2.5 Road-based Public Transportation Network and Services

2.5.1 Overview

1) Role of Public Transportation

Public transportation comprises passenger transport services which are available for use by the general public, as opposed to modes for private use such as cars, motorcycles and vehicles for hire. Role of public transportation is not only to provide transport services for general public, but also to ensure people's mobility at least at a minimum level. Public transportation services are usually funded by fares charged to each passenger, with varying levels of subsidy from the local and central governments. In some cities, it is operated without subsidy, partially/ fully subsidized or zero fare system.

Public transportation is provided by a company or authority that operates a fleet of vehicles. They may or may not be regulated or subsidized by authorities. The infrastructure used may be exclusive or shared with private vehicles. In many Asian cities para-transit (not fully regulated fare or operational system) modes such as Bajaj/ Ojek/ Becak in Indonesia and Tricycle in Philippines provide services as public transportation modes.

2) Road-based Public Transportation System in JABODETABEK

In JABODETABEK, there are various types of road-based public transportation systems operated (Refer to Table 2.5.1). Currently, there is a Busway network operated by Transjakarta, Trasn Pakuan network in Bogor city, large buses with seating capacity of 50 (maximum 90 including standees) passengers, (Patas AC, Patas Non-AC and Regular), medium buses with seating capacity of 24 (maximum 55) passengers (called Metro Mini, Kopaja, etc.) and small buses (Transit Vans) with capacity of 9-14 passengers (called Microlet, Angkot, etc.).

Table 2.5.1 Type of Bus Services in JABODETABEK

Service Type	Characteristics
Busway (BRT)	This is a Bus Rapid Transit (BRT) system managed by BLU Transjakarta (under Transport Agency of DKI Jakarta. Busway fleet is air-conditioned and operates on the designated road lane along major corridors in Jakarta, and stopping at designated bus shelters only. The service is provided with a relatively cheaper fare than other large buses (both AC & Non-AC) because it is heavily subsidized by the government. There are 11 corridors currently (2012) operating within DKI Jakarta.
Trans Pakuan	This is a bus system in Kota Bogor. The fleet is air-conditioned medium bus, and stopping at designated bus shelters. They are operated with time schedule on general lane. There are 3 routes currently (2012).
Patas AC	This is an air-conditioned express limited stop bus service. The service is operated at a higher fare than other large buses. The coverage of this bus service extends to the surrounding Kota, but does not extend into to the rural areas. The service is used by commuters to DKI Jakarta from the surrounding Kota/ cities.
Patas	This is a rapid and non air-conditioned bus service. The coverage of this bus service is wider than Patas AC, being extended along major radial highways in JABODETABEK.
Regular Bus	This is a normal and non air-conditioned bus service. The service is operated in the dense urbanized areas. Intra-urban travelers use this service with a relatively low fare
Medium Bus	Medium bus provides public with a supplemental public transport service, mostly plying on the secondary roads. Some of the routes even provide direct transport to central part of Jakarta from suburban areas.
Small Bus	Small bus service provides people with feeder services to reach major bus terminals and main routes, rail stations. In addition it provides a frequent service for short trips within urban areas, mostly operated in the major Kota areas of JABODETABEK.

Source: Study Team

Taxi and Bajaj are providing hired individual transport service. There are also Ojek (motorcycle taxis) providing fast and short-distance service but it is not legally permitted. The operation of Manpowered 3-wheeled vehicle of Becak has been prohibited within DKI Jakarta since 1990, due to slow speed and short trip length, causing congestion. However, Becak are still operational in suburbs for short trips between the main road and narrow streets. These are commonly used by women for comfort.

Existing situations/ status of each of the road-based public transport system are further described in the following sections.

3) Bus Transportation Management

In the development of road-based public transport system in JABODETABEK, the number of government agencies and organizations are responsible. Particularly, in each stage of the development such as planning, funding, construction and implementation, operation, maintenance and monitoring is essential. In addition role of local governments and private sector is significant, but policy development, strategy implementation and regulation enforcement by the government is also very important (Refer to Table 2.5.2)

Table 2.5.2 Framework of Public Transportation System Development in JABODETABEK

Item	Planning	Funding	Construction / Implementation	Operation / Maintenance / Monitoring	Regulation / Guideline
Busway	Dishub / MOT	Bappeda (APBD) / Private	Private Operator / BLU Transjakarta	Dishub / BLU Transjakarta	MOT
Large Bus (Patas AC/ Patas/ Regular)	Dishub / MOT	BUMN/BUMD / Private	BUMN / BUMD / Private	Dishub	MOT
Medium Bus (Kopaja, Metro Mini)	Dishub	Private (individual)	Private (Cooperation Organization)	Dishub	MOT / Local Gov. Regulation
Small Bus (Angkot, Mikrolet, KWK)	Dishub	Private (individual)	Private (Cooperation Organization)	Dishub	MOT / Local Gov. Regulation
Taxi	Dishub	Private	Private Company	Dishub	MOT
Ojek	-	Private (individual)	Private (personal)	-	Regional Community
Bajaj	Dishub	Private (individual)	Private	Dishub	Local Gov. Regulation
Becak (prohibited in DKI Jakarta)	-	Private (individual)	Private (individual)	-	Local Gov. Regulation
Omprengan (informal bus service)	-	Private (individual)	Private (individual)	Dishub	-
Intra-city Bus Terminal	Dishub	Bappeda (APBD)	Contractor	Dishub	MOT
Inter-city Bus Terminal	MOT / Dishub	Bappenas (APBN)	Contractor	MOT / Dishub	MOT

Source: Study Team

Note: MOT : Ministry of Transport
BSTP : Direktorat Bina System Transportasi Perkotaan (Directorate of Urban Transportation System)
Dishub : Dinas Perhubungan (Transportation Agency)
APBN : State Budget
APBD : Local Government Budget
BLU : Badan Layanan Umum (Public Service Board)
BAPPEDA : Badan Perencana Pembangunan Daerah (Regional Development Planning Agency)
BAPPANAS: Badan Perencanaan dan Pembangunan Nasional (National Development Planning Agency)
BUMN : State Owned Enterprise
BUMD : Local Government Owned Enterprise

2.5.2 Transjakarta Busway

1) Busway System Development

Busway system in Jakarta is managed and indirectly operated by BLU Transjakarta, which is an organization under the Transportation Agency of DKI Jakarta Government. This kind of business providing a public transport service with fare revenue is called BLU.

Operation of Busway is contracted out for a period of 7 years to private operators by corridor. Contract amount is based on the total bus-km operated. Buses are owned by each corridor operator, with the exception of Corridor 1, where buses are owned by Transjakarta. Ticketing and fare collection systems are also contracted out to two private companies (5-years contract). Automatic ticket gates are installed in Corridor 1, 2 and 3. Since these equipments were provided by DKI Jakarta, the fare collection contract is for the manpower costs only. On the other hand Corridors 4, 5, 6, 7, 8, 9 and 10 use paper tickets, the fare collection contract includes cost for ticketing system and provision of manpower. Collected fare revenue is deposited in DKI's bank account and handled by Transjakarta management. However, Transjakarta is also subsidized by DKI Jakarta government, as the fare-box revenues are not sufficient to cover the operating expenses and other costs. Road maintenance is carried out and paid for by DKI Jakarta and vehicle maintenance is the responsibility of each operating company.

2) Busway Corridor Network

The planning, development and implementation of Jakarta Busway network started in early 2000. Corridor 1, between Blok M and Kota was commissioned in 2004. Since then the Busway network has expanded to 11 corridors, with total length of 184km and 208 stations (refer to Table 2.5.3 and Figure 2.5.1). In addition four more corridors, as listed below are being planned to be opened in the near future:

Corridor 12: Pluit–Tanjung Priok

Corridor 13: Blok M–Pondok Kelapa

Corridor 14: Manggarai–University of Indonesia

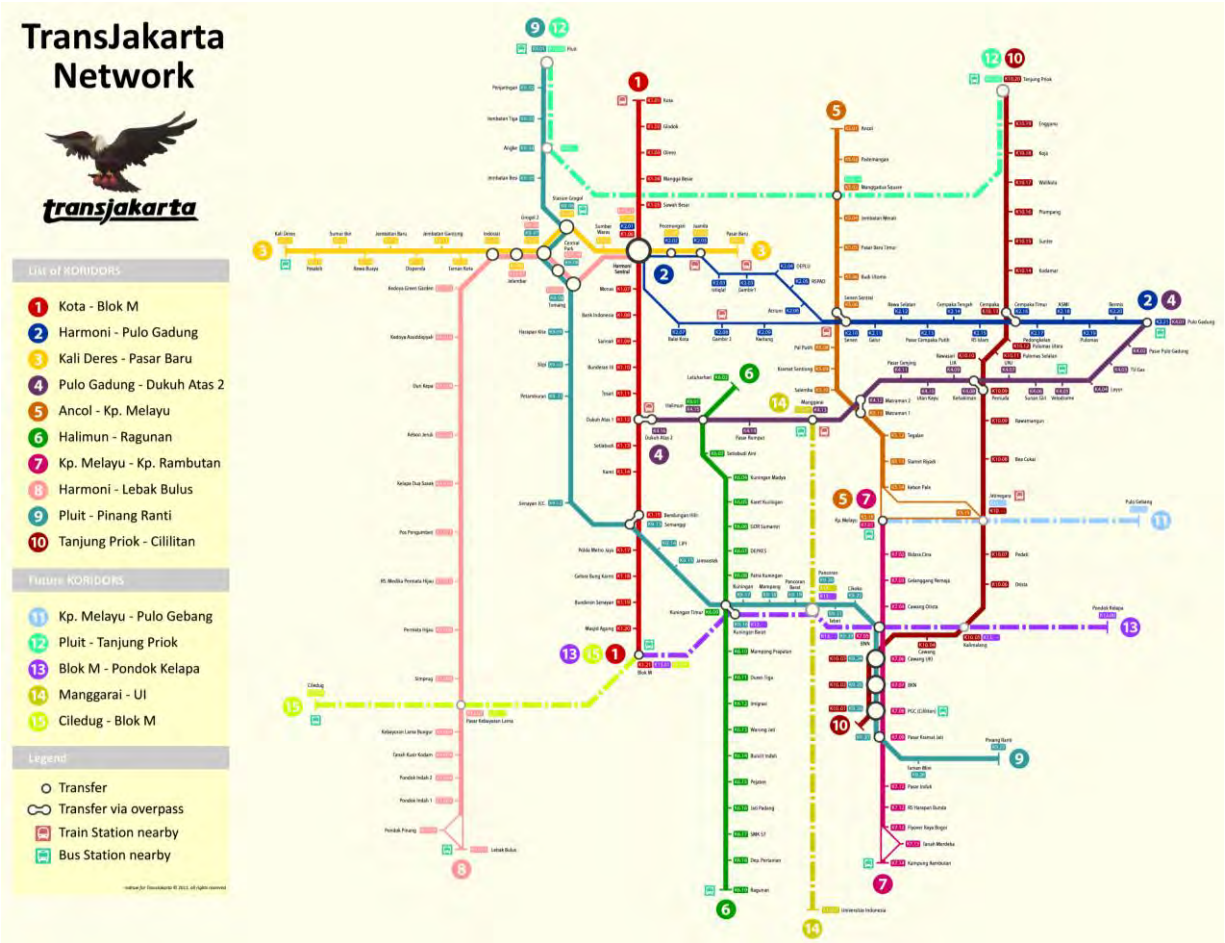
Corridor 15: Ciledug–Blok M

Table 2.5.3 Transjakarta Busway Corridor Details

Corridor		Opened	Length (km)	No. of Stops	Travel Time (min.)	Station Interval (km)	Ave. Speed (km/h)
1	Block M – Kota	1-Feb-2004	12.9	20	43	0.68	18
2	Pulo Gadung – Harmoni	15-Jan-2006	14.3	23	48	0.65	18
3	Kalideres – Harmoni	15-Jan-2006	19.0	14	63	1.46	18
4	Pulo Gadung – Dukuh Atas	27-Jan-2007	11.5	15	38	0.82	18
5	Ancol – Kp. Melayu	27-Jan-2007	13.5	15	45	0.96	18
6	Ragunan – Kuningan	27-Jan-2007	13.3	19	44	0.74	18
7	Kp. Rambutan – Kp. Melayu	27-Jan-2007	12.8	14	43	0.98	18
8	Lebak Bulus – Harmoni	21-Jan-2009	26.6	23	89	1.21	18
9	Pluit – Pinang Ranti	31-Dec-2010	28.8	29	96	1.03	18
10	Tanjung Priok – Cililitan PCG	31-Dec-2010	19.4	20	65	1.02	18
11	Kampung Melayu – Pulo Gebang	28-Dec-2011	12.0	16	50	0.75	18
Total Operational Network in 2012		**1-Jan-2012**	**184.1**	**208**	**-**	**0.89**	**-**

Source: Transjakarta

Figure 2.5.1 Transjakarta Busway Network



Source: Transjakarta

3) Busway Operators

For the operation of each Busway corridor, a new company is established which is co-founded by the existing bus operators, who operate the existing bus routes along the same section as the Busway corridor (with more than 50% of the route length overlap) and DKI Jakarta Government shares 40% of the capital cost. (Refer to Table 2.5.4)

Perum PPD (State-own Enterprise) is the founder of 7 Busway companies running ten corridors: (18% for PT.JET for Corridor 1, 22.8%; PT. TB of Corridors 2&3; 23% for PT.JTM of Corridors 4&6, 22% for PT.JMT of Corridor 5.

Table 2.5.4 Busway Operating Companies

Corridor	Operator
1	PT. JET (Jakarta Express Trans)
2	PT. TB (Trans Batavia)
3	PT. TB (Trans Batavia)
4	PT. JTM (Jakarta Trans Metropolitan)
5	PT. JMT (Jakarta Mega Trans) & PT. LRN (Eka Sari Lorena Transport)
6	PT. JTM (Jakarta Trans Metropolitan) + PT. PP (Primajasa Perdanarayantama)
7	PT. PP (Primajasa Perdanarayantama)
8	PT. LRN (Eka Sari Lorena Transport) + PT. PP (Primajasa Perdanarayantama)
9	PT. BM (Bianglala Metropolitan)
10	PT. BM (Bianglala Metropolitan)
11	PT. DAMURI

Source: Transjakarta

4) Busway Fleet

The specialized and standardized bus fleets with capacity of 85 persons/bus are used for the Busway operation. The height of boarding/alighting doors is raised to fit with the platform of the designated Busway stations/ shelters. In total there were 564 buses in operation, of which 473 with CNG engines. (only Corridor 1 buses (91) have diesel engines). Twenty three (23) articulated buses are used for Corridor 5. Table 2.5.5 and Table 2.5.6 give the bus makers and the age of the Busway fleet in operation up to 2011.

Table 2.5.5 Busway Fleet by Manufacturer (2011)

Corridor	Bus Manufacturer							Available Buses
	Mercedes	Hino	Daewoo	Hyundai	Huang Hai	Komodo	Inobus	
1	28	63	-	-	-	-		**91**
2	-	-	55	-	-	-		**55**
3	-	-	71	-	-	-		**71**
4	-	18	18	12	-	-		**48**
5	-	-	-	-	10	13		**23**
6	-	22	31	-	-	-		**53**
7	-	34	29	22	-	-		**85**
8	No data							
9				69		8		**77**
10						17		**17**
11						23	21	44
Total	**28**	**137**	**204**	**103**	**10**	**61**	**21**	**564**

Source: Transjakarta
Notes:
1. Diesel engine 91 buses are used for Corridor 1.
2. CNG buses are used for Corridors 2-7 (Total 335 Buses)
3. Articulated buses are used for Corridor 5 (Total 23 CNG Buses)

Table 2.5.6 Busway Fleets by Engine Type

Bus Type	2004	2005	2006	2007	2008	2009	2010	2011
Diesel Euro 2	56	91	91	91	91	91	91	91
CNG	–	–	70	70	70	70	70	70
	–	–	–	168	168	168	168	168
	–	–	–	–	10	10	10	10
	–	–	–	–	–	87	87	87
	–	–	–	–	–	–	96	96
	–	–	–	–	–	–	–	42
Total No. of Buses	**56**	**91**	**161**	**329**	**339**	**426**	**522**	**564**

Source: Transjakarta

5) Busway Ridership and Financial Aspects

In 2010 Busway network (10 corridors) carried about 238,000 passengers daily; of which patronage on Corridor 1 was about 80,000 (34%). The average week day passengers entering each station are depicted in Figure 2.5.2. The relatively high usage of Corridor 1 is obviously noticeable. The two terminal stations: Kota & Block M having the highest loading of the entire network. On other corridors the terminal station have the highest loading, with very few passenger using the intermediate stations. It should be noted that the figures show the passengers entering the station from the street, and do not include passengers transferring between corridors. This figures therefore do not reflect the total boardings/ alighting at each station. However, if the transferring passengers are to be included then Harmoni station would probably be the busiest as four lines either terminate or provide interchange facility between the four lines at this station.

Busway operates a flat fare system, for a single journey fare is IDR 3,500 (IDR 2,000 in the morning two hours: 5-7AM) with free transfer within the Busway network. No student concession is available. Operational balance (difference between the revenue and operating costs) of Transjakarta is negative due to cheap fare setting. Since actual cost per passenger is about IDR 5,800, DKI Jakarta is subsidizing each trip by up to IDR 2,300. (refer Table 2.5.7). Another feature or/ impact of flat fare system is that such system attracts long distance passengers, and is a deterrent for short distance passengers, as they may choose a cheaper / quicker mode (e.g. paratransit) for shorter journeys. This again is reflected in Figure 2.5.2 by the fact that fewer passengers enter/ exit the intermediate stations than the terminal stations.

Table 2.5.7 Transjakarta Busway Ridership and Operating Deficit

Year	No. of Annual Passenger Trips	Average Daily Passenger Trips	Operating Deficit (%)
2004	15,942,423	47,589	10.1
2005	20,798,196	56,981	2.5
2006	38,828,039	106,378	24.8
2007	61,446,334	168,346	34.8
2008	74,619,995	204,438	33.4
2009	82,377,655	225,692	-
2010	86,937,487	238,184	-

Source: Transjakarta;
Notes:

1. Average Daily in 2004, is based on opening on 1-Feb-2004 (335 days of Operation);
2. Average Daily for other Years is based on 365 days of operations / year.

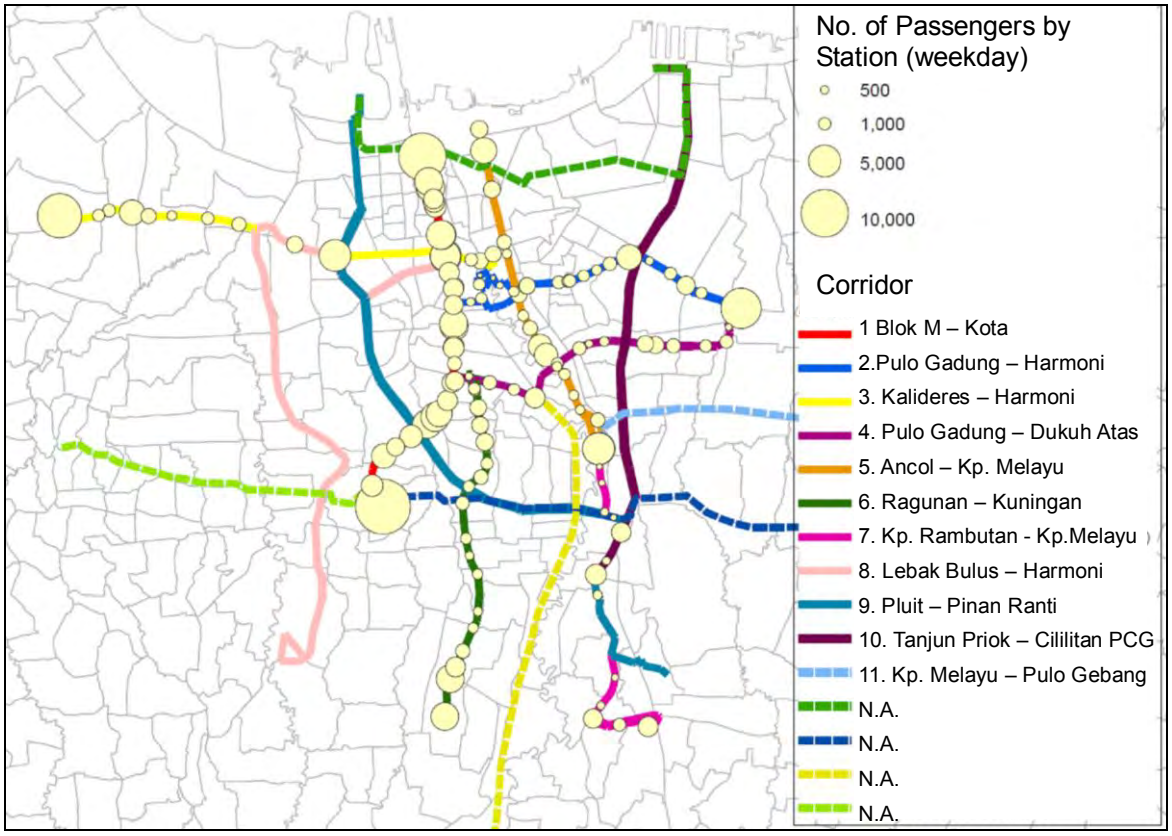
The Busway performance is further illustrated in Table 2.5.8 below. It is rather interesting to note that the performance of Busway (passenger carried per bus per day) is almost the same since 2005, i.e. around 600+ passengers. This indicates that the user switch to Busway upon its opening, but it does not attract further passengers in the corridor with the passage of time, as one would expect that with the increasing congestion on the road for both private and non-Busway buses, more passengers would transfer to the Busway.

Table 2.5.8 Ridership and Cost Recovery of Transjakarta Busway

Year	Operational Corridors	Average Daily Passenger Trips	Total Busway Fleet Size	Average Daily Passenger Trips/ Bus
2004	Corridor 1 (from 1-Feb-04)	47,589	56	850
2005	Corridor 1 Only	56,981	91	626
2006	Corridors 2&3 (Opened 15-Jan)	106,378	161	661
2007	Corridors 4,5,6,&7 (Opened 27-Jan)	168,346	329	512
2008	All Corridors 1~7 Operational	204,438	339	603

Source: Transjakarta;

Figure 2.5.2 No. of Passengers by Station (2009)



Source: Transjakarta;

2.5.3 Trans Pakuan

Trans Pakuan is a bus system in Kota Bogor. The bus of Trans Pakuan is operated by obeying a time schedule and stops only at designated shelters. On the other hand they do

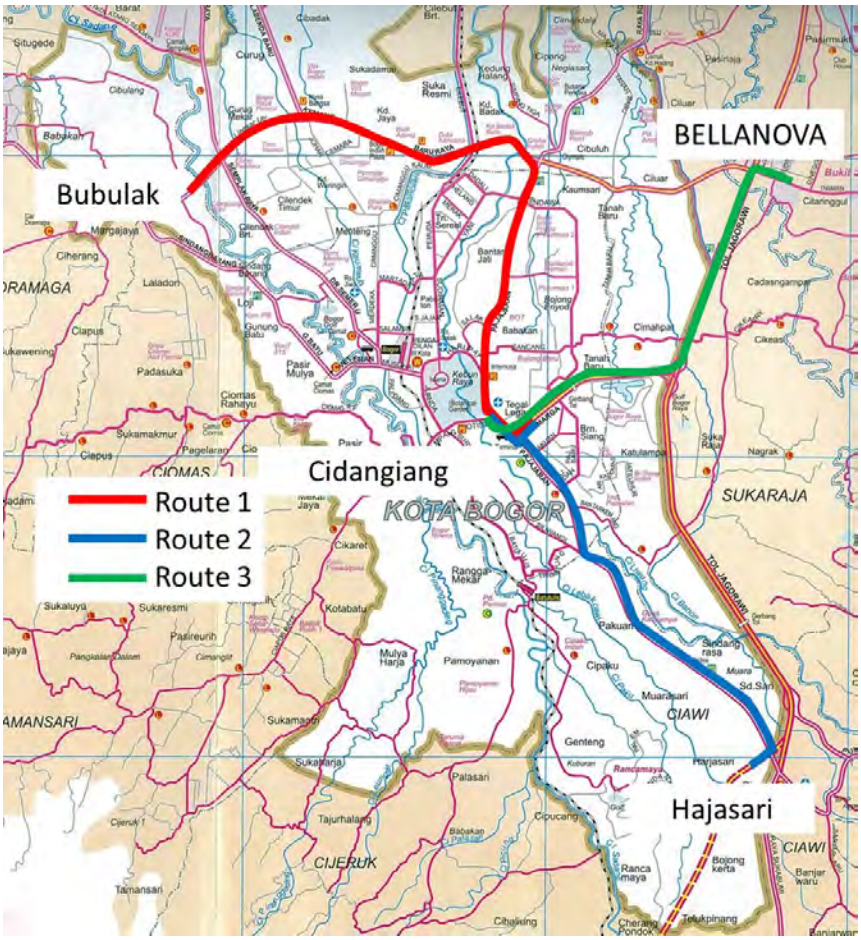
not have dedicated lanes as Trans Jakarta. Therefore, the bus of Trans Pakuan is operated on general lane with other vehicles. Trans Pakuan operates three routes as shown in Table 2.5.9 and Figure 2.5.3. Route 1 connects from Bubuluk to Cidangiang. Bubuluk shelter is meeting point with other small buses. Cidangiang shelter is located center of Kota Bogor near the Barang siang bus terminal. Route 1 opened on May 2007 and has 39 shelters. The bus runs every 10min per a direction. Fare is 3,000 Rp. Route 2 connects from Cidangiang to Hariasari. It opened on July 2009. 27 shelters are located on Route 2. The bus frequency is very low. Only 9-10 buses are operated per a day. Route 3 connects from Cidangiang to BELLANOVA directly using toll way without stopping on the way. The bus of Route 3 is operated every 30min per a direction. The fare is 5,000Rp. Trans Pakuan is operated by Perusahaan Daerah Jasa Transportasi which is owned by Kota Bogor.

Table 2.5.9 Trans Pakuan Route

Route	Section	Length (km)	Travel Time (min)	Opened	No. of shelters	Operation Hours	Fare (Rp)
Route 1	Bubuluk – Cidangiang	11.5	35	May 2007	39	5:20-21:00	3,000
Route 2	Cidangiang – Harjasari	10	30	July 2009	27	6:00-19:00	3,000
Route 3	Cidangiang - BELLANOVA	5	12	February 2010	2	6:30-21:30	5,000

Source: Trans Pakuan

Figure 2.5.3 Location of Trans Pakuan Route



Trans Pakuan has total 68 shelters on three routes. The shelters are categorized tree types as portable type, opened type and secured type as shown in Figure 2.5.4.

Figure 2.5.4 Bus Shelters

Portable type | Opened type | Secured type

Trans Pakuan has total 30 buses that are provided by Director General of Land Transportation, Ministry of Transportation. 10 buses are provided in 2005, 20 buses are provided in 2007. All fleets are equipped with air conditioning system and Bus Smart Card Ticketing System. Passenger capacity of the fleet is 26 people.

Figure 2.5.5 Fleet

Figure 2.5.6 Bus Smart Card Ticketing System

Number of daily passengers is shown in Table 2.5.2. The Trans Pakuan is used around 3,000 passengers per a day.

Table 2.5.10 No. of Daily Passengers

Year	Route 1	Route 2	Route 3	Total
2007	1,726	-	-	1,726
2008	2,253	-	-	2,253
2009	2,979	55	-	3,034
2010	2,721	40	195	2,956

Source: Trans Pakuan

2.5.4 Other Bus Services

1) Bus Operation Fleet Characteristics & Operator

Other than the Busway system and Trans Pakuan, other bus services in JABODETABEK area may be divided into three main types, in terms of vehicle size and service characteristics. Basic characteristics of each bus service type are summarized in Table 2.5.11.

- Large bus (50 seats): Patas AC, Patas Non-AC, Regular Bus
- Medium bus (24 seats): Metro Mini, Kopaja, etc.
- Small bus (9-14 seats): Mikrolet, Angkot, etc.

Table 2.5.11 Charactersitics of Bus Services in JABODETABEK

Items	Large Bus			Medium Bus	Small Bus
	Patas AC	Patas Non-AC	Regular Bus		
Service Type	Rapid Limited Stops & AC	Rapid Limited Stops & non-AC	Normal Regular Stops & non-AC	Supplemental public transport service on secondary roads	Feeder services to reach major bus routes, terminals and stations
Major Service Coverage Areas	DKI Jakarta & Surrounding 3-Kotas: (Tangerang, Depok, Bekasi)	Wider area than Patas AC, extends to major radial highways	Mostly in DKI Jakarta and serves intra-urban trips	Mostly in DKI Jakarta and some routes connect with suburban areas in Jabodetabek	All over Jabodetabek area for shorter trips
Bus Capacity	50 Seats			24 Seats	9-14 Seats
Air-conditioned	Yes	Non-AC			
Major Operators (DKI Jakarta)	Perum PPD, PT. Mayasari Bhakti (sharing 61% of Bus Fleet)	Perum PPD, PT. Mayasari Bhakti (sharing 79% of Bus Fleet)	PPD, PT. Mayasari Bhakti (sharing 81% of Bus Fleet)	PT. Metro Mini, Kopaja (sharing 92% of Bus Fleet)	Small operators / cooperatives (Miklolet, KWK. APK, APB, etc.)
2010 Fleet size Registered in DKI Jakarta	673	782	128	2,465	12,943
Ave. Trip Length (km/ min.) in 2002	13.3km / 80min			6.2km / 53min	3.9km / 37min
Average Occupancy in 2002 (SITRAMP)	51.4 pax			22.3 pax	7.7 pax
Fare Collection	On-board by conductor				
Fare Level: IDR (2010)	6,000-12,000	2,000-4,000 (Student 1,000)		2,000 (Student 500)	2,000-3,000 (Student 1,000)

Source: Collected from various data sources


Large Bus (Pastas)


Medium Bus (Kopaja / Metro Mini)


Small Bus (Mikrolet/ Angkot)

In JABODETABEK, 42,767 buses were operating, of which 2,237 were large buses, 3,207 medium buses and 37,323 small buses (Table 2.5.12).

Table 2.5.12 No. of Buses in JABODETABEK

Kota/Kabupaten	Large Bus	Medium Bus	Small Bus	Total
DKI Jakarta	1,049	2,465	12,943	16,457
Kota Bogor	239	73	4,529	4,841
Kota Depok	57	150	6,504	6,711
Kota Tangerang	321	210	7,915	8,446
Kota Tangerang Selatang	20	30	2,290	2,340
Kota Bekasi	264	211	-	475
Kab. Bogor	79	68	657	804
Kab. Tangerang	162	-	2,485	2,647
Kab. Bekasi	46	-	-	46
Total	2,237	3,207	37,323	42,767

Source: Ministry of Transportation and Transport Agency of each Local Government

2) Bus Routes Analysis

The JUTPI study has updated the bus route inventory of SITRAMP, by adding new routes and deleting abolished routes since SITRAMP project in coordination with relevant transport agencies of local governments in JABODETABEK. So far it has only the route description: origin and destination. As of 2010, bus services in JABODETABEK is provided with a total of 1,109 bus routes: comprised of: 8 Busway corridors (serving within DKI Jakarta, 11 corridors as of 31 December 2011), 455 large bus routes, 118 medium bus routes and 536 small bus routes (refer Table 2.5.13).

Table 2.5.13 No. of Registered Bus Routes by Service Type in 2010

Local Government	Busway	Large Bus				Medium Bus	Small Bus	Total
		Patas AC	Patas Non-AC	Regular	Sub-Total			
DKI Jakarta	8	137	117	122	383	110	156	650
Kota Tangerang	Not Operated Outside DKI Area	1	15	-	16	-	94	110
Kab. Tangerang		-	-	-	-	-	47	47
Kota Depok		-	1		1	7	45	53
Kota Bogor		2		27	29	-	25	54
Kab. Bogor		1	7	-	8	-	107	115
Kota Bekasi		8	1	3	12	-	32	44
Kab. Bekasi		-	1	4	5	1	30	36
Total	**8**	**149**	**142**	**156**	**455**	**118**	**536**	**1,109**

Source: Transport Agency of each local government
Note: The number of routes is counted based on the place of registration.

In terms of registration of route license, many of the large and medium bus routes are registered in DKI Jakarta. Small bus routes which serve short-distance service within the local area are registered in each local government.

Table 2.5.14 gives the origin and destination of each bus route in 2010, by service type. Route characteristics of each bus type are outlined as follows:

Busway: Busway network is serving major corridor of road network in DKI Jakarta and connect CBD with major district hubs of suburban areas. At this moment, it provides service within DKI Jakarta area only.

Large Buses: The routes of large buses comprised of Patas AC, Patas Non-AC and Regular bus. These buses connect mostly major bus terminals within DKI Jakarta and between DKI Jakarta and 5 Kota in BODETABEK. Large bus network supplements the Railway and Busway network as the trunk public transport systems. However, there are still some large bus routes operating along the same road sections as the Busway.

Medium Bus: The medium bus routes connect mostly between major bus terminals and district hubs within DKI Jakarta. There are some routes which connect DKI Jakarta and BODETABEK. Some of these routes operate along major arterial road network thus overlap with the Busway and large bus routes.

Small Bus: The small bus routes provide short-distance access transport to and from bus terminals and major local area destinations. In general, these routes cover local areas of DKI Jakarta as well as Kotas and Kabupatens of BODETABEK. However, there are some routes which provides medium to long distance service and partly duplicate the large and medium bus route network.

Table 2.5.14 No. of Registered Bus Routes by Route O/D and Service Type in 2010

All 8 Busway Routes Serve ONLY Intra DKI Jakarta areas.

Patas AC		1	2	3	4	5	6	7	8	9	10	Total
1	DKI Jakarta	60	17	4	8	16	-	6	22	11	-	144
2	Kota Tangerang	-	-									-
3	Kota Tangerang Selatan	-	-	-					1			1
4	Kab. Tangerang	-	-	-	-							-
5	Kota Depok	-	-	-	-	-			1			1
6	Kota Bogor	-	-	-	-	-	2		1			3
7	Kab. Bogor	-	-	-	-	-	-	-				-
8	Kota Bekasi	-	-	-	-	-	-	-	-			-
9	Kab. Bekasi	-	-	-	-	-	-	-	-	-		-
10	Outside	-	-	-	-	-	-	-	-	-	-	-
Total		60	17	4	8	16	2	6	25	11	-	149

Patas		1	2	3	4	5	6	7	8	9	10	Total
1	DKI Jakarta	73	23	-	12	6	-	3	11	2	3	133
2	Kota Tangerang	-	-					2	1			3
3	Kota Tangerang Selatan	-	-	-								-
4	Kab. Tangerang	-	-	-	-							-
5	Kota Depok	-	-	-	-	-			1			1
6	Kota Bogor	-	-	-	-	-	-		1			1
7	Kab. Bogor	-	-	-	-	-	-	-	2	1	1	4
8	Kota Bekasi	-	-	-	-	-	-	-	-			-
9	Kab. Bekasi	-	-	-	-	-	-	-	-	-		-
10	Outside	-	-	-	-	-	-	-	-	-	-	-
Total		73	23	-	12	6	0	5	16	3	4	142

Regular Bus		1	2	3	4	5	6	7	8	9	10	Total
1	DKI Jakarta	111	-	-	2	6	11	-	3	3	-	136
2	Kota Tangerang	-	-									-
3	Kota Tangerang Selatan	-	-	-								-
4	Kab. Tangerang	-	-	-	-		4					4
5	Kota Depok	-	-	-	-	-						-
6	Kota Bogor	-	-	-	-	-	-	4	1	3	6	14
7	Kab. Bogor	-	-	-	-	-	-	-	2			2
8	Kota Bekasi	-	-	-	-	-	-	-	-			-
9	Kab. Bekasi	-	-	-	-	-	-	-	-	-		-
10	Outside	-	-	-	-	-	-	-	-	-	-	-
Total		111	0	0	2	6	15	4	6	6	6	156

Busway & Large Bus Total		1	2	3	4	5	6	7	8	9	10	Total
1	DKI Jakarta	252	40	4	22	28	11	9	36	16	3	421
2	Kota Tangerang	-	-					2	1			3
3	Kota Tangerang Selatan	-	-	-					1			1
4	Kab. Tangerang	-	-	-	-		4					4
5	Kota Depok	-	-	-	-	-			2			2
6	Kota Bogor	-	-	-	-	-	2	4	3	3	6	18
7	Kab. Bogor	-	-	-	-	-	-	-	4	1	1	6
8	Kota Bekasi	-	-	-	-	-	-	-	-			-
9	Kab. Bekasi	-	-	-	-	-	-	-	-	-		-
10	Outside	-	-	-	-	-	-	-	-	-	-	-

Busway & Large Bus Total	1	2	3	4	5	6	7	8	9	10	Total
Total	**252**	**40**	**4**	**22**	**28**	**17**	**15**	**47**	**20**	**10**	**455**

	Medium Bus Total	1	2	3	4	5	6	7	8	9	10	Total
1	DKI Jakarta	**93**	7	-	5	8	1	-	-	1	-	**115**
2	Kota Tangerang	-	-									**-**
3	Kota Tangerang Selatan	-	-	-								**-**
4	Kab. Tangerang	-	-	-	-							**-**
5	Kota Depok	-	-	-	-	-	2		1			**3**
6	Kota Bogor	-	-	-	-	-	-					**-**
7	Kab. Bogor	-	-	-	-	-	-	-				**-**
8	Kota Bekasi	-	-	-	-	-	-	-	-			**-**
9	Kab. Bekasi	-	-	-	-	-	-	-	-	-		**-**
10	Outside	-	-	-	-	-	-	-	-	-	-	**-**
Total		**93**	**7**	**-**	**5**	**8**	**3**	**-**	**1**	**1**	**0**	**118**

	Small Bus Total	1	2	3	4	5	6	7	8	9	10	Total
1	DKI Jakarta	**135**	7	6	1	19		7	13			**188**
2	Kota Tangerang	-	**50**	4	32							**86**
3	Kota Tangerang Selatan	-	-	**8**	3	3		2				**16**
4	Kab. Tangerang	-	-	-	**37**			1				**38**
5	Kota Depok	-	-	-	-	**16**	1	4		1		**22**
6	Kota Bogor	-	-	-	-	-	**25**	8				**33**
7	Kab. Bogor	-	-	-	-	-	-	**90**		1	1	**92**
8	Kota Bekasi	-	-	-	-	-	-	-	**31**	2		**33**
9	Kab. Bekasi	-	-	-	-	-	-	-	-	**28**		**28**
10	Outside	-	-	-	-	-	-	-	-	-	-	**-**
Total		**135**	**57**	**18**	**73**	**38**	**26**	**112**	**44**	**32**	**1**	**536**

	All Bus Types Total	1	2	3	4	5	6	7	8	9	10	Total
1	DKI Jakarta	**480**	54	10	28	55	12	16	49	17	3	724
2	Kota Tangerang	-	**50**	4	32			2	1			89
3	Kota Tangerang Selatan	-	-	**8**	3	3		2	1			17
4	Kab. Tangerang	-	-	-	**37**		4	1				42
5	Kota Depok	-	-	-	-	**16**	3	4	3	1		27
6	Kota Bogor	-	-	-	-	-	**27**	12	3	3	6	51
7	Kab. Bogor	-	-	-	-	-	-	**90**	4	2	2	98
8	Kota Bekasi	-	-	-	-	-	-	-	**31**	2		33
9	Kab. Bekasi	-	-	-	-	-	-	-	-	**28**		28
10	Outside	-	-	-	-	-	-	-	-	-	-	-
	Total	**480**	**104**	**22**	**100**	**74**	**46**	**127**	**92**	**53**	**11**	**1109**

Source: Transport Agency of each local government (8 Busway Routes included in DKI-DKI)

Figure 2.5.7 Bus Route Network in JABODETABEK in 2002

PATAS AC

PATAS Non-AC

Regular Bus

Medium Bus

Small Bus

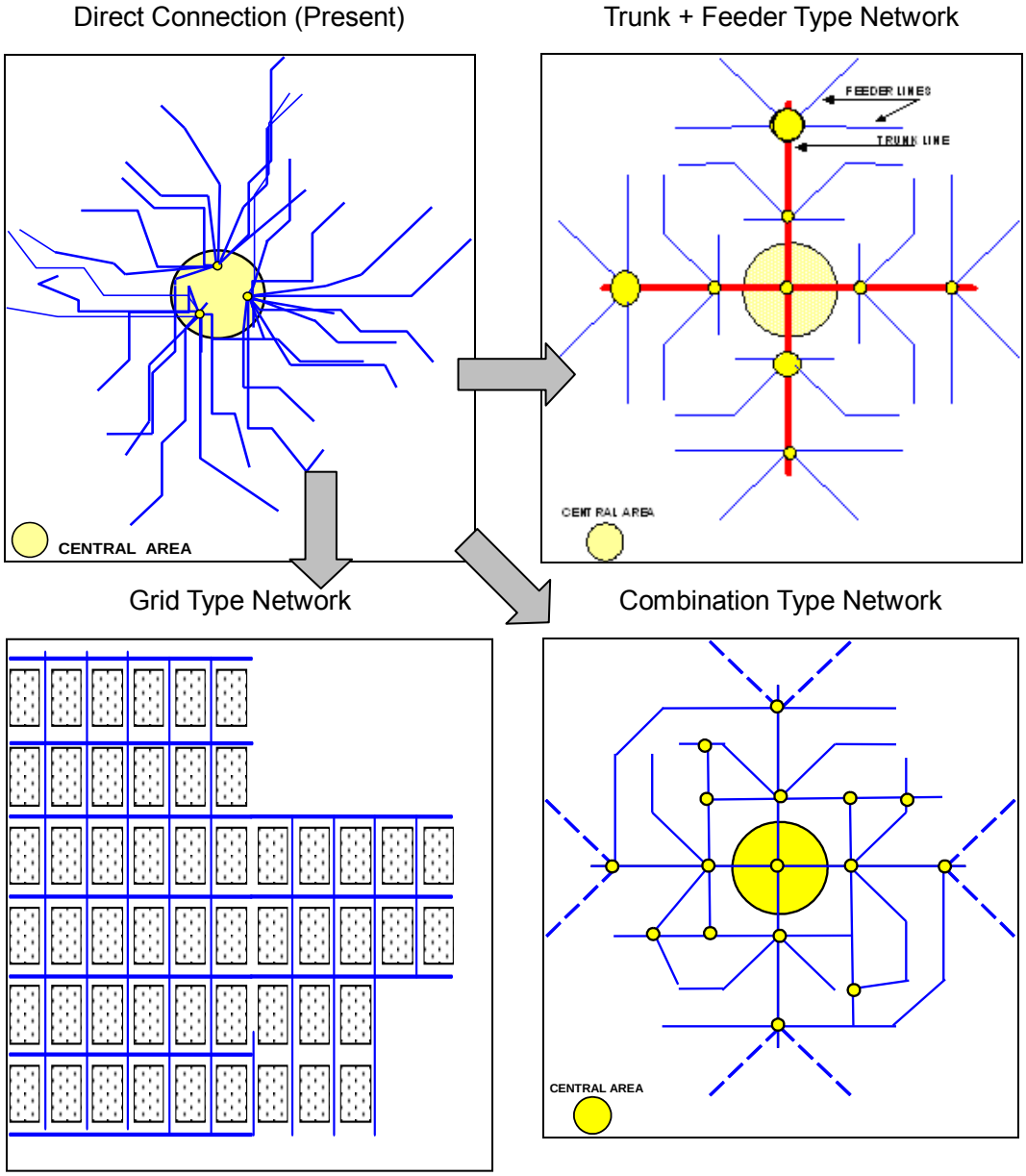
Source: SITRAMP

The current configuration of bus route network is almost the same. Characteristics of the current bus route structure may be further described as follows:

- No hierarchical route structure such as trunk and feeder route system is in operation (due to insufficient bus route network planning);
- Excessive concentration/ duplication of bus routes between DKI Jakarta DKI CBD area and the Bodetabek suburbs;
- Insufficient bus service coverage, particularly in suburban areas;
- Imbalance between bus demand and supply due to inefficient operational practices and insufficient monitoring and lack of control.

