

5. NATURAL ENVIRONMENTAL CONDITION OF THE STUDY AREA

5.0 General

The detailed environmental study of the project area under the Strategic Transport Plan (STP) project was not carried out. For this study purpose, the secondary data on the natural environment of the study area of Urban Transportation, Sector Survey- JICA are collected from the different relevant offices, such as meteorological department of Dhaka, Survey of Bangladesh, Forestry department, Directorate of geology etc. Secondary data also collected from reviewed the several reports of STP project, DUTP environmental Action plan, Urban Transport Improvement Environmental Study Project, Moughbazar Mouchak Intersection Flyover project and other relevant EIA reports on urban studies.

5.1 Study Area

The Study Area consist Dhaka Metropolitan Area (DMA), including of six districts (Zilas): Dhaka, Gazipur, Narsinghdi, Manikganj, Munshiganj and Narayanganj under Dhaka division with a total area of 7,440 square kilometres as same as STP project. The study area is located within the V-shape formed by the confluence of the two big rivers the Padma and Meghna in the south-central part of the Bangladesh. The southwest boundary of the Study Area is the northern shore of the Padma River. The eastern boundary of the Study Area is the western shore of the Meghna River. The map of the STP area including DMA, DCC and adjoining areas is presented in **Figure.5.1**. According to the STP the project area are delineated into three concentric areas in terms of Land uses as follows,

1) Dhaka Metropolitan Area (DMA): The DMA boundaries are the RAJUK boundaries including most of areas maps as the area defined by the Turag, Buriganga and Balu Rivers and the Narayanganj District boundary. The Dhaka City Corporation (DCC) Area plus the entirety of the thanas to the north and east of the DCC which are partially within the DCC are considered in DMA. The DMA area is divided into four areas as follows;

DMA North: The northern part of the DMA consists of Gazipur Sadar Thana and Tongi.

DMA East: The eastern part of the DMA consists of Kaliganj Thana in Gazipur District and Rupganj Thana in Narayanganj District. It lies to the east of the Balu River and is roughly bisected by the Sitalakhya River.

DMA Southern East and West: The southern east part of the DMA consists of Sonargaon, Bandar & Narayanganj Thanas, all of which are in Narayanganj District. The southwest part of the DMA comprised Keraniganj Thana, lies directly south of Old Dhaka occupying low-lying land south of the Buriganga River on the north and the Dhaleswari River on the south.

DMA West: The western part of DMA is Savar Thana bounded on the west by the Dhaleswari, the western boundary of RAJUK and the DMA, and on the east by the DCC and the Gazipur Thana.

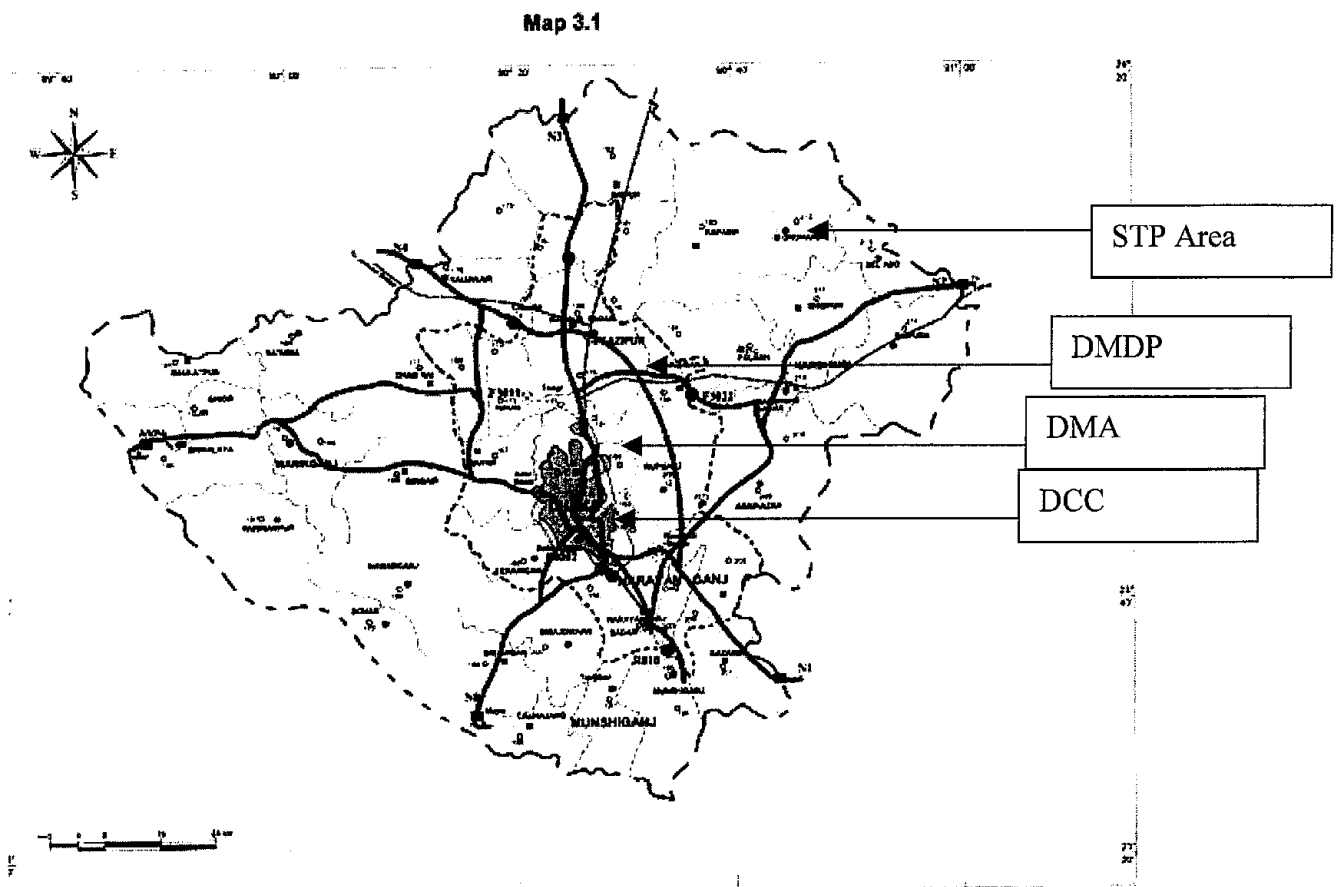


Figure-5.1: The STP Study Area.

II) Greater Dhaka Area (GDA): The GDA is the inner portion of the DMA and consists of Dhaka City Corporation (DCC) and its peripheral environs defined as all thanas either wholly or partially contained within the DCC. The area includes the area of Sultan Ganj (Kamrangir Char) and entire area within the Turag River, the Buriganga River and the Balu River on the east, and the southern boundaries of Demra and Shyampur thanas.

III) Outer Study Area (OSA) or Outer Ring: The OSA is divided into the sub-areas as OSA North, OSA East, OSA South and OSA West.

OSA North: The northern part of the OSA comprised whole Gazipur District, other than the two thanas included in the DMA. The southern portion of OSA North contains forest areas the Bhawal National Park. The south-west portion of OSA North is traversed by the Jamuna Bridge-Chittagong Corridor and includes the western portion of the railway.

OSA East: The eastern part of the OSA is comprised of Narsinghdi District and one thana (Araihazar) in the neighbouring district and Narayanganj Sadar.

OSA South: The southern part of the Outer Ring consists of Munshiganj District and the southern portion of Dhaka District.

OSA West: The western part of the Outer Ring comprised Manikganj District.

5.2 Natural Environment

The existing natural environmental situations under the project area consist of physico-chemical environment and ecosystem or ecological environment. The natural environmental condition of the study area is described in the ensuing sections;

5.2.1 Physico-chemical Environment: The potential physico-chemical parameters within the project area includes meteorology, air quality, hydrology and flooding condition.

5.2.2 Meteorology

The meteorological data of the study areas is collected on Temperature, Humidity, Monthly Rainfall and Winds at the Dhaka meteorological station from the Department of Meteorology, Dhaka.

Temperature: The meteorological data on monthly and yearly maximum and minimum temperatures were collected for the period of 1993 to 2007 for Dhaka station. Summary data on highest maximum and lowest minimum temperature is presented in **Table 5.1**.

Table 5.1: Monthly and Yearly Maximum and Minimum Temperatures

Year	Maximum Temperature (C)		Minimum Temperature (C)	
	Value	Month	Value	Month
1993	37	April	7.2	January
1994	37.6	April	9	January
1995	39	April	6.5	January
1996	38.4	April	9	January
1997	37.5	August	7.8	January
1998	37.5	May	7.8	January
1999	39.6	March	9.4	January
2000	36.6	May	10	January
2001	37.5	April	9.8	January
2002	35.5	March	11.2	January
2003	36.7	June	8.1	January
2004	38.1	May	10.4	February
2005	37	April	11.4	January
2006	38.5	March	10.4	January
2007*	37.5	May	9.6	January

Note: * Data for 12 months is not available, because data was collected in July 2007 from the Meteorological Department

Temperature variations during 10 years from 1993 to 2007 are found and the highest maximum temperature 39.6 °C in March 1999 and lowest minimum temperature 6.5°C in January 1995 were reported at Dhaka station for Dhaka division.

Humidity: The humidity data on monthly maximum and minimum and annual average were collected for the period of 1993 to 2007 of Dhaka station. Generally 80-85 percent humidity in the hot season is common and the humidity remains high year round, producing thick fogs in winter in the study area of the project. Based on the collected data, a summary of ten years on highest maximum and lowest minimum humidity in percentage is given in **Table 5.2**.

Table 5.2: Monthly and Yearly Average Humidity in Dhaka

Year	Maximum Humidity (%)		Minimum Humidity (%)		Annual Average (%)
	Value	Month	Value	Month	
1993	84	Jul-Aug	61	March	76
1994	81	June-Aug	68	February	74
1995	83	July-Sep	64	April	74
1996	84	August	65	February	75
1997	86	September	64	February	76
1998	86	July	63	March	77
1999	85	July	57	March	74
2000	80	Aug-Sep-Oct	60	February	73
2001	83	June	55	March	73
2002	84	July	57	February	73
2003	82	September	64	March	73
2004	85	September	60	February	72
2005	82	August	60	February	71
2006	81	June	53	March	72
2007*	84	July	54	March	82

Note: *Annual average data for 12 months is not available, because data was collected in July 2007 from the Meteorological Department

Monthly average maximum humidity 86% was observed in September 1997 and July 1998. The minimum humidity 53% in March 2006 was observed, whereas the highest annual average humidity 77% in the year of 1998 were reported in Dhaka. Lowest average annual Humidity 71% was found in 2005.

Rainfall: The rainfall data on daily, monthly and annual total for the 10-years from 1993 to 2007 of Dhaka Meteorological station was collected. About 15% of the annual rainfall occurs in the pre-monsoon season. About 80% occur in the wet season and only 5% during the winter months. Yearly maximum and minimum rainfalls including annual total rainfall in millimeters (mm) of last 10 years from 1993 to 2007 is given in **Table 5.3**.

Table 5.3: Yearly Maximum, Minimum and Total Rainfall in Dhaka

Year	Maximum Rainfall (mm)		Minimum Rainfall (mm)		Total Rainfall (mm)
	Value	Month	Value	Month	
1993	556	May	0	Jan-Dec	2819
1994	266	June	0	December	1540
1995	360	August	0	March	1751
1996	361	August	0	Jan-Nov-Dec	2044
1997	549	July	1	November	1896
1998	552	August	0	December	2310
1999	553	July	0	Jan-Feb-mar-Dec	2374
2000	359	August	0	Nov-Dec	2124
2001	386	June	0	Jan-Dec	1679
2002	446	July	0	December	1875
2003	473	June	0	Jan-Nov	1693
2004	839	September	0	Jan-Feb-Nov-Dec	2347
2005	542	July	0	December	2637
2006	663	September	0	Jan-Feb-Mar-Dec	1919
2007*	628	June	0	January	1770

Note: *Total Rainfall data for 12 months is not available, because data was collected in July 2007 from the Meteorological Department

Monthly total maximum rainfall 839mm in September 2004 and zero rainfall in every year were reported at Dhaka station. Highest annual total rainfall 2819 mm was observed in 1993 which followed by second highest 2637mm in 2005.

Wind: Monthly maximum wind speed in knots and direction in degrees as well as monthly prevailing wind speed in knots and direction are collected. These data collected from the years of 1990 to 2005 as follows (Table 5.4).

Table 5.4: Monthly and Prevailing Maximum Wind Speed and Direction

Year	Dhaka					
	Monthly Maximum Wind.			Monthly Prevailing Maximum Wind.		
	Speed (knots)	Month	Direction in Degree	Speed	Month	Direction
1993	21	Aug	300	4.6	March	S
1994	31	Jul	180	4.4	March	S
1995	10	May, Jul	360, 130	3.9	August	SE
1996	21	Sep	30	3.3	Oct	E
1997	18	Sep	310	2.9	August	SE
1998	13	Nov	50	3.6	Nov	NE
1999	12	Apr	270	2.6	July	SE
2000	15	May, Oct	270, 50	3.3	April	S
2001	20	Sep	180	4.1	April	S
2002	15	Nov	40	4.2	April	S
2003	25	May	310	5.1	April	S
2004	18	May/Jul	180/130	6.3	Sep	E
2005	15	May	360	4.8	Oct	SE

(Source: Meteorological Department, Dhaka)

Monthly maximum wind speed 31 knots in direction of 180° and Monthly Prevailing maximum Wind 6.3 speed in direction of east the year of 1994 were reported for Dhaka station. The wind frequency during the rainy season varies from SE-SW towards NW-NE with a general south to north movement while in the dry season the direction varies from NW-NE to SE-SW with a general north to south movement.

Usually extreme events such as cyclone, tornado and tidal surge normally strike Bangladesh in two seasons from mid October to mid December and April to May. The monsoon season also brings intense cyclones, primarily to the marine coastal areas along the Bay of Bengal. While these cyclones, with winds exceeding 100km/hr and devastating storm tides, affect large expanses of the coastal area, none of the districts under the project area are in that zone of influence.

5.2.3 Air quality in Urban Area

Motorized transport of Dhaka is suspected to be the single largest contributor of air pollution in Dhaka urban area. The main air pollutants emitted from vehicle exhausts Suspended Particulate Matter (SPM) Hydrocarbon (HC) Carbon monoxide (CO) Carbon dioxide (CO₂) Nitrogen Oxide (NO_x Sulfur dioxide (SO₂) etc.) disperse widely into the atmosphere and their concentration reduces rapidly with distance from the road. The highest concentrations of CO, CO₂ and HC are encountered in congested slow moving traffic, whilst the highest emissions of NO_x are encountered whilst driving at high speed and emission SO₂ from diesel used vehicles.

Government of Bangladesh aims to reduce air pollution and traffic congestion had decided to phase out two stroke three wheelers from the city with effect from January 2003 as a consequence ambient air quality of Dhaka improved to a great extent. But still study data

indicated air pollutants are occurring in different intersection of the roads in the Dhaka city due to movement of low quality diesel driven vehicles into the public transport fleet of Dhaka and narrow roads.

Air quality monitoring was conducted under the study of the Feasibility Study; 'Detailed Engineering Design & Preparation of Tender Documents for the Construction of Flyovers at Moghbazar and Mouchak intersections in Dhaka City' by LGED through a Technical Assistance Grant from Kuwait Fund for Arab Economic Development (KFAED) in 2005. Under the study, air quality monitoring was carried out at five locations along the road intersections during March 2005 and April 2005 to compare the variation of the air pollutants emission from the exhausted motorized vehicles. The results are presented in **Table 5.5** and **Table 5.6**.

Table 5.5: Air Quality Monitoring at Different Locations of the Study Area, 2005

Locations	Date	Starting & Ending Time	Duration (Hrs)	Ambient Air Pollutant Concentration in $\mu\text{g}/\text{m}^3$				Weather Condition
				SPM	NOx	SOx	CO	
Tejgaon , Near Wega Fashion Ltd. Sampling point -1	14-16* March 2005	10.55am-11.30am	23.43	838.58	50.45	96.04	2925.00	Sunny Day, Wind blown from South Direction
Moghbazar More, near Three Star Hotel, Sampling point -2	14-15 March 2005	11.40am-10.00am	22.55	1123.81	70.71	108.81	3510.0	
Mouchak, near Fortune Shopping Mall, Sampling point -3	06-07 March 2005	9.55am-11.30 am	23.75	1788.03	62.37	118.90	4680.0	
Malibag More, near Meradona Hotel, Sampling point -4	06-07 March 2005	10.30am-10.30am	22.61	1032.17	79.78	124.48	4914.0	
Malibag Rail Crossing, near Sohag Paribahan, Sampling point -5	15-16 March 2005	5.00pm-5.00pm	24.20	834.91	54.52	86.60	3510.0	
Standard Set Values under Environmental Conservation Rules (ECR), 1997 for the Commercial and Mixed Area				500.00	100.00	100.00	5000.00	Normal Situation

(Source: Lab-Analysis was done in laboratory of Department of Environment, March 2005).

Table 5.6: Air Quality Monitoring at Different Locations in Dhaka City, 2005

Locations	Date	Starting & Ending Time	Duration (Hrs)	Ambient Air Pollutant Concentration in $\mu\text{gm}/\text{m}^3$				Weather Condition
				SPM	NOx	SOx	CO	
Tejgaon , Near Wega Fashion Ltd. Sampling point -1	9-10 April 2005	10.00am-10.45am	24.45	643.54	47.54	89.24	2835.0	Sunny Day, wind blown from South
Moghbazar More, near Three star Hotel , Sampling point -2	9-10 April 2005	11.40am-9.44am	22.40	828.71	74.89	110.41	3320.0	
Mouchak, near Fortune Shopping Mall, Sampling point -3	10-11 April 2005	11.45am-01.01 am	26.44	798.53	56.34	98.92	4280.0	Rainy, cloudy & Sunny day. Wind direction was from South
Malibag More, near Meradona Hotel, Sampling point -4	10-11 April 2005	12.30am-9.30am	21.00	627.85	71.20	114.08	4114.0	
Malibag Rail Crossing, near Sohag Paribahan, Sampling point -5	11-12 April 2005	01.23pm-10.00m	21.23	581.46	44.45	76.46	3010	Sunny day. Wind direction was from South after rainy day.
Standard Set Values, ECR-1997, for the Commercial and Mixed Area				500.00	100.00	100.00	5000.00	

(Source: Lab-Analysis was done in laboratory of Department of Environment, April 2005)

The monitored results indicated that emission rate of SPM from the vehicles exhaust at all monitoring locations were higher than the standard set value ($500.00 \mu\text{gm}/\text{m}^3$) ECR-1997. Emission of SOx at two locations also found higher than the Standard Set Values ($100, \mu\text{gm}/\text{m}^3$) of the ECR-1997. Overall the emission levels were found higher during the month of April than the emission observed in the month of March.

In STP study it is noted that during the period of prior and post phase out of two stroke three wheelers, there has been a phenomenal surge of entry in Dhaka of small to mid size diesel public transports to fill in the gap created by the phase out of the two stroke three wheelers. The total vehicles are plying on the Dhaka city roads are about 449482 in 2007 according to the registration of different motorized vehicles in Dhaka under the BRTA (Table 5.7). During last 5 years about 36% vehicles are increased from 2003 to 2007 but expansion of the roads network and widening of the existing roadways didn't occur as much as required to fulfill the demand. As a result, the air pollutants emitted from the exhausted vehicles are the main sources for the ambient air pollution the Dhaka urban area.

Table 5.7: Number of Year-wise Registration of Motorized Vehicles in Dhaka

Type of Vehicles	Up to 2003	2004	2005	2006	2007	Total
Motor Car	87866	4734	5633	7403	10244	115880
Jeep/St. Wagon/Microbus	32391	2114	3303	4548	4372	46728
Taxi	9369	523	514	266	-	10672
Bus	2614	779	728	949	1082	6152
Minibus	7460	368	118	75	77	8098
Truck	20342	1437	1104	1480	830	25193
Auto-rickshaw/Auto-tempo	37116	2344	139	230	121	39950
Human Hailer	673	136	20	-	-	829
Covered Van		527	-	-	-	527
Motor Cycle	119299	7872	12879	16284	17303	173637
Others	12514	1300	2361	2728	2913	21816
Total	329644	22134	26799	33963	36942	449482

(Source: BRTA, Bangladesh)

Air pollutant emission resent monitoring data has been reported in a study on 'Roadside Vehicular Emission Test Program in Dhaka', 2006 under the World Bank funded Air Quality Management Project (AQMP). Under the study of AQMP March 2006 about 604 diesel and 1536 petrol/ octane CNG driven motorized vehicles were tested (Table 5.8).

Table 5.8: Total Number of Motorized Vehicles Tested under AQMP-DoE

Diesel driven vehicles tested		Petrol/Octane and CNG driven vehicles tested	
Type of vehicles	No. of tested Vehicles	Type of vehicles	No. of tested Vehicles
Double Decker	135	Auto Rickshaw	191
Single Decker	142	Motor cycle and Mishuk	116
Mini bus	98	Private car	676
Jeep and Microbus	42	Microbus and jeep	148
Mini truck, Human hauler and Maxi	38	Mini covered van, Pickup and Human Hailer	77
Pickup, Mini covered van	35	Taxi cab	328
Truck and covered van	114		
Total	604	Total	1536

(Source: Air Quality Management Project, DoE, March 2006)

The study data indicated that the diesel driven Maxi and Human haulers are worst polluters having smoke emission of more than 90 HSU and about 90% of these vehicles are not fit to ply on the city road. Mini buses about 60% could not meet the revised emission standard of 80 HSU and 71% Pick up and Mini covered vans showed smoke emission value 80 HSU. Single Decker diesel buses 51% could not meet the revised level of 80 HSU. Also it is reported that average smoke emission of double Decker Ashok Leyland buses is 45 HSU, while for Volvo it was 34 HSU. Both these vehicles maintained smoke emission level less than 80 HSU. The average smoke opacity of different types of diesel driven vehicles is given in Table 5.9.

Table 5.9: Average Smoke Opacity of Different Types of Diesel driven Vehicles

Type of vehicles	Average Smoke Opacity	Allowable Pollutant Concentration (Bangladesh Environmental Conservation Rule, 1997)
Double Decker	44	65 Hartridge Smoke Unit (HSU)
Single Decker	65	
Mini bus	72	
Jeep	74	
Microbus	77	
Human hauler	87	
Maxi	94	
Pickup	81	
Mini covered van	98	
Covered van	66	
Mini Truck	87	
Truck	81	

(Source: Air Quality Management Project, DoE, March 2006)

Petrol driven vehicles except 2-stroke Motorcycles are not gross polluters. Motorcycle (2-stroke) has very high failure rates for both CO and HC emission (Table 5.10) more than 76% and 82% respectively, compared to 43% and 36% respectively for four stroke motorcycles.

Table 5.10: Average CO and HC emission of different types of Petrol driven Vehicles

Type of Vehicles	Average CO Emission from Petrol driven Vehicles	Average HC Emission from Petrol driven Vehicles
Auto rickshaw	6.08	6635
Mishuk	5.89	3882
Minibus	8.5	21755
Motor Cycle(2 stroke)	5.89	4772
Motor Cycle(4 stroke)	2.52	519
Private Car	3.03	991
Jeep	2.27	412
Taxi Cab	2.96	749
Microbus	1.33	617
Mini Truck	2.47	1873
Mini Covered Van	2.43	447
Pickup	3.46	722

(Source: Air Quality Management Project, DoE, March 2006)

Tested results indicated that CO and HC emission for the CNG (Table 5.11) vehicles are lower than the petrol vehicles but still most of the petrol vehicles are within the permissible limits of the Bangladesh Emission Standard Values for Motor Vehicle Exhaust (Table 5.12) according to Environmental Conservation Rules 1997, DOE.

Table 5.11: Average CO and HC emission of different types of CNG driven Vehicles

Type of Vehicles	Average CO Emission of CNG driven vehicle	Average HC Emission of CNG driven vehicle
Auto rickshaw	1.03	687
Private Car	1.2	259
Taxi cab	1.03	429
Microbus	0.29	474
Leguna	0.13	1095
Covered van	0.08	378
Pickup	2.66	522

(Source: Air Quality Management Project, DoE, March 2006)

Table 5.12: Emission Standard Values for Motor Vehicle Exhaust

Parameters/ Determinants	Unit	Standard Value
-black smoke ⁽¹⁾	Hartridge Smoke Unit (HSU)	65 ⁽³⁾
-CO ⁽²⁾	g/m ³ percent volume	24 4 ⁽⁴⁾
-hydrocarbon ⁽²⁾	g/m ³ ppm	2 180
-NO _x ⁽²⁾	g/m ³ ppm	2 600

(Source: Environmental Conservation Rule, 1997)

- (1) measured at two thirds of maximum rotating speed
 (2) whichever is lower out of two values expressed in two different units
 (3) for vehicles more than 5 years old, or that have completed 80,000 Km, the standard value is 75 HSU
 (4) two and three wheeler vehicles with engine displacement less than 50 cm³, the standard value is 5 volume percentage; for other two and three wheelers 4.5 volume percentage.

The Ambient Air Quality Standards for the Different Categories of Land-use according to Environmental Conservation Rules 1997, DOE is presented in **Table 5.12**.

Table 5.12: Ambient Air Quality Standards for the Different Categories of Land-use

Category of Environment	Allowable Pollutant Concentrations (µg/m ³)			
	Suspended Particular Matter (SPM)	Sulfur Dioxide (SO ₂)	Carbon Mono-Oxide (CO)	Nitrogen Dioxide (NO _x)
- Industrial and mixed use	500	120	5000	100
- Commercial and mixed use	400	100	5000	100
- Residential and rural	200	80	2000	80
- Sensitive	100	30	1000	30

(Source: Environmental Conservation Rules, 1997)

The conclusion of the AQMP study is that diesel run vehicles except Double Decker Buses are main vehicles for contributing to deteriorate the air quality of Dhaka city. Emission from the Double Decker Buses operated by the BRTC is well below the revised standard of air pollutants.

Small diesel vehicles like Human haulers, Mini covered vans and Maxi are the worst polluters followed by Mini buses.

The main recommendations of the AQMP study are as follows;

- Necessary action plan need to be formulated to address the diesel vehicle pollution in Dhaka city taking into consideration
- Ensure strict enforcement of the in-use emission standards, annual regulatory inspection of all diesel vehicles
- realize environmental benefits a phasing out plan of gross polluting vehicles employing an emission standard road map
- Promote to more CNG vehicles, which are established as environment friendly. Better technology vehicles should be encouraged for entry into the market
- Institutional coordination and strengthening of DoE, BRTA and Police needs to be looked into to ensure that the roadside emission checks could become a regular feature for emission auditing of the vehicles in Dhaka city.
- Inspection and Maintenance (I & M) of the vehicular fleet of Dhaka city especially that of the diesel fleet needed, therefore, a regulatory I & M programs needs to be designed and implemented with enforcement.
- Long pending bus route franchise issue should be settled and environmental criteria should be made part of the bidding document. The existing bus routes also need to be scientifically designed so as to optimize the use of the bus fleet.

In STP study stated that the study on Policy Options for Controlling Emissions from Gross Polluting Diesel Vehicles, commissioned by the World Bank funded Air Quality Management Project, looked into all the above mentioned parameters of diesel pollution and formulated a set of recommendations to reduce the diesel pollution. In 2005, an Action Plan (Interim Report **Table 14**) has been formulated based on the recommendations came out from a stockholder seminar to the Government.

5.2.4 Noise Level

Generally main source of the noise generation in the urban areas is traffic movements on the roadways. Noises are generated by vehicles engine, exhaust system and transmission, and are the dominant noise source when traffic is not free flowing, particularly from heavy vehicles. The factors, which influence a basic traffic noise level, are traffic flow, speed and mode of transports, road gradient and road surface characteristics. In built up areas under the DCC traffic jam are tremendous and noise level is expected to be high frequency.

It is reported in the STP study that ambient noise in the city is traffic-related. Traffic projects, particularly those funded by multi-lateral development banks are likely to raise the issue of noise barriers in project identification, design and cost estimates. Noise level monitoring was conducted twice at the same five locations under the Moughbazar and Mouchak Intersections Flyovers Feasibility Design and Tender Documents project during March 2005 and April 2005. The monitored data showed (**Table 5.13**) that the noise level ranges from 78 to 82 dBa on 24th March and from 80-82 on 10th April and all monitored data exceeded the ECR, 1997 set standard value 60 dB (A) for commercial and mixed area in Bangladesh.

Table 5.13: Noise Level Measurement at the Different Locations of the Study Area

Locations	Date	Time	Sound level in dB(A)	Date	Time	Sound level in dB(A)	Weather Condition
Tejgaon, Near Wega Fashion Ltd. Sampling point -1	24-02-05	2.32 pm	82	10.04.05	1.30 pm	81	Sunny Day, Wind blown from South Direction
Moghbazar More, near Three star Hotel, Sampling point -2	24-02-05	2.45 pm	81	10.04.05	2.05	82	
Mouchak, near Fortune Shopping Mall, Sampling point -3	24-02-05	3.54p m	82	10.04.05	2.45	82	
Malibag More, near Meradona Hotel, Sampling point -4	24-02-05	3.15p m	82	10.04.05	3.20	82	
Malibag Rail Crossing, near Sohag Paribahan, Sampling point -5	24-02-05	3.39p m	78	10.04.05	4.45	80	
Standard Set Values, ECR-1997, Bangladesh for Commercial and Mixed Area at day time			60				Normal Condition

(Source: Moughbazar-Mouchak Flyover Project IEE Report 2005).

Noise monitoring at different location in the Dhaka city were also carried out in another study on Society for Assistances to Hearing Impaired Children showed (Table 5.14) and results indicated that high noise level generated at all monitoring points. Noise monitoring was done at sensitive locations in the city in another study and result showed that monitored noise level (Table 5.15) were exceed the standard set values of the ECR, 1997.

Table 5.14: Noise Monitoring Data at Different Locations of Dhaka City

Area	Noise level (decibels)	Area	Noise level (decibels)
Sayedabad Bus Terminal	106	Mirpur - 1	97
Bangala Motor	106	Kakrail	97
Sonargaon Hotel	104	Gulshan	92
Farmgate	104	Sapla Chattar Motijheel	90
Mohakhali Crossing	103	Sadargate	89
Haghbazari	103	Mirpur - 10	87
Mowchak	103	BIRDEM Hospital	86
Gabtuli	102	Dhanmondi Residential Area	81
Jatrabari	100	Gulshan Residential Area	78
Tejgaon Industrial Area	97	Banani and Baridhara Residential Area	70

(Source: Society for Assistances to Hearing Impaired Children)

Table 5.15: Measured Noise Levels in Some Sensitive Areas Within Dhaka city

Location (outside the facility)	Measured noise level (dB)	
	Morning	Afternoon
Shaheen school	74	83
Motijheel Govt. high school	79	83
Dhanmondi Govt. boys high school	75	80
Azimpur Girls College	78	80
Tejgaon women's College	67	75
P.G. Hospital	78	82
Dhaka Medical College Hospital	69	80
Mitford Hospital	73	76
Children Hospital	69	72

(Source: GoB 1999, 1997 Bangladesh Compendium Environment statistic, BBS, Dhaka, as cited in Unnatyan Shamannay, People's report in Bangladesh Environment 2001, Vol- II, Database, SAHIC, second edition 2005)

5.2.5 Topography and Geodetic Data

Dhaka is situated between latitudes 23°42' and 23° 54' N and longitudes 90° 20' and 90° 28'E. The topography of the project area is natural floodplain. Dhaka is located at the southern tip of a Pleistocene terrace, the Madhupur Tract. Two characteristic geological units cover the city and surroundings, viz. Madhupur Clay of the Pleistocene age and alluvial deposits of the Recent age. The Madhupur Clay is the oldest sediment exposed in and around the city area having characteristic topography and drainage. Main Dhaka city is located on the Madhupur Tract bounded by the flood plains of the Ganges and the Brahmaputra system. The study area Geomorphologically is divided into the following units based on surface morphology and elevation.

