, namely Metropolitan MRT, is more strategic and often more commercially viable compared to national railway projects. In fact, in many countries, metropolitan MRT or railway project independent entities. (i.e. Seoul, Bangkok, Delhi).

Thirdly, there would be an argument for status of workers. It is not easy to transfer civil servants (or public officers) to private workers. If the MRT project entity is set up as government organization, the most of staff will be civil servants. However, in the future, it is highly probable that arguments for corporatization or privatization would arise. In that case, it would be very difficult to secure the status of the works.

Based on above reasons, it is recommended that the MRT project is run by an entity, which is independent from the government itself. Thus, it can be said that realistic options are “Option B” and “Option C”.

As shown in the above table, “Option B” is takes form of a “public corporation”. In Bangladesh, a public corporation is established based on individual specific law. “Option C” takes form of “company” and it is established based on the Companies Act XVIII of 1995. Regarding “Option C”, there are some variations, depending on constituents of share holders. The variations are shown in the following table.

Table 15.2-3 Possible Variations of Option C

	Description
Option C-1	<ul style="list-style-type: none"> - 100% of share is held by the government. - This is often called as “State-Owned Enterprise (SOE)”
Option C-2	<ul style="list-style-type: none"> - Share is held by the government and other entities (e.g. donors, private entities). - This is often called as “State-Owned Enterprise (SOE)”, especially, when more than 51% of share is held by the government.
Option C-3	<ul style="list-style-type: none"> - 100% of share is held by private entities. - In this option the government does not hold the share.

Source: JICA Study Team

In developed countries, “Option C-3” is commonly adopted because they private companies have sufficient experience of running railway project. However, the situation is different for developing countries. In developing countries, the experience of running railway project is rather scarce and it is often the case that a private market for railway is immature.

This situation also applies to Bangladesh. For example, Bangladesh Railway (BR) is a government agency (corporative entity) and does not take the form of company. In fact, the private market for railway operation is still immature in Bangladesh. In a situation like this, it would be reasonable to anticipate that “Option C-3”, would not work well, at least at the initial operation stage of the project.

Next, the possibility of adoption of “Option C-2” is considered. This takes a form of company, where both public and private entities participate as share holders. This is a kind of joint venture and sometimes called as “hybrid venture”. The advantage of this option is to assure the stability of business through involvement of public sector, while utilizing the experience and know-how of private sectors. In this option, synergy effects between two sectors can be expected and this is one of ideal models of PPP.

This option has another possibility. This option provides project participation opportunities not only for private entities, but also for foreign public entities. For example, IFC (International Finance Corporation) of the World Bank Group have many experiences of investing to the project operating company (it often takes a form of Special Purpose Company). Also, JICA is now considering restarting the function of direct investment to such project entities. Considering these points, “Option C-2” can be regarded as a very attractive option.

The disadvantage of this option is that it is often difficult to set an equal footing between public and private entities. Both parties would try to take initiative of management, and the decision making does not work well without appropriate coordination and consents on both sides. The other concern is that the existence of responsibilities tends to be unclear. Especially, when the performance of the project appears to be worse than projected, both sides are induced to criticize the other party.

Moreover, this option assumes the existence of competent private railway company. But such company does not exist in Bangladesh.

By considering the advantages and the disadvantages, it can be concluded that “Option C-2” is a “Challenging” option for Bangladesh. Even there would be many hurdles to adopt this option, this still have many potentials and advantages. Also, it is expected that existence of this option can function as a “checking mirror” to assure the appropriateness of adoptions of other options. It is also worth mentioning that, there might be an argument that the share should be opened to non-government entities in the future. Therefore, it is recommended that this option would be kept as a possible option.

Based on the above consideration, “Option B” and “Option C-1” is left. The detailed differences between these options are not clear except that the latter shall have stronger accountability. Since “Option C-1” takes a form of “company” it should have a duty to report and explain its business performance to shareholder. Even if the share was held by the government by 100%, it could not exempt from the duty. Thus, in that regard, “Option C-1” is a superior option. However, this is just one aspect of the comparison and the appropriateness of options needs to be checked from various aspects. Thus, it is recommended that more detailed analysis shall be conducted in the study in the next phase.

Regarding legal status of DMTC, when considering from the view point of PPP, following three options are identified as candidate options. And it is recommended that further comparative analysis shall be conducted in the study in the next phase.

Table 15.2-4 Candidate Options for Legal Form of DTMC

	Description
Option B: Corporation	<ul style="list-style-type: none"> - A public corporation established on individual law - It might be easy for the government to establish and manage the project. - There is a question that the accountability is properly addressed.
Option C-1: Company	<ul style="list-style-type: none"> - A company whose share is held by 100% by the government. - Compared to Option B, higher accountability is expected.
Option C-2: Company	<ul style="list-style-type: none"> - A company whose share is held by the government and other entities (e.g. donors, private entities). - Great synergy effects of public and private entities are expected. - There are many hurdles to establish the company and existence of responsibility tend to become unclear.

Source: JICA Study Team

(2) Relation between DMTA/MOC and DMTC

Next, relation between DMTA/MOC and DMTC is considered. It is also based on the study results of Organization Analysis in the previous chapter. As the legal status of DMTC organization, “Option B (Corporation)” and “Option C-1 (Company)” are considered.

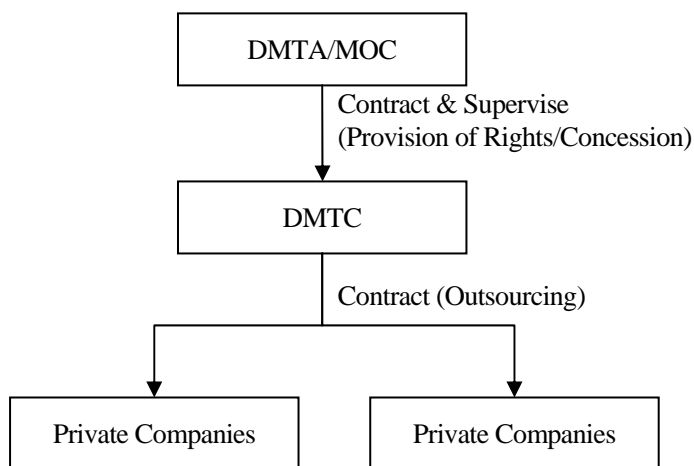
When DMTC takes form of a “corporation”, there will be no direct “contract” between DMTA/MOC and DMTC because DMTC is a public entity. According to the study results of organization, DMTA/MOC function as a public agent to monitor and supervise the project and DMTC is a public operator of the project. In narrow sense, this is not PPP. However, it is highly possible that even in this case, some of the works of DMTC can be outsourced to private companies. Those works include following items:

- Development/Procurement of E&M
- Developments/Procurement of rolling stocks
- O&M of infrastructure
- O&M of E&M
- O&M of rolling stocks

When DMTC takes form of a “company”, there will be some direct “contract” between DMTA/MOC and DMTC. The contract may take a form, such as “Concession Agreement”, “License Agreement”, or “Entrusting Agreement”. In either form, DMTC will be entitled a right from the government to run the MRT project. At present, it is not sure whether such “rights” or “concessions” are entitled by DMTA or MOC.

The relation between DMTA/MOC and DMTC is almost same with that of “Option B”. Namely, DMTA/MOC function as a public agent to monitor and supervise the project and DMTC is an operating company of the project. It is highly probable that DMTC outsource some of its works like in the case of “Option B”.

The project scheme of “Option C-1” is shown in the following figure:

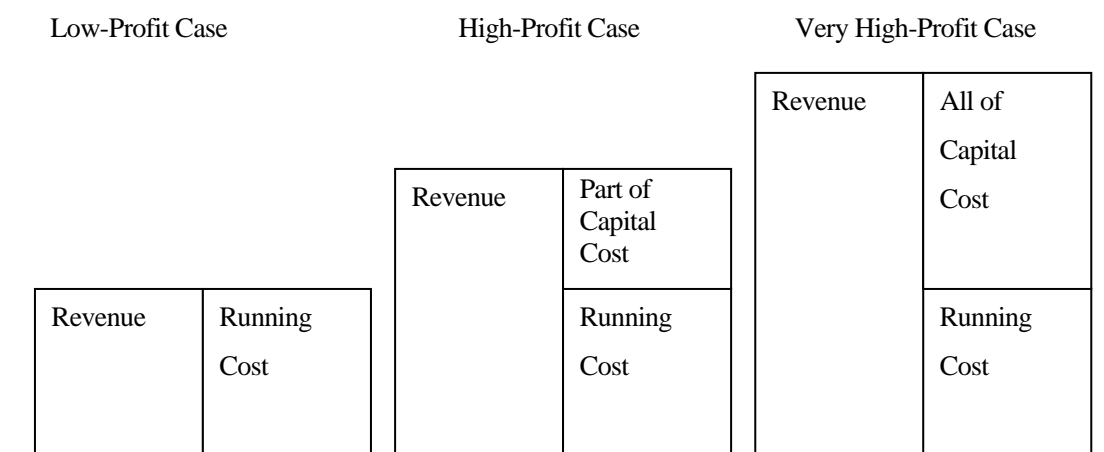


Source: JICA Study Team

Figure 15.2-1 Project Scheme of “Option C-1”

(3) Scope of Works of DMTC

The biggest question regarding the scope of works of DMTC is whether construction works should be included in its scope of works. The basic or minimum conditions for DMTC operation is that it must be financially viable and sustainable, when capital depreciation is ignored. But if it is sufficiently profitable, it can include some of the construction works. The image is shown in the following figure.



Source: JICA Study Team


Figure 15.2-2 Image of Capital Investment Recovery

The capital costs include following items:

- Infrastructure
- Development/Procurement of E&M
- Development/Procurement of Rolling Stocks

Depending on the profitability of the project, following options can be considered

Table 15.2-5 Options for inclusion of capital works for scope of works of DMTC

	O&M (All Items)	Rolling Stocks Development	E&M Development	Infrastructure Development
High Profitability	✓	✓	✓	✓
	✓	✓	✓	
	✓	✓		
	Low Profitability	✓		

Source: JICA Study Team

Besides profitability of the project, the capacity and ability of DMTC must be considered. If it has sufficient human capacity and construction ability, some development works can be included in its scope of works. However, it is not so, the scope of works should be limited to O&M of the operation.

Under current situation, the plan of establishing DMTC has not been developed in details. Therefore, it is not easy to conclude the appropriate scope of work. However, it can be pointed out that it is not easy for DMTC to incorporate full construction division because of limited human resources. Thus, the tentative idea for the scope of works of DMTC is that it should focus on the O&M of the project, after the completion of project facilities. The project facilities, such as infrastructure, E&M and rolling stocks are developed or procured by the government. Inevitably, the procurements of necessary capital funds will be the role of DMTA (MOC). DMTC are then entitled right to use the assets or lease the asset from the DMTA (MOC).