In order to improve current route configuration so as to provide efficient bus service, hierarchical route network structure should be formulated taking into consideration the passenger demand volumes and characteristics of bus services and the road network constraints and opportunities in corridors. In principle, Busway and large bus network should serves for the demand with large volume and over longer distances are connecting between major district hubs and the CBD (this network could be consider as transit corridor for the future rail-based mass transit system development). Medium bus may provide services for the medium level of demand volumes over medium distance. Small bus should serves flexibly for the low volume demand over short distance. Some alternative concepts of bus route improvement are shown in Figure 2.5.8.

Figure 2.5.8 Conpect of Hierarchcal Bus Network Structure



Source: Study Team

3) Bus Fare System

Bus fare system is decided by the local government. Bus fare is adjusted in accordance with fluctuation in oil prices. Current bus fare in DKI Jakarta is IDR 6,000-12,000 for Patas AC depending on the destination of bus, IDR 2,000-4,000 for Patas Non-AC and regular bus depending on the distance of bus, IDR 2,000 for medium bus, IDR 2,000-3,000 for small bus depending on the area of operation. As a comparison with other Southeast Asia mega cities, such as Bangkok and Manila, fare levels in Jakarta are almost the same for each type of service. (Refer Table 2.5.15)

Table 2.5.15 Comparison of Bus Fare in Southeast Asia Mega Cities

City	Service Type	Fare & Fare System	Fare (US$)	
			5km-ride	10km-ride
Jakarta	Busway	Flat IDR 3,500	0.42	0.42
	Patas AC	Flat IDR 6,000-12,000	0.72-1.44	0.72-1.44
	Patas Non-AC	Flat IDR 2,000-4,000	0.24-0.48	0.24-0.48
	Regular Bus	Flat IDR 2,000-4,000	0.24-0.48	0.24-0.48
	Medium Bus	Flat IDR 2,000	0.24	0.24
	Small Bus	Flat IDR 2,000-3000	0.24-0.36	0.24-0.36
Bangkok	AC Bus	Flat by route: THB 12-23	0.40-0.76	0.40-0.76
	Non-AC Bus	Flat by route: THB 7.5-8.5	0.25-0.28	0.25-0.28
Manila	AC Bus	Distance-related: Peso 12 + Peso 2.2/km	0.54	0.79
	Non-AC Bus,	Distance-related: Peso 10 + Peso 1.85/km	0.45	0.66
	Jeepney	Distance-related: Peso 7(<4km) + Peso 0.5/km	0.22	0.28

Source: Collected from various information Sources

4) Bus Terminal

In JABODETABEK, there are 75 bus terminals classified by MOT (16 inter-provincial, 26 inter-city and 33 intra-city), as shown in Figure 2.5.5. According to SITRAMP database, there are also 29 on-street bus terminals. Information on each bus terminal as listed below is being surveyed, studied and compiled in the form of an inventory by the study team.

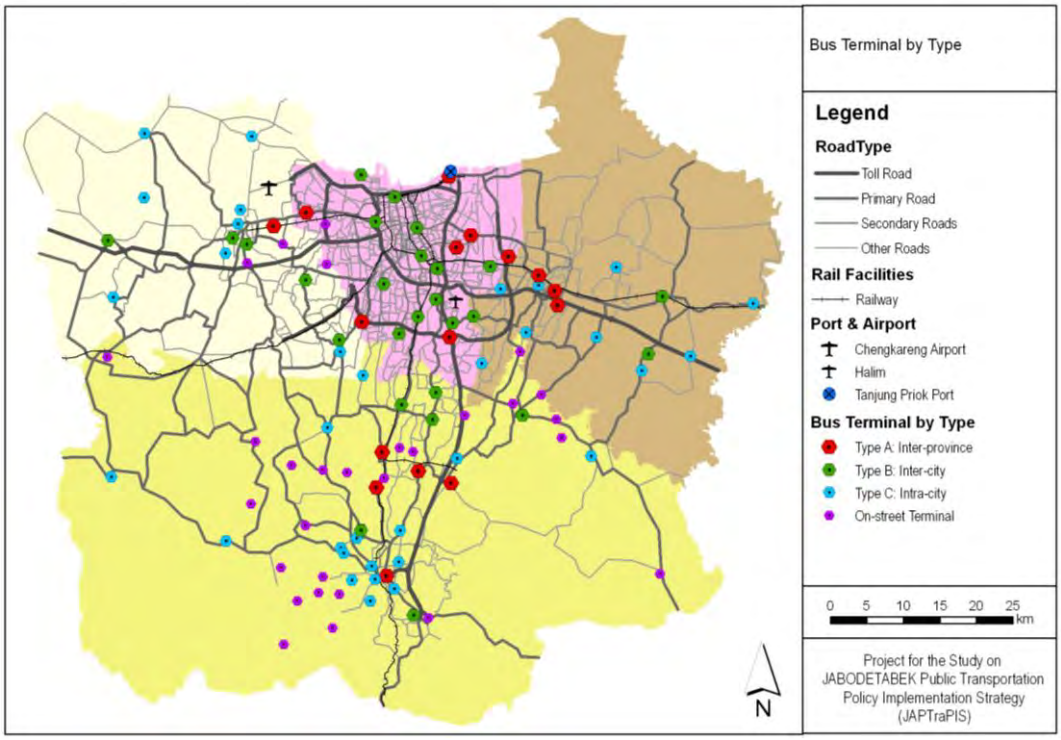
- Location (address, map and pictures)
- Function and administrative agency or organization
- List of facilities (parking area, bus bays/ lanes, office, toilets, shops, mosque, open spaces, and other land use activities
- List of registered bus routes by bus type, and
- Other facilities and functions

Table 2.5.16 shows the top 30 intra-city bus terminals in JABODETABEK in terms of the number of bus routes terminated. In this table, bus terminal denotes a place of origin and destination of a bus route. Many of bus terminals have designated area for bus parking, passenger waiting rooms and other amenities and facilities, but some terminals are just road-side stopping place and are used for just turning around buses.

There are 104 bus routes which terminate at Blok M terminal excluding small bus routes. Other major bus terminals are Kp. Rambutan (95 routes), Pulo Gadung (87 routes), Bekasi (87 routes), Kota (76 routes) and Senen (76 routes).

Table 2.5.17 shows the accumulated number of bus routes. A total of 915 bus routes terminate in the top 30 bus terminals. This covers 82.5% of the all bus routes, 100% of Busway, 96% of all large bus (Patas AC, Patas Non-AC & Regular) routes, 98% of medium bus and 66% of small bus, routes respectively.

Figure 2.5.9 Location of Major Bus Terminals in JABODETABEK



Source: SITRAMP (information was updated by MOT statistics)

Table 2.5.16 Top 30 Bus Terminals in JABODETABEK

Rank	Bus Terminal	No. of Bus Routes (Terminate or Pass Through)						
		Busway	Patas AC	Patas	Reg.	Med.	Small	Total
1	Blok M	1	24	27	26	27	-	104
2	Kp. Rambutan	1	24	23	22	11	15	95
3	Pulo Gadung	3	17	19	19	13	19	87
4	Bekasi	-	26	16	6	1	27	76
5	Kota	1	21	17	15	6	17	76
6	Senen	-	14	17	10	17	9	67
7	Tg. Priok	-	13	16	19	4	14	66
8	Depok	-	14	7	2	9	29	61
9	Grogol	-	12	16	19	5	9	61
10	Kalideres	1	12	20	14	7	7	61
11	Kp. Melayu	2	7	2	10	15	24	58
12	Tn. Abang	-	11	8	16	16	6	57
13	Lebak Bulus	1	13	6	5	9	10	43
14	Bogor	-	1	2	29	3	3	38
15	Ciputat	-	7	6	1	3	20	37
16	Ps. Minggu	-	5	3	4	7	18	37
17	Cililitan	-	-	3	7	2	24	36
18	Cikarang	-	11	2	4	1	16	34
19	Cikokol	-	-	2	-	-	32	34
20	Ciledug	-	7	5	1	3	17	33
21	Cimone	-	7	2	1	-	20	30
22	Rawamangun	-	2	-	11	1	8	22
23	Cileungsi	-	3	-	2	-	15	20

Rank	Bus Terminal	No. of Bus Routes (Terminate or Pass Through)						
		Busway	Patas AC	Patas	Reg.	Med.	Small	Total
24	Klender	-	3	5	4	3	4	19
25	Parung	-	-	-	-	-	16	16
26	Manggarai	-	-	-	4	8	3	15
27	Cibinong	-	3	1	-	-	11	15
28	Leuwiliang	-	-	-	-	-	15	15
29	Ragunan	2	2	1	4	4	2	13
30	Poris Plawad	-	2	4	-	-	16	22

Source: Transport Agency of each local government, some routes may just pass through a terminal, and may not end there. Hence there are more routes shown than the total number of bus routes in operation.

Table 2.5.17 No. of Bus Routes Covered by Top 30 Bus Terminals in JABODETABEK

Rank	Bus Terminal	Accumulated No. of Bus Routes 1)							Ratio to Total No. of Bus Routes (%)						
		BW	Patas AC	Patas	Reg.	Med.	Small	Total	BW	Patas AC	Patas	Reg.	Med	Small	Total
1	Blok M	1	24	27	26	27	-	105	12.5	16.1	19.0	16.7	22.9	0.0	9.5
2	Kp. Rambutan	2	46	48	45	35	15	191	25.0	30.9	33.8	28.8	29.7	2.8	17.2
3	Pulo Gadung	4	61	60	60	46	34	265	50.0	40.9	42.3	38.5	39.0	6.3	23.9
4	Bekasi	4	83	74	66	47	58	332	50.0	55.7	52.1	42.3	39.8	10.8	29.9
5	Kota	4	94	78	74	53	74	377	50.0	63.1	54.9	47.4	44.9	13.8	34.0
6	Sunen	4	1-6	92	82	69	79	432	50.0	71.1	64.8	52.6	58.5	14.7	39.0
7	Tg. Priok	4	113	99	92	71	89	468	50.0	75.8	69.7	59.0	60.2	16.6	42.2
8	Depok	4	119	102	93	75	114	507	50.0	79.9	71.8	59.6	63.6	21.3	45.7
9	Grogol	4	126	114	105	80	120	549	50.0	84.6	80.3	67.3	67.8	22.4	49.5
10	Kalideres	5	129	126	112	83	126	581	62.5	86.6	88.7	71.8	70.3	23.5	52.4
11	Kp. Melayu	6	134	126	114	96	143	619	75.0	89.9	88.7	73.1	81.4	26.7	55.8
12	Tn. Abang	6	137	128	121	108	146	646	75.0	91.9	90.1	77.6	91.5	27.2	58.3
13	Lebak Bulus	7	142	128	125	109	153	664	87.5	95.3	90.1	80.1	92.4	28.5	59.9
14	Bogor	7	142	129	144	109	153	684	87.5	95.3	90.8	92.3	92.4	28.5	61.7
15	Ciputat	7	142	131	144	109	172	705	87.5	95.3	92.3	92.3	92.4	32.1	63.6
16	Ps. Minggu	7	143	133	144	113	182	722	87.5	96.0	93.7	92.3	95.8	34.0	65.1
17	Cililitan	7	143	133	147	114	202	746	87.5	96.0	93.7	94.2	96.6	37.7	67.3
18	Cikarang	7	144	134	147	114	219	765	87.5	96.6	94.4	94.2	96.6	40.9	69.0
19	Cikokol	7	144	135	147	114	249	796	87.5	96.6	95.1	94.2	96.6	46.5	71.8
20	Ciledug	7	144	136	147	114	261	809	87.5	96.6	95.8	94.2	96.6	48.7	72.9
21	Cimone	7	144	136	147	114	281	829	87.5	96.6	95.8	94.2	96.6	52.4	74.8
22	Rawamangun	7	144	136	148	114	289	838	87.5	96.6	95.8	94.9	96.6	53.9	75.6
23	Cileungsi	7	145	136	148	114	303	853	87.5	97.3	95.8	94.9	96.6	56.5	76.9
24	Klender	7	145	137	150	114	304	857	87.5	97.3	96.5	96.2	96.6	56.7	77.3
25	Parung	7	145	137	150	114	314	867	87.5	97.3	96.5	96.2	96.6	58.6	78.2
26	Manggarai	7	145	137	150	115	316	870	87.5	97.3	96.5	96.2	97.5	59.0	78.4
27	Cibinong	7	145	137	150	115	324	878	87.5	97.3	96.5	96.2	97.5	60.4	79.2
28	Leuwiliang	7	145	137	150	115	339	893	87.5	97.3	96.5	96.2	97.5	63.2	80.5
29	Ragunan	8	145	138	153	116	342	902	100	97.3	97.2	98.1	98.3	63.8	81.3
30	Poris Plawad	8	146	138	153	116	354	915	100	98.0	97.2	98.1	98.3	66.0	82.5
All Routes		**8**	**149**	**142**	**156**	**118**	**536**	**1109**	**100**	**98.0**	**97.2**	**98.1**	**98.3**	**66.0**	**82.5**

Source: Transport Agency of each local government
Note: 1) No. of bus routes covered by the designated terminal and higher ranked terminals

2.5.5 Taxi Bajaj and Para-transit

1) Taxi

There are many taxis available and these are widely used in JABODETABEK. Taxis are not only cruising around for customers but also wait at major places such as railway stations, bus terminals, shopping centers, hotels and office buildings. Almost all taxis have fare meter and major taxi companies have radio contact for pick-up service. According to SITRAMP data of 2002 average travel distance and time of a taxi trip was 6.8km and 47minutes, respectively.

In DKI Jakarta, as of December 2009, there are 24,324 licensed taxis registered by 46 taxi companies, of which 12,015 licenses have renewed and are operational. Large taxi companies which operate more than 1,000 taxis are PT. Blue Bird (1,600) and PT. Express Transindoutama (1,000). Taxi fare is distance based, it starts at IDR6,000 for the first 2km and IDR3,000 per km for the following travel distance. In addition IDR3,000 is added per hour as time-related fare.

In many cases, taxi is operated by a driver who has a contract with the taxi company (owner). The commission paid to the taxi driver by the Taxi Company varies. In general, net revenue of a taxi is about IDR100,000 per day

2) Bajaj

There are many Bajajs available and these are widely used in DKI Jakarta. Bajaj is used mainly for short-distance trips such as access to railway, to bus and market from home, etc. Bajaj are not only cruising for customers but also wait at major locations such as railway stations, bus terminals, markets. According to SITRAMP data in 2002 average travel distance and time of Bajaj trip was 1.7km and 24minutes, respectively.

In DKI Jakarta, as of December 2009, there are 14,424 licensed Bajaj of which 12,797 Bajaj licenses have been renewed and are operational. There are 600 registered Bajajs with CNG engines. Bajaj fare is decided by negotiation between the driver and the customer. Fare of Bajaj is relatively higher than that of a taxi trip of the same length. In many cases, Bajaj is operated by drivers who has contract with a company (owner). The commission/ rental paid by the Bajaj driver to the owner vary. In general, net revenue of a Bajaj driver is about IDR100,000 per day

3) Ojek

Motorcycle taxi is commonly called Ojek. It is a very common, but remains an unlicensed service. They are operational in most areas of JABODETABEK. Generally fare for an Ojek trip is around IDR 10,000. Nowadays, because of the traffic congestion, Ojek service has become the quickest mode of transport compared with any other mode, especially in the congested part of Jakarta. Many people choose Ojek rather than taxi, because motorcycle can easily move ahead in the traffic queue, particularly at traffic signals. Recently, some local governments have been considering a registration

system for the Ojek, so as to regulate this paratransit mode of transport, to ensure public safety.

2.5.6 Problems and Issues

The following problems issues were identified in the urban transportation context

- Low mobility due to traffic congestion
- Low service level of public transportation
- Increasing motorcycle ownership & usage
- Air pollution caused by rapidly increasing motorcycles, Bajaj and traffic in general
- Road traffic accidents and railway accidents
- Lack of traffic signals
- Insecurity on public transportation
- Low accessibility for poor households
- Rejection of Students for boarding on buses
- Lack of transportation facilities for the physically challenged

As for bus transportation, the following items are directly related to this study:

Low service level of public transportation: The level of bus services is low in many aspects. Poor frequency, Not punctual, unreliable, non-designated bus stops, unexpected termination of operation, long waiting time, sense of insecurity on board by passengers, poor hygiene condition inside buses – these are just some of its many deficiencies related to bus service, and are being addresses in this study. .

Insecurity on public transportation: Although the security situation on buses is better since the SITRAMP time, still many crimes occur on board the buses.

Rejection of students to use buses: Students are sometimes rejected from boarding a bus by bus crew, because their fare is less than half of the normal passenger fare. This unfair treatment is partly caused by bus rental system, as bus drivers should get sufficient fare revenue to cover the rental charges, fuel cost, and other operational expenses, and of-course his own profit. By allowing students the bus driver is reducing his revenue without any compensation.

As a direct result of above-mentioned problems related to bus operation, the following situations have been identified:

- Lack of bus system capacity: The number of buses has not increased since the 1997 economic crisis. Consequently buses are overcrowded due to shortage of operational bus fleets on a number of routes.
- Inadequate bus operation regime: One of the root causes of unreliable and uncomfortable bus operation has been found to be the bus rental system known as “Setoran” or “WAP”. Bus drivers and conductors are inevitably seeking the fare revenues to cover the bus rental charges, which they should pay to the bus company or bus owners, and also recover the fuel cost and other expenses, and of-course their own margin. Therefore, they try to get as many passengers as possible before they depart from a bus terminal ignoring inconvenience of on board bus passengers, and those waiting along the route, as they may not be able to board the already over

crowded bus; or the bus may not even stop and pick up waiting passengers. After leaving the terminal the bus crew rushes to the next bus stop to collect passengers in a rather dangerous driving manner; and in many cases violating traffic rules

- Weak monitoring and control capability of bus operation: The agency responsible for bus operation has not got the sufficient capability in bus route planning since reliable passenger demand data are not available. The agency has also been facing difficulty in monitoring and control of bus operations due to limited resources, as there are too many bus operators, and routes along same corridors or using the same bus terminal
- Bus route structure: Currently there are some 850 bus routes in operation in JABODETABEK. At the time of SITRAMP study, more than 70 bus routes ply on the busiest streets, Jl. Sudirman and Jl. Thamrin, and carry bus passengers to various destinations around JABODETABEK. The current bus operation is characterized as many routes with low frequency for each route. The route structure is complicated and many routes overlap. Similarly, there are many areas where more direct services are limited, and passengers may have to use a number of transfers to reach their destination. Hence, under the flat fare system a single journey (with a number of changes) may cost a lot more than trips with a single bus journey, who may even be travelling longer distance.

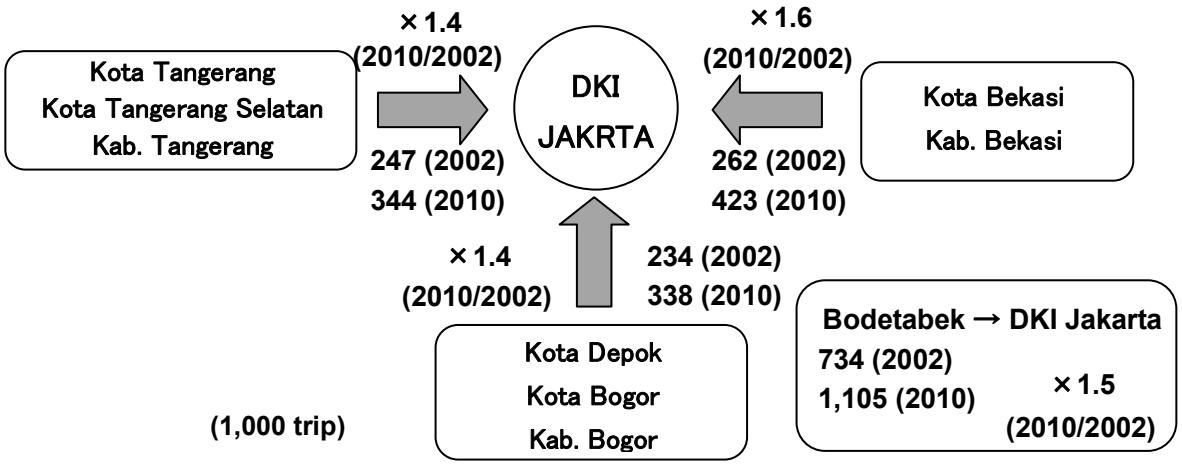
2.6 Traffic Management and Safety

2.6.1 Overall Traffic Conditions and Management

1) Traffic Conditions

There is a severe congestion due to increase travel demand in JABODETABEK area. The increase traffic volume has bought traffic congestion resulting in longer travel times on most roads. The number of commuter trips has increased by about 50% from 2002 to 2010 as shown in Figure 2.6.1. Currently, more than 1,100,000 commuters travel from Bodetabek to Jakarta. The economic losses caused by traffic congestion in JABODETABEK area could be as much as Rp. 5,500 Billion per year in terms of vehicle operating costs and travel time losses.

Figure 2.6.1 Increase in Commuter Traffic from BODETABEK to JAKARTA; 2002-2010



Source; JICA Study Team

2) Traffic Signal Control

There are about 600 major intersections, of which 287 are signalize in DKI Jakarta. It shows that the level of junction signalization is quite low for such a dense urban area. In addition right turn is not allowed at almost all major road junctions. Thus, vehicles needing to make a right turn must make a U-turn, some distance away on the same road and then turn left on to the desired road. The U-turning vehicle causes disruption to the fast lane flows on both sides of the road, causing long queues at U-turn location and further disturb the traffic flow when weaving to left lane before turning left. In addition this causes excess travel on both sides of the road causing additional congestion, and economic losses in terms of time lost and increased vehicle operating cost.

Three ATC systems (Area Traffic Control system) in DKI Jakarta were supplied by Sainco of Spain, Siemens of Germany, and AWA of Australia through Telnic of Indonesia, and are installed by DKI JAKARTA. However, coexistence of three distinctly different systems prevents signal integration, results in poor management of traffic flow and is preventing the upgrade to more advanced systems. At present, the ATC system has some problems thus it is not an exaggeration to say that ATC system in DKI Jakarta area is almost defunct. In addition, numbers of signalized junctions in the BOTABEK area are even fewer than DKI Jakarta.

3) One-way Street Management

In central DKI Jakarta, several roads are act as one-way road. It increases the road capacity as well as intersection throughput, and also simplifies the turning movements at a junction. On the other hand, the trip length become longer and public transportation users suffer inconvenience due to route diversion and longer walk distances to access the bus services on parallel roads.

4) Car Pooling (3 in 1) Regulation

Since beginning of 90's, car pooling (locally known as 3 in 1) regulation is in operation in DKI Jakarta. Under this system only high-occupancy vehicles (with three or more occupants) are allowed to use or enter the central arterial road. The system is in operation on Jl. Sudirman, Jl. MH. Thamrin, Jl. JG. Subroto: R.Rasuna Said up to G. Pemuda Intersection; during weekday peak periods (morning peak; 7:00-10:00, evening peak; 16:00-19:00, Mondays to Fridays). Taxis and public buses are exempted from this regulation. The regulation is generally observed, and the measure has been effective in reducing the number of vehicle entering the restricted areas resulting somewhat less congestion and higher speeds on the inner city roads during the restricted periods. On the other hand, traffic demand on the parallel streets increases during the restricted periods, causes severe congestion and decreases travel speed to no more than walking pace.

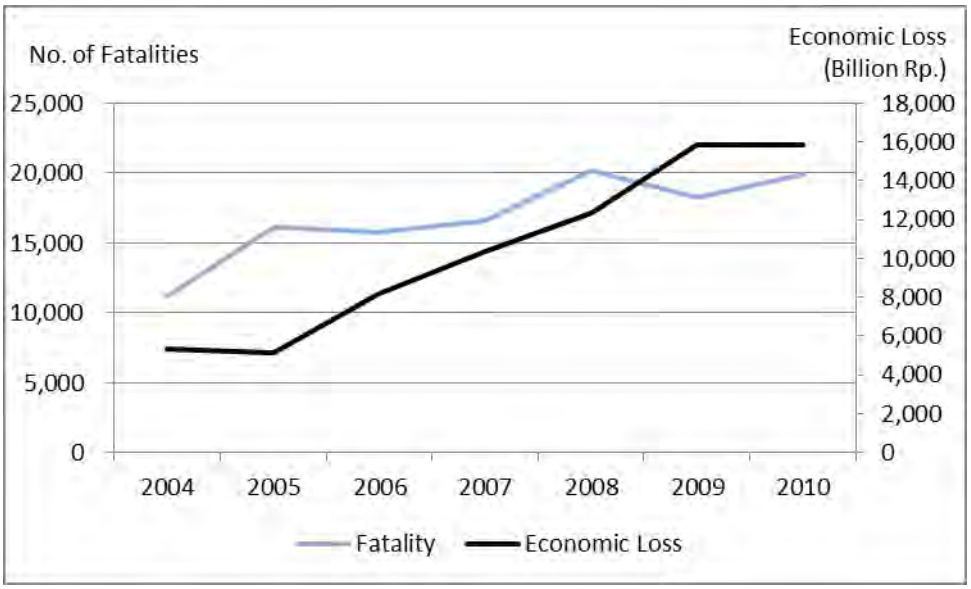
5) Truck Regulation

Heavy trucks (capacity>5.5 ton) are restricted to enter the central arterial roads (Jl. Sudirman, & Jl. Thamrin). The lighter trucks (capacity<5.5 ton), buses and motorcycles are restricted to use left lanes on Jl Sisingamangaraja, Jl. Sudirman and Jl. Thamrin. On Jl. Medan Merdeka Baret, Jl. Majapahit, Jl. Gajah Mada, Jl. Hayam Wuruk, Jl. Pintu Besar Selatan, and Jl. Pintu Bear Utara, trucks are restricted to use only the 1st or 2nd lane from the left side.

2.6.2 Traffic Accident Situation

Traffic accidents are one of the serious social problems in Indonesia. Number of fatalities through road traffic accident in Indonesia was 19,837 in 2010. It has increased by about 70% between 2004 and 2010. The estimated economic losses due to traffic accidents could be as much as Rp. 15.8 trillion in 2010. Number of fatalities and economic losses since 2004 are shown in Figure 2.6.2. Only some of the local governments in the JABODETABEK area collect traffic accident data, which is summarized in Table 2.6.1.

Figure 2.6.2 Number of Fatalities and Economic losses due to Traffic Accidents in Indonesia



Source; Transportation in Figure 2010, DGLT

Table 2.6.1 Traffic Accident in JABODETABEK in 2008

Region	Year	No. of Traffic Accidents	Fatalities	Injured Seriously	Injured Slight
DKI Jakarta	No data				
Kota Bogor	2008	57	9	29	57
Kab. Bogor	No data				
Kota Depok	2008	163	26	93	131
Kota Tangerang	2008	378	50	104	465
Kab. Tangerang	2008	614	228	576	109
Kota Tangerang Selatan	No data				
Kota Bekasi	2008	396	124	177	201
Kab. Bekasi	2008	518	86	100	746

Source; Bogor Regency Statistical Agency, State Police of Depok City, Tangerang City Statistical Agency, Tangerang Regency Statistical Agency, Bekasi city Statistical Agency, Bekasi Regency Statistical Agency

According to a 2009 research paper[10], in three provinces DKI Jakarta, West Java and Jambi as shown in Table 2.6.2, fatalities through road accidents were mostly riders of motorcycles, which accounted for about 61% of the total; pedestrian fatalities were 15%, and cyclists 13%; passengers of 4-wheel vehicles 4% and drivers of 4-wheel vehicles

[10] Sutanto SOEHODHO, Road Accidents in Indonesia, IATSS RESEARCH, Vol.33, No.2, 2009

were 3% in 2008. There are three main contributory factors in traffic accident, it is shown that the human factors are the most predominant and represent the largest percentage according to the statistics given in Table 2.6.3.

Table 2.6.2 Fatalities to Road Users by Type of Vehicle in 2008

Pedestrians	Cyclists	Riders of 2 or 3-wheel vehicles	Passengers of 4-wheel vehicles	Drivers of 4-wheel vehicles	Other
15%	13%	61%	4%	3%	4%

Source; Sutanto SOEHODHO, Road Accidents in Indonesia, IATSS RESEARCH, Vol.33, No.2, 2009

Table 2.6.3 Three Factors of Traffic Accidents

Factor	Traffic accidents	Fatality	Seriously injured	Slight injured
Human	93%	92%	90%	90%
Vehicle	4%	5%	6%	7%
Road and environment	3%	3%	4%	3%

Source; Sutanto SOEHODHO, Road Accidents in Indonesia, IATSS RESEARCH, Vol.33, No.2, 2009

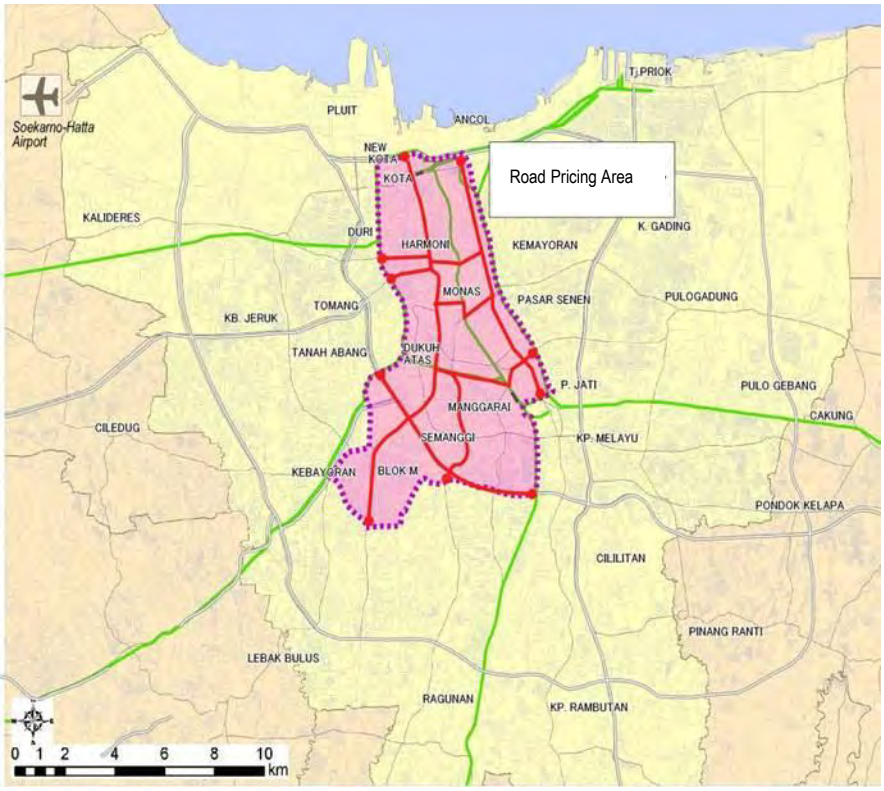
2.6.3 Traffic Management Plan

Road Pricing was proposed as one of the priority project by the SITRAMP study. Road Pricing could have considerable impact on traffic demand. Users are levied charges for using roads in a particular area. Charges are levied when a user enter the restricted area through certain target area roads. Road pricing could help reduce traffic congestion and improve environment. Revenue collected could be used for the development of better public transport system and improve poor transport infrastructure.

After the SITRAMP proposal, road pricing was considered by JETRO Project in 2008 (The Study on Jakarta Road Pricing in the Republic of Indonesia). The basic concept of the road pricing project is based on the assumption that it would be in the form of ERP, and may be implemented into two phases. In phase 1 of the project, roads where car pooling (3 in 1) is operational with total length of 17 km would be subject to road pricing. That is, each passing vehicle would have to be equipped with an on-board unit (OBU), and the applicable road user charges would be deducted from a prepaid charge card inserted into the OBU, as the vehicle passes through a gantry (checkpoint) installed at the entry points of target roads. In the next stage, Phase 2 area under ERP would be expanded to cover all trunk roads within the congested CBD area as identified by the JETRO project to cover all the trunk roads that run parallel to the new Busway routes, total length: 46 km.

Outline of the proposed road pricing project area is shown in Figure 2.6.3, and the operational hours will be the same as the current 3 in 1 scheme, implying 7:00 – 10:00 and 16:00 – 19:00 from Monday to Friday. The target vehicles will be automobiles and motorcycles, including vans and pickups. Emergency vehicles and public transport vehicles will be exempted. As the large trucks are already restricted to enter these areas, they will continue to be restricted. The proposed charges will be Rp. 15,000 and Rp. 5,000 per operational period for automobiles and motorcycles, respectively, in order to expect a reasonable level of reduction in traffic volume.

Figure 2.6.3 Proposed Road Pricing Area



Source; Japan External Trade Organization (JETRO) (2008). Study on Jakarta Road Pricing in the Republic of Indonesia. Revised by JICA Study Team

2.7 Urban Environment

2.7.1 Overview

A Strategic Environmental Assessment (SEA) shall be conducted of all projects proposed by the Study and selected as priority projects based on the Environmental Law (No.23 of 1997) in Indonesia and JICA's guideline for environment and social consideration. However, necessity of the SEA will be evaluated during the strategy development phase.

In case of the priority projects, the necessity of Environmental Impact Assessment (EIA or AMDAL) will be discussed with the related agencies and necessary documents will be prepared as necessary.

Table 2.7.1 shows the result of the provisional scoping conducted by the JICA's preparatory Study Team in January 2010. They have evaluated the impact of the Study and raised several issues which is necessary to be carefully addressed and investigated in this Study.

Table 2.7.1 Provisional Scoping – Social Environment

No.	Item	Impact	Object	+or−	Period/ Phase	Scale	Possibility	Rating	Study
Social Environment									
1	Involuntary Resettlement	Loss of residence or land due to land acquisition	Residents at construction site	−	Planning	S	M	B	Material / Site Survey
2	Economic Activities	Loss of production opportunity by changing the land use pattern	Residents of the study area	−	Operation	S	S	C	Material
		Loss of work changing the economic structure by Project implementation		−	Operation	M	M	B	Material
		Increase of job opportunity accompanied by the Project		+	Operation	M	M	B	Material
		Relocation or decrease of poverty in the area		+	Operation	S	S	C	Material
		Upgrading of medical service or educational environment		+	Operation	M	M	B	Material
3	Traffic and public facilities	Decrease of traffic accidents or jam by construction or use of the transport facility	Residents at construction site, and neighbors	+	Operation	M	M	B	Material / Site Survey
4	Divided communities	Severance caused by the new roads, loss of Service or divided living activity		−	Operation	S	S	C	Material
5	The poor and ethnic people	Unequal distribution of benefit, unbalance of beneficiary		−	Operation	S	S	C	Material
6	Cultural heritage	Loss of heritage by changing the land use, or damage by emission or vibration	Properties in and adjacent to construction site	−	Construction	S	S	C	Material
7	Water rights, and rights of common	Impact to fishery by changing the river or swamp course	Fishermen	−	Operation	S	S	C	Material
8	Sanitation	Import of infectious disease by the workers, epidemic of disease	Residents in construction site, and neighbors	−	Construction	S	S	C	Material
9	Waste	Waste from construction, soil, drainage from facilities, solid waste from urbanized area		−	Construct Operation	S	S	B	Material
10	Hazards (risk)	Increase of risk such as collapse of ground, cave-in and accidents		−	Construction	S	S	C	Material

Table 2.7.2 Provisional Scoping – Natural Environment & Pollution

Nzo.	Item	Impact	Object	+or−	Period	Scale	Possibility	Rating	Study
Natural Environment									
11	Geological and topographical features	Change of valuable geological and topographical features by cutting and filling the land	Construction site	−	Construct	S	S	C	Material
12	Soil erosion	Outflow of surface soil by rain after cutting the land and forest	Construction site and adjacent areas	−	Construct	S	S	C	Material
13	Groundwater	Pollution and decrease of water level by over pumping of water,	Water use and topography	−	Construct Using	S	S	C	Material
14	Lakes and rivers	Change of flow, quality and water bed by reclamation and inflow of waste water	Residents living along the rivers and lakes	−	Construct Using	S	S	B	Material
15	Coastal zones	Change of coast by construction, erosion and sedimentation of sand	Residents living along the coast	−	Construct Using --	S	S	C	Material
16	Flora and fauna	Impact to biodiversity by changing the land use and by construction	Those in and adjacent to construction site	−	Construct Using	S	S	C	Material
		Impact of the construction vehicles and decrease of emission, noise and dust		+	Construct Using	S	S	C	Material / Site Survey
		Impact to the mangrove, coral reef and seaweed		−	--	S	S	C	Material
17	Landscape	Change of land by development, damage to beauty by structure	People to observe the site	−	Using	M	M	B	Material / Site Survey
18	Global warming	Decrease of energy demand by urbanization	Citizen	+	Using	M	M	B	Material
Pollution									
19	Air pollution	Dust from construction vehicles	Residents in construction site	−	Construct	S	S	C	Material
		Decrease of emission by traffic accompanied by the Project	Residents	+	Using	M	M	B	Material / Site Survey
20	Water pollution	Increase of discharge accompanied by urbanization, water from construction sites and factories	Neighbors	−	Construct Using	S	S	C	Material
21	Soil contamination	Impact on human health by hazardous waster and heavy metals disposed improperly		−	Construct Using	S	S	C	Material
22	Noise and vibration	By construction vehicles	Neighbors	−	Construct	S	S	B	Material
		Decrease of noise and vibration by decrease of traffic	Neighbors	+	Using	M	M	B	Material / Site Survey
23	Ground subsidence	Impact by use of ground water accompanied by construction and economic activities	Residents in construction site/ Neighbors	−	Construct Using	S	S	C	Material
24	Offensive odor	Odor from waste disposal site and sewage treatment plant	Neighbors	−	Construct Using	S	S	C	Material
		Decrease of emission by decrease of traffic	Neighbors	+	Using	M	M	B	Material / Site

									Survey
25	Bottom sediment	Impact by sedimentation of discharge from construction sites and factories to the rivers and swamps	Residents in construction site/ Neighbors	—	Construct Using	S	S	C	Material

Note: Rating A: Serious impact is expected, B: Some impact is expected, C: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses.), No mark: No impact is expected. IEE/ EIA is not necessary
Scale and Possibility: S: Small, M: Medium, N: Not applicable
Source: JICA Preparatory Study Team, 2010

The expected negative environmental impacts of transport projects during construction and operation are:

- ***Water Quality*** - change of flow volume, quality of water bed due to reclamation and inflow of **waste water**,
- change of **land** use by development, damage to landscape by structures (*after* construction), and
- **noise** and **vibration** by construction vehicles (*during* construction).