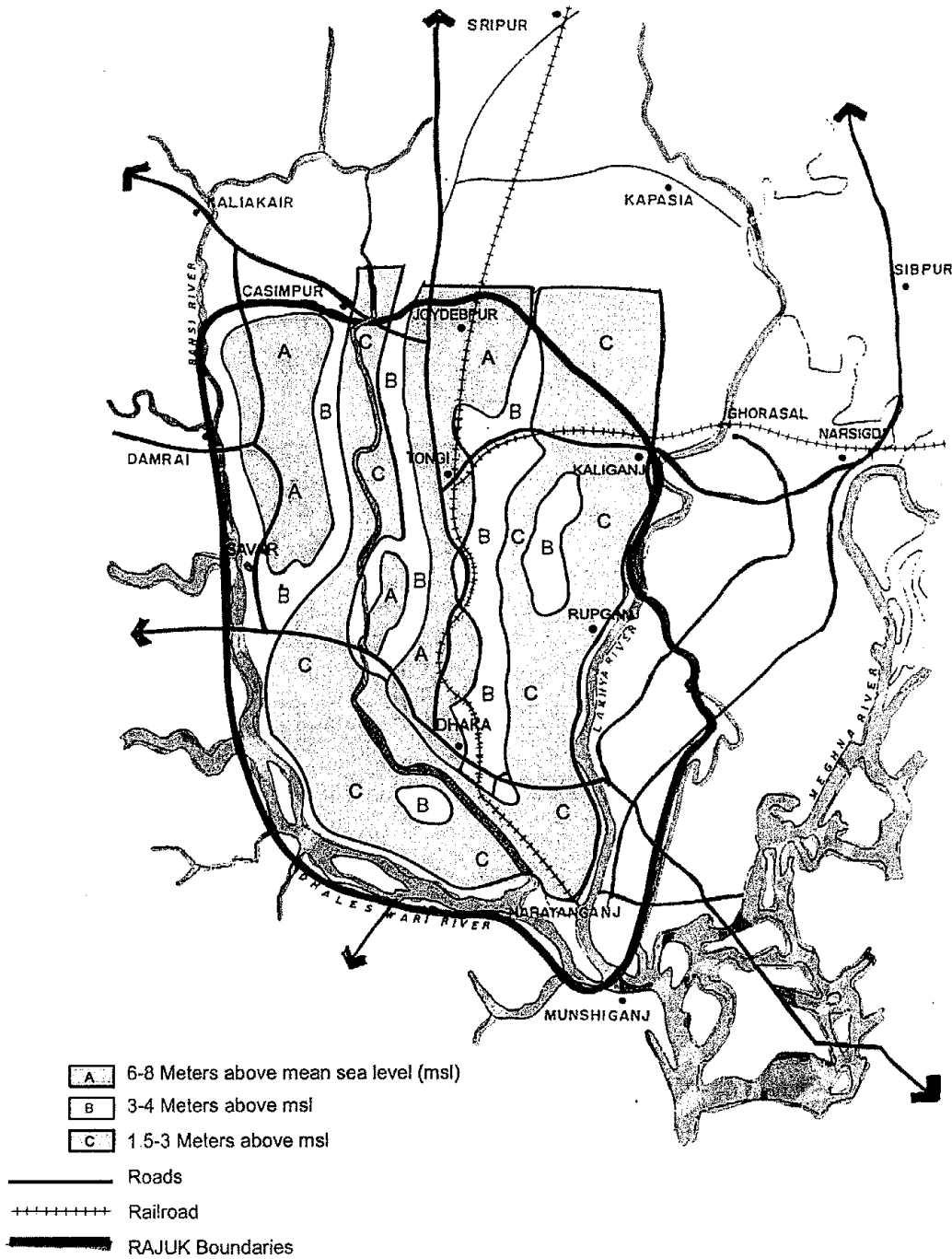
- High land (AH)
- Mixed high and low lands (AM)
- Low land (AL)
- Abandoned channel (AC)
- Natural Level (NL)
- Depression (D)
- Sand bar (SB)
- Point bar (PB)

The elevation of the area investigated ranges from 2 metres to 14 metres above MSL. The highest elevation is 14 metres above mean sea level at the Pallabi area and the lowest is 1.8 metres above mean sea level found in a depression behind Rampura TV Station. The major geomorphic units of the clay are high land or the Dhaka terrace, the low lands or Floodplains, Depressions and abandoned Channels. Low lying swamps and marshes located in and around the city are other major topographic features. The elevation of mapping unit AH ranges from 4 m to 15 m; All ranges from 2 metres to 4 metres and areas less than 2 metres are depressions (D). Topographic variations are presented in the **Figure 5.2** and the STP study stated that the topographic factors encourage growth of the city toward the north and beyond the bounds of the city along the corridor to Mymensingh.

According to Survey of Bangladesh Department data the benchmark points of height at fourteen points with the DCC area are given in **Table 5.16** and among them the highest height above MSL (Mean See Level) was observed 8.7583m at Tejgaon Residential area.

EXHIBIT 2-1

TOPOGRAPHY



Source: 4th Dhaka Water Supply and Sanitation Project

Figure 5.2: Topography of the Dhaka City (Source: Strategic Transport Plan Final Report 2005).

Table 5.16: Benchmark (BM) Points Description of some Locations in the Dhaka city

Sl. No.	BM No.	Sheet No.	Location	Height Above MSL	Pillar/ BM Site Description
1.	540	791/5	Lat : 23° 45" Long : 90° 23' 54" Tejgaon Industrial Area, Dhaka	7.8789 m	Pillar consists of a concrete monolith 5' X 5' X 3' under ground level and 2' X 2' X 2' above ground level with a brass rod at the top and centre, the upper six inches being frustum of pyramid. One face of the pillar the inscription: "Geodetic Survey Mark" is engraved 1967 BM is located in the compound of Survey of Bangladesh office. It is east side of the main building and in front of car parking place of the office
2	6037	791/5	Lat : 23° 50' 46" Long : 90° 24' 46" Kaola, Thana : Uttara, Dhaka	7.5585	Pillar consists of a concrete monolith 0.9' X 0.9' X 0.7' under ground level and 0.9' X 0.9' X 0.6' above ground level with a brass rod at the top and centre, the upper 9 cm being frustum of pyramid. One face of the pillar the inscription: "Survey of Bangladesh" is engraved BM 6037. BM is located in the 6.5 cm east side of Dhaka -Tongi road, 25 cm south of Kaila Rail Gate bus stand, 9.1m south from light post and 1.2 m west from canal
3.	6038	791/6	Lat : 23° 42' 37" Long : 90° 26' 04" Jatrabari Park, Upazila: Demra, Dhaka	6.1322 m	Pillar consists of a concrete monolith 0.9' X 0.9' X 0.7' under ground level and 0.9' X 0.9' X 0.6' above ground level with a brass rod at the top and centre, the upper 9 cm being frustum of pyramid. One face of the pillar the inscription: "Survey of Bangladesh" is BM is situated inside Jatrabari park, which located north of Jatrabari road junction
4.	6194	791/5	Lat : 23° 46' 26" Long : 90° 22' 06" Sher - e - Bangla Nagar, (National TB Control) Thana : Mohammadpur, Dhaka	7.1006	Pillar consists of a concrete monolith 0.9' X 0.9' X 0.7' under ground level and 0.9' X 0.9' X 0.6' above ground level with a brass rod at the top and centre, the upper 9 cm being frustum of pyramid. One face of the pillar the inscription: "Survey of Bangladesh" is engraved BM 6194. BM is situated in the compound and south-west corner of National T.B Control Project clinic, 20.1 m south-east from the SW corner of the clinic building and 7.7 m north-east from the western gate of the clinic
5.	A/1	791/6	Lat : 23° 44' 05" Long : 90° 24' 30" Segun Bagicha, Bangladesh Shilpakala Academy Thana : Ramna, Dhaka	6.1836	B O M Engraved on mosaic flooring at south-west end of bottom step of stairs leading to north-west front veranda and main entrance of Bangladesh Shilpakala Academy main building. East of Ramna park
6.	A/5	791/6	Lat : 23° 43' 48" Long : 90° 25' 47" Kamalapur, Thana: Motijheel, Dhaka	6.9213	B O M Engraved on cementing flooring at outside wall (western) of Pubali Bank. The BM is inside the iron railing of western veranda of the station building, Kamalapur R.S

Sl. No.	BM No.	Sheet No.	Location	Height Above MSL	Pillar/ BM Site Description
7.	A/15	791/5	Lat : 23° 45' 36" Long : 90° 23' 46" Assit. Station Master Office, Tejgaon R/A, Thana : Tejgaon, Dhaka	8.7583m	B O M Engraved on cemented floor near north end of the front door, against Station Master's office room of Tejgaon R.S
8.	A/19	791/5	Lat : 23° 46' 48" Long : 90° 24' 08" Mohakhali, Thana : Gulshan, Dhaka	7.6502	Bridge is 800meter north from Mohakhali Railway level crossing
9.	K/7	791/5	Lat : 23° 43' 48" Long : 90° 25' 25" Kaola, Thana : Cantonment, Dhaka	6.6900	B O M Engraved on cemented base, north-west of railway culvert No. 39 in front of Banarupa Housing Society
10.	M/2	791/6	Lat : 23° 46' 48" Long : 90° 21' 02" Darussalam, Thana : Mirpur, Dhaka	6.6690	B O M Engraved on cemented base at west end of lower step of western stair at main entrance of office building of Technical Training Centre, Mirpur
11.	MM/1	791/6	Lat : 23° 44' 10" Long : 90° 24' 10" IEB Auditorimu, Thana : Ramna, Dhaka	7.5124	B O M Engraved on cemented base at west end of second step of stair leading to the outer eastern door of IEB auditorium and 6 cm east from collapsible gate in the compound of Engineering institution at Ramna
12.	S/3	791/6	Lat : 23° 44' 50" Long : 90° 22' 51" Kalabagan, Thana : Dhanmondi, Dhaka	6.7413	B O M Engraved on cemented base, first step of stair(from bottom) of sluice gate, beside Kalabagan lake, west side of Pantha Path and near Rasel Square.
13.	S/5	791/6	Lat : 23° 43' 48" Long : 90° 23' 4" Palashi, Thana : Lalbag, Dhaka	7.6836	B O M Engraved on cemented flooring of the corridor, inside the main building of the IFCDR, BUET. Mrk is about 5 ft south from the door of room no. 10, 9ft east from the door of room no. 107 and 13ft west from main entrance (collapsible gate) of the same building
14.	303	791/5	Lat : 23° 47' 52" Long : 90° 24' 56" Gulshan Ladi Park, Thana : Gulshan - 2, Dhaka	8.5344	Pillar is situated inside Glushan-2 park. It is south-east corner of a big pond in the park, north-east of Gulshan ladies community club and about 50 m north of Gulshan Model High school and 300 m north- east of Gulshan -2 main bus stand

(Source: Survey of Bangladesh, Benchmark (BM) Description, 2008)

5.2.6 Geological and Soil Characteristic

Geological characteristic of Dhaka indicates that Madhupur Clay in Dhaka City and surroundings are varying significantly both horizontally and vertically. The elevated parameters, particularly its low strength and high compressibility values indicate the clay, to some extent, is problematic for the Engineering construction. The moisture content and plastic limit results show the Madhupur clay is normally consolidated to over consolidated. The clay is normal to active and has intermediate to high plasticity. The compressibility values suggest that the clay is very low to highly compressible at different locations. Therefore, soil characteristic of the Project area is also important issues for engineering points of view.

Dhaka City and its surrounding areas are covered with Pleistocene Madhupur Clay and Holocene sediments belonging to the Ganges - Brahmaputra flood plain. The western part of

the investigated area lies in the Madhupur Tract having highly oxidized Pleistocene sediments. The east, the area is covered with recent flood plain deposits.

On the basis of geo-morphological expression and sediment characteristics, the area has been divided into nine geological units having deposits of the following:

1. Sand bar / point
2. Active natural levee
3. Flood Plain
4. Depression
5. Abandoned channel
6. Gully fill
7. High flood plain
8. Old natural levee
9. Madhupur Clay.

Faults and Lineaments: According to Geological Report on the geological setting and topography, Dhaka City has experienced major and minor faulting at different times. Some faults and lineaments were observed in satellite images and aerial photographs and were confirmed through field surveys. But, in many places, human settlement activities have destroyed the field evidences. The identified faults are as follows:

- Along Bagunbari Khal, trending east - west in the southern part of the city (F1z0;
- Along abandoned channel, in Uttara area, across Zia International Airport, trending north - south in the northern part of the city (F2);
- Along the Turag River in Mirpur area near zoo, trending north – south in the western part of the city (F3)

The Lineaments are as follows

- Along the edge of depression from Khilkhet to Jatrabari trending north - south in central part of the city (L1);
- Along the edge of depression in the southern part of Dakhin Khan, trending south - west in eastern part of the city (L2);
- Along the edge of depression in the west of Uttra, trending north - south in northern part of the city (L3);
- Along the edge of depression in Pallabi area, trending north - south in the northern part of the city (L4);
- Along the branch of the Turag River, trending northeast - southwest in northern part of the city (L5)'
- Along Tongi Khal in Tongi - Uttara - Uttar Khan area, trending east - west in northern limit of the city (L6a and L6b);
- Along Buriganga River in southern Limit of the City, trending southwest - northeast (L7);
- Along old natural levee in the Mohammadpur area, trending north - south (L8)

It is noted that a sharp lithological change was observed along Begunbari Khal at the Rampura - Badda area. In the low - lying areas at the Badda area, the Madhupur Clay is exposed except in depressions, whereas recent flood - plain sediments were found at low - lying areas on the other side of the Khal in the Rampura area.

Earthquake /Seismology: Dhaka City falls in earthquake zone II of the seismic - zoning map of Bangladesh. The probable maximum intensity predicted for this zone is 6.0 to 6.5, with a seismic coefficient of 0.05 (Geological Survey of Bangladesh), but according to Kaila and Sarkar

(1978), Dhaka experienced a maximum earthquake on 12 June 1897, with an intensity of IX at the Modified Mercalli scale. During that quake, an area of more than 3000,000 square kilometers (Bangladesh and northeastern states of India) were laid in ruins; all means of communication were interrupted, the hills vent and cast down in landslides and the plains fissured and riddled with vents with sound, from which sand and water poured out in most astounding quantities. Before this great earthquake, Dhaka experienced six medium to large earthquakes in April 1762 and 1775; on April 10 and May 11, 1812; in December 1876; and on July 14, 1885. After the earthquake of 1967, many sand boils were formed in and around Dhaka. Many cracks on roads and civil structures were also found after the earthquake.

5.2.7 Surface and Subsurface Hydrology

The three major rivers the Jamuna, the Padma and the Meghna Padma forms portions of the STP Study Area boundaries. In addition, other four rivers, branch-rivers and its distributaries and canal traverse into the study area. A few lakes and many ponds are also located within the study area. The general hydrology of the river network within the study area (**Figure 5.3**) is as follows;

- **Padma River:** The Padma begins in the Indian State of Uttar Pradesh, enters Bangladesh from the northwest through the Rajshahi Division. It defines the southern boundary of the Study Area. This river Known as the Ganges in India.
- **Jamuna River:** The Jamuna begins in the Indian Himalayas and flows in a generally north-south direction, converging with the Padma at a point to the west of Dhaka on the southern boundary of the Study Area. This river is known as the Bramapautra in India
- **Meghna River:** The Meghna River originates to the north-eastern part of the Country. With minor exceptions, it is coincident with the eastern boundary of the Study Area. It also joins the Jamuna on the southern boundary of the STP Area.
- **Turag.** The Turag forms both the western and northern boundaries of DCC. The Turag is largely contained by embankments along the western edge of the city. Significant wetlands exist along the river.
- **Buriganga.** The Turag changes its name to the Buriganga at the point at which it changes direction and flows to the southeast, roughly parallel to the Padma. With the exception of the Kamrangir Char at the junction of the two rivers, it forms the southern boundary of the DCC.
- **Balu.** The Balu flows north-south, roughly parallel to the Turag and is a tributary of the Sitalakhya River which it joins in the Study Area.
- **Sitalakhya River.** The Sitalakhya River also flows generally north-south and converges with the Buriganga and Meghna Rivers in the south-eastern corner of the Study Area

There are significant water bodies in terms of environmental sensitive located within the DCC include the Begunbari Khal, and the Banani, Gulshan and Dhanmondi Lakes, all of which were at one time linked by a system of canals, most of which have been filled and subsumed by urban development. A number of other water channels such as Dholai khal (canal), Pandu, and Tongi canal criss -crossed through and around the city.

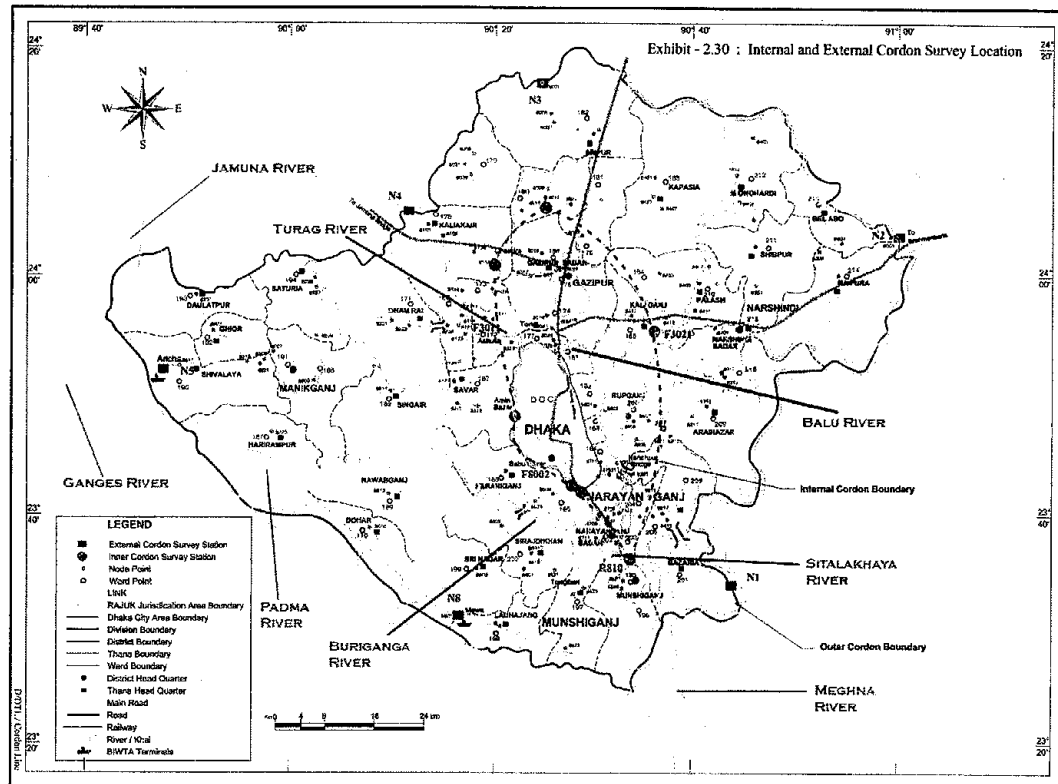


Figure 5.3: River Network Within the Study Area

Ground water: The Dupi Tila sands aquifer is the main source of groundwater in Dhaka city. Madhupur clay overlies the aquifer with a thickness of 8-45m and on average 10m. The aquifer varies in thickness from 100 to 200m (average 140m). Groundwater occurs at a depth of 25 to 30m in the central part of the city. In the suburbs the ground water table lies at a depth of 15 to 20m. Under the present situation the peripheral rivers act as sources of recharge as the Dupi Tila sands are exposed.

Presently, the ground water table in Dhaka is seriously declining due to extractions by wells to meet growing demand combined with decreases in recharge rates due to urban development. In the STP study noted that Water levels are reported to have declined 24 meters since 1996. Artesian wells have been the traditional source of water in the Dhaka area, but the Dhaka Water and Sewer Authority (DWSA) is reportedly turning to the metropolitan area's rivers as the source of water in the future. Arsenic contaminated in groundwater in shallow aquifers of the project areas is another environmental hazard.

5.2.9 Flood and Inundation Characteristics

The STP study highlighted that Dhaka occupies a large part of the relatively small proportion of land which is considered to be "permanently" flood-free. The flooding zone in Dhaka city is presented in Figure 5.4. The areas to the south, south-west and east are low-lying and under water for many months of the year. Two types of floods namely rainfall and river flooding are occurred in urban areas. The latter is the more serious caused by both rainfall snowmelts upstream in neighboring countries. Disastrous flooding generally occurs when the three river systems experience high levels of runoff simultaneously - as was the case in the floods of 1988, 1998 and 2004. Though high ground is some areas, in recent years continuous flooding in Dhaka has exceeded 70 days with water levels reaching several feet. Embankments around the city protect it from direct onslaught, but as water levels rise in the channels they eventually

reach above the elevation of the city (reportedly up to 20

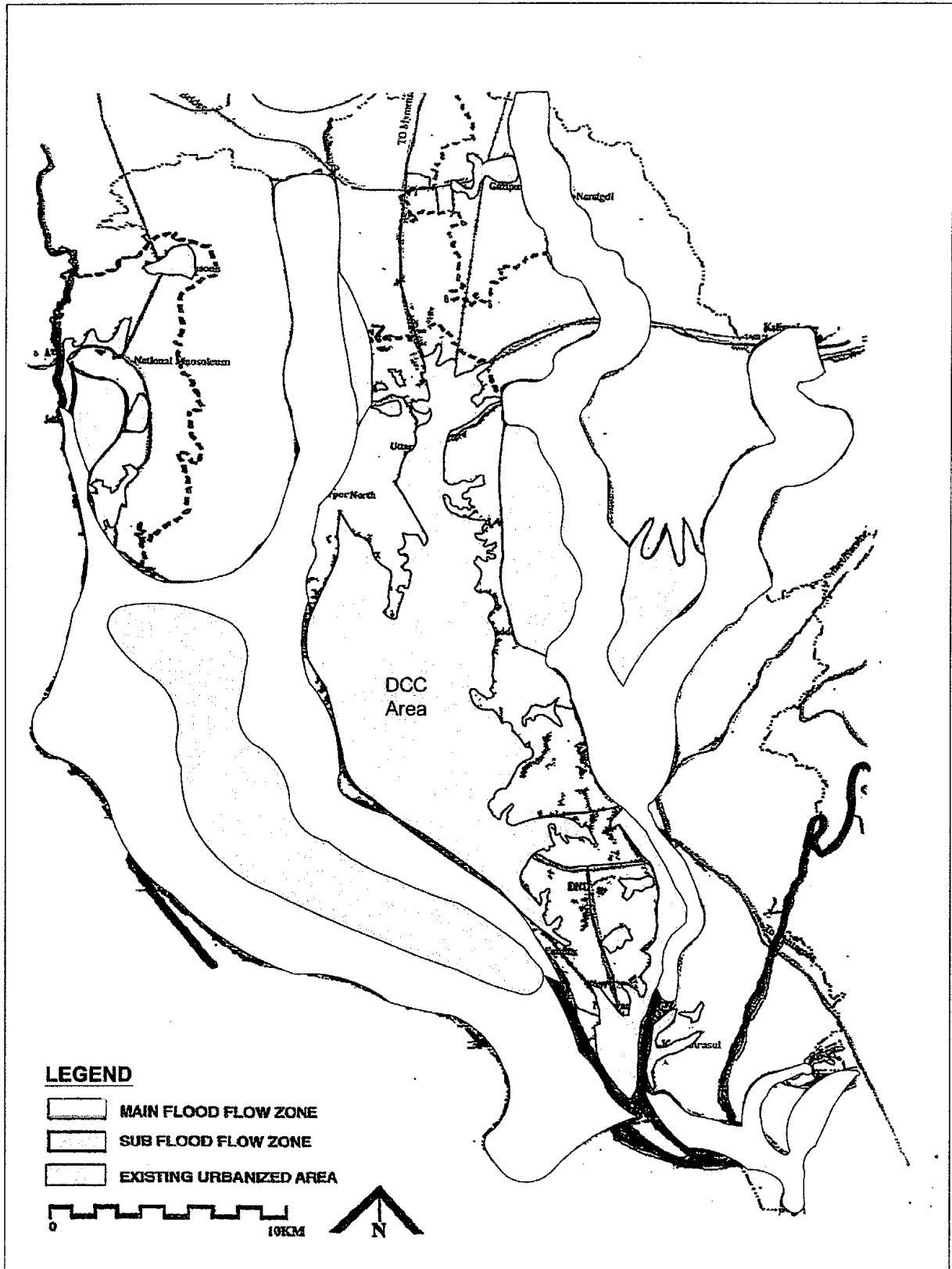


Figure 5.4: Flooding Flow Zones in Study Area. (Source: Strategic Transport Plan Final Report 2005).

feet above). Maximum and minimum water level data were collected for the Padma, Jamuna, Shitalakhya (Lakhya), Buriganga, Balu, Turag rivers and Tongi canal from 1997 to 2006 from the Processing and Flood Forecasting Circle, Bangladesh Water Development Board. The maximum and minimum annual water levels of the Buriganga, Sitalakhya, Jamuna and Padma rivers are presented in Table 5.17.

Table 5.17: Maximum and Minimum Annual Water Levels

Year	Buriganaga River Water			Lakhya River Water			Jamuna- Brahmaputra			Padma-Ganges River		
	Station Name/ Station ID	Max (m)	Mini (m)	Station Name/ Station ID	Max (m)	Mini (m)	Station Name/ Station ID	Max (m)	Mini (m)	Station Name/ Station ID	Max (m)	Mini (m)
1997	Dhaka_Mi ll Barrack, ID SW42	5.39	0.64	Demra ID SW179	5.71	0.95	Bahadura bad_Trans it, ID SW 46.9L	19.93	13.22	Mawa, SW93.5L	5.86	1.01
1998		7.24	0.60		7.11	0.80		20.37	12.96		7.14	0.86
1999		5.81	0.80		6.03	1.11		19.82	13.09		6.24	1.06
2000		5.75	0.52		5.85	1.08		20.16	13.25		6.28	1.01
2001		5.10	0.61		5.55	0.88		19.32	13.18		6.16	1.05
2002		5.82	0.70		5.93	0.95		20.09	12.89		6.46	1.06
2003		5.87	0.65		6.11	0.87		19.89	13.28		6.51	0.81
2004		6.68	0.78		6.86	0.78		20.19	13.04		6.84	1.25
2005		5.36	0.70		6.00	0.95		19.51	13.20		6.04	1.07
2006	4.65	0.60	5.12	0.94	18.85	12.95	5.42	1.04				

(Source : Bangladesh Water Development Board, 2008)

The maximum water levels of these rivers are presented in Figure 5.5. Highest water level were observed in Jamuna river 20.19 m (PWD) during 2004 followed by Turag river 7.29m (PWD), Tongi canal 7.13 m (PWD) and so on.

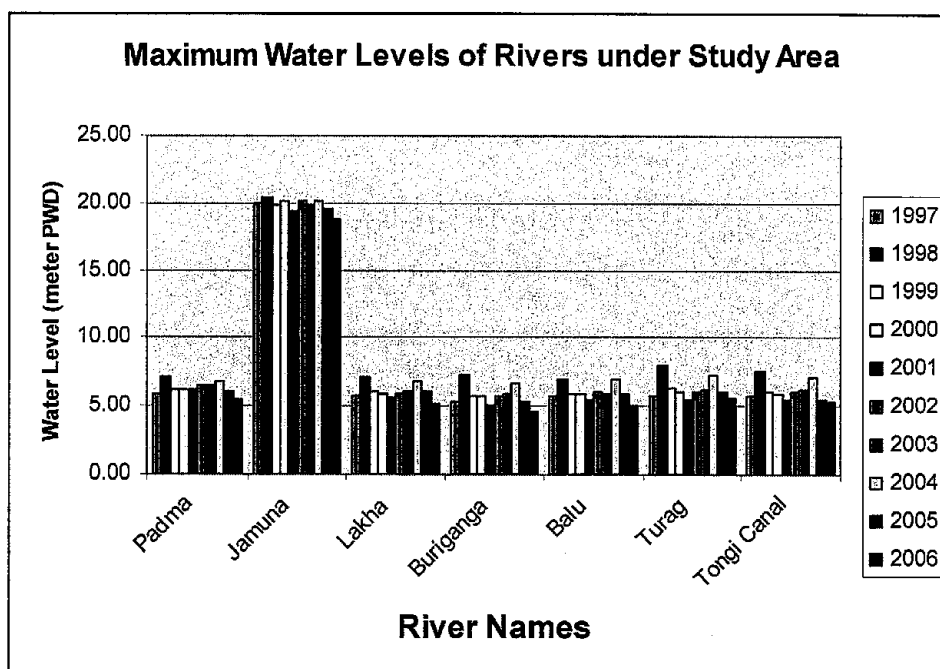


Figure 5.5: Maximum water level of the rivers within the Study Area

Hydrological data on the water level of the Buriganga River, Turag River, Sitalakhya River and Jamuna River located within the study area is collected. Water level hydrograph for the years of 1988, 1998, 2004 and 2007 during first July to September are presented in **Figures 5.6, 5.7, 5.8 & 5.9**

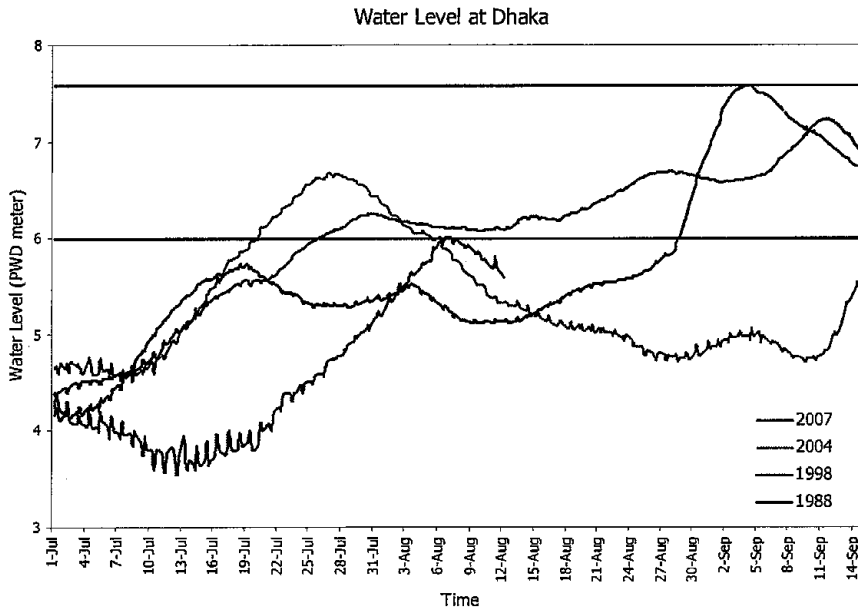


Figure 5.6: Water level in Dhaka City, Buriganga River

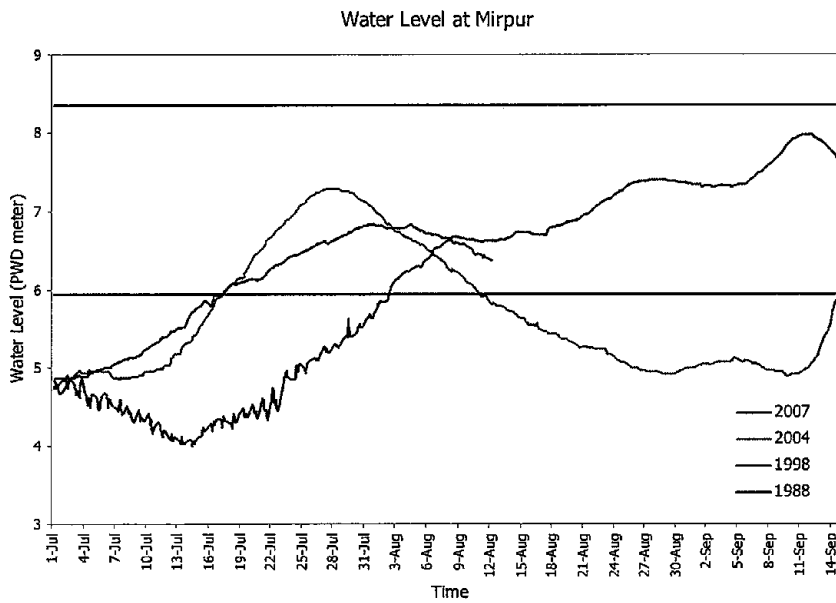


Figure 5.7: Water level at Mirpur location in Dhaka city, Turag River

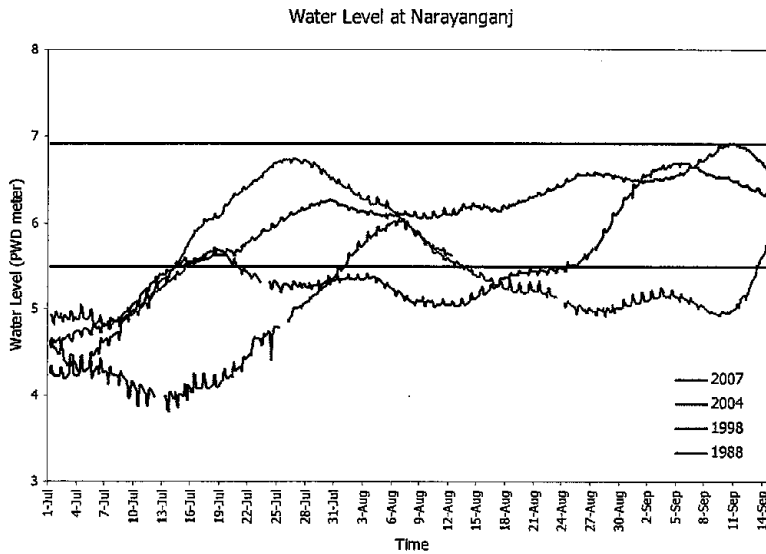


Figure 5.8: Water level in Narayanganj, Sitalakhaya River

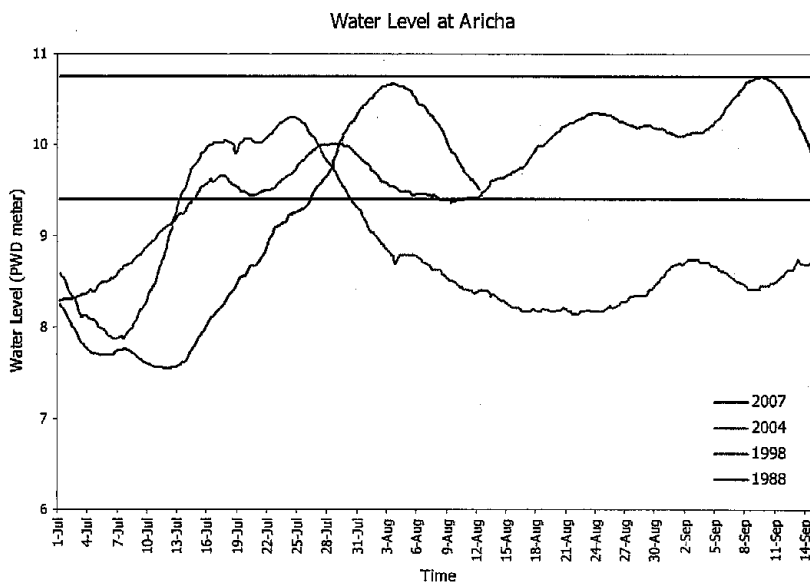


Figure 5.9: Water level at Aricha, Jamuna River

Flooding in Dhaka city is a common phenomena and every year the depression are flooded due overflowing rivers. Flash flood is not common in Dhaka city. The Turag and Buriganga are the major rivers and are controlling the flooding. In Dhaka, mostly of times flooding occurs due to severe rainfalls. Huge buildings and paving reduce the total permeable surfaces on developed and natural lands, which reduce the infiltration capacity of the urban surface, resulting discharge to rivers and depressions.

