Table 7.4.12 Quantity Table of Clock Tower Flyover

Clock Tower Flyover		Unit	Quantity																				Total
			Act1	Pct1	Pct2	Pct3	Act2																
Superstructure	Bridge Type		Steel Box Girder																				
	Bridge Length	m	260.000																				260.0
	Span Length	m	55.000	80.000	70.000	55.000																	260.0
	Width	m	7.250	7.250	7.250	7.250																	
	Bridge Area	m2	398.75	580.00	507.50	398.75																	1,885.0
	Median & Sidewall Width	m	1.500	1.500	1.500	1.500																	
	Concrete - PC T Girder	m3	0.0	0.0	0.0	0.0																	0.0
	Concrete - PC Box Girder	m3	0.0	0.0	0.0	0.0																	0.0
	Reinforcement - PC Girder	tf	0.0	0.0	0.0	0.0																	0.0
	Steel - I Girder	tf	0.0	0.0	0.0	0.0																	0.0
	Steel - Box Girder	tf	163.5	319.0	243.6	163.5																	889.6
	Election	tf	163.5	319.0	243.6	163.5																	889.6
	Pavement	m2	316.3	460.0	402.5	316.3																	1,495.0
Substructure	Total Height	m	8.300	9.200	13.600	9.200	8.300																
	Concrete - Beam & Column	m3	74.0	61.6	96.8	61.6	74.0																367.9
	Concrete - Pilecap	m3	76.1	73.5	73.5	73.5	76.1																372.8
	Reinforcement - Pier	tf	18.0	16.2	20.4	16.2	18.0																88.9
	Steel - Pier	tf	0.0	0.0	0.0	0.0	0.0																0.0
Foundation	Pile Length	m	10.000	10.000	10.000	10.000	10.000																
	No. of Pile	No.	9	9	9	9	9																
	Bored Pile	m	90.0	90.0	90.0	90.0	90.0																450.0

Source: JICA Study Team

7.5 CONSTRUCTION PLANNING

7.5.1 CONSTRUCTION PLAN

(1) General

The construction plan consists of two major project components of the civil works, namely, i) new construction of the flyover, and ii) widening of the existing road including new construction of the pedestrian bridge and re-setting of traffic signal.

(2) Major Project Component

Major components of the project are new construction of the bridge section (flyover) of about 3.4 km and road section including two types of civil works, namely, i) widening of the existing road with total length of about 3.7 km, and ii) new construction of the pedestrian bridges and Re-setting of the traffic signal.

Major components of the project and approximate work quantities are listed in Table 7.5.1.

Table 7.5.1 Major Project Components

DESCRIPTION	UNIT	Pre-FS projects				
		Project 1.1	Project 1.2	Project 1.3	Project 3.7	
		Yusefu Lule - Mukuwano Rds Flyover	Jinjya - Yusefu Lule Rds Flyover and Mukuwano - Jinjya Rds Flyover	Queen's Way - Mukuwano Rd Flyover	Shoprite Jct Traffic Improvement	
					Shoprite Section	Clock tower Section
New construction of the flyover						
1. Bridge work						
Length	m	1,675.00	1,687.00	110.00	-	-
Width	m	13.00	10.00	7.25	-	-
Approach road	m	230.00	325.70	184.00	-	-
Widening of the existing road						
2. Road work						
Length	m	1,304.00	356.00	2,007.00	-	-
Overlay area	m2	19,462.00	4,222.00	11,066.00	5,786.00	12,855.00
Widening area	m2	5,267.00	465.00	24,763.00	4,517.00	11,707.00
Re-setting of traffic signal	pace	-	-	-	1.00	1.00

Source: JICA Study Team

(3) Outline of Construction Work

The main construction work of this Project is flyover construction, which is the first of its kind in Kampala City.

Construction work of flyover involves large-scale civil engineering works mainly with steel material and requires bridge construction equipment. The equipment and materials are expected to be supplied from other countries such as neighboring Kenya or South Africa.