In contrary, the expected positive environmental impacts are:

- decrease of **noise** and **vibration** due to decrease of traffic (*after* construction), and
- decrease of **emission** by decrease of traffic (*after* construction).

The expected negative social impacts are: a) loss of **work** changing the economic structure by project implementation (*after* construction) and b) waste from construction, soil, drainage from facilities, **solid waste** from urbanized area (*during* and *after* construction).

In contrast, the expected positive social impacts are a) increase of **job opportunities** due to Project (*after* construction), b) upgrading of **medical service** or **educational environment** (*after* construction), and 3) decrease of **traffic accidents** or **congestion** after construction or by the use of the transport facility.

These environmental and social impacts of the project should be monitored before and after its implementation with the baseline conditions for the indicators outlined follows;

- Observation of air pollution, water pollution, noise and vibration level
- Land use changes
- Amount of traffic volume and related emission caused by vehicle age and by type of fuel
- Employment levels or jobless rate or change in the employment of informal sector to formal sector
- Access to the hospitals and schools or bus passenger composition of students and elders
- Number of accidents and fatality rate
- Solid waste management program during construction

2.7.2 Environment Laws and Regulations

1) Related Laws and Regulations

The laws and regulations relating to the environment impacts are listed in Table 2.7.3. The current Environment Law was established in 1997 No. 23. Former Environment Law was established in 1982, No. 4, regulating management and protection of the environment, Polluters Pay Principle for an environmental impact assessment. Referring to these laws as the base, the Ministry of Environment established a regulation related to the introduction of Strategic Environment Assessment (or KLHS) in Decree No. 32 of 2009. It defines the SEA should be carried out in case of establishment of any policy, plan and program based on the principals of sustainable development. However, as the regulation was established only recently, SEA implementation has only a few examples.

Table 2.7.3 Laws and Regulations on Environment

Area	Name	Contents
Nation- wide	Head of Environmental Impact Controlling Board Decree No.056 of 1994	Guidelines for the preparation of an EIA
	Head of Environmental Impact Controlling Board Decree No.299 of 1996	Social aspects of EIA
	Environmental Law, No.23 0f 1997	New environmental law (grounds for the current laws on environment)
	Head of Environmental Impact Controlling Board Decree No.105 of 1997	Guideline for environment management plan / environmental monitoring (relating to EIA)
	Government Regulation, No.27 of 1999	Procedure of EIA
	Government Regulation, No.41 of 1999	Standard for Air Environment
	Ministry of Environment, Decree No.2 of 2000	Guidelines for preparation of EIA
	Head of Environmental Impact Controlling Board Decree No.09 of 2000	Guidelines for arrangement of EIA
	Community Involvement and Information in EIA Process, No.08 of 2000	Community participation and disclosure of information
	Ministry of Environment, Regulation on UKL and UPL, Decree No.86 of 2002	Regulation on the procedure of UKL, UPL
	Ministry of Environment, List of Projects that Require AMDAL, Decree No.11 of 2006	Project and development which require EIA
	Ministry of Environment, Decree No.7 0f 2009	Standard for vehicle noise
	Analysis about Environmental Impact (AMDAL), Ministry of Environment, Decree No.32 of 2009	Commitment to implement SEA based on article 10 of No.23/1997
DKI Jakarta	Government of DKI Jakarta Decree No.76 of 2001	Relating residents and transparency of EIA implementation
	Government of DKI Jakarta Decree No.2863 of 2001	Projects and developments which require EIA
	Government of Jakarta Province Decree No.99 of 2002	Guidelines for EIA/ Environmental management plan (UKL) / Environmental monitoring (UPL)
	Government of DKI Jakarta Decree No.189 of 2002	Projects which require UKL/UPL
	Government of Jakarta Province Decree No.92 of 2007	Method of inspection of gas emission of vehicles and sticker
	Government of Jakarta Province Decree No.31 of 2008	Standard for gas emission and method of inspection of vehicles and motorbikes

Source: JICA Preparatory Team for JABODETABEK Public Transportation Policy Implementation Strategy, 2010

2) Developments in Restricted Areas

The areas in which development is restricted are defined in the National Spatial Plan (RTRWN) as N-1 and N-2 areas aims to protect the natural condition. In case of new bus terminal or bus shelter construction or any other construction of structures is prohibited. (refer Table 2.7.4)

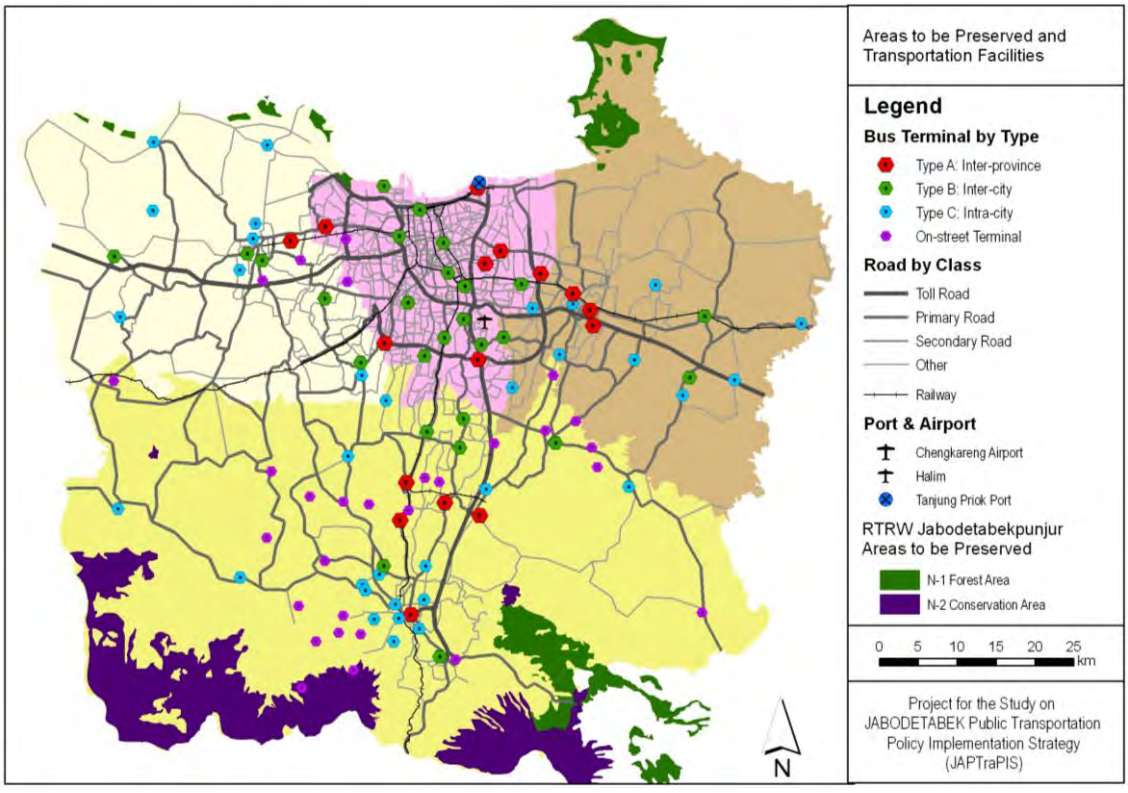
Figure 2.7.1 shows the existing location of areas which are to be preserved and transportation facilities could be located in these areas. Only two bus terminals are located in these areas. These terminals are the final destination of the bus routes, and do not have any terminal structures or facilities.

Table 2.7.4 Development Restrictions in Conservation Areas

Zone Code	Name of Zoning	Referral Management and Spatial Control
N-1	Protected Area	Not allowed to farm or any other aquaculture activities Existing aquaculture to be excluded from this zone in long term Protected Forest Research Border river, lake, sea, and steep slopes Forest protection of water surface Mangrove forest
N-2	Forest Conservation: Reserve/ National Park/ Nature Tourism Park/ Wildlife Reserve/ Culture/ Heritage	Not allowed to farm or any other aquaculture activities Nature tourism Preserve area and culture conservation, flora and fauna Research

Source: RTRWN

Figure 2.7.1 Areas to be Preserved and Transportation Facilities



Source: RTRW Jabodetabekpunjur, 2008

2.7.3 Major Environmental Indicators

1) Air / Water / Noise and Vibration

The new regulation on road No.22 established in 2009 states that the environmental impact on air quality and noise pollution from vehicles should be considered, to ensure environmental sustainability. According to that regulation, i) every activity in the field of traffic and transportation should prevent and control of environmental pollution and to comply with environmental quality standards in accordance with the provisions of the legislation, ii) any motor vehicles that operates on the street must meet the exhaust emission limits and the noise level, and iii) every owner and / or driver of motor vehicles and public transport company shall prevent the occurrence of air pollution and noise.

Air pollution is regulated by Government Regulation No.41/1999, as given in Table 2.7.5. The actual condition of ambient air quality, which was observed in 2007-2008 is given in Table 2.7.6 and illustrated in Figure 2.7.2

In addition, standards of emission from vehicles are regulated by National government and DKI Jakarta; these are given in Table 2.7.7.

However, to improve the air quality, several activities has been conducted and are summarized in Table 2.7.8 and air quality is improving due to these actions.

Table 2.7.9 gives the minimum noise level as regulated in Decree No. 7 issued in 2009 by the Ministry of Environment.

Table 2.7.5 National Standard for Ambient Air Quality

Measured Duration	SO_2 (µg/m^3)	CO (µg/m^3)	NO_2 (µg/m^3)	TSP (µg/m^3)	HC (µg/m^3)
1 Hour	900	30,000	400	-	-
3 Hours	-	-	-	-	160
24 Hours	365	10,000	150	230	-

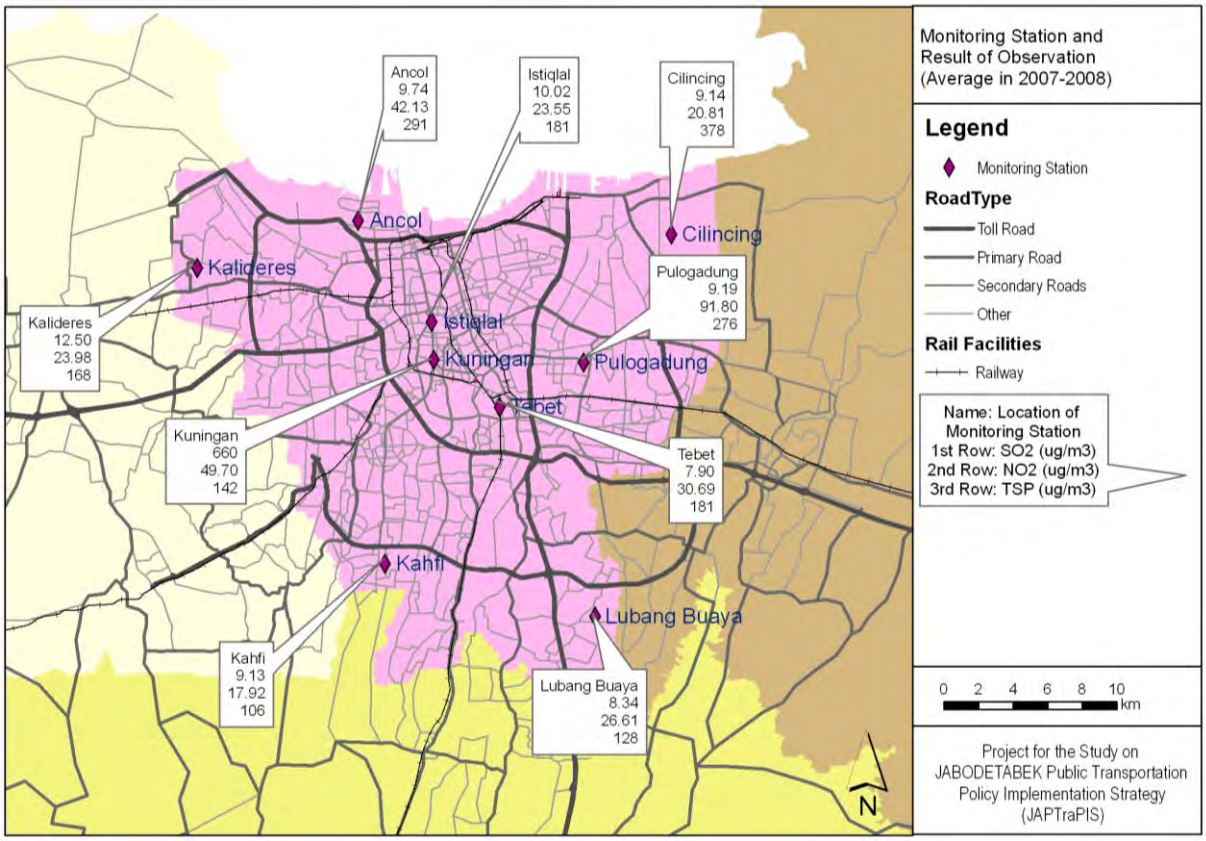
Source: Government Regulation regarding Control of Air Pollution No.41/1999

Table 2.7.6 Observation of Air Condition in Jakarta (Average of the Observed Months)

No	Location	SO_2 (µg/m^3)	CO (µg/m^3)	NO_2 (µg/m^3)	TSP (µg/m^3)
	Quality Standard of DKI Jakarta (24 Hours)	**260.0**	**9,000**	**92.00**	**230**
1	Kuningan	6.6		49.7	142
2	Tebet	7.9		30.7	181
3	Pulogadung	9.2		91.8	276
4	Istiqlal	10.0		23.6	181
5	Ancol	9.7		42.1	291
6	Cilincing	9.1		20.8	378
7	Lubang Buaya	8.3		26.6	128
8	Kahfi	9.1		17.9	106
9	Kalideres	12.5		24.0	168
10	East Jakarta		920		
11	West Jakarta		1,210		
12	Gelora Senayan		1,260		
Average		**9.2**	**1,130**	**36.3**	**206**

Note: HC is not monitored
Source: Environmental Status Report, 2008, BPLHD (Environmental Management Agency), DKI Jakarta

Figure 2.7.2 Location of the Environmental Monitoring Station in DKI Jakarta and A Result of Monitoring (Average in 2007-2008)



Source: Environmental Status Report, 2008, BPLHD (Environmental Management Agency), DKI Jakarta

Table 2.7.7 Vehicle Emission Standard

Type of Vehicle		Production Year	Items						Condition
			CO (%)		Hydro-Carbon (ppm)		Dust (%)		
			A	B	A	B	A	B	
Gasoline Engine		Before 2007	4.5	3.0	1,200	700			Idling
Diesel Engine		After 2007	1.5	1.5	200	200			
Gross Vehicle Weight (GVW)	<= 3.5 ton	Before 2010					70	50	
		After 2010					40	40	
	Over 3.5 ton	Before 2010					70	60	
		After 2010					50	50	
Motor-cycle	2 Stroke	Before 2010		4.5		12,000			Idling
	4 Stroke	Before 2010		5.5		2,400			Idling
	2 & 4 Stroke	After 2010		4.5		2,000			Idling

Note: A: National Standard No.5/2006, B: DKI Jakarta Standard No.31/2008

Table 2.7.8 Activities to improve the ambient air

Reduction of Emissions	Stickers are posted to the vehicles which comply with the standard
Car-free Day or Public Transportation Day	Closing some roads for six hours (6:00-12:00) twice a month
Busway	Campaign to increase the usage
Inspection of Emissions from Motorcycle	Implementing and coordinating with the police

Source: JICA Preparatory Team for JABODETABEK Public Transportation Policy Implementation Strategy, 2010

Table 2.7.9 Vehicles Noise Level

A: New Type of Vehicle or More Prefer to Category M, N, and O as Dynamic

No	Category		Power	L Max dB (A)	
				Implementation Year	
				Phase 1	Phase 2
M1 (< 9 Persons)			-	80	77 (2.3)
1	Bus	GVW < 2 T	-	81	78 (2)
		2 T < GVW < 3,5 T	-	81	79 (2.3)
		GVW > 3.5 T	P < 150 Kw	82	80 (3)
		-	150 Kw < P	85 (1)	83 (3)
2	Truck	GVW < 2 T	-	81	78 (2)
		2 T < GVW < 3,5 T	-	81	79 (2.3)
		GVW > 3.5 T	P < 75 kW	86	81 (3)
		-	75 kW < P 150 kW	86	83 (3)
		3.5 T < GVW < 12 T	150 Kw < P	86 (1)	84 (3)
		GVW > 12 T	-	88 (1)	84 (3)
Testing Method				ECE R51	ECE R51 - 01

B: New Type of Vehicle or More Prefer to Category M, N, and O as Dynamic that have a Proper Base for Passenger

No	Category		Power	L Max dB (A)	
				Implementation Year	
				Phase 1	Phase 2
M1 (< 9 Persons)			-	90	87 (2.3)
1	Bus	GVW < 2 T	-	91	88 (2)
		2 T < GVW < 3,5 T	-	91	89 (2.3)
		GVW > 3.5 T	P < 150 Kw	92	90 (3)
		-	150 Kw < P	95 (1)	90 (3)
Testing Method				ECE R51	ECE R51 - 01

C: New Type of Vehicle With Category L as Dynamic

No	Category		L Max dB (A)	
			Implementation Year	
			Phase 1	Phase 2
1	Motorcycle	L < 80 cc	85	77
		80 < L < 175 cc	90	80
		L > 175 cc	90	83
Testing Method			ECE R - 41 - 01	

Note: Source: Decree No. 7, 2007, Ministry of Environment; (1) 147 kW (ECE) < P; (2) Direct Injection + 1 dB (A) Relaxation
(3l P < 150 kW (ECE) : + 1 dB (A) Relaxation : 150 kW (ECE) < P : + 2 dB (A) Relaxation

2) Traffic Volume and Vehicle Emissions

The impact of reorganization of buses and routes and the traffic volumes are discussed in other sections. However, the impact of reduction of bus numbers, replacement or introduction of new buses to the fleet then consistency of emission levels due to reduction in vehicles should be evaluated. There are two points to be noted when evaluating the source of emissions, 1) age of vehicle, and 2) type of used by vehicle.

Age of vehicle is one of the variables to be collected by the on-going public transportation survey. It will be evaluated based on the survey results. However, this problem is directly related to the inspection and the registration of vehicles. Currently, the jurisdiction of the inspection is lies with the transport agency of each local government and the jurisdiction of registration is in the domain of police in each area. The current situation of inspection and

registration will be further investigated in detail.

Alternative fuel types are being investigated by BAPPENAS with the aid of Australia. The alternative fuels being studied include: CNG, LNG, LPG, Bio-fuel and others.

DKI Jakarta has implemented a program of CNG fuel introducing on Busway vehicles, it was announced by the President on May 20, 2006. In addition, related regulations were published on i) the regulation No. 2 in 2005 on air pollution control and ii) Kep. Gubernur No. 141 in 2007 on the type of fuel to be used public transport and local government operated vehicles.

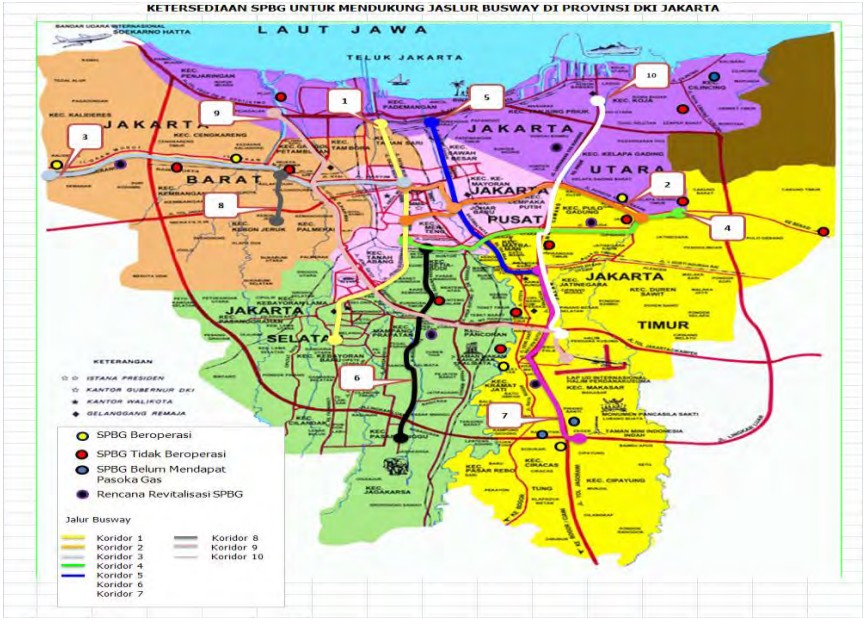
Table 2.7.10 and Figure 2.7.3 show the location of CNG stations in DKI Jakarta in 2010, and Table 2.7.11 lists the location of LNG stations. There are 20 CNG and 8 LNG stations mainly in DKI Jakarta (except 1 LNG station in Bekasi). Table 2.7.12 gives the number of CNG buses introduced by Transjakarta. Table 2.7.13 details the number of public vehicles using CNG and the consumption rate of each vehicle type.

Table 2.7.10 Location of CNG Stand in DKI Jakarta in 2010

No	Llocation	Administrator	Remarks
1	Jl. SUMENEP	PERTAMINA	NOT OPERATIONAL
2	JL. DAAN MOGOT	EL NUSA	NOT OPERATIONAL
3	JL. BENDA ARAYA – KALIDERES	PERTAMINA	OPERATIONAL
4	JL. DAAN MOGOT – PESING	PERUM PPD	OPERATIONAL
5	JL. RAWA BUAYA	PETROSS GAS	OPERATIONAL
6	JL. PLUIT SELATAN	PERTAMINA	NOT OPERATIONAL
7	JL. BOULEVARD TIMUR	EL NUSA	NOT OPERATIONAL
8	JL. DANAU SUNTER	EL NUSA	NOT OPERATIONAL
9	JL. PEMUDA	PERTAMINA	OPERATIONAL
10	JL. BEKASI	PERTAMINA	NOT OPERATIONAL
11	JL. RAYA BOGOR	PERTAMINA	NOT OPERATIONAL
12	JL. A. YANI	SWASTA	NOT OPERATIONAL
13	JL. WARUNG BUNCIT	PERTAMINA	NOT OPERATIONAL
14	JL. PASAR MINGGU	PERTAMINA	OPERATIONAL
15	JL. TEBET TIMUR	PERTAMINA	NOT OPERATIONAL
16	JL. RAYA PONDOK UNGU	PERTAMINA	NOT OPERATIONAL
17	JL. PERINTIS KEMERDEKAAN	PETROSS GAS	OPERATIONAL
18	JL. MARGONDA – DEPOK	PERTAMINA	NOT OPERATIONAL
19	JL. SUDIRMAN - TANGERANG	PERTAMINA	NOT OPERATIONAL
20	KAMPUNG RAMBUTAN	PGN	OPERATIONAL

Source: DGLT

Figure 2.7.3 Location of CNG Stand



Source: DGLT

Table 2.7.11 Location of LNG Selling Outlets

No	Location	Kota	Remarks
1	Jl. Scouts Raya	Jakarta Timur	COCO retail outlets 31.131.01
2	Jl. Abdul Muis	Jakarta Pusat	COCO retail outlets 31.102.02
3	Jl. HR. Rasuna Said	Jakarta Selatan	COCO retail outlets 31.129.02
4	Jl. Cikini Raya	Jakarta Pusat	COCO retail outlets 31.103.03
5	Jl. MT. Â Haryono	Jakarta Selatan	COCO retail outlets 31.128.02
6	Jl. Ahmad Yani No. 1	Bekasi	COCO retail outlets 31.171.01
7	Jl. Daan Mogot No. 2	Jakarta Barat	COCO retail outlets 31.114.03
8	Jl. East Bekasi Km. 18	Jakarta Timur	COCO retail outlets 31.134.01

Source: DGLT

Table 2.7.12 Number of CNG Buses on Transjakarta Busway Corridors

No	Type	# unit	# unit CNG 2009	# unit CNG 2010	# unit non-CNG
1	Busway (Corridor 1-7)	418	327	327	91
2	Busway (Corridor 8-10)			200	
TOTAL		**418**	**327**	**527**	**91**

Source: DGLT

Table 2.7.13 Number of Public Vehicles by Fuel Type & Consumption

Public Transportation	Gasoline Fuel Vehicle	CNG Vehicle	Fuel Consumption /vehicle/day
Taxi	24,256	2,360	40 lsp/day
Mikrolet	6,746	36	30 lsp/day
Metromini	4,979	-	-
Large Bus	4,752	-	-
Bajaj	14,360	400	6 lsp/day

Note:a. Supplies of gas to bus ± 250 lsp/day/bus
b. Gas demand for taxi / microbus ± 24 lsp/day/car
c. The need gas for Bajaj ± 6 lsp/day/car
Lsp (Liter Setara Premium): Liter equivalant to Premium
Source: DGLT

3) Employment in Public Transportation Sector

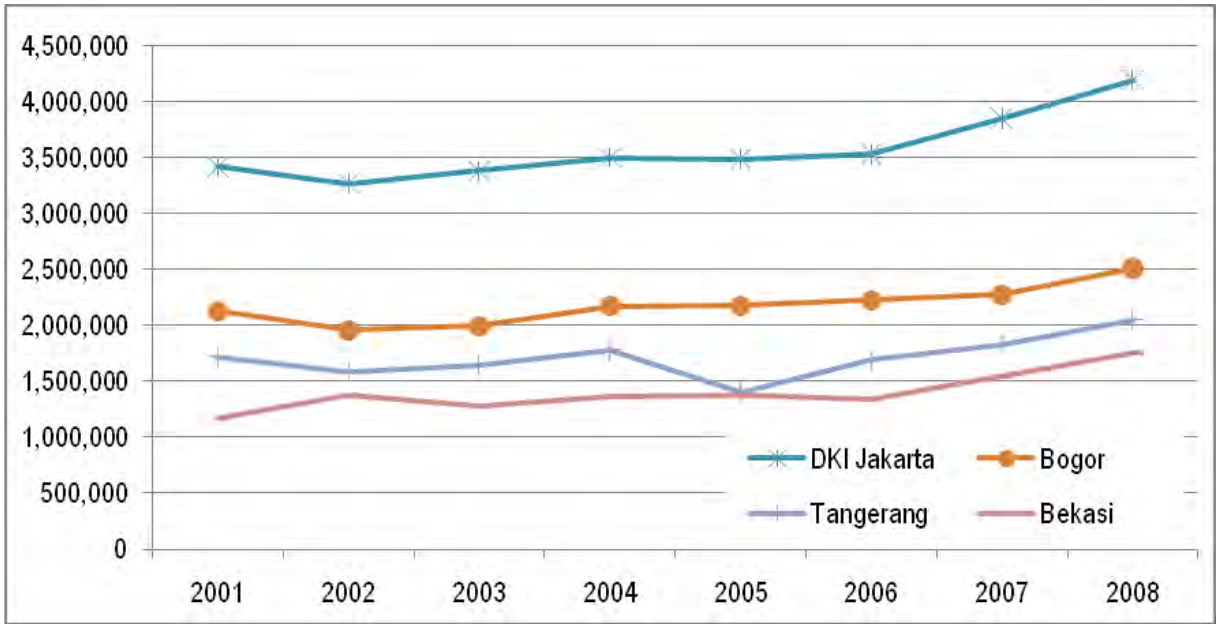
As described in section 1), it is expected that the reorganization of bus operation affects to the employment mostly of bus drivers and conductors. In the process of transport strategy formulation, it would be carefully considered to build a framework of reemployment of these workers. However, in the process of implementation of the project, the indicators relating to the employment should be monitored. Table 2.7.14 gives the total employment level, number of persons employed in transport sector, growth rate since 2001 and jobless levels. In addition, Figure 2.7.4 illustrates the growth of employment in 8 years from 2001 to 2008.

Table 2.7.14 Employment in Study Area 2001 to 2008

Region		Number (,000)						Growth Rate (% p.a)				Un-employment Rate (%)
		Total Employment			Employment in Transport Sector			Total Employment		Employment in Transport Sector		
		2001	2005	2008	2001	2005	2008	'01-'05	'05-'08	'01-'05	'05-'08	2009
Study Area	DKI Jakarta	3,415	3,486	4,192	295	318	417	0.5	6.3	1.9	9.4	12.2
	Bogor	2,124	2,174	2,505	206	237	253	0.6	4.8	3.5	2.1	14.2
	Tangerang	1,717	1,399	2,048	164	145	218	-5.0	13.5	-3.1	14.5	9.8
	Bekasi	1,163	1,371	1,755	153	165	201	4.2	8.6	1.8	6.8	12.3
	Total	8,419	8,430	10,500	818	865	1,089	0.0	7.6	1.4	7.9	12.2

Source : Survey Angkatan Kerja Nasional (SAKERNAS), BPS

Figure 2.7.4 Growth of Number of Employment from 2001 to 2008



Source : Survei Angkatan Kerja Nasional (SAKERNAS), BPS

4) Access to Hospitals and Schools

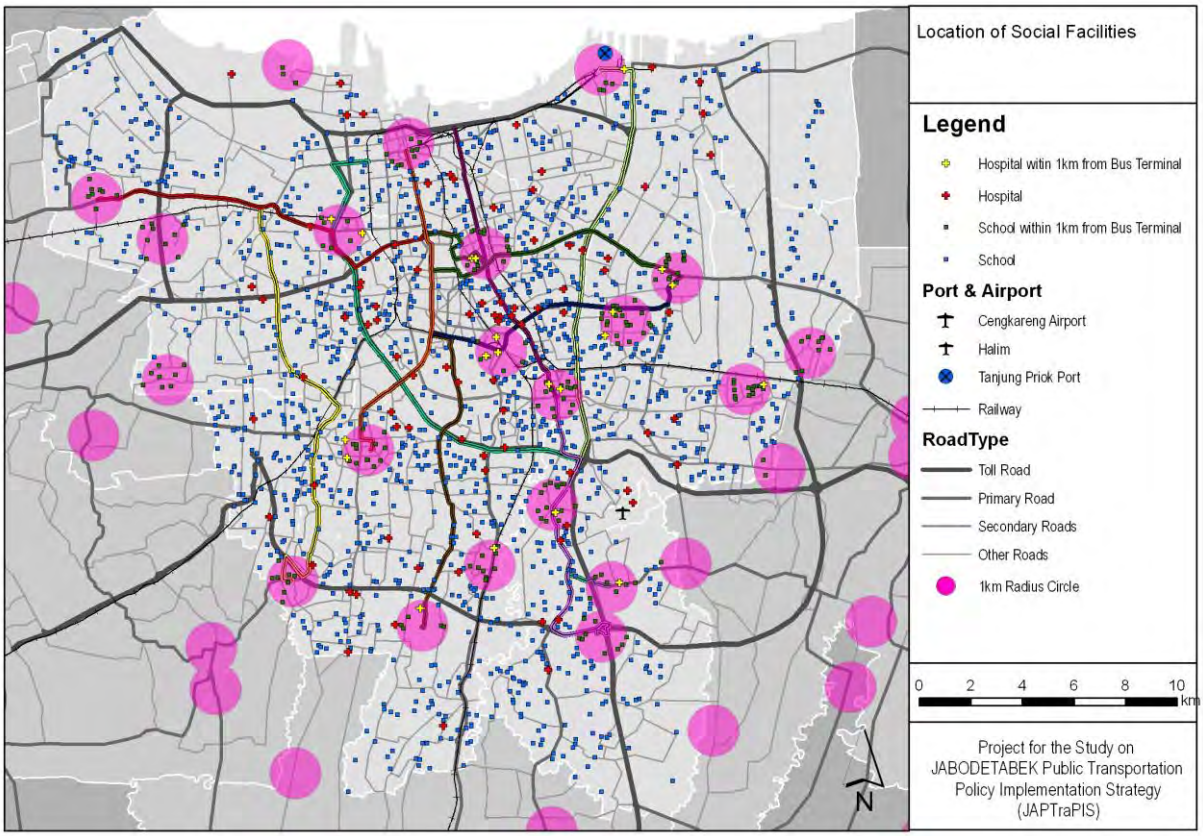
To evaluate the accessibility to social facilities such as hospitals and schools, the location of bus terminals and bus stops should be examined. It should be considered to ensure that the access to the social facilities is convenient and secure.

For example, Figure 2.7.5 shows the location of social facilities in 2002 and the selected facilities which are located within 1km radius of the existing bus terminals. There are 206 schools and 21 hospitals which fulfill this condition. However, these analyses should be expanded to include the bus stops along the target bus route. Also, the size of the radius of the catchment area should be investigated in detail.

In addition, the result of the commuter survey by JUTPI and the public transportation survey by JAPTraPIS would be utilized to clarify the characteristics of bus users, especially students and elderly people. These issues should be considered as safety net for the under privileged.

These analyses may be utilized to investigate the Minimum Service Standards in the process of public transportation strategy formulation.

Figure 2.7.5 Social Facilities within 1km Radius of Bus Terminals



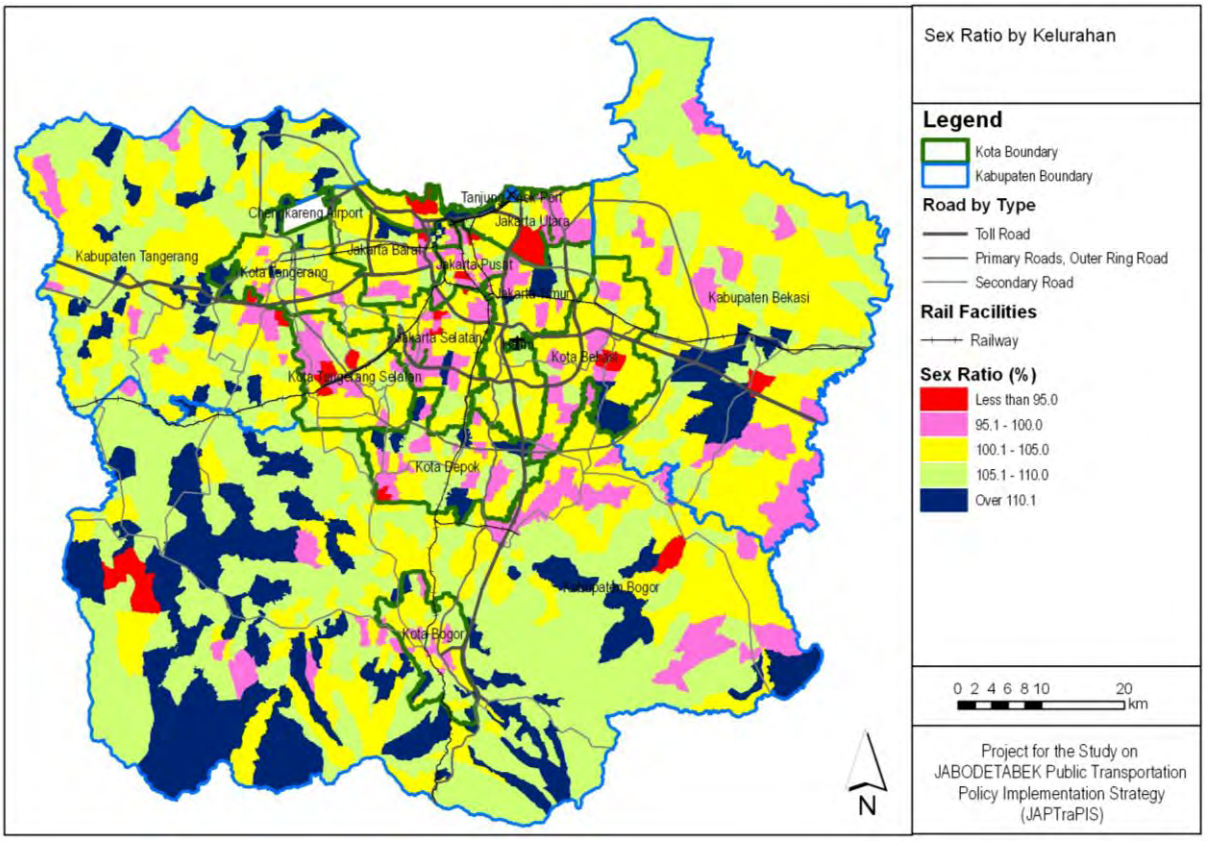
Source: SITRAMP GIS Database, 2002

5) Gender Issues

Gender issues related to transportation facilities were investigated based on the results of Commuter Survey by JUTPI and Pubic Transportation Survey by JAPTraPIS. The trip characteristics related to the selection of transportation mode, trip length and other opinion variables are the main factors for analysis.

Figure 2.7.6 depicts the distribution of gender balance (male/female Ratio as %) by census Kelurahan. The areas with lower male population are mostly scattered around the Kota areas.

Figure 2.7.6 Gender Balance by Census Kelurahan



Source: Census 2010, BPS

3 EXISTING PUBLIC TRANSPORT CHARACTERISTICS

3.1 Introduction

This chapter aims to analyze the recently estimated public transportation demand based on comprehensive urban transport demand data updated by JUTPI[1] in the study area and to show the characteristics of demand and supply side of public transportation based on results of the public transportation surveys that were conducted by JAPTraPIS. The analysis is a first step towards identifying the key demand areas in JABODETABEK; how this demand, particularly public transport travel could be best accommodated using the most efficient and affordable modes of travel. This is essential, the share of public transport in the study area has been declining at a rapid rate during the last decade, in favor of private mode, particularly motorcycle. To understand the existing condition of public transport demand, the analyses of private mode and mode share has also been undertaken. The analysis comprises of five main aspects: (i) Characteristics of the JUTPI updated urban transport demand, (ii) Characteristics of public transport usage, (iii) Characteristics of supply of public transportation, (iv) Characteristics of public transportation driver/conductor, and (v) Evaluation of public transportation.

3.1.1 Commuter Survey

Commuter survey was conducted under the JUTPI during March-May 2010 to understand the characteristics of commuter trips of worker and student in the household as well as to collect the socio-economic information of the household and its members in JABODETABEK. The valid sample sizes are 178,953 households and 334,973 commuters respectively. In the analysis, the survey sample was expanded to represent the study area.

3.1.2 Person Tracking Survey

To investigate trip generation/attraction and modal choice behavior for all trip purposes in the study area, JUTPI also conducted person tracking survey. This survey is similar to conventional person trip survey, but respondents are requested to carry GPS device sot that the GPS data could be used to verify the paper-based responses. The survey was conducted at approximately 600 households equally distributed by income level and by area (urban/rural) for three working days in 2010. The sample size is 17,720 recorded trips, and the sample was not expanded for the study area.

3.1.3 Public Transportation Surveys

Public transportation surveys were consisted four surveys; (i) Bus vehicle and passenger traffic count survey, (ii) Bus route operation survey, (iii) Public transportation passenger interview survey and (iv) Public transportation operator interview survey.

(1) Bus vehicle and passenger traffic count survey

The number of arriving/departing buses and passenger occupancy were counted during 24 hours period at 20 bus terminals and at five Busway stations. Arrival and departure times of buses were also recorded. The service frequency and number of passengers by bus route and by time of day were determined from the survey data.

[1] JABODETABEK Urban Transportation Policy Integration

(2) Bus route operation survey

On board bus passenger boarding/alighting, time and locations were recorded by surveyors. This is to determine the characteristics of bus operation and passenger demand by bus route. These surveys were conducted during morning peak (6:30-8:30 or 6:00-9:00), off-peak (11:00-14:00) and evening peak (17:30-19:30 or 17:00-20:00) periods. This survey covered 30 major bus routes.

(3) Public transportation passenger interview survey

A sample of passengers in each public transport mode (Busway, ordinary bus, Taxi, Bajaj, Ojek) were interviewed by surveyors at major terminals (20 bus terminals) to obtain trip and personal information, assessment of present public transport services, and the needs for public transport. Over 10,000 samples were collected. Trip characteristics of the demand side were determined through this survey.

(4) Public transportation driver/conductor and operator interview survey

A sample of public transport operators (Bus owners of Busway, ordinary bus, taxi, bajaj) were interviewed about the management, operation, problems, and their needs. In addition, sampled drivers and conductors of each of the public transport mode (Busway, ordinary bus, taxi, Bajaj, Ojek) were interviewed at major terminals and asked about the daily operation (operating hours, frequency, expense, revenue, etc.), problems, and their needs. Trip characteristics of the supply side were determined through this survey. A sample of 200 operators and 200 drivers/conductors were interviewed at each terminal.