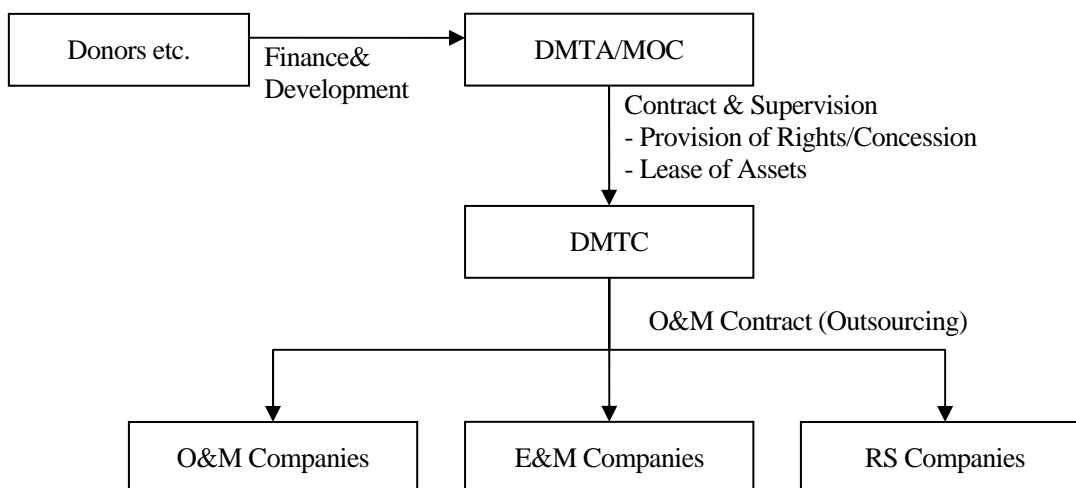
The demarcation between DMTC and DMTA (MOC) based on above ideas is shown in the following table:

Table 15.2-6 Tentative SOW and Demarcation of DMTC and DMTA(MOC)

	O&M (All Items)	Rolling Stocks Development	E&M Development	Infrastructure Development
		Financing for Capital Development		
DMTC	✓			
DMTA (MOC)		✓	✓	✓

Source: JICA Study Team

The project scheme in this assumption is shown in the following figure:



Source: JICA Study Team

Figure 15.2-3 Tentative Project Scheme for MRT Project

This is just a rough idea and requires further study in the next phase but this demarcation is clear and understandable as a starting point for the detailed discussion.

(4) Room for Private Participation

In above scenario, DMTC are to be established as a public corporation or a company, whose share is 100% owned by the governments. In this sense, the room for private participation is rather limited. Especially, if most of the capital investment is to be done by DMTA (MOC), there would be a little need for private financing.

However, it is highly probable that many of the following works will be outsourced to private companies:

- Development/Procurement of E&M
- Developments/Procurement of rolling stocks
- O&M of infrastructure
- O&M of E&M
- O&M of rolling stocks

Even though the room for private participation is limited, it is true that the project can improve its efficiency and services, by taking full advantage of private involvement. Thus, it is important to develop a scheme, in which private participation is promoted as much as possible, by taking profitability and maturity of private into consideration.

15.2.3 Issues for the Further Study

The analysis in this study is rather primitive due to limited information and immaturity of project scheme planning on the government side. Even though some tentative ideas are presented in this section, they require further elaboration. Especially, it is important to continue the study on following items:

- Legal Status of DMTC organization
- Possibility of capital participation by private or foreign entities
- Relation between DMTC and DMTA (MOC)
- Scope of works of DMTC (especially, capital investment)
- Utilization and involvement of private companies

The study shall be conducted, by considering various aspects such as, legal, social, macroeconomic, financial, and political aspects.

APPENDIX 16: BUILDING DATA BASE

16.1 Composition of DHUTS Database System

The structure of DHUTS database and GIS metadata dictionary are listed as followed:

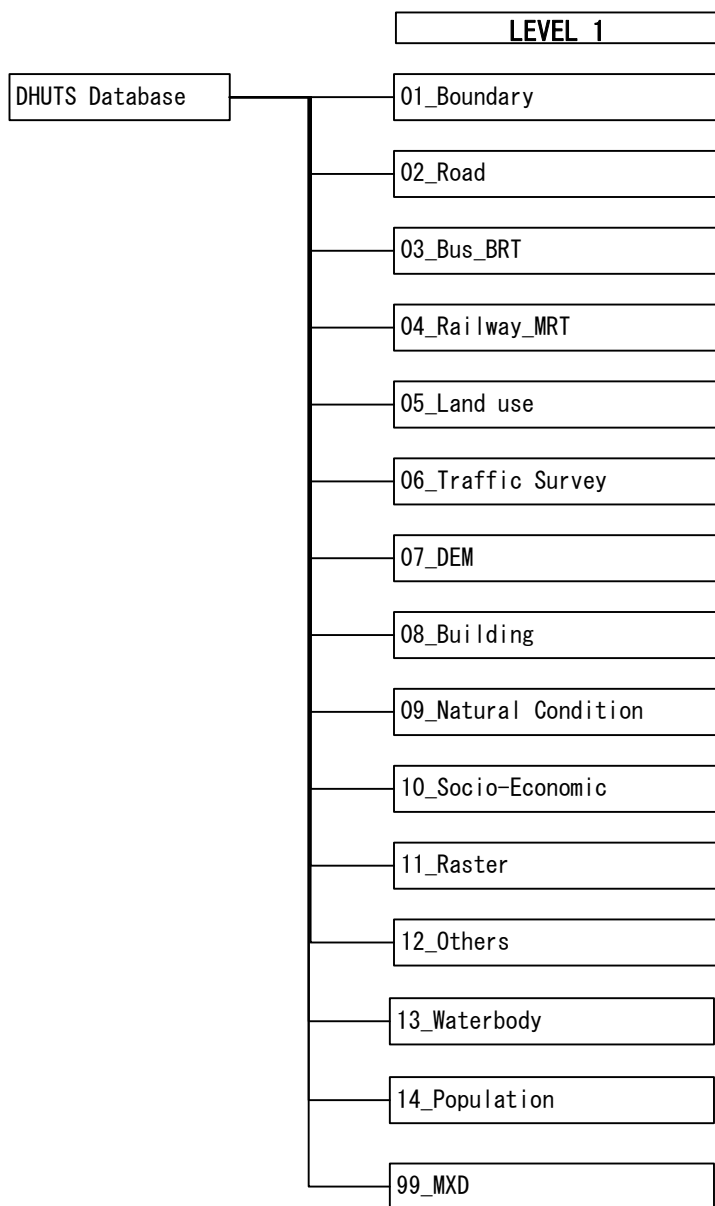


Figure 16.1-1 DHUTS Database Structure (Level 1)

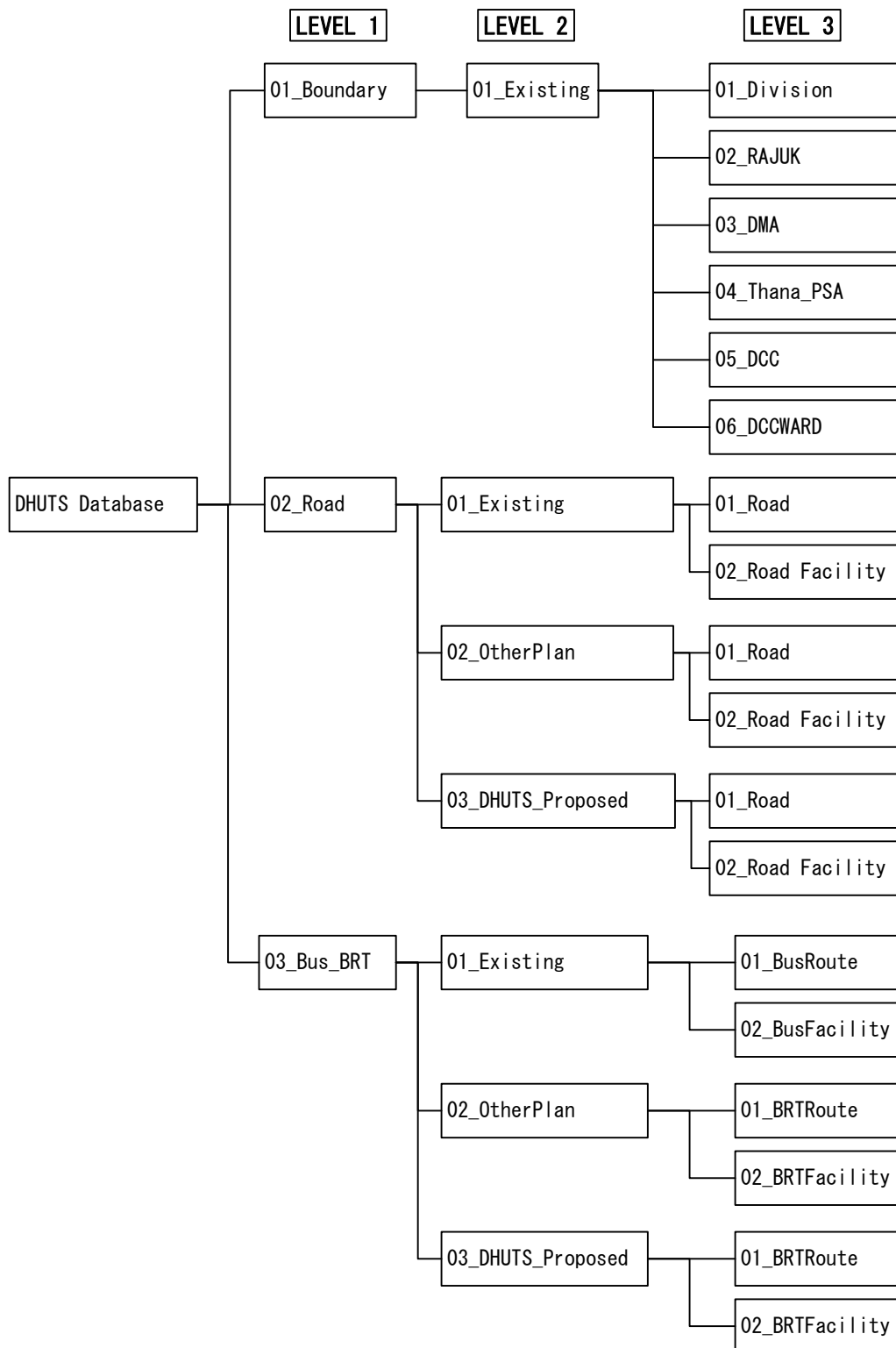


Figure 16.1-2 DHUTS Database Structure (Level 2 and 3)