5.2.10 Drainage system in Dhaka City

Dhaka city is surrounded by rivers and the main large volume of water of the area flows through the Burihiganga River in the south, the Baloo in the east and the Turag in the north and west. The mean annual rainfall is 2,653 millimetres in 2005 (BBS 2006). A small portion of this is evaporated and the infiltration rate is very low due to over consolidated, less permeable

Madhupur Clay skin on the top of sand bed and development of huge settlement on the city. Most of the rain water is being drained out to the surrounding rivers. A few abandoned channels are also playing minor roles in the drainage system in the city. These are mainly Begunbari Khal and Dholai Khal. The drainage capacity of Begunbari Khal was relatively higher than Dholai Khal. This Dholai canal was tributary of the Balu River and named, Dholai River. The present abandoned canals along Segunbagicha- Ramna Park and Chankarpul Medical College were the part of the Dholai River Begunbari canal –Green road and Kalabagan –Dhanmondi lake was connected to Turag River. In before all abandoned rivers were well connected and they were worked as natural drainage system of the Dhaka city. Recently due to extensive filling activities, the Dholai Khal and other many canals are almost filled up for rapid urbanization (Urban Geology of Dhaka Atlas of urban Geology Vol -11, ESCAP, 1999). As a result, severe drainage congestions are occurred in the city in every year. Stagnant water and flooding are a regular event in low-lying areas in city. Even after a minor rainfall, city dwellers suffer from it. Main causes of the stagnant water / water logging are obstruction of major natural drainage system, siltation of existing river- beds and by filling activities for housing development along side river banks, few roadways are constructed more elevated than the surroundings areas and in adequate culverts are constructed in the city to maintain the natural flow of water. It is noted that, city roads have subdivided a single natural drainage system and catchments area into hundreds of segments. Inefficient and improper artificial drainage (man made drainage, storm drainage) system also created stagnant water in many areas of the city, such as Moghbazar, Malibagh Chowdhury para, Santinagar, Mouchak, Farirapul, Purana palton, Palashi, etc. Flood-protection embankment around the Dhaka city has obstructed most the channel flow towards the rivers and created water congestion inside the embankment. Many sluice gates are not working properly and inadequate opening to maintain the natural drainage.

5.3 Ecosystem

The ecosystem of the study are consists higher ridges characterized by red soil, traditionally called *Chala* and lower inundation areas characterized by darker clays traditionally, called *Baid*. The ecosystem of the project area comprise different environmental aspects mainly vegetation and forest, fisheries, aquatic biology, wildlife and environmentally protected or Sensitive areas. Semi urban ecosystem consists small ponds, low –lying lands with good vegetation coverage, open playgrounds and underdeveloped open lands.

5.3.1 Vegetation and Forestry

The faunal composition of the study areas cannot be recognized or categorized under a single category like previous deciduous species, because many species have disappeared from the areas since 1-2 decades of major ecological changes from deciduous to urban or semi urban ecosystem. The vegetation coverage in Dhaka has been changed due to rapid urbanization and industrialization. Most of the naturally growing plant species have disappeared in the last 30-40 years. At present different species of plants are planted in the Roadside Park and /or green belt within the DCC area. Only a few numbers of trees and vegetation are present within the ROW of roadways in the DMA. Numbers of garden trees such as Bokul Flower, Patabahar, Shishu etc. are planted in the road median and RoW of roadways under Dhaka City Beatification Project. Most dominating species of the plants in residential and office premises are mahogany (*Swietenia spp*) under family of Meliaceae, mango (*Mangifera indica*), narikel (*cocos nucifera*) etc. Data on Plant distribution map and plant species planted in the Dhaka city and other urban city are still not available even contracted with the officials of the Forest Department of Bangladesh, Dhaka.

Presently Bangladesh has only 7% forestland against 25% of the coverage country should have. The higher ridges of Dhaka are basically deciduous forest or *sal* forest. In addition to

commercially valuable sal tree, the forest in these areas has other valuable trees such as koro (*Albizia spp*), chambal, amlaki, etc. The southern portion of OSA North contains portions of one of the renowned forest areas in Bangladesh, named the Bhawal National Park or known as Rajendrapur National Park. The country's biggest Bhawal National Park is located in Gazipur district under the Dhaka division. The forested area is located approximately 40 kilometres north of Dhaka. Established in 1974 and encompassing an area of 5,022 hectares, part of the area has been "notified as a protected area in 1982 under the International Union for Conservation of Nature (IUCN's) protected area Category 5." Grabbers have already occupied illegally 11000 acres of forest lands out of 64000 acres that include the 12,435 acre National Park in Gazipur. As it's a neighboring district of the capital Dhaka with very good location, influential people over the years have already grabbed 20% of its forestland. The corridor also accommodates both the main north-south road and railroad.

5.3.2 Wildlife: No significant wildlife habitats are available in the DCC area except national Zoo located in Mirpur. Urban areas are already under stress from human habitations. A few pet wildlife are still available in some residents such as dogs, cats, monkey, deer etc. As minimum trees and vegetation are found due to rapid urbanization in the city, only local birds like Kak (crow, *Corvus macrorhynchos*), Charui (House sparrow, *Passer domesticus*) Jalali kabutor (Blue rock pigeon, *Columba livia*) Kat shalik (Grey headed myna, *Sturnus malabaricus*) Tya (Para keet, *Psittacula krameri*) Kokil (Asian Cuckoo, *Eudynamis scolopacea*) etc are found in the study area. Before wetlands were enriched by presence of migratory birds. The species diversity has now however, dropped significantly.

5.3.3 Wetland

Most of the area along rivers The Turag in west, the Buriganga in south and the Balu in east to Dhaka are wetlands. Dhaka has developed on the north bank of the Buriganga and between the Turag and the Balu rivers. Development of the settlement are occurring by land filling continuing losses of wetlands and the implications for exacerbation of flooding are major environmental issues in the Study Area. A portion of the western part of DMA area is occupied by the Turag River Wetlands and subject to complete inundation during the monsoon season. Sewage and industrial waste water of the greater part of the Dhaka city comes from through the canals. As a consequence, the aquatic flora and fauna are lost forever.

6. Information on Environment and Social Consideration

6.1 Legal Requirement on Environmental Issues

In Bangladesh Environmental protection is a multi-sectored phenomenon dealing with interactions of diverse human activities with various components of the environment. As such, many of the environmental issues have been addressed in the sector legislation. On the basis of the objectives, environmental legal requirements may be brought under three broad categories. These are:

- control of environmental pollution;
- conservation of environmental resources ; and
- protection of environmental and occupational health.

With respect to environmental affairs, the legal system of Bangladesh is potentially quite strong. So far time to time many Environmental policies and Acts are formulated and approved under the Government of Bangladesh are as follows.

6.1.1 Environmental Pollution Control Ordinance, 1977

In 1977, the 'Environmental Pollution Control Ordinance' was enacted to provide control, abatement and prevention of pollution of the environment. The Government of Bangladesh formulated the 'Environmental Pollution Control Ordinance' to enforce strict measures against environmental pollution in Bangladesh. The Department of Environmental Pollution Control (DEPC) was responsible for its implementation. In 1989, a new ministry, Ministry of Forest and Environment (MoFE) was formed and the DEPC was brought under this ministry renaming Department of Environment (DoE). Various activities for the environmental protection, environmental improvement, pollution control and prevention are under the power and jurisdiction of the Director General (DG) of the DoE. With time DoE has been upgraded and strengthened, and now Bangladesh is in a position to implement its Environmental Policy, Legislation and Environmental Quality Standards (EQS) in a project.

6.1.2 Environmental Policy 1992

The Government of Bangladesh in 1992 had formulated an environmental policy. The broad requirements of this policy are;

- sustenance of ecological balance and overall progress of the country through protection and improvement of environment;
- protection of the country against natural disasters;
- identification and control of all activities that pollute and degrade the environment;
- ensuring environmentally sound development in all sectors;
- ensuring sustainable, long-term and environmentally sound utilization of all resources; and
- active association with environment related initiatives to the extent possible.

The environmental activities concern all regions and development sectors of the country. In the Policy, several rules related to 15 different sectors have been stated and those related to Transport and Communication network are clauses as:

3.11 Transport and Communication

3.11.1 Ensure that road, rail, air and inland water transport systems do not pollute the environment or degrade the resources. Conduct Environmental Impact assessment before undertaking related projects

3.11.2 Ensure that vehicles and people using roads, rails, air and inland waterways do not pollute the environment and take steps to protect health of the workers running these transport

3.11.3 Control activities in inland ports and dockyards which cause pollution of water and the local environment.

6.1.3 Environmental Conservation Bill /Act, 1995

In 1995, the 'Environmental Conservation Bill' (Act No.1) was approved, repealing the 'Environmental Pollution Control Ordinance', providing for the conservation and improvement of the environment and mitigation of pollution. This bill is an Act with provisions for the followings:

- formulation of rules/regulations for environmental protection, improvement, pollution control and abatement including formulation of Environmental Quality Standards (EQS), environmental guidelines among others through Gazette Notification;
- identification/declaration of ecologically sensitive areas through Gazette Notification and control activities damaging to the ecology of these areas; and
- environmental impact assessment (EIA) and Environmental Clearance of the development projects.

In order to enforce the Environmental Conservation Acts, the Government of Bangladesh established the Department of the Environment DOE under the Ministry of Environment and Forest.

6.1.4 Environmental Conservation Rule, 1997

Afterward, in 1997, the 'Environmental Conservation Rule' (ECR) was promulgated by the DOE. The Gazette with Environmental Rules and Regulations addressing environmental protection and conservation was published in 1997. This document also provides standards for quite a number of emissions such as air pollution, noise pollution water quality, etc.

Violation of the law or failure to comply with the notice/order issued under the law is liable to a penalty which may be a prison term for upto 5 years or a fine of upto taka 1 lac or both.

6.1.5 Regulations and Enforcements for Traffic- oriented Environmental Issues: In Transportation many regulations and acts have been formulated in Bangladesh are as follows;

- Transportation and Safety is the Vehicles Act, 1927 (Bangla Act I of 1927). The regulation and enforcement related to traffic as follows

An Act to provide for better control of horse - drawn vehicles in certain areas in Bangladesh.

4(1) No person under the age of eighteen years shall drive a vehicle (Vehicles means any wheeled vehicle by a horses and used for the conveyance of human beings) in any

public place (public place means a road, street, way or other place, where a thoroughfare or not, to which the public are granted access or over which they have a right to pass.

(source: Laws Regulating Environment in Bangladesh, Bangladesh Environmental Lawyers Association (BELA, The Ford Foundation, December 1996, Mohiuddin Farooque and S. Rizwana Hasan)

- The Motor Vehicles Ordinance, 1983, (ordinance No. LV of 1983)

Bangladesh Road Transport Authority is the enforcement authority for carrying out the purpose of this Ordinance.

- The Bengal Motor Vehicles Rules 1940

Section 114 Horns (a): stated that *every motor vehicle shall fitted with a horn or other approved device available for immediate use by the driver of a vehicle and capable of giving audible and sufficient warning of the approach position of the vehicle'*

Under this rule it is also mentioned that no motor can produce an unduly shrill, loud or alarming noise by the motor horn and each motor should fitted with a bulb horn.

- The Highways Act, 1925 (Bengal Act III of 1925)

An Act to provide for the better maintenance and control of Government roads in Bangladesh

- Railway Act. 1890, etc.

6.1.6 Other legislations

Other legislation related to conservation of natural resources and protection of the environmental health which are to some extent relevant to the transportation Project includes:

- The Forest Act, 1927 as modified in 1973;
- The Wildlife (Preservation) Order, 1973;
- The Protection and Conservation of Fish Act, 1950
- The Protection and Conservation of Fish (Amendment) ordinance, 1982;
- The Factory Act, 1965; The Factory Rules, 1979;
- The Motor vehicle Rules, 1940 as modified upto 1983; and
- The Bangladesh Penal Code, 1860 as modified from time to time;

6.1.7 Institutional Arrangements for Environmental Issues

Under the section 12 of the Environmental Conservation Acts stipulates that 'no industrial units or project shall be established or undertaken without obtaining Environmental Clearance from the Director General of Department of Environment in the manner prescribed by the Rules'. The procedure for obtaining Environmental Clearance from DOE is set out in the Environmental Conservation Rule, which categorise industrial and infrastructure projects into four categories such as, Green, Orange-A, Orange-B and Red depending on project's nature and their perceived environmental impact. Under the regulations in force, ECR classified Road and Bridge construction into four categories

- Road Construction /Reconstruction/Extension (feeder road, local road) = Orange/B category
All Road construction projects, under these categories is requiring an Initial Environmental Examination (IEE) study,
- Road Construction /Reconstruction/Extension (Regional, National and International road) = Red/A category
All roads under this categorise needs an Initial Environmental Examination (IEE), followed by an Environmental Impact Assessment (EIA) study.
- Bridge Construction /Reconstruction/Extension below 100 m length = Orange/B
All Bridge construction projects under these categories is requiring an Initial Environmental Examination (IEE) study,
- Bridge Construction /Reconstruction/Extension above 100m length = Red/A
All Bridge construction projects, involving a bridge length of over 100 m, is considered as a Red or 'Type-A' class project, requiring an Initial Environmental Examination (IEE), followed by an Environmental Impact Assessment (EIA).

The Department of Environment issue the Environmental Clearance Certificate (ECC) after review and approval of the Initial Environmental Examination and Environmental Impact Assessment study reports and Environmental Management Plan of an infrastructural project according to the Guidelines of the ECR 1997.

6.1.8. Procedure for Conducting an Environmental Study

There are no clearly formulated guidelines to conduct any environmental study such as Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) for the infrastructure projects. The Department of Environment has prepared guideline for IEE and EIA for industrial sector. Department of Roads and Highways under Ministry of Communication has prepared Environmental guideline for their road project. In 1994, the Local Government Engineering Department (LGED) published guidelines on environmental issues related to physical planning. These guidelines provide practical assistance with respect to environmental issues and parameters to be taken into account. Similarly, other departments have their own guidelines for environmental issues of projects.

6.2. Review of the Reports

6.2.1. Review the STP Report from Aspect of Environment

This is understood that in the Terms of Reference (ToR) of the STP project did not include the scope of work on the environmental impacts of the alternative strategies in STP. So the environmental issues related to alternative strategies and evaluation of alternative transportation strategies were not documented in the STP Study. However, therefore, the review of the STP from the environmental points of view could not carry out.

6.2.2. Public Opinion to STP

The STP reveals that Public consultation program under the study had achieved its objectives of dissemination of information. It created awareness among people regarding the challenges ahead and the possible action programs. Many of the inter-ministerial and inter-departmental controversies and conflicting issues were discussed and resolved in the process. The

participatory process was undertaken during the initial phases of data collection and information gathering for the project. In STP more than 20 such participatory meetings, workshops, round tables and seminars were organized and included attendance by different stakeholder groups including government agencies, concerned groups and DCC Ward Commissioners. The process had generated awareness and created an overwhelming interest by the participants in STP. The following programs were implemented as part of the public consultation program for the STP:

- Media consultation meetings.
- Media campaign through newspaper advertisement:
- Stakeholders meetings;
- Radio and TV talk shows
- Press conference and briefings
- Organizations consulted

Opinion of the Participants Towards STP: The overall responses of the participants in each discussion meeting, workshop and seminar were positive and instructive to STP. The main opinions are;

- Transportation system for Dhaka is in turmoil and traffic congestion and the huge loss of productive time is a national problem which needs immediate attention.
- Regarding the mass rapid transit system everybody considers that the city should have introduced some sort of Mass Rapid Transit (MRT) system long before.
- Need to improve and consolidate the existing bus transport and free the main arterial corridors from non-motorized vehicles particularly rickshaws.
- Bangladesh Railway to shift the railway line to Balu river embankment, or to shift Kamalapur operation to Tongji, or to introduce urban railway services at an affordable price.
- Consider circular waterways, ring roads and east–west corridors.
- There was a preference for a Metro Rail System (underground) in the long run but an acceptance of bus consolidation and Bus Rapid Transit (BRT) as the short-term solution.
- Participants were in agreement with the Consultants and the Advisory Committee that Dhaka should have an excellent multi-modal public transport system combining all major transport modes.
- Need for Policy formulation and institutional strengthening
- Regarding the land acquisition for right of way of recommended roads and highways it should be defined and fixed in the first phase of the project implementation otherwise it would be difficult to get land for roads due to uncontrolled development.
- However, the participants expect the STP to recommend an excellent, viable, speedy and adequate transport system in Dhaka to meet the travel demand for next 20 years by introducing an MRT system as soon as possible.

6.3 Land Acquisition and Resettlement issues

6.3.1 General

For the information of Law, order and guideline for resettlement, particularly urban Resettlement in Bangladesh the following documents are reviewed.

- Development of a National Policy on Involuntary Resettlement', ADB TA, 4517-BAN, May 2007, report
- Development of National Resettlement Policies on Involuntary Resettlement for Bangladesh, 2006, Mania
- Draft outline of a National Resettlement Policy for Bangladesh, 1999, RETA, 5781, Review of National Resettlement Policies and Experience with Involuntary Resettlement Projects (1998, ADB)
- Acquisition and Requisition of Immovable Property Ordinance II, 1982, etc.

6.3.2 Acquisition and Requisition of Immovable Property Ordinance II 1982

This is the first legal instrument for land acquisition for development projects in Bangladesh. There is very little compensation and resettlement assistance is offered under the existing laws and regulations. In the 1982 Ordinance, entitled and compensation of legal or titled owners is recognized, loss of assets of the non-titled informal settlers, particularly the loss of income and livelihoods sources are not generally considered for restoration. Government of Bangladesh has no clearly formulated resettlement policy for persons affected by development projects. In practices, donors (ADB and World Bank) guidelines have been followed for the Resettlement and Rehabilitation of the Affected Persons by the executing agencies.

All the donor agencies such ADB, WB, ADB, JICA have broad principles to minimize displacement, and require time-bound action plans with measures to restore or improve incomes of those unavoidably affected by development project. ADB's poverty reduction strategy (1999) reinforces the importance of mitigating the risks of displacement, and taking steps to improve the conditions for the poor and the vulnerable groups in particular. The Donors' requirements for resettlement through their policies and plans are (i) avoiding involuntary resettlement where feasible, (ii) minimize resettlement where population displacement is unavoidable, and (iii) ensure that displaced people receive assistance so that they would be at least as well off as they would have been in the absence of the project.

For improvement and enhancement of policy on resettlement, a draft National Resettlement Policy for Bangladesh was prepared under the TA funded by ADB in 1999 based on RETA, 5781, Review of National Resettlement Policies and Experience with Involuntary Resettlement Projects (1998, ADB). Gaps and limitation in Land acquisition Ordinance of 1982 are identified and important issues related to transportation are;

- No provision for payment of compensation for relocation of the encroachers and squatters who have been living on the Right of Way or acquired lands for years.
- Inadequate compensation/resettlement assistance is offered under the existing laws and regulations
- Lack of provisions for resettlement and income restoration.

6.3.3 Procedure of Land Acquisition

“The Acquisition and Requisition of Immovable Property Ordinance II” 1982 provided certain safeguards for the owners as far as payment of compensation is concerned and also against wastage and misuses of land. This ordinance with subsequent amendments in 1993-94 is the final version of the relevant law now in practice in Bangladesh. The law has provision for payment of average value for the whole property as compensation for acquired land.

The salient features of the ordinance are that, once the government decided to acquire a place land for public purpose, the land Acquisition Ordinance (LA ordinance) of 1982 is applied. Notice is served to persons interested in the land i.e. legal owner of the land. Matter to be considered or not to be considered for determining compensation is dealt with under this law. The Deputy Commissioner (DC) on behalf of the government then tender payment notice. DC would serve the notice at convenient places on or near the property in the prescribed form and manner stating that the property is proposed to be acquired.

The DC for acquired property on the basis of its market value awards the owners with compensation money. The registered value of the property (land, structure, pond etc.) is assessed on the basis of average recorded value for preceding 12 months, in addition, a sum of 50 percent premium on the registered value. The affected persons are also to be compensated for loss of standing crops, trees, perennials, and fishes as assessed by DC.

This law does not permit the affected persons to take the salvageable materials for which they are being compensated. However, worship graveyard and cremation ground are not to be acquired for the purpose.

Non-titled (those who has no legal documents) people are not covered under the 1982 LA ordinance. But if someone lives in a private homestead with permission, compensation is generally paid to the owner for the structure only and not for the land.

6.3.4 Resettlement Action Plan (RAP)

The objective of the Resettlement Action Plan (RAP) is to provide guidelines for compensation payments for project affected properties and persons by the project. The RAP includes the following steps;

- Prepare a database of PAPs through a census of affected household living within the RoW.
- Identify relocation/compensation options of the PAPs
- Prepare a entitlement matrix/ Resettlement Policy Matrix
- Address gender issues in resettlement planning
- Prepare implementation procedure and Monitoring Plan

6.3.5 Resettlement Policy Matrix

The resettlement policy matrix may generally be guided by the following criteria;

- During transition period, the affected shop holders should be provided with shifting cost and workers will get compensation for loss of income.

- The shifting cost, land acquisition cost, compensation of structures ,income loss and trees will be borne by the project.
- Consultation with local people, masjeed (Mosque) committee & others
- Affected common establishment like place of mosque, mandir (Temple) worship is to be shifted to suitable location through acquisition of land and the cost there against is to be charged to the project
- The project shall bear the cost of the affected private houses.
- The project shall bear the removal cost of households of squatters

The basic objective of the implementation program is to ensure that all the Project Affected Persons are paid due compensations in time, so that they can re-establish their social and economic livelihoods at least to the pre-project condition. The instant Resettlement Action Plan have proposed cash compensation to compensate the loss of individual properties, loss of business income, loss of income of affected employees engaged in business units, loss of rental income from affected structures, special grants to vulnerable households affected by the project. The other component of the RAP is the relocation of affected common / community properties. A successful implementation of RAP requires:

- RAP to be approved;
- Clear understanding of the tasks to be accomplished along with their sequencing and linkages;
- A well conceived organizational set up with well trained efficient staff for implementing the tasks
- Ensuring Training Staff deployment
- A carefully prepared work implementation matrix;
- Issuing legal notices for land acquisition and cut-off date
- Entitled persons should be verified and estimate of their types and quantitative lose
- Ensure the provision grievance of the Affected persons
- Proper functioning of the committees formed
- Above all, a cordial work relationship among the agencies, likes, RHD, DCs office, Consultants, NGO committees etc. involved in implementation of RAP.

6.4 Social Consideration

6.4.1 Review the Clean Air and Sustainable Environment Project

The study report on Clean Air and Sustainable Environment Project is reviewed in terms of land acquisition, resettlement issues and impact mitigation principles. The study report stated that social safeguards issues will be addressed under project by using together the Bangladesh Acquisition and Requisition of Immovable Property Ordinance, 1982 and the Bank's OP 4.12 as well as the current practice of land acquisition. For the mitigation of the social impacts according to ordinance and provisions of the OP 4.12 the DCC will apply the following principles and guidelines to acquire private and take back its own and other public lands from private uses, as well as adopt safeguard measures to mitigate any social adverse impacts.

6.4.1.1 Land Acquisition Administration: The DCC will select, design and implement the subprojects with an emphasis on avoiding or minimizing use of private and public lands that have been under private uses, and minimizing disruptions to business / trading activities where the works concern construction / repair of existing and new facilities.

- i) Where acquisition and displacement are unavoidable: DCC will consider the following measures to minimize adverse impacts:

- Minimize acquisition and use as much public lands as possible; and
- Avoid or minimize :
 - Displacement from homesteads,
 - Loss of productive / valued lands,
 - Impacts on business / commercial activities,
 - Dislocation of business / trading activities from its own /other public lands, and
 - Impacts on community facilities, including places of worship, cemeteries, objects / structures of historical and cultural significance, etc.
- Option to offer residual plots to acquisition: the landowner will have the option to offer the entire plot to acquisition if a portion of plot remain after acquisition.
- ii) Where subprojects involve construction of new or reconstruction / renovation of the existing facilities without a need for land acquisition, DCC will,
 - Plan and carry out the construction activities to avoid or minimize disruptions to business, trading and other livelihood activities.
 - Arrange alternative temporary locations, or allow the business operators, especially those who use the sidewalks, to use any vacant spaces in the vicinities to carry on their activities during the construction period.
- iii) Where Direct Purchase requires the DCC can purchase lands from private landowners according to the following criteria
 - All purchases will be on a 'willing buyer-seller' basis,
 - To ensure fairness and transparency, prices will be negotiated and paid in presence of the Grievance Redress Committee.
 - Minutes of the negotiations with names and address of DCC and non-DCC participants, and the records of purchases will be made available for review by IDA and others interested in the matter.

6.4.1.2 Impact Mitigation Principles

Where adverse impacts are found unavoidable, DCC will adopt measures to mitigate them in accord with the following the principles

- Resettlement of the project affected persons will be planned and implemented as an integral part of the subproject itself.
- Absence of legal title will not be considered a bar to assistance, especially to the socio-economically vulnerable groups.
- Vulnerability, in terms of socio-economic characteristics of the affected persons / households will be identified and mitigated
- Homestead-losers, including the poor and vulnerable households squatting on public lands, will be assisted with physical relocation and provision of basic amenities like water supply, sanitation, etc.

- People, who are economically well-off and use public lands/properties for free, will not qualify for financial or any other form of assistance
- No compensation will be paid for facing temporary inconveniences by business operators and traders, unless they are required to completely stop their operations during the construction period
- Where subprojects cause community-wide impacts, such as on community facilities, access to common property resources, etc. DCC will rebuild them with its own resources and/or provide alternatives in consultation with the user communities.

6.4.1.3 Eligibility for Compensation/Assistance: Regardless of their tenure status to the lands used for a subproject, the affected persons/households will be eligible for compensation and assistance area as follows.

Private Landowners: Persons who have legal rights to the affected lands and assets,

Squatters: Socio-economically vulnerable persons/households who do not have legal rights to the affected lands, but use them for residential and livelihood purposes.

Owner of Displaced Businesses, Which are (i) permanently displaced from built private and DCC or other public premises; and (ii) required to temporarily close down during the construction period. In both cases, compensation/assistance will apply to businesses operated by both landowners themselves and their tenants.

Employees of Displaced Businesses. Who are employed in the above two types of affected businesses.

Rental Income Earners. From built premises situated on private lands.

Vested and Non-resident Property Owners/Users: Current users of the vested non-resident properties (enemy properties' under the Enemy Properties Act of 1965, through 1984) during acquisition

Leaseholders: Owners of business and other activities existent on the formally leased-in public lands.

Community and Groups: Where local communities and groups are likely to lose income earning opportunities or access to crucial common property resources.

6.4.1.4 Compensation Principles & Standards: The following principles and standards will be used to determine compensation and assistance for affected persons/households

i) Acquired Lands and Other Assets

Replacement costs for an equal amount of land of same use and quality, including the registration costs or stamp duties. Replacement costs of houses/structures and other immovable built items (e.g. sanitation, drainage, etc) at the current market prices of same building materials, plus the current costs of labor to build them will be considered. Current market prices of trees and other assets which are irreplaceable will be considered. If the acquired lands are agricultural and amount to 20% or more of the total

productive area, a transition allowance at three times the value of the crops produced in one year in the acquired land will be also considered.

II) Homestead Loss

Relocation assistance for households displaced from private homesteads either in lands they can personally arrange to buy, or in those arranged by DCC, for socio-economically vulnerable households displaced from lands owned by DCC or other public agencies and provision of pre-acquisition level basic utilities, such as water supply, sanitation, electricity, etc will be considered

III) Loss of Business, Employment and Rental Income

Temporarily Closed Businesses: Where business activities come to a complete closure during construction, the owners will be paid for income loss at rates based on average daily net income prorated for a period needed to re-open the individual businesses, or for the duration of the civil works.

Partially Affected Business: Where business premises are partially dismantled and the remainders are structurally safe and useable, compensation, calculated as above, will be paid for smaller of the number of days needed to repair and reopen the individual businesses, or complete the civil works.

Businesses Completely Displaced from Private Premises: Relocation in DCC's rental premises in the same general area of the subproject, *plus* compensation for 30 days based on average daily net income prorated for a period needed to reopen the individual businesses or

Compensation, calculated as above, for the number of days the business owners need to find alternative locations themselves, for a maximum of 90 days.

Loss of Employment Income from Displaced & Temporarily Closed Businesses : Persons who have been continuously employed by the displaced and temporarily closed businesses for at least six months up to the day of PAP census (cut - off date), will be compensated for the period until their employers restart their operations, or for a maximum of 30 days. The daily rates will be based on their monthly salary paid by the employers.

Loss of Income from Rented - out Private Premises : Six months' rent at the current rates for loss of rental income from premises affected on private lands.

III) Vested and Non - Resident Properties, the following guidelines will apply:

Agricultural lands: Present users / owners will qualify for compensation three times the value of all crops grown on the acquired portion in a year.

Acquired business premises: For temporarily closed and partially affected business, the same measures as proposed for such impacts in the preceding paragraph will apply.

For premises that are to be dismantled completely : Relocation in DCC's rental premises in the same general area of the subproject, plus compensation for 30 days based on average daily net income prorated for a period needed to reopen the individual business, or

Compensation, calculated as above, for the number of days the business owners need to find alternative locations themselves, for a maximum of 90 days

Loss of Income from Rented - out Premises : Three months' rent at the current rates for loss of rental income from premises affected on private lands.

Acquired homesteads (including houses / structures): DCC and other implementing agencies will make alternative arrangements in consultation with the present users / owners.

Partially Affect Lands: Where acquisitions partially affect lands and other properties, the present owners / users will be allowed to use the remainders.

6.4.2 Different Modes of Vehicles for Public Transportation and Fare

6.4.2.1 Rickshaw: The STP Household Interview Survey data indicated that rickshaws are the primary travel mode for 34% of all person trips in Dhaka. Rickshaw volumes of 20,000 to 40,000 per day are common and reach as high as 60,000 in the Old area. Usually during the peak hour, rickshaw volumes of 2,000 to 4,000 per hour are plying on the roadways in the city. The STP reveals that DCC established regulations that restricted the number of rickshaw licenses issued to approximately 80,000. In reality, however, there is no effective mechanism for enforcement of the license requirement and as a result the number of rickshaws plying on the streets of Dhaka is many times the limit established by DCC. While there is no effective means to determine the actual number of rickshaws currently in operation, estimates indicate that there are more than 500,000 rickshaws plying the streets of Dhaka. This results in the fact that some 80% of the fleet is operating illegally. It is noted that about 40% of the rickshaws are being used by women and children, or people with goods, 30% of users are students and rest of other are being used by people to travel in short distances. Rickshaw passengers are generally upper-middle to lower-middle income groups of the city dwellers.

Rickshaw Fare: STP survey data indicated that the average length of trips made by rickshaws is 2.34 kilometres. Presently, Rickshaws charges are around Tk 6-8 (\$0.09-0.11) for one kilometre of travel, Tk 10-15 (\$0.14-0.22) for two kilometres of travel, and then approximately Tk3 (\$0.04) for each additional kilometre. Total fare for a trip of 5 kilometres would be about Tk 20 (\$0.29).

Rickshaw Manufacturing Cost: During the STP study period the cost of a new rickshaw was around Tk8,000 (\$133); the cost for a rickshaw van was around Tk 6,000 (\$100); and the cost for a thela (push cart) was around Tk5,000 (\$83). About 5% of the rickshaw drivers own their own vehicles.

Rental Charge of Rickshaw driver/ non-Owner Pays to Rickshaw Owners: The normal rental charge to the rickshaw owner for the use of a rickshaw for an entire workday (about 16 hours) is between Tk70 and Tk80 (\$1.01 to \$1.1). For an 8 hour shift, the rental charge is about Tk40 (\$0.67). Net earnings of a rickshaw driver/non-owner are estimated to be around Tk 4000 (\$58.8) per month.

6.4.2.2 Rickshaw Restriction in Dhaka Urban City:

The STP reveals that in 2002, the DCC initiated the implementation of an "NMT-Free Arterial Network – Phased Implementation Plan". The Committee for Integrated Corridor Improvement appointed by DTCB had identified a preliminary network of 120 km arterial roads in Dhaka for phased conversion to Non –Motorized Transport- free operations under supported by DUTP.