The construction process is described as follows:

1) New Construction of Flyovers

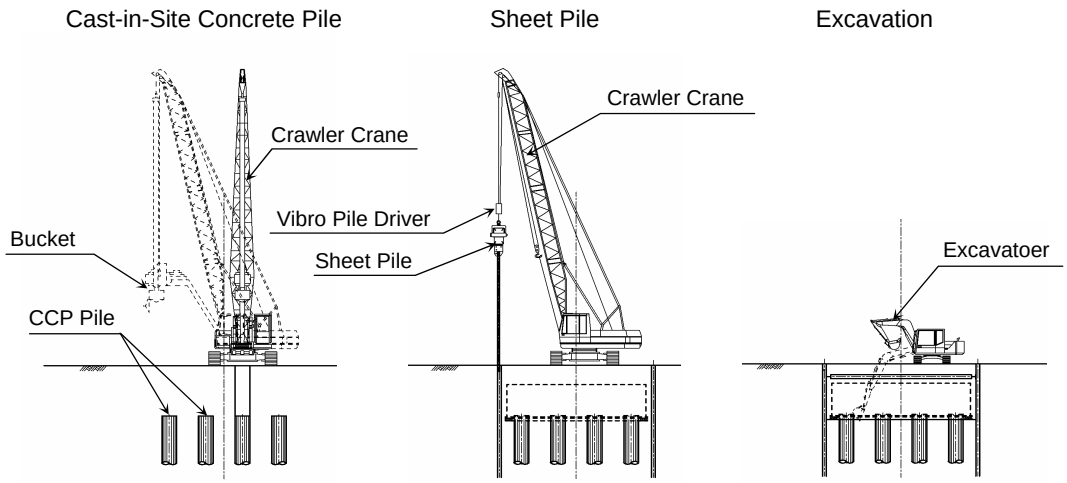
Foundation works

The construction method of foundation works can be divided into three steps, namely:

STEP-1: Piling Works

STEP-2: Sheet Pile Installation

STEP-3: Structural Excavation

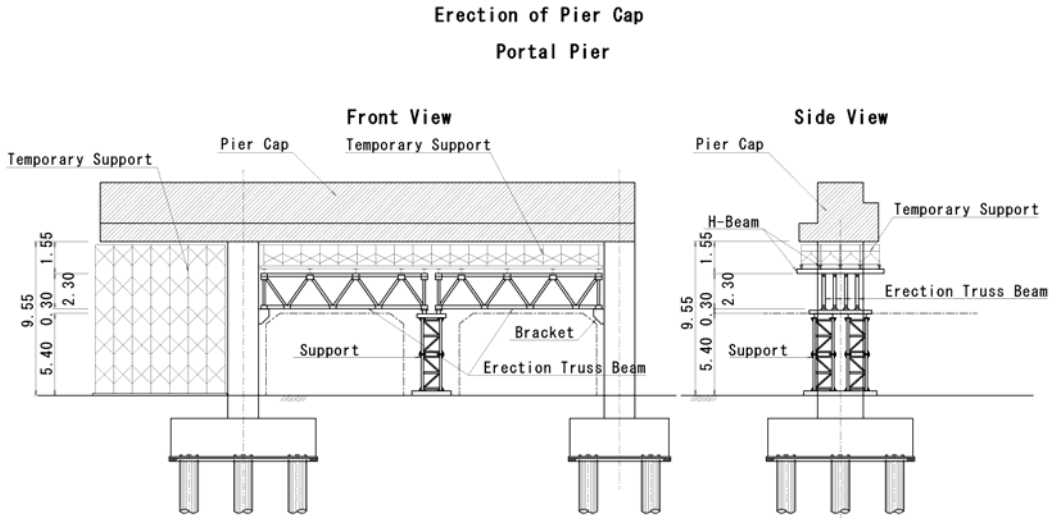


Source: JICA Study Team

Figure 7.5.1 Construction of Foundation Works

Substructure

The RC-Portal Type Pier will be constructed with temporary support as shown in Figure 7.5.2. It is planned to traverse the existing arterial road which is required to be open to traffic flow even under construction.



Source: JICA Study Team

Figure 7.5.2 Construction of Substructure (RC-T Type)