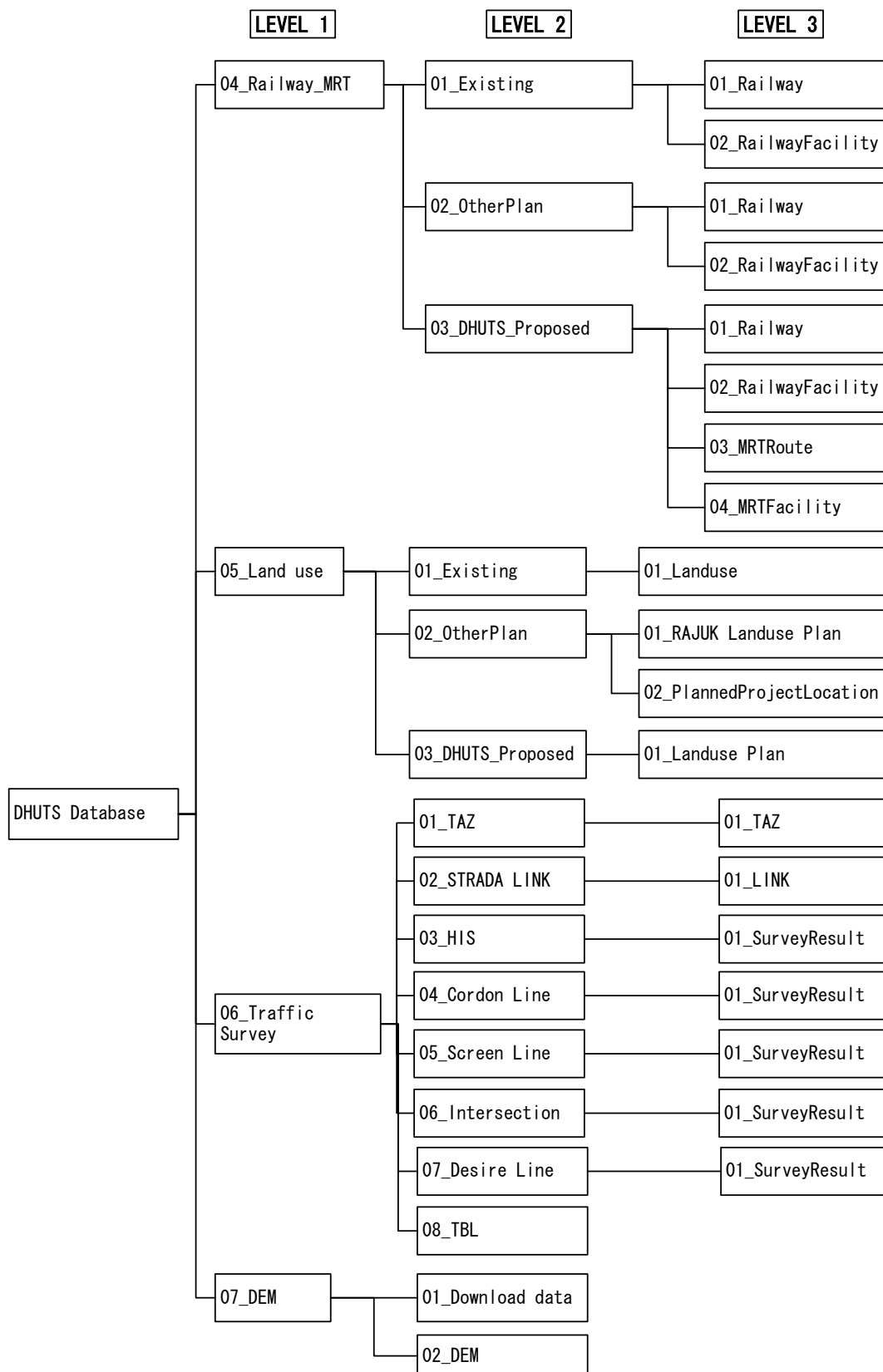


Figure 16.1-3 DHUTS Database Structure (Level 2 and 3)-Continued

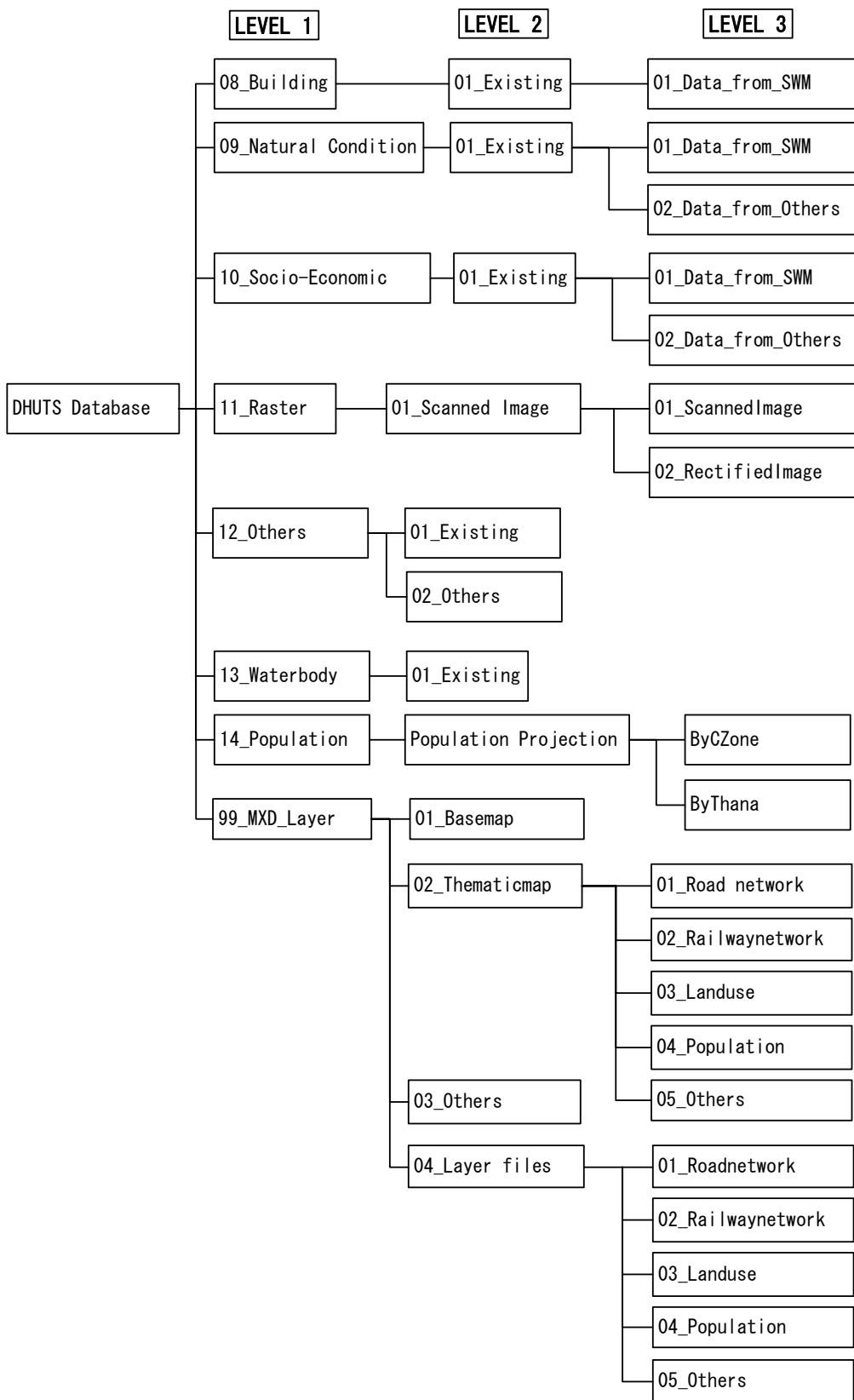


Figure 16.1-4 DHUTS Database Structure (Level 2 and 3)-Continued

DHUTS DATABASE STRUCTURE (Description of LEVEL 2 & 3)				
	Level 1	Level 2	Level 3	Description
DHUTS Database	01_Boundary	01_Existing	01_Division	Dhaka division boundary
	01_Boundary	01_Existing	02_RAJUK	RAJUK boundary
	01_Boundary	01_Existing	03_DMA	Dhaka Metropolitan Area(DMA) boundary
	01_Boundary	01_Existing	04_Thana_PSA	Thana/Paurashava/Upazila boundary
	01_Boundary	01_Existing	05_DCC	DCC boundary
	01_Boundary	01_Existing	06_DCCWARD	Ward boundary inside DCC area
	02_Road	01_Existing	01_Road	Existing Road network data
	02_Road	01_Existing	02_Road Facility	Existing Road facility data
	02_Road	02_OtherPlan	01_Road	Collected Road plan data from other agencies
	02_Road	02_OtherPlan	02_Road Facility	Collected Road facility plan data from other agencies
	02_Road	03_DHUTS_Proposed	01_Road	Road network plan prepared by DHUTS
	02_Road	03_DHUTS_Proposed	02_Road Facility	Road facility plan prepared by DHUTS
	03_Bus_BRT	01_Existing	01_BusRoute	Existing bus route data
	03_Bus_BRT	01_Existing	02_BusFacility	Existing bus facility data, such as bus terminal
	03_Bus_BRT	02_OtherPlan	01_BRTRoute	Collected BRT plan data from other agencies
	03_Bus_BRT	02_OtherPlan	02_BRTFacility	Collected BRT facility plan data from other agencies
	03_Bus_BRT	03_DHUTS_Proposed	01_BRTRoute	BRT network plan prepared by DHUTS
	03_Bus_BRT	03_DHUTS_Proposed	02_BRTFacility	BRT facility plan prepared by DHUTS
	04_Railway_MRT	01_Existing	01_Railway	Existing railway network
	04_Railway_MRT	01_Existing	02_RailwayFacility	Existing railway facility, such as railway stations
	04_Railway_MRT	02_OtherPlan	01_Railway	Collected rail-based transportation plan prepared by other agencies
	04_Railway_MRT	02_OtherPlan	02_RailwayFacility	Collected rail-based transportation facility plan prepared by other agencies
	04_Railway_MRT	03_DHUTS_Proposed	01_Railway	Railway plan prepared by DHUTS (except MRT)
	04_Railway_MRT	03_DHUTS_Proposed	02_RailwayFacility	Railway facility plan prepared by DHUTS (except MRT facility)
	04_Railway_MRT	03_DHUTS_Proposed	01_MRTRoute	MRT route plan prepared by DHUTS
	04_Railway_MRT	03_DHUTS_Proposed	02_MRTFacility	MRT facility plan prepared by DHUTS
	05_Land use	01_Existing	01_Landuse	Existing land use data (prepared by DHUTS and JICA/SOB project)
	05_Land use	02_OtherPlan	01_RAJUK land use plan	RAJUK land use plan, development constraint map data, and other RAJUK data
	05_Land use	02_OtherPlan	02_PlannedProjectLocation	Development project location
	05_Land use	03_DHUTS_Proposed	01_Landuse Plan	Land use plan prepared by DHUTS
	06_Traffic Survey	01_TAZ	01_TAZ	DHUTS Traffic Analysis Zone (Azone, Bzone, Czone)
	06_Traffic Survey	02_STRADALINK	01_LINK	DHUTS traffic analysis network based on JICA STRADA
	06_Traffic Survey	03_HIS	01_Surveyresult	DHUTS home interview survey results data
	06_Traffic Survey	04_CordonLine	01_Surveyresult	DHUTS Cordon line survey results data (incl. Survey location)
	06_Traffic Survey	05_ScreenLine	01_Surveyresult	DHUTS Screen line survey results data (incl. Survey location)
	06_Traffic Survey	06_Intersection	01_Surveyresult	DHUTS Intersection traffic survey results data (incl. Survey location)
	06_Traffic Survey	07_DesireLine	01_Surveyresult	DHUTS Desire Line
	06_Traffic Survey	08_TBL		MS Excel spreadsheet data

Figure 16.1-5 DHUTS Database Structure (Description of Level 2 and 3)