The strategy was to overcome prevailing grid-lock and improve traffic flow and overall mobility for the traveling with more efficient operation of motorized traffic. Under the study a plan calls for the phased withdrawal of NMTs from 11 major roads in Dhaka City, over a period of two years (2004 & 2005). The proposed roads for withdrawal of NMTs and latest situation are presented in Table 1. About 15,000 rickshaw pullers had been evicted from the Mirpur road.

Table 1: The Proposed Roads for Withdrawal of NMTs and Latest Situation.

Sl	Road Name	NMT Free proposed Date	Latest Situation
1	Mirpur Road (Gabtali-Kolabagan)/Panthapath (Kolabagan- Sonargaon crossing)	20-12-02	1st Phased out
2	Mirpur Road (Kolabagan- Azimpur)	31.8.04	2 nd phased out
3	Airport Road (Shahabagh- Sonargaon Crossing- Fargate Mohakhali Banani rail crossing)		Phased out
4	Rokeya Sharani (Mirpur10-Taltala- Agargaon- Farmgate)	31-05-05	
5	Tongi Diversion Road (Mohakhali- Moghbazar- Kakrail)	30-11-05	Partly phased out
6	Progati Sharani /DIT road (Kurill- Baridhara- Badda- Rampura-Malibagh -Mouchak)	30-11-05	
7	New Eskaton road /Circular road (Banglamotor- Moghbazar- Mouchak Malibagh –Rajabagh)	31-7-05	
8	New Elephant Road /Bhashani road (science Lab- Shahabagh – Matshubhavan- Press club- College Road)	31-8-04	
9	Zahir Raihan road /Hatkhola (Azimpur- Fulbaria- Takatali Saidabad)	30-12-05	
10	North South road/ English road ? Chittagong Av. (Malibagh-kakrail- Purana palton-zero point- Fulbaria- Sadarghat)	31-7-06	
11	Technical-Mirpur 1-Mirpur 2 Katchukhet-Banani	30-9-05	Phased out

(Source: STP and collected information)

In 2004, the Government of Bangladesh adopted the National Land Transport Policy. This proposed a progressive ban on movement of rickshaw on the arterial roads in Dhaka, together with measures to encourage rickshaw use in areas and as feeder services to the bus network. However, phased out rickshaw on the arterial roads has created a significant loss of income for affected rickshaw pullers in capital. During 2004 World Bank report highlighted the necessary safeguards and mitigation measures to undertaking any further conversion, which includes that implementation of a package of remedial and support measures for the disadvantaged and displaced rickshaw pullers and owners whose livelihood in adversely affected should be done. It is noted from the news paper (The Daily Star March 2005) that the World Bank will give \$7.5 million soft loan for a project to rehabilitate the evicted rickshaw-pullers from the city roads as part of a government plan to ease congestion in the Dhaka city.

6.4.2.3 Large and Small Buses

Buses transport is very important mode for public transportation in Dhaka city. According to the BRTA registration list there are large 34645 buses (32 seats and length 10 or more meter), 34970 mini buses (15-32 seat and length 8) and 1758 Human haulers (9-15 seat and length less than 8 meter) are plying on the city roadways. The STP stated that in terms of vehicles, buses accounted for 11½% of all vehicles and 17½% of all motorized vehicles. Dhaka has three well developed bus terminals: Gabtoli Bus Terminal, Saidabad Bus Terminal and Mohakhali Bus Terminal. BRTC has its own depots at Pallabi, Kallyanpur and Tejgaon. Currently,

improvements to these three intercity terminals are being implemented as part of the Dhaka Urban Transport Project (DUTP), funded by the World Bank in Tejgaon, and other places.

Seating Provision for Disable persons and Women: In Bangladesh seating arrangement for the disable persons is not provided in the all types of buses, which is one of the prime requirements on the humanity ground. Only a few buses have women's seating provision.

Bus Stands: The bus stands or shed are not developed adequately in Dhaka city to meet the demands of city dwellers. Most of the bus stands the passengers have to wait for transport without under the shed in severe raining or in sunny hot day.

Bus Fare: 5 kilometre trips are around Tk5 (\$0.07) depending somewhat upon the type of bus and quality of services. The general traffic fare of mini bus and big bus in the urban areas is given in Table 6.2 based upon the rapid on spot survey at bus stand and ticket counter. Recently again fare price has been increased in the city.

Table 6.2: Traffic Fares of Mini and Large Buses in the Urban Areas in Dhaka,

Traffic	From	To	Fare	Average Rate/km (collected from Ticket Counter)
Bus No-3 Mini Bus (Local Service)	Airport	- Gulishtan	Tk. 12/ -	Tk. 0.70/-
	Airport	- Banani	Tk. 5/-	
	Banani	- Gulishtan	Tk. 8/-	
Bus No-6 Large Bus (Local Service)	Gulshan	- Kamlapur	Tk. 12/ -	Tk. 0.80/-
	Gulshan	- Mohakhali	Tk. 4/-	
	Mohakhali	- Farmgate	Tk. 3/-	
	Farmgate	- Gulistan	Tk. 5/-	
	Gulistan	- Famlapur	Tk. 3/-	
Madumati Paribahan Large Bus (Seated)	Gulshan (2)	- Gulshan (2)	Tk. 5/-	Tk. 0.80/-
	Gulshan (1)	- Mohakhali-Farmgate	Tk. 8/-	
	Farmgate	- Gulistan	Tk. 6/-	
	Gulistan	- Kamlapur	Tk. 5/-	
21 Paribahan Large Bus (Seated)	Gaptoli	- Malibag	Tk. 20/ -	Tk. 1.05/-
	Gaptoli	- Mohakhali	Tk. 15/ -	
	Mohakhali	- Rampura Bazar	Tk. 8/-	
	Mohakhali	- Malibag	Tk. 10/ -	
Bengal Motor Arif Enterprise Large Bus (Seated)	Mirpur (1)	- Rampura & Banasree	Tk. 15/ -	Tk. 1.00/-
	Mohalkhali	- Rampura & Banasree	Tk. 8/-	
Discovery Transport Large Bus (Seated)	Abdullapur	- Gabtoli	Tk. 20/ -	Tk. 0.83/-
	(via Bijoysorani - Mirpur to 1&2)		Tk.	
	Abdullahpur	- Kajipara	Tk. 16/ -	
	Banani	- Mirpur (2)	Tk. 12/ -	
	(via Mirpur - 10&1		Tk.	
Monjil Paribahan Large Bus (Seated)	EPZ	- Motijheel	Tk. 35/ -	

Traffic	From	To	Fare	Average Rate/km (collected from Ticket Counter)
	EPZ	- Abdullahpur	Tk. 16/-	Tk. 0.80/-
	Abdullahpur	- Banani	Tk. 12/-	
	Banani	- Motijheel	Tk. 10/-	
Dhaka Paribahan Large Bus (Seated)	EPZ	- Motijheel	Tk. 35/-	Tk. 1.00/-
	Airport	- Motijheel	Tk. 16/-	
Kalmilata Paribahan Large Bus (Seated)	Abdullahpur	- Gulistan	Tk. 20/-	Tk. 0.90/-
	Airport	- Gulistan	Tk. 12/-	

(Source: Filed Survey, Sector Survey on Urban Transportation by JICA, March 2008)

6.4.2.3 CNG Auto Rickshaw

CNG Auto Rickshaw and Rental Cab: Auto-rickshaws (also known as baby taxis or CNGs) investment cost and the quality of service is less than that provided by regular taxis (car) and, therefore, the cost to the user is lower. After phased out the 40,000 auto-2-stroke rickshaws to eliminate air pollution the Government approved the introduction of 12,000 four-stroke CNG-fuelled auto-rickshaws in Dhaka city. In addition to CNG Auto rickshaw rental car or cab is also another transport for the transportation in the city. Recent fares of CNG Auto rickshaw and rental car/cab are presented in **Table 6.3** based on spot surveys. The traffic fare of this vehicle governed by vehicle's in-built meter reading. But sometimes drivers asked for Tk 5 to 10 more than the actual reading of the meter. It is noted that per 1 minute stoppage due to Traffic Jam, the fare increases by excess Tk. 2.00.

Table-6.3: Traffic Fares of CNG Auto-Rickshaw and Cab in Dhaka

Traffic	Initial Meter Reading	From	To	Fare	Av. Rate/km Collected from drivers
CNG (Four Stroke Baby Taxi).	Tk. 13.50 (upto 1st 2km)	Kachukhet	- Puranapaltan Line	Tk. 68/-	Tk. 6/km~6.50/km
		Kachukhet	- New Market	Tk. 66/-	
Black Cab	Tk. 15.00 (upto 1st 2km)	Kachukhet	- Airport	Tk. 70/-	Tk. 6/km~6.50/km
		Kachukhet	- Tongi Bridge	Tk. 95/-	
Yellow Cab	Tk. 20.00 (upto 1st 2km)	Kachukhet	- Airport	Tk. 85/-	Tk. 8/km~8.50/km
		Kachukhet	- Tongi Bridge	Tk. 130/-	

(Source: Filed Survey, Sector Survey on Urban Transportation by JICA, March 2008)

6.4.3 Slums in Dhaka City

Slums have been a feature of life in the cities of Bangladesh for a long period. Most of the dwellers in the slums are permanent and temporary rickshaw puller. There are 4966 numbers of largest slums have been developed in the Dhaka city, which accounted about 54.8% of the total

slum numbers of the big six cities in Bangladesh (Ref: Slums of Urban Bangladesh Mapping and Census 2005). About 673,883 households are found in these slums and average population density in slums was 831 persons / acre or 205,415 people/ km². Housing quality in slums is mostly poor quality with weak and temporary structures or Kutcha units. Slum dwellers live in very small single room homes.

Majority slums clusters have been developed on private owned lands, public lands (Government and semi Government lands) and roadsides. These lands are usually low lying areas, marshes, sewage canals riversides, rail tracks and embankments. These sorts of places are prone to suffer from poor drainage and hence water logging and flooding. During the monsoon and flooding period different parts of the Dhaka city become a miserable condition and slums dwellers have to move to places.

7. Conclusions and Recommendation

Introduction

The Japanese Mission visited Bangladesh between 2-14 of March 2008 and successfully completed their mission collecting all required data, information, reports, GIS Maps and stakeholders views. The consultants in addition to the field survey, research, review and update prepared and submitted all reports as per ToR such as Inception, Interim and Draft Final in time. It was a difficult job considering the time limit allowed for the assignment. However, in addition to their assigned jobs the consultants were able to extend all sorts of assistance and cooperation to the visiting Mission discussing problems and issues of Dhaka Transport in general and STP recommendation in particular and accompanied site visits wherever necessary. During the visit they explained them the physical constraints and showed them existing congested situation.

Assistance

The Consultants identified and suggested program strategy and priority projects with greater detailed analysis for possible Japanese finance and technical co-operation. The mission has discussed important policy and institutional issues suffering the existing agencies and appraised the need for strengthening them for improving situation as well as needs for establishing new powerful and stronger authorities for future development particularly in view of introducing MRT system. The Consultants also discussed the very sensitive issues of environment under which the development works will be undertaken and implemented including social environment, natural and physical environment including their policy guidelines and regulations.

Recommendation

The STP Consultants along with the powerful Advisory Committee and major stakeholders preferred modified 2b strategy for Dhaka out of 10 Strategies developmnet. The main feature of modified strategy 2b includes integrated and multi-modal mass transit system such as regional highway improvements, several city by-passes, construction of east-west connections, construction of missing links, adequate drainage facilities, safety provisions, required flyovers, underpasses, overpasses, improvements and widening of city streets, etc. The strategy included and emphasized construction of mass rapid transit lines to solve existing congestion problems as well as accommodating ever growing passenger traffic demand up to 2024. Two types of mass transit systems were recommended for inner city areas i.e. Bus Rapid Transit (BRT) system and Metro Rapid Transit (MRT) System. Three at grade BRT lines and three MRT lines of which two underground and one elevated were recommended. The strategy also included major interchange development for mass transit transfer, elevated expressway options, major city highway corridors improvement and intersections improvements. The strategy also envisaged and recommended several institutional and policy related action plans.

After reviewing the STP reports, recommendations, working papers, re-visiting project sites and detailed discussion with the JICA Mission the Consultants arrives some conclusions regarding selecting the priority policies and programs for Japanese assistance. They have selected and recommended few policy strategies and projects from among the elaborated list of modified 2b option of STP. The selected policies will be multi-year program which continuously improve the transport system in Dhaka and will have long term impacts and benefits to the city dwellers. Three main policies suggested are:

- ❖ Improving Existing Traffic Management System
- ❖ Study, Design and Implementation of Mass Rapid Transit System

- ❖ Institutional Development and Governance in DMA organizations
- ❖ Priority Highway Projects to ease traffic circulation in Dhaka

Improving Existing Traffic Management System

At the present time, the level of driver competence and their behaviour patterns in the city are very poor. In addition, the highways and pedestrian paths have been taken over by traders and others who use the running surfaces for uses other than transportation. This causes traffic congestion and delays and reduces the carrying capacity of the highways. One of the major untapped transport related assets of Dhaka is the substantial unused traffic capacity inherent in the existing highway system that is now being wasted through inappropriate use and poor driver behaviour.

The above recommendation has stressed the need to reclaim the lost capacities in the existing highway system and introduce discipline on the road by the use of traffic management measures. The concept requires that good practice in organization and priorities is implemented within the existing right of way. No land acquisition is required and no displacement of persons results. Only recovering the right-of-way may improve lots of traffic discipline in the city. In such cases, any non-conforming uses such as illegal structures forming pinch points and persons who carry on their businesses on the road itself will be affected.

Study, Design and Implementation of Mass Rapid Transit System

As mentioned MRT system is a highly demanded strategy for Dhaka. Two types of mass transit systems were recommended for inner city areas i.e. Bus Rapid Transit (BRT) system and Metro Rapid Transit (MRT) System. Three at grade BRT lines and three MRT lines of which two underground and one elevated were recommended. The strategy also included major interchange development for mass transit transfer, elevated expressway options, major city highway corridors improvement and intersections improvements.

Mass Rapid Transit Routes

1.	BRT Line -1: The Red Route	:	Tongi-Uttara- Progati Sarani-Rampura-Kamalapur-Saidabad Bus Terminal
2.	BRT Line -2: The Blue Route	:	West Gabtali –Shymoli-Dhanmondi-Fulbaria- Saidabad Bus Terminal
3.	BRT Line -3: The Yellow Route	:	Airport – Mohakhali- Ramna- Fulbaria-Old City (Mitford)
4.	Metro Line-1: The Green Route (Underground)	:	Uttara – Airport – Mohakhali-Tejgaon- Kamalapur- Saidabad
5.	Metro Line-2: The Brown Route (Elevated Circular)	:	Gulshan- Banani- Mirpur-Mohammadpur- Dhanmondi- Malibagh- Rampura-Gulshan
6.	Metro Line-3: The Purple Route (Underground)	:	Pallabi-National Assembly-Farmgate – Palashi-Gulistan-Saidabad

Institutional Development and Governance in DMA organizations

Institution strengthenings of key organization are urgent necessity. The key organizations related to the transport system and involved in the implementation of the Strategic Transport Plan for Dhaka Metropolitan area are: (i) Ministry of Communications (MoC), the apex policy making and regulatory authority, (ii) Dhaka Transport Co-ordination Board (DTCB), (iii) Dhaka City Corporation (DCC), (iv) Dhaka Metropolitan Police (DMP), (v) Rajdhani Unnayan Kartipakhaa (RAJUK) and (vi) Bangladesh Road Transport Authority (BRTA). In addition, Inland Water Transport Authority (BIWTA), Bangladesh Railway (BR); Department of Environment (DoE); Road and Highways Department (RHD), Local Government Engineering Department (LGED), and the adjoining Municipal Authorities and others are also involved in the DMA transport related issues and development activities.

Priority Highway Projects to ease traffic circulation in Dhaka

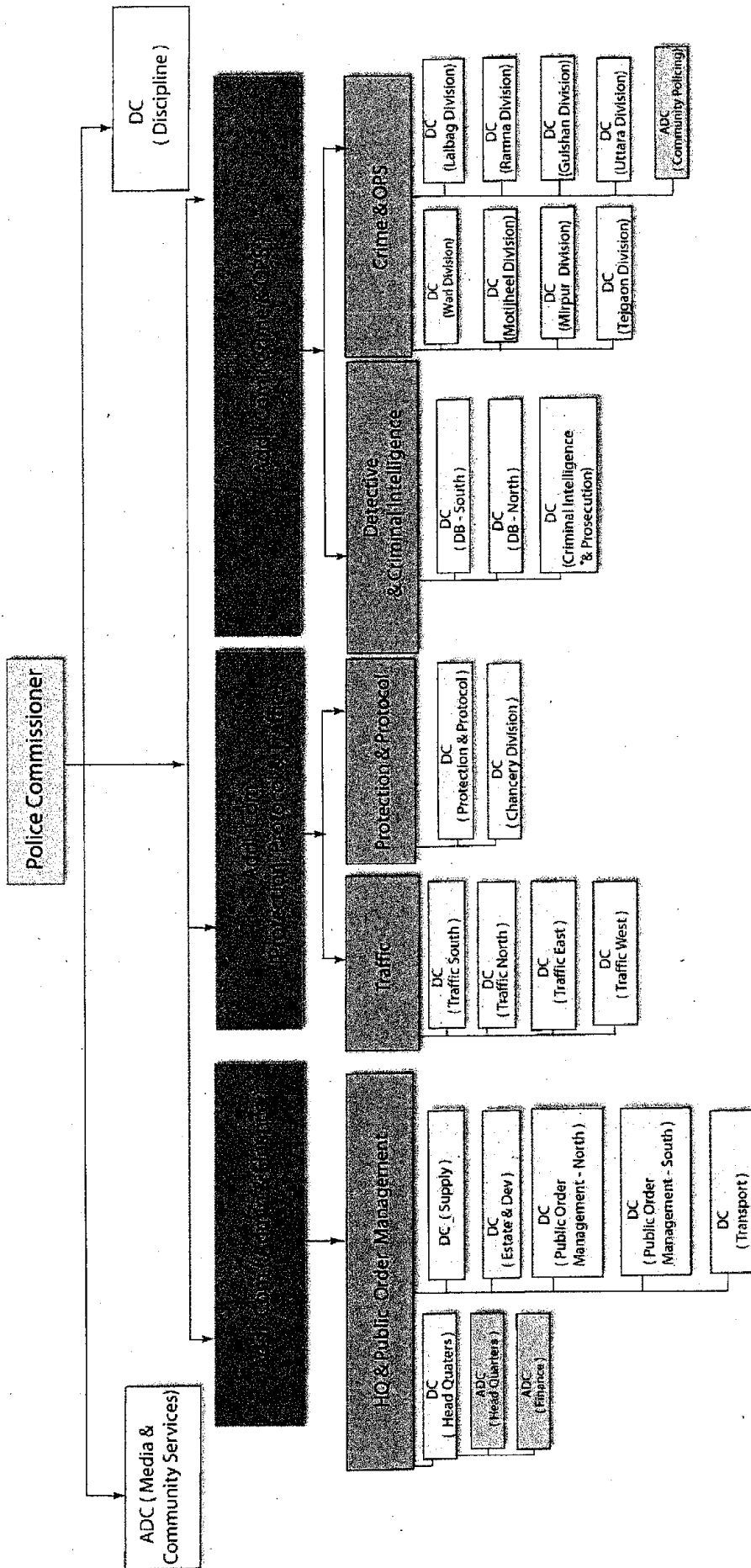
The Consultants also recommend following highways projects for Japanese assistance based on their priorities:

SL	Description	Length (Km)		Comment
7	Zia Colony to Mirpur Cantonment – Pallabi	6.30km	2-lane dual	This is planned as a 6.3kms dual 2-lane road aimed at opening up the area south and west of the International Airport. It will create a much needed east-west link in the northern part of the city allowing traffic from the western parts of the area to access the Airport without having to make large detours
12	Tunnel connecting Shahid Jahangir Gate (Cantonment) & Rokeya Saroni	0.90km	3-lane dual	Originally a new project identified by STP it is intended to provide a much needed east-west connection for the city. It will lead directly west from the end of the recently constructed Mohakhali Flyover. The alignment is not yet fixed but is anticipated to connect on the west side of the airport into Agargaon Road.
18	Circular Road (ring road) over embankment (Ashulia to Buriganga 2nd bridge (Babu bazar))	25.00km	2-lane dual	In order to organize the western areas of the city and to begin the process of encouraging development to the west, it is recommended that the road located on the embankment be developed in this phase. Proposed by RHD as a 25 km long dual 2-lane highway upgrading scheme provides a key link in the strategic network linking into the numerous ferry terminals along the Turag River.
32	Pallabi (Mirpur) to Uttara 3rd Phase up to Tongi - Ashulia road (Dhour)	6.50km	2-lane dual	This dual 2-lane highway proposed by RAJUK is to the west of Uttara and will complete the basic infrastructure in this area and open up the land for expansion.
54	Eastern Embankment along Balu river, Tongi, Demra (Chittagong Highway)	30.00km	2-lane dual	The real justification for the embankment will be made by traffic and on other basis of flood protection. It is recommended that scheme #54 be reduced to a 2-lane road.

Conclusions

It is hoped that the mission will be able to produce an excellent report on Urban Transportation of Dhaka and recommend the Japanese Government and JICA the priority strategy and priority projects to be selected for technical and financial assistance. The Consultants will always remain engaged to clarify any point or supply data and information as required by the Mission.

Organizational Set-up of DMP



BANGLADESH ROAD TRANSPORT AUTHORITY

MINISTRY OF COMMUNICATIONS

CHAIRMAN 291

Pers. 5
 1x Chairman
 1x Asstt. Director (PS)
 1x Steno-grapher/PA
 1x LDA-cum-Typist
 1x MLSS

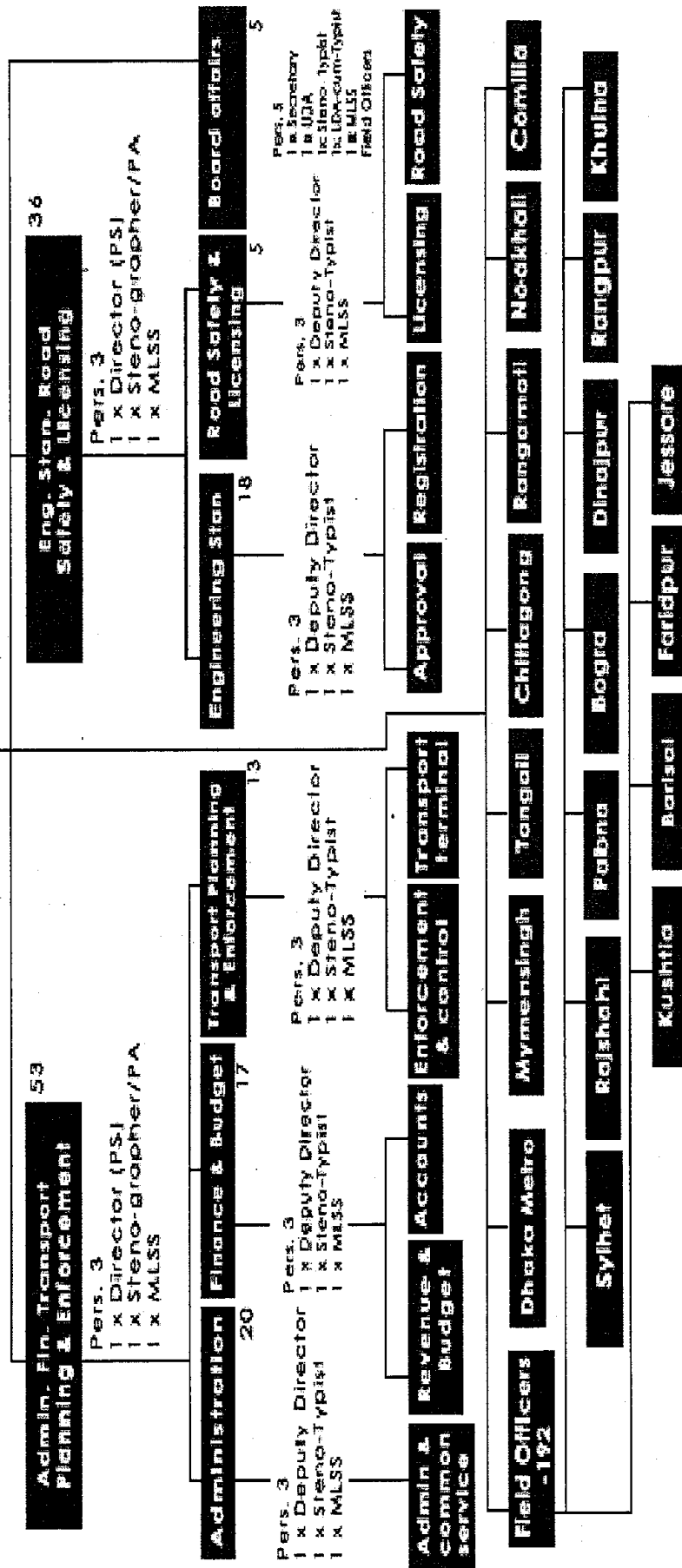
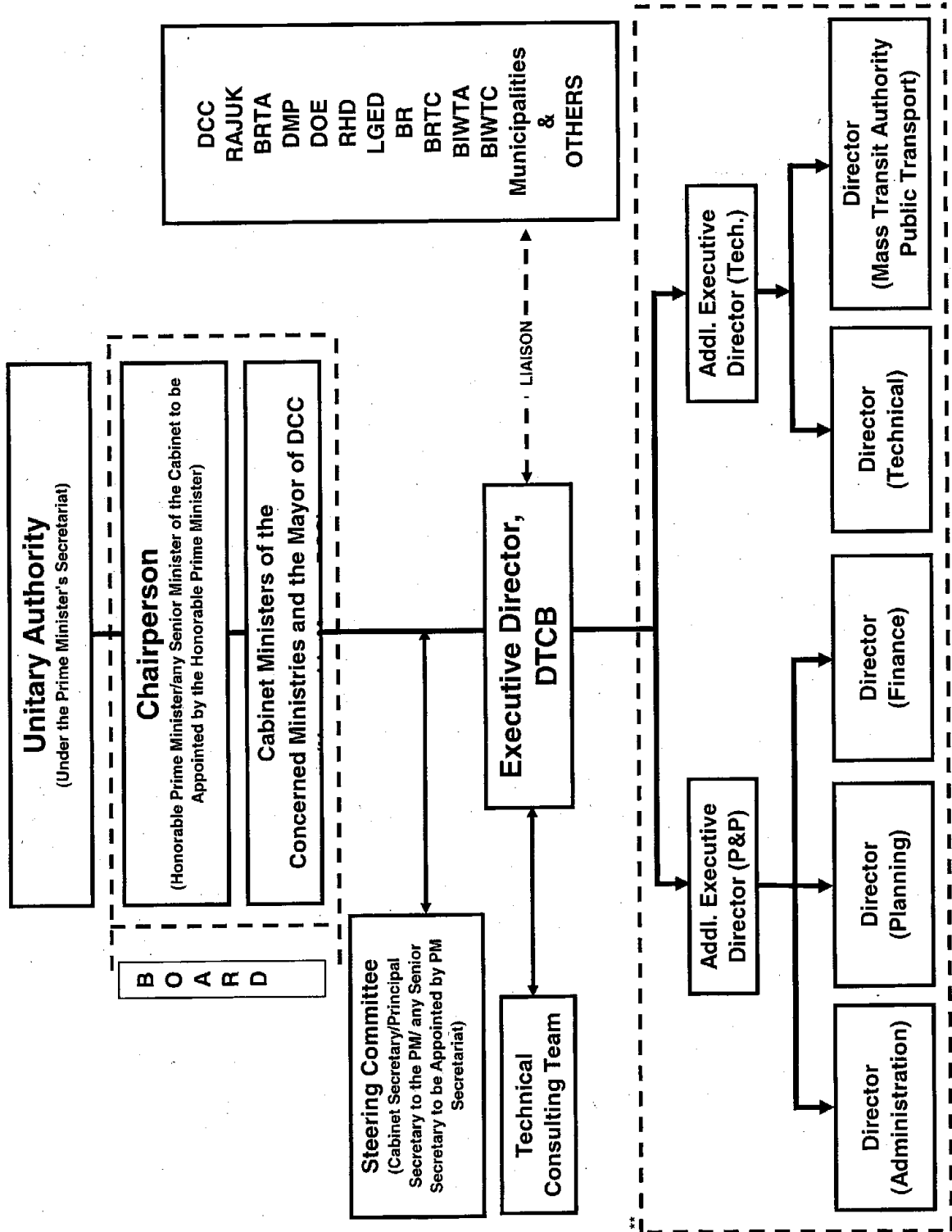
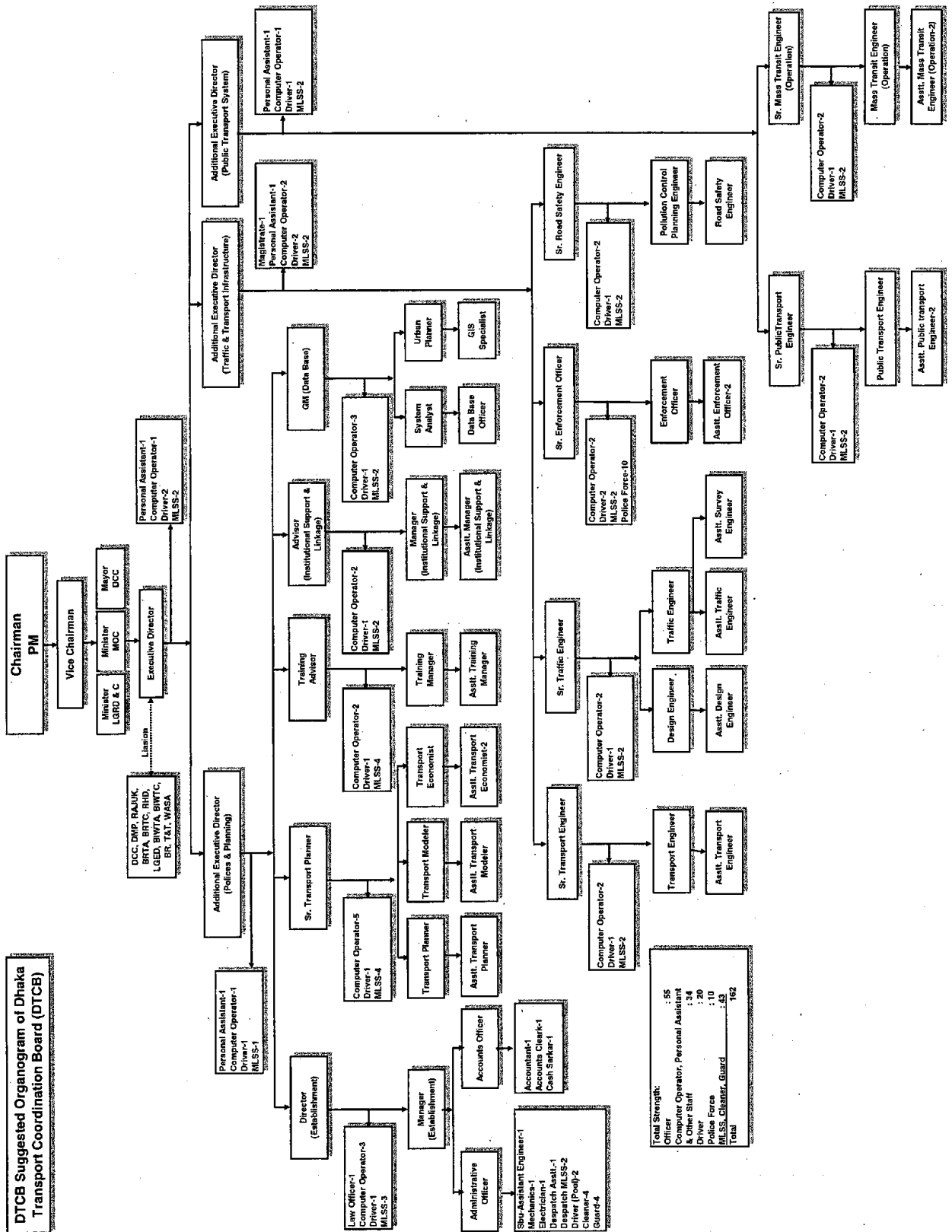


EXHIBIT 2.4: A CONCEPTUAL APPROACH TO AN ORGANIZATION OF A UNITARY AUTHORITY



** Note: The suggested set-up will be determined by the government after finalization of the revised functions of the DTCB/Unitary Authority.