3.2 Analysis of Current Travel Demand

3.2.1 Processing of Travel Demand Data Provided by JUTPI

Since the 2004 SITRAMP study there has been a considerable number of changes in the trip making, and trip patterns in the study area. JUTPI model development, its calibration and validation is being finalized. The demand data, provided to JAPTraPIS, on which the following analysis is based on the output of the JUTPI Study.

3.2.2 Outline of Total Travel Demand

JUTPI study provided JAPTraPIS trip matrices, both for person travel and goods movement within the JABODETABEK area. i.e. Trips to or from the JABODETABEK area to other areas outside JABODETABEK were excluded, as were the through trips. It is pertinent to mention that internal-external and through trips could have an impact on the long-distance travel demand to/from the nodes/ terminals in the study area. The total daily travel demand data was in the form of trip matrices. The trip matrices are at 621 zone levels which are a direct disaggregation of SITRAMP[2] 343 zone system.

The person trip matrices are further disaggregated by three income groups (Low, Medium & High) and by vehicle type. Similarly the goods movement was provided by two types of trucks (Small and Large). The total demand is summarized in Table 3.2.1.

In summary there are about 53million daily person trips in 2010, of which Motorcycles accounts for close to 53% (28.1million), Car 10.5 million at 20% and all public transport

[2] Study of Integrated Transportation Master Plan for JABODTABEK

(PT) modes 14.4million (27%) of the total. It should be noted that in SITRAMP study it was reported that close to 40% all person trips are by public transport mode. Indicating a great degree of reliance on public transport and more efficient travel, and better use of road space. However, the PT share has moved mostly to motorcycle, which provides fast and cheap door-to-door travel. There are numerous reasons for this decline in PT share or increase in motorcycle trips in less than a decade. Some of these reasons are the main subject of this study and are addressed in various sections. The key objective being to halt the decline in PT share, and reverse the trend, how this can be achieved is yet to be determined.

Table 3.2.1 Daily Total Travel Demand in the JABODETABEK Area

Mode Description	Sub-Group	Total Trips	Intra-Zonal	Inter-Zonal
Motorcycle Person Trips	Low Income*	8,314,748	3,533,530	4,781,218
	Medium Income*	17,801,390	5,475,141	12,326,249
	High Income*	2,007,651	402,841	1,604,809
	Sub-Total	**28,123,863**	**9,411,513**	**18,712,350**
Car Person Trips	Low Income	1,211,348	511,547	699,801
	Medium Income	7,233,139	2,234,348	4,998,790
	High Income	2,056,607	318,049	1,738,559
	Sub-Total	**10,501,094**	**3,063,945**	**7,437,150**
All Public Transport Person Trips	Low Income	5,323,158	2,299,740	3,023,418
	Medium Income	8,466,125	2,742,389	5,723,736
	High Income	637,535	135,409	502,126
	Sub-Total	**14,426,818**	**5,177,538**	**9,249,280**
Total All Modes Person Trips	Low Income	14,849,254	6,344,818	8,504,437
	Medium Income	33,500,654	10,451,879	23,048,775
	High Income	4,701,793	856,299	3,845,494
	Total	**53,051,776**	**17,652,996**	**35,398,780**
Truck (Vehicle) Trips	Small Trucks	382,736	2,756	379,980
	Large Trucks	76,081	727	75,354
	Total All Trucks	**458,817**	**3,483**	**455,334**

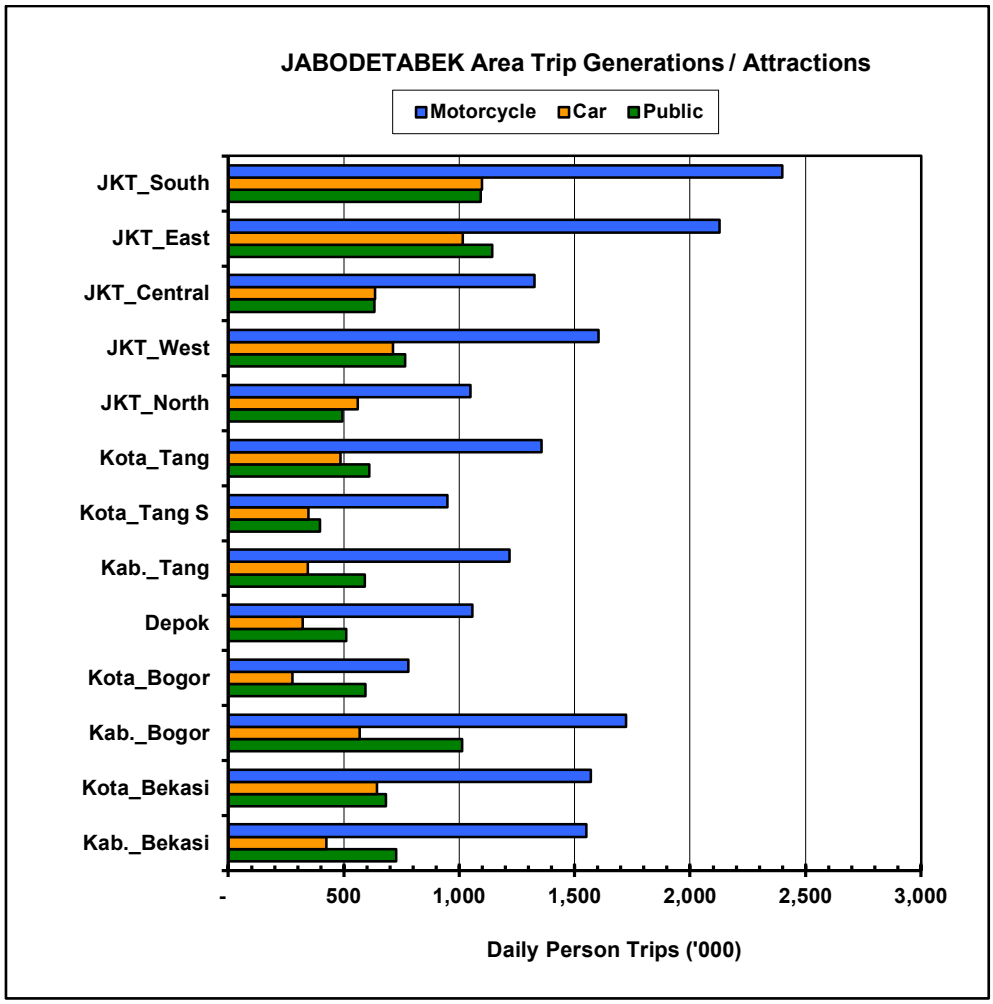
Note: Low Income: Average Household Income < IDR1.5million/month; Medium Income: Average Household Income >=IDR1.5million, and < IDR 6.0 million/month; and High Income: Household Average Income>= IDR6.0million/month; *Source: JUTPI Model Output*

3.2.3 Total Travel Demand by Area (Kota / Kabupaten)

The JABODETABEK study area comprises of 10 Kotas (5 within DKI Jakarta) and 3 Kabupatens. The total daily trip generations/ attractions by the 13 areas by each vehicle type are shown in Figure 3.2.1.

The figure illustrates the dominance of motorcycle trips in all areas, and in most cases the public transport trips exceed car trips, and the difference is greatest in rural areas such as Kabupaten Bogor, Bekasi and Tangerang, indicating high reliance of public transport in the regions.

Figure 3.2.1 Daily Person Trips ('000) by Mode of Travel

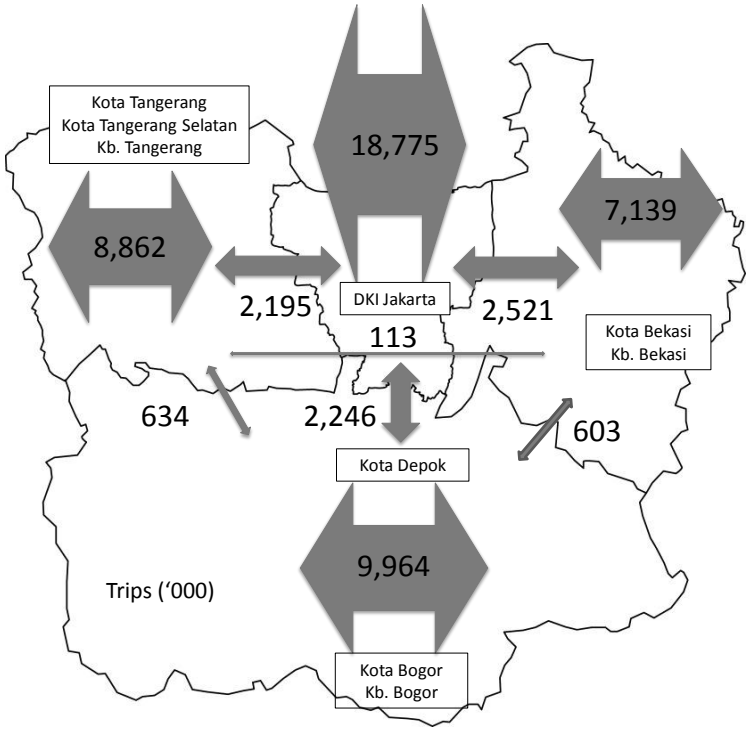


Source: Analysis by JAPTraPIS Study Team, Source Data JUTPI

3.2.4 Travel Demand Patterns (Trip Distribution) in the Study Area

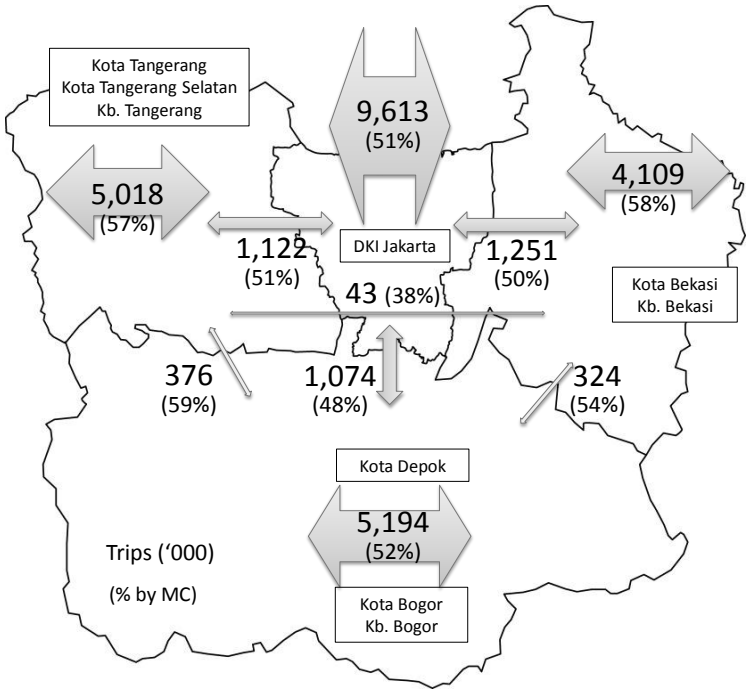
The highest travel demand is within DKI Jakarta (18.8million (35.2%) trips. In addition there are 7.0million trips to/from DKI Jakarta daily. The broad travel patterns by each of the three modes of travel is illustrated in Figures below. The next busiest area of travel demand is the southern areas of DKI Jakarta (including Kotas Depok & Bogor and Kabupaten Bogor, accounts for 10 million internal trips about 18.8% of the study area movements.

Figure 3.2.2 Daily Travel Pattern by All Modes of Travel - Trips ('000)



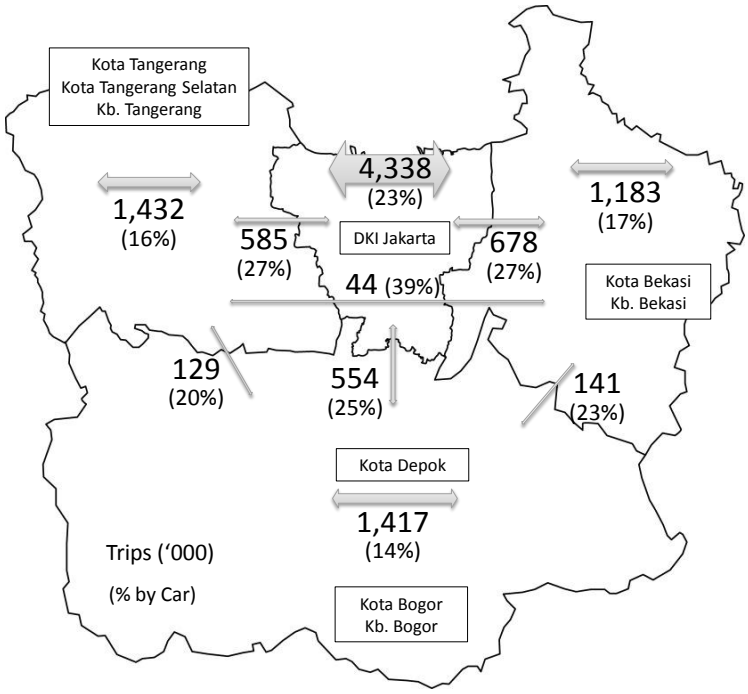
Source: Analysis by JAPTraPIS Study Team, Source Data JUTPI

Figure 3.2.3 Daily Travel Pattern by Motorcycle Trips ('000)



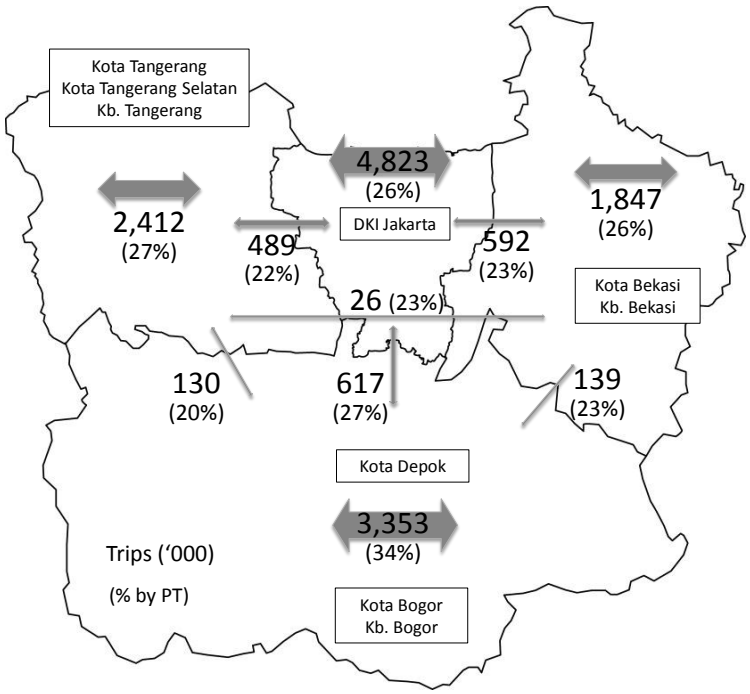
Source: Analysis by JAPTraPIS Study Team, Source Data JUTPI

Figure 3.2.4 Daily Travel Pattern by Car Trips ('000)



Source: Analysis by JAPTraPIS Study Team, Source Data JUTPI

Figure 3.2.5 Daily Travel Patterns by Public Transport Trips ('000)



Source: Analysis by JAPTraPIS Study Team, Source Data JUTPI

Trip distribution patterns were further analyzed by km of travel for each mode of travel and by income group. Table 3.2.2 below presents the average trip length of all inter-zonal trips.

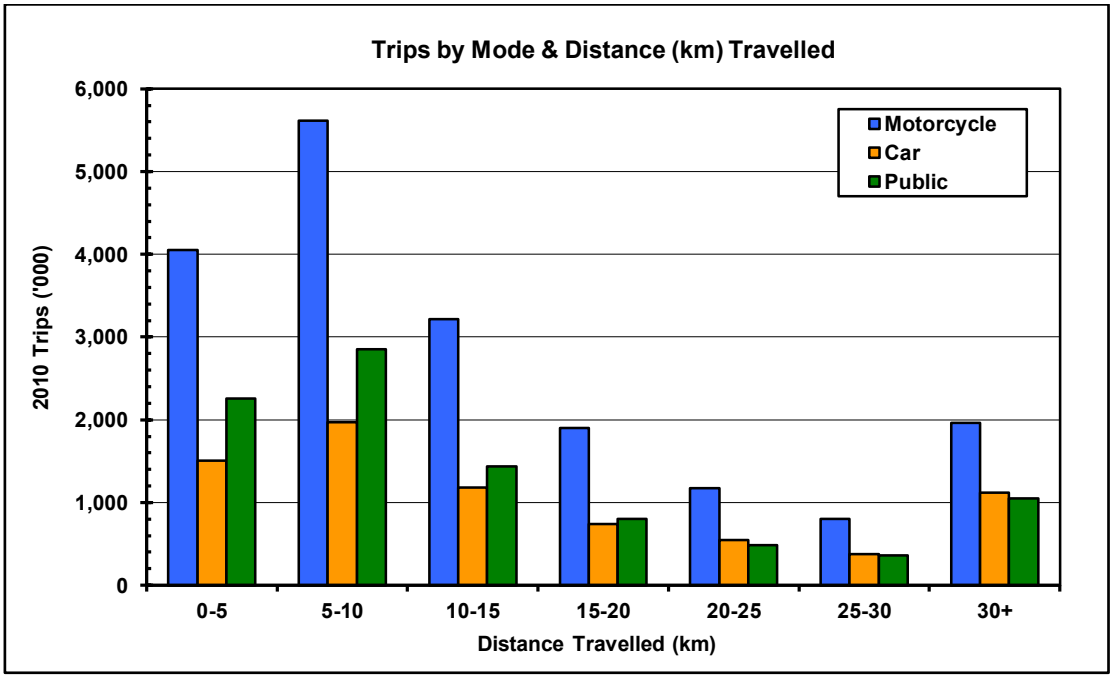
It can be seen that the people with lower incomes travel the farthest irrespective of the mode of travel. This indicates the rural incomes are lower than those living in urban areas, and also explains that poorer households cannot afford to live in urban areas. However average trip length by motorcycle is somewhat lower than those travelling by car but higher than those travel by PT for which the average trip length is just over 14km. It is also true that that high income group people travel the shortest on motorcycle and on public transport. Analysis of number trips by each mode is depicted in Figure 3.2.6

Table 3.2.2 Trip Length (km) Distribution by Mode of Travel (Inter-zonal Trips)

Mode of Travel	Average Trip Length of Inter-zonal Trips (km)			
	Low Income	Medium Income	High Income	All Income Groups
Motorcycle Trips	15.9	13.8	13.3	14.3
Car	17.6	16.6	16.1	16.6
Public Transport	15.2	13.6	13.3	14.1
Small Trucks				23.4
Large Trucks				25.0

Source: JAPTraPIS Analysis of JUTPI Data

Figure 3.2.6 Trips Mode and Length (km) Inter-zonal Trips '000)



Source: JAPTraPIS Analysis of JUTPI Data

Figure 3.2.6 illustrates that close to two-third of all motorcycle trips (over 12.5million) travel under 15km, and over 4million travel over 30km per trip per day. With an average speed of around 20kph, it shows that some 0.7million people travel almost three hours per day either to work or for other purposes.

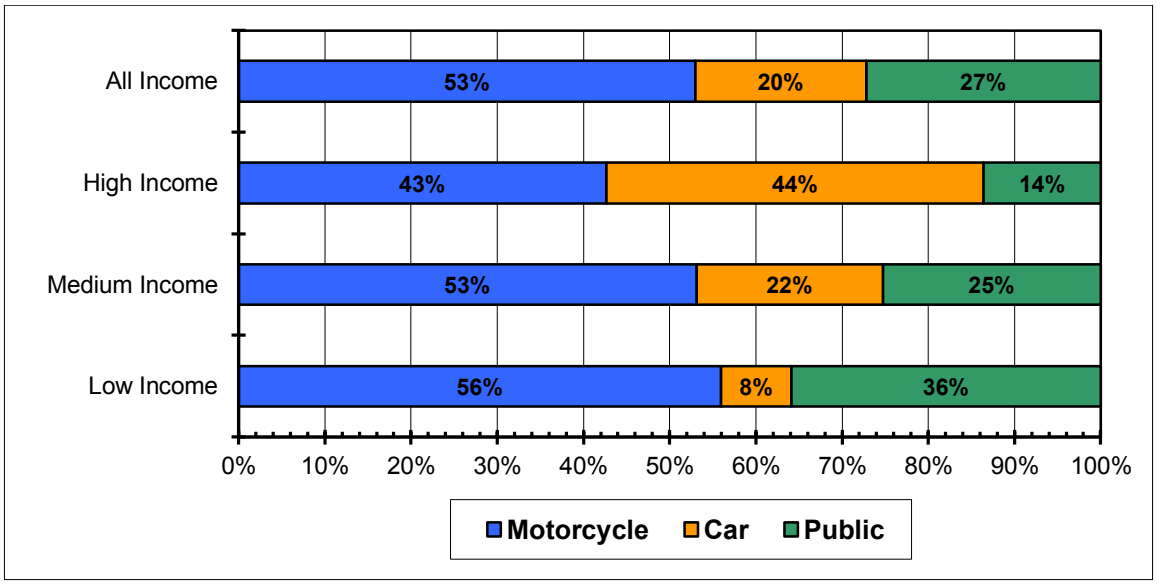
Public transport passengers also endure long journeys, over a million trips are longer than 30km, indicating travel time longer that one-and-half hour for each journey. These passengers represent some 11% of all PT patronage.

3.2.5 Travel Demand – Mode Choice in the Study Area

Figure 3.2.7 shows that PT share is below 40% for low & medium income persons, and it decreases to 14% for high income trips mainly because the high income motorcycle trips shift to car. It can be further seen that car mode share increases with increase in income, and increases to more than 5½ times (from 8% to 44%) from low to high income car travelers. Among the low income, motorcycle is the most dominant mode at 56% of all trips are by motorcycle. Trips by middle income group are the highest, over 63% of all trips. Within this income group PT share is only 25%, and accounts for 8.5million trips some 16% of all study area travel demand. But what is more pronounced is that over 50% of this income group travel is by motorcycle.

The promotion of PT mode therefore should target the middle income group the most. Although the motorcycle share of trips among the low income group is highest (56%), it accounts for only 15.6% of the study area total travel.

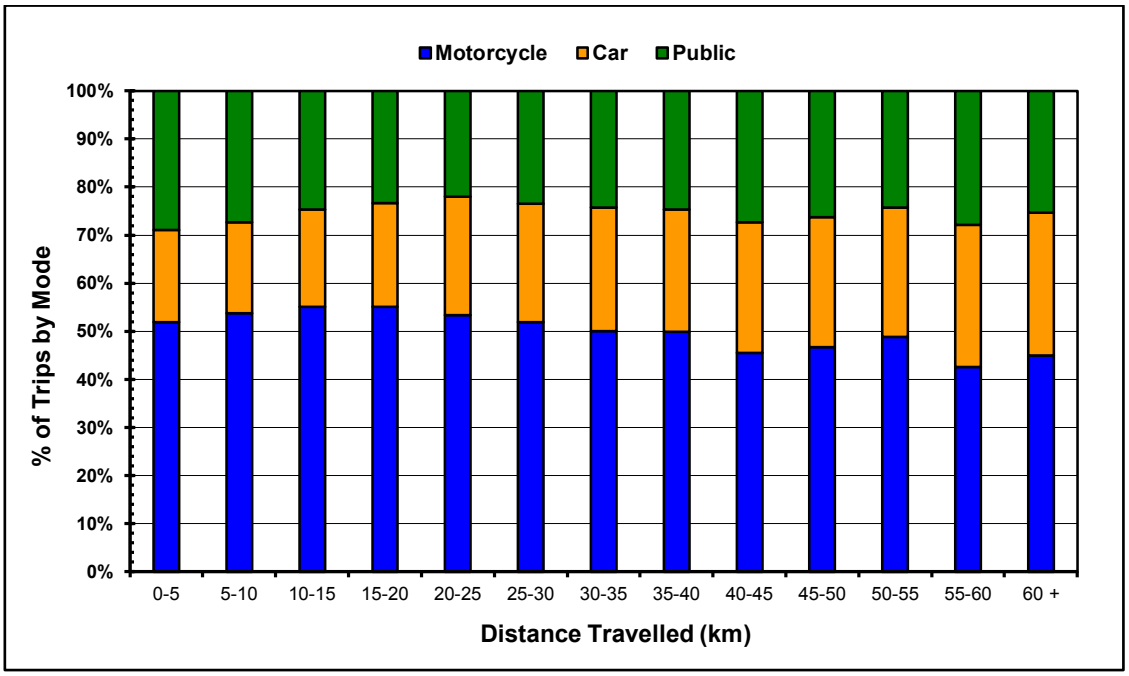
Figure 3.2.7 Daily Mode Share by Income Group % of Trips



Source: JAPTraPIS Analysis of JUTPI Data

Analysis of mode share by travel distance is shown in Figure 3.2.8 below. It reveals that Motorcycle mode share is the highest for any length of travel and is over 50% for short trips up to 5km, after which the motorcycle share drops to below 50% for travel from 40km. PT Share is low for 10-30km distance trips (replaced by motorcycle) and is almost about 30% for trips below 10km and over 40km, almost the limit of the study area travel (96% of all PT trips less than 50km). The Car mode share is almost the same for distance travelled between 10km to maximum, indicates that those who have a car would use it for all travel.

Figure 3.2.8 Daily Mode Share by Distance Travelled



Source: JAPTraPIS Analysis of JUTPI Data

3.3 Characteristics of Existing Public Transportation Usage

3.3.1 Dataset

The analyses result shown in Table 3.3.3 to Table 3.3.4 are based on two dataset received from JUTPI:

- Commuter survey data
- Person tracking survey data

It is worth noted that the sample from person tracking survey dataset is very small in size; it is therefore, might not be able to represent the real pattern of public transport usage for all purposes. Nevertheless, the analysis results provide necessary information on the current usage of public transport in the study area.

3.3.2 Travel Time

Average travel time per trip for each public transport modes in 2010 are presented in Table 3.3.1. The travel times are calculated from commuter survey and person tracking survey for the commuting purpose and all purposes respectively.

The travel times are the sum of in-vehicle travel time and do not include the waiting time or transfer time.

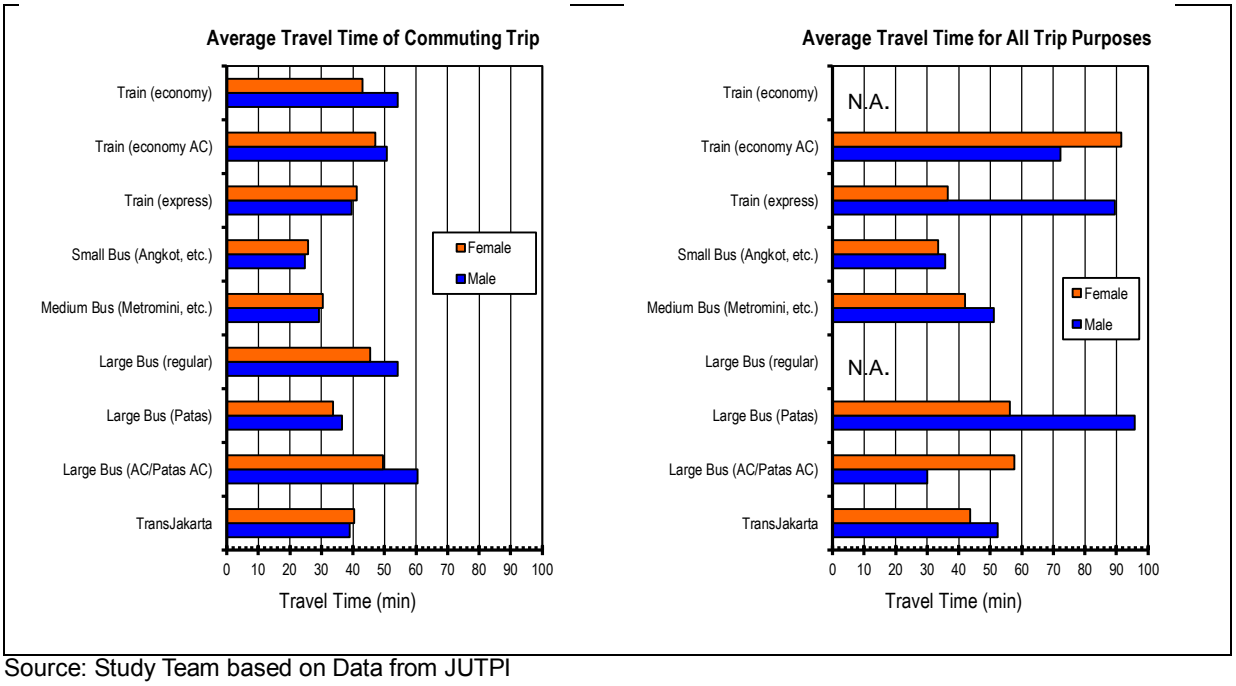
Table 3.3.1 Average Travel Time per Trip by Public Transport Mode

Public Transport Mode	Average Trip Travel Time (min)	
	Commuting Trip	All Purposes
TransJakarta	40.0	46.5
Large Bus (AC/Patas AC)	55.4	51.4
Large Bus (Patas)	35.1	76.6
Large Bus (regular)	50.2	Data not available
Medium Bus (Metromini, etc.)	29.9	45.9
Small Bus (Angkot, etc.)	25.3	34.3
Train (express)	40.3	53.0
Train (economy AC)	49.2	81.0
Train (economy)	51.5	Data not available

Source: Study Team based on Commuter Survey Data from JUTPI

Figure 3.3.1 illustrates the travel time on public transport mode by gender. The figure shows that male passengers generally travel longer on almost all public transport modes comparing to female.

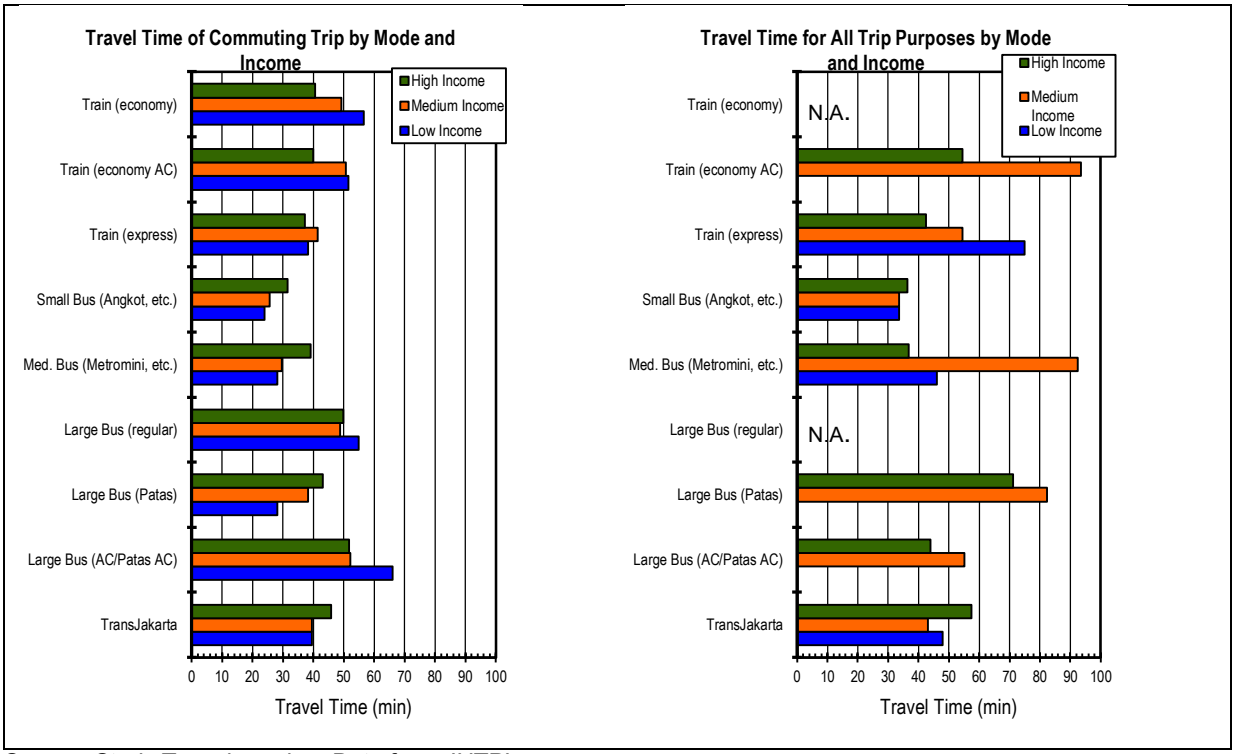
Figure 3.3.1 Travel Time by Public Transport Mode and Gender



Source: Study Team based on Data from JUTPI

Distribution of travel time by mode and income is also presented in Figure 3.3.2 below.

Figure 3.3.2 Distribution of Travel Time by Income and Mode



Source: Study Team based on Data from JUTPI

3.3.3 Fare

Table 3.3.2 shows the average fare per trip by transport mode calculated from commuter survey and person tracking survey for the commuting purpose and all purposes respectively.

The average trip fare for train (express/economy AC) user is the most expensive as it costs. Commuting trip by small bus (e.g. Angkot) appears to be the cheapest one; this reflects that trip by small bus is generally short.

Table 3.3.2 Average Fare per Trip by Mode

Public Transport Mode	Average Fare per Trip (Rupiah)	
	Commuting Trip	All Purposes
TransJakarta	5669.3	6127.9
Large Bus (AC/Patas AC)	9412.4	2888.9
Large Bus (Patas)	5569.4	5077.6
Large Bus (regular)	6977.2	Data not available
Medium Bus (Metromini, etc.)	3539.8	3548.0
Small Bus (Angkot, etc.)	2630.5	2930.8
Train (express)	8836.2	14609.4
Train (economy AC)	10055.3	8305.1
Train (economy)	5523.0	Data not available

Source: Study Team based on Data from JUTPI

3.3.4 Number of Transfer

Table 3.3.3 shows the average number of transfer per trip by transport mode calculated from commuter survey and person tracking survey for the commuting purpose and all purposes respectively.

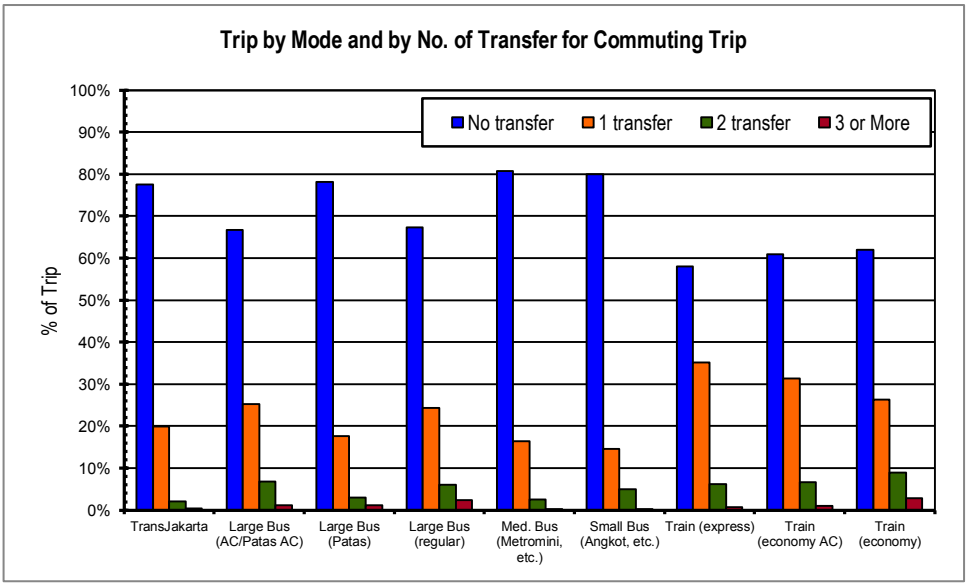
The average number transfer for train (express) is highest (0.50 transfer/trip) comparing to other modes, while for medium bus the average number of transfer is smallest (0.22 transfer/trip).

Table 3.3.3 Average Fare per Trip by Mode

Public Transport Mode	Average Fare per Trip (Rupiah)	
	Commuting Trip	All Purposes
TransJakarta	0.25	Data not available
Large Bus (AC/Patas AC)	0.43	0.52
Large Bus (Patas)	0.27	Data not available
Large Bus (regular)	0.44	0.23
Medium Bus (Metromini, etc.)	0.22	0.49
Small Bus (Angkot, etc.)	0.26	Data not available
Train (express)	0.50	1.59
Train (economy AC)	0.48	1.78
Train (economy)	0.53	0.79

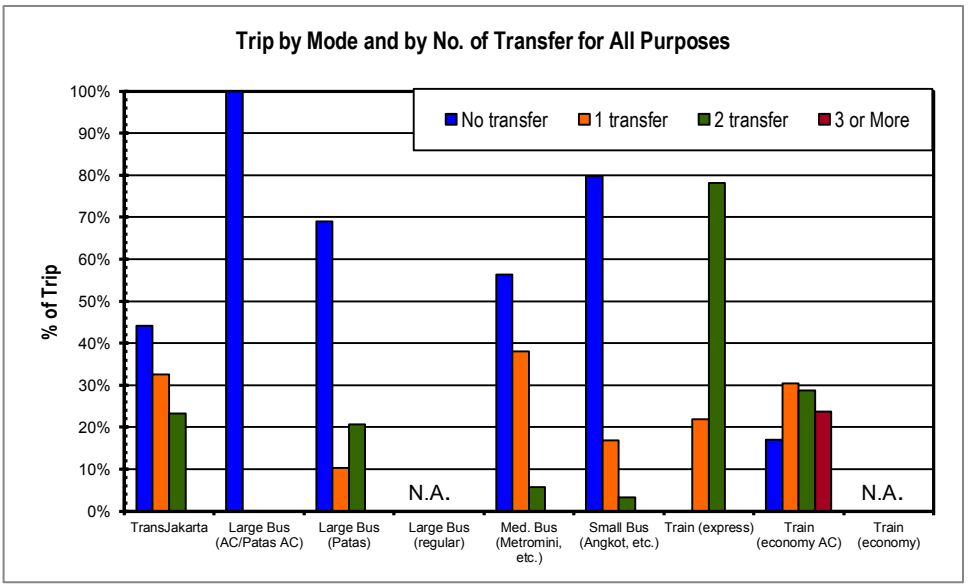
Source: Study Team based on Data from JUTPI

Figure 3.3.3 Public Transport Modal Share by Number of Transfer for Commuting Trip



Source: Study Team based on Data from JUTPI

Figure 3.3.4 Public Transport Modal Share by Number of Transfer for All Trip Purposes

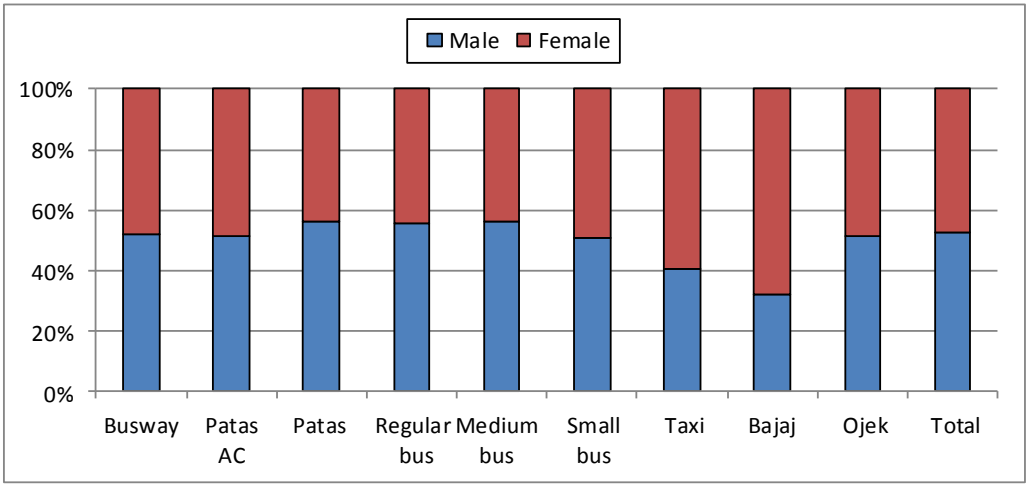


Source: Study Team based on Data from JUTPI

3.3.5 Gender, Age and Social Status

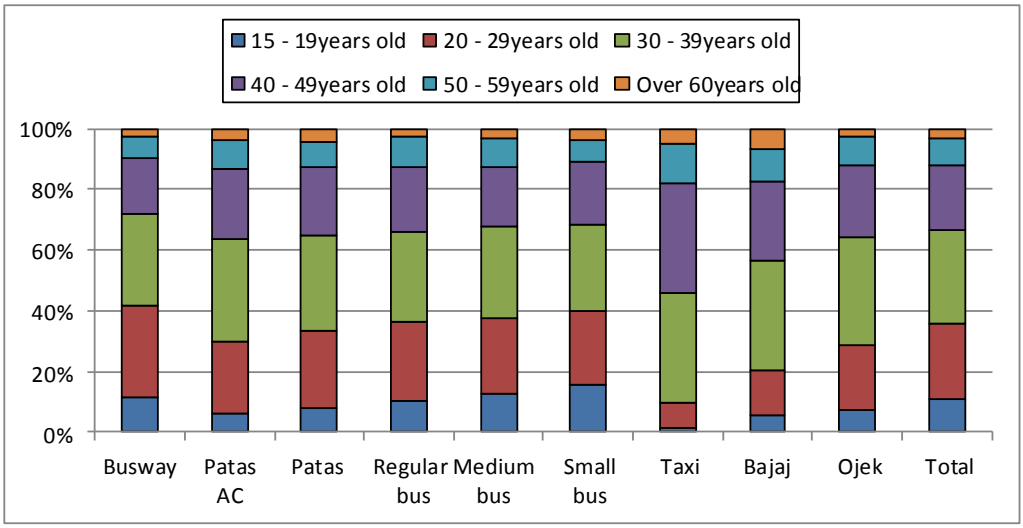
The rate of gender of public transportation users is presented in Figure 3.3.5. Ratios of male and female are almost same except taxi and Bajaj. Female rations of Taxi and Bajaj are larger than mail ration. The 30-39 years old group is substantially high and it amounts to around 30% to 36% except Taxi as shown in Figure 3.3.6. Main passenger of Taxi is 40–49 years old group. The rate of social status of public transportation users is shown in Figure 3.3.7. Compositions of social status are similar each mode, and ratio of private is high.