DHUTS DATABASE STRUCTURE (Description of LEVEL 2 & 3)				
	Level 1	Level 2	Level 3	Description
DHUTS Database	07_DEM	01_Downloaded data	-	Downloaded Digital Elevation Model (DEM) raw data from SRTM site (http://seamless.usgs.gov/index.php)
	07_DEM	02_DEM	-	DEM data created from SRTM in shape file format
	08_Building	01_Existing	01_Data_from_SWM	Building footprint data (data extent is JICA/SOB project area)
	09_Natural Condition	01_Existing	01_Data_from_SWM	Natural condition data (data extent is JICA/SOB project area)
	09_Natural Condition	01_Existing	02_Data_from_Others	Natural condition data (except SWM project data)
	10_Socio-Economic	01_Existing	01_Data_from_SWM	Socio-economic data (data extent is JICA/SOB project area)
	10_Socio-Economic	01_Existing	02_Data_from_Others	Socio-economic data (except SWM project data)
	11_Raster	01_ScannedImage	01_ScannedImage	Scanned Image data, such as published map and printed satellite imagery (before geo-reference image data)
	11_Raster	01_ScannedImage	02_RectifiedImage	Geo-referenced Image data prepared by DHUTS, such as published map and printed satellite imagery for a reference purpose
	12_Others	-	-	Other GIS data
	13_Waterbody	01_Existing		Existing waterbody data from DHUTS Landuse data
	14_Population	Population Projection	ByCZone	Census population & population Projection by DHUTS
	14_Population	Population Projection	ByThana	Census population & population Projection by DHUTS
	99_MXD	01_Basemap	-	MXD files for DHUTS Base map
	99_MXD	02_Thematic map	01_Road	MXD files for Road related thematic map, such as road network map
	99_MXD	02_Thematic map	02_Railway	MXD files for Railway related thematic map, such as railway network map, and MRT proposed route map.
	99_MXD	02_Thematic map	03_Landuse	MXD files for Land use related thematic map, such as existing land use map.
	99_MXD	02_Thematic map	04_Population	MXD files for Population related thematic map, such as existing population density map and future population distribution map.
	99_MXD	02_Thematic map	05_Others	MXD files for other thematic map, such as Elevation map and jurisdiction map.
	99_MXD	03_Others		MXD file(s) for data analysis
99_MXD	04_Layerfiles	01_Road	Layerfile(legend file) for thematic map	
99_MXD	04_Layerfiles	02_Railway	Layerfile(legend file) for thematic map	
99_MXD	04_Layerfiles	03_Landuse	Layerfile(legend file) for thematic map	
99_MXD	04_Layerfiles	04_Population	Layerfile(legend file) for thematic map	
99_MXD	04_Layerfiles	05_Others	Layerfile(legend file) for thematic map	

Figure 16.1-6 DHUTS Database Structure (Description of Level 2 and 3)

DHUTS DATABASE STRUCTURE (File naming rules)	
File naming rules	
EX_XXXX	File name starting from "EX_" means "Existing (Existing condition)" data.
PL_XXXX	File name starting from "PL_" means "Planned by other agency" data.
PR_XXXX	File name starting from "PR_" means "Proposed by DHUTS" data.

Figure 16.1-7 DHUTS Database Structure (File naming Rules)

DHUTS DATABASE STRUCTURE (List of data)											
Data ID	Level 1	Level 2	Level 3	Level 4	Levels	Data Type	Data Extent	Description	Source	Major Attributes	Status
B001	Boundary	Existing	Division	Ex-DhakaDivision		Polygon	Dhaka Division	Dhaka Division boundary	Geo Consults		
B002	Boundary	Existing	RAJUK	Ex-RAJUK Py		Polygon	RAJUK	RAJUK area outline	RAJUK		
B003	Boundary	Existing	RAJUK	Ex-RAJUK Ln		Line	RAJUK	RAJUK area outline	RAJUK		
B004	Boundary	Existing	DMA	Ex-DMA, Bv		Polygon	DMA	Dhaka Metropolitan Area boundary	DHUTS (based on Geo Consults data)		
B005	Boundary	Existing	DMA	Ex-DMA, Ln		Line	DMA	Dhaka Metropolitan Area boundary	DHUTS (based on Geo Consults data)		
B006	Boundary	Existing	Thana_PSA	Ex-RAJUK, Thana_PSA		Polygon	RAJUK	Thana and PSA boundary	DHUTS (based on Geo Consults data)		
B007	Boundary	Existing	Thana_PSA	Thana_PSA		Line	RAJUK	Thana and PSA boundary	DHUTS (based on Geo Consults data)		
B008	Boundary	Existing	DCC	Ex-DCC, Bv		Polygon	DCC	DCC area outline	SWM Project		
B009	Boundary	Existing	DCC	Ex-DCC, Ln		Line	DCC	DCC area outline	SWM Project		
B010	Boundary	Existing	DCC WARD	Ex-DCC Ward Py		Polygon	DCC	Ward boundary inside DCC	DHUTS		
B011	Boundary	Existing	DCC WARD	Ex-DCC Ward Ln		Line	DCC	Ward boundary inside DCC	DHUTS		
R001	Road	Existing	Road		EX_Road	Line	RAJUK	Existing Road network (Year 2009)	DHUTS	Road Inventory survey data, road condition and road length	
R002	Road	Existing	Road/Facility	Road Inventory	Ex_TruckTerminal	Point		Existing Truck Terminal	DHUTS	Road Inventory survey	
R003	Road	Existing	Road		PR_Road	Line		Proposed Road Network (Year 2009)	DHUTS		
R004	Road	Existing	Road	BWDB	BWDB Road	Line		Completed Ongoing and Proposed roads of BWDB	BWDB		
R005	Road	Existing	Road	DCC	DCC Road	Line		Completed Ongoing and Proposed roads of DCC	DCC		
R006	Road	Existing	Road	LGED	LGED Road	Line		Completed Ongoing and Proposed roads of LGED	RAJUK		
R007	Road	Existing	Road	RAJUK	RAJUK Road	Line		Completed Ongoing and Proposed roads of RAJUK	RAJUK		
R008	Road	Existing	Road	RHD	RHD Road	Line		Completed Ongoing and Proposed roads of RHD	RHD		
R009	Road	Existing	Road/Facility	Road/Facility	DCC Bridge	Point		Completed Ongoing and Proposed Bridge of DCC	DCC		
R010	Road	Existing	Road/Facility	Road/Facility	LGED BRIDGE	Point		Completed Ongoing and Proposed Bridge of LGED	LGED		
R011	Road	Existing	Road/Facility	Road/Facility	RHD Bridge	Point		Completed Ongoing and Proposed Bridge of RHD	RHD		
BS01	Bus BRT	Existing	BusRoute	Ex-Bus route		Line	DMA	Existing bus route	DHUTS		
BS02	Bus BRT	Existing	BusFacility	Ex-Bus facility		Point	DMA	Bus terminal data	DHUTS		
BS03	Bus BRT	OtherPlan	BRTRoute	PL BRT route		Line		Planned BRT route by STP	DHUTS (based on STP)		Not Available
BS04	Bus BRT	Proposed	BRTRoute	PR BRT route		Line		Proposed BRT route by DHUTS	DHUTS		
BS05	Bus BRT	Proposed	BRTFacility	PR BRT facility		Point		Proposed BRT facility by DHUTS (bus stop etc)	DHUTS		
RL01	Railway MRT	Existing	Railway	EX Rail		Line	RAJUK	Existing Railway network	DHUTS		
RL02	Railway MRT	Existing	Railway/Facility	EX RailSta		Point	RAJUK	Existing Railway facilities, such as level crossing	DHUTS		
RL03	Railway MRT	OtherPlan	Railway								Not Available
RL04	Railway MRT	Proposed	Railway								Not Available
RL05	Railway MRT	Proposed	Railway/Facility								Not Available
RL06	Railway MRT	Proposed	Railway/Facility								Not Available
RL07	Railway MRT	Proposed	MRTRoute	PR MRT		Line		Proposed MRT route by DHUTS	DHUTS		
RL08	Railway MRT	Proposed	MRTRoute	PR MRTSta		Point		Proposed MRT station by DHUTS	DHUTS		
RL09	Railway MRT	Proposed	MRTFacility	PR MRTSta		Polygon	RAJUK	Existing River, Pond and reservoir (Year 2009)	DHUTS		
WT01	Water body	Existing	EX_Waterbody								Data extract from DHUTS existing land use
LU01	Landuse	Existing	Landuse	EX_Landuse		Polygon	RAJUK	Existing Landuse of RAJUK area (Year 2009)	DHUTS		
LU02	Landuse	Existing	Landuse	EX_Landuse_Union		Polygon	RAJUK	Existing Landuse of RAJUK area (Year 2009)	DHUTS		
LU03	Landuse	Existing	Landuse	EX_Settlement		Polygon	Dhaka Division	Existing Settlement in Dhaka Division (Year 2008)	GeoConsults data (Purchased data from Bangladesh private company)		Original data might from LGED
LU04	Landuse	Existing	Landuse	EX_Landuse2002		Polygon	SOB-JICA project area	Land use map prepared by JICA Solid Waste Management project (Clean Dhaka Project), Y2005. This data was made by interpretation of aerial photo taken in year 2002 in addition to field survey.	JICA Solid Waste Management project (Clean Dhaka Project), Y2005		Not Available
LU04	Landuse	OtherPlan	RAJUK Landuse Plan	Development Constraint		Polygon	RAJUK	Planned land use by RAJUK	RAJUK		Not Available
LU05	Landuse	Proposed	Landuse Plan	PR_Landuse		Polygon	RAJUK	Proposed land use by DHUTS	DHUTS		Not Available

Figure 16.1-8 DHUTS Database Structure (List of Data)