DTCB Suggested Organogram of Dhaka Transport Coordination Board (DTCB)



Total Strength:

SS	: 55
Computer Operator, Personal Assistant & Other Staff	: 38
Driver	: 20
Police Force	: 10
MLSS, Cleaner, Guard	: 53
Total	162

EXISTING PROJECTS AND FUTURE PLANS BY DONORS

Name of Donor : The World Bank (IDA)

Sl. No.	Name of Sectors / Sub Sectors	Name of Projects Ongoing/ New Projects	Estimated Cost		ADP-Allocation 2007 - 2008		
			Total	Project Aid	Total	Project Aid	Others
1.	<u>Transport</u> (a) Roads & Highways Department (RHID)	<u>On-going</u> (i) Road Sector Reform Project (RSRP)	221200	144728	5500	5000	-
		<u>On-going</u> (i) Air Quality Management Project	3977	3233	700	600	-
3.	<u>Live-stock</u> (a) Department of Livestock Services	<u>New Project</u> (i) Avian Influenza Preparedness and Response Project	15400	13300	1981	1198	-
		<u>On-going</u> (i) Refurbishing of Assets of Chittagong Steel Mills and Adamjee Jute Mills for conveying into EPZs.	6586	5277	1120	920	-
5.	<u>Housing & Physical Planning</u> (a) M/o Law and Justice etc.	<u>On-going</u> (i) Refurbishing of Two SoEs & Establishment of Industrial Parks	28200	23454	4688	3822	-
		<u>On-going</u> (i) Legal and Judicial Capacity ^a Building Project	31982	23200	4450	3860	-
	(b) Department of Public health Engineering (DPHE)	(i) Water Supply Programme Project in Bangladesh.	30715	20640	2760	-	-
		(ii) Dhaka Urban Transport (DUT)	57860	49091	5450	2760	-
	(d) Local Government Engineering Department (LGED)	(iii) Municipal System Project					

a. DINIDA and SIDA are also assisting with IDA

Sl. No.	Name of Sectors / Sub Sectors	Name of Projects Ongoing / New Projects	Estimated Cost		ADP Allocation 2007 - 2008		
			Total	Project Aid	Total	Project Aid	Others
Name of Donor : The Asian Development Bank (ADB)							
Transport (a) Roads & Highways Department (RHD)		On-going					
		(i) Road Network Maintenance and Improvement Project	86177	50760	5399	2671	-
		(ii) Road Network Improvement and Maintenance Project - I	70638	43500	16209	5292	-
		(iii) Road Network Improvement and Maintenance Project - II	109824	74340	28920	15223	-
		(iv) ADB Assisted Flood Damage Rehabilitation Project	42590	32772	471	440	-
6. Bangladesh Railway (BR) (a) BR		On-going					
		(i) Rehabilitation of Mainline ^b Section of Bangladesh Railway	53739	7235	17303	5242	6800
		(ii) Rehabilitation of Damages to Rail Lines etc.	13203	11359	-	-	-
		(iii) Bangladesh Railway Sector Improvement Project	360125	288100	4048	1000	-
		(iv) Double Lines between Tongi and Bhairab Bazar	72437	52400	2806	500	-
		(v) Reform of Bangladesh Railway	2513	2010	1842	500	-
7. Chittagong Port Authority (CPA)		On-going					
		(i) Chittagong Port Trade Facilitation (CPA, NBR & RHD)	22586	16894	1500	1000	-
8. Agriculture (a) Bangladesh Water Development Board (BWDB) (b) Directorate of Agricultural Marketing (DAM)		On-going					
		(i) North-West Crop Diversification Project	56151	39680	8830	6620	-
		(ii) Bangladesh Agro-business Project	28356	27081	6438	6122	2230

b. Chaina is also associated

Sl. No.	Name of Sectors / Sub Sectors	Name of Projects Ongoing / New Projects	Estimated Cost		ADP-Allocation 2007 - 2008		
			Total	Project Aid	Total	Project Aid	Others

Name of Donor : The Asian Development Bank (ADB)

	(c) Department of Livestock Services (DLS)	<u>On-going</u> (iii) Second Participatory Livestock Development Project	3432	1121	1050	300	-
	(d) Bangladesh Water Development Board (BWDB)	(iv) South-West Area Integrated Water Resources Plan and Management Project	26025	19507	2895	2380	-
	(e) Local Government Engineering Department (LGED)	(v) Second Small Scale Water ^d Resource Development Sector Project	42734	31908	8000	5200	-
	<u>Industries</u>	- -	- -	- -	- -	- -	- -
	<u>Housing</u>	<u>On-going</u>					
	(a) Department of Public Health and Engineering (DPHE)	(i) Secondary Town Water Supply and Sanitation Project	48560	34250	1360	1243	-
	(b) Local Government Engineering Department (LGED)	(ii) Secondary Towns Infrastructures Development Project - II	41591	26880	380	-	-
		(iii) Urban Government and Infrastructure Improvement Project	51639	36000	8400	5000	-
		(iv) Rehabilitation of Flood Damaged urban Physical Infrastructure Project	24052	15337	2520	1891	-
	<u>Tourism</u>	- -	- -	- -	- -	- -	- -

c. Netherlands is also associated
d. Japan and Netherlands are also associated

Sl. No.	Name of Sectors / Sub Sectors	Name of Projects Ongoing / New Projects	Estimated Cost		ADP-Allocation 2007 - 2008		
			Total	Project Aid	Total	Project Aid	Others
Name of Donor : Japan Bank of International Cooperation (JBIC)							
	<u>Transport</u> (a) Roads & Highways Department	<u>On-going</u> (i) Jamuna Bridge Access Road Project (ii) Procurement of Portable Steel Bridge Phase - II (iii) Construction of Rupsha Bridge andLink Road	42612	26607	1242	942	-
			52621	27933	1000	-	-
			70418	36968	325	-	-
	<u>Agriculture</u> (a) Bangladesh Livestock Research Institute (BLRI)	(i) Poultry Technology Development Dissemination Project	3351	2500	1821	938	-
	<u>Industries</u> (a) Bangladesh Chemical Engineering Corporation	(i) Di-Ammonium Phosphat Plant	51964	38882	211	211	-
	<u>Housing</u> (a) Chittagong WASA	(i) Kamaphuli Water Supply Project	96290	69350	2000	1500	-
	<u>Tourism</u>	- -	- -	- -	- -	- -	- -
Note :							
The other development partners involved in the development of Transport, Agriculture, Industry and Housing are :							
Kuwait Fund, Islamic Development Bank, DANIDA, SIDA, DFID, IFAD, UNDP and India are worth mentioning. These development partners are involved in a few projects only of the above mentioned sectors. However, none of them has participated in the development of tourism in Bangladesh							

Table 1.1(a): Origin- Destination Matrix
Truck O-D Result

Road Name: Dhaka-Mawa-Khulina
Survey Location: Mawa Ferry Ghat

Direction: Bothway

Location Name	Origin											Total	%										
	Bagerhat	Barishal	Chittagong	Cornilla	Dhaka	Faridpur	Gazipur	Gopalganj	Jhalakhati	Khulina	Madaripur			Munshiganj	Narayanganj	Noakhali	Rangamati	Shariatpur	Shatkhira	Syhet			
Bagerhat					1															1	1		
Barguna													1									1	1
Barishal			1		2		1															4	4
Chittagong			7		1		1		6											1		16	17
Cornilla																						1	1
Dhaka	3	6					3	1	1	8										1		23	25
Faridpur					3		1							1								5	5
Jessore					1																	1	1
Khulina			9																			12	13
Madaripur			2																			3	3
Munshiganj																						1	1
Narayanganj	1	3						1	3	1												11	12
Rangamati						1																1	1
Shariatpur					3																	3	3
Shatkhira			1		2	6																9	10
Thakurgaon																					1	1	1
Total	4	16	13	2	19	1	2	5	2	10	9	1	2	1	1	3	1	1	1	1	93	100	
%	4	17	14	2	20	1	2	5	2	11	10	1	2	1	3	1	1	1	1	1	100		

Source :JICA Study ,2008

Table 1.1(b): Origin- Destination Matrix
Commodity Flow

Road Name: Dhaka-Mawa-Khulna
Survey Location: Mawa Ferry Ghat

Origin	Destination	Commodity											Total	%			
		Agricultural Product	Construction Material Metals	Construction Materials	Consumer goods	Forest Product	Grocery	Jute & Jute goods	Misc. Goods	Mineral	Petroleum						
Bagerhat	Dhaka														1	1.1	
Barguna	Narayanganj		1													1	1.1
Barishal	Chittagong															1	1.1
	Dhaka									1						2	2.2
	Gazipur															1	1.1
Chittagong	Barishal	5													2	7.5	
	Dhaka														1	1.1	
	Gopalganj	1														1	1.1
	Khulna		1											2		6	6.5
	Shatkira														1	1.1	
Comilla	Shariatpur															1	1.1
Dhaka	Bagerhat															3	3.2
	Barishal															2	2.2
	Gopalganj															1	1.1
	Jhalakhati															2	6.5
	Khulna															1	1.1
	Madaripur		5													1	1.1
	Shariatpur															3	8.6
Faridpur	Dhaka															1	1.1
	Gazipur															3	3.2
	Noakhali															1	1.1
Jessore	Dhaka															1	1.1
Khulna	Chittagong															1	1.1
	Narayanganj															6	9.7
	Rangamati															1	1.1
	Sylhet	1														1	1.1
Madaripur	Chittagong	1														1	1.1
	Dhaka															2	2.2
Munshiganj	Dhaka															1	1.1
Narayanganj	Bagerhat															1	1.1
	Barishal															1	1.1
	Gopalganj															2	3.2
	Jhalakhati															1	1.1
	Khulna															2	3.2
	Madaripur															1	1.1
	Shariatpur															1	1.1
Rangamati	Faridpur															1	1.1
Shariatpur	Dhaka	1														3	3.2
Shatkira	Chittagong	1														2	2.2
	Comilla	2														2	2.2
	Dhaka	4														1	1.1
Thakurgaon	Munshiganj	1														6	6.5
	Total	18	10	2	1	13	20	11	10	5	3	93					
	%	19.4	10.8	2.2	1.1	14.0	21.5	11.8	10.8	5.4	3.2	100					

Source: JICA Study, 2008

**Table 1.1(c): Origin- Destination Matrix
Bus O-D Result**

**Road Name: Dhaka-Mawa-Khulna
Survey Location: Mawa Ferry Ghat**

Direction: Bothway

Origin	Destination												Total	%			
	Bagerhat	Barguna	Barishal	Dhaka	Faridpur	Gazipur	Gopalganj	Jhalakhati	Khulna	Madaripur	Munshiganj	Patuakhali			Pirojpur	Shariatpur	
Bagerhat				2												2	1
Barguna				2												2	1
Barishal				4												4	1
Dhaka	4	4	11		4		6	1	12	4	107	1	2	2	158	51	
Faridpur				1											1	0	
Gopalganj				2											2	1	
Khulna				8											8	3	
Madaripur				8											8	3	
Munshiganj				117		1									118	38	
Patuakhali				1											1	0	
Pirojpur				3											3	1	
Shatkhira				2											2	1	
Total	4	4	11	150	4	1	6	1	12	4	107	1	2	2	309		
%	1	1	4	49	1	0	2	0	4	1	35	0	1	1		100	

Source: JICA Study, 2008

Table 2.1(a): Origin- Destination Matrix
Truck O-D Result

Road Name: Dhaka-Aricha
Survey Location: Savar Bus Stand

Direction: Bothway

Location Name	Destination										Total	%											
	Barguna	Bogra	Chittagong	Comilla	Dhaka	Dinajpur	Fardpur	Gabandha	Jessore	Khulna			Neiphaman	Norshingdi	Pabna	Rajbari	Rajshahi	Rangpur	Saikhira	Syhet	Thakurgaon		
Bogra			2									1									5	5	
Chittagong							1															3	3
Comilla								1														1	1
Cox's Bazar										1												1	1
Dhaka	1	3			9	7	2	1	3	6				3		5	1				2	46	42
Dinajpur					2																	2	2
Gazipur						1																1	1
Jessore					4																	6	5
Jhenaidah					1																1	1	1
Joypurhat					3																	3	3
Khulna					1																	1	1
Kushila					3																	3	3
Lalmonirhat					1																	1	1
Manikganj					2																	2	2
Meherpur																						1	1
Nagaon					3																	5	5
Narayanganj					1									1								1	1
Nilphamari					2																	3	3
Pabna					2																	2	2
Panchagar					1																	1	1
Rajshahi					2																	2	2
Rangpur					7																	9	8
Saikhira					3																	3	3
Shunangari																				1		1	1
Tangail					5																	5	5
Thakurgaon					1																	1	1
Total	1	3	7	2	54	8	3	1	4	7	1	1	2	3	3	6	1	1	1	1	2	110	
%	1	3	6	2	49	7	3	1	4	6	1	1	2	3	3	5	1	1	1	1	2	100	

Source :JICA Study ,2008

Table 2.1(b): Origin- Destination Matrix
Commodity Flow

Road Name: Dhaka-Aricha
Survey Location: Savar Bus Stand

Origin	Destination	Commodity													Total	%					
		Agricultural Product	Construction Material Metals	Construction Materials	Consumer goods	Electronics	Fishery Product	Forest Product	Grocery	July & June goods	Machinery and equipment	Misc. Goods	Mineral	Petroleum							
Bogra	Chittagong	1																	2	1.8	
	Dhaka	2																		2	1.8
	Narsingdi																			1	0.9
Chittagong	Fardpur		1																	1	0.9
	Pabna																			1	0.9
	Rangpur																			1	0.9
Comilla	Jessore		1																	1	0.9
Cox's Bazar	Neiphamani																			1	0.9
Dhaka	Barguna				1															1	0.9
	Bogra		1																	1	0.9
	Dhaka					5														3	2.7
	Dinepur		2																	1	0.9
	Fardpur			1																1	0.9
	Gaibandha																			1	0.9
	Jessore		2																	2	1.8
	Khulna																			1	0.9
	Rajbari																			1	0.9
	Rajshahi																			1	0.9
	Rangpur																			1	0.9
	Satkhira																			1	0.9
	Thakurgaon																			1	0.9
Dinajpur	Dhaka		2																	2	1.8
Gazipur	Dinepur																			1	0.9
Jessore	Comilla		1																	1	0.9
	Dhaka																			1	0.9
	Sylhet																			1	0.9
Jherakich	Dhaka																			1	0.9
Joypurhat	Dhaka																			1	0.9
Khulna	Dhaka		3																	3	2.7
	Dhaka																			1	0.9
	Dhaka		1																	1	0.9
Lalmonghat	Dhaka																			1	0.9
Manikganj	Dhaka																			1	0.9
Meharpur	Chittagong																			1	0.9
Naogaon	Chittagong																			1	0.9
	Comilla		1																	1	0.9
	Dhaka		3																	3	2.7
Narayanganj	Khulna																			1	0.9
Niuphamari	Chittagong		1																	1	0.9
	Dhaka		2																	2	1.8
Pabna	Dhaka		2																	2	1.8
Panchagar	Dhaka		1																	1	0.9
Rajshahi	Dhaka		2																	2	1.8
Rangpur	Chittagong																			1	0.9
	Dhaka		4																	4	3.6
Sakhtira	Dhaka																			1	0.9
Shuramganj	Dhaka																			3	2.7
Tangail	Pabna																			1	0.9
	Dhaka		2																	2	1.8
Thakurgaon	Dhaka		1																	1	0.9
	Dhaka		31																	3	2.7
	%		26.2	17	15.5	10.9	5.5	6	5.5	0.9	2.7	1.8	0.9	2.7	11.8	8.2	5.5	6	110	100	

Source: JICA Study, 2008

Table 2.1(c): Origin- Destination Matrix
Bus O-D Result

Road Name: Dhaka-Aricha
Survey Location: Savar Bus Stand

Direction: Bothway

Location Name	Destination															Total	%									
	Bogra	Chapai Nawabganj	Dhaka	Dinajpur	Fardpur	Galbandha	Gazipur	Gopalganj	Jessore	Joypurhat	Khulna	Kurigram	Manikganj	Natore	Nilphaman			Pabna	Panchagath	Rajbari	Rajshahi	Rangpur	Saikhira	Tangail	Thakurgaon	
Barguna			1																					1	1	
Barisal			7																						7	4
Bogra			5																						5	3
Chapai Nawabganj			1																						1	1
Comilla				1																					1	1
Dhaka	3	2	55	6	3	1	2	1	3	1	6	3	3	1	3	3	1	2	5	10	2	3	1	120	63	
Dinajpur			3																						3	2
Fardpur			2																						2	1
Galbandha			2																						2	1
Gopalganj			1																						1	1
Jessore			4																						4	2
Jhenaidah			1																						1	1
Khulna			1																						1	1
Kurigram			3																						3	2
Kushia			2																						2	1
Magura			1																						1	1
Manikganj			7																						7	4
Meherpur			1																						1	1
Naogaon			3																						3	2
Narail			1																						1	1
Pabna			3																						3	2
Pirojpur			1																						1	1
Rangpur			5																						5	3
Saikhira			2																						2	1
Tangail			10																						10	5
Thakurgaon			1																						1	1
Total	3	2	123	6	4	1	2	1	3	1	6	3	3	1	3	3	1	2	5	10	2	3	1	189	100	
%	2	1	65	3	2	1	1	1	2	1	3	2	2	1	2	2	1	1	3	5	1	2	1	1		

Source: JICA Study, 2008

Table 3.1(a): Origin- Destination Matrix
Truck O-D Result

Road Name: Dhaka-Comilla
Survey Location: Meghna Bridge

Direction: Bothway

Location Name	Destination													Total	%					
	Bagerhat	Barisal	Bogra	Chandpur	Chittagong	Comilla	Dhaka	Feni	Galbandha	Gazipur	Jessore	Munshiganj	Narayanganj			Noakhali	Norshingdi	Rajshahi	Sirajganj	
Bogra					1													1	1	
Chapai Nawabgonj							1												1	1
Chittagong		1						1	5	1	2	11			1		2	60	44	
Comilla	1						6											7	5	
Cox's Bazar							2											2	1	
Dhaka					18	5		2										25	18	
Dineajpur					1			2										3	2	
Gazipur					4													4	3	
Jessore					2	1												3	2	
Madaripur					1													1	1	
Munshiganj						1												1	1	
Narayanganj				2	6	7		1					3					19	14	
Noakhali							1											2	1	
Pabna					1													1	1	
Rajshahi			1			1												1	1	
Rangamati							1		1									2	1	
Rangpur								1										1	1	
Shatkhira						3												3	2	
Total	1	1	1	2	34	18	45	7	1	6	1	2	11	3	1	1	2	137		
%	1	1	1	1	25	13	33	5	1	4	1	1	8	2	1	1	1	100		

Source :JICA Study ,2008

**Table 3.1(c): Origin- Destination Matrix
Bus O-D Result**

**Road Name: Dhaka-Comilla
Survey Location: Meghna Bridge**

Direction: Bothway

Location Name	Destination											Total	%			
	B.Baria	Chandpur	Chittagong	Comilla	Cox's Bazar	Dhaka	Feni	Khulna	Laxmipur	Narayanganj	Noakhali			Panchagar	Rangamati	
B.Baria						1									1	0
Chandpur						12									12	4
Chittagong						10		1							11	4
Comilla						75				1					76	27
Cox's Bazar						4						1			5	2
Dhaka	3	19	14	51	8	16			13		12			2	138	50
Feni						10									10	4
Laxmipur						14									14	5
Narayanganj				3											3	1
Noakhali						7									7	3
Tangail				1											1	0
Total	3	19	14	55	8	133	16	1	13	1	12	1	2	278		
%	1	7	5	20	3	48	6	0	5	0	4	0	1		100	

Source: JICA Study, 2008

Table 4.1(a): Origin- Destination Matrix
Truck O-D Result

Road Name: Dhaka-Narayanganj-S
Survey Location: Bhulta

Direction: Bothway

Location Name	Destination													Total	%				
	B. Baria	Chittagong	Chuadanga	Dhaka	Gazipur	Habiganj	Jessore	Kishoreganj	Manikganj	Moulvibazar	Munshiganj	Narayanganj	Narshingdi			Pabna	Shunamganj	Sylhet	
Chittagong				1													1	3	2
Dhaka	1					2		4		2		6	13	1	4		1	34	19
Habiganj				3							1							4	2
Kishoreganj				11														11	6
Lalmonirhat												1						1	1
Moulvibazar				1														1	1
Narayanganj	3		1	11	5		1	1	1			11	9		2		6	51	29
Narshingdi				22								2						26	15
Shunamganj				1								1						2	1
Sylhet				43														43	24
Total	4	2	1	92	6	2	1	5	1	2	1	21	23	1	6	8	176		
%	2	1	1	52	3	1	1	3	1	1	1	12	13	1	3	5	100		

Source :JICA Study ,2008

Table 4.1(b): Origin- Destination Matrix
Commodity Flow

Road Name: Dhaka-Narayanganj-Sylhet
Survey Location: Bhulta

Origin	Destination	Commodity													Total	%								
		Agricultural Product	Construction Material Metals	Construction Materials	Consumer goods	Garments	Fishery Product	Forest Product	Grocery	Jute & Jute goods	Misc. Goods	Mineral	Petroleum											
Chittagong	Gazipur																		1	0.6				
	Narsingdi																		1	0.6				
Dhaka	Sylhet		1																	1	0.6			
	B.Baria																				1	0.6		
	Habiganj																				1	0.6		
	Kishoreganj																				2	1.1		
	Moulvibazar																				4	2.3		
	Narayanganj																				2	1.1		
	Narayanganj																				6	3.4		
	Narayanganj																				13	7.4		
	Narayanganj																				5	2.8		
	Narayanganj																				1	0.6		
	Narayanganj																				3	1.7		
	Narayanganj	B.Baria																					1	0.6
Chuadanga																							1	0.6
Dhaka																							11	6.3
Gazipur																							5	2.8
Jessore																							1	0.6
Kishoreganj																							1	0.6
Manikganj																							1	0.6
Narayanganj																							11	6.3
Narayanganj																							9	5.1
Narayanganj																							2	1.1
Narayanganj																							6	3.4
Narsingdi		Chittagong																						2
	Dhaka																						22	12.5
	Narayanganj																						2	1.1
	Narayanganj																						1	0.6
Sylhet	Narayanganj																						1	0.6
	Dhaka																						1	0.6
Total																							43	24.4
																							1	0.6
%																							176	100
																							1	0.6

Source: JICA Study, 2008

**Table 4.1(c): Origin- Destination Matrix
Bus O-D Result**

Road Name: Dhaka-Narayanganj-Sylhet
Survey Location: Bhulta

Direction: Bothway

Location Name	Destination									Total	%	
	B.Baria	Dhaka	Habiganj	Kishoreganj	Moulvibazar	Narayanganj	Narshingdi	Shunamganj	Sylhet			
Origin	B.Baria		10							10	5	
	Dhaka	4		5	21	8	6	32	1	25	102	51
	Habiganj		4							4	2	
	Kishoreganj		29							29	14	
	Moulvibazar		1							1	0	
	Narayanganj		3				1	1		5	2	
	Narshingdi		24				1			25	12	
	Shunamganj		4							4	2	
	Sylhet		21							21	10	
	Total	4	96	5	21	8	8	33	1	25	201	
%	2	48	2	10	4	4	16	0	12		100	

Source: JICA Study, 2008

**Table 5.1(a): Origin- Destination Matrix
Truck O-D Result**

**Road Name: Dhaka-Mymensingh
Survey Location: Bhaluka toll point**

Direction: Bothway

Location Name	Destination											Total	%		
	Chittagong	Dhaka	Faridpur	Gazipur	Jamalpur	Kishoreganj	Manikganj	Mymensingh	Narayanganj	Netrokona	Sherpur			Tangail	
Chittagong								1						1	1
Chuadanga								1						1	1
Dhaka					2		28			3	2	1		36	22
Gazipur						1	11				4			16	10
Jamalpur		9												9	6
Jessore								1						1	1
Mymensingh	1	14	2	28	1		15	3						65	40
Narayanganj					1		6				1			8	5
Narsingdi							5			1				6	4
Netrokona		1		3			2	2						8	5
Sherpur		2		7			1	1						11	7
Thakurgaon				1										1	1
Total	1	26	2	39	4	1	71	6	4	7	1	163			
%	1	16	1	24	2	1	44	4	2	4	1	100			

Source :JICA Study ,2008

Table 5.1(b): Origin-Destination Matrix
Commodity Flow

Road Name: Dhaka-Mymensingh
Survey Location: Bhaluka toll point

Origin	Destination	Commodity															Total	%		
		Agricultural Product	Construction Material Metals	Construction Materials	Consumer goods	Electronics	Fertilizer	Fish/ Poultry Feed	Fishery Product	Forest Product	Grocery	Jute & Jute goods	Livestock	Machinery and equipment	Medicine	Misc. Goods			Mineral	Petroleum
Chittagong	Mymensingh														1				1	0.6
Chuadanga	Mymensingh	1																	1	0.6
Dhaka	Jamalpur																		2	1.2
	Mymensingh	5				1									2				28	17.2
	Netrokona																		3	1.8
	Sherpur	1																	2	1.2
	Tangail																		1	0.6
Gazipur	Kishoreganj	1																	1	0.6
	Mymensingh	1													1				11	6.7
	Sherpur																		4	2.5
	Dhaka	2																	5	5.5
Jamalpur	Mymensingh																		1	0.6
Jessore	Mymensingh																		1	0.6
Mymensingh	Chittagong																		1	0.6
	Dhaka	5																	14	8.6
	Faridpur																		2	1.2
	Gazipur	5																	28	17.2
	Jamalpur																		1	0.6
	Manikganj																		1	0.6
	Mymensingh																		15	9.2
Narayanganj	Narayanganj																		2	3.1
	Jamalpur																		1	0.6
	Mymensingh																		4	3.7
	Sherpur																		1	0.6
Narsingdi	Mymensingh																		5	3.1
	Netrokona																		1	0.6
Netrokona	Dhaka	1																	1	0.6
	Gazipur	1																	3	1.8
	Mymensingh																		2	1.2
	Narayanganj	1																	1	0.6
	Dhaka	1																	2	1.2
Sherpur	Gazipur																		7	4.3
	Mymensingh																		1	0.6
	Narayanganj																		1	0.6
Thakurgaon	Gazipur																		1	0.6
	Gazipur																		1	0.6
Total		26	4	50	1	1	7	8	7	7	10	2	2	5	14	4	10	4	163	
%		16.0	2.5	30.7	0.6	0.6	4.3	4.9	4.3	4.3	6.1	1.2	1.2	3.1	8.6	2.5	6.1	6.1	100	

Source: JICA Study, 2008

**Table 5.1(c): Origin- Destination Matrix
Bus O-D Result**

Road Name: Dhaka-Mymensingh
Survey Location: Bhaluka toll point

Direction: Bothway

Location Name		Destination								Total	%	
		Chittagong	Dhaka	Gazipur	Jamalpur	Kishoreganj	Mymensingh	Narayanganj	Netrokona			Sherpur
Origin	Chittagong								1	1	0	
	Dhaka				17	5	75		19	33	149	50
	Gazipur						6				6	2
	Jamalpur		8								8	3
	Kishoreganj		1								1	0
	Mymensingh	1	64	17			10	1			93	31
	Narayanganj						1				1	0
	Netrokona		16	2							18	6
	Sherpur		21	3							24	8
	Total	1	110	22	17	5	92	1	20	33	301	
%	0	37	7	6	2	31	0	7	11		100	

Source: JICA Study, 2008

Table 3.1.1: Classified Traffic Count Survey Result (AADT)

Road Name Location Traffic Direction		Mirpur Road Asad Gate Bothway																					
Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total
6:00-7:00 AM	11	374	197	114	25	123	251	122	6	14	0	90	96	4	20	4	398	81	3	201	1451	482	1933
7:00-8:00 AM	109	767	2263	125	2	152	411	314	22	15	0	60	39	2	14	5	648	95	0	791	4300	743	5043
8:00-9:00 AM	469	852	4093	201	19	231	730	445	18	10	0	89	14	0	5	0	270	46	0	2466	7176	316	7492
9:00-10:00 AM	496	1078	2490	164	1	154	603	290	8	2	0	105	6	0	3	3	17	73	0	1680	5403	91	5494
10:00-11:00 AM	397	1291	2692	175	2	162	556	274	4	6	0	120	6	0	2	2	21	34	0	2447	5689	55	5744
11:00-12:00 AM	431	1272	2621	203	1	154	486	244	1	5	0	131	6	22	7	10	19	23	0	2620	5594	42	5636
12:00-13:00 PM	463	1140	2943	203	2	132	581	267	1	13	0	148	9	0	10	9	18	41	0	2746	5921	59	5980
13:00-14:00 PM	422	1209	2972	221	0	190	512	284	8	22	0	138	7	6	18	7	59	39	0	2467	6016	99	6114
14:00-15:00 PM	355	1305	2295	244	46	289	380	440	4	6	2	135	15	2	9	6	28	87	2	1450	5533	117	5650
15:00-16:00 PM	371	1390	2179	254	36	282	408	308	12	8	5	129	22	1	7	4	46	69	6	1558	5416	121	5537
16:00-17:00 PM	294	1590	2275	295	37	259	344	408	14	14	4	148	26	3	5	4	34	101	3	1788	5720	138	5858
17:00-18:00 PM	438	1588	2573	314	37	236	303	499	19	8	0	119	22	0	1	5	41	117	0	2570	6162	158	6320
18:00-19:00 PM	354	1411	2364	281	30	263	326	476	35	8	4	152	38	3	5	5	27	122	0	2630	5755	149	5904
19:00-20:00 PM	313	1343	2162	310	25	295	368	495	13	4	6	126	64	6	14	1	28	118	2	2035	5545	148	5693
20:00-21:00 PM	299	1145	1876	307	22	262	319	459	5	2	8	141	179	10	8	4	119	137	1	1795	5046	257	5303
21:00-22:00 PM	282	1175	1620	295	26	201	256	272	5	1	15	139	189	0	7	2	1047	114	0	1248	4485	1161	5646
22:00-23:00 PM	201	1157	1641	635	98	142	394	240	0	0	7	83	285	0	13	1	1472	141	0	332	4897	1613	6510
23:00-00:00 PM	131	232	1261	655	70	94	244	163	0	0	11	46	588	2	40	5	1167	86	2	199	3542	1255	4797
00:00-01:00 AM	92	90	395	411	21	33	55	53	0	0	0	62	509	6	27	5	795	52	8	102	1759	855	2614
01:00-02:00 AM	36	54	151	196	6	24	9	31	0	0	0	37	429	3	18	7	326	26	4	52	1001	356	1357
02:00-03:00 AM	3	13	52	109	5	18	4	11	0	0	0	28	401	3	7	1	173	17	1	16	655	191	846
03:00-04:00 AM	0	15	11	64	19	32	7	11	0	0	0	19	423	2	9	6	419	3	5	25	618	427	1045
04:00-05:00 AM	1	66	23	117	5	96	66	31	0	0	4	41	443	3	12	8	390	14	1	32	916	405	1321
05:00-06:00 AM	3	284	73	159	24	224	264	146	6	2	13	42	210	4	15	14	756	65	4	168	1483	825	2308
AADT	5971	20841	41222	6052	559	4048	7877	6283	181	140	79	2328	4026	82	276	118	8318	1701	43	31418	100083	10062	110145

Factor AADT	Seasonal		
	MT	NMT	pedestrian
	1.10		

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total (MT & NMT)
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total (MT & NMT)
AADT	6568	22925	45344	6657	615	4453	8665	6911	199	154	87	2561	4429	90	304	130	9150	1871	47	34560	110091	11069	121160
Percentage	5.97	20.82	41.19	6.05	0.56	4.04	7.87	6.28	0.18	0.14	0.08	2.33	4.02	0.08	0.28	0.12	82.67	16.91	0.43		100	100	
Percentage of Motorized and Non Motorized																					90.85	9.14	100

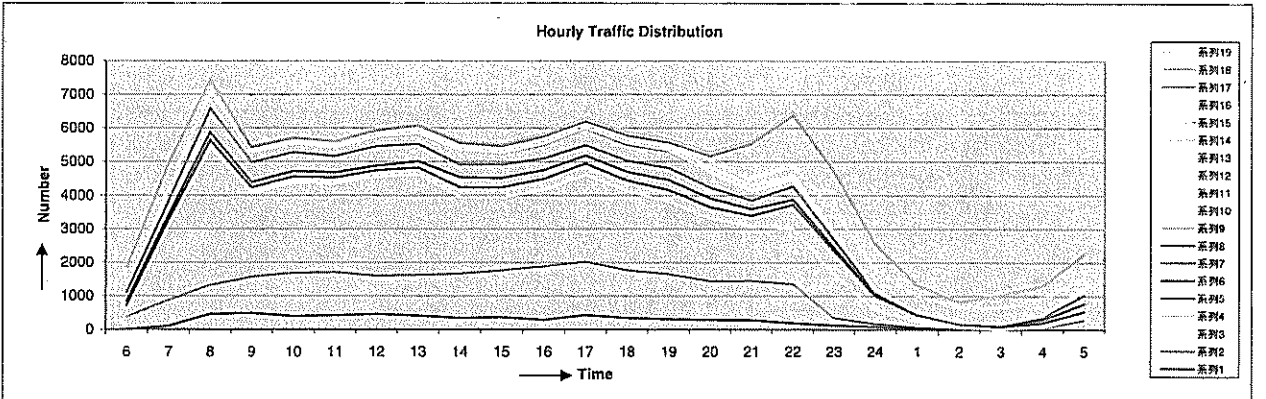
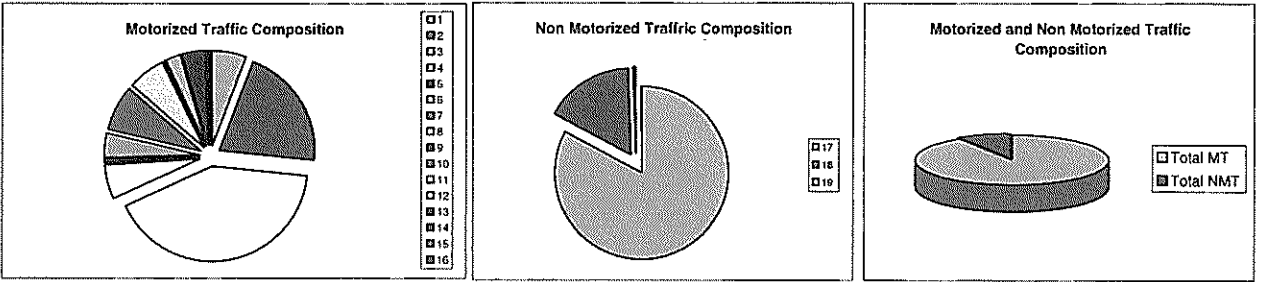