Figure 3.3.5 Gender of Public Transportation Users



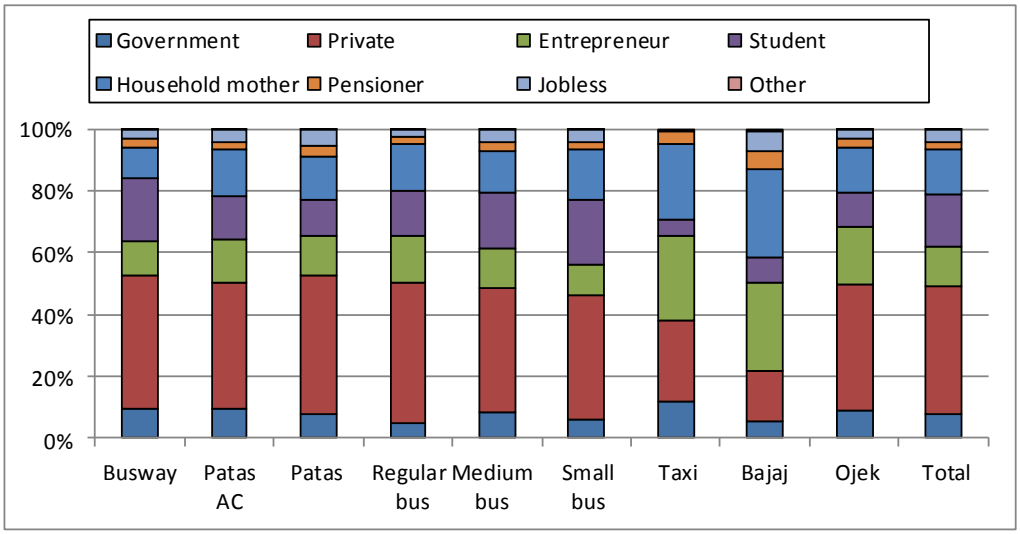
Source: Public Transportation Passengers Interview Survey, JAPTraPIS

Figure 3.3.6 Age of Public Transportation Users



Source: Public Transportation Passengers Interview Survey, JAPTraPIS

Figure 3.3.7 Social Status of Public Transportation Users

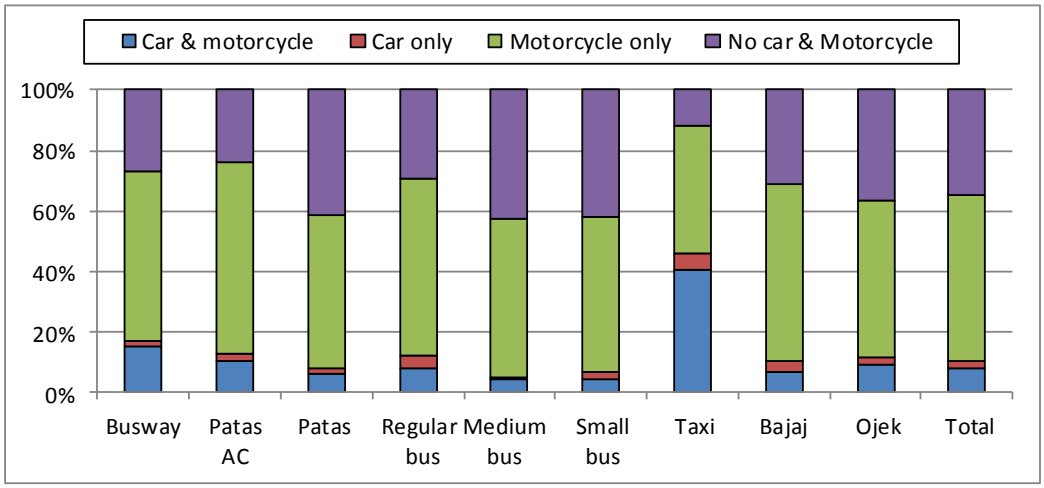


Source: Public Transportation Passengers Interview Survey, JAPTraPIS

3.3.6 Car and Motorcycle Availability and Frequency

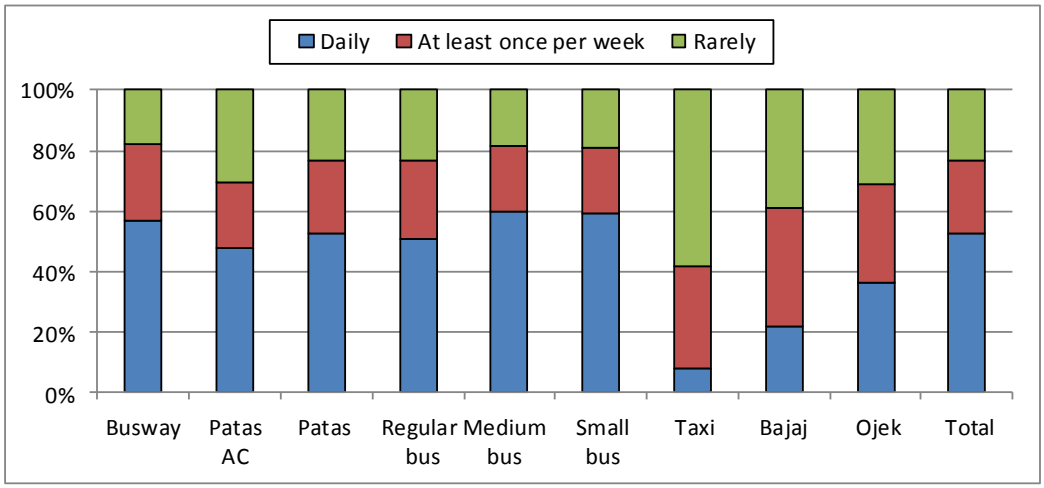
Ratio of vehicle availability and frequency of public transport use by last access mode to terminal is shown in Figure 3.3.8 and Figure 3.3.9. Ratios of motorcycle availability by each mode are more than 55%. Rations of car own by each mode are small and it is less than 20% except taxi. Rations of daily public transport use by each bus type are around 50%, on the other hand rations of daily public transport use by taxi is small. It amounts to 7%.

Figure 3.3.8 Car and Motorcycle Availability of Public Transportation Users



Source: Public Transportation Passengers Interview Survey, JAPTraPIS

Figure 3.3.9 Frequency of Public Transport Uses

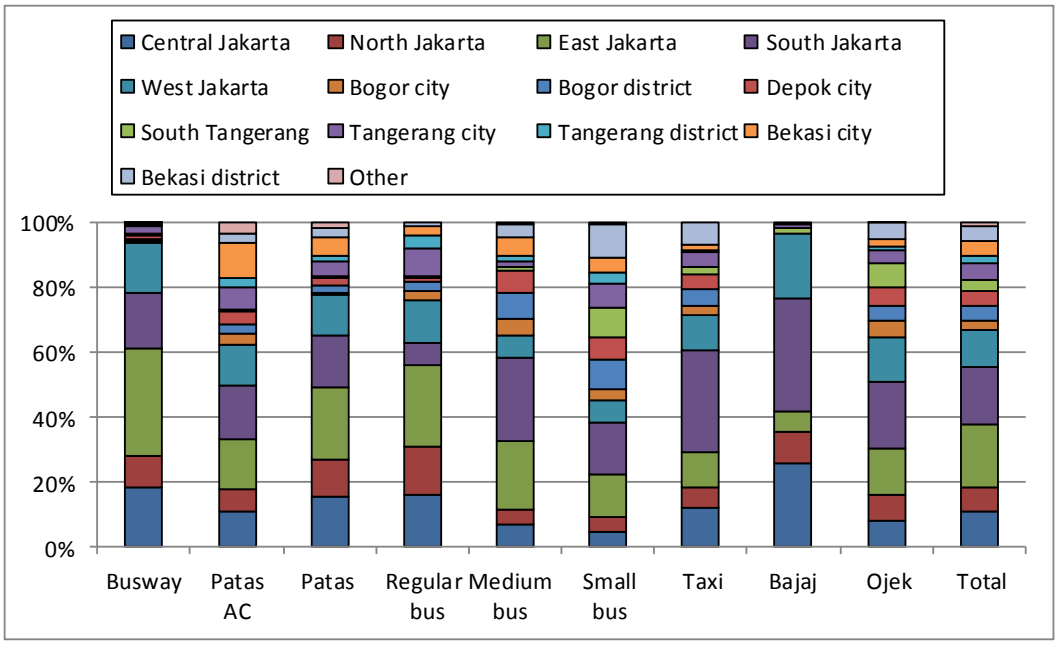


Source: Public Transportation Passengers Interview Survey, JAPTraPIS

3.3.7 Trip origin and Purpose

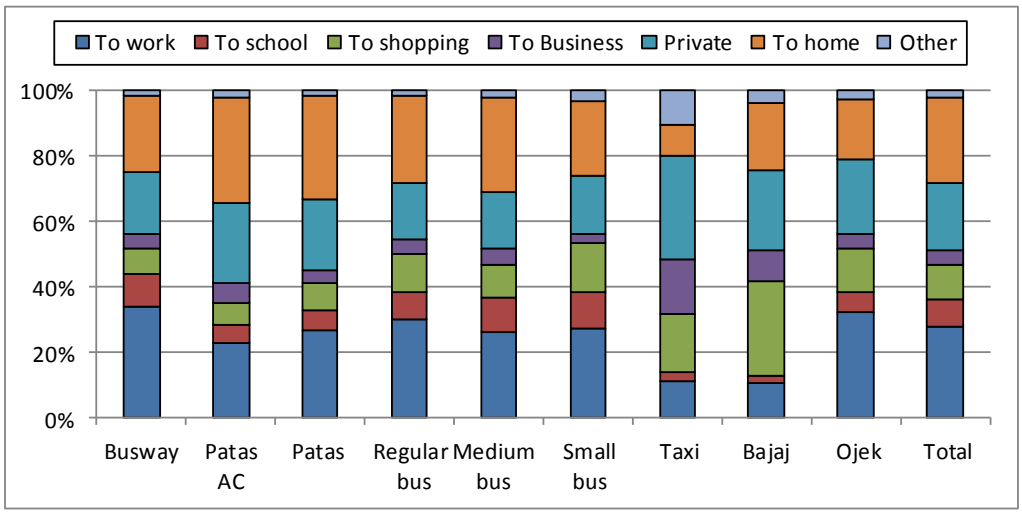
The rate of origin of public transportation users is presented in Figure 3.3.10. Ratios of origin from Jakarta city are high in each mode. The trip purpose of public transportation users is shown in Figure 3.3.11. Ratios of purpose of trip for work are high in each mode except taxi. On the other hand ratios of purpose for private are high in taxi.

Figure 3.3.10 Origin of Public Transportation Users



Source: Public Transportation Passengers Interview Survey, JAPTraPIS

Figure 3.3.11 Trip Purpose of Public Transportation users



Source; Public Transportation Passengers Interview Survey, JAPTraPIS

3.4 Characteristics of Supply of Existing Public Transportation

3.4.1 Frequency

The frequency by mode in main bus terminal is shown in Table 3.4.1. More than 1,000 buses arrive each bus terminal. The medium bus and the small bus consist of mostly them.

Table 3.4.1 Frequency by Mode in Each Terminal

No	Name of bus terminal	Location	Paats AC	Patas	Regular bus	Medium bus	Small bus	Total
1	Senen	1.Entrance	179	63	0	1,683	1,721	3,646
		2.Exit	186	67	0	1,701	1,728	3,682
		3.No enter	3	108	0	114	782	1,007
2	Tn Abang	1.Loaction 1	6	92	0	36	3,911	4,045
		3.Location 2	25	20	0	368	843	1,256
		4.Location 3	24	0	0	421	829	1,274
		5.Location 4	6	6	0	85	899	996
3	Kota	1.Virtual entrance	0	0	0	349	3,531	3,380
		2. Virtual Exit	0	0	0	325	3,486	3,811
		3.site 1	0	0	0	0	384	384
4	Tj Priok	1.Entrance	60	519	303	787	2,710	4,379
		2.Exit	60	522	304	783	2,736	4,405
5	Kp Rambutan	1.Entrance	105	252	106	703	2,378	3,544
		2.Exit	106	253	106	704	2,388	3,557
		3.Location 1 (no enter)	27	10	6	52	859	927
		4.Location 5	5	1	232	19	1,403	1,660
6	Pulogadung	1.Entrance	31	133	60	841	4,156	5,221
		2.Exit	38	127	59	907	4,085	5,216
7	Kp Melayu	1.Entrance	18	6	147	1,265	4,207	5,643
		2.Exit	20	6	147	1,298	4,315	5,786
		3.Location 8	0	0	0	241	1,158	1399
		4.Location 9	0	0	0	142	0	142
		5.Location 10	0	2	2	27	479	510
		6.Location 1 (no enter)	2	21	0	60	57	140
8	Blok M	1.Entrance	306	173	468	3,377	64	4,388
		2.Exit	294	172	480	3,378	64	4,388
9	Lebak Bulus	1.Entrance	63	10	0	1,003	2,427	3,503
		2.Exit	63	9	0	1008	2,406	3,486
		3.Location 3	43	45	0	113	468	669
		4.Location 7	0	0	0	0	74	74
		5.Location 8	0	0	0	0	507	507
10	Ps.Minggu	1.Entrance	4	1	0	8	13	26
		2.Exit	4	1	0	8	13	26
		3.Location 2	0	1	0	6	12	19
		4.Location 5	0	0	0	3	12	15
		5.Location 7	1	0	0	10	10	21
11	Grogol	1.Entrance	48	85	68	176	358	735
		2.Exit	49	86	64	173	363	735
		3.Location 5	19	69	52	1,226	878	2,244
		4.Location 6	16	104	102	1,305	903	2,430
12	Kalideres	1.Entrance	121	117	0	1,016	1,390	2,644
		2.Exit	121	120	0	1,024	1,356	2,621
		3.Location 5	1	0	0	257	482	740
13	Bekasi	1.Entrance	238	202	0	91	2,923	3,454
		2.Exit	240	211	0	79	2,908	3,438
		3.Location 5	0	0	0	39	1,082	1,121
14	Cikarang	1.Entrance	97	265	0	186	500	1,048
		2.Exit	98	268	0	191	497	1,054
		3.Other	0	0	0	197	3,406	3,603
15	Bogor(Baranagsiang)	1.Entrance	162	308	0	398	2,847	3,715
		2.Exit	170	295	0	381	2,886	3,732
16	Cileungsi	1.Entrance	72	0	8	0	348	428
		2.Exit	73	0	9	0	350	432
		3 Location 3	0	0	0	0	1,007	1,007
		4 Location 4	44	0	13	1	1,275	1,333
		5 Location 5	53	1	11	5	1,328	1,398
		6 Location 6	0	0	0	0	1,005	1,005
		7 Location 7	0	0	0	0	1,226	1,226
		8 Location 8	1	1	0	0	911	913

17	Depok	1.Entrance	103	25	0	201	8,715	9,044
		2.Exit	98	27	0	203	9,235	9,563
		3.site 1	0	0	0	0	3,175	3,175
18	Ciputat	1 Location 1	36	29	0	197	2,212	2,474
		2 Location 2	37	27	0	199	2,195	2,458
		3 Location 3	0	0	0	0	3,068	3,068
		4 Location 4	0	0	0	0	2,951	2,951
		5 Location 5	0	0	0	0	1,194	1,194
		6 Location 6	0	0	0	0	1,066	1,066
19	Poris Plawad	1.Entrance	308	124	0	170	1,710	2,312
		2.Exit	315	129	0	178	1,804	2,426
		3.sLocation 4	0	0	0	0	155	155
20	Ciledug	1 Location 1	0	0	0	258	412	670
		2 Location 2	97	0	0	368	2,155	2,620
		3 Location 3	126	0	0	427	2,620	3,173
		4 Location 4	0	0	0	0	2,219	2,219
		5 Location 5	0	0	0	136	1,807	1,943
		6 Location 6	0	0	0	0	2,144	2,114

Source; Bus Vehicle and Passenger Traffic Count Survey, JAPTraPIS

Frequency at transfer station of busway is shown in Table 3.4.2. The table shows two type of frequency. One is frequency which counts all buses, and other is frequency which excludes unavailable buses for passengers. Frequency of corridor 1 is the highest than other corridor and frequency of corridor 3 is also quite high. On the other hand frequency of corridor 8 and 10 is small compared with others.

Table 3.4.2 Frequency at Station and by Corridor

Station	Corridor	Section A	Section B	Direction A to B			Direction B to A		
				Available Bus(1)	All bus(2)	(1)/(2)%	Available Bus(1)	All bus(2)	(1)/(2)%
Harmoni	Corridor 1	Blok-M	Kota	454	524	87%	512	561	91%
	Corridor 2	Pulogadung	Harmoni	-	-	-	312	323	97%
	Corridor 3	Kalideres	Harmoni	416	422	99%	389	420	93%
Grogol	Corridor 3	Kalideres	Harmoni	430	474	91%	341*	402*	85%
	Corridor 8	Harmoni	Lebak Bulus	77*	83*	93%	123	132	93%
	Corridor 9	Pinangranti	Pluit	267	370	72%	298**	313*	95%
Matraman	Corridor 4	Pulogadung	Dukuh Atas 2	326	331	98%	294	343	86%
	Corridor 5	Kp. Melayu	Ancol	340	443	77%	196	382	51%
Kuningan	Corridor 6	Ragunan	Dukuh Atas 2	338	341	99%	332	340	98%
Cawang UKI	Corridor 7	Kp.Melayu	Kp.Rambutan	378	391	97%	361	383	94%
	Corridor 9	Pinangranti	Pluit	290	300	97%	214	287	75%
	Corridor 10	Tg.Priok -	PGC	141	141	100%	137	138	99%
Kuningan	Corridor 9	Pinangranti	Pluit	348	373	93%	325	372	87%

*Data from 15 to 17 o'clock is missing because of demonstration at Grogol

**Data from 15 to 16 o'clock is missing because of demonstration at Grogol

Source; Bus Vehicle and Passenger Traffic Count Survey, JAPTraPIS

3.4.2 Travel Speed, Boarding and Alighting Passengers

Average travel speed and average boarding and alighting passengers of each bus route is presented in Table 3.4.3. Off peak travel speed is faster than peak travel speed on the whole. Boarding – alighting passenger in morning peak and evening peak is larger than off peak on the whole.

Table 3.4.3 Average Travel Speed and Average Boarding and Alighting Passengers

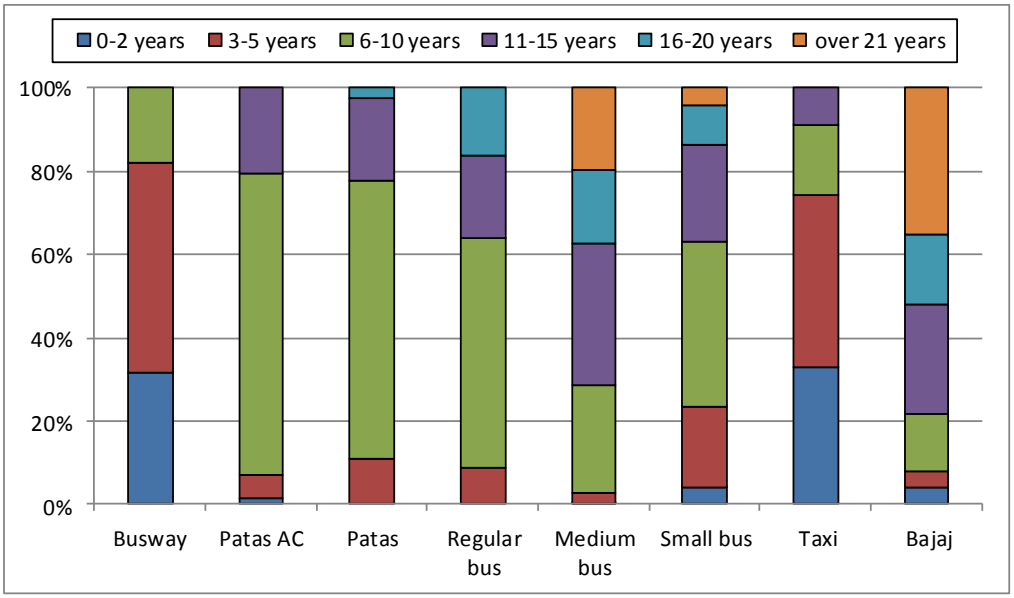
No	Type	Route No	Origin	Destination	Average travel speed (km/h)			Average board and alight passengers		
					Morning peak	Off-peak	Evening peak	Morning peak	Off-peak	Evening peak
1	Busway	Corridor 1	Blok M	Kota	16.7	17.4	16.2	208	165	159
			Kota	Blok M	17.2	18.3	18.2	227	173	253
2		Corridor 2	Pulo Gadung	Harmoni	16.0	18.3	16.2	206	155	195
			Harmoni	Pulo Gadung	17.2	14.9	16.6	173	130	201
3		Corridor 3	Kalideres	Harmoni	19.1	20.9	22.3	129	143	137
			Harmoni	Kalideres	18.8	22.6	19.8	191	85	198
4		Corridor 4	Dukuh Atas	Pulo Gadung	18.7	20.9	13.0	199	139	224
			Pulo Gadung	Dukuh Atas	14.3	15.6	14.4	143	70	171
5		Corridor 5	Kp.Melayu	Ancol	19.5	19.4	17.4	215	195	295
			Ancol	Kp. Melayu	16.5	15.2	11.5	155	187	250
6		Corridor 6	Ragunan	Dukuh Atas	21.8	26.7	18.3	215	118	147
			Dukuh Atas	Ragunan	21.7	28.4	21.1	182	128	137
7		Corridor 7	Kp. Rambutan	Kp.Melayu	12.3	16.0	-	130	151	-
			Kp. Melayu	Kp. Rambutan	17.4	17.4	16.9	239	123	193
8		Corridor 8	Lebak Bulus	Harmoni	13.6	18.9	18.9	212	219	217
			Harmoni	Lebak Bulus	21.0	21.3	14.3	186	89	205
9		Corridor 9	Pinang Ranti	Pluit	21.4	26.4	19.8	295	248	349
			Pluit	Pinang Ranti	21.1	17.8	13.4	217	228	446
10		Corridor10	Tj Priok	Cililitan	19.9	21.6	19.5	239	220	265
			Cililitan	Tj. Priok	16.8	18.2	13.2	193	181	344
11	Patas AC	AC07	Kp. Rambutan	Tg. Priok	22.5	22.7	21.5	101	117	161
			Tg. Priok	Kp. Rambutan	22.8	21.7	14.9	95	105	125
12		AC28	Bekasi	Blok M	32.2	20.4	24.1	60	35	58
			Blok M	Bekasi	24.9	28.3	21.0	52	35	65
13	Large Bus AC		Kali Deres / Grogol	Baranangsiang	33.1	33.1	31.4	142	124	129
			Baranangsiang	Kali Deres /Grogol	31.2	36.0	33.8	81	131	86
14	Patas	P7	Pulo Gadung	Grogol	25.6	31.3	26.8	123	95	78
			Grogol	Pulo Gadung	27.1	30.3	19.6	91	76	102
15		P12	Senen	Kali Deres	20.5	20.8	15.2	82	76	72
			Kali Deres	Senen	12.7	16.1	11.7	95	65	111
16		P55	Is Cawang	Grogol	10.9	19.0	7.2	93	65	77
			Grogol	Kp. Melayu	16.2	14.8	11.2	75	85	101
17		P43	Cililitan	Tg. Priok	21.7	21.1	17.2	95	115	127
			Tg. Priok	Cililitan	26.1	25.4	20.7	145	107	154
18		P54	Grogol	Depok	16.4	15.0	12.7	121	133	165
			Depok	Grogol	14.8	14.3	10.6	183	119	175
19	Regular Bus	905	Pulo Gadung	Mangga Dua	16.4	15.0	16.2	189	117	123
			Mangga Dua	Pulo Gadung	16.7	14.2	17.4	137	67	126
20	Medium Bus	P19	Blok M	Tanah Abang	17.7	12.5	24.4	77	47	79
			Tanah Abang	Blok M	14.7	15.2	12.9	62	55	116
21		S75	Blok M	Ps. Minggu	14.5	17.9	10.5	52	45	57
			Ps. Minggu	Blok M	7.9	13.8	10.4	75	33	97
22		S69	Ciledug	Blok M	9.5	14.2	16.0	83	49	59
			Blok M	Ciledug	16.5	11.4	10.5	33	35	67
23		T506	PP Kopi	Kp. Melayu	11.7	14.4	9.1	68	67	71
			Kp. Melayu	PP Kopi	22.0	22.0	15.2	35	41	81
24		S62	Manggarai	Tg. Barat	12.7	17.4	10.8	41	45	58
			Tg. Barat	Manggarai	6.5	11.9	11.3	64	37	51
25	Small bus	M01	Senen	Kp. Melayu	22.1	12.3	7.5	18	21	37
			Kp. Melayu	Senen	17.9	15.0	14.5	27	20	29
26		T08	Kp. Rambutan	Cililitan	11.8	10.9	9.7	21	35	30
			Cililitan	Kp. Rambutan	13.3	14.0	8.9	17	20	41
27		B17	Ps Npres Kebayoran	Citraland	15.6	14.9	16.4	37	50	32
			Citraland	Ps Npres Kebayoran	19.9	16.6	18.0	31	32	31
28		T20	Pulo Gadung	Bekasi	22.0	17.5	16.0	12	21	17
			Bekasi	Pulo Gadung	15.5	15.8	15.9	17	13	26
29		B01	Cengkareng	Cikokol	13.1	18.2	15.0	33	29	45
			Cikokol	Cengkareng	18.5	19.3	18.5	29	23	27
30		03	Barangsiang	Laladon	22.5	14.9	19.6	28	28	28
			Laladon	Barangsiang	20.4	16.0	13.3	35	18	27

Source: Bus Route Operation Survey, JAPTraPIS
Highest travel speed among period is highlighted by yellow and largest board and alight passengers among period is highlighted by green.
Corridor 7 in evening peak operate different route, so its travel speed is not written in this table.

3.4.3 Vehicle Ages

Vehicle age by modes is shown in Figure 3.4.1. Busway and taxi operators own new vehicles compared with others. Their total percentages of 0-2 years and 3-5 years are around 70 to 80%. Patas AC and Patas, Regular bus operators own many 6-10 years old vehicle which percentage is around 50%. Medium bus and Bajaj operators own old vehicles compared with others.

Figure 3.4.1 Vehicle Age

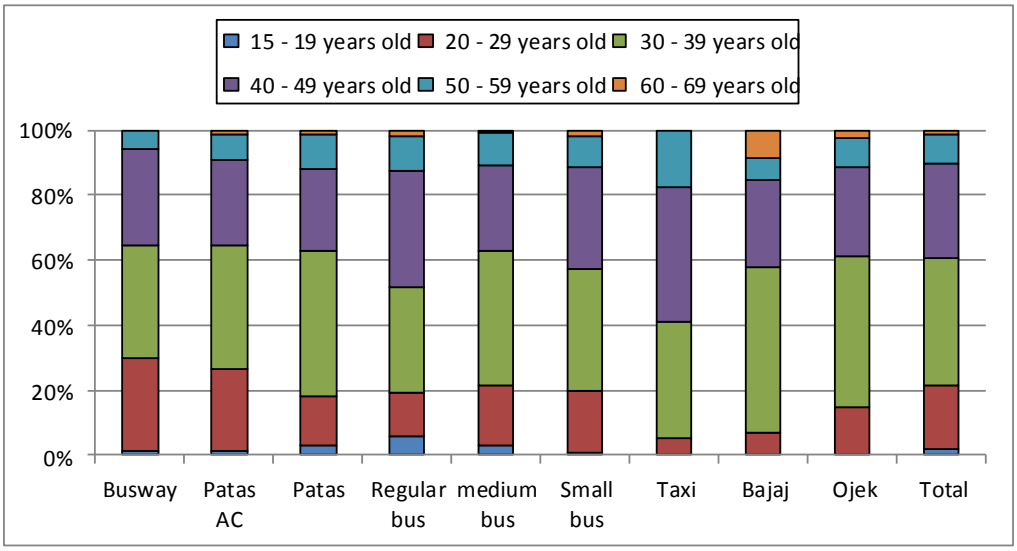


Source; Public Transportation Driver/Conductor and Operator Interview Survey, JAPTraPIS

3.5 Characteristics of Existing Public Transportation Driver/Conductor

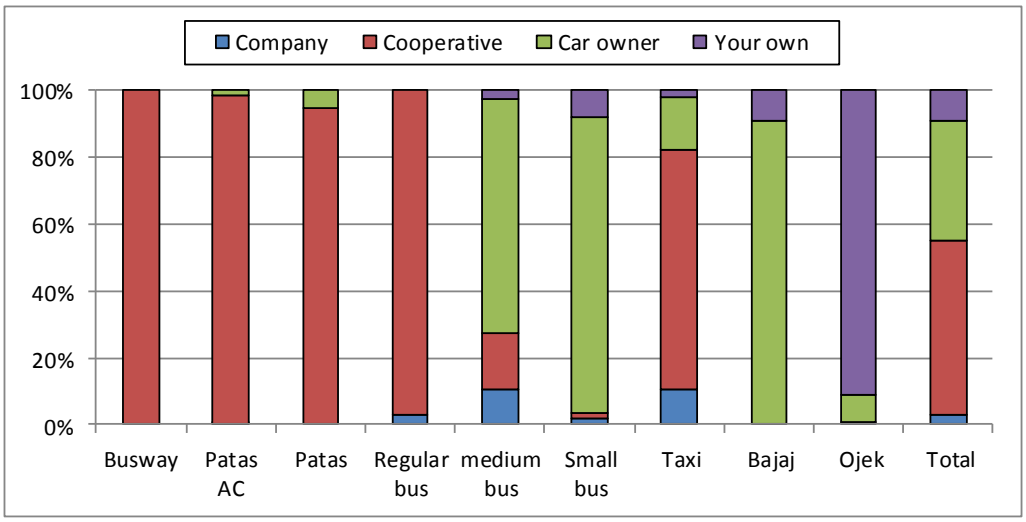
Figure 3.5.1 shows driver age of public transportation driver. Ration of 30-39 years group is high and it amounts to 32% to 51%. 40-49 years group is also high. Car ownership is presented in Figure 3.5.2. The car ownerships of Busway, Patas AC, Patas and taxi are corporative almost.

Figure 3.5.1 Driver Age



Source; Public Transportation Driver/Conductor and Operator Interview Survey, JAPTraPIS

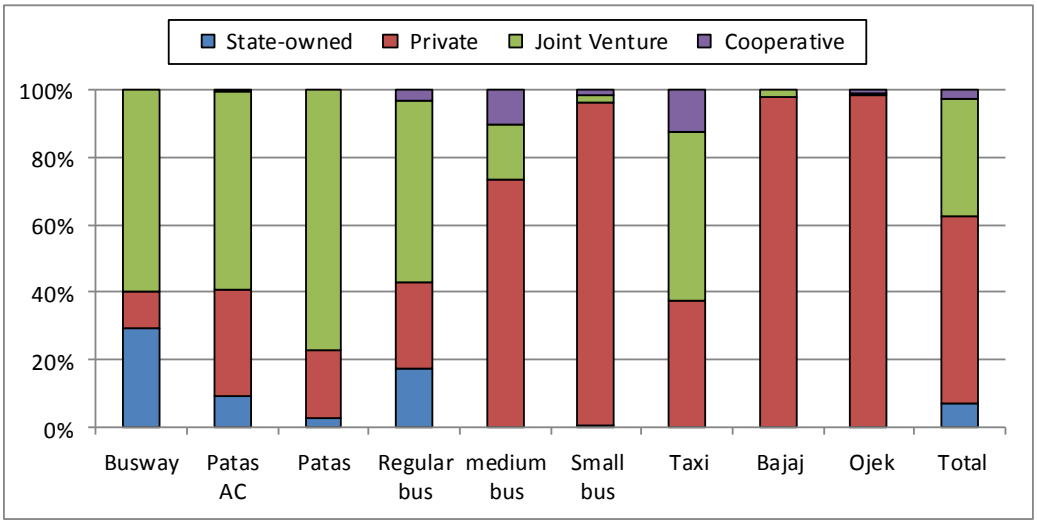
Figure 3.5.2 Car Ownership



Source; Public Transportation Driver/Conductor and Operator Interview Survey, JAPTraPIS

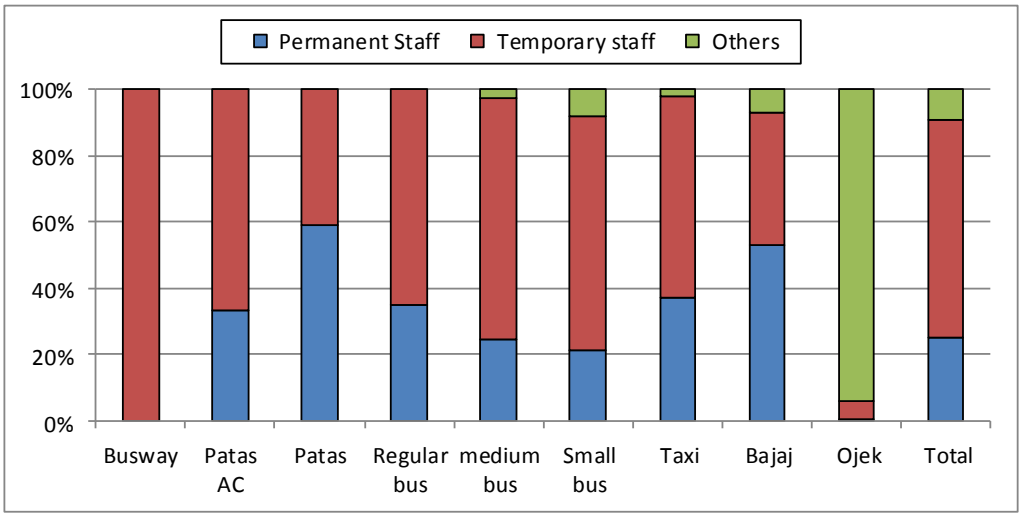
Operation style of company/cooperative is presented in Figure 3.5.3. It is often the case that Busway, Patas AC, Patas, Regular bus and taxi are operated by joint venture. On the other hand, Medium bus, Small bus, Bajaj and Ojek are operated by private almost. Figure 3.5.4 shows employ style of driver. Temporary staff is the main part of them except Patas, Bajaj and Ojek.

Figure 3.5.3 Operation Style of Company/Cooperative



Source; Public Transportation Driver/Conductor and Operator Interview Survey, JAPTraPIS

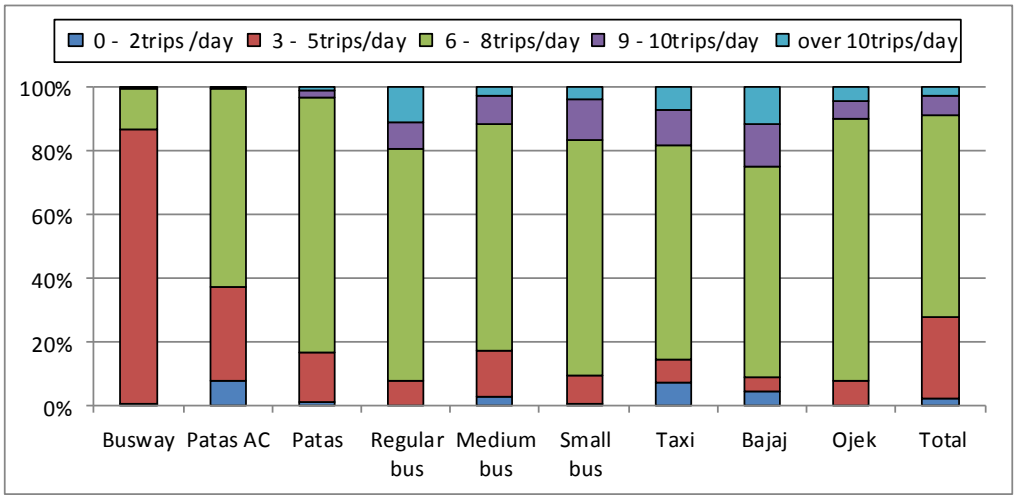
Figure 3.5.4 Employment Style



Source; Public Transportation Driver/Conductor and Operator Interview Survey, JAPTraPIS

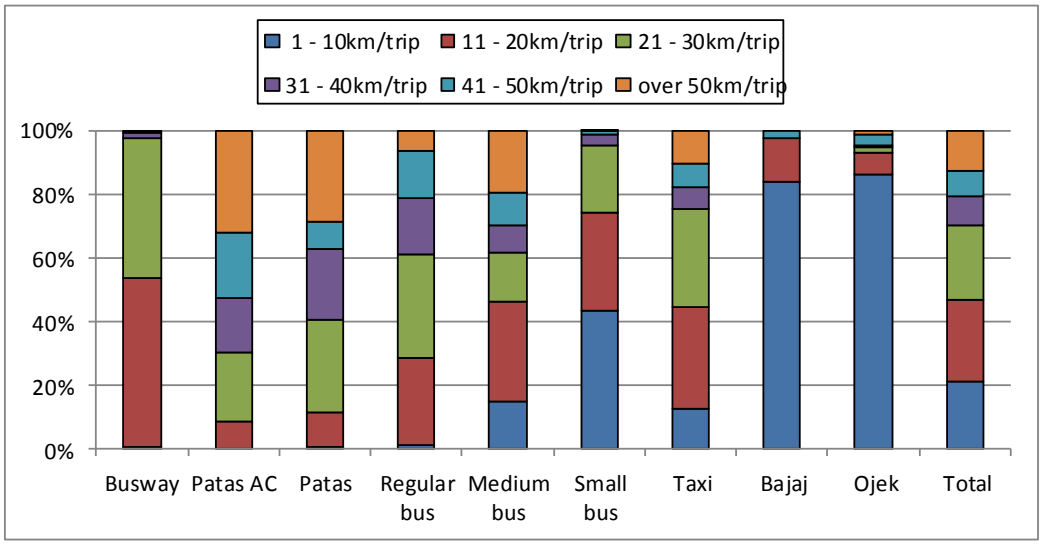
Driving frequency of driver per day is shown in Figure 3.5.5. Frequencies of most modes are around 6 – 8 trips/day except buway. Figure 3.5.6 shows average operation distance per day. As size of bus is larger, average operation distance tend to increase.