DHUTS DATABASE STRUCTURE (List of data)												
Data ID	Level 1	Level 2	Level 3	Level 4	Level 5	Data Type	Data Extent	Description	Source	Major Attributes	Remarks	Status
NA01	Natural	Existing	Data from others	EX_Embankment		Line	Dhaka division	Existing embankment in Dhaka division	Geo Consults			
NA02	Natural	Existing	Data from SWM	EX_LandCondition		Polygon	SOB-JICA project area	Existing Building Footprint (Year2004)	JICA Solid Waste Management project (Clean Dhaka Project), Y2005		Data extent is JICA SOB Study area only, not RAJUK area	
BD01	Building	Existing	Data from SWM	EX_Building		Polygon	Dhaka Division	landmark data	GeoConsults data (Purchased data from Bangladesh private company)			
OT01	Other	Existing		EX_landmark		Point	Dhaka Division	Union head quarter location data	GeoConsults data (Purchased data from Bangladesh private company)			
OT02	Other	Existing		EX_UnionHQ		Point	Dhaka Division		GeoConsults data (Purchased data from Bangladesh private company)			
OT03	Other	Existing		EX_division06		Polygon	Division		GeoConsults data (Purchased data from Bangladesh private company)			
OT04	Other	Existing		EX_bridge dhaka div		Point	Dhaka Division		GeoConsults data (Purchased data from Bangladesh private company)			
OT05	Other	Others	Data from SWM	EX_SocioEconomic		Polygon	SOB-JICA project area	Socio-Economic Condition data	JICA Solid Waste Management project (Clean Dhaka Project), Y2005			
SO01	Socio Economic Condition	Existing										
PO01	Population	Population Projection	ByCZone	Population_DHUTS		Polygon	RAJUK	Census Population & Population projection by DHUTS	Census population Y2001 by Bangladesh Bureau of Statistics & Population projection Y2009 to Y2025 by DHUTS			
PO02	Population	Population Projection	ByThana			Polygon	RAJUK	Census Population & Population projection by DHUTS	Census population Y2001 by Bangladesh Bureau of Statistics & Population projection Y2009 to Y2025 by DHUTS			Not Available
TS01	Traffic Survey	Intersection	Survey Result	T_S_Intersection_Loc		Point	DMA	Intersection Location				
TS02	Traffic Survey	Corridorline	Survey Result	T_S_Corridorline_Loc		Point	DMA	Corridorline Location				
TS03	Traffic Survey	Screenline	Survey Result	T_S_Screenline_Loc		Point	DMA	Screenline Location				
TS04	Traffic Survey	Existing		T_S_RoadInventory_Loc		Line	DMA	Desire Line for B Zone				Not Available
TS05	Traffic Survey	DesireLine	Survey Result	DesireLine_Bzone		Line		Desire Line for B Zone				
TS06	Traffic Survey	DesireLine	Survey Result	DesireLine_Czone		Line		Desire Line for C Zone				
TZ01	Traffic Survey	TAZ	TAZ	TZ_Azone		Polygon	RAJUK	DHUTS traffic analysis zone (Large zone)	DHUTS			
TZ02	Traffic Survey	TAZ	TAZ	TZ_Bzone		Polygon	RAJUK	DHUTS traffic analysis zone (Medium zone)	DHUTS			
TZ03	Traffic Survey	TAZ	TAZ	TZ_Czone		Polygon	RAJUK	DHUTS traffic analysis zone (Small zone)	DHUTS			
TZ04	Traffic Survey	TAZ	ZoneCentroid	CentroidBzone		Point		Centroid Coordinate for Zone B				
TZ05	Traffic Survey	TAZ	ZoneCentroid	CentroidCzone		Point		Centroid Coordinate for Zone C				
LNK01	LINK	-		LK_STRADA		Line	RAJUK	DHUTS link data (export from JICA STRADA)	DHUTS		Link ID, Node ID, Link type	Not Available

Figure 16.1-9 DHUTS Database Structure (List of Data) - Continued

DHUTS DATABASE STRUCTURE (List of data)												
Data ID	Level 1	Level 2	Level 3	Level 4	Level 5	Data Type	Data Extent	Description	Source	Major Attributes	Remarks	Status
DM01	DEM	DEM		EX-DEM		raster	RAJUK	Digital Elevation Model (DEM) calculated from 30m SRTM data	SRTM project	Elevation(m)	The Shuttle Radar Topographic Mission (SRTM) is a project to obtain a near-global scale to generate the most complete high-resolution digital topographic database of Earth. SRTM consisted of a specially modified radar system that flew onboard the Space Shuttle Endeavour during an 11-day mission in February of 2000.	
IM01	Raster	ScannedImage	ScannedImage	DMDP_scanned_map		Raster (tif)	DMDP					
IM02	Raster	ScannedImage	RectifiedImage	DMA QuickBird Image		raster(jpeg)	DMA	Scanned & rectified Quickbird imagery('printout') in DMA	Print out imagery purchased from CEGIS	No attribute		
IM03	Raster	ScannedImage	RectifiedImage	DMDP Dhaka Urban Area Plan		raster(ing)	DMDP		Print out imagery purchased from DMDP			
IM04	Raster	ScannedImage	RectifiedImage	DMDP Structure Plan		raster(ing)	DMDP		Print out imagery purchased from DMDP			
IM05	Raster	ScannedImage	RectifiedImage	GoogleEarth		raster(ing)	Google Earth					
IM06	Raster	-	RectifiedImage	RAJUKMAP		raster(jpeg)	RAJUK	Scanned & rectified RAJUK Plan map	Published by The Mappa Ltd.	No attribute		Not Available
IM07	Raster	-		DHAKAQITY		raster(jpeg)	Dhaka city	Scanned & rectified Dhaka city map	Published by The Mappa Ltd.	No attribute		Not Available
MX_01	MXD Layer	Basemap	MXD	RAJUK Basemap (A3)		-	RAJUK					
MX_02	MXD Layer	Basemap	MXD	RAJUK Basemap (A4)		-	RAJUK					
MX_03	MXD Layer	Basemap				-	DMA					Not Available
MX_04	MXD Layer	Basemap				-	DMA					Not Available
MX_05	MXD Layer	Thematic map	Roadnetwork	Existing Road Network2009			RAJUK					
MX_06	MXD Layer	Thematic map	Roadnetwork	Proposed Road Network2009			RAJUK					
MX_07	MXD Layer	Thematic map	Railnetwork	Existing MRT Network2009			RAJUK					
MX_08	MXD Layer	Thematic map	Railnetwork	Proposed MRT Network2009			RAJUK					
MX_09	MXD Layer	Thematic map	Landuse	Existing Landuse2009			RAJUK					
MX_10	MXD Layer	Thematic map	Transport Network (Road and Rail)	Existing Transport Network2009			RAJUK					
MX_11	MXD Layer	Thematic map	Transport Network (Road and Rail)	Proposed Public Transport Network2009			RAJUK					

Figure 16.1-10 DHUTS Database Structure (List of Data) -Continued

16.2 GIS Metadata Dictionary

Table 16.2-1 Description of Dhaka Division Boundary Layer

Level- 1 Name	01_Boundary
Level-2 Name	01_Existing
Level-3 Name	01_Division
Data Type	Polygon
Data Extent	Dhaka Division
Layer Description	Dhaka Division Boundary
Name of Shape file	Ex_DhakaDivision
Source	Geo Consults (Purchased Data)
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\01_Boundary\01_Existing\01_Division

Attribute Table: Attributes of Ex_DhakaDivision

No of Records: 2

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	DIVCODE	Long Integer	9	Division Code	
2	DIVNAME	Text	25	Division Name	
3	LANDTYPE	Text	25	Type of Land	1. Land 2. Water

Table 16.2-2 Description of RAJUK Boundary Layer

Level- 1 Name	01_Boundary
Level-2 Name	01_Existing
Level-3 Name	02_RAJUK
Data Type	Line
Data Extent	RAJUK
Layer Description	RAJUK area outline
Name of Shape file	Ex_RAJUK_Ln
Source	RAJUK
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\01_Boundary\01_Existing\02_RAJUK

Attribute Table: Attributes of Ex_RAJUK_Ln

No of Records: 1

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	NM_Area	Text	20	Name of the area	RAJUK
2	PERI_RAJUK	Double	18	Perimeter of the area	Perimeter in meter

Table 16.2-3 Description of RAJUK Boundary Layer-Continued

Level- 1 Name	01_Boundary
Level-2 Name	01_Existing
Level-3 Name	02_RAJUK
Data Type	Polygon
Data Extent	RAJUK
Layer Description	RAJUK area outline
Name of Shape file	Ex_RAJUK_Py
Source	RAJUK
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\01_Boundary\01_Existing\02_RAJUK

Attribute Table: Attributes of Ex_RAJUK_Py

No of Records: 1

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	NM_Area	Text	20	Name of the area	RAJUK
2	ar_RAJUK	Double	18	Perimeter of the area	Perimeter in meter

Table 16.2-4 Description of DMA Boundary Layer

Level- 1 Name	01_Boundary
Level-2 Name	01_Existing
Level-3 Name	03_DMA
Data Type	Line
Data Extent	DMA
Layer Description	Dhaka Metropolitan Area Boundary
Name of Shape file	Ex_DMA_Ln
Source	DHUTS (Based on Geo Consults data)
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\01_Boundary\01_Existing\03_DMA

Attribute Table: Attributes of Ex_DMA_Ln

No of Records: 1

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	NM_Area	Text	20	Name of the area	DMA
2	PERI_DMA	Double	18	Perimeter of the area	Perimeter in meter

Table 16.2-5 Description of DMA Boundary Layer -Continued

Level- 1 Name	01_Boundary
Level-2 Name	01_Existing
Level-3 Name	03_DMA
Data Type	Polygon
Data Extent	DMA
Layer Description	Dhaka Metropolitan Area Boundary
Name of Shape file	Ex_DMA_py
Source	DHUTS (Based on Geo Consults data)
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\01_Boundary\01_Existing\03_DMA

Attribute Table: Attributes of Ex_DMA_py

No of Records: 1

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	NM_Area	Text	20	Name of the area	DMA
2	ar_DMA	Double	18	Perimeter of the area	Perimeter in meter

Table 16.2-6 Description of Thana Boundary Layer

Level- 1 Name	01_Boundary
Level-2 Name	01_Existing
Level-3 Name	04_Thana_PSA
Data Type	Polygon
Data Extent	RAJUK
Layer Description	Thana and PSA Boundary
Name of Shape file	Ex_RAJUK_Thana_PSA
Source	DHUTS (Based on Geo Consults data)
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\01_Boundary\01_Existing\04_Thana_PSA

Attribute Table: Attributes of Ex_RAJUK_Thana_PSA

No of Records: 30

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	NM_Thana	Text	50	Name of the Thana	30 Thana
2	NM_Zila	Text	50	Name of the Zila	3 Zila
3	ar_Thana	Double	18	Area of Thana	Area in sq meter

Table 16.2-7 Description of DCC Boundary Layer

Level- 1 Name	01_Boundary				
Level-2 Name	01_Existing				
Level-3 Name	05_DCC				
Data Type	Line				
Data Extent	DCC				
Layer Description	DCC area outline boundary				
Name of Shape file	Ex_DCC_Ln				
Source	SWM Project				
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\01_Boundary\01_Existing\05_DCC				
Attribute Table: Attributes of Ex_DCC_Ln					
No of Records: 1					
Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	NM_Area	Text	20	Name of the area	DCC
2	PERI_DCC	Double	18	Perimeter of the area	Perimeter in meter

Table 16.2-8 Description of DCC Boundary Layer- Continued

Level- 1 Name	01_Boundary				
Level-2 Name	01_Existing				
Level-3 Name	05_DCC				
Data Type	Polygon				
Data Extent	DCC				
Layer Description	DCC area outline boundary				
Name of Shape file	Ex_DCC_py				
Source	SWM Project				
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\01_Boundary\01_Existing\05_DCC				
Attribute Table: Attributes of Ex_DCC_Ln					
No of Records: 1					
Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	NM_Area	Text	20	Name of the area	DCC
2	ar_DCC	Double	18	Area of DCC	Area in Sq meter

Table 16.2-9 Description of DCC Boundary Layer- Continued

Level- 1 Name	01_Boundary				
Level-2 Name	01_Existing				
Level-3 Name	06_DCCWARD				
Data Type	Polygon				
Data Extent	DCC				
Layer Description	Ward boundary inside DCC				
Name of Shape file	Ex_DCCWARD				
Source	DHUTS				
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\01_Boundary\01_Existing\06_DCCWARD				
Attribute Table: Attributes of Ex_DCCWARD					
No of Records: 90					
Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	Czone	Short Integer	4	C Zone ID	
2	Xcoord	Double	18	X coordinate	Centroid X coordinate
3	Ycoord	Double	18	Y coordinate	Centroid Y coordinate
4	FLG_DMA	Short Integer	4		
5	FLG_DCC	Short Integer	4		
6	Bzone	Double	18	B Zone ID	
7	Azone	Double	18	A Zone ID	
8	Momo01	Text	254	Memorandum	
9	Ar_Czone	Double	18	C Zone area	