Table 3.1.2: Classified Traffic Count Survey Result (AADT)

Road Name Location Traffic Direction			Salmosjid Road Abahari Sports Ground Bohway																				
Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total
6:00-7:00 AM	15	74	83	30	33	21	18	59	0	5	0	16	9	0	3	0	175	132	0	209	366	307	673
7:00-8:00 AM	70	166	1964	39	78	55	26	136	10	20	0	31	10	0	0	0	1519	214	0	448	2600	1733	4333
8:00-9:00 AM	149	199	3090	67	54	112	32	206	37	19	0	46	1	0	0	0	2502	95	0	374	4012	2597	6609
9:00-10:00 AM	179	378	1637	71	85	79	34	127	2	4	0	61	1	0	0	0	3361	159	0	392	2658	3520	6178
10:00-11:00 AM	203	417	1849	92	75	139	27	130	1	8	0	56	1	0	0	0	3697	119	1	439	2998	3817	6815
11:00-12:00 PM	227	380	1925	71	62	111	24	151	0	12	0	56	1	0	0	1	3699	77	3	490	3021	3779	6800
12:00-13:00 PM	196	431	2000	66	54	95	36	138	0	8	0	59	1	0	0	1	3880	71	1	618	3085	3952	7037
13:00-14:00 PM	171	389	2515	75	59	106	48	197	1	15	0	147	0	0	0	0	4010	64	1	922	3723	4075	7798
14:00-15:00 PM	202	510	1486	106	72	91	43	209	8	12	0	40	1	0	2	3	4186	120	4	768	2785	4310	7095
15:00-16:00 PM	192	491	1491	103	70	97	20	193	9	13	0	47	1	0	4	1	3953	103	4	578	2732	4060	6792
16:00-17:00 PM	200	469	1586	112	70	103	12	191	4	22	0	47	2	0	6	3	3883	99	0	652	2827	3982	6809
17:00-18:00 PM	193	544	1776	80	68	108	18	230	31	5	0	42	8	1	5	4	4015	105	1	770	3111	4121	7232
18:00-19:00 PM	218	387	1988	94	97	100	24	188	7	3	0	35	5	0	5	1	3647	101	0	948	3152	3748	6900
19:00-20:00 PM	242	403	1770	111	97	104	22	280	1	2	0	31	12	0	1	1	3825	115	2	668	3077	3942	7019
20:00-21:00 PM	248	378	1447	118	73	88	19	229	7	1	0	40	8	0	10	1	3327	131	0	526	2667	3458	6125
21:00-22:00 PM	213	278	1286	133	89	89	12	159	0	0	0	31	13	1	12	5	2671	158	0	532	2321	2829	5150
22:00-23:00 PM	151	172	1333	290	42	56	42	112	0	0	0	16	34	0	3	0	2083	141	3	543	2251	2227	4478
23:00-00:00 PM	77	51	501	313	16	10	29	59	0	0	0	10	29	3	3	2	692	63	0	480	1103	755	1858
00:00-01:00 AM	24	19	123	164	0	0	7	39	0	0	0	11	34	1	3	0	132	21	6	122	425	159	584
01:00-02:00 AM	6	7	32	43	0	0	1	9	0	0	0	2	31	1	7	1	53	3	3	12	140	59	199
02:00-03:00 AM	7	5	16	8	0	0	0	3	0	0	0	1	23	1	2	0	37	6	1	7	66	44	110
03:00-04:00 AM	1	3	2	9	0	0	0	0	0	0	0	2	10	0	2	1	36	5	0	3	30	41	71
04:00-05:00 AM	1	7	6	21	0	0	0	0	0	0	0	4	8	0	0	0	47	15	0	26	47	62	109
05:00-06:00 AM	1	33	14	33	6	0	0	0	0	0	0	5	5	0	3	0	221	66	0	145	100	287	387
AADT	3186	6191	29920	2249	1195	1562	494	3045	118	149	0	836	248	8	71	25	55651	2183	30	10672	49297	57864	107161

Factor AADT	Seasonal	
	MT	NMT
	1.10	

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total (MT & NMT)	
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total (MT & NMT)	
AADT	3505	6810	32912	2474	1315	1718	543	3350	130	164	0	920	273	9	78	28	61216	2401	33	11739	54227	63650	117877	
Percentage	6.46	12.56	60.69	4.56	2.42	3.17	1.00	6.18	0.24	0.30	0.00	1.70	0.50	0.02	0.14	0.05	96.18	3.77	0.05		100.00	100.00		
Percentage of Motorized and Non Motorized																						46.00	54.00	100

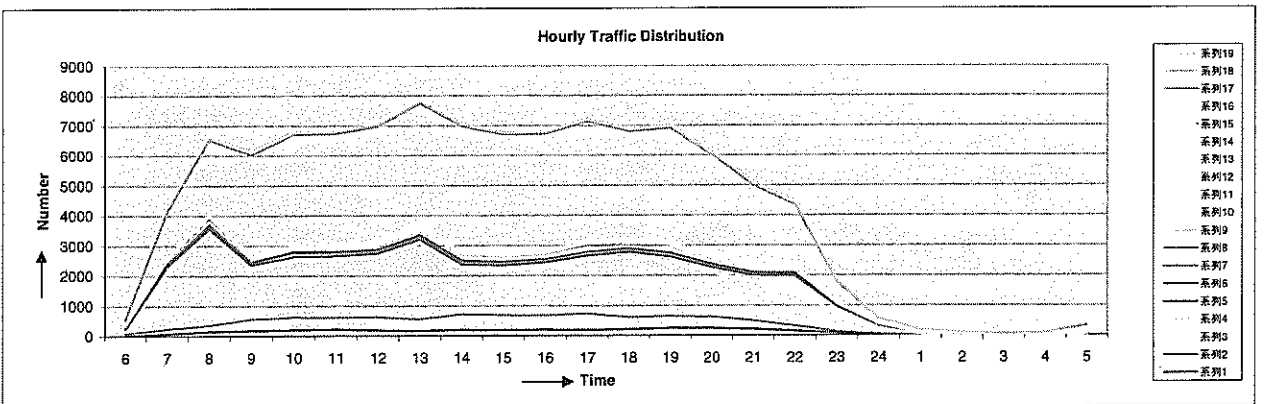
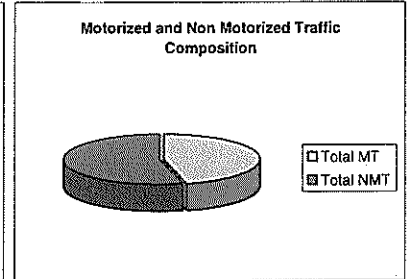
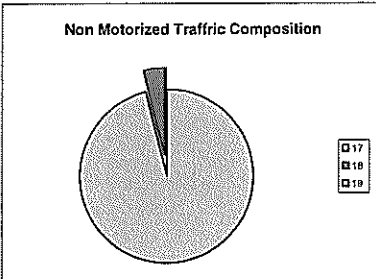
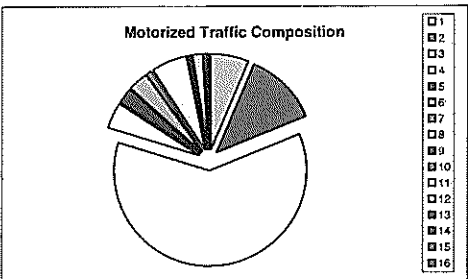


Table 3.1.3: Classified Traffic Count Survey Result (AADT)

Road Name		Gabtali-Savar Road																					
Location		Modhumali Model Town																					
Traffic Direction		Bothway																					
Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total
6:00-7:00 AM	3	9	56	38	9	158	100	62	6	0	0	40	219	2	30	5	93	2	0	97	737	95	832
7:00-8:00 AM	19	16	141	51	8	179	139	88	14	0	0	48	240	0	32	1	119	1	0	594	976	120	1096
8:00-9:00 AM	41	29	311	97	27	274	173	100	10	0	0	95	210	1	24	3	146	17	0	127	1395	163	1558
9:00-10:00 AM	60	42	343	106	12	213	159	93	7	0	0	143	268	1	40	5	176	15	0	114	1492	191	1683
10:00-11:00 AM	59	49	401	127	8	216	167	88	2	0	0	109	243	0	64	5	171	11	0	106	1538	182	1720
11:00-12:00 AM	69	76	525	193	3	199	146	91	0	0	0	113	238	0	64	6	114	3	0	82	1723	117	1840
12:00-13:00 PM	64	60	527	246	4	191	184	108	0	0	0	122	238	2	51	8	168	8	0	103	1805	176	1981
13:00-14:00 PM	77	67	449	192	10	205	151	79	2	0	0	169	216	0	47	8	206	17	0	165	1672	223	1895
14:00-15:00 PM	89	64	309	161	9	234	166	166	9	3	0	135	185	5	26	13	115	6	0	281	1574	121	1695
15:00-16:00 PM	76	82	338	159	13	307	185	191	6	5	0	179	170	3	20	8	145	3	2	321	1742	150	1892
16:00-17:00 PM	106	93	357	183	7	322	166	142	1	5	0	185	201	2	13	9	154	6	3	297	1792	163	1955
17:00-18:00 PM	87	72	344	200	8	371	177	219	20	2	0	182	250	0	17	12	220	13	1	375	1961	234	2195
18:00-19:00 PM	87	59	412	202	12	338	129	171	11	1	0	171	211	0	22	8	143	3	3	254	1834	149	1983
19:00-20:00 PM	57	49	340	171	5	272	102	131	0	2	0	159	209	0	23	5	94	7	0	222	1525	101	1626
20:00-21:00 PM	44	28	288	141	2	270	81	103	5	2	0	177	202	3	24	9	131	11	1	183	1379	143	1522
21:00-22:00 PM	22	25	205	117	7	248	71	93	3	0	0	155	229	0	20	10	94	5	0	227	1205	99	1304
22:00-23:00 PM	16	2	165	80	0	138	29	45	0	0	0	125	196	0	21	3	1	0	0	70	820	1	821
23:00-00:00 PM	4	0	140	49	1	98	10	40	0	0	0	113	366	3	27	1	3	1	0	25	852	4	856
00:00-01:00 AM	1	0	46	39	0	53	6	17	0	0	0	124	381	3	46	4	2	0	0	0	720	2	722
01:00-02:00 AM	0	1	29	19	1	17	1	5	0	0	0	118	262	1	25	1	0	0	0	2	480	0	480
02:00-03:00 AM	1	0	10	9	1	45	0	9	0	0	0	38	251	0	19	0	1	0	0	3	383	1	384
03:00-04:00 AM	2	1	5	6	1	79	0	11	0	0	0	30	221	0	25	2	0	0	0	0	383	0	383
04:00-05:00 AM	1	0	8	6	1	126	8	10	0	0	0	31	249	1	20	1	13	0	0	11	462	13	475
05:00-06:00 AM	3	2	4	10	4	148	16	26	0	0	0	35	142	0	29	3	53	0	0	26	422	53	475
AADT	988	826	5753	2602	153	4701	2366	2088	96	20	0	2796	5597	27	729	130	2362	129	10	3685	28872	2501	31373

Factor AADT	Seasonal		
	MT	NMT	pedestrian
	1.10		

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total (MT & NMT)	
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total (MT & NMT)	
AADT	1087	909	6328	2862	168	5171	2603	2297	106	22	0	3076	6157	30	802	143	2598	142	11	4054	31759	2751	34510	
Percentage	3.42	2.85	19.93	9.01	0.53	16.28	8.19	7.23	0.33	0.07	0.00	9.68	19.39	0.09	2.52	0.45	94.44	5.16	0.40		100	100		
Percentage of Motorized and Non Motorized																						92.03	7.97	100

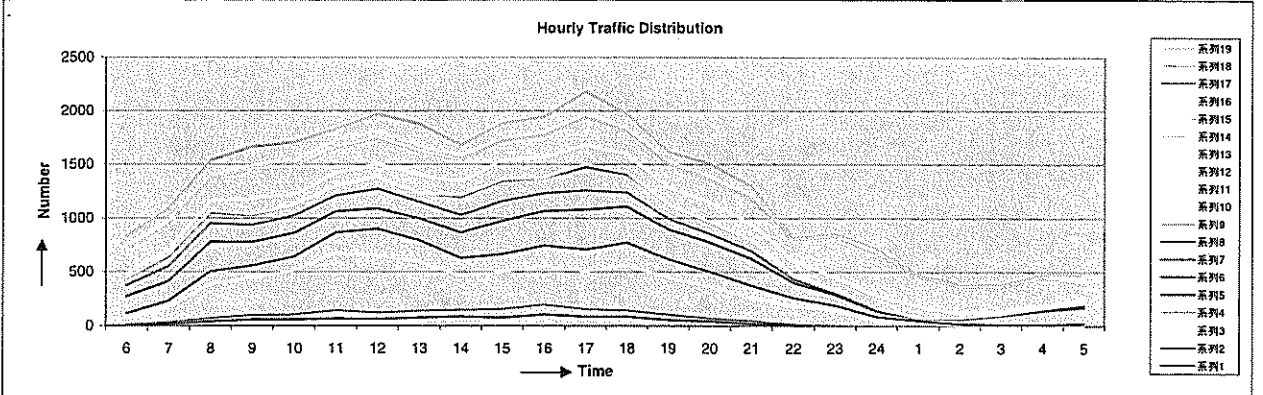
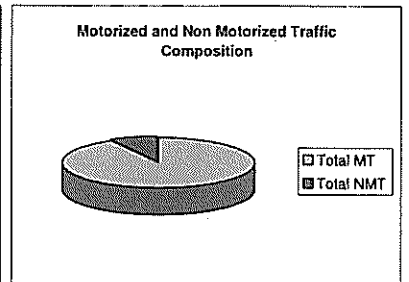
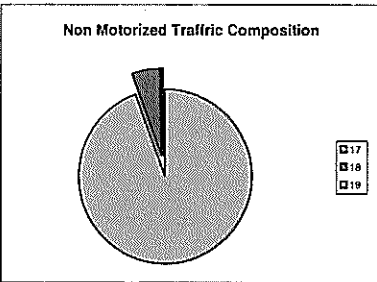
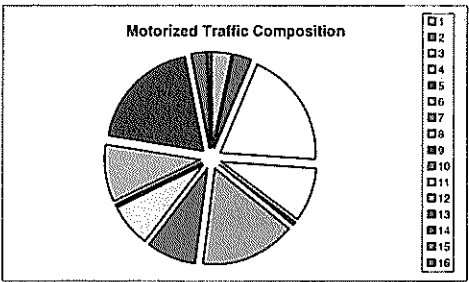


Table 3.1.4: Classified Traffic Count Survey Result (AADT)

Road Name		Old Airport Road																					
Location		Kazi Nazrul Islam Avenue																					
Traffic Direction		Bothway																					
Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total
Time	Motorcycle	Auto Rickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi van	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total
6:00-7:00 AM	37	587	245	145	101	91	358	150	5	0	0	93	48	12	19	2	544	57	0	306	1873	581	2454
7:00-8:00 AM	172	1332	1158	181	72	157	504	255	7	6	0	163	24	7	15	0	1354	72	8	1917	4053	1434	5487
8:00-9:00 AM	450	2188	2162	281	54	240	835	344	12	2	0	214	19	3	7	0	84	66	0	2167	6811	150	6961
9:00-10:00 AM	454	2276	2508	329	16	210	740	294	13	1	0	180	7	6	3	1	10	82	0	2045	7038	92	7130
10:00-11:00 AM	444	2781	2442	427	22	198	617	293	3	3	0	199	12	8	8	2	11	42	0	2595	7459	53	7512
11:00-12:00 PM	463	2921	2797	552	9	194	544	295	2	3	0	261	21	7	22	1	11	39	0	3023	8093	50	8143
12:00-13:00 PM	452	2945	2553	545	8	165	565	250	1	2	0	233	14	5	15	2	4	19	0	3148	7755	23	7778
13:00-14:00 PM	553	2941	2791	540	9	182	520	295	2	3	0	246	9	3	14	1	5	39	0	3439	8109	44	8153
14:00-15:00 PM	613	2806	2385	497	4	284	532	462	9	6	1	245	5	0	17	0	15	67	1	3369	7866	83	7949
15:00-16:00 PM	363	2940	2239	547	8	302	537	476	11	2	1	292	5	4	10	0	20	45	0	2343	7737	65	7802
16:00-17:00 PM	419	2744	2248	525	3	269	504	504	8	5	0	279	14	1	16	0	16	56	0	2811	7539	72	7611
17:00-18:00 PM	424	2411	2291	508	2	261	675	545	15	7	0	296	25	0	8	0	13	63	0	3537	7468	76	7544
18:00-19:00 PM	476	2506	2178	582	6	412	731	760	8	2	0	254	28	3	24	0	19	92	2	3417	7990	113	8103
19:00-20:00 PM	368	2342	2162	548	6	262	536	579	13	0	0	265	76	3	27	2	12	59	0	3008	7209	71	7280
20:00-21:00 PM	367	2052	2261	583	4	288	537	551	10	1	0	253	207	14	22	2	24	67	0	3519	7162	91	7253
21:00-22:00 PM	324	1557	1891	491	6	265	633	601	4	0	0	217	180	4	31	0	191	50	3	2811	6204	244	6448
22:00-23:00 PM	303	1711	1621	874	46	207	481	210	1	0	0	89	410	6	57	1	290	29	2	1392	6017	321	6338
23:00-00:00 PM	107	1027	1722	1146	37	75	336	119	0	0	0	73	630	7	52	2	366	12	7	843	5333	385	5718
00:00-01:00 AM	38	586	815	535	35	30	95	99	0	0	0	62	588	8	51	10	270	9	2	163	2952	281	3233
01:00-02:00 AM	19	49	135	183	6	7	26	46	0	0	0	41	551	5	43	10	231	3	2	84	1121	236	1357
02:00-03:00 AM	2	39	26	98	0	4	9	31	0	0	0	50	311	4	40	6	106	1	0	15	620	107	727
03:00-04:00 AM	4	17	16	33	1	9	3	17	0	0	0	26	272	3	22	3	74	2	0	107	426	76	502
04:00-05:00 AM	1	31	16	50	4	35	10	9	0	0	0	24	534	1	32	4	161	0	0	88	751	161	912
05:00-06:00 AM	1	136	56	103	26	46	126	46	1	0	0	28	243	2	44	0	426	13	2	149	858	441	1299
AADT	6854	40935	38738	10303	485	4193	10434	7252	125	43	2	4083	4233	116	599	49	4257	964	29	45211	128444	5250	133694

Factor AADT	Seasonal		
	MT	NMT	pedestrian
	1.10		

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total (MT & NMT)
Time	Motorcycle	Auto Rickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi van	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total (MT & NMT)
AADT	7539	45029	42612	11333	534	4612	11477	7977	138	47	2	4491	4656	128	659	54	4683	1060	32	49732	141288	5775	147063
Percentage	5.34	31.87	30.16	8.02	0.38	3.26	8.12	5.65	0.10	0.03	0.00	3.18	3.30	0.09	0.47	0.04	81.09	18.36	0.55		100	100	
Percentage of Motorized and Non Motorized																					96.07	3.93	100

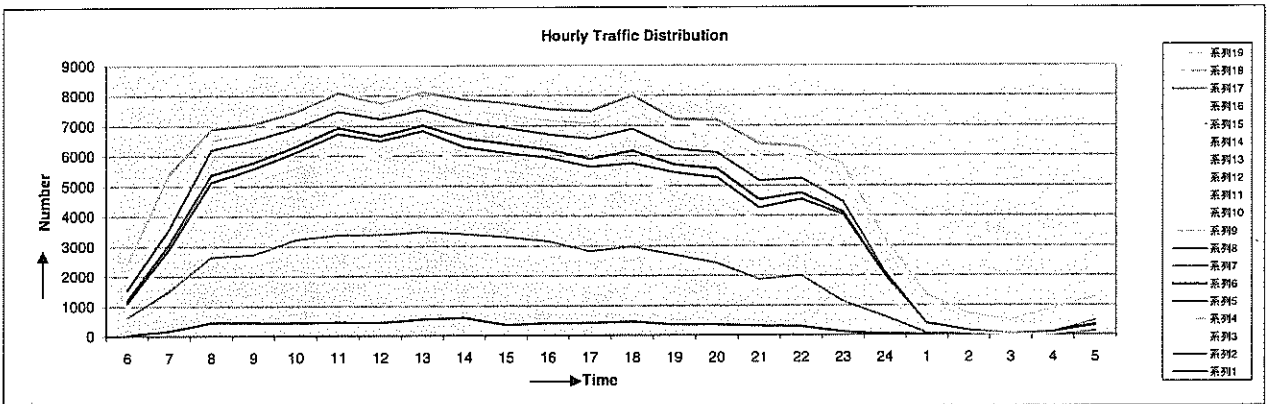
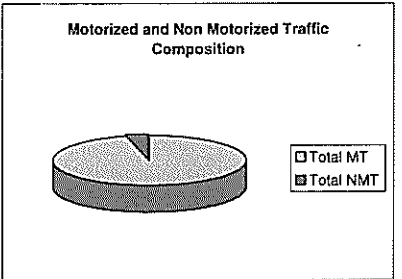
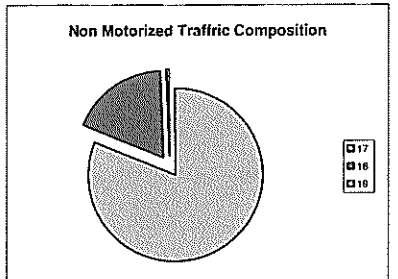
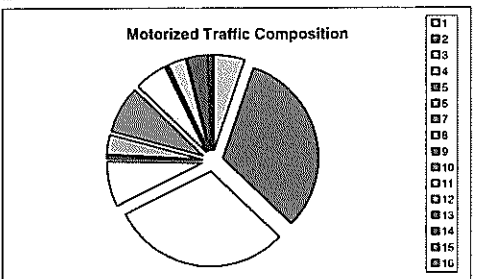


Table 3.1.5: Classified Traffic Count Survey Result (AADT)

Road Name		Maulana Bhasani Road																					
Location		Engineers Institute																					
Traffic Direction		Boilway																					
Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total
6:00-7:00 AM	13	120	114	25	5	86	237	40	5	3	0	34	51	0	15	1	198	65	0	96	749	263	1012
7:00-8:00 AM	44	198	653	27	3	206	520	130	22	3	0	33	14	0	5	5	431	74	0	144	1863	505	2368
8:00-9:00 AM	108	238	948	20	0	331	626	105	11	2	0	43	4	0	3	2	168	67	0	242	2441	235	2676
9:00-10:00 AM	180	295	913	39	1	421	807	85	9	0	0	36	0	0	2	5	19	63	0	276	2793	82	2875
10:00-11:00 AM	168	380	891	61	1	514	795	106	1	2	0	43	1	0	2	4	22	62	0	344	2969	84	3053
11:00-12:00 AM	189	370	898	55	2	638	780	97	0	0	0	53	0	0	6	6	10	44	0	667	3094	54	3148
12:00-13:00 PM	208	459	963	78	4	511	699	108	2	2	0	46	2	0	10	11	22	37	0	926	3103	59	3162
13:00-14:00 PM	231	421	997	53	3	405	619	135	3	3	0	46	4	0	3	7	16	35	0	948	2930	51	2981
14:00-15:00 PM	259	398	727	83	0	375	606	158	11	3	0	50	11	0	7	5	23	45	0	473	2693	68	2761
15:00-16:00 PM	241	505	827	65	0	376	617	156	12	8	0	63	5	0	9	7	18	31	0	422	2891	49	2940
16:00-17:00 PM	216	539	918	99	0	337	628	193	10	8	0	58	6	0	1	3	14	42	0	479	3010	56	3066
17:00-18:00 PM	235	401	898	84	0	421	724	178	38	0	0	40	10	0	1	0	15	37	0	824	3030	-52	3082
18:00-19:00 PM	187	362	887	104	0	400	610	194	14	0	0	36	12	0	6	1	19	61	0	1209	2813	80	2893
19:00-20:00 PM	238	437	901	120	0	347	580	243	16	0	0	59	51	3	8	0	22	43	0	749	3003	65	3068
20:00-21:00 PM	188	333	746	83	4	356	651	194	16	0	0	36	102	4	14	2	109	69	0	576	2729	178	2907
21:00-22:00 PM	203	318	775	104	0	321	582	135	13	0	0	60	211	2	13	1	497	41	0	346	2738	538	3276
22:00-23:00 PM	85	163	776	210	14	217	514	24	0	0	0	23	394	11	5	1	1240	31	0	386	2437	1271	3708
23:00-00:00 PM	57	72	314	243	0	78	288	13	0	0	0	16	436	9	3	2	541	15	0	253	1531	556	2087
00:00-01:00 AM	20	43	126	162	0	10	123	16	0	0	0	15	405	8	1	0	267	16	0	73	929	283	1212
01:00-02:00 AM	7	21	35	64	0	8	21	9	0	0	0	20	465	1	2	0	145	3	0	52	653	148	801
02:00-03:00 AM	4	16	17	36	0	10	10	9	0	0	0	22	445	2	1	0	148	2	0	20	572	150	722
03:00-04:00 AM	2	15	19	23	0	11	10	6	0	0	0	21	340	0	1	0	98	2	0	22	448	100	548
04:00-05:00 AM	4	21	12	47	0	10	57	4	0	0	0	12	342	2	1	0	149	12	1	73	512	162	674
05:00-06:00 AM	16	93	40	70	2	21	173	33	0	0	0	20	250	3	4	6	230	28	6	205	730	264	994
AADT	3102	6212	14395	1955	39	6410	11277	2371	183	34	0	885	3561	45	123	69	4421	925	7	9805	50661	5353	56014

Factor AADT	Seasonal		
	MT	NMT	pedestrian
	1.10		

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total (MT & NMT)
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total (MT & NMT)
AADT	3412	6833	15835	2151	43	7051	12405	2608	201	37	0	974	3917	50	135	76	4863	1018	8	10786	55727	5888	61615
Percentage	6.12	12.26	28.41	3.86	0.08	12.65	22.26	4.68	0.36	0.07	0.00	1.75	7.03	0.09	0.24	0.14	82.59	17.28	0.13		100	100.00	
Percentage of Motorized and Non Motorized																					90.44	9.56	100

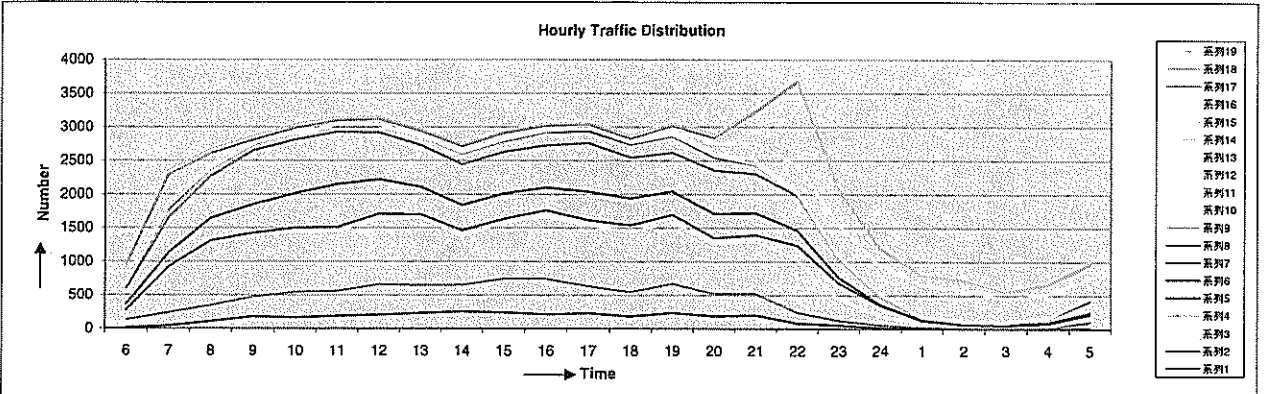
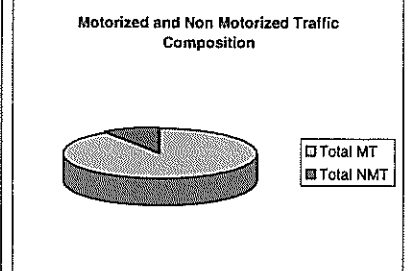
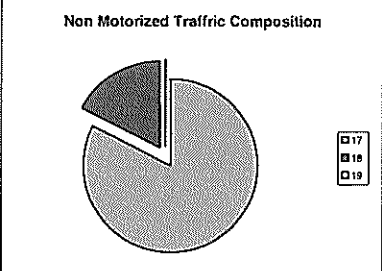
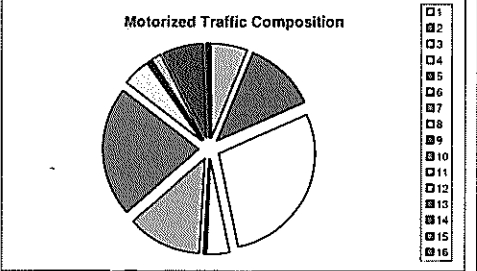


Table 3.1.6: Classified Traffic Count Survey Result (AADT)

Road Name	New Airport Road
Location	Mohakhall Rail Crossing
Traffic Direction	Bothway

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total
6:00-7:00 AM	20	302	478	128	102	85	67	230	10	17	0	66	97	4	8	0	95	51	0	222	1614	146	1760
7:00-8:00 AM	130	877	3195	233	203	160	149	435	90	26	0	98	24	0	2	0	162	101	1	561	5622	264	5886
8:00-9:00 AM	399	1303	4445	227	194	219	187	502	24	1	0	125	3	0	3	3	113	123	0	774	7635	236	7871
9:00-10:00 AM	475	1795	4333	294	198	235	194	388	3	0	0	131	1	1	2	2	47	68	0	667	8052	116	8168
10:00-11:00 AM	393	2025	4503	317	190	201	156	174	3	0	0	194	3	0	4	3	43	53	0	513	8166	96	8262
11:00-12:00 AM	569	2152	3742	389	218	197	154	230	6	0	0	211	5	1	10	7	24	24	0	430	7891	48	7939
12:00-13:00 PM	540	2070	3970	418	257	177	122	312	3	1	0	209	3	2	6	4	31	22	0	436	8094	53	8147
13:00-14:00 PM	423	2079	4017	366	196	181	142	344	8	0	0	227	3	0	16	9	38	40	35	528	8011	113	8124
14:00-15:00 PM	427	1960	3326	474	179	262	242	672	21	13	0	231	14	2	21	0	97	81	0	595	7844	178	8022
15:00-16:00 PM	425	1864	3059	451	176	255	208	737	21	11	0	251	25	4	8	0	93	53	0	512	7495	146	7641
16:00-17:00 PM	411	1895	3093	408	179	258	219	811	20	7	0	253	21	1	2	0	103	47	0	617	7578	150	7728
17:00-18:00 PM	447	1602	3214	375	182	217	206	765	91	5	0	246	22	2	7	0	99	100	0	880	7381	199	7580
18:00-19:00 PM	382	1357	3288	416	166	216	195	887	74	2	0	177	17	0	7	0	50	77	0	1078	7184	127	7311
19:00-20:00 PM	373	1140	3156	421	192	198	190	823	58	3	0	187	28	7	19	0	49	76	0	962	6795	125	6920
20:00-21:00 PM	380	1075	3340	533	181	195	172	777	27	0	0	184	68	0	12	0	176	88	0	619	6944	264	7208
21:00-22:00 PM	330	949	2950	519	164	179	195	803	12	0	0	153	106	10	12	1	181	67	0	473	6383	248	6631
22:00-23:00 PM	105	790	2453	375	128	71	137	109	3	0	0	179	258	11	3	3	223	37	0	397	4625	260	4885
23:00-00:00 PM	71	195	1829	685	87	39	47	136	2	0	0	148	296	3	0	0	154	20	0	269	3538	174	3712
00:00-01:00 AM	36	37	888	350	38	3	17	81	1	0	0	94	281	10	0	0	108	22	0	85	1836	130	1966
01:00-02:00 AM	12	22	124	138	13	0	3	46	0	0	0	76	399	2	0	0	88	5	0	61	835	93	928
02:00-03:00 AM	6	24	64	95	4	11	2	37	0	0	0	56	386	1	0	0	86	1	0	28	686	87	773
03:00-04:00 AM	3	21	37	50	0	14	3	30	0	0	0	47	327	2	1	0	67	11	0	29	535	78	613
04:00-05:00 AM	4	54	29	88	39	29	8	31	0	0	0	37	288	3	0	0	74	14	1	83	610	89	699
05:00-06:00 AM	12	216	81	136	91	63	81	74	7	3	0	55	245	4	1	0	133	33	7	156	1069	173	1242
AADT	6373	25804	59614	7886	3377	3485	3076	9434	484	89	0	3635	2920	70	144	32	2334	1214	45	10975	126423	3593	130016