Figure 3.5.5 Frequency per Day



Source; Public Transportation Driver/Conductor and Operator Interview Survey, JAPTraPIS

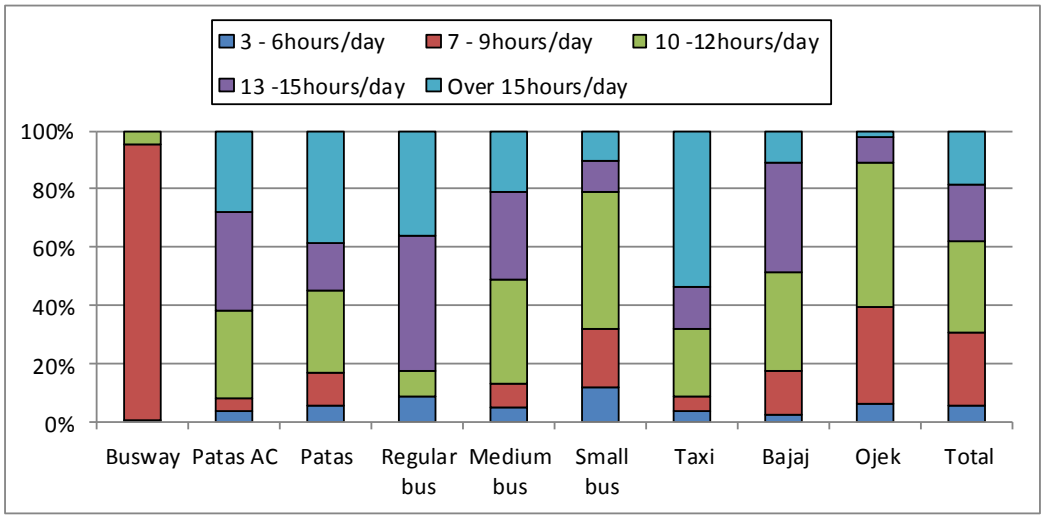
Figure 3.5.6 Average Operation Distance per Trip



Source; Public Transportation Driver/Conductor and Operator Interview Survey, JAPTraPIS

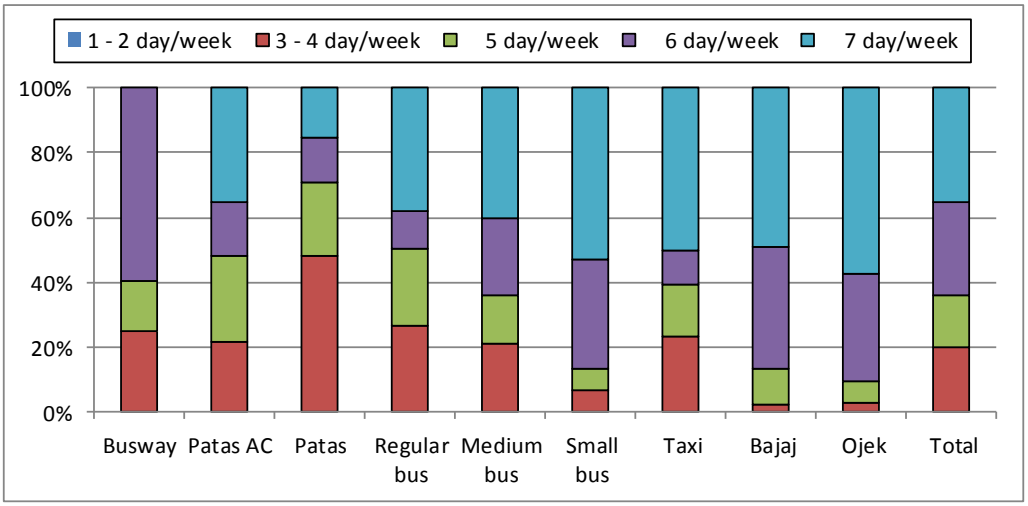
Working hour per day is presented in Figure 3.5.7. Ratio of 7-9 hour working in Buway is almost 100%.On the other hand there are many drivers / conductors who work over 10 hours. Working day per week is shown in Figure 3.5.8. More than 35% samples of each mode work 7 days a week except Busway and Patas.

Figure 3.5.7 Working Hour per Day



Source; Public Transportation Driver/Conductor and Operator Interview Survey, JAPTraPIS

Figure 3.5.8 Working Day per Week



Source; Public Transportation Driver/Conductor and Operator Interview Survey, JAPTraPIS

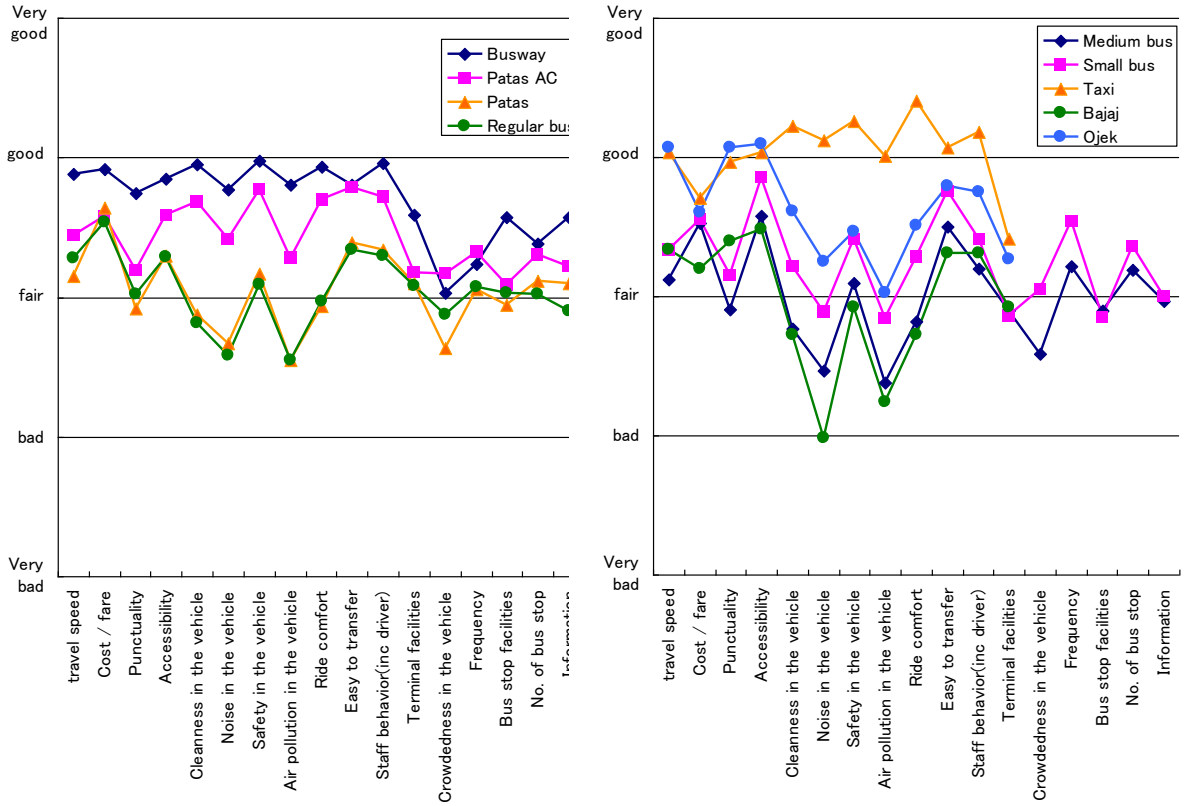
3.6 Evaluation of Public Transportation

Points of evaluation of each public transport service by assess mode to terminal is shown in Figure 3.6.1. Evaluations of each service about busway and taxi are high compared with other mode generally. On the other hand evaluations of each service about Patas and Medium bus, Bajaj are low.

Focus on each service by each mode, busway has high evaluation about cleanness in the vehicle and safety in the vehicle, staff behavior. On the other hand it has low evaluation about crowdedness in the vehicle. Patas has high evaluation about safety in the vehicle, and low evaluation about bus stop facilities. Patas and regular bus has similar evaluation, the highest evaluation is cost / fare, and the lowest evaluation is Air pollution in the vehicle. Medium bus and small bus has also similar evaluation, the highest evaluation is

accessibility, and the lowest evaluation is air pollution in the vehicle. Taxi has high evaluation about ride comfort. On the other hand it has low evaluation about cost / fare. Bajaj has high evaluation about accessibility and low evaluation about noise in the vehicle. Ojek has high evaluation about travel speed and punctuality, accessibility and low evaluation about air pollution in the vehicle.

Figure 3.6.1 Evaluation of Each Public Transport Services



Source: Public Transport Passengers Interview Survey, JAPTraPIS

Table 3.6.1 Evaluation of Each Public Transport Services

	Busway	Patas AC	Patas	Regular bus	Medium bus	Small bus	Taxi	Bajaj	Ojek
Travel speed	3.9	3.4	3.1	3.3	3.1	3.3	4.0	3.3	4.1
Cost / fare	3.9	3.6	3.6	3.5	3.5	3.6	3.7	3.2	3.6
Punctuality	3.7	3.2	2.9	3.0	2.9	3.2	4.0	3.4	4.1
Accessibility	3.8	3.6	3.3	3.3	3.6	3.9	4.0	3.5	4.1
Cleanness in the vehicle	4.0	3.7	2.9	2.8	2.8	3.2	4.2	2.7	3.6
Noise in the vehicle	3.8	3.4	2.7	2.6	2.5	2.9	4.1	2.0	3.3
Safety in the vehicle	4.0	3.8	3.2	3.1	3.1	3.4	4.3	2.9	3.5
Air pollution in the vehicle	3.8	3.3	2.5	2.5	2.4	2.8	4.0	2.2	3.0
Ride comfort	3.9	3.7	2.9	3.0	2.8	3.3	4.4	2.7	3.5
Easy to transfer	3.8	3.8	3.4	3.3	3.5	3.8	4.1	3.3	3.8
Staff behavior(inc driver)	4.0	3.7	3.3	3.3	3.2	3.4	4.2	3.3	3.8
Terminal facilities	3.6	3.2	3.1	3.1	2.9	2.9	3.4	2.9	3.3
Crowdedness in the vehicle	3.0	3.2	2.6	2.9	2.6	3.0	-	-	-
Frequency	3.2	3.3	3.1	3.1	3.2	3.5	-	-	-
Bus stop facilities	3.6	3.1	2.9	3.0	2.9	2.9	-	-	-
No. of bus stop	3.4	3.3	3.1	3.0	3.2	3.4	-	-	-
Information	3.6	3.2	3.1	2.9	3.0	3.0	-	-	-
Average	3.7	3.4	3.1	3.0	3.0	3.3	4.0	3.0	3.6

Source: Public Transport Passengers Interview Survey, JAPTraPIS

Note: average of points 1: very bad, 2: bad, 3: fair, 4: good, 5: very good

The highest point in each mode service is colored red and the lowest point is colored blue

4 REVIEW OF THE EXISTING TRANSPORT MASTER PLAN (PTM)

4.1 Overview

Transport problems in JABODETABEK are becoming increasingly complex, in areas of level of services (quality) and with demand outstripping supply. Careful planning is required to cater for growing future demand, as rising population, economic growth and rising incomes are causing sharp increases in vehicle numbers and passenger trips.

Critical traffic congestion is present on all main city arterial roads, and the public transport system is presently operating at capacity. Lack of optimization and integration of supporting systems requires renewed government efforts to adopt an effective planning and implementation framework.

To date, transport planning in JABODETABEK has not been directed by a special comprehensive transport Master Plan, with each local government area following their own transport plan under their City Master Plan (RTRW), containing general policies of the city development plan (with transport as one aspect). The RTRW plans are not integrated in the context of JABODETABEK transport development planning. Consequently with inter-city demand increasing, the existing systems cannot cope and do not provide adequate services for commuters. This has caused the government to engage planning strategies to improve the quality and quantity of inter-city public transport services.

Integrated transport planning of JABODETABEK should be in line with the new government's development approach of decentralization (under Law No. 32/2004 Local Government and Law No. 34/2004 on Fiscal Balance between the Central and Local Government). Therefore a new development paradigm should be prepared to guide local governments in JABODETABEK area to formulate integrated transport policies for their cities and the wider JABODETABEK region.

Integrated transport planning commenced two years ago, when the national government prepared the Transport Master Plan for JABODETABEK, the Master Plan Pola Transportasi Makro (PTM), aimed at synchronizing each city/district's transport planning across the JABODETABEK region. However as it was only finalized as a study, without formal regulation, and local governments were not compelled to, and did not follow the plan. Also, the PTM did not clearly outline a clear strategy on inter-regional transport development, instead, only listing several suggestions for inter-city development, borrowed from the government's RTRW.

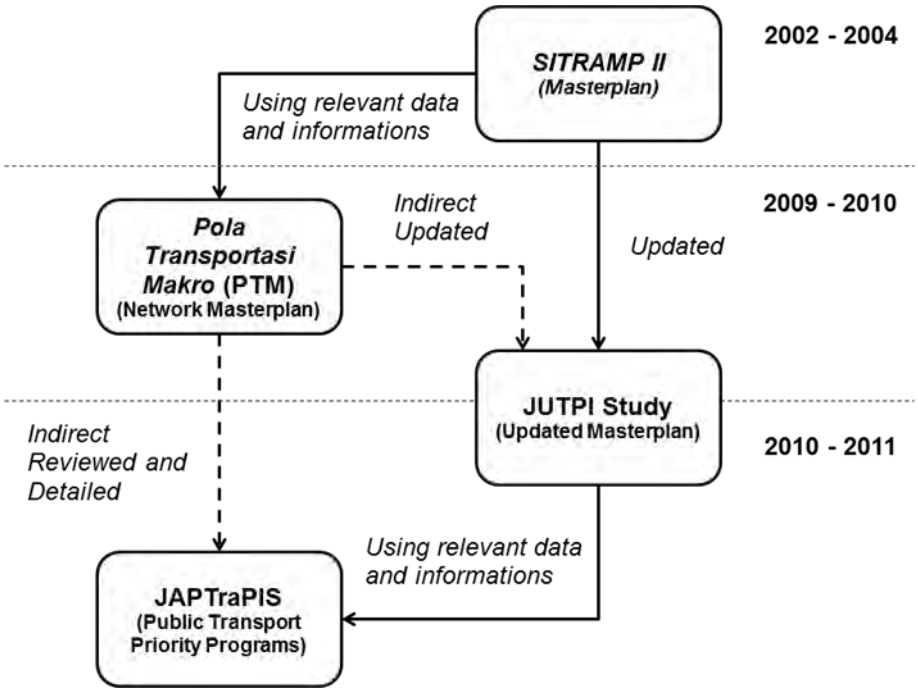
Further efforts were made by the central government in their commitment to strengthen JABODETABEK transport integration through the JUTPI study, involving the Coordinating Ministry for Economic Affairs (CMEA) and BAPPENAS as main stakeholders and facilitators. The objective of this study is "to enhance governance for implementing the JABODETABEK urban transport project," and "improving capability and technical strength of target group on urban transport planning."

These objectives were achieved through the work of the JUTPI study, to revise and update the Master Plan and establish an urban transport coordination committee (a Transport Authority). The outcomes of the study are expected to improve the JABODETABEK transport system, as well as decreasing traffic congestion and other transport problems.

Following the PTM and JUTPI study, this study called JAPTraPIS was conducted, using the results of PTM and JUTPI reviews. Its purpose is to develop a short-term strategy for

JABODETABEK public transport improvements based on the PTM planning concepts, with updated JUTPI data. JAPTraPIS will review the PTM and add more detailed implementation strategy for the development of public transport system in JABODETABEK up to year 2020.

Figure 4.1.1 Scheme: The Relation of SITRAMP, PTM, JUTPI, and JAPTraPIS Studies



Source: Study Team

4.2 Background on the Existing Master Plan

The PTM review conducted through discussion with the Ministry of Transport, Transport Agencies of JABODETABEK cities and districts, and the study team that prepared the PTM has developed several key considerations which require additional policy, regulation, as well as institutional approaches.

Local governments at provincial and city/district levels follow a planning document referred to as TATRALOK and TATRAWIL. The TATRALOK (Local Transport Administration) document is at city/district level, while the TATRAWIL (Regional Transport Administration) document is at provincial level. The validity period of the documents is 5 years. The main problem of TATRALOK is lack of coordination between the central policy with local policy and limited support from formal regulation.

These documents were only supported by a Head of Transport Agency Decree, meaning they would be difficult to implement by local government. Also it should be noted that the development planning only referred to spatial planning (RTRW), as the most formal regulation.

Since government introduced the PTM concept, many local governments in city/district levels, especially in JABODETABEK started to adopt the terminology of PTM, to replace TATRALOK/TATRAWIL. However, the legal status of PTM is still weak, as it is recognizes only as a study, which need to be strengthen as Government Regulation (Local

Government Regulation) to be implemented. Only the DKI Province has issued their PTM as a Local Government Regulation (Perda).

In terms of three major aspects of development planning document characteristics, among others law, administrative system, and substance, the PTM document has different characteristics compared with TATRALOK / WIL and spatial planning (RTRW). The differences are shown in Table 4.2.1.

Table 4.2.1 Relationship Between PTM, TATRALOK and Spatial Planning (RTRW)

ASPECT	PTM	TATRALOK/WIL	RTRW (Spatial Planning)
ImplementingAgency			
Preparing and Arranging	BAPPEDA	Transport Agency	BAPPEDA
Main Implementing Agency	BAPPEDA, Transport Agency, Public Works Agency	Transport Agency	Government units which closely related to the spatial planning development
Supervisor	BAPPEDA	Transport Agency	BAPPEDA
Responsible	Government Leader (Ministry of Transport, Province and City/ District Head of Transport Agencies)	Head of Transport Agency	Government Leader (Ministry of BAPPENAS, Province and City/ District Head of BAPPEDA)
Administrative			
Government Hierarchy	Regional PTM (managed by Central Government) Provincial PTM Local PTM (City/District)	TATRANAS (Tata Transportasi Nasional) in Central Government TATRAWIL (Tata Transportasi Wilayah) in Provincial Government TATRALOK (Tata Transportasi Lokal) in City/District Government	National RTRW Provincial RTRW City/District RTRW
Validation Time	More than 5 years (but has not specifically decided yet)	5 years	5 years
Actual Condition	Has just promoted in JABODETABEK area, among other JABODETABEK (2009), DKI Jakarta (2007), Bogor and Bekasi City (finalization phase)	Almost all local government already prepared	All central and local government prepared
Implementation	Document status is still study, difficult to be implemented Must be followed up by RTRW	Document status is still study, difficult to be implemented Must be followed up by RTRW	Document status is already legal (Government Regulation), both in central and local governments Can be implemented and referred for development directly
Regulation			
Type of Legality	Not yet decided, but there is a possibility to be issued as Ministerial Regulation	Generally in a form of Head of Transport Agency Decree	Stipulated in National Law and detailed in Government Regulation (both central and local governments)
The Availability of Preparation Guideline (Standard)	Has no specific guideline yet	Has no specific guideline yet	Has been explained by the formal guideline
Substance			
Scope of Area	Functional area (such as JABODETABEK) and administrative area from central to local government	Administrative area only, from central to local government	Functional area (such as JABODETABEK) and administrative area from central to local government

ASPECT	PTM	TATRALOK/WIL	RTRW (Spatial Planning)
Scope of Material	General substance Includes the general overview, profile, analysis, and list of development planning programs Transport include public transport, system, network, infrastructure, institutional, regulation, and spatial The technical programs and budget are not mentioned	Public transport, traffic, transport system substances Includes the general overview, profile, analysis, and list of development planning programs, but specifically for traffic infrastructure and public transport The technical programs and budget are mentioned	General substance Includes the general overview, profile, analysis, and list of development planning program, but generally for spatial planning (transport planning only as a sub section) The technical programs and budget are not mentioned in detail

Source: PTM Review, Direct Interview with Transport Agency, MoT and PTM Study Team

4.3 Summary of Existing Transport Master Plan (PTM)

JAPTraPIS and the PTM study are closely related; the PTM study outlining general direction of transport development in JABODETABEK, and JAPTraPIS selecting priority programs mentioned in PTM, specifically those related to public transport.

This review focuses on two parts of the PTM, being:

- Part 1: Public transport development policy, and
- Part 2: The list of public transport development programs from central and local governments

In the Part 1, there are two main policy concepts of transport development in PTM, which are:

- The concept of a road-based mass transport system in JABODETABEK, and,
- The concept of transport system development policy direction.

The review of each concept is as follows:

4.3.1 The Concept of a Road-Based Mass Transport System in JABODETABEK

This concept relates to the design of a sustainable public transport system specifically being the existing BRT lines, and includes the following:

- Main bus network
- Park and ride
- Feeder bus network
- Options for bus operation
- Institutional aspects

1) Strategies for the Main Bus Network

This section of the PTM lists the planning principles for the bus network in JABODETABEK. In accordance with Law No. 22/2009 -Road Transport Traffic (LLAJ), the wider regional bus network should be integrated with BRT (Transjakarta) using the busway concept of a dedicated special lane, particularly for large cities such as Depok, Bogor, Bekasi and Tangerang.

However, as this is a long term plan, several present roads have inadequate right of way

for BRT so the initial development will be that of a feeder line serving BRT (Transjakarta), transitioning later to a dedicated BRT. The concept of bus network development in the PTM is a system of trunk routes supported by a feeder route network.

2) Strategies for Park and Ride

The PTM supports BRT through providing Park and Ride facilities where feeder services have not been effective or adequate, and where private cars and motorcycles use cannot be avoided. This policy will promote public transport by making the connection from home to the bus system more convenient and reducing the number of private cars and motorcycles commuters into the inner city.

According to the PTM, there are five types of Park and Ride that can be developed, being:

- Informal Park and Ride lots
- Joint-use lots
- Park and pool lots
- Suburban park and ride lots
- Transit centre

3) Strategies for Feeder Buses

Feeder buses can provide ease of accessibility from feeder areas into main corridor (trunk line) and vice versa, optimizing travel time and reducing costs.

The PTM list three approaches for developing feeder bus lines, being:

- Improve existing routes to serve as feeder line
- Replace existing routes with new feeder routes
- Modifying existing routes to adapt as feeders

4) Alternative Bus Operation Concepts

The PTM outlines several options for BRT integration into the surrounding bus network. These include:

- A closed system where trunk lines operate independently and are supported by feeder buses operating to BRT stations
- A hybrid system where dedicated BRT operates on busway and some feeder buses access the busway for short distances.
- An open system where all feeder buses can access the busway for part or whole of the journey.

For each alternative, the relationship with the BRT system needs to be addressed. Any bus operating to the BRT or accessing the BRT must be under the institutional umbrella of the BRT in order to protect and support the operational design of the BRT as a system.

In option (a) where feeder buses serve the BRT, they must be fare integrated and be able to share revenue fairly between operators. In Options (b) & (c) feeder buses operating on the Busway must be able to offer the same level of service and be fully integrated into the BRT operation. All options therefore require feeder bus operators to be integrated into the same institutional and management arrangement as the BRT Operator's Contract (BOC)

system to ensure minimum service standards are maintained and that fare revenues are distributed according to kilometers of service provided. This will require significant rationalization of the bus industry operating in these areas.

5) Institutional Aspects

This section outlines the necessity of developing cross-jurisdictional coordination between local governments to improve management and integration by establishing an urban transport coordination committee (a Transport Authority) to develop integrated mass public transport management of the provinces, Kabupaten and Kota.

The PTM reviews several types of institution under Law No. 17/2003 and Law No. 5/1962 regarding Local State Owned Government (Local Government Enterprises) and the Law No. 19/2003 regarding State Owned Government (Government Enterprises). These include (1) Public Service Board (BLU), (2) Local/National State Owned Government, (3) Local/National Government Enterprises.

According to the PTM, the institution will comprise an Organizing Board and Management Board. The function of Organizing Board is to develop and synchronize general policies, give direction and offer assistance for the implementation of JABODETABEK mass public transport development policy and management. The role of the Management Board is to implement tasks from Organizing Board, including coordination, research, arrange planning, programs, and activities, develop, and maintain public infrastructure fleets and infrastructures, as well as conducting the bidding process for selection transport operators.

4.3.2 The Concept of Strategic Transport Policy

In contrast to road based transport systems which focus on operational aspects, the development of strategic transport policy addresses the full scope of policy from a strategic viewpoint. It encompasses spatial planning; transport systems including mass transit systems and the public transport network; policies to promote public transport; demand management policy; development of road infrastructure; transport capacity requirements, and institutional and regulatory policies.

1) Spatial Planning Development

According to the PTM, strategic spatial planning for JABODETABEK is based on the Jabodetabekpunjur spatial plan issued under Presidential Decree No. 54/2008, with the coverage areas being the Jakarta Outer Ring Road Toll Roads with a radius up to 1.5 - 2 km from the ring road alignments. The review has also used SITRAMP to identify JABODETABEK's urban center, being DKI Jakarta as the main urban center with Bogor, Depok, Tangerang and Bekasi cities/districts as sub centers.

The transport strategy is concerned with transport development over a 10 years horizon, aiming to strengthen the function of sub-centers as the supporting area for urban center activity. It will ensure that sub-centers areas can accommodate transport infrastructure and services to improve accessibility from Bogor, Depok, Tangerang, Bekasi Cities/Districts to DKI Jakarta.

This will require:

- Developing spatial areas in line with the pattern of the transport network, especially the mass public transport network;
- Using incentives and disincentives to guide the spatial planning so it improves the

transport network;

- Relocating central government activities to sub centers.

2) The Public Transport System

Presidential Regulation No. 54/2008 refers to the transport system in the JABODEBATEKPUNJUR and involves the regulation of the mass public transport system and road network development based on both supply and demand.

This regulates:

- Managing supply, which includes the construction of new roads, improvement of road network capacity, reduction of conflict points, road network development by type, construction of toll roads, pedestrian development, capacity improvement, and development of public transport network.
- Managing demand aspect which includes development of Transit Oriented Development (TOD), Transport Demand Management (TDM), and spatial planning control.

3) Mass Transit System and Network

For the mass transit transport network, the concept of system development consists of:

- Restructuring and strengthening the system and physical condition of existing infrastructure to improve their functions (without adding new infrastructure);
- Development of new systems and networks that can directly improve the transport capacity;
- Integration between JABODETABEK bus and railway transport by system and network.

These concepts will be directed toward the following goals to improve the performance of bus transport services:

- Reforming the system and physical conditions of the existing bus system; including restructuring the operator system, organizing the route of large, medium and small buses, arranging bus stops, improving supporting facilities, conversion to environmentally friendly fuels, and relocating the inter-city terminal
- Reforming the inter-city terminal function
- Developing of feeder system and network to support the trunk line system
- Developing other facilities to improve public transport convenience such as, Park and Ride facilities, planning and development of pedestrian and bicycle paths and facilities, development of transfer facility in inter-modal terminal
- Development of inter-city busway corridors

Meanwhile, in addition to the bus development, PTM also mentions a development strategy for railway systems and networks, to anticipate the potential passenger demand in 2030. The strategy includes:

- Restructuring and strengthening the system and physical condition of existing infrastructure to improve their functions (without adding new infrastructure)
- Development of new system and network that can directly improve the transport

capacity

- Improvement of railway's frequency and fleet and improve safety
- Improvement of circular rail model for JABODETABEK railways
- Repair and improvement of physical and service quality of supporting facilities
- Accessibility improvements to railway stations
- Development of double tracks, light rails, and MRT corridors

4) Policy to Promote the Use of Public Transport

This policy relates to providing transfer facilities, land planning and development to promote public transport, and use of information technology to support public transport

For transfer facilities, several considerations are pointed out by the PTM, including:

- Managing and regulating passengers flow into and out of mass public transport corridors and vice versa;
- Developing a passenger information system;
- Regulation on the integration of inter-modal ticketing system;
- Security improvements.

The PTM also directs the implementation of Transit Oriented Development (TOD) to increase the attractiveness of public transport usage. TOD will be implemented in areas with high density that require good accessibility between the center of activity/housing to transport infrastructure, such as terminals, stations and bus stops, which offer strategic modal transfers. The benefits include a reduction of transport costs and air pollution, a reduced dependence on fuel, as well as improving access to non-motorized transport from the settlements to the local service centers.

The PTM also outlines information technology options to improve public transport including the ticketing system; on-line traffic information system; and bus/train tracking linked to a control system.

5) Demand Management Policy

The PTM mandates efforts to control the travel demand through the implementation of demand management concept. Several types of demand management measures are listed as follows:

- Commercial Van/Car Pooling; commercial shuttle to provide mobility from residential area to park and ride locations;
- Road Pricing; to apply a cost levy on road users in several selected roads. The charge's revenue will be used directly to finance road maintenance;
- Parking Management; managing the parking tariff; restrictions on roadside parking, etc.

6) Development of Road Network

The concept of road network development in PTM is aimed to decrease the traffic congestion, to improve the quality of road capacity as well as road service. It list four approaches:

- The improvement/construction of arterial and collector roads;
- Increasing the road capacity;
- Expansion of economic activity in urban center; and
- Policy to support road networks.

The improvement / construction of arterial and collector roads will be done through the optimization of road capacity, introducing the system of opposing traffic flows (contra-flows), improving traffic signal coordination on major arterial road intersections, changing roundabouts into signalized traffic intersections, improvements in road network efficiency, road widening, restricting random passengers boarding and alighting where no bus stops exist, and the separation of freight vehicles from major roads.

7) Strategies for Managing Public Transport Capacity

PTM outlines two strategies for public transport capacity improvement, being in railway network capacity and road-based public transport network capacity.

For the railway network, development is directed towards strengthening the existing network, through the expansion of existing services. This includes designing comprehensive connectivity among trip generation centers in West, East, North, and South of JABODETABEK. In addition, the improvement includes the increasing the train fleet, improving non-economic services, and improving management of headways in peak hours. These measures are expected to decrease the congestion ratio.

For the road based public transport capacity, the strategy is expected to accommodate the growth of passengers capacity demand, using several programs as follows:

- Strengthening and developing 15 busway corridors which are already stipulated in the DKI Governor Regulation No. 103/2007
- Development of MRT Lebak Bulus - Dukuh Atas corridor (1st corridor). Although in the form of rail, the PTM considers the impact of MRT on road-based public transport as it will replace the function of the busway in the future, in order to increase transport capacity along Blok M – Kota.

Furthermore, the direction and development of the bus system network up to 2030 will be focused on the improvement of the existing bus network which will have developed by 2015 and the improvement of transport capacity in several potential corridors as follows:

- Development of the east and west LRT/MRT corridors which connect the east area (Cikarang) to the west area (Balaraja) in JABODETABEK and passing through the rapidly growing business area in DKI Jakarta (Kelapa Gading – Sunter).
- Development of additional MRT especially for MRT Lebak Bulus – Kp. Bandan, which expected to support the planned Lebak Bulus – Dukuh Atas corridor.
- Development of Pulo Gebang – Sentra Primer Barat LRT corridor (can be extended to Tangerang City).
- Development of DKI Jakarta Busway into JABODETABEK Busway, to improve the public transport service for commuters

8) Institutional and Regulatory Policies

The PTM considered several issues that must be resolved based on existing conditions,

which include:

- The orientation of highway-based public transport development did not clearly prioritize the improvement of service quality;
- The overlapping authority of various institutions involved in public transport was still high. Some institution includes are influenced by informal local community leaders in some regions;
- There is a lack of public transport suited to various regional characteristics
- There needs to be improved guidance and supervision of private parties operating public transport
- The mechanism of determining routes and mode types are not designed optimally and do not follow regulations.
- As the characteristics of each operator and community in many areas are different, a generic law and regulation may be difficult to implement effectively.

With regard to the above, the PTM directs the following strategies:

(1) Establishment of JABODETABEK Transport Authority (JTA)

The JTA will function as regulator, supervisor, and special development body to organize the development of public transport for trunk and feeder roads, as well as specific policies with special handling, such as ERP, Park & Ride and others.

The institution will responsible for Jakarta, Bogor, Depok, Tangerang, and Bekasi regions. The organizational structure will have three main areas/divisions namely:

- Road based public transport management;
- Rail based public transport management; and
- Special development management.

Under Special Development, the tasks include implementation of ERP, Park & Ride, and others.

Furthermore, in order to strengthen management quality, especially in the financial budget, the institution should provide a special unit which responsible to manage the revenues received from special development activities.

(2) Repositioning of Tupoksi (main responsibility and function) of Transport Agency, Public Works Agency and PT Kereta Api in each city and district in JABODETABEK

The repositioning is aimed to accommodate the establishment of Public Transport Authority, which has specific tasks that may possibly overlap with those agencies. Therefore, especially for the inter-sectoral and inter-regions public transport development policy, the responsibility will be shared with the Public Transport Authority, while technical agencies will be only responsible to their internal development policies.

4.3.3 List of Proposed Projects

Although, the list of specific proposed projects of the PTM is included as Appendix A and indicate the time frame for implementation, Main plan components are summarized in the table below.

Table 4.3.1 Main Plan Components of the PTM for JABOETABEK

Components	Projects
Road-based Mass Transit System (BRT)	- Trunk line (12 corridors) - Full-BRT line (6 corridors) - Feeder line (10 corridors)
Bus Transport System	- Public bus system - Inner-city bus terminals - Feeder bus system - Related facilities (intermodal, P&R, pedestrian, bicycle) - Inter-city busway
Bus Operation and Management	- Bus fleet control - Bus operation and route management
Railway Transport System	- Development of railway network - Improvement of railway capacity and services
Supporting Strategy	- Supporting policy for public transport (ITS, TDM) - Spatial development (TOD, integrated Dev., etc.)
Road Network Development	- Arterial/collector road - JORR and other toll roads - DKI 6 inner toll roads - flyover/underpass - Traffic control - Other supporting policies

Source: PTM JABODETABEK

4.4 Comments on the PTM

The PTM planning framework is based on the integration of the various components of road-based transport, outlining respective strategies and as well as institutional support mechanisms. It then outlines a strategic policy which encompasses spatial planning, the role of public transport in terms of capacity and performance and policies to support public transport. The listed projects appear to be consistent with the planning framework.

The PTM identifies the principle of creating better use of existing infrastructure by advocating improving system capacity and performance and supports network development, such as the interaction of feeder routes to the BRT

The PTM includes in its demand management policy, an improved mobility strategy, as well as TDM restrictive measures.

4.5 Review of the Existing Transport Master Plan (PTM)

4.5.1 Overview

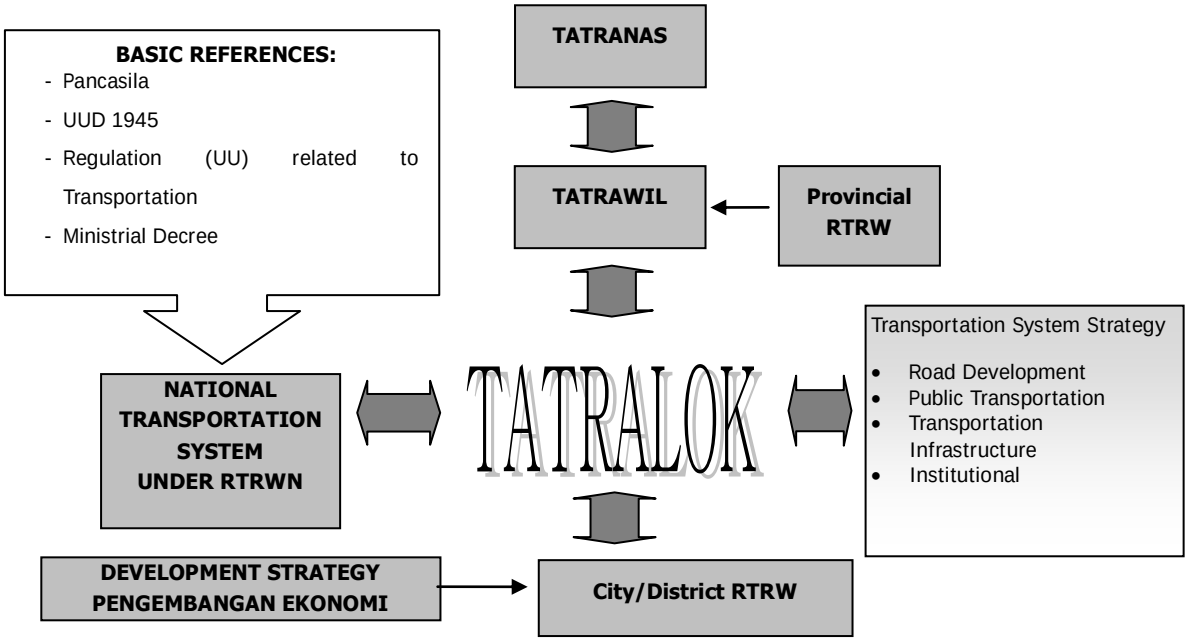
To date, transport planning in JABODETABEK has not been directed by a special comprehensive transport Master Plan, with each local government area following their own transport plan which stipulated in their Local Transportation Master Plan (TATRALOK) and/or City Master Plan (RTRW). Both TATRALOK and RTRW plans are not integrated in the context of JABODETABEK transport development planning. Consequently with inter-city demand increasing, the existing systems cannot cope and do not provide adequate services for commuters. This has caused the government to engage planning strategies to improve the quality and quantity of inter-city public transport services.

So far, there are 9 (nine) cities and districts in JABODETABEK area. In the context of

transportation planning, each city/district prepares their transportation plan and recorded in their formal document, which specifically named TATRALOK. This document contains many things regarding transportation plan in the city/district, which include road development, traffic engineering, public transport development, as well as regulation and transport facilities/infrastructures.

In the provincial level, TATRALOK is generalized/guided by TATRAWIL, while in the highest structure of the plan, in the national level, there is TATRANAS. Basically, the function of TATRAWIL is to coordinate each plan from cities/districts in a province. In addition, TATRANAS, is a very general vision and mission regarding transportation plan in Indonesia, which mentions the function and main responsibility of each city/district in Indonesia, in order to achieve the better system of national transportation.

Figure 4.5.1 TATRALOK



By regulation, TATRALOK documents in most of city/district governments are only supported by Transportation Agency Regulation, and valid for 5 years. Therefore, local government would be difficult to implement TATRALOK. Also it should be noted that the development planning only referred to spatial planning (RTRW), as the most formal regulation. Hence, local government must add their transportation programs stipulated in their TATRALOK into city/district spatial plan (RTRW).

Since the new concept of PTM introduced in 2003, DKI Jakarta government became the first local government which changes their TATRALOK into PTM. Moreover, they already revised their PTM in 2007. The validity period of the PTM is longer than TATRALOK, which is 20 years, to keep the sustainability of transportation planning. In the context of JABODETABEK, national government then also provided a study regarding the preparation of PTM, and completed by the end of 2009. However, except DKI Jakarta, other cities/districts government has not changed their TATRALOK yet. According to the JUTPI study, only Bogor City and Tangerang City are now preparing to do the revision.

The following table shows the existing condition of local transportation master plan in JABODETABEK area.

Table 4.5.1 The Existing Condition of Local Transportation Master Plan in JABODETABEK Area

Local Government	Local Transportation Plan	Information
DKI Jakarta	Pola Transportasi Makro (PTM) 2007 - 2020	DKI Jakarta government first changed their TATRALOK into PTM in 2003, then revised (updated) their PTM in 2007
Bogor City	TATRALOK (The Study on General Plan of City Road Transportation) 2006 - 2011	Bogor government is still preparing their new PTM, which revised their existing TATRALOK
Bogor District	RTRW for Transportation Section	Bogor District has not own the TATRALOK document. They plan to prepare PTM by the end of 2011
Bekasi City	RTRW for Transportation Section	Bekasi City government has not own the TATRALOK document, and so far they planned their transportation development by transportation section in RTRW
Bekasi District	TATRALOK 2008 - 2013	Bekasi District is still preparing their new PTM, which revised their existing TATRALOK
Tangerang City	TATRALOK 2010 - 2015	Tangerang City will prepare the PTM by the end of 2011
Tangerang District	RTRW for Transportation Section	No sufficient information
Depok City	TATRALOK	Depok City has just revised their TATRALOK and adopted the approach of PTM for their transportation plan
Tangerang Selatan City	Still following the Tangerang City and District	Tangerang Selatan has just established as a new city in 2010.

In relations with the JAPTraPIS study, Local Transportation Master Plan will be reviewed in order to collect some information and programs related to local transportation development, especially in the context of public transportation, as a main topic of JAPTraPIS study. The following chapter is the general policy direction overview and a number of related programs/projects of public transportation stipulated in the Local Transportation Master Plan of cities/districts government in JABODETABEK.

4.5.2 Summary of Local Transportation Master Plan

1) DKI Jakarta

A. Road-Based Public Transport Policies and Strategies

The concept of road based public transport development which planned to serve DKI Jakarta is BRT with bus priority with the support from LRT and MRT. The following aspects are system that should be developed to support the operation of the BRT:

- Development of public bus system
- Development of mass transport system
- Development of alternative transport policies
- Development of supporting policy

The Development of Public Bus System

Public bus system will be improved through the improvement of route management and bus rationalization. In terms of route management, the strategy includes route restructure especially for routes that impacted from busway operation, and feeder bus development to

support busway operation. For the bus rationalization, it directs the governments to control the number of operated bus in their area.

The Development of Mass Transport System

The government of DKI plans to develop the mass transport system periodically which started from 2004 up to 2020. The development includes:

- Bus priority network
- Light Rapid Transit (LRT)
- Mass Rapid Transit (MRT)

The bus priority networks mentioned in DKI PTM is in the form of busway. There are 15 corridors of busway connected strategic area in DKI (the detail corridors can be seen in the list of program). In terms of Light Rapid Transit (LRT), the government plans to develop two lines of LRT monorail, which are Blue Line and Green Line LRT. The function of LRT is mainly directed to support the operation of busway in DKI.

Mass Rapid Transit (MRT) is planned by the government to improve the quality of public transport as well as capacity especially in the main corridor of DKI, which one of them is Dukuh Atas – Lebak Bulus (Fatmawati – Sudirman road).

The Development of Alternative Transport Policies and Supporting Policies

There are some development alternatives and supporting policies planned by DKI Government through their PTM, which among others the implementation of Transport Demand Management (TDM), the development of traffic control and information system, and the development of road pedestrians. These policies will be achieved by the government periodically started from 2004 up to 2020.