Table 16.2-10 Description of Existing Road Network

Level- 1 Name	02_Road
Level-2 Name	01_Existing
Level-3 Name	01_Road
Data Type	Line
Data Extent	RAJUK
Layer Description	Existing Road Network (Year 2009)
Name of Shape file	Ex_Road
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\02_Road\01_Existing\01_Road

Attribute Table: Attributes of Ex_Road

No of Records: 109273

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	LAYER	Text	254	Name of the Layer	1. RC_Brick 2. RC_Paved 3. RC_Unpaved
2	NM_RdCTG	Text	50	Name of the Road Category	1. National Highway 2. Primary 3. Regional Highway 4. Secondary 5. Zila Road
3	CD_RdCTG	Short Integer	4	Road Category Code	
4	Status	Text	50	Status of the Road	

Table 16.2-11 Description of Existing Road Network-Continued

Level- 1 Name	02_Road
Level-2 Name	01_Existing
Level-3 Name	02_RoadFacility
Data Type	Point
Data Extent	RAJUK
Layer Description	Existing Road Network (Year 2009)
Name of Shape file	Ex_TruckTerminal
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\02_Road\01_Existing\02_Road Facility

Attribute Table: Attributes of Ex_TruckTerminal

No of Records: 6

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	Name	Text	50	Name of the Layer	Location of Truck Terminal

Table 16.2-12 Description of Existing Road Network-Continued

Level- 1 Name	02_Road
Level-2 Name	03_DHUTS Proposed
Level-3 Name	01_Road
Data Type	Line
Data Extent	RAJUK
Layer Description	Proposed Road Network (Year 2009)
Name of Shape file	PR_Road
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\02_Road\03_DHUTS_Proposed\01_Road

Attribute Table: Attributes of PR_Road

No of Records: 631

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	Rd_typeNM	Text	50	Name of Road Type	1. National Highway 2. National Highway(plan) 3. National Highway(Plan) - RHD 4. Primary Road 5. Regional Highway 6. Regional Highway(Plan) 7. Secondary Road 8. Secondary Road(Plan)
2	Length_km	Double	18	Length of the roads	Length in Km
3	Source	Text	20	Road source	1. DHUTS 2. RHD

Table 16.2-13 Description of Bust Route Layer

Level- 1 Name	03_Bus_BRT
Level-2 Name	01_Existing
Level-3 Name	01_BusRoute
Data Type	Line
Data Extent	DMA
Layer Description	Existing Bus Route
Name of Shape file	Ex_Bus_Route
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\03_Bus_BRT\01_Existing\01_BusRoute

Attribute Table: Attributes of Ex_Bus_Route

No of Records: 164

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	Route_No	Text	15	Number of Route	149 Routes
2	Issue_Bus	Short Integer	3	Number of Bus Issue	

Table 16.2-14 Description of Bus Facility Layer

Level- 1 Name	03_Bus_BRT
Level-2 Name	01_Existing
Level-3 Name	02_BusFacility
Data Type	Point
Data Extent	DMA
Layer Description	Bus Terminal Data
Name of Shape file	Ex_BusTerminal
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\03_Bus_BRT\01_Existing\02_BUSFacility

Attribute Table: Attributes of Ex_BusTerminal

No of Records: 6

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	NM_BSTerm	Text	50	Name of Bus Terminal	6 Terminals

Table 16.2-15 Description of DHUTS Proposed BRT Route Layer

Level- 1 Name	03_Bus_BRT
Level-2 Name	03_DHUTS_Proposed
Level-3 Name	01_BRTRoute
Data Type	Line
Data Extent	
Layer Description	Proposed BRT Route by DHUTS
Name of Shape file	PR_BRT_Route
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\03_Bus_BRT\03_DHUTS_Proposed\01_BRTRoute

Attribute Table: Attributes of PR_BRT_Route

No of Records: 5

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	BRT_NM	Text	20	Name of BRT line	1. LINE 1 2. Proposed LINE 1 3. LINE 2 4. Proposed LINE 2 5. LINE 3

Table 16.2-16 Description of Existing Railway Layer

Level- 1 Name	04_Railway_MRT
Level-2 Name	01_Existing
Level-3 Name	01_Railway
Data Type	Line
Data Extent	RAJUK
Layer Description	Existing Railway Network
Name of Shape file	Ex_Rail
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\04_Railway_MRT\01_Existing\01_Railway

Attribute Table: Attributes of Ex_Rail

No of Records: 34

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	Status	Text	50	Status of the railway	Not Operated

Table 16.2-17 Description of Existing Railway Station Layer

Level- 1 Name	04_Railway_MRT
Level-2 Name	01_Existing
Level-3 Name	02_RailwayFacility
Data Type	Point
Data Extent	RAJUK
Layer Description	Existing Railway Station
Name of Shape file	Ex_RailSta
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\04_Railway_MRT\01_Existing\02_RailwayFacility

Attribute Table: Attributes of Ex_RailSta

No of Records: 19

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	St_Name	Text	50	Name of Railway Station	19 Railway Stations
2	Status	Text	50	Status of the railway	Not Operated

Table 16.2-18 Description of Proposed MRT Network Layer

Level- 1 Name	04_Railway_MRT
Level-2 Name	03_DHUTS_Proposed
Level-3 Name	03_MRTRoute
Data Type	Line
Data Extent	
Layer Description	Proposed MRT route by DHUTS
Name of Shape file	PR_MRT
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\04_Railway_MRT\03_DHUTS_Proposed\03_MRTRoute

Attribute Table: Attributes of PR_MRT

No of Records: 3

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	NM_MRT	Text	50	Name of MRT Line	1. Metro Route 1 2. Metro Route 2 3. Metro Route 3

Table 16.2-19 Description of Proposed MRT Station Layer

Level- 1 Name	04_Railway_MRT
Level-2 Name	03_DHUTS_Proposed
Level-3 Name	04_MRTFacility
Data Type	Point
Data Extent	
Layer Description	Proposed MRT station by DHUTS
Name of Shape file	PR_MRTSta
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\04_Railway_MRT\03_DHUTS_Proposed\04_MRTFacility

Attribute Table: Attributes of PR_MRTSta

No of Records: 49

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	NM_Sta	Text	50	Name of Station	49 MRT Station
2	NM_MRT1	Text	50	Name of MRT Line	1. Metro Route 1 2. Metro Route 2 3. Metro Route 3
3	NM_MRT2	Text	50	Intersected Station of two routes	Name of the 2 nd Route station

Table 16.2-20 Description of Existing Land Use Layer

Level- 1 Name	05_Landuse
Level-2 Name	01_Existing
Level-3 Name	01_Landuse
Data Type	Polygon
Data Extent	RAJUK
Layer Description	Existing Landuse of RAJUK area (Year 2009)
Name of Shape file	Ex_Landuse2009
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\05_Landuse\01_Existing\01_Landuse

Attribute Table: Attributes of Ex_landuse2009

No of Records: 94708

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	LAYER	Text	254	Name of the Layer	Layer naming for the landuse category by SWM
2	SWM_Code	Double	18	Code used by Solid Waste Management	Coding for the landuse category by SWM
3	SWM_Use	Text	254	Landuse by Solid Waste Management	Naming for the landuse category by SWM
4	DHUTS_Code	Double	18	Code used by DHUTS	Coding for primary Landuse category by DHUTS
5	DHUTS_Use	Text	15	Landuse category used by DHUTS	Naming for the primary Landuse Category by DHUTS
6	Descrip	Text	254	Description of 2 nd Landuse Category	Deatil description of each landuse category by DHUTS
7	Sub_use	Text	254	Description of 3 rd Landuse Category	1.Categories Road & Railway in 4 different classes 2. Categories the Water bodies in 3 different classes.
8	Ar_LUpy01	Double	254	Area of the existing landuse by DHUTS	Area in sq meter
9	CD_LULV1	Text	254	Code of the Landuse category	Coding for new 10 landuse categories by DHUTS for level 1
10	NM_LULV1	Text	254	Name of the Landuse category	Naming for new 10 landuse categories by DHUTS for level 1
11	CD_LULV2	Text	254	Code of the Landuse category	Coding for new 10 landuse categories by DHUTS for level 2
12	NM_LULV2	Text	254	Name of the Landuse category	Naming for new 10 landuse categories by DHUTS for level 2
13	CD_LULV3	Text	254	Code of the Landuse category	Coding for new 10 landuse categories by DHUTS for level 3
14	NM_LULV3	Text	254	Name of the Landuse category	Naming for new 10 landuse categories by DHUTS for level 3
15	FLG_Outside	Short Integer	4		

Table 16.2-21 Description of Traffic Survey Layer

Level- 1 Name	06_Trffic Survey
Level-2 Name	01_TAZ
Level-3 Name	01_TAZ
Data Type	Polygon
Data Extent	RAJUK
Layer Description	DHUTS traffic analysis zone (Large zone)
Name of Shape file	TZ_Azone
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\06_Traffic Survey\01_TAZ\01_TAZ

Attribute Table: Attributes of TZ_Azone

No of Records: 127

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	Azone	Double	18	Area code of Azone	19 zone
2	P2001	Double	18	Population in 2001	Population in sq meter
3	P2009	Double	18	Population in 2009	Population in sq meter
4	P2025	Double	18	Population in 2025	Population in sq meter
5	PGrw09_25	Double	18	Population Growth from 2009 to 2025	Population growth in sq meter
6	Ar_m2	Double	18	Area of Azone	Area in sq meter
7	Pden01_ha	Double	18	Population density in 2001	Population density in hactre
8	Pden09_ha	Double	18	Population density in 2009	Population density in hactre
9	Pden25_ha	Double	18	Population density in 2025	Population density in hactre
10	Additional	Double	18		
11	2025_Origi	Double	18		
12	2025_Revic	Double	18		
13	Population	Double	18	Population of Azone area	Population in sq meter
14	PGrw09_25b	Double	18	Population growth from 2009 to 2025	Population growth in sq meter

Table 16.2-22 Description of Traffic Survey Layer-Continued

Level- 1 Name	06_Trffic Survey
Level-2 Name	01_TAZ
Level-3 Name	01_TAZ
Data Type	Polygon
Data Extent	RAJUK
Layer Description	DHUTS traffic analysis zone (Medium zone)
Name of Shape file	TZ_Bzone
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\06_Traffic Survey\01_TAZ\01_TAZ

Attribute Table: Attributes of TZ_Bzone

No of Records: 56

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	Bzone	Double	18	Area code of Bzone	56 zone
2	Azone	Double	18	Area code of Azone	19 zone
3	Xcoord	Double	18	Value of X coordinate	Centroid X coordinate
4	Ycoord	Double	18	Value of Y coordinate	Centroid Y coordinate
5	ID	Short Integer	4	ID number	56 IDs

Table 16.2-23 Description of Traffic Survey Layer-Continued

Level- 1 Name	06_Trffic Survey
Level-2 Name	01_TAZ
Level-3 Name	01_TAZ
Data Type	Polygon
Data Extent	RAJUK
Layer Description	DHUTS traffic analysis zone (Small zone)
Name of Shape file	TZ_Czone
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\06_Traffic Survey\01_TAZ\01_TAZ