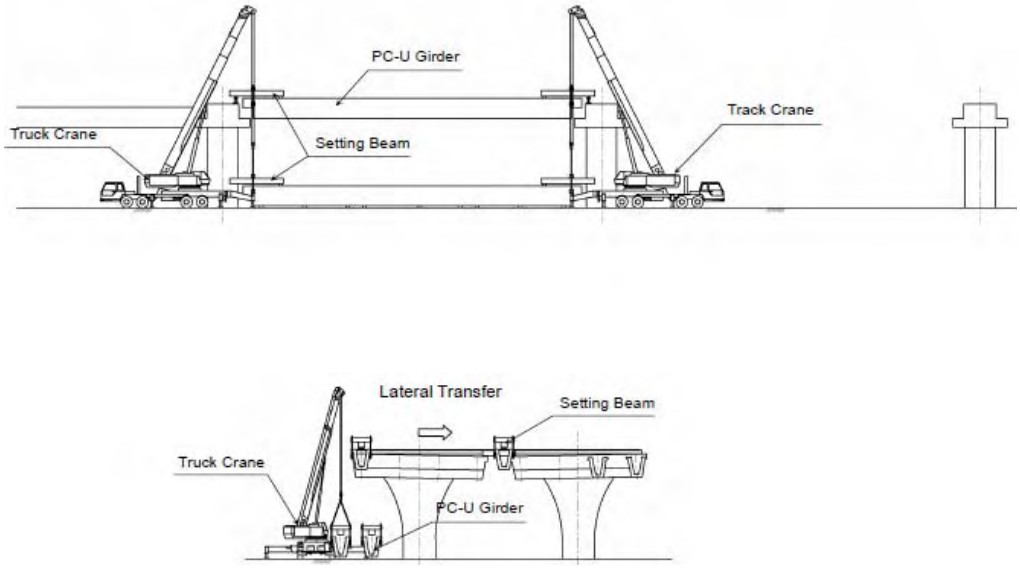
Superstructure

Truck Crane

PC-I girders are fabricated in the factories (pre-cast). One girder will be fabricated with the proper length of segments in the factory and thereafter will be transported and connected to the other girder on site.

The girder will be erected by truck cranes as shown in Figure 7.5.3.

After the girder is lifted up on the piers, the girder will be shifted in a lateral direction and will be set in the right position. Consequently, the next girder will be erected in the same manner.



Source: JICA Study Team

Figure 7.5.3 Erection by Truck Cranes

The specificity of the flyover construction works includes the following:

i) Construction work in the city,

ii) Construction with open traffic status,

iii) Large-scale construction equipment is necessary,

iv) Large quantity of construction material is required.

From the highlights mentioned above, night construction work is necessary for the flyover construction works.

2) Widening of Existing Road

There are many road construction works in Uganda at the moment. Therefore, construction equipment and materials to be used for construction are available including onshore procurement.

However, general control and supervision are necessary because the works have to be done not as isolated components but in parallel and in combination with the other component, which is the bridge construction.

Step-1 Clearing and grubbing works

Step-2 Relocation of the underground utilities

Step-3 Construction of the pedestrian way and drainage work, etc.

Step-4 Construction of sub-base and base course

Sub-base layers should be compacted by vibrating roller (7 - 8.5 ton capacity).

Base course also should be compacted by road roller macadam (12 ton

capacity) and pneumatic tire roller (8 - 20 ton capacity).

Step-5 Dense bitumen binder course

The dense bitumen binder course is required for some sections of the widening area to strengthen the pavement.

Step-6 Wearing course

Binder course will be applied and compacted by road roller macadam (12 ton capacity) and pneumatic tire roller (8 - 20 ton capacity), while 30 mm of wearing course will be applied and compacted by hand guide roller (0.8 - 1.1 ton capacity) for the walkway.

3) Improvement of Existing Road

Step-1 Removal of the traffic safety facilities

Median and the curbside stone on the road surface are removed using back-hoe (0.5 m^3).

Step-2 Machining of the existing road surface

Cutting machine of the crawler type.

Step-3 Spreading and curing of the tack coat

Emulsion spreading is sprayed using asphalt distributor.

Step-4 Wearing course

The pavement work of wearing course will then be applied and compacted by road roller macadam (12 ton capacity) and pneumatic tire roller (8 - 20 ton capacity).

Step-5 Road marking work

Channelization and sidewalk marking shall be applied to the road surface using road marking machine. This work includes road widening part.

(4) Construction of Pedestrian Bridges

The main structure of the pedestrian bridge is as follows:

- ✓ Foundation: Direct Foundation
- ✓ Substructure: RC Column
- ✓ Superstructure PC-T Type Girder

The steps of the pedestrian bridge construction are as follows;

Step-1 Foundation excavation

Direct foundation method and construction by the "open cut method" will be applied.

Step-2 Footing

After the aggregate bed has been compacted, concrete placing for the concrete footing will follow in several lifts.

Step-3 Column

The RC-type Column is designed to traverse the existing arterial road which is required to be open to traffic flow even under construction.

Step-4 Superstructure Works

PC-T type girders are fabricated in the factories (pre-cast). One girder will be fabricated with proper length in the factory which will then be transported and connected to another girder on the site. The girder will be erected by truck cranes. After the girder is lifted up on the piers, the girder will be set in the right position.

Step-5 Subsidiary work

Installation of step and handrail works.

(5) Re-setting of Traffic Signal

Re-setting of traffic signal is carried out in parallel with the road construction (i.e., Step-2 – Road construction work). The re-setting of traffic signal work is shown as follows:

Step-1 Removal of the existing signal,

Step-2 Construction of cable duct and cable junction manhole,

Step-3 Laying of the cable and electrical test,

Step-4 Erection of the signal pole and signal installation, and

Step-5 Confirmation of the function and adjustment of the signal timing.

7.5.2 TRAFFIC CONTROL

(1) General

As the project roads are very busy trunk roads in Kampala City, the construction works have to be carried out without interrupting daily traffic. This will be done under well-designed method of traffic management system organized by the contractor and MoWT in affiliation with KCC and traffic police to secure the safety of vehicles and pedestrians as well as those of project personnel.

Traffic Management during the Construction Work

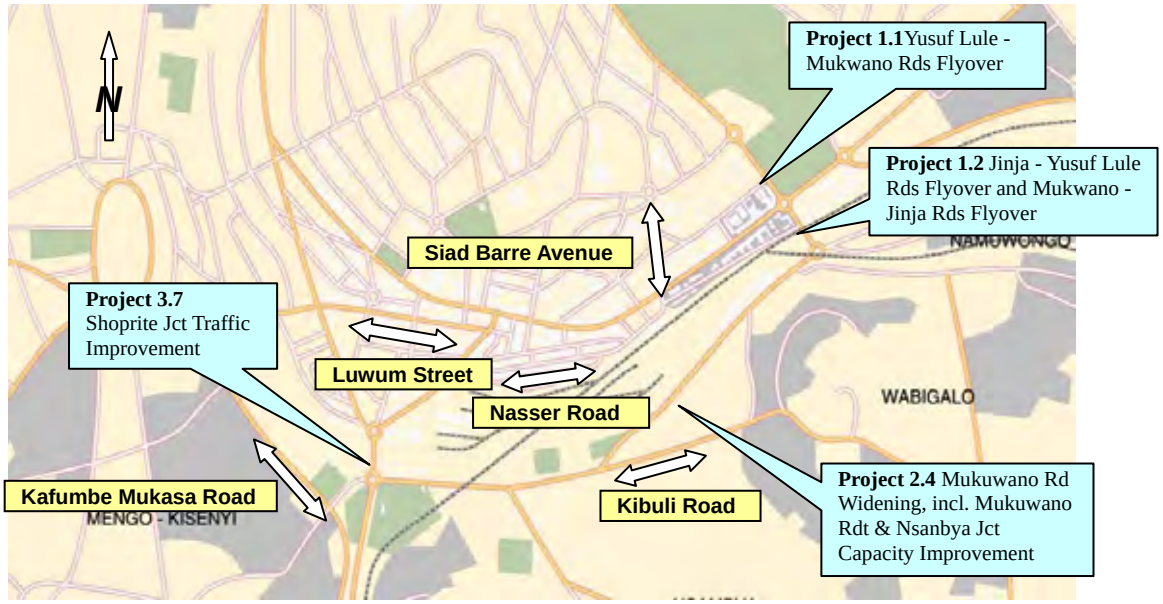
The project roads are mostly 7.0 m wide, 2-lane roads which require traffic management during the construction works. These works shall be done under one side construction method without interrupting traffic for both directions. This method requires traffic control by contractor with the assistance of traffic police. Since the weekday daytime traffic is large, major construction works are required to be carried out at night and during weekends.

(2) Basic Concept

Basic conditions for traffic management during construction are as follows:

- The one lane width shall be kept at 3.0 m at the minimum.
- Public transport vehicles shall be given priority to pass through the project site.
- Other traffic (private cars) shall be diverted to use other roads.

Involvement of construction site and plan of diverted road is shown as follows:



Source: JICA Study Team

Figure 7.5.4 Plan of Diverted Road

7.5.3 COSTRUCTION SCHEDULE

The tentative implementation schedule of the Project is prepared taking into account the ICB procedure. The project includes four sub-projects:

Flyover sub-projects:

- ✓ Project 1.1 Yusufu Lule - Mukwano Roads Flyover, and
- ✓ Project 1.2 Jinja - Yusufu Lule Roads Flyover and Mukwano - Jinja Roads Flyover

The construction period for this sub-project is scheduled for 36 months. All two sub-components shall commence and implemented concurrently.

Roads sub-projects:

- ✓ Project 2.4 Mukwano Road Widening including Mukwano Roundabout & Nsambya Junction Capacity Improvement, and
- ✓ Project 3.7 Shoprite Junction Traffic Improvement