B. List of Projects

Table 4.5.2 List of Project (DKI Jakarta)

	Project	2004-2007	2007-2010	After 2010	Agency	Information
1.	Route management				Transportation Agency	
2.	Rationalization of public bus				Transportation Agency	
3.	Development of bus priority network system Blok M – Kota P. Gadung – Harmoni Kalideres – Harmoni P. Gadung – Duku Atas K. Melayu – Ancol Ragunan – Kuningan Rambutan – K. Melayu				Transportation Agency	Busway corridor
4.	Development of bus priority network system L. Bulus – Harmoni P. Ranti – Pluit Cililitan – T. Priok P. Gebang – K. Melayu Pluit - T. Priok				Transportation Agency	Busway corridor

	P. Kelapa – Blok M UI – Manggarai Ciledug – Blok M					
5.	LRT Monorail Green Line			[redacted]	Transportation Agency	
6.	LRT Monorail Blue Line			[redacted]	Transportation Agency	
7.	MRT L. Bulus – D. Atas D. Atas – K. Bandan			[redacted]	Transportation Agency	L. Bulus – D. Atas (1st Phase), D. Atas – K. Bandan (2nd Phase)

2) Tangerang City

A. Road-Based Public Transport Policies and Strategies

Public transport policies that will be implemented by Tangerang City government according to their TATRALOK are as follows:

- Rationalizing the existing bus route patterns and expanding the connectivity to the new development areas
- Regulating the existing system to accommodate the operation of bus, where large capacity buses will be concentrated for arterial roads and low capacity buses for collector and local roads.
- Preparing the development of dedicated lane in order to support the future plan of mass transport system.
- Providing the transfer facility for public transport passengers. It includes transfer facility from bus to bus, bus to train, and bus to small bus.
- Preparing the integrated terminal with mode transfer and other supporting facilities such as commercial area, public facilities and green open spaces.
- Providing supporting facilities such as shelter and sub-terminal.

B. List of Projects

Table 4.5.3 List of Project (Tangerang City)

Project		2006-2010	After 2010	Agency	Information
1.	Mass transport for trunk line	[redacted]		Banten Province and Tangerang City Transportation Agency	MH Thamrin - Sudirman - D Mogot corridor
2.	Sub Center Terminal Ciledug	[redacted]		Transportation Agency	Replacing the existing Ciledug Terminal
3.	Sub Center Terminal G. Subroto		[redacted]	Transportation Agency	Supporting Terminal Cimone
4.	Feeder line G. Subroto	[redacted]		Transportation Agency	Rationalization
5.	Feeder line Hasyim Ashari	[redacted]		Transportation Agency	Rationalization
6.	Feeder line Bandara M1	[redacted]		Transportation Agency	Airport Integrated Bus Terminal
7.	Sub Center Terminal M Toha		[redacted]	Transportation Agency	Replacing Pasar Baru Terminal
8.	Feeder line M Toha		[redacted]	Transportation Agency	Rationalization
9.	Feeder line Siliwangi		[redacted]	Transportation Agency	Rationalization
10.	Pembenahan Ter. Cimone		[redacted]	Transportation Agency	Transit Terminal / Feeder Terminal

3) Bekasi City

A. Road-Based Public Transport Policies and Strategies

The plan of public transportation in Bekasi City is stipulated in the Spatial Plan (RTRW) of Bekasi City. And according to the plan, Bekasi City concentrates to improve the quality of road networks, and railway connection as a mode of Mass Rapid Transit (MRT). However, especially for the development of road based public transport, Bekasi City only provides some strategies including route management, inner-city BRT, as well as attempting the possibility of JABODETABEK Busway operation which connecting Bekasi – DKI Jakarta.

B. List of Projects

Regarding road based public transport which related to the inter-city connectivity within JABODETABEK area, there are some programs proposed by the government:

- Development of MRT for KH Noer Ali – Cawang corridor
- Development of MRT for Pulo Gadung – Bekasi – Cikarang corridor
- Development of BRT for North and South corridor with the specific route Summarecon area – Ahmad Yani – Pekayon – Hankam – Kranggan

4) Bekasi District

A. Road-Based Public Transport Policies and Strategies

There are two main policy concepts of road based public transport development in TATRALOK of Bekasi District, which are (1) the development of Bus Rapid Transit (BRT), and (2) the improvement of public transport services for industrial areas and settlements. Regarding the development of BRT, some strategies that should be achieved among others the integration between BRT and feeder system (the feeder system is supported by small bus, medium bus, and para-transit), and the promotion of the use of public transport through the development of park and ride, implementation bus restructuring, pedestrian and bicycle ways. Otherwise, the improvement of public transport services for industrial areas and settlements will be directed to serve industrial workers in Bekasi District, from their settlement areas to industrial areas (such as Jababeka, East Jakarta Industrial Park, MM2100, Delta Silicon Industrial Park, Hyundai Industrial Park, Bekasi International Industrial Estate).

In additions, the development of road-based public transport in Bekasi District also consider the future potential of JABODETABEK Busway connection that can serve Bekasi District – Bekasi City - DKI Jakarta.

B. List of Projects

Table 4.5.4 List of Project (Bekasi District)

Project		2008-2013	2013- 2028	Agency	Information
1.	Public transport (Angkot) restructurization	[redacted]		Transportation Agency	
2.	Improvement and revitalization of existing public transport mode	[redacted]		Transportation Agency	
3.	Public transport load factor	[redacted]		Transportation Agency	Supporting the public

	survey				transport restructurization
4.	Development of industrial area public transport and transportation mode changes ojek	[redacted]		Transportation Agency	Connecting industrial areas to settlement areas
5.	Development of mass transport network system for main corridors	[redacted]		Transportation Agency	BRT and integrated feeder services

5) Depok City

A. Road-Based Public Transport Policies and Strategies

The development strategies of public transportation in Depok City are as follows:

1. Improving the accessibility of public transportation, from traffic generation areas to traffic attraction areas, while the transfer mode centers (transfer terminal) become the important nodes that should be provided.
2. Improving the efficiency and effectiveness of public transport routes and services through the bus restructurization, fleet renewal, traffic demand management, and park and ride.
3. Improving the supporting facilities such as terminals, sub-terminals, and shelters that can be integrated with other transportation mode such as railway station.

In additions, the main policy of Depok City transportation development is the improvement of mass transport accessibility and integration between BRT/railway with feeder system. Therefore, in the few years ahead, government plans to strengthen the feeder bus services that connect settlement areas to trunk roads (BRT networks) as well as railway stations.

B. List of Projects

Plan for feeder bus in Depok City:

1. Feeder to Lebak Bulus Terminal (Depok – Lebak Bulus) with large bus and planned to start by 2011.
2. Feeder to Blok M (Depok – Blok M) with large bus and planned to start by 2011
3. Feeder to Pasar Minggu (Depok – Pasar Mingu) with large bus and medium bus, planned to start by 2011
4. Feeder to Kp Rambutan (Depok – Kp Rambutan) with large bus and medium bus, planned to start by 2011

6) Bogor District

A. The Type of Road-Based Public Transport Policies and Strategies

The main policies of Bogor District transportation development are the road development, improvement of BRT connection, and integration between BRT/railway with feeder system and transit terminals. Therefore, in the few years ahead, government plans to strengthen the road capacity for BRT, improve the terminal into transfer terminal and many others. The detail of programs can be seen in the list of program below.

B. List of Project

Table 4.5.5 List of Project (Bogor District)

Project		2010-2015	2015- 2020	Agency	Information
1.	Road widening for Busway (Gandaria – Kedunghalang – Bogor)	[redacted]			Supporting the implementation of BRT
2.	Road widening for Busway (Lebak Bulus – Parung – Bogor)	[redacted]			Supporting the implementation of BRT
3.	Road widening for Busway (Cibubur Toll Road – Cileungsi – Bogor)	[redacted]		Transportation Agency	Supporting the implementation of BRT
4.	Development of Inter Modal Integration Facilities in Bojonggede (connector between Station and Bojonggede Terminal)	[redacted]		Transportation Agency	Improving the transfer terminal function
5.	Development of Park and Ride facility in the stations and terminals in the Bodebek area	[redacted]		Transportation Agency	Supporting the implementation of BRT

5 OUTLINE OF REVISED TRANSPORT MASTER PLAN BY JUTPI

5.1 Overview

In the JUTPI Project, the Comprehensive Transport Master Plan for JABODETABEK was revised based on the SITRAMP Study Master Plan taking into account of the updated urban transport demand and the central and local government plans such as PTM and RTRW. The revised plan was submitted to the Indonesian government in 2011 and being evaluated for the approval of the President. This revised plan is the basis of the planning for road-based public transport system in JAPTraPIS. In this chapter, the outline of the revised transport master plan by the JUTPI Project is outlined.

In the revision of the transport master plan, the following major issues are examined:

1) Evaluation of Progress of the SITRAMP Study Master Plan

The review provides an assessment of the present status of implementation, citing the reasons for implementation delays, covering:

- Regulatory aspects: lack of legal basis and coordination for projects to proceed);
- Financial aspects: insufficient funds and fund raising issues and,
- Institutional aspects: cross jurisdictional issues and coordination between agencies and governments.

2) Socio Economic Changes Between 2002 and 2010

The revised plan has summarized growth factors in population and vehicle ownership and the changing modal share favoring motorcycle share at the expense of the share of bus travel. It outlines changing land use citing the spread of urban development and densification of former agricultural and low density areas.

3) Future Perspectives and Travel Demand

The principal guidelines under the '**Jabodetabekpunjur 2018'** for spatial planning are outlined (being approved as a Presidential Decree in 2008) and specifically include:

(1) guiding population dispersion in the Bodetabek area,

(2) restricting development in southern water catchment areas particularly in Bogor,

(3) promoting linear development along the East-West axis (Bekasi – Tangerang),and

(4) prioritizing development such as in finance, trade and tourism within Jakarta.

The plan outlines the need to develop greater job opportunities in the sub center areas of Bodetabek by improving sustainable regional development and to reduce the travel demand to the main urban business centers of Jakarta DKI.

Presently the public transport modal share in the region is 22 % (excluding Non-Motorized Transport (NMT) trips) and 18% including NMT trips.

5.2 Development Goals and Strategies

5.2.1 Fundamentals of the Transport Master Plan for Jabodetabek

1) Goals for Urban Transport Development

The JUTPI study, after analysis of socio-economic changes from 2002-2010 trends, supports the goals set in previous Transport Master Plans which are outlined as:

(1) Efficiency in transport system to support economic activities – citing the economic loss caused by congestion and improvements to efficiency through managing supply and demand factors

(2) Equity in transport to all members in society – this relates specifically to provide affordable mobility options to vulnerable sections of society.

(3) Environmental betterment related to transport- specifically air pollution and noise are the environmental factor to be considered.

(4) Transportation safety and security – specifically raises minimizing accidents of road and rail transport.

2) Regional Trunk Transportation Strategy

(1) Development of Primary Transport System to Support Inter-regional Cargo and Passenger Transport Demand

The revised plan recommends enhancing the primary transportation network to meet increasing demand for movements of inter-regional cargo by improving access to Tanjung Priok Port, the airport, and industrial estates.

For passenger travel it recommends improved access to the international airport, intercity bus terminals, and the Manggarai central railway station.

It lists access improvements 'in the pipeline' as:

- Tanjung Priok port in accordance with its expansion plan and additional cargo handling capacity carried by vessels to/from the region
- Soekarno-Hatta international airport - railway airport access line. (but may be impacted by new international airport development plan)
- Coordination with the airport and the seaport development plans is of great importance to establish land transportation system development master plan.

(2) East-West Strategic Transport Corridor Development

The revised plan supports the existing spatial planning guidelines which prevents urban development in the water resources areas to the south and proposes a greater emphasis toward development of the East-West axis.

(3) Strengthening Accessibility between Urban Centers in Jabodetabek

Strengthened access between urban centers in Bodetabek is supported as well as a long-term measure to develop sub centers in Bodetabek to decrease travel demand to Jakarta DKI.

The Sub Centers in Bodetabek shall be developed at intersections of Bodetabek Ring Road (Outer Outer Ring Road, or Second JORR) with radial highway; namely, Tangerang、

Serpong, Cinere, Depok (Cimangis), Setu and Cibitung.

The revised plan also supports Transit Oriented Development (TOD) where land is available for high density urban developments. The revised plan lists a number of candidate locations for development mostly around future rail development sites and also nominates high density population sites such as Kemayoran and Kelapa Gading which can be served by mass transit in the future.

5.2.2 Urban Transport Policy and Strategy

The JUTPI study proposes four key urban transport policies to support the previously outline goals, these policies and strategies are the basis of the Master Plan and are as follows:

1) Strategies for Promotion of Public Transport Use

- Increase of Railway Transportation Capacity and Improvement of Service
- Enhancement of Maintenance System for Electric Train Cars
- Improvement of Management of Railway Operation
- Railway Operation Financial Reform
- Enhancement of Inter-modality
- Provision of Extensive Public Transportation Network
- High Intensity Land Development in the Surrounding Area of Railway Stations
- Giving Priority for Public Transportation
- Reformation of Bus Operation Regime
- Public Transportation Fare Policy Reform

2) Strategies for Alleviation of Traffic Congestion

- Efficient Use of the Existing Road Network
- Construction of Flyovers and Underpasses and Connecting Missing Links
- Clearing of Illegal Occupants on the Road
- Transportation Demand Management (TDM)
- Traffic Control Improvement
- Secure Lands for Road Development
- Separation of Heavy Vehicles from General Traffic

3) Strategies for Reducing Air Pollution and Traffic Noise

- Establishment of Environmental Management Scheme
- Implementation and Enhancement of Air Pollutant/Noise Emission Standards
- Enhancement of Vehicle Inspection and Maintenance Program
- Low Sulfur Diesel Program
- Promotion of Biodiesel

- Environment-Friendly Driving Behavior

4) Strategies for Improving Transport Safety and Security

- Inspection of Private Vehicles
- Proper Maintenance of Roads
- Rehabilitation and Installation of Traffic Signal System
- Rehabilitation of Railway Signal System
- Grade Separation between Railway and Road and Provision of Railway Crossing
- Analysis on Causes of Traffic Accidents
- Improvement of Security

5.3 Review of Ongoing Projects

The revised plan reviews the transportation projects proposed after the SITRAMP Study Master Plan (2004).

Road development projects and plans assessed are as follows:

- Six Inner Toll Roads
- Four Non-Toll Elevated Roads
- Arterial Road Development Parallel to Jakarta – Merak Toll Road
- Kali Malang Toll Road Development Plan in DKI Jakarta
- Kali Malang Arterial Road Development Plan in DKI Jakarta

1) Public Transportation Development Project

In this section the review outlines the Transjakarta Busway plan to increase the coverage to 15 lines from the present 10 routes being operated.

It observes that the Average Number of Daily Passengers has risen from 43,634 per day in 2004 to 168,346 passengers per day in 2008 (7 lines).

It reports that some articulated buses are now installed on Corridors 5 and 9 and additional articulated buses are to be installed onto Corridor 1, and that expansion of bus shelters on Corridor 1 has been carried out to accommodate longer articulated buses.

Comment: As of February 2012 there is no evidence that the latter has occurred, and the passenger volumes cited demonstrate that the present busway utilization is quite low (although buses are overcrowded) relative to the amount of bus infrastructure provided. This would indicate a severe underutilization of infrastructure.

The review notes that expansion of Busway along arterial roads into Bodetabek region has as not occurred due to lack of coordination between DKI Jakarta and Bodetabek local governments.

2) Rail Projects

The review has outlines several rail-development projects

- **Jabotabek Railway Circular Line upgrading** with an expected ridership increase from 325,000 in 2009 to 1,500,000 in 2015.

- **Railway Electrification and Double-Double Tracking of Java Main Line Project (I)** to increase transport capacity and operational efficiency by double-double tracking on Bekasi Line eliminating the level crossing and separating Jabotabek Railway line (commuter line) from the Java Main Line (long-distance line) in the section where the two lines share the same rail tracks.
- **Airport Access (Rail Link)** from Manggarai station and extend westward to Soekarno-Hatta international airport with 7 stops on the way and two alignment options are outlined.
- **Monorail** - the review acknowledges the cancellation of the Monorail Blue Line project

3) Examination of Proposed Plans

The review acknowledges that numerous transport development plans are proposed separately and some of them overlap.

The overlapped projects include:

(1) Six Inner Toll Road

(2) Non-Toll Elevated Road

(3) Busway Development Plan

(4) MRT Development Plan

These various projects are to be further reviewed to determine how they fit in a strategy to meet the stated goals and what the priorities of implementation should be. Projects that demonstrate the ability to address demand with a good cost/ benefit would be favored and prioritized in implementation.

5.4 Urban Transportation Development Scenarios

1) Preliminary Analysis on Required Railway System

The review provides a preliminary analysis on required railway system in Jabodetabek proposing that demand at the cross section of Jakarta Outer Ring Road will increase to 204,880* passengers per day for one direction by 2030 leading to a shortage of capacity which will require two MRT lines in addition to the Tangerang Line, west of JORR, two additional railway lines in the south and one additional line to the East section of JORR.

2) Urban Transportation Development Scenarios

The revised plan nominates three urban transportation system development scenarios to evaluate their efficiency and appropriateness. These include:

(1) Intensive Highway Network Development Scenario - includes six inner toll roads and non-toll elevated roads with an alternative for intra-urban tollway is East West link between Jakarta Merak Toll Road at Tomang and on the Jakarta Intraurban tollway N-S Link at Cempak Putih.

(2) Intensive Public Transportation System Development Scenario - includes all the proposed rail-based public transportation system including three East - West MRT system, with the Monorail Green Line included with its extension to Ragnan Zoo.

(3) Intensive Highway and Public Transportation Development Scenario which accelerates both highway network development and public transportation system

development, and where they overlap are built as an integrated elevated road and an underground MRT, citing a Tokyo example.

Option 2 or 3 include the upgrading of Jakarta's 10 busway corridors which clearly would create better use of existing infrastructure and represent a large existing competitive advantage which can be exploited.

3) Phasing of Urban Transportation System Development Scenarios

The JUTPI plan has listed infrastructure actions for the short term (2015), intermediate term (2020) and long term (2030) and includes:

(1) Rail-based system including mono-rail,

(2) Busway and feeder bus service and

(3) Highway network

The plan includes numerous diagrams and maps showing phases of development.

Development of Transportation Network (2010-2030) and Public Transport Coverage

The plan shows that the proposed length of railway network will increase by about 200 kilometers and the length of busway will also double from 172 km to 324 km.

Road ratio will increase slightly from 8.1 % in 2010 to 9.1 % in 2030 while the ratio for Bodetabek increase vary slightly as Bodetabek represents a wide area.

5.5 Future Public Transport Demand

5.5.1 Assumption for Travel Demand Forecast by JUTPI

1) Socio-economic Profile and Future Framework

(1) Population

The population of JABODETABEK is approximately 28 million in 2010 in which DKI Jakarta has the highest population density. However, population growth rate of BODETABEK area has continuously increased through last three decades and is currently higher than DKI Jakarta.

Table 5.5.1 Population of JABODETABEK by Region

Region	Population (unit: 1,000 Persons)					Growth Rate 2000-2010 (% per year)	Area (km^2)	Density 2010 ($inhab/km^2$)
	1971	1980	1990	2000	2010			
DKI Jakarta	4,579	6,503	8,210	8,364	9,588	1.4	663	14,470
Bogor	1,863	2,741	3,949	5,300	7,484	3.5	2,975	2,516
Tangerang	1,067	1,529	2,724	4,100	5,940	3.8	1,275	4,659
Bekasi	831	1,143	2,073	3,200	5,021	4.6	1,480	3,393
JABODETABEK	8,340	11,916	16,956	20,964	28,033	2.9	6,393	4,385

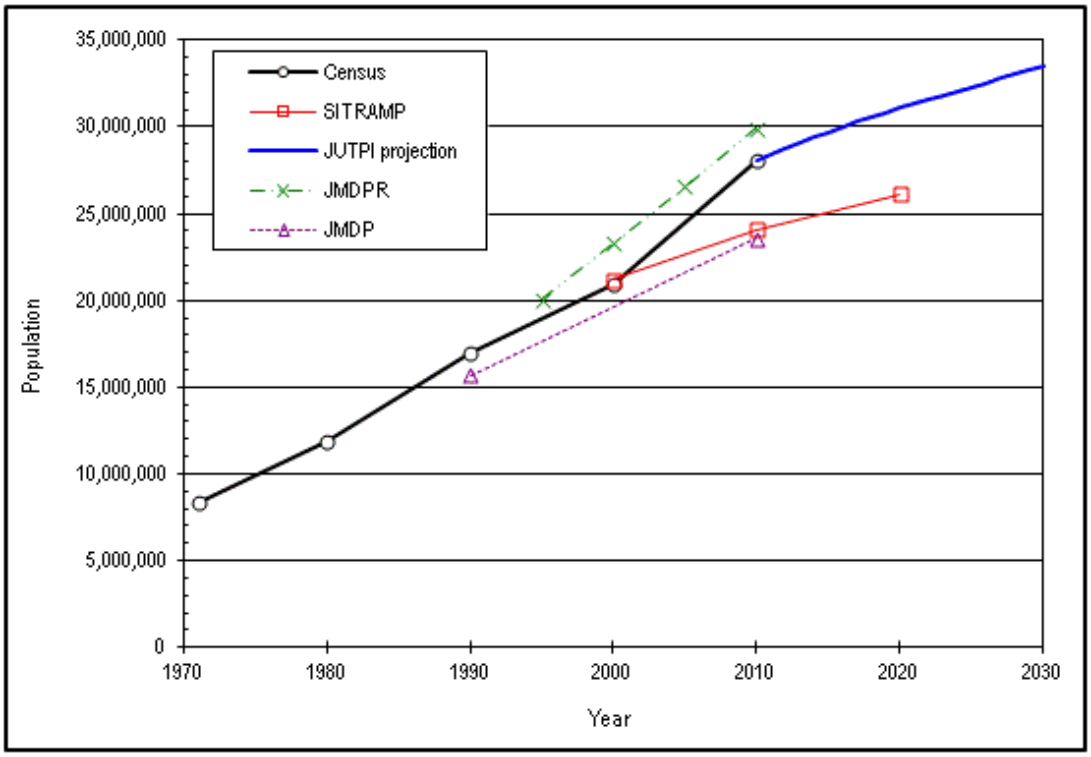
Source: Statistical Year Book of Indonesia 1998; Population of Java Barat 1995; Population Census 2000; Population Census 2010

JUTPI revised population projection of SITRAMP study by uplifting the estimated population year 2020 and 2030 based on Population Census 2010. It is forecasted that

JABODETABEK population would reach 31 million in 2020 and 34 million in 2030 (Figure 5.5.1).

According to the forecast, residential area would spread to outside of DKI Jakarta and work place locations would also spread out, but the highest density would remain in the CBD area. Table 5.5.2 shows the future population framework by region.

Figure 5.5.1 JABODETABEK Population Projection



Source: JUTPI

Table 5.5.2 Future Population Framework by Region

Year	2010	2015	2020	2025	2030
DKI Jakarta	9,588	9,883	10,066	10,161	10,263
Bogor	7,484	7,983	8,432	8,828	9,247
Tangerang	5,940	6,478	6,946	7,382	7,851
Bekasi	5,021	5,356	5,657	5,923	6,204
BODETABEK	18,444	19,817	21,036	22,132	23,301
JABODETABEK	28,033	29,701	31,102	32,294	33,564

Source: Population Census and JUTPI Estimate

(2) GRDP

The GRDP of JABODETABEK area in 2008 was approximately 498 trillion rupiah at 2000 constant price. Despite the fact that annual growth rate of GRDP has slowed down a little bit, it manages to stay close to 6% per year. Table 5.5.3 illustrates the trend of GRDP by region.

JUTPI assumed that GRDP growth rate of JABODETABEK is 5% from 2008 considering the recent trend of GRDP. Table 5.5.4 shows the projected GRDP and per capita GRDP in JABODETABEK area.

Table 5.5.3 Trend of GRDP for JABODETABEK by Region

(unit: Billion Rupiah at 2000 Constant Price)

Region	2003	2004	2005	2006	2007	2008
Jakarta Selatan	58,900	62,191	65,772	69,897	74,377	78,997
Jakarta Timur	45,033	47,622	50,496	53,489	56,886	60,124
Jakarta Pusat	67,559	71,609	75,965	80,549	85,781	91,229
Jakarta Barat	39,496	41,659	44,170	46,799	49,763	52,736
Jakarta Utara	49,794	52,659	55,830	59,123	62,883	66,536
Kab. Bogor	22,421	23,671	25,056	26,546	28,151	29,721
Kota Bogor	3,168	3,361	3,567	3,782	4,013	4,253
Kab. Tangerang	14,401	15,324	16,445	17,577	18,295	19,227
Kota Tangerang	18,988	20,079	21,462	22,933	24,505	26,067
Kab. Bekasi	36,733	38,977	41,319	43,793	46,481	49,302
Kota Bekasi	10,545	11,113	11,740	12,453	13,255	14,042
Kota Depok	4,170	4,441	4,750	5,066	5,418	5,771
DKI Jakarta	**260,782**	**275,740**	**295,233**	**309,857**	**329,690**	**349,622**
BODETABEK	**110,426**	**116,966**	**124,339**	**132,150**	**140,118**	**148,383**
JABODETABEK	**371,208**	**392,706**	**416,572**	**442,007**	**469,808**	**498,005**

Source: BPS, Regencies/Municipalities in Indonesia Gross Regional Domestic Product 2003-2008

Table 5.5.4 Projected GRDP and per Capita GRDP

(Value at 2000 Constant Price)

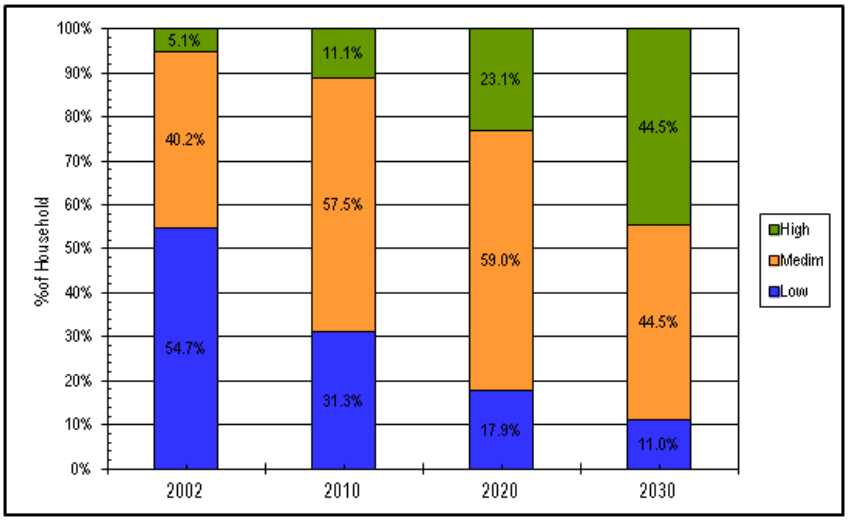
Year	2005	2010	2015	2020	2025	2030
GRDP (bil. Rupiah)	419,611	548,232	699,698	893,011	1,139,734	1,454,621
Per Capita GRDP (mil. Rupiah)	17.7	21.7	26.1	31.9	39.2	48.2

Source: JUTPI

(3) Household Income distribution

Household income level is an important factor for choosing mode of transportation. JUTPI estimated household income distributions in future years assuming that the household income increases in accordance with the growth of per capita GRDP. Figure 5.5.2 depicts the change in household income distribution from 2002 to 2030.

Figure 5.5.2 Household Income Distribution

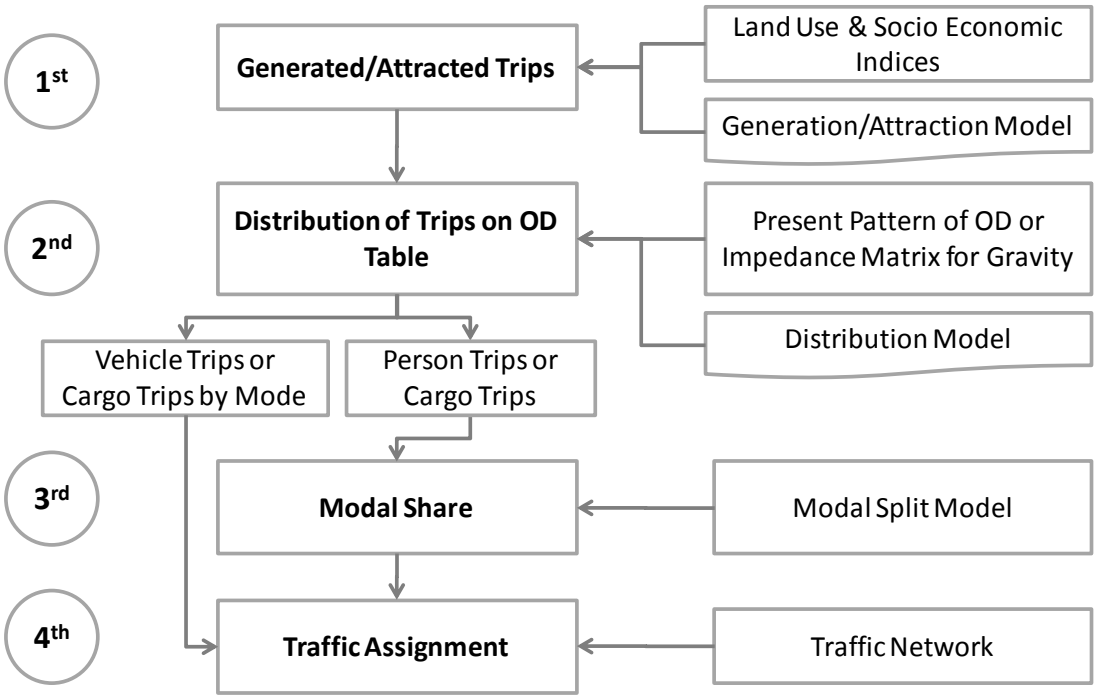


Source: JUTPI Estimate

2) Demand Forecasting Methodology

JUTPI used conventional 4-step method to develop demand forecasting model for JABODETABEK. JUTPI model has its root from SITRAMP model. Since the 2004 SITRAMP study, there has been a considerable number of changes in trip making and trip pattern in the study area. To capture these changes, JUTPI conducted several surveys such as commuter survey 2010 and person tracking survey 2010 based on which a comprehensive JUTPI model is developed using state-of-the-art software CUBE.

Figure 5.5.3 Demand Forecasting Procedure



(1) Zone System and Network Development

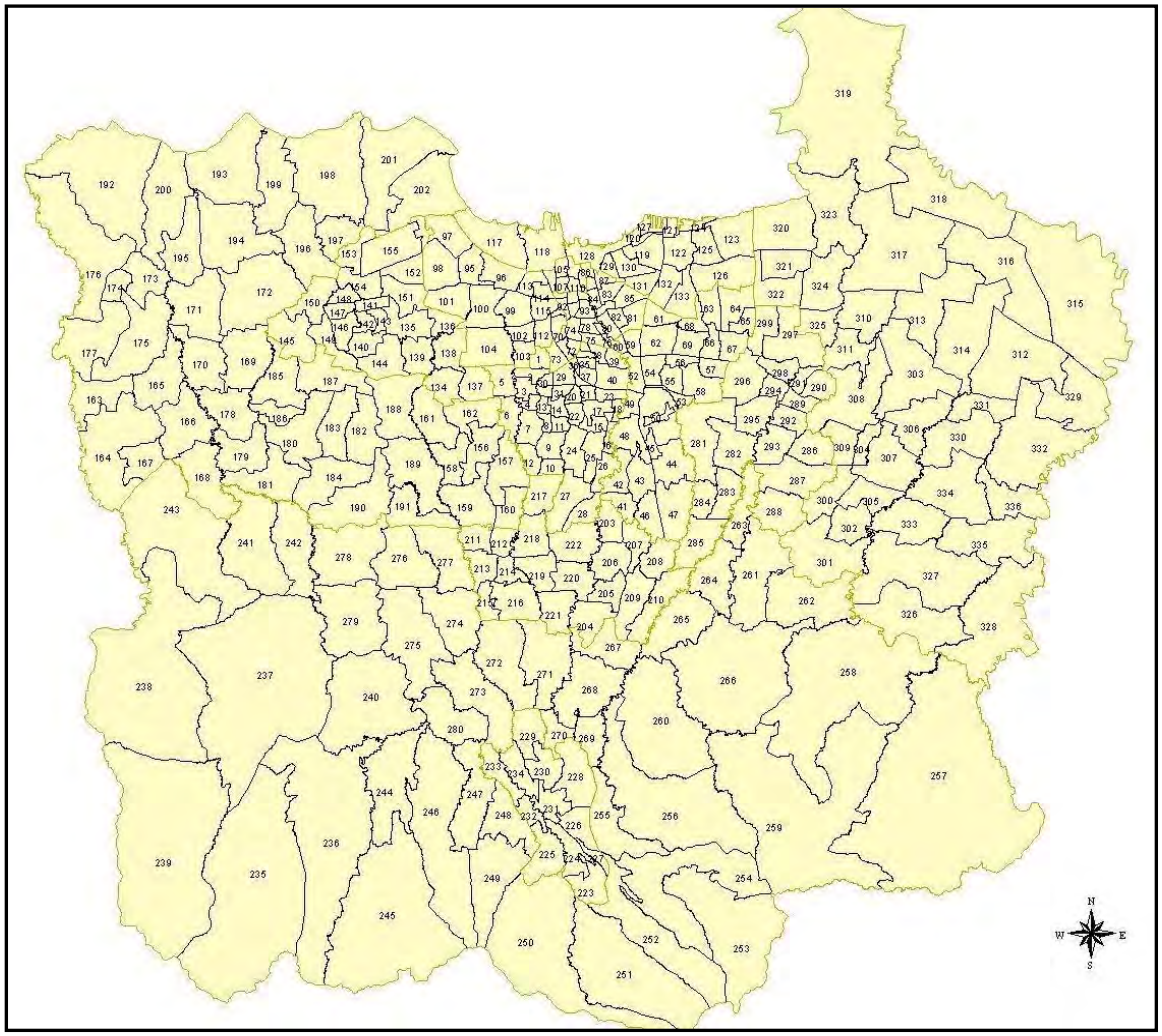
JUTPI adopted the SITRAMP 343 zone system for the analysis. However, some zones along the corridors of planned MRT and railways were further sub-divided into smaller zones for details analysis. This created 621 traffic analysis zones, which are a direct disaggregation of SITRAMP 343 zone system. The zone system is shown in Figure 5.5.4.

The study networks are road network and public transport network depicted in Figure 5.5.5. The networks were developed for JUTPI target year 2030 with three cases according to scenarios of JUTPI demand forecasting:

- Case 1: Highway intensive and public transport moderate
- Case 2: Highway moderate and public transport intensive
- Case 3: Highway intensive and public transport intensive

These networks are computerized network originating from SITRAMP, and they have been revised by JUTPI not only to reflect accomplishment of the road network and public transportation network in JABODETABEK after the year 2004 when SITRAMP completed, but also to include the development plan of transportation network for its analyses.

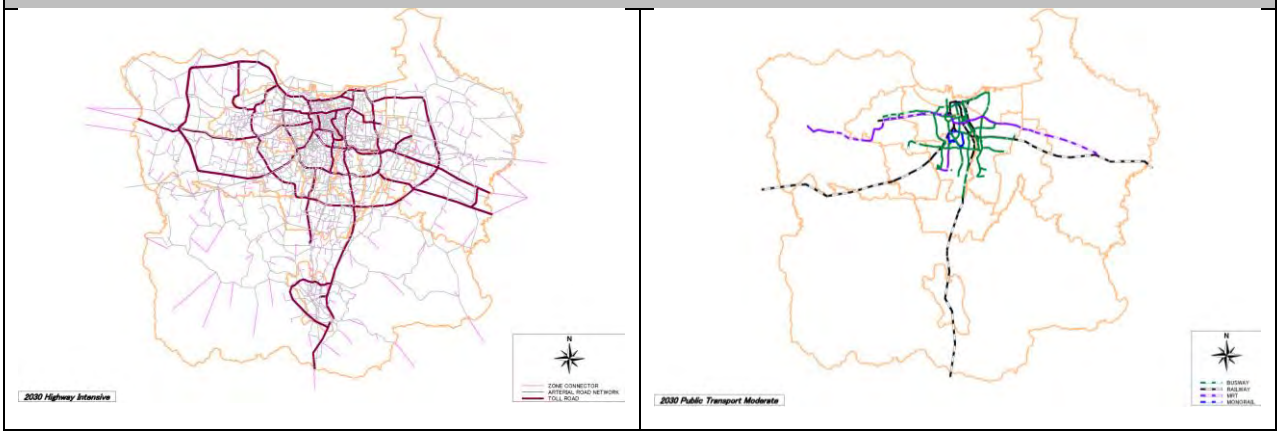
Figure 5.5.4 Traffic Analysis Zone System



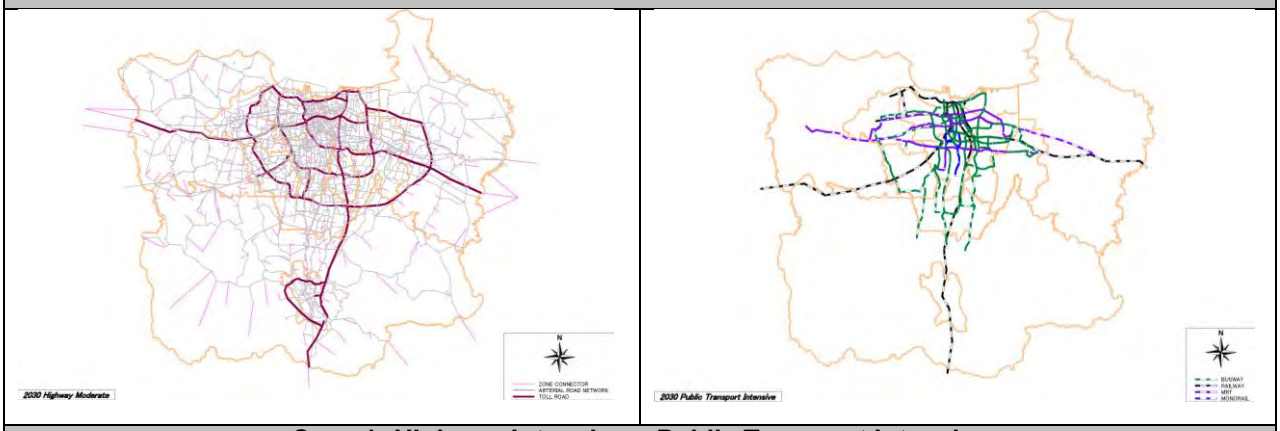
Source: SITRAMP 2004

Figure 5.5.5 Highway and Transit Development Scenario Year 3030

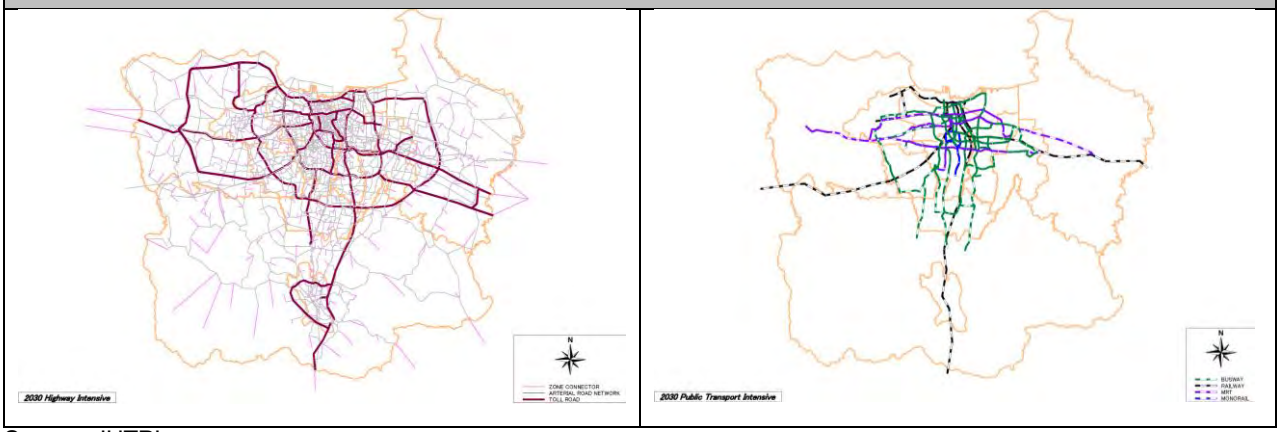
Case 1: Highway Intensive – Public Transport Moderate



Case 2: Highway Moderate – Public Transport Intensive



Case 1: Highway Intensive – Public Transport Intensive



Source: JUTPI

(2) Trip Production/Attraction

JUTPI estimated trip production/attraction by purpose, by area type (urban and rural), and by income level from simple regression model based on past survey data. The formulation of the models are:

$$P_i = \alpha_0 + \sum_n \alpha_n X_{n,i} \qquad \text{and} \qquad A_j = \beta_0 + \sum_n \beta_n X_{n,j}$$

Where: P_i, A_j : produced trips at zone i , and attracted trips at zone j respectively;

α, β : parameters;

X_i, X_j : explaining variables.