Attribute Table: Attributes of TZ_Czone

No of Records: 108

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	Czone	Short Integer	4	Area code of Czone	108 zones
2	Xcoord	Double	18	Value of X coordinate	Centroid X coordinate
3	Ycoord	Double	18	Value of Y coordinate	Centroid Y coordinate
4	Bzone	Double	18	Area code of Bzone	56 zones
5	Azone	Double	18	Area code of Azone	19 zones
6	memo01	Text	254		
7	Ar_Czone	Double	18	Area of Czone	Area in sq meter

Table 16.2-24 Description of Traffic Survey Layer-Continued

Level- 1 Name	06_Trffic Survey
Level-2 Name	04_Cordonline
Level-3 Name	01_SurveyResult
Data Type	Point
Data Extent	DMA
Layer Description	
Name of Shape file	TS_cordonline_Loc
Source	
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\06_Traffic Survey\04_CordonLine\01_SurveyResult

Attribute Table: Attributes of TS_cordonline_Loc

No of Records: 13

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	loc_name	Text	50	Location Name	13 location name
2	loc_type	Short integer	4	Location Type	2 type of location
3	loc_IDName	Text	4	Location ID name	13 ID name

Table 16.2-25 Description of Traffic Survey Layer -Continued

Level- 1 Name	06_Trffic Survey
Level-2 Name	05_ScreenLine
Level-3 Name	01_SurveyResult
Data Type	Point
Data Extent	DMA
Layer Description	
Name of Shape file	TS_screenline_Loc
Source	
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\06_Traffic Survey\05_ScreenLine\01_SurveyResult

Attribute Table: Attributes of TS_screenline_Loc

No of Records: 54

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	Loc_name	Text	50	Location Name	51 location name
2	Type	Short integer	4	Location Type	3 type of location
3	loc_IDName	Text	4	Location ID name	52 ID name
4	TCS_ID	Text	5		
5	Type_ID	Short Integer	4		
6	LENGTH	Double	18		
7	NODE_I	Text	50		
8	NODE_J	Text	50		
9	STRA_LINK	Text	50		
10	STRA_VMAX	Short Integer	4		
11	STRA_QMAX	Short Integer	4		
12	STRA_QVTYPE	Short Integer	4		
13	STRA_FARE1	Short Integer	4		
14	STRA_FARE2	Short Integer	4		
15	STRA_FARE3	Short Integer	4		
16	STRA_FARE4	Short Integer	4		
17	STRA_FARE5	Short Integer	4		
18	STRA_FARE6	Short Integer	4		
19	STRA_FARE7	Short Integer	4		
20	STRA_FARE8	Short Integer	4		
21	STRA_DIR1	Short Integer	4		
22	STRA_DIR2	Short Integer	4		
23	STRA_DIR3	Short Integer	4		
24	STRA_DIR4	Short Integer	4		
25	STRA_DIR5	Short Integer	4		
26	STRA_DIR6	Short Integer	4		
27	STRA_DIR7	Short Integer	4		
28	STRA_DIR8	Short Integer	4		
29	STRA_DIR9	Short Integer	4		
30	STRA_DIR10	Short Integer	4		
31	ST_RTYPE	Short Integer	4		
32	ST_EVALUA	Short Integer	4		
33	ST_DISP	Short Integer	4		
34	ST_USER1	Short Integer	4		
35	ST_USER2	Short Integer	4		
36	ST_USER3	Short Integer	4		
37	ST_USER4	Short Integer	4		

Table 16.2-26 Description of Traffic Survey Layer -Continued

Level- 1 Name	06_Trffic Survey
Level-2 Name	06_Intersection
Level-3 Name	01_SurveyResult
Data Type	Point
Data Extent	DMA
Layer Description	
Name of Shape file	TS_Intersection_Loc
Source	
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\06_Traffic Survey\06_Intersection\01_SurveyResult

Attribute Table: Attributes of TS_Intersection_Loc

No of Records: 18

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	Loc_Name	Text	50	Location Name	
2	Loc_ID	Text	5	Location ID name	

Table 16.2-27 Description of Digital Elevation Model Layer

Level- 1 Name	07_DEM
Level-2 Name	02_DEM
Level-3 Name	
Data Type	Raster
Data Extent	RAJUK
Layer Description	Digital Elevation Model (DEM) calculated from 90m SRTM data
Name of Shape file	EX_DEM
Source	SRTM project
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\07_DEM\02_DEM

Attribute Table: Attributes of EX_DEM

No of Records: 18

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	GRIDCODE	Double	10		

Table 16.2-28 Description of Existing Building Layer

Level- 1 Name	08_Building
Level-2 Name	01_Existing
Level-3 Name	01_Data_from_SWM
Data Type	Polygon
Data Extent	SOB-JICA project area
Layer Description	Existing Building Footprint
Name of Shape file	Ex_Building
Source	JICA Solid Waste Management project (Clean Dhaka project), Y2005
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\08_Building\01_Existing\01_Data_from_SWM

Attribute Table: Attributes of Ex_Building

No of Records: 650976

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	AREA	Double	18	Area of Building	Area in meter
2	PERIMETER	Double	18	Perimeter of Building	Perimeter in meter
3	DBHT007_	Double	11		
4	DBHT007_ID	Double	11		
5	TEXT1	Text	10		
6	TEXT2	Text	10		
7	FLAG	Double	10		
8	CODE1	Double	10		
9	CODE2	Double	10		
10	SUB-CAT1	Text	50	Building Category	Stories Information
11	SUB-CAT2	Text	50	Building sub Category	Description of Building

Table 16.2-29 Description of Natural Condition Layer

Level- 1 Name	09_Natural Condition
Level-2 Name	01_Existing
Level-3 Name	01_Data_from_SWM
Data Type	Line
Data Extent	
Layer Description	
Name of Shape file	Ex_Embankment
Source	
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\09_Natural Condition\01_Existing\01_Data_from_SWM

Attribute Table: Attributes of Ex_Embankment

No of Records: 149

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	LENGTH	Double	18	Embankment Length	Length in meter
2	EMBALL_	Double	11		
3	EMBALL_ID	Double	11		
4	SCODE	Double	10		
5	ECODE	Text	15		

Table 16.2-30 Description of Natural Condition Layer-Continued

Level- 1 Name	09_Natural Condition
Level-2 Name	01_Existing
Level-3 Name	01_Data_from_SWM
Data Type	Polygon
Data Extent	
Layer Description	
Name of Shape file	Ex_LandCondition
Source	
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\09_Natural Condition\01_Existing\01_Data_from_SWM

Attribute Table: Attributes of Ex_LandCondition

No of Records: 20728

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	AREA	Double	18	Area of the Land	Area in meter
2	PERIMETER	Double	18	Perimeter of the Land	Perimeter in meter
3	DLC007_	Double	11		
4	DLC007_ID	Double	11		
5	CODE	Double	10		
6	SUB_CAT1	Text	60	Land condition category	
7	SUB_CAT2	Text	60		

Table 16.2-31 Description of Existing Socio Economic Condition Layer

Level- 1 Name	10_Socio-Economic Condition
Level-2 Name	01_Existing
Level-3 Name	01_Data_from_SWM
Data Type	Polygon
Data Extent	SOB_JICA project area
Layer Description	Socio-Economic condition data
Name of Shape file	Ex_SocioEconomic
Source	JICA Solid Waste Management project (Clean Dhaka project),Y2005
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\10_Socio-Economic Condition\01_Existing\01_Data_from_SWM

Attribute Table: Attributes of Ex_SocioEconomic

No of Records: 22339

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	AREA	Double	18	Area of the Land	Area in meter
2	PERIMETER	Double	18	Perimeter of the Land	Perimeter in meter
3	DSE007_	Double	11		
4	DSE007_ID	Double	11		
5	CODE	Double	10		
6	SUB_CAT1	Text	60	Socio-Economic category	1.Residential <ul style="list-style-type: none"> • High • Middle • Low 2.Mixed 3.Market & Shop
7	SUB_CAT2	Text	60	Socio-Economic sub category	Description of Market & Shop

Table 16.2-32 Description of Raster Folder

Level- 1 Name	11_Raster
Level-2 Name	01_ScannedImage
Level-3 Name	01_ScannedImage
Data Type	Raster
Data Extent	DMDP
Source	DMDP
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\11_Raster\01_ScannedImage\01_ScannedImage

Name of Scanned Image	Name of File	File Extension	Description
DMDP_scanned_map	1. DMDP_DhakaUrbanAreaPlan	TIF	Dhaka Urban Area and Structure Plan
	2. DMDP_StructurePlan	TIF	

Table 16.2-33 Description of Raster Folder

Level- 1 Name	11_Raster
Level-2 Name	02_RectifiedImage
Level-3 Name	01_RectifiedImage
Data Type	Raster
Layer Description	Dhaka Urban Area Plan
Source	Printout Imagery purchased from CEGIS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\11_Raster\01_ScannedImage\02_RectifiedImage

Name of Rectified Image	Name of File	File Extension	Data Extent	Description
DMA QuickBird Image	1. QuickBird_DMA	JPEG	DMA	Scanned & rectified Quickbird Imagery (printout)
DMDP Dhaka Urban Area Plan	2. DMDP02_BTM	IMG	DMDP	Scanned & rectified Dhaka Urban Area Plan map
DMDP Structure Plan	3. DMDP01_BTM	IMG	DMDP	Scanned & rectified Dhaka Urban Area Plan map
GoogleEarth	4. Zia_Intl_Airport	IMG	Google Earth	
RHD	5. Dhaka_Circle_Rd1	IMG	RHD	Scanned & rectified RHD map

Table 16.2-34 Description of Other Layers

Level- 1 Name	12_Others
Level-2 Name	
Level-3 Name	
Data Type	Point
Data Extent	Dhaka Division
Layer Description	Landmark data
Name of Shape file	Ex_Landmark
Source	GeoConsults data (Purchased data from Bangladesh private company)
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\12_Others\Ex_Landmark\Shape

Attribute Table: Attributes of Ex_Landmark

No of Records: 35496

Field No	Field Name	Field Type	Length/Precision	Field Description	Field Details
1	TYPE	Double	11	Type of Landmark	
2	ST_NAME	Text	27	Name of Landmark	

Table 16.2-35 Description of Other Layers-Continued

Level- 1 Name	12_Others
Level-2 Name	
Level-3 Name	
Data Type	Point
Data Extent	Dhaka Division
Layer Description	Landmark data
Name of Shape file	Ex_UnionHQ
Source	GeoConsults data (Purchased data from Bangladesh private company)
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\12_Others\Ex_Landmark\Shape

Attribute Table: Attributes of Ex_UnionHQ

No of Records: 1554

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	TYPE	Double	11	Type of Landmark	
2	ST_NAME	Text	27		
3	THACODE	Double	11	Thana Code	
4	UNIONCOD01	Long Integer	7	Union Code	
5	DIVNAME	Text	25	Division Name	
6	DISTNAME	Text	13	District Name	
7	THANAME	Text	50	Thana Name	
8	UNINAME	Text	27	Union Name	

Table 16.2-36 Description of Other Layers-Continued

Level- 1 Name	12_Others
Level-2 Name	
Level-3 Name	
Data Type	Point
Data Extent	Dhaka Division
Layer Description	Landmark data
Name of Shape file	Bridge_dhaka div
Source	GeoConsults data (Purchased data from Bangladesh private company)
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\12_Others\Ex_Landmark\Shape