Factor AADT	Seasonal		
	MT	NMT	pedestrian
	1	10	

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total (MT & NMT)
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total (MT & NMT)
AADT	7010	28384	65575	8675	3715	3834	3384	10377	532	98	0	3999	3212	77	158	35	2567	1335	50	12073	139065	3952	143018
Percentage	5.04	20.41	47.15	6.24	2.67	2.76	2.43	7.46	0.38	0.07	0.00	2.88	2.31	0.06	0.11	0.03	64.96	33.79	1.25	100	100	100	100
Percentage of Motorized and Non Motorized																					97.24	2.76	100

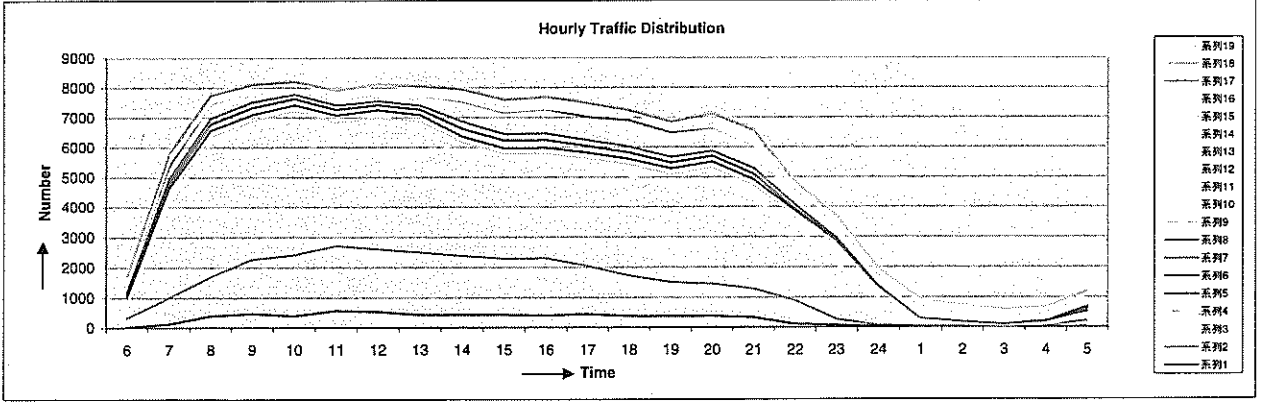
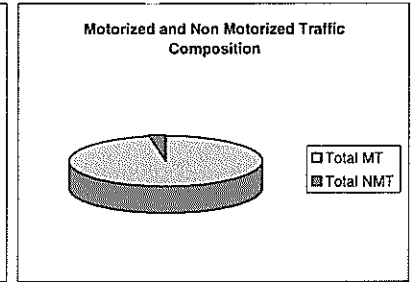
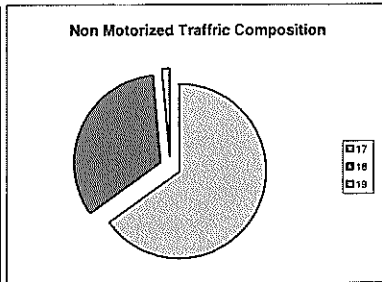
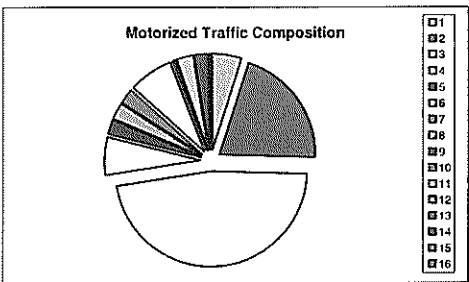


Table 3.1.7: Classified Traffic Count Survey Result (AADT)

Road Name		Banani-Gulshan-2 Road																		Location		Kamal Alaturk Avenue		Traffic Direction		Boitway	
Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total				
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total				
6:00-7:00 AM	14	60	141	23	44	17	8	47	8	4	0	14	14	0	0	0	84	41	0	149	394	125	519				
7:00-8:00 AM	42	166	1050	29	29	12	28	85	10	11	0	20	3	0	0	0	710	81	0	839	1485	791	2276				
8:00-9:00 AM	75	331	1405	70	43	31	27	115	3	4	0	28	0	0	0	0	299	86	0	3041	2132	385	2517				
9:00-10:00 AM	152	531	1884	95	32	46	27	117	0	4	0	34	0	0	0	0	192	83	0	5037	2922	275	3197				
10:00-11:00 AM	134	637	1509	128	34	53	28	95	0	0	0	40	0	0	0	0	168	70	0	4061	2656	238	2894				
11:00-12:00 AM	155	750	1824	115	27	37	41	92	0	0	0	51	0	0	0	0	165	56	0	4029	3082	221	3313				
12:00-13:00 PM	155	805	1777	132	37	39	25	99	0	0	0	64	0	0	0	0	123	65	0	3744	3133	188	3321				
13:00-14:00 PM	153	724	1591	133	28	27	26	94	0	0	0	55	0	0	0	0	52	67	0	4037	2831	119	2950				
14:00-15:00 PM	143	657	1442	137	27	40	48	180	15	7	0	52	0	0	0	0	30	72	0	4059	2748	102	2850				
15:00-16:00 PM	149	605	1533	152	38	36	45	204	8	1	0	51	0	0	0	0	80	68	0	3814	2823	148	2971				
16:00-17:00 PM	152	471	1631	103	25	36	37	203	8	4	0	46	0	0	0	0	87	50	0	4283	2716	137	2853				
17:00-18:00 PM	164	421	1539	94	23	35	39	223	11	3	0	50	0	0	0	0	34	58	0	4295	2602	92	2694				
18:00-19:00 PM	145	358	1518	86	34	34	36	236	14	0	0	45	4	0	0	0	44	59	0	4413	2510	103	2613				
19:00-20:00 PM	111	294	1473	107	32	41	35	211	11	0	0	41	5	0	0	0	118	67	0	3210	2361	185	2546				
20:00-21:00 PM	83	293	1193	108	24	37	27	145	6	0	0	32	8	0	0	0	407	75	0	2318	1956	482	2438				
21:00-22:00 PM	100	205	1071	122	14	34	31	148	9	0	0	24	4	0	0	0	359	65	0	1294	1762	424	2186				
22:00-23:00 PM	76	112	721	323	131	36	5	72	0	0	0	18	30	0	0	0	228	65	0	347	1526	293	1819				
23:00-00:00 PM	27	65	434	211	53	19	1	51	0	0	0	11	34	0	0	0	157	22	0	131	906	179	1085				
00:00-01:00 AM	11	20	143	89	5	4	17	31	0	0	0	21	36	0	0	0	105	3	0	24	377	108	485				
01:00-02:00 AM	1	19	46	41	2	1	3	4	0	0	0	8	41	0	0	0	45	0	0	15	166	45	211				
02:00-03:00 AM	0	11	17	21	0	1	0	0	0	0	0	9	54	0	0	0	22	6	0	48	113	28	141				
03:00-04:00 AM	0	5	23	15	1	3	0	0	0	0	0	6	43	0	0	0	28	0	0	43	96	28	124				
04:00-05:00 AM	3	29	14	27	6	8	0	0	0	0	0	6	29	0	0	0	34	0	0	18	122	34	156				
05:00-06:00 AM	11	63	65	81	86	8	0	0	0	0	0	12	27	0	0	0	95	19	0	102	353	114	467				
AADT	2058	7633	24044	2440	775	635	534	2452	103	38	0	738	332	0	0	0	3666	1178	0	53361	41782	4844	46626				

Factor AADT	Seasonal		
	MT	NMT	pedestrian
	1.10		

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total (MT & NMT)
Time	Motorcycle	Autotrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total (MT & NMT)
AADT	2264	8396	26448	2684	853	699	587	2697	113	42	0	812	365	0	0	0	4033	1296	0	58697	45960	5328	51289
Percentage	4.93	18.27	57.55	5.84	1.85	1.52	1.28	5.87	0.25	0.09	0.00	1.77	0.79	0.00	0.00	0.00	75.68	24.32	0.00	100	100		
Percentage of Motorized and Non Motorized																					89.61	10.39	100

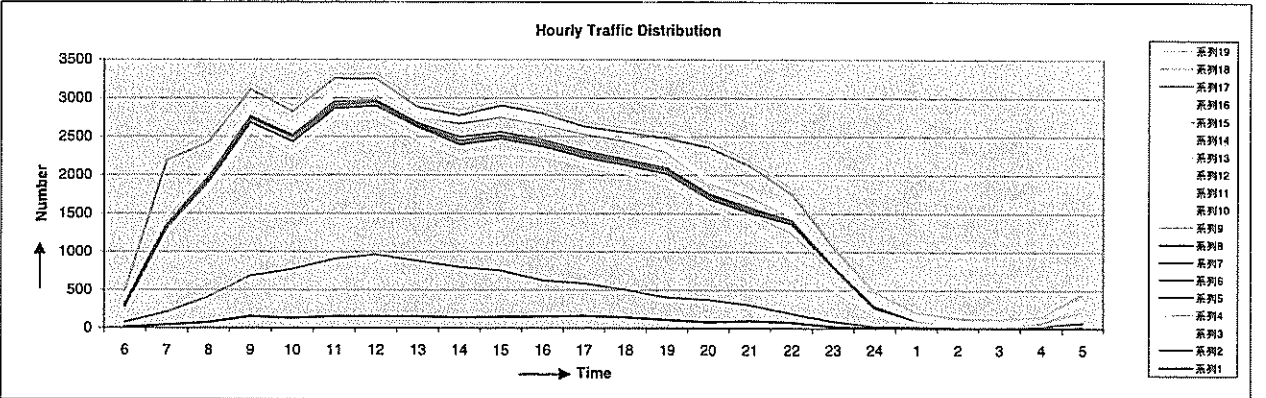
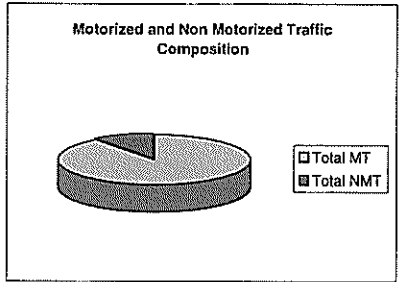
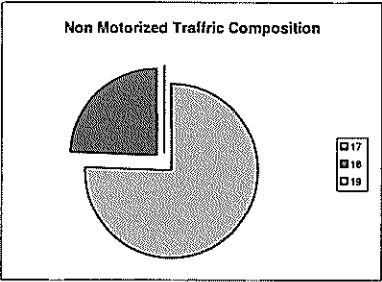
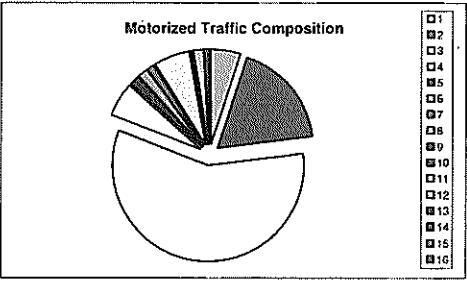


Table 3.1.8: Classified Traffic Count Survey Result (AADT)

Road Name Location Traffic Direction			Ultara Model Town Rajlaxmi Complex Bothway																	Total MT	Total NMT	Grand Total	
Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total
Time	Motorcycle	Auto Rickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total
6:00-7:00 AM	27	41	264	128	11	162	262	97	8	14	0	132	211	8	130	99	160	51	0	137	1594	211	1805
7:00-8:00 AM	77	137	1586	268	4	375	600	276	38	16	0	130	38	5	52	46	667	76	0	717	3648	743	4391
8:00-9:00 AM	169	265	2249	327	12	500	662	229	32	7	0	195	12	2	57	31	1793	51	0	948	4749	1844	6593
9:00-10:00 AM	175	400	1807	321	8	490	628	170	6	2	0	221	7	2	33	27	2249	29	0	957	4297	2278	6575
10:00-11:00 AM	162	554	1908	368	8	451	642	192	10	8	0	260	6	2	58	14	2504	37	1	942	4643	2542	7185
11:00-12:00 AM	218	548	2039	421	3	444	571	145	14	9	0	276	16	5	72	26	2079	21	1	1081	4807	2101	6908
12:00-13:00 PM	218	616	2249	409	8	430	563	208	9	3	0	341	14	1	86	31	2191	21	0	1107	5186	2212	7398
13:00-14:00 PM	212	601	2274	465	16	353	564	219	7	6	0	362	22	1	87	25	1754	20	0	1146	5214	1774	6988
14:00-15:00 PM	217	536	1900	412	6	470	900	641	15	22	0	246	40	6	36	9	1525	48	1	1245	5456	1574	7030
15:00-16:00 PM	272	697	1977	457	7	409	869	576	11	13	0	399	63	10	39	16	1425	47	1	1250	5915	1473	7288
16:00-17:00 PM	197	680	1652	437	1	543	727	529	17	5	0	472	61	12	45	17	1517	46	0	988	5395	1563	6958
17:00-18:00 PM	220	579	1616	427	3	602	863	583	21	9	0	382	47	15	37	10	2080	69	0	1698	5414	2149	7563
18:00-19:00 PM	204	625	1966	540	2	685	1021	636	32	0	0	372	45	17	74	8	2139	62	0	2397	6227	2201	8428
19:00-20:00 PM	187	532	1761	489	4	587	1011	593	29	0	0	335	113	18	48	2	1798	54	2	2289	5717.2	1854	7571.16
20:00-21:00 PM	155	424	1553	558	8	413	716	493	24	0	0	348	273	23	55	4	1227	46	0	1616	5047	1273	6320
21:00-22:00 PM	112	395	1451	560	3	437	705	484	16	0	0	365	434	18	78	9	984	54	1	1323	5007	1039	6046
22:00-23:00 PM	88	325	1266	514	71	294	843	415	15	0	0	151	406	5	5	7	1101	15	1	1171	4405	1117	5522
23:00-00:00 AM	40	204	634	459	71	142	435	228	0	0	0	150	572	8	5	4	514	4	0	641	2952	518	3470
00:00-01:00 AM	9	90	220	276	29	50	96	71	0	0	0	109	594	6	5	5	140	6	0	171	1580	146	1706
01:00-02:00 AM	2	25	75	144	6	21	37	29	0	0	0	58	504	7	16	7	55	5	0	63	931	60	991
02:00-03:00 AM	2	5	31	73	5	17	18	28	0	0	0	72	414	1	6	5	18	0	0	20	677	18	695
03:00-04:00 AM	2	2	12	37	2	28	16	28	0	0	0	50	321	1	4	2	12	0	0	26	505	12	517
04:00-05:00 AM	3	2	23	33	7	88	50	46	0	0	0	49	304	2	1	10	24	0	0	22	618	24	642
05:00-06:00 AM	12	18	47	93	10	207	376	160	0	0	0	82	338	1	6	12	67	16	0	58	1362	83	1445
ADT	2980	8241	30560	8216	305	8196	13175	7076	304	114	0	5557	4855	176	1035	434	28023	778	8	22013	91226	28809	120035

Factor AADT	Seasonal		
	MT	NMT	pedestrian
	1.10		

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total (MT & NMT)
Time	Motorcycle	Auto Rickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw Va	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total (MT & NMT)
AADT	3278	9065	33616	9038	335	9018	14493	7784	334	125	0	6113	5341	194	1139	477	30826	856	9	24214	100349	31690	132039
Percentage	3.27	9.03	33.50	9.01	0.33	8.99	14.44	7.76	0.33	0.12	0.00	6.09	5.32	0.19	1.13	0.48	97.27	2.70	0.03		100	100	
Percentage of Motorized and Non Motorized																					76.00	24.00	100

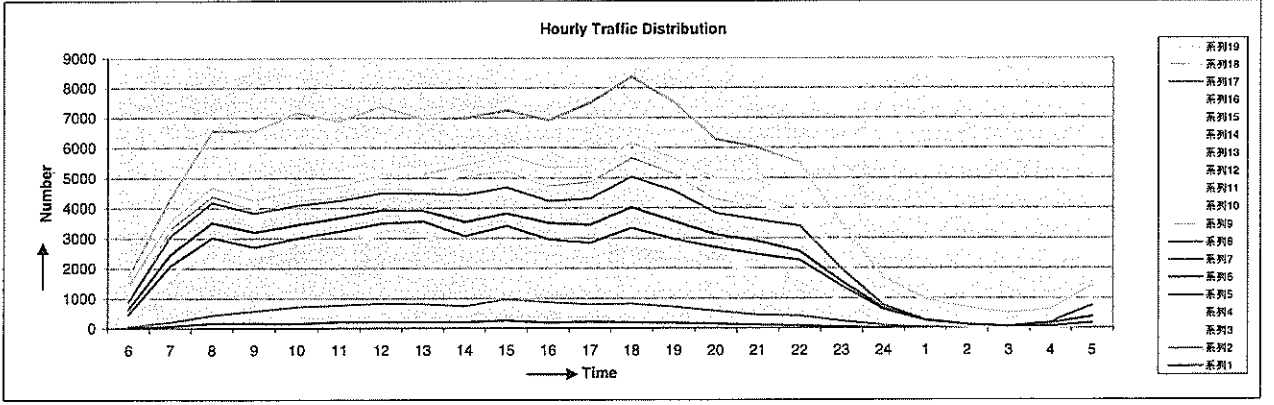
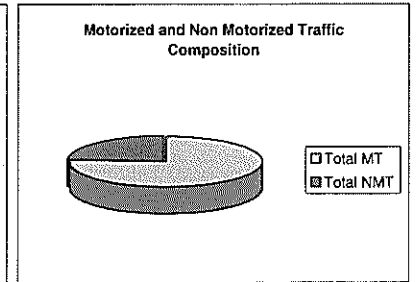
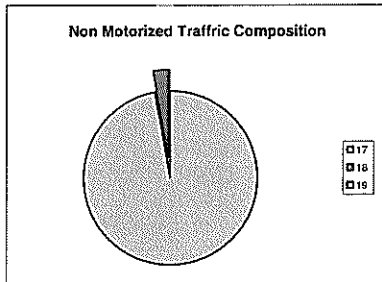
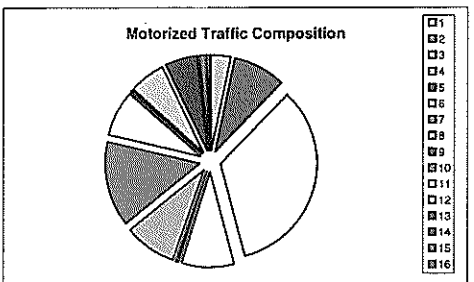


Table 3.1.9: Classified Traffic Count Survey Result (AADT)

Road Name Location Traffic Direction		Hampura-Bishow Road Progati Sharan Bypass																					
Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total
Time	Motorcycle	Autrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Max	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw V	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total
6:00-7:00 AM	24	137	133	91	93	83	166	137	3	4	21	42	108	18	16	18	138	47	0	320	1094	185	1279
7:00-8:00 AM	58	294	643	125	94	145	281	280	11	10	25	58	73	2	7	21	462	184	0	1305	2127	646	2773
8:00-9:00 AM	90	438	570	105	54	201	223	246	23	5	17	52	56	3	0	17	769	196	3	1877	2101	968	3069
9:00-10:00 AM	140	691	670	152	42	213	238	243	6	4	58	79	44	1	2	15	932	151	6	1872	2598	1089	3667
10:00-11:00 AM	129	774	728	191	51	199	225	144	3	2	55	100	78	14	5	26	847	68	6	1448	2724	921	3645
11:00-12:00 AM	101	616	745	170	39	181	202	176	3	1	43	90	139	1	5	54	792	52	2	958	2566	846	3412
12:00-13:00 PM	133	672	712	189	31	127	190	186	0	1	36	83	136	1	4	60	792	88	9	1072	2561	889	3450
13:00-14:00 PM	130	664	769	168	42	100	192	217	0	0	65	102	121	1	10	50	812	84	2	1151	2631	898	3529
14:00-15:00 PM	101	423	592	257	69	284	384	448	6	4	0	131	122	11	9	79	1053	100	0	1314	2920	1153	4073
15:00-16:00 PM	81	623	651	226	58	303	310	507	0	12	0	137	140	9	1	61	1240	112	7	1229	3119	1359	4478
16:00-17:00 PM	76	844	618	297	64	284	246	341	5	14	0	152	121	11	18	45	1280	123	1	1448	3136	1404	4540
17:00-18:00 PM	86	811	571	305	60	305	243	354	22	7	0	138	84	21	13	28	1283	144	0	1562	3048	1427	4475
18:00-19:00 PM	78	572	642	324	46	310	241	287	11	2	0	132	121	10	0	17	1214	121	0	1526	2793	1335	4128
19:00-20:00 PM	83	574	608	332	34	247	225	272	5	1	0	143	126	8	2	16	1237	144	1	1464	2676	1382	4058
20:00-21:00 PM	89	441	700	205	43	226	257	305	8	0	0	143	210	29	2	12	1366	162	1	955	2670	1529	4199
21:00-22:00 PM	53	281	509	254	57	198	240	244	1	0	0	107	182	12	0	8	855	147	0	567	2146	1002	3148
Total 16 Hours	1452	8855	9861	3392	877	3406	3853	4387	107	67	320	1689	1851	152	94	527	15072	1923	38	20069	40910	17033	57943
AADT	2178	13283	14792	5088	1316	5109	5795	6581	161	101	480	2534	2792	228	141	791	22608	2885	57	30104	61365	25550	86915

Factor AADT	Seasonal		
	MT	NMT	pedestrian
	1.10		

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total MT	Total NMT	Grand Total (MT & NMT)	
Time	Motorcycle	Autrickshaw	Car/Jeep/Station wagon	Taxi	Auto tempo/Laguna/Max	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Rickshaw / Rickshaw V	Bicycle	Animal Drawn vehicle	pedestrian	Total MT	Total NMT	Grand Total (MT & NMT)	
AADT	2396	14611	16271	5597	1447	5620	6374	7239	177	111	528	2787	3071	251	155	870	24869	3173	63	33114	67502	28104	95606	
Percentage	3.55	21.65	24.10	8.29	2.14	8.33	9.44	10.72	0.26	0.16	0.78	4.13	4.55	0.37	0.23	1.29	88.49	11.29	0.22		100	100	100	
Percentage of Motorized and Non Motorized																						70.60	29.40	100

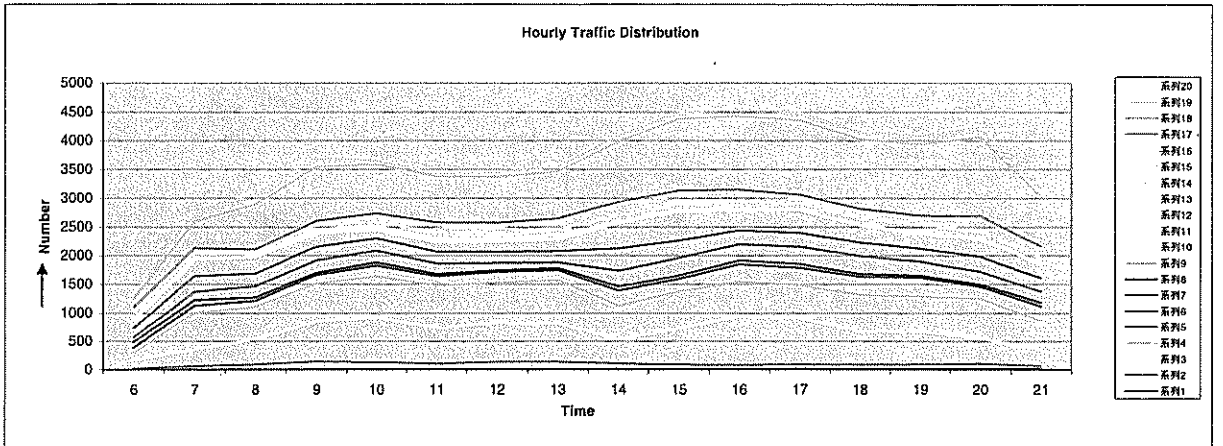
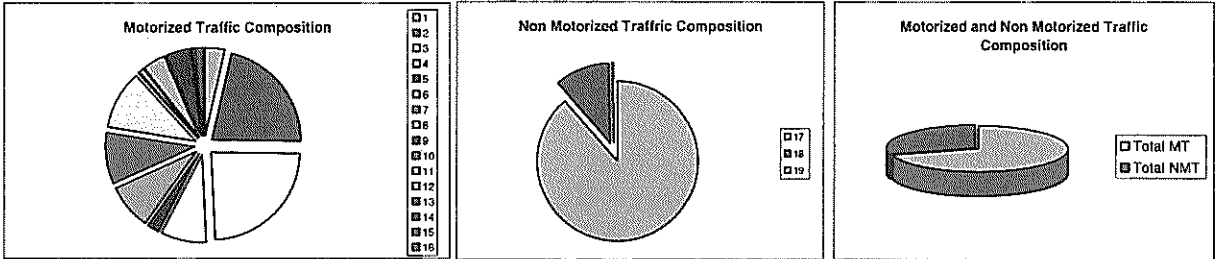


Table 3.2.1 : Classified Traffic Count Survey Result (AADT)

Link Name	Dhaka-Mawa-Khadra			Division			Munshiganj			Link No.			63			
Station Name	Sreenagar			Circle			Dhaka			Road No.			109			
Traffic Direction	Bothways			Zona			Dhaka			Meters Covered			24 Hrs			
Time	1	2	3	4	5	6	7	8	9	10	11	12	13	Total Motor	Total N-Motor	Grand Total
06.00-07.00	1	13	9	12	17	11	4	12	30	0	5	21	0	109	26	135
07.00-08.00	0	15	4	27	67	8	5	20	18	1	3	42	0	165	45	210
08.00-09.00	0	7	9	26	108	16	8	18	34	6	4	28	0	232	32	264
09.00-10.00	0	9	0	31	111	25	9	21	23	13	4	33	0	242	37	279
10.00-11.00	0	20	1	48	110	17	7	39	26	16	5	51	0	284	56	340
11.00-12.00	0	10	1	24	131	24	7	41	53	28	6	107	0	319	113	432
12.00-13.00	1	11	5	35	111	27	8	33	68	34	7	121	0	333	128	461
13.00-14.00	0	5	7	32	114	27	6	45	73	43	6	110	0	352	116	468
14.00-15.00	1	37	8	57	101	29	18	47	55	27	8	53	0	380	61	441
15.00-16.00	3	16	4	48	95	25	9	25	52	25	8	66	0	302	74	376
16.00-17.00	2	10	13	44	112	20	15	44	79	33	11	110	0	372	121	493
17.00-18.00	1	19	6	26	86	19	11	46	69	31	11	66	0	314	77	391
18.00-19.00	1	22	9	28	86	22	17	45	52	27	5	34	0	309	39	348
19.00-20.00	1	26	7	22	71	17	13	40	29	13	3	20	0	239	23	262
20.00-21.00	2	22	15	30	62	23	8	32	18	9	3	18	0	221	21	242
21.00-22.00	1	15	9	21	41	10	7	11	12	7	2	13	0	134	15	149
22.00-23.00	0	22	10	21	9	24	6	17	7	4	0	11	0	120	11	131
23.00-24.00	1	19	3	9	2	14	7	10	6	4	0	2	0	75	2	77
00.00-01.00	1	27	3	5	1	10	5	14	6	0	0	0	0	72	0	72
01.00-02.00	0	21	6	7	0	12	9	6	3	1	0	0	0	65	0	65
02.00-03.00	1	16	5	8	0	14	2	3	1	0	0	0	0	50	0	50
03.00-04.00	0	18	6	7	1	6	6	0	1	0	0	0	0	45	0	45
04.00-05.00	0	18	2	2	3	14	5	5	0	0	0	0	0	49	0	49
05.00-06.00	0	18	6	15	3	11	7	3	5	0	2	10	0	68	12	80
AADT	17	416	148	585	1,442	425	199	577	720	322	93	916	0	4,851	1,009	5,860

Factor AADT

Seasonal			
Truck	Bus	Light	N.M.
1.10	1.10	1.10	1.15

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	Total Motor	Total Non-Motor	Grand Total
AADT	19	458	163	644	1,586	458	219	635	782	354	107	1,053	0	5,336	1,160	6,496
Percentage	0.35	8.58	3.05	12.06	29.73	8.76	4.10	11.89	14.84	6.64	9.22	90.78	0.00	100%	18%	100%

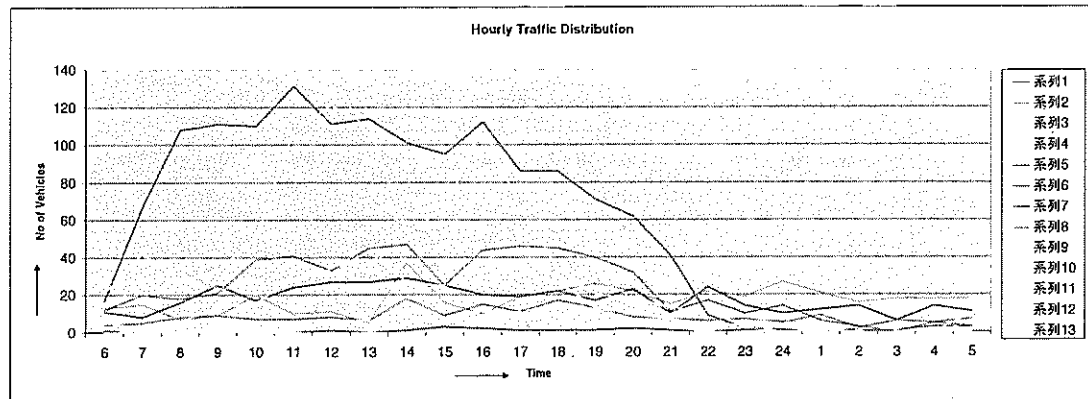
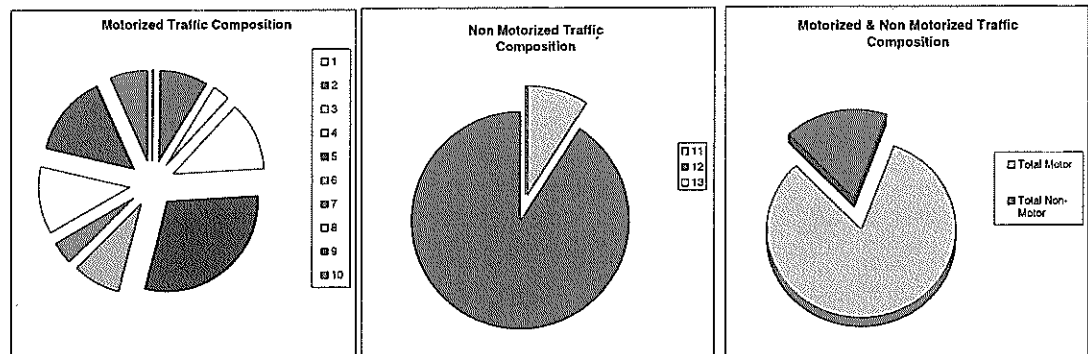


Table 3.2.3 : Classified Traffic Count Survey Result (AADT)

Link Name Station Name Traffic Direction	Dhaka-Sylhet Bhulla Bothways	Division Circle Zone	Comilla Comilla Comilla	Link No. Road No. Relays Counted	112 24 Miles 2 day											
Time	1 Heavy Truck / Trailer /Container	2 Medium Truck	3 Small Truck	4 Large Bus	5 Medium Bus	6 Micro Bus	7 Utility	8 Car	9 Auto Rickshaw	10 Motor Cycle	11 Bicycle	12 Cycle- Rickshaw	13 Cart	Total Motor	Total N-Motor	Grand Total
06.00-07.00	4	133	15	22	38	14	9	16	18	9	22	44	0	278	66	344
07.00-08.00	12	284	25	59	131	24	13	27	177	11	137	103	0	763	240	1,003
08.00-09.00	10	289	20	97	168	48	26	49	228	21	138	164	0	956	302	1,258
09.00-10.00	16	281	25	104	127	54	39	60	93	18	57	186	0	817	243	1,060
10.00-11.00	19	293	22	125	122	58	34	92	104	30	51	179	0	899	230	1,129
11.00-12.00	18	242	17	102	105	50	27	92	93	28	51	217	0	774	268	1,042
12.00-13.00	20	188	32	122	135	70	34	102	112	34	78	203	0	849	281	1,130
13.00-14.00	24	158	22	99	117	68	25	79	90	25	100	176	0	707	276	983
14.00-15.00	14	133	19	100	150	54	61	91	139	17	40	195	0	778	235	1,013
15.00-16.00	12	103	18	83	140	56	63	108	111	19	10	207	0	713	217	930
16.00-17.00	13	114	19	97	137	77	68	109	113	27	10	252	0	774	262	1,036
17.00-18.00	22	76	14	79	145	81	79	126	111	18	35	247	0	751	282	1,033
18.00-19.00	19	93	27	81	128	58	44	107	94	7	26	175	0	658	201	859
19.00-20.00	12	89	23	72	98	52	39	99	104	8	79	104	0	596	183	779
20.00-21.00	14	67	17	62	90	56	44	94	86	12	47	92	0	542	139	681
21.00-22.00	22	69	27	56	91	64	35	82	24	4	36	57	0	474	93	567
22.00-23.00	15	79	28	42	36	34	19	60	19	11	31	32	0	343	63	406
23.00-24.00	14	71	17	39	11	26	12	35	12	2	1	11	0	240	12	252
00.00-01.00	8	63	20	27	3	14	11	24	6	0	2	7	0	176	9	185
01.00-02.00	8	65	12	20	2	10	1	10	0	0	1	6	0	128	7	135
02.00-03.00	6	41	17	14	1	12	4	5	0	0	0	2	0	100	2	102
03.00-04.00	10	52	7	24	2	2	1	6	0	0	1	1	0	104	2	106
04.00-05.00	2	47	13	6	3	13	0	3	2	0	0	7	0	89	7	96
05.00-06.00	4	56	17	27	26	9	1	3	0	1	7	20	0	144	27	171
A DT	318	3,086	473	1,559	2,006	1,004	689	1,480	1,736	302	960	2,687	0	12,653	3,647	16,300