Explaining variables of these models are socio-economic indices such as population by income level, the number of students, the number of working place and so forth. Table 5.5.5 summarizes these explaining variables and the data used.

Table 5.5.5 Explaying Valuables for Estimating Trip Production/Attraction

Explaining Variables	2010	2020 and 2030
Population	- Control Total: Commuter Survey 2010 - Distribution by zone and income level: Commuter Survey 2010	- Control Total: JUTPI projection - Distribution by zone and income level: SITRAMP Case 4B
No. of Student at Residential Place		
No. of Student at School Place		
No. of Workers at Residential Place		
No. of Workers at Work Place		

Source: JUTPI

(3) Trip Distribution

JUTPI developed person trip distribution pattern for the base year 2010 by using the commuter survey data.

JUTPI model assumed that the future trip distribution would follow the pattern forecasted in SITRAMP Case 4B. Under this assumption, trip distribution by purpose and by income in 2020 and 2030 was estimate using Fratar method by taking the SITRAMP 2020/2030 Case 4B trip matrices and production/attraction trips estimated in the previous section as input.

SITRAMP Case 4B is one of the recommended urban development scenarios with urban sub-center development and moderate development along railway, and busway corridor development with traffic demand management (TDM) policy.

(4) Modal Choice

JUTPI developed modal choice model using multinomial logit and nested logit model. The models are built based on two most recent surveys, i.e. commuter survey 2010 for commuting trip and person tracking survey 2010 for non-commuting trip. Exceptionally, for those zones in the planned MRT corridor, the modal choice model developed in the preparatory study for Jakarta MRT North-South Line Extension 2008 was employed.

Table 5.5.6, Table 5.5.7 and Table 5.5.8 illustrates the mode choice models for area outside the MRT corridor. Moreover, Table 5.5.9 shows the mode choice models for area inside the MRT corridor.

Table 5.5.6 Multinominal Logit Mode Choice Model for Commuter 'Work'

Mode	Variable	Parameters	Std. Error	T-value
NMT	Constant variable	1.7159400	1.76E-01	9.7288
MC	Constant variable	1.7332500	8.19E-02	21.1635
Car	Constant variable	1.0304400	7.77E-02	13.2623
NMT	Natural log of trip distance (km)	-1.3829700	5.61E-02	-24.6408
NMT	Natural log of household income (million Rp./month)	-0.3109110	9.63E-02	-3.2297
NMT	1 if the home zone is in the urban area; 0 otherwise	-0.8265770	1.43E-01	-5.7832
MC	Generalized travel time for motorcycle (0.01min)	-0.0000803	5.46E-06	-14.7062
Car	1 if a high-income household (>= 6 million Rp./month)	0.9650590	3.96E-02	24.3618
Pub	1 if a low-income household (< 1.5 million Rp./mo.)	-0.0455644	4.84E-02	-0.9405
Roh Bar: 0.28349 Hit-Ratio (%): 54.17964				

Source: JUTPI

Table 5.5.7 Nested Logit Mode Choice Model for Commuter 'School'

Mode	Variable	Parameters	Std. Error	T-value
NMT	Constant variable	7.43E+01	1.36E-01	545.2968
MC	Constant variable	4.59E-01	5.18E-02	8.8559
Pub	Constant variable	-1.05E+02	6.17E-01	-169.833
NMT	Natural log of trip distance (km)	-1.51E+02	5.63E-01	-268.501
NMT	Natural log of household income (million Rp./month)	-8.45E+01	1.86E-01	-452.992
NMT	1 if the home zone is in the urban area; 0 otherwise	-2.91E+01	2.21E-01	-131.428
MC	1 if a middle-income household (>= 1.5 and < 6 million Rp./mo.)	1.55E+00	6.96E-02	22.209
Car	Generalized travel time for auto (0.01min)	-1.17E-04	1.79E-05	-6.538
NMT(upper)	Constant variable	7.43E+01	1.36E-01	545.2313
Private(upper)	Constant variable	3.06E+01	7.50E-01	40.7709
Pub(upper)	Generalized travel time for transit (0.01min)	-1.15E-03	3.10E-04	-3.7207
	Lamda	6.30E-03	1.27E-04	49.4991
Roh_bar : 0.17965 Hit-Ratio (%) 49.95878				

Source: JUTPI

Table 5.5.8 Multinominal Logit Mode Choice Model for Non-Commuter

Mode	Variable	Parameters	Std. Error	T-value
Car	Const:1-1	0.0864041	0.5333060	0.162
MC	Const:1-2	0.3336550	0.5266440	0.634
NMT	Const:1-3	0.2910230	0.5249260	0.554
Generic	Generic:1-1	-0.0052673	0.0011282	-4.669
Car	IncomeL	-1.1935100	0.2708920	-4.406
Car	CarPerCap	2.1318500	0.4447880	4.793
Car	UrUr	0.2154220	0.1442650	1.493
MC	McPerCap	1.9304200	0.2817690	6.851
Pub	NHBB	-1.1239000	0.2942980	-3.819
Pub	IncomeH	-1.0929000	0.2083870	-5.245
NMT	HBO	0.8921880	0.4252340	2.098
NMT	McDistS	-0.3131360	0.0874556	-3.581
Roh Bar: 0.30597 Hit-Ratio (%): 57.60756				

Source: JUTPI

Table 5.5.9 Multinominal Logit Mode Choice Model for Planned MRT Corridor

Model for MRT Corridor

Mandatory Purpose, High Income

Variable	Time	CarOwn	CarErp	McErp	PtFare	MrtFare	Disntance						Roh	Roh_bar	Hit-R(%)
Car	-0.001137	1.89586	-0.00010										0.266	0.263	65.6
Motorcycle				-0.000199											
Pulic Transport					-0.00028										
MRT						-8.09E-06	0.0336334								
t-value	-0.2651	13.3671	-10.245	-4.4425	-5.3278	-0.3655	3.4218								

Mandatory Purpose, Middle Income

Variable	Const1	Const2	Const3	Time	CarOwn	CarErp	McErp	PtFare	Disntance	MrtFare			Roh	Roh_bar	Hit-R(%)
Car	-2.56249			-0.012003	1.35123	-5.69E-05							0.146	0.144	54.4
Motorcycle		-1.61349					-9.28E-05								
Pulic Transport			-2.58997					-7.5E-05	0.0112414						
MRT										-0.000288					
t-value	-9.4356	-9.4358	-13.7872	-4.3251	5.7234	-6.5942	-4.9738	-0.9455	0.7416	-12.8627					

Mandatory Purpose, Low Income

Variable	Const1	Const2	Const3	Time	CarOwn	McOwn	PtFare	MrtFare					Roh	Roh_bar	Hit-R(%)
Car	-16.2235			-0.011219	16.3046								0.422	0.418	66.3
Motorcycle		-2.97442				1.4771									
Pulic Transport			-2.39903				-0.000192								
MRT								-0.000398							
t-value	-5.1548	-6.3251	-5.8601	-1.8222	5.8574	5.4801	-2.5186	-7.236							

Non-Mandatory Purpose, All Income

Variable	Const1	Const2	Const3	Time	Income_H	CarOwn	CarErp	McOwn	Distance	Income_L	PtFare	MrtFare	Roh	Roh_bar	Hit-R(%)
Car	-4.6993			-0.000266	0.4678	2.86051	-3.16E-05						0.203	0.202	52.0
Motorcycle		-3.70754						1.46034	-0.050928						
Pulic Transport			-2.27884							0.592614	-0.000142				
MRT												-0.000372			
t-value	-32.8592	-21.7114	-22.5081	-0.1532	4.6751	23.9786	-6.2243	11.5726	-10.6058	8.2241	-9.1988	-28.3354			

Source: JUTPI

(5) Modal Choice

The key features of the network used for trip assignment are summarized as follows. The methods used for assignment is 'multi-user class incremental assignment' on generalized cost of travel. The user classes are:

- Motorcycles, by three income classes,
- Cars by three income classes, and
- Public Transport (Bus Volumes as Pre-loads), PT person trips are also assigned by three income classes.

Motorcycle and Car person trips are converted to equivalent Passenger Car Units (PCU), and the generalized cost parameter, and other related parameters are given in Table 5.5.10.

Table 5.5.10 Travel Assignment Parameters

Mode of Travel	Value of Time – VoT (IDR/Hour)			Vehicle Attributes	
	Low Income	Medium Income	High Income	Occupancy	PCU Factor
Motorcycle Trips	2,130	5,217	16,658	1.342	0.25
Car	2,889	7,075	22,591	1.820	1.00
PT Trips – Large Bus	1,588	3,888	12,413	51.4	2.0
PT Trips – Med Bus				22.3	1.5
PT Trips – Small Bus				7.7	1.2
Small Trucks	n/a				**1.5**
Large Trucks	n/a				**2.0**

Source: JAPTraPIS Analysis of JUTPI Data

Other cost parameters such as toll tariff and public transport fare are also considered in the travel assignment. Table 5.5.11 summarizes the tariff system on toll road in 2009, and Table 5.5.12 lists the fare system of public transport as of 2009 respectively.

Table 5.5.11 Tariff System on Toll Road 2009

Toll / Section Name (including Concession Agreement)	Tariff (Rupiah)	
	Flat Tariff	Distance Proportionate
Jakarta Outer Ring Road (1st JORR)	6000	
Jakarta Intra Urban Tollway (JIUT)	5500	
Tangerang - Tomang @ Gate Karang Tengah, Serpong – Bintaro	3500	
Airport 2: Penjaringan - BSH	3000	
Airport 1: Pluit - Penjaringan	2500	
1 st JORR (Ulujami, Cawang)	2000	
Connection Links: JIUT – 1st JORR (Dukuh on Jagorawi, Gate PGT on Jkt-Cikampek, Meruya on Jkt-Tangeran-Merak)	1500	
Cawang to PGB & PGT (Jakarta Cikampek)	1000	
Depok - Antasari		698
2nd JORR (Cengkareng – Serpong, Cinere – Jagorawi)		610
2nd JORR (Serpong – Cinere, Cibitung – Tg. Priok)		550
2nd JORR (Jagorawi – Cibitung)		500
Jakarta – Cikampek		195
Tangerang – Merak		167
Jagorawi		149

Source: JUTPI

Table 5.5.12 Fare System of Public Transport 2009

Mode	Fare (Rupiah)	Note
Large Bus (Patas AC) Large Bus (Patas)	6,000 4,000	With air conditioner * for pupil Rp.1,000
Regular Bus Medium Bus Small Bus	4,000 2,000 1,000 – 3,000	* for pupil Rp.1,000 * for pupil Rp.500 * for pupil Rp.1,000
Busway (exclusive lane)	3,500 500 + 350/Km	Year 2010 Year 2020 - 2030
Taxi	6,000 3,000 30,000	Flag Fall Per Km Per Hour

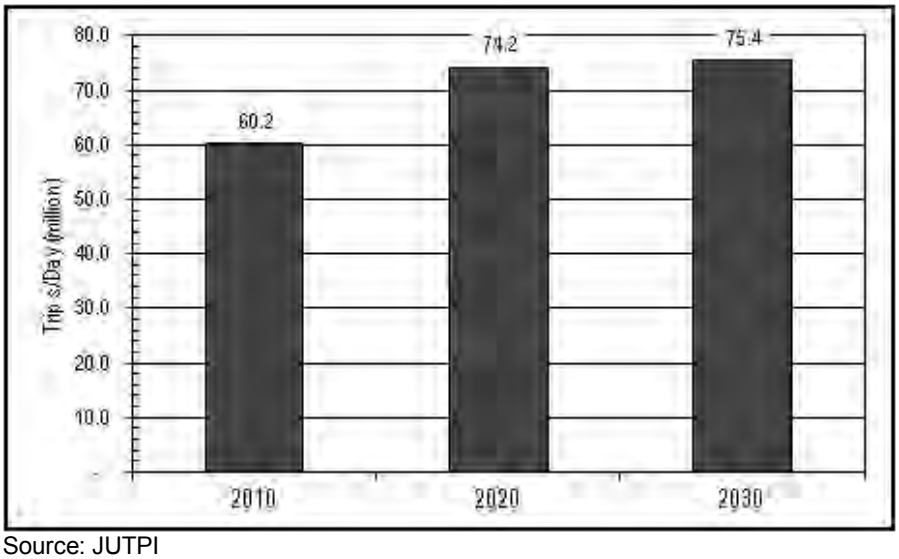
Source: JUTPI

5.5.2 Travel Demand Forecast

1) Trip Production/Attraction

Figure 5.5.6 shows total trip production/attraction forecasted for years 2020 and 2030 and that of year 2010. The total trips by purpose and region of the corresponding years are also listed in Tables 5.5.13, 5.5.14 and 5.5.15.

Figure 5.5.6 Present and FutureTips in JABODETABEK



Source: JUTPI

Table 5.5.13 Trip Production/Attraction by Purpose in 2010 ('000 trips)

Region	Home-Based Work	Home-Based School	Home-Based Other	Non-Home-Based Business	Non-Home-Based Other
DKI Jakarta	4,639	4,182	10,299	2,005	2,945
Tangerang	2,072	2,609	5,461	664	1,192
Bekasi	1,811	1,907	4,794	505	935
Depok	518	655	1,577	178	257
Bogor	1,835	1,905	5,298	358	1,594
Total	**10,875**	**11,257**	**27,429**	**3,710**	**6,922**

Source: JUTPI

Table 5.5.14 Trip Production/Attraction by Purpose in 2020 ('000 trips)

Region	Home-Based Work	Home-Based School	Home-Based Other	Non-Home-Based Business	Non-Home-Based Other
DKI Jakarta	5,958	4,038	9,641	2,702	4,172
Tangerang	3,475	2,342	6,204	1,094	2,374
Bekasi	2,841	2,012	4,959	850	1,878
Depok	778	662	1,617	299	450
Bogor	3,000	2,363	6,332	941	3,225
Total	**16,053**	**11,417**	**28,753**	**5,886**	**12,099**

Source: JUTPI

Table 5.5.15 Trip Production/Attraction by Purpose in 2030 ('000 trips)

Region	Home-Based Work	Home-Based School	Home-Based Other	Non-Home-Based Business	Non-Home-Based Other
DKI Jakarta	5,934	4,004	9,209	2,694	4,451
Tangerang	3,554	2,408	6,377	1,184	2,548
Bekasi	2,829	2,020	4,979	923	2,019
Depok	811	683	1,606	304	478
Bogor	2,987	2,358	6,512	1,048	3,476
Total	**16,115**	**11,473**	**28,683**	**6,154**	**12,971**

Source: JUTPI

2) Trip Distribution

Trip OD matrices of 13 regions of JABODETABEK for the base year 2010 and forecast years 2020 and 2030 are presented below.

Table 5.5.16 Block Matrix 2010 – Total Person Trip OD Matrix

Region		1 JKT. South	2 JKT. East	3 JKT. Central	4 JKT. West	5 JKT. North	6 Kota Tangerang	7 Kota Tang South	8 Kab. Tangerang	9 Depok	10 Kota Bogor	11 Kab. Bogor	12 Kota. Bekasi	13 Kab. Bekasi	Total
1	JKT_South	3,551	425	320	244	113	128	270	61	265	44	138	169	51	**5,779**
2	JKT_East	425	3,639	318	108	213	30	30	17	133	35	186	393	146	**5,674**
3	JKT_Central	320	318	1,336	242	232	55	55	49	65	18	73	159	71	**2,990**
4	JKT_West	244	108	242	2,996	202	178	56	103	33	15	51	59	36	**4,321**
5	JKT_North	113	213	232	202	2,421	27	14	25	24	14	32	95	81	**3,492**
6	Kota_Tang	128	30	55	178	27	2,273	157	362	11	10	43	15	11	**3,300**
7	Kota_Tang South	270	30	55	56	14	157	1,880	80	37	3	75	12	4	**2,674**
8	Kab._Tang	61	17	49	103	25	362	80	3,511	9	22	108	6	8	**4,360**
9	Depok	265	133	65	33	24	11	37	9	1,960	25	206	32	20	**2,819**
10	Kota_Bogor	44	35	18	15	14	10	3	22	25	1,339	430	21	21	**1,997**
11	Kab._Bogor	138	186	73	51	32	43	75	108	206	430	5,342	129	78	**6,890**
12	Kota_Bekasi	169	393	159	59	95	15	12	6	32	21	129	3,164	385	**4,640**
13	Kab._Bekasi	51	146	71	36	81	11	4	8	20	21	78	385	3,205	**4,117**
Total		**5,779**	**5,674**	**2,990**	**4,321**	**3,492**	**3,300**	**2,674**	**4,360**	**2,819**	**1,997**	**6,890**	**4,640**	**4,117**	**53,052**

Source: JUTPI

Table 5.5.17 Block Matrix 2020 – Total Person Trip OD Matrix

Region		1 JKT. South	2 JKT. East	3 JKT. Central	4 JKT. West	5 JKT. North	6 Kota Tangerang	7 Kota Tang South	8 Kab. Tangerang	9 Depok	10 Kota Bogor	11 Kab. Bogor	12 Kota. Bekasi	13 Kab. Bekasi	Total
1	JKT_South	3,596	375	438	293	124	185	347	48	312	49	140	177	71	**6,155**
2	JKT_East	375	3,208	330	138	219	44	49	31	146	32	122	400	128	**5,222**
3	JKT_Central	438	330	1,657	368	238	103	99	37	106	23	90	195	59	**3,740**
4	JKT_West	293	138	368	3,247	206	240	66	111	49	15	51	71	39	**4,893**
5	JKT_North	124	219	238	206	2,350	28	18	35	31	15	43	107	74	**3,487**
6	Kota_Tang	185	44	103	240	28	2,576	150	444	18	4	53	19	32	**3,897**
7	Kota_Tang South	347	49	99	66	18	150	1,737	108	55	14	76	16	8	**2,742**
8	Kab._Tang	48	31	37	111	35	444	108	5,622	8	4	93	10	27	**6,578**
9	Depok	312	146	106	49	31	18	55	8	2,128	47	294	42	25	**3,261**
10	Kota_Bogor	49	32	23	15	15	4	14	4	47	1,232	598	18	8	**2,060**
11	Kab._Bogor	140	122	90	51	43	53	76	93	294	598	9,918	93	70	**11,639**
12	Kota_Bekasi	177	400	195	71	107	19	16	10	42	18	93	3,109	482	**4,740**
13	Kab._Bekasi	71	128	59	39	74	32	8	27	25	8	70	482	5,063	**6,085**
Total		**6,155**	**5,222**	**3,740**	**4,893**	**3,487**	**3,897**	**2,742**	**6,578**	**3,261**	**2,060**	**11,639**	**4,740**	**6,085**	**64,499**

Source: JUTPI

Table 5.5.18 Block Matrix 2030 – Total Person Trip OD Matrix

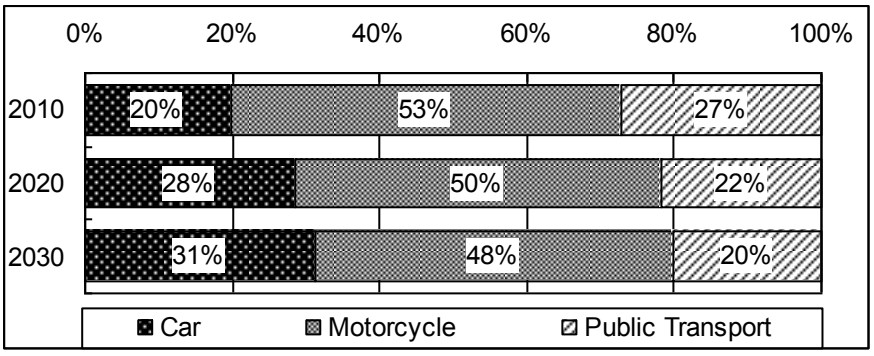
Region		1 JKT. South	2 JKT. East	3 JKT. Central	4 JKT. West	5 JKT. North	6 Kota Tangerang	7 Kota Tang South	8 Kab. Tangerang	9 Depok	10 Kota Bogor	11 Kab. Bogor	12 Kota. Bekasi	13 Kab. Bekasi	Total
1	JKT_South	3,497	400	462	310	144	219	377	68	338	56	161	200	87	**6,320**
2	JKT_East	400	2,929	338	148	230	54	65	28	156	39	142	443	132	**5,105**
3	JKT_Central	462	338	1,572	392	245	129	116	38	120	30	94	220	76	**3,834**
4	JKT_West	310	148	392	3,117	223	283	73	131	51	20	62	75	51	**4,936**
5	JKT_North	144	230	245	223	2,318	33	22	44	37	20	51	126	85	**3,577**
6	Kota_Tang	219	54	129	283	33	2,597	159	489	18	6	54	20	40	**4,103**
7	Kota_Tang South	377	65	116	73	22	159	1,766	111	63	19	80	18	20	**2,887**
8	Kab._Tang	68	28	38	131	44	489	111	5,720	9	3	88	12	29	**6,770**
9	Depok	338	156	120	51	37	18	63	9	2,127	57	308	49	28	**3,363**
10	Kota_Bogor	56	39	30	20	20	6	19	3	57	1,240	630	21	8	**2,151**
11	Kab._Bogor	161	142	94	62	51	54	80	88	308	630	10,112	128	77	**11,988**
12	Kota_Bekasi	200	443	220	75	126	20	18	12	49	21	128	3,048	539	**4,899**
13	Kab._Bekasi	87	132	76	51	85	40	20	29	28	8	77	539	5,016	**6,189**
Total		**6,320**	**5,105**	**3,834**	**4,936**	**3,577**	**4,103**	**2,887**	**6,770**	**3,363**	**2,151**	**11,988**	**4,899**	**6,189**	**66,121**

Source: JUTPI

3) Modal Choice

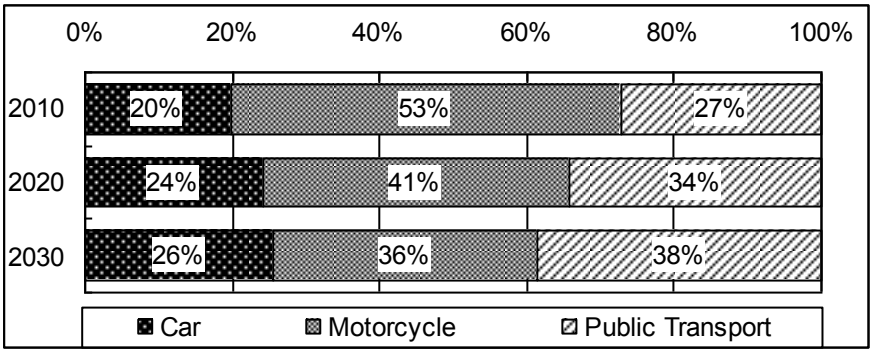
Estimated modal choice for each of the analysis case (scenario) in the study area is shown below. The trips by non-motorized modes are excluded.

Figure 5.5.7 Mode Choice for Case 0 (Do Nothing)



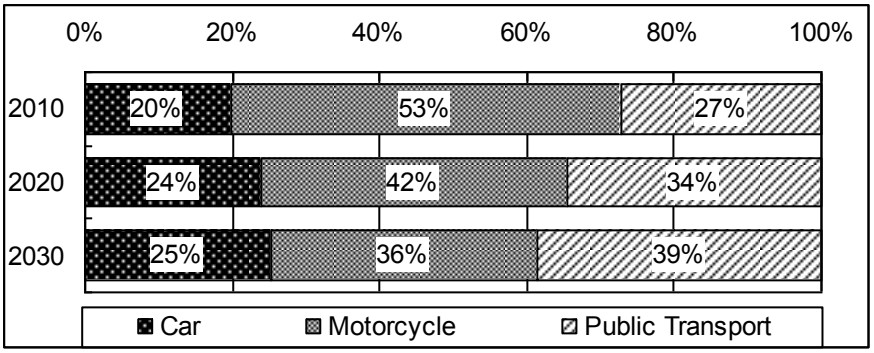
Source: JUTPI

Figure 5.5.8 Mode Choice for Case 1 (Highway Intensive & Public Transport Moderate)



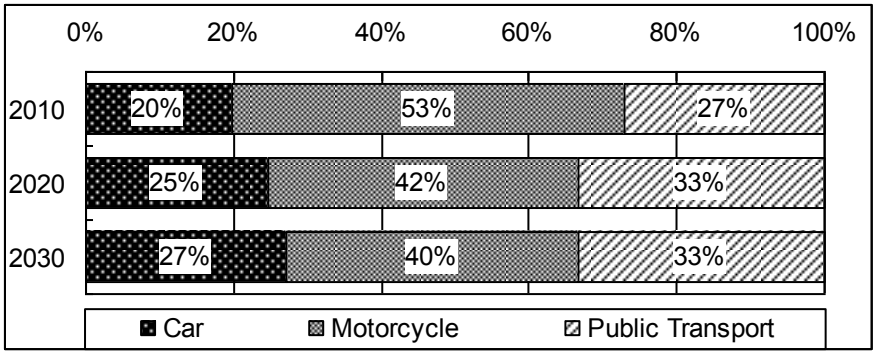
Source: JUTPI

Figure 5.5.9 Mode Choice for Case 2 (Highway Moderate & Public Transport Intensive)



Source: JUTPI

Figure 5.5.10 Mode Choice for Case 3 (Highway Intensive & Public Transport Intensive)



Source: JUTPI

5.6 Revised Urban Transport Master Plan

1) Key Project Components

The revised master plan lists a total of 120 projects as shown in Table 5.6.1. It covers entire area of urban transport system categorized as follows:

- Road Network Development
- Improvement of Traffic Control System and Demand Management
- Bus Transport System and Interchange Facility Development
- Railway System Development

- Access to International and Inter-regional Transportation
- Improvement of Transport Safety and Security
- Environment Betterment
- Measure in Urban Planning
- Institutional Setup and Reform
- Financial Arrangement

Table 5.6.1 Road Network Development

	No. of Projects / Programs				
	Short (2015)	Middle (2020)	Long (2030)	Non shown	Total
Road Network Development					
Toll Road Development	5	6	5	-	16
Non Toll Elevated Road Development	2	2	-	-	4
Arterial Road Development / Widening	5	13	2	-	20
Improvement of Bottleneck / Road facility	-	-	4	-	4
Improvement of Traffic Control System and Demand management					
For Road Traffic (ERP, ATC, ETC etc.)	8	-	-	1	9
For Public Transportation	2	1	-	-	3
Bus Transportation System and interchange Facility Development					
Busway System Development	-	2	-	-	2
Enhancement of Bus Services / Facility Development	1	7	1	-	9
Railway System Development					
New Railway Development (MRT, Airport Access, Monorail)	2	4	5	-	11
Improvement of Existing Railway	3	3	-	-	6
Development / Improvement of Facilities	2	3	14	-	19
Improvement of Transportation Safety and Security					
Traffic safety Education / Allocation of Security Guards	-	1	1	-	2
Environment Betterment					
Enhancement of Vehicle Inspection etc.	1	1	2	-	4
Measure in Urban Planning					
Strengthen Development Control etc.	1	1	1	-	3
Institutional Setup and Reform					
Establish JTA etc.	3	-	-	1	4
Financial Arrangement					
Road Fund, Tax etc.	-	4	-	-	4

Source: JUTPI Revised Master Plan

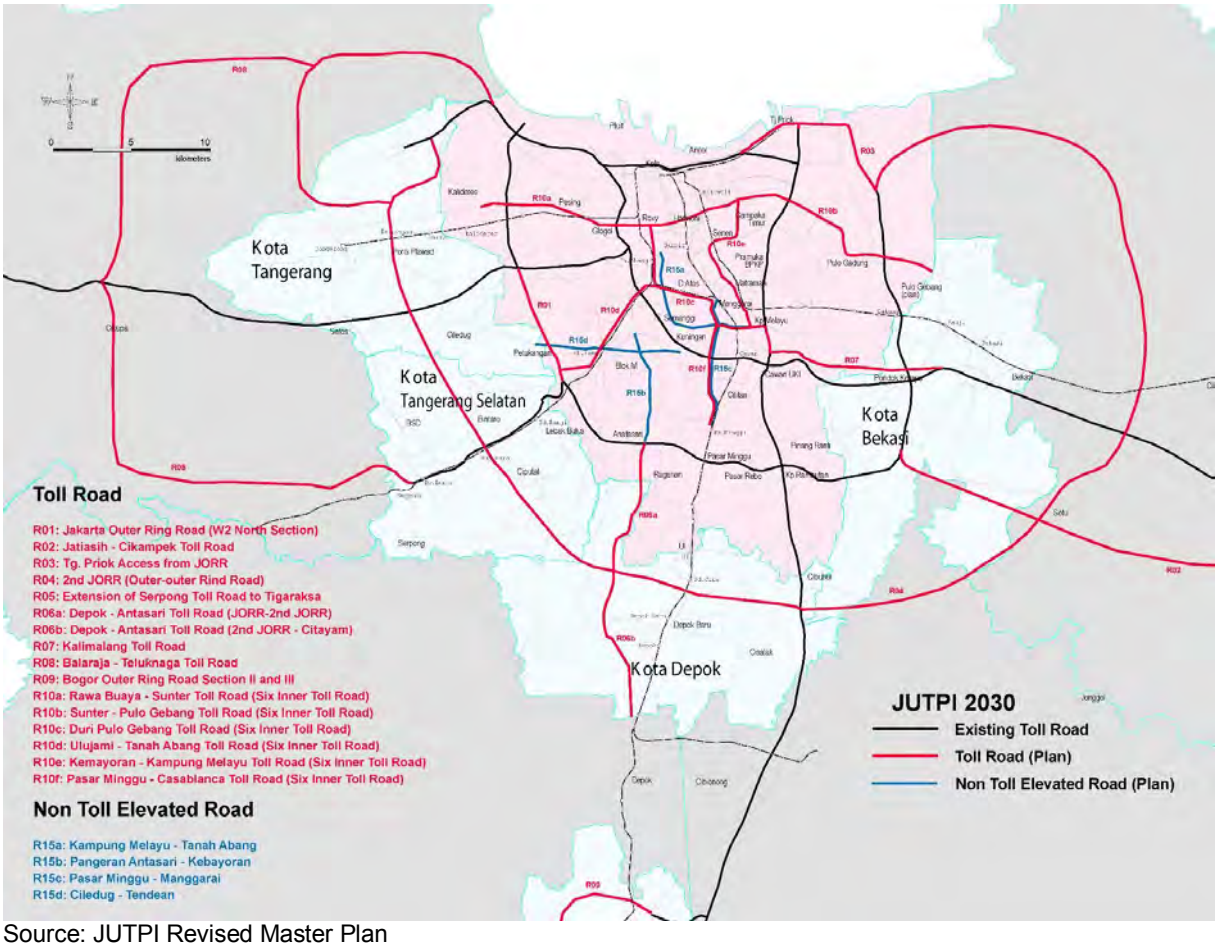
2) Revised Urban Transport Network

The revised plan shows backbone network of urban transport up to target year of 2030 and 2020 as shown in Figure 5.6.1-4.

A number of ring roads and radial roads, inner toll roads, non-toll elevated roads, road widening and access roads to station were proposed in the master plan.

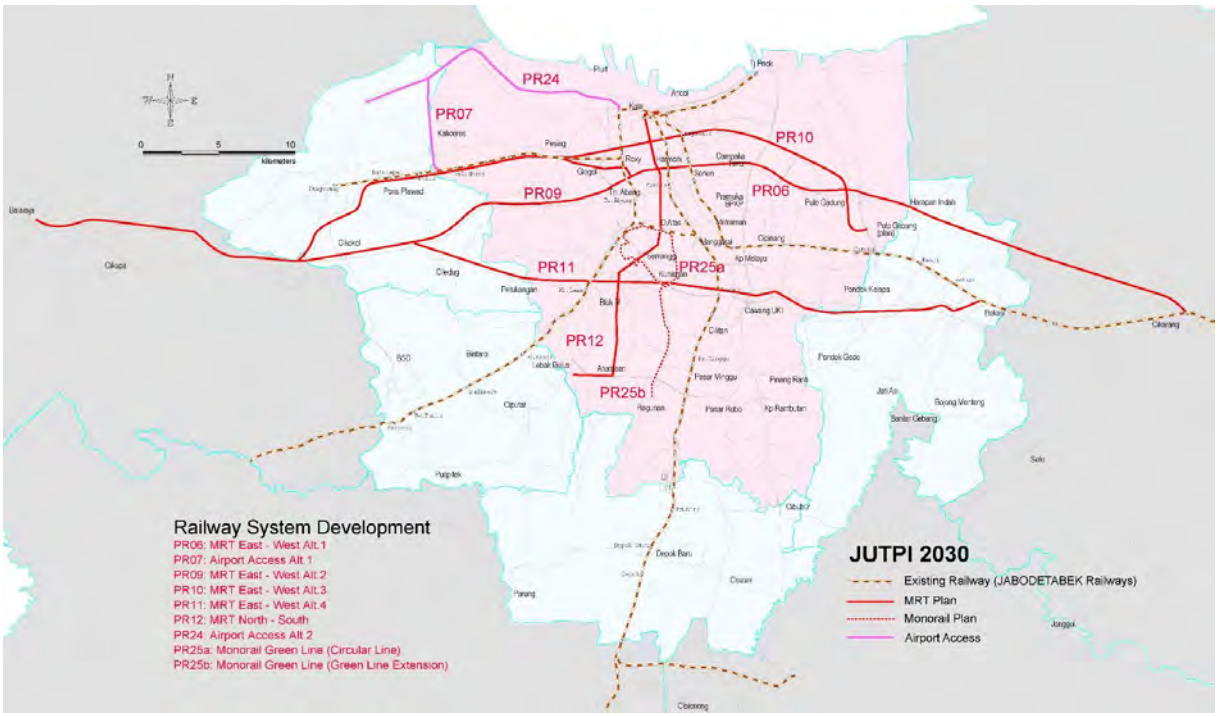
As for public transportation network, several busway developments, MRT, airport access and monorail were also proposed.

Figure 5.6.1 2030 Road Network by JUTPI Revised Master Plan



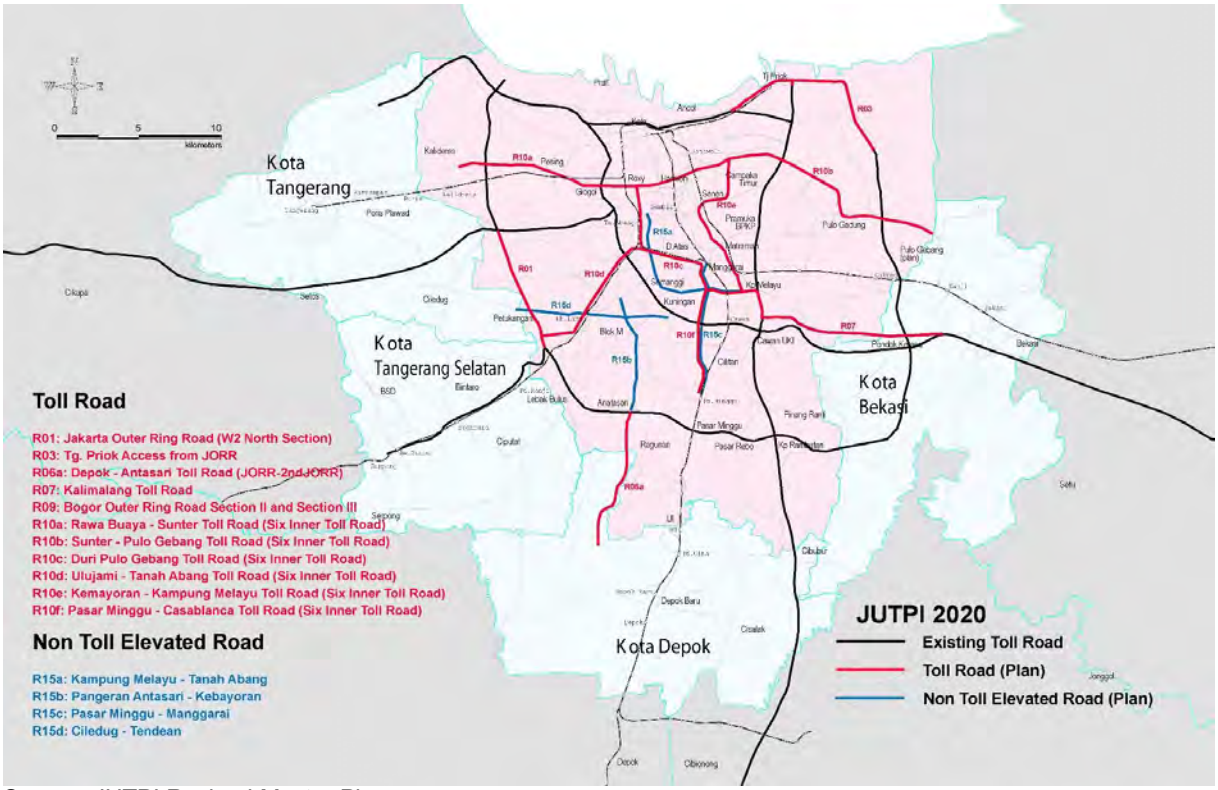
Source: JUTPI Revised Master Plan

Figure 5.6.2 2030 Public Transport Network by JUTPI Revised Master Plan



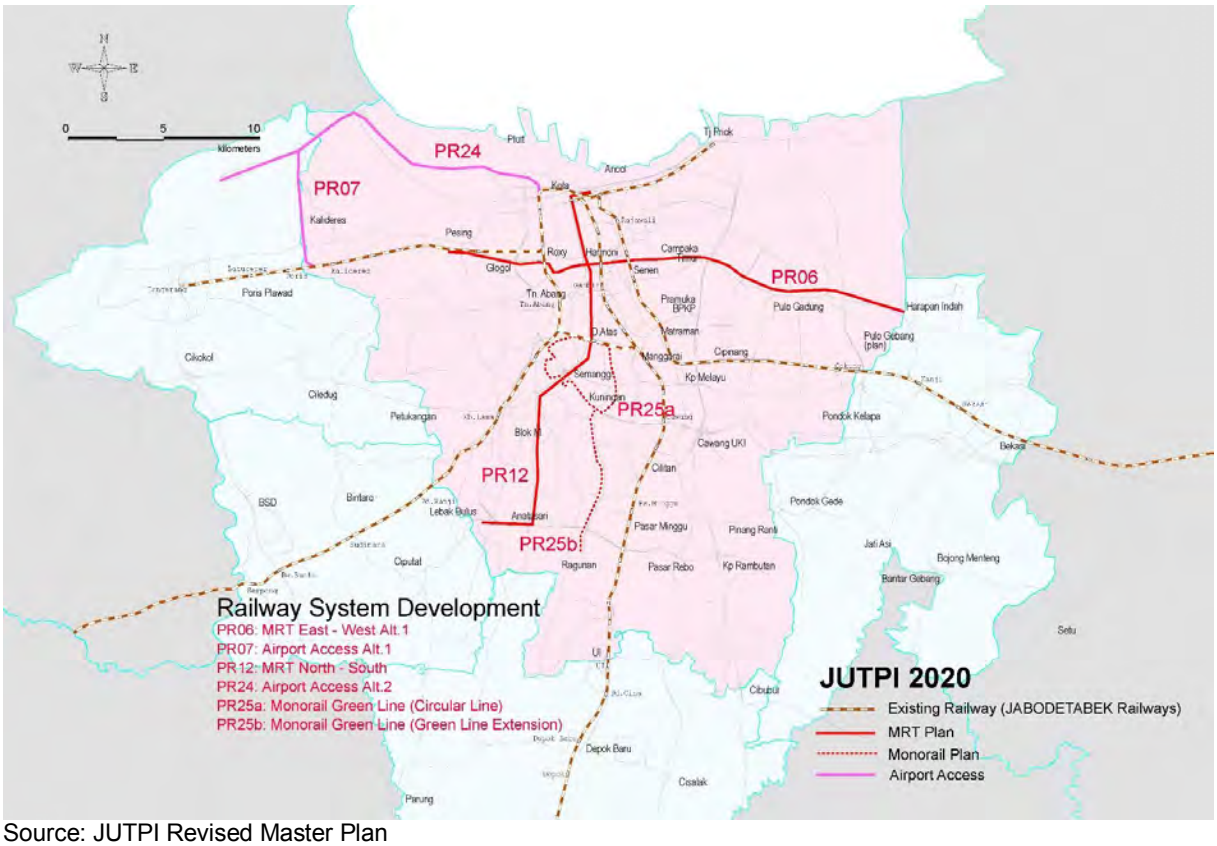
Source: JUTPI Revised Master Plan

Figure 5.6.3 2020 Road Network by JUTPI Revised Master Plan



Source: JUTPI Revised Master Plan

Figure 5.6.4 2020 Public Transport Network by JUTPI Revised Master Plan



Source: JUTPI Revised Master Plan