Attribute Table: Attributes of Bridge_dhaka div

No of Records: 6391

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	EASTING	Double	12	X coordinate	
2	NORTHING	Double	12	Y coordinate	
3	COMPID	Double	10		
4	ROADID	Double	10	Road ID	
5	ROADNO	Text	11	Road No	
6	LRPNAME	Text	100	Landmark Name	1. Bridge 2. Culvert
7	LRPNO	Text	11	Landmark No	
8	SURVEYDATE	Date		Survey Date	
9	LRPSHORTDE	Text	50		
10	LRPLONGDES	Text	100		
11	REFERENCED	Text	11		
12	OFFSETFORM	Double	9		
13	DISTANCEFR	Double	9		
14	ROADCHINA	Double	9		

Table 16.2-37 Description of Others Layer -Continued

Level- 1 Name	12_Others
Level-2 Name	
Level-3 Name	
Data Type	Point
Data Extent	Dhaka Division
Layer Description	Landmark data
Name of Shape file	division06
Source	GeoConsults data (Purchased data from Bangladesh private company)
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\12_Others\Ex_Landmark\Shape

Attribute Table: Attributes of division06

No of Records: 10

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	AREA	Double	17	Area of each division	
2	DIVCODE	Long Integer	9	Division Code	
3	DIVNAME	Text	25	Division Name	6 divisions
4	LANDTYPE	Text	25	Land Type	1. Land 2. Water

Table 12.2: Description of Others Layer

Level- 1 Name	12_Others
Level-2 Name	
Level-3 Name	
Data Type	Point
Data Extent	
Layer Description	Place Name
Name of Shape file	Place_Name
Source	
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\12_Others\PlaceName

Attribute Table: Attributes of Place_Name

No of Records: 10

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	NM_Place	Text	50	Place Name	

Table 16.2-38 Description of Others Layer -Continued

Level- 1 Name	12_Others
Level-2 Name	
Level-3 Name	
Data Type	Point
Data Extent	
Layer Description	
Name of Shape file	Plannd_Projects_collected_data
Source	
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\12_Others\Planned Projects

Attribute Table: Attributes of Plannd_Projects_collected_data

No of Records: 6391

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	NM_Prj	Text	50		
2	SEQ	Short Integer	4		
3	No_Prj	Text	50		
4	ID_Prj	Text	50		
5	SEQ_1	Double	15		
6	New_Code	Text	254		
7	NO_PROJECT	Text	254		
8	NAME_PROJ	Text	254		
9	IMP_AGENCY	Text	254		
10	ACRE	Double	15		
11	PLAN_POP	Double	15		
12	Object_typ	Text	254		
13	CTG_size	Short Integer	4		

Table 16.2-39 Description of Others Layer -Continued

Level- 1 Name	12_Others
Level-2 Name	
Level-3 Name	
Data Type	Point
Data Extent	
Layer Description	
Name of Shape file	Airport_pt
Source	
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\12_Others\ZiaAirport

Attribute Table: Attributes of Airport_pt

No of Records: 1

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	LU_NM	Text	50	Airport Name	Zia International Airport

Table 16.2-40 Description of Others Layer -Continued

Level- 1 Name	12_Others
Level-2 Name	
Level-3 Name	
Data Type	Polygon
Data Extent	
Layer Description	
Name of Shape file	Airport_py
Source	
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\12_Others\ZiaAirport

Attribute Table: Attributes of Airport_pt

No of Records: 1

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	LU_NM	Text	50	Airport Name	Zia International Airport

Table 16.2-41 Description of Existing Water Body Layer

Level- 1 Name	13_Waterbody
Level-2 Name	01_Existing
Level-3 Name	
Data Type	Polygon
Data Extent	RAJUK
Layer Description	Existing River, Pond and Reservoir (Year 2009)
Name of Shape file	Ex_Waterbody
Source	DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\13_Waterbody\01_Existing

Attribute Table: Attributes of Ex_Waterbody

No of Records: 14879

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	LAYER	Text	254	Name of the Layer	Layer naming for the landuse category by SWM
2	SWM_Code	Double	18	Code used by Solid Waste Management	Coding for the landuse category by SWM
3	SWM_Use	Text	254	Landuse by Solid Waste Management	Naming for the landuse category by SWM
4	DHUTS_Code	Double	18	Code used by DHUTS	Coding for primary Landuse category by DHUTS
5	DHUTS_Use	Text	15	Landuse category used by DHUTS	Naming for the primary Landuse Category by DHUTS
6	Descrip	Text	254	Description of 2 nd Landuse Category	Deatil description of each landuse category by DHUTS
7	Sub_use	Text	254	Description of 3 rd Landuse Category	1. Categories Road & Railway in 4 different classes 2. Categories the Water bodies in 3 different classes.
8	Ar_LUPy01	Double	254	Area of the existing landuse by DHUTS	Area in sq meter
9	CD_LULV1	Text	254	Code of the Landuse category	Coding for new 10 landuse categories by DHUTS for level 1
10	NM_LULV1	Text	254	Name of the Landuse category	Naming for new 10 landuse categories by DHUTS for level 1
11	CD_LULV2	Text	254	Code of the Landuse category	Coding for new 10 landuse categories by DHUTS for level 2
12	NM_LULV2	Text	254	Name of the Landuse category	Naming for new 10 landuse categories by DHUTS for level 2
13	CD_LULV3	Text	254	Code of the Landuse category	Coding for new 10 landuse categories by DHUTS for level 3
14	NM_LULV3	Text	254	Name of the Landuse category	Naming for new 10 landuse categories by DHUTS for level 3
15	FLG_Outside	Short Integer	4		

Table 16.2-42 Description of Population Projection Layer

Level- 1 Name	14_Population
Level-2 Name	01_Population Projection
Level-3 Name	01_ByCzone
Data Type	Polygon
Data Extent	RAJUK
Layer Description	Census population & population projection by DHUTS
Name of Shape file	Population_DHUTS
Source	Census population Y2001 by Bangladesh Bureau of Statistics & Population projection Y2009 to Y2025 by DHUTS
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\14_Population\Population Projection\ByCzone

Attribute Table: Attributes of Population_DHUTS

No of Records: 108

Field No	Field Name	Field Type	Length/ Precision	Field Description	Field Details
1	Km2_area	Double	18	CZone area	Area in sq Km
2	TAZNo	Double	18	Traffic area zone no	
3	PTL2001	Double	18	Total Population 2001	Census Population by BBS
4	PTL2009	Double	18	Total Population 2009	Projected population by DHUTS
5	PTL2025	Double	18	Total Population 2025	Projected population by DHUTS
6	PGrw09_25	Double	18	Population Growth from 2009 to 2025	Projected population by DHUTS
7	Czone	Double	18	Czone ID	
8	Bzone	Double	18	Bzone ID	
9	Azone	Double	18	Azone ID	
10	Memo01	Text	254	Memorandum	
11	FLG_DMA	Short Integer	4		
12	Ar_Czone	Double	18	Area of Czone	Area in Meter
13	X_center	Double	18	Value of X coordinate	Centroid X coordinate
14	Y_center	Double	18	Value of Y coordinate	Centroid Y coordinate
15	C_Zone	Double	18	C zone ID	
16	Den25rev3	Double	18	Population Density in 2025	Latest Revision of projected population density 2025
17	Den09	Double	18	Population Density in 2009	Projected population density 2009

Table 16.2-43 Description of MXD Layer

Level- 1 Name	99_MXD_Layer
Level-2 Name	01_Basemap
Level-3 Name	
Data Type	MXD
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\01_Basemap\MXD

Name of MXD layer	Page size	ArcGIS Version	Data Extent
1) RAJUK basemap A3_20091110	A3	AG 9.3	RAJUK
2) RAJUK basemap A3_AG91		AG9.1	
3) RAJUK basemap A4_20091101	A4	AG 9.3	
4) RAJUK basemap A4_AG91_200911011		AG9.1	

Table 16.2-44 Description of MXD Layer -Continued

Level- 1 Name	99_MXD_Layer
Level-2 Name	01_Basemap
Level-3 Name	
Data Type	MXD
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\02_Thematicmap\01_Roadnetwork

Name of MXD layer	Page size	ArcGIS Version	Data Extent
Existing Road Network2009	A3	AG 9.3	
Existing Road Network2009_AG91		AG9.1	
Proposed Road Network2025	A3	AG 9.3	
Proposed Road Network2025_AG91		AG9.1	

Table 16.2-45 Description of MXD Layer -Continued

Level- 1 Name	99_MXD_Layer
Level-2 Name	02_Thematicmap
Level-3 Name	01_Roadnetwork
Data Type	MXD
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\02_Thematicmap\01_Roadnetwork

Name of MXD layer	Page size	ArcGIS Version	Data Extent
Existing Road Network2009	A3	AG 9.3	RAJUK
Existing Road Network2009_AG91		AG9.1	
Proposed Road Network2025	A3	AG 9.3	
Proposed Road Network2025_AG91		AG9.1	

Table 16.2-46 Description of MXD Layer -Continued

Level- 1 Name	99_MXD_Layer
Level-2 Name	02_Thematicmap
Level-3 Name	02_railwaynetwork
Data Type	MXD
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\02_Thematicmap\02_railwaynetwork

Name of MXD layer	Page size	ArcGIS Version	Data Extent
Existing Railway Network2009	A3	AG 9.3	RAJUK
Existing Railway Network2009_AG91		AG9.1	
Proposed MRT Network	A3	AG 9.3	
Proposed MRT Network_AG91		AG9.1	

Table 16.2-47 Description of MXD Layer -Continued

Level- 1 Name	99_MXD_Layer
Level-2 Name	02_Thematicmap
Level-3 Name	03_Landuse
Data Type	MXD
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\02_Thematicmap\03_Landuse

Name of MXD layer	Page size	ArcGIS Version	Data Extent
Existing landuse2009.mxd	A3	AG 9.3	RAJUK
Existing landuse2009_AG91.mxd		AG9.1	

Table 16.2-48 Description of MXD Layer -Continued

Level- 1 Name	99_MXD_Layer
Level-2 Name	02_Thematicmap
Level-3 Name	06_Transport Network_(Road and Rail)
Data Type	MXD
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\02_Thematicmap\06_Transport Network_(Road and Rail)

Name of MXD layer	Page size	ArcGIS Version	Data Extent
Existing Trasnport Network2009	A3	AG 9.3	RAJUK
Existing Trasnport Network2009_AG91		AG9.1	
Proposed Public Transport Network	A3	AG 9.3	
Proposed Public Transport Network_AG91		AG9.1	

Table 16.2-49 Description of MXD Layer -Continued

Level- 1 Name	99_MXD_Layer
Level-2 Name	04_Layerfiles
Level-3 Name	
Data Type	Layer
Layer path	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\04_Layerfiles

Category	Layer File Name	File Ext	
01_Roadnetwork	Ex_Road2009	LYR	\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\04_Layerfiles\01_Roadnetwork
02_railwaynetwork	Existing Railway (2009)_Offset1		\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\04_Layerfiles\02_railwaynetwork
03_Landuse	1) DAP (ver. Sep. 2009) 2) Existing landuse2009_20091021		\\Admin\dhuts\JICA Study Team\14 GIS\data\DHUTS_GIS\99_MXD_Layer\04_Layerfiles\03_Landuse