Factor AADT

Seasonal			
Truck	Bus	Light	NM
1.10	1.10	1.10	1.15

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	Total Motor	Total Non- Motor	Grand Total
AADT	350	3,395	520	1,715	2,207	1,104	758	1,628	1,910	332	1,104	3,050	0	13,918	4,194	18,112
Percentage	2.51	24.39	3.74	12.32	15.65	7.93	5.45	11.70	13.72	2.39	26.32	73.68	0.00	100%	100%	100%
Percentage of Motorized and Non Motorized														77%	23%	100%

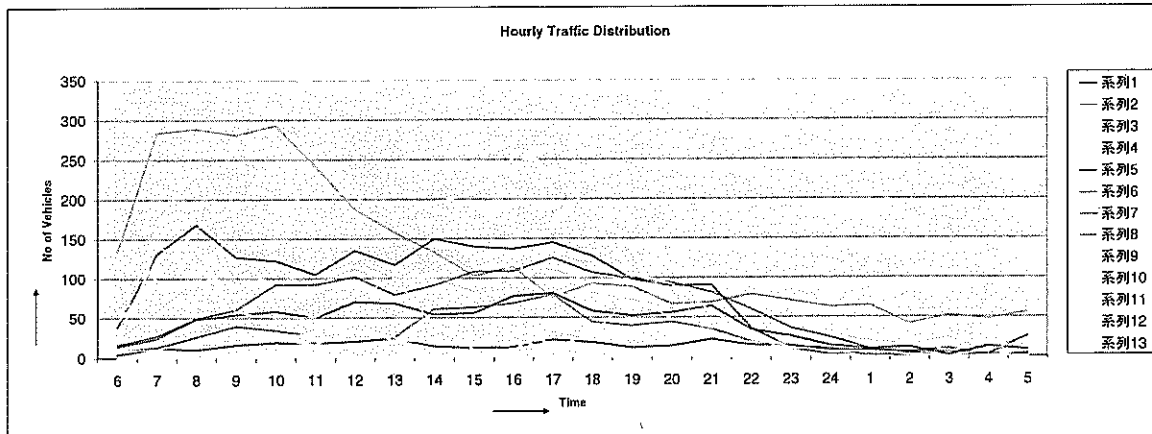
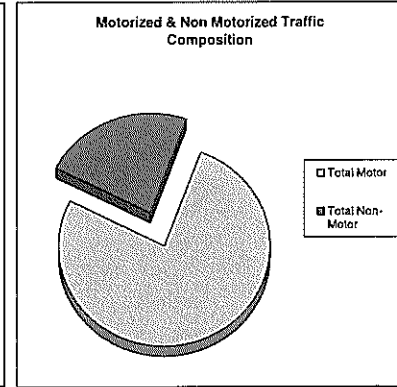
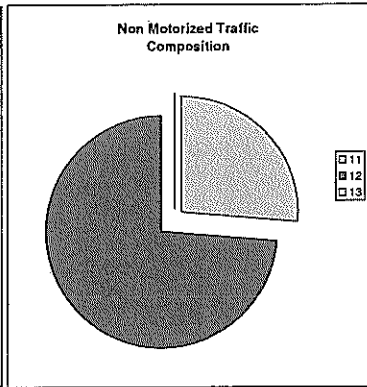
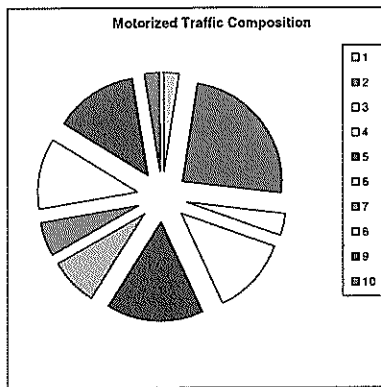


Table 3.2.4 : Classified Traffic Count Survey Result (AADT)

Link Name Station Name Traffic Direction	Dhaka-Mymensingh Bhaluka Toll Point Bothways	Division Circle Zone	Mymensingh Mymensingh Mymensingh	Count No. Peak No. Date Recorded	4 hrs 2 days
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Time	1 Heavy Truck / Trailer /Container	2 Medium Truck	3 Small Truck	4 Large Bus	5 Medium Bus	6 Micro Bus	7 Utility	8 Car	9 Auto Rickshaw	10 Motor Cycle	11 Bicycle	12 Cycle- Rickshaw	13 Cart	Total Motor	Total N-Motor	Grand Total
06.00-07.00	4	80	15	10	3	4	11	1	8	4	15	33	0	140	48	188
07.00-08.00	5	113	9	47	5	4	4	7	13	15	177	122	0	222	299	521
08.00-09.00	3	87	11	58	17	15	8	20	18	40	109	140	0	277	249	526
09.00-10.00	5	75	15	70	17	26	23	26	11	73	72	183	0	341	255	596
10.00-11.00	3	95	15	71	20	31	13	29	24	92	60	240	0	393	300	693
11.00-12.00	5	88	19	70	19	23	17	21	46	96	60	274	0	404	334	738
12.00-13.00	10	89	14	84	10	30	16	29	47	79	66	246	0	408	312	720
13.00-14.00	5	83	14	105	13	32	27	31	16	90	128	239	0	416	368	784
14.00-15.00	7	76	19	80	35	20	7	33	20	56	73	131	0	333	204	537
15.00-16.00	5	90	18	70	24	16	5	25	23	86	79	169	0	362	249	610
16.00-17.00	1	87	19	68	20	17	29	36	27	89	83	194	0	384	277	661
17.00-18.00	3	88	18	61	21	18	17	30	33	90	100	210	0	379	310	689
18.00-19.00	2	83	20	60	31	39	9	32	36	61	86	202	0	373	288	661
19.00-20.00	3	74	20	76	20	21	19	30	22	59	136	195	0	344	331	675
20.00-21.00	3	105	19	50	12	23	11	15	19	52	95	159	0	309	254	563
21.00-22.00	4	89	34	42	9	26	8	17	16	43	50	106	0	288	156	444
22.00-23.00	2	137	29	19	11	19	3	17	7	22	30	60	0	266	90	356
23.00-24.00	1	107	21	6	1	22	6	12	7	8	15	25	0	191	40	231
00.00-01.00	1	82	0	10	1	18	6	13	3	5	4	16	0	139	20	159
01.00-02.00	2	100	8	5	0	15	5	4	0	0	0	6	0	139	6	145
02.00-03.00	2	90	6	4	0	6	1	3	0	1	1	2	0	113	3	116
03.00-04.00	2	71	5	4	0	4	5	2	1	0	2	0	0	94	2	96
04.00-05.00	0	78	5	1	0	0	2	0	1	1	1	1	0	88	2	90
05.00-06.00	2	60	8	4	0	3	4	0	2	0	6	9	0	83	15	98
AADT	80	2,127	361	1,055	289	432	247	433	400	1,062	1,449	2,962	0	6,486	4,411	10,897

Factor AADT

Seasonal			
Truck	Bus	Light	NM
1.10	1.10	1.10	1.15

Series	1	2	3	4	5	6	7	8	9	10	11	12	13	Total Motor	Total Non- Motor	Grand Total
AADT	88	2,340	397	1,161	318	475	272	476	440	1,168	1,666	3,406	0	7,135	5,073	12,207
Percentage	1.23	32.79	5.57	16.27	4.46	6.66	3.81	6.68	6.17	16.37	32.85	67.15	0.00	100%	42%	100%
Percentage of Motorized and Non Motorized														58%	42%	100%

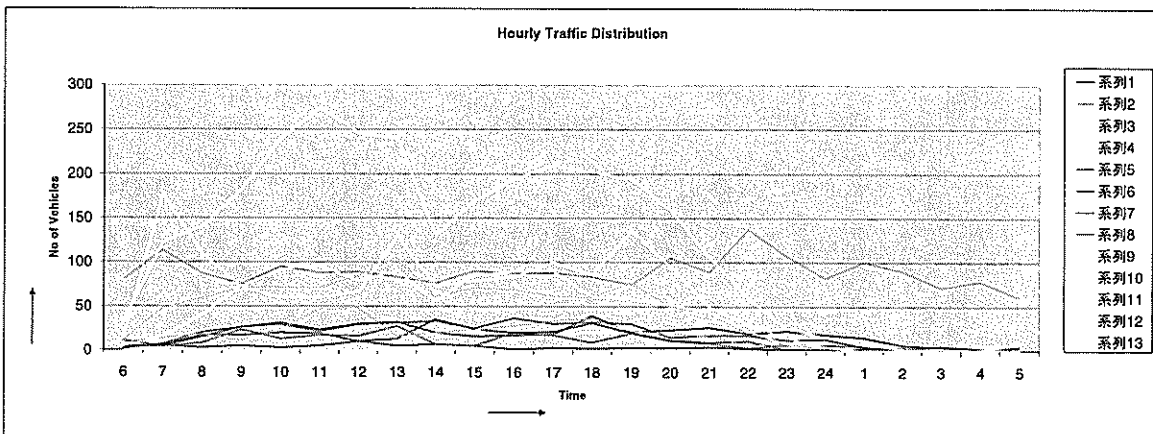
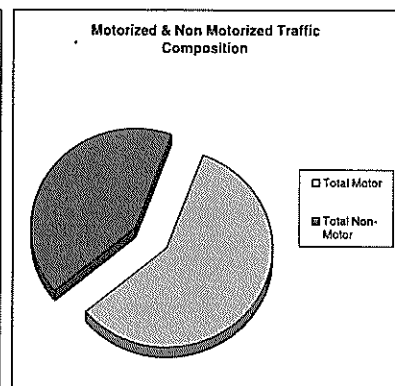
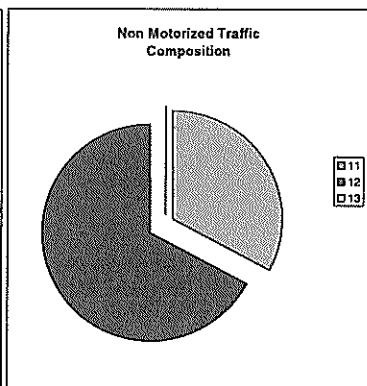
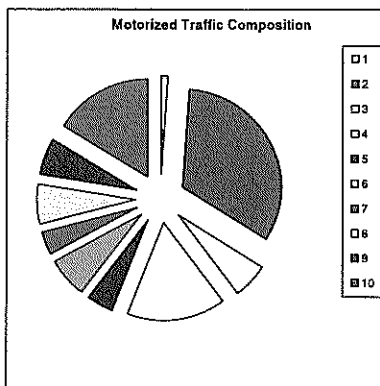


Table 3.6 Objective Evaluation of Alternative Transport Strategies

	Existing Condition 2004		Base Case		1a		1b		1c		2a		2b		2c		3a		3b		3c		3d	
	USD Billions	Peak Hour	USD Billions	Peak Hour	Roads+ All BRT No Metro	Roads+ BRT Metro	Roads+ All BRT No Metro	Roads+ BRT Metro	Roads+ No BRT All Metro	Roads+ No BRT All Metro	Roads++ All BRT No Metro	Roads++ BRT Metro	Roads+++ All BRT No Metro	Roads+++ BRT Metro	Roads+++ No BRT All Metro	Roads+++ No BRT All Metro	Roads+++ All BRT No Metro	Roads+++ BRT Metro	Roads+++ All BRT No Metro	Roads+++ BRT Metro	Roads+++ All Metro	Roads+++ All BRT No Metro	Roads+++ No BRT No Metro	
COST																								
w BR Costs	0.0		0.2		2.9	4.9	4.9	3.9	5.5	5.5	3.1	5.2	5.2	5.8	5.8	4.2	6.3	6.3	6.9	6.9	6.9	3.2	3.2	
w/o BR costs	0.0		0.2		1.9	3.9	3.9	4.5	4.5	4.5	2.1	4.2	4.2	4.8	4.8	3.2	5.3	5.3	5.9	5.9	5.9	3.2	2.2	
PERSON TRIPS																								
Total	666,700	Peak Hour	1,606,100	Peak Hour	1,655,700	1,652,200	1,655,700	1,655,700	1,655,700	1,655,800	1,655,800	1,652,400	1,655,800	1,655,800	1,655,800	1,654,400	1,651,100	1,654,300	1,654,300	1,654,300	1,654,300	1,657,500	1,657,500	
Transit	544,200	Peak Hour	1,295,000	Peak Hour	1,372,500	1,367,500	1,369,200	1,369,200	1,369,200	1,372,300	1,367,400	1,368,500	1,368,500	1,368,500	1,368,500	1,369,300	1,364,600	1,365,800	1,365,800	1,365,800	1,365,800	1,370,200	1,370,200	
Auto	122,500	Peak Hour	311,100	Peak Hour	283,200	284,700	286,500	286,500	286,500	283,500	285,000	287,300	287,300	287,300	283,500	285,000	287,300	288,500	288,500	288,500	288,500	287,300	287,300	
PERSON KMS																								
Total	5,497,000	Peak Hour	11,646,000	Peak Hour	14,411,000	14,627,000	14,456,000	14,456,000	14,456,000	14,487,000	14,718,000	14,439,000	14,439,000	14,439,000	14,487,000	14,671,000	14,367,000	14,367,000	14,367,000	14,367,000	14,367,000	14,344,000	14,344,000	
Transit	4,233,000	Peak Hour	8,355,000	Peak Hour	11,622,000	11,840,000	11,664,000	11,664,000	11,664,000	11,690,000	11,922,000	11,635,000	11,635,000	11,635,000	11,690,000	11,913,000	11,591,000	11,591,000	11,591,000	11,591,000	11,591,000	11,561,000	11,561,000	
Auto	1,264,000	Peak Hour	3,291,000	Peak Hour	2,789,000	2,787,000	2,792,000	2,792,000	2,792,000	2,797,000	2,796,000	2,804,000	2,804,000	2,804,000	2,797,000	2,796,000	2,776,000	2,776,000	2,776,000	2,776,000	2,776,000	2,783,000	2,783,000	
PERSON HRS																								
Total	403,000	Peak Hour	2,084,000	Peak Hour	914,000	934,000	953,000	953,000	953,000	887,000	908,000	930,000	930,000	930,000	887,000	908,000	886,000	886,000	886,000	886,000	886,000	1,067,000	1,067,000	
Transit	328,000	Peak Hour	1,594,000	Peak Hour	629,000	660,000	711,000	711,000	711,000	627,000	658,000	708,000	708,000	708,000	627,000	658,000	693,000	693,000	693,000	693,000	693,000	858,000	858,000	
Auto	75,000	Peak Hour	490,000	Peak Hour	285,000	274,000	242,000	242,000	242,000	260,000	250,000	222,000	222,000	222,000	260,000	250,000	193,000	193,000	193,000	193,000	193,000	209,000	209,000	
VEHICLE TRIPS																								
Transit	Peak Hour	na	na	Peak Hour	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Auto	101,200	Peak Hour	257,200	Peak Hour	234,000	235,300	236,800	236,800	236,800	234,300	235,500	237,400	237,400	237,400	234,300	235,500	238,400	238,400	238,400	238,400	238,400	237,500	237,500	
VEHICLE KMS																								
Transit	Peak Hour	na	na	Peak Hour	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Auto	1,045,000	Peak Hour	2,720,000	Peak Hour	2,305,000	2,303,000	2,308,000	2,308,000	2,308,000	2,312,000	2,311,000	2,318,000	2,318,000	2,318,000	2,312,000	2,311,000	2,294,000	2,294,000	2,294,000	2,294,000	2,294,000	2,300,000	2,300,000	
VEHICLE HRS																								
Transit	Peak Hour	na	na	Peak Hour	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Auto	61,000	Peak Hour	405,000	Peak Hour	236,000	226,000	200,000	200,000	200,000	215,000	207,000	183,000	183,000	183,000	215,000	207,000	160,000	160,000	160,000	160,000	160,000	173,000	173,000	
TRAVEL SPEED																								
Total	13.6	Peak Hour	5.6	Peak Hour	15.8	15.7	15.2	15.2	15.2	16.3	16.2	15.5	15.5	15.5	16.3	16.2	16.2	16.2	16.2	16.2	16.2	13.4	13.4	
Transit	12.9	Peak Hour	5.2	Peak Hour	18.5	17.9	16.4	16.4	16.4	18.7	18.1	16.4	16.4	16.4	18.7	18.1	16.4	16.4	16.4	16.4	16.4	13.5	13.5	
Auto	17.0	Peak Hour	6.7	Peak Hour	9.8	10.2	11.6	11.6	11.6	10.7	11.2	12.6	12.6	12.6	10.7	11.2	14.4	14.4	14.4	14.4	14.4	13.3	13.3	

Table 3.7: Comparison of Traffic Data on Selected Sections of Dhaka 2004 and 2008

Survey Location	Road Name	Year of Traffic Count	Motorcycle	Auto Rickshaw	Car/JEEP/Station wagon	Taxi	Auto tempo/Laguna/Maxi	Bus (large)	Minibus	Micro Bus	Staff Bus	School Bus	Small Van	Pickup	Truck 2-Axle	Truck 3-Axle	Truck Trailer	Tanker / Tank Lorry	Total MT
Asad Gate	Mirpur Road	2004	4,425	20,599	27,724	8,710	1,951	3,516	9,546	3,626	429	153	121	1,484	3,683	65	122	125	86,279
		2008	6,568	22,925	45,344	6,657	615	4,453	8,665	6,911	199	154	87	2,561	4,429	90	304	130	110,092
	Growth Interim	(in %)	48.4	11.3	63.6	-23.6	-68.5	26.6	-9.2	90.6	-53.6	0.7	-28.1	72.6	20.3	38.5	149.2	4.0	27.6
	Growth Annual	(in %)	16.1	3.8	21.2	-7.9	-22.8	8.9	-3.1	30.2	-17.9	0.2	-9.4	24.2	6.8	12.8	49.7	1.3	9.2
Abahani Sports Ground	Salmosjid Road	2004	2,244	8,327	17,794	4,804	306	1,125	614	2,537	234	150	40	389	233	12	23	10	38,842
		2008	3,505	6,810	32,912	2,474	1,315	1,718	543	3,350	130	164	0	920	273	9	78	28	54,229
	Growth Interim	(in %)	56.2	-18.2	85.0	-48.5	329.7	52.7	-11.6	32.0	-44.4	9.3	-99.8	136.5	17.2	-25.0	239.1	180.0	39.6
	Growth Annual	(in %)	18.7	-6.1	28.3	-16.2	109.9	17.6	-3.9	10.7	-14.8	3.1	-33.3	45.5	5.7	-8.3	79.7	60.0	13.2
Modhumati Model Town	Gablali-Savar Road	2004	436	376	2,806	1,207	31	3,616	2,471	1,330	59	17	0	1,714	3,398	44	299	110	17,714
		2008	1,087	909	6,328	2,662	168	5,171	2,603	2,295	106	22	0	3,076	6,157	30	802	143	31,759
	Growth Interim	(in %)	149.3	141.8	142.8	137.1	441.9	43.0	5.3	72.6	79.7	29.4	0.0	79.5	81.2	-31.8	168.2	30.0	79.3
	Growth Annual	(in %)	49.8	47.3	47.6	45.7	147.3	14.3	1.8	24.2	26.6	9.8	0.0	26.5	27.1	-10.6	56.1	10.0	26.4
Kazi Nazrul Islam Avenue	Old Airport Road	2004	7,583	46,120	27,464	14,824	1,524	3,853	12,529	5,668	949	345	136	2,807	1,139	3,570	430	196	128,935
		2008	7,539	45,029	42,612	11,333	534	4,612	11,477	7,977	138	47	2	4,491	4,656	128	659	54	141,288
	Growth Interim	(in %)	-0.6	-2.4	55.2	-23.5	-65.0	26.3	-8.4	40.8	-85.5	-86.4	-98.5	60.0	308.8	-96.4	53.3	-72.4	9.6
	Growth Annual	(in %)	-0.2	-0.8	18.4	-7.8	-21.7	8.8	-2.8	13.6	-28.5	-28.8	-32.8	20.0	102.9	-32.1	17.8	-24.1	3.2
Engineers Institute	Maulana Vashani Road	2004	1,487	4,616	5,849	2,586	538	3,390	13,646	893	85	17	10	641	3,649	149	128	171	37,855
		2008	3,412	6,833	15,835	2,151	43	7,051	12,405	2,608	201	37	0	974	3,917	50	135	78	55,728
	Growth Interim	(in %)	129.5	48.0	170.7	-16.8	-92.0	108.0	-9.1	192.0	136.5	117.6	-99.0	52.0	7.3	-66.4	5.5	-55.6	47.2
	Growth Annual	(in %)	43.2	16.0	56.9	-5.6	-30.7	36.0	-3.0	64.0	45.5	39.2	-33.0	17.3	2.4	-22.1	1.8	-18.5	15.7
Mohakhali Rail Crossing	New Airport Road	2004	3,037	17,159	16,480	6,284	4,420	1,560	3,552	3,142	286	92	14	2,789	3,068	147	142	18	62,192
		2008	7,010	28,384	65,575	8,675	3,715	3,834	3,384	10,377	532	98	0	3,999	3,212	77	158	35	139,065
	Growth Interim	(in %)	130.8	65.4	297.9	38.0	-16.0	145.8	-4.7	230.3	84.7	6.5	-99.3	43.4	4.7	-47.6	11.3	94.4	123.6
	Growth Annual	(in %)	43.6	21.8	99.3	12.7	-5.3	48.6	-1.6	76.8	28.2	2.2	-33.1	14.5	1.6	-15.9	3.8	31.5	41.2
Kamat Alaturk Avenue	Banani-Gulshan 2	2004	1,471	9,086	18,005	3,960	2,329	479	1,036	2,089	63	48	8	534	301	15	20	7	36,451
		2008	2,264	8,396	26,448	2,684	853	699	587	2,697	113	42	0	812	365	0	0	0	45,960
	Growth Interim	(in %)	53.9	-7.6	46.9	-32.2	-63.4	45.9	-43.3	29.1	79.4	-12.5	-98.8	52.1	21.3	-99.3	-99.5	-98.6	16.5
	Growth Annual	(in %)	18.0	-2.5	15.6	-10.7	-21.1	15.3	-14.4	9.7	26.5	-4.2	-32.9	17.4	7.1	-33.1	-33.2	-32.9	5.5
Rajlaxmi Complex	Uttara Model Town	2004	1,690	5,276	19,250	7,861	1,206	4,654	14,933	4,985	446	101	10	3,945	4,323	351	612	233	69,876
		2008	3,278	9,065	33,616	9,038	336	9,018	14,493	7,784	334	125	0	6,113	5,341	194	1,138	477	100,351
	Growth Interim	(in %)	94.0	71.8	74.6	15.0	-72.1	93.8	-2.9	56.1	-25.1	23.8	-99.0	55.0	23.5	-44.7	86.1	104.7	43.6
	Growth Annual	(in %)	31.3	23.9	24.9	5.0	-24.0	31.3	-1.0	18.7	-8.4	7.9	-33.0	18.3	7.8	-14.9	28.7	34.9	14.5

Table 3.8: Comparison of Traffic Data on Selected Sections , External Cordon Survey 2004 and 2008

Survey Location	Road Name	Year of Traffic Count	Heavy Truck / Trailer /Container	Medium Truck	Small Truck	Large Bus	Medium Bus	Micro Bus	Utility	Car	Auto Rickshaw	Motor Cycle	Total MT
Sreenagar	Dhaka-Mawa-Khulna	2004	3	308	266	900	614	281	254	318	413	166	3,523
		2008	19	458	163	644	1,586	468	219	635	792	354	5,338
	Growth Interim	(in %)	533.3	48.7	-38.7	-28.4	158.3	66.5	-13.8	99.7	91.8	113.3	51.5
	Growth Annual	(in %)	177.8	16.2	-12.9	-9.5	52.8	22.2	-4.6	33.2	30.6	37.8	17.2
Meghna Bridge	Dhaka-Chittagong	2004	425	5,089	314	2,094	2,002	1,113	1,139	1,560	868	285	14,889
		2008	2,751	4,761	778	3,496	2,527	2,880	1,038	2,407	1,278	383	22,299
	Growth Interim	(in %)	547.3	-6.4	147.8	67.0	26.2	158.8	-8.9	54.3	47.2	34.4	49.8
	Growth Annual	(in %)	182.4	-2.1	49.3	22.3	8.7	52.9	-3.0	18.1	15.7	11.5	16.6
Bhulta	Dhaka-Sylhet	2004	75	1,140	361	584	1,200	374	431	459	230	639	5,493
		2008	350	3,395	520	1,715	2,207	1,104	758	1,628	1,910	332	13,919
	Growth Interim	(in %)	366.7	197.8	44.0	193.7	83.9	195.2	75.9	254.7	730.4	-48.0	153.4
	Growth Annual	(in %)	122.2	65.9	14.7	64.6	28.0	65.1	25.3	84.9	243.5	-16.0	51.1
Bhaluka Toll Point	Dhaka-Mymensingh	2004	68	2,013	161	1,010	285	723	249	261	327	461	5,558
		2008	88	2,340	397	1,161	318	475	272	476	440	1,168	7,135
	Growth Interim	(in %)	29.4	16.2	146.6	15.0	11.6	-34.3	9.2	82.4	34.6	153.4	28.4
	Growth Annual	(in %)	9.8	5.4	48.9	5.0	3.9	-11.4	3.1	27.5	11.5	51.1	9.5

TABLE 3.9: NUMBER OF YEARWISE REGISTRATION OF MOTOR VEHICLES IN DHAKA

Sl No	Type of Vehicles	Up to 1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
1	Motor Car	68,149	2,452	5,560	5,542	6,163	4,734	5,633	7,403	10,244	115,880
2	Jeep/St. Wagon/Microbus	25,181	910	1,579	2,911	1,810	2,114	3,303	4,548	4,372	46,728
3	Taxi	1,178	348	762	2,101	4,980	523	514	266	-	10,672
4	Bus	953	202	453	632	374	779	728	949	1,082	6,152
5	Minibus	3,412	242	831	1,924	1,051	368	118	75	77	8,098
6	Truck	14,562	1,635	890	1,127	2,128	1,437	1,104	1,480	830	25,193
7	Auto-rickshaw/Auto-tempo	24,548	1,881	75	2,616	7,996	2,344	139	230	121	39,950
8	Human Hailer	-	-	-	-	673	136	20	-	-	829
9	Covered Van	-	-	-	-	-	527	-	-	-	527
10	Motor Cycle	85,600	8,768	8,590	9,102	7,239	7,872	12,879	16,284	17,303	173,637
11	Others	5,601	819	1,825	1,012	3,257	1,300	2,361	2,728	2,913	21,816
	Total	229,184	17,257	20,565	26,967	35,671	22,134	26,799	33,963	36,942	449,482

FORM LTA

Application for an authorization to drive a public service vehicle / transport vehicle.

[Rule 5 (4) of the Motor vehicles Rules, 1984]

To
THE TRANSPORT AUTHORITY -----

I apply for an authorization to drive a public service vehicle / transport vehicle within the district of ----- or whole of Bangladesh ----- and forward, herewith, the driving license held by me (No. ----- dated the ----- issued by the Licensing Authority -----

Name of applicant -----

(In block letters or clear script)

Class of vehicle authorized to drive -----

Present address of applicant -----

Permanent address of the applicant -----

Name of post office from where -----

The delivery of the license will -----

Be taken.

Date ----- 20

(Signature or thumb impression
of applicant)



বাংলাদেশ

গেজেট

অতিরিক্ত সংখ্যা
কর্তৃপক্ষ কর্তৃক প্রকাশিত

বুধবার, মে ৫, ২০০৪

Government of the People's Republic of Bangladesh
Ministry of Communication
BRTA Section

NOTIFICATION

Dated, the 16th November, 2003

No. RRD/BRTA/Overload -38/96(P-1) - 653 -- In supersession of all previous orders in this respect, the Government has been pleased to raise the existing single load limit from 8.2 tons to 10.0 tons and to refix the maximum permissible laden/train weight limit of motor vehicles higher than 20.0 tons and the maximum permissible weight for single axle and group of axles and also the maximum permissible laden /train weight of motor vehicles or combination of vehicles (rigid or articulated) for use in Bangladesh as specified in the Annexure attached herewith, as per recommendation of the Steering-cum-Standing Committee constituted vide memo no. Sawra/BRTA/Overload-38/96-354, dated 12-05-1998

Provided that if convinced, the Government may modify by an order, the heavier or lighter weight than those specified in the Annexure for a particular type of vehicle or for use in a particular area or for a particular purpose for a specified period.

By Order of the President
Khwaja Ghulam Ahmed
Joint Secretary

Annexure

Maximum Permissible Axle and Laden Weights Limit for Motor Vehicles**TABLE-1**

Item	Type of Axles	Maximum Permissible Weight Limit for an Axle in Tons is
1.	Steering/Single axle with 2 tyres	5.5
2.	Single rear axle with 4 tyres	10.0
3.	Two closely spaced axle (centre lines of axles not more than 2.5 and not less than 1.02 metres apart) with 2 tyres each.	6.25
4.	Two closely spaced axle with 4 tyres each	8.25
5.	Three closely spaced axles (centre lines of outermost axles not more than 3.25 metres apart) with 2 tyres each.	4.5
6.	Three closely spaced axles with 4 tyres each	6.5
7.	Four closely spaced axles with 4 tyres each	5.5

TABLE-2

Item	Total Number of Axel	Type of Attachment	Distance between centre lines of foremost and rearmost axles in metres	Permissible Maximum Laden /Train Weight Limit in Tons is
1	2	3	4	5
1	2	Rigid, single steering & one rear axle	3 or less	13.0
2	2	Rigid, single steering & one rear axle	More than 3	15.0
3.	3	Rigid, single steering & two closely spaced rear axles.	More than 4	22.0
4.	3	Two axle prime mover and single axle trailer	More than 5	25.0

1	2	3	4	5
5	4	Rigid, single steering & three closely spaced rear axles	More than 5	25.0
6.	4 or more	Rigid, single/twin steering, single intermediate & two closely spaced rear axles	More than 7	30.0
7.	4	Articulated, 2 axle prime mover and closely spaced 2 axle trailer	More than 8	32.0
8.	4	2 axle prime mover and 2 axle trailer not closely spaced	More than 8	33.0
9.	5	Articulated, 2 axle prime mover and closely spaced 3 axle trailer	More than 9	35.0
10	5	Articulated, 3 axle prime mover and closely spaced 2 axle trailer	More than 10	38.0
11.	6	Articulated, 3 axle prime mover and closely spaced 3 axle trailer	More than 10	41.0
12	7	Articulated, 3 axle prime mover and closely spaced 4 axle trailer	More than 10	44.0

Subject to the conditions specified hereinunder, the maximum weight of any of its axle or the laden /train weight of a motor vehicle (including trailer, if any) or any combination thereof, for operation on any public road or highway in Bangladesh shall not exceed the weight limits specified in the tables above for the axle or group of axles (more than one) or for the vehicle (including trailer, if any).

Provided that considering the design and its purpose of use, the Authority (BRTA) may under the conditions of a special permit to be issued by it, allow the use of a special purpose vehicle (a vehicle intended for carrying indivisible load of unusual size) on a specified route or area for specified period, if deems necessary in the interest of public service and if found safe to do so.

Provided further that the weight of any steering axle shall not be-

(i) in the case of an articulated vehicle, less than 10 percent of the sum of all axle weight of such vehicle; and

(ii) in case of two axle rigid vehicle, more than 55 percent of the single rear axle weight limit of such vehicle .

Provided further that where the distance between the centre lines falls, between any two distances herein specified in Table-2, the total weight of such group of consecutive axles shall be determined by direct proportion, and laden weight or

train weight of the said vehicle shall not exceed by more than 4500 kilograms, for every meter between the foremost and rearmost axles, and 2500 kilograms for every additional axle over 7 axles

2. Subject to the axle weight limit specified in Table-1, the axle weight of a particular axle shall be equal to the sum of the individually permissible tyre loads (manufacture's rating) of that axle of the maximum axle weight specified by the manufacturer, whichever is lower. The weight of any intermediate (not being foremost or rearmost) axle shall not exceed 8.25 tons.

3. Subject to the maximum axle weight and laden weight specified in the Tables above, the axle weight of a two axle rigid vehicle where the distance between the center lines of foremost and rearmost axle is less than 3 meters, shall not exceed 9.0 tons.

4. Subject to the laden weight limit specified in Table-2, the laden weight of a vehicle shall be equal to the sum of the axle weights of all the axles, or the maximum laden weight or the train weight specified by the manufacturer for the vehicle or the, vehicle combination (including trailer, if any), whichever is lower:

Provided that the maximum laden weight or the maximum train weight of a vehicle shall not exceed in case of an articulated vehicle forty-eight tons and in any other case thirty tow tons:

Provided further that maximum total weight of all trailers, whether laden or un-laden, drawn at any one time by a locomotive shall not exceed forty- eight tons.

5. The axle weight and the laden weight or the train weight limit given in the tables above shall always be subjected to the maximum limit certified by the Registering Authority in the certificate of registration of the vehicle in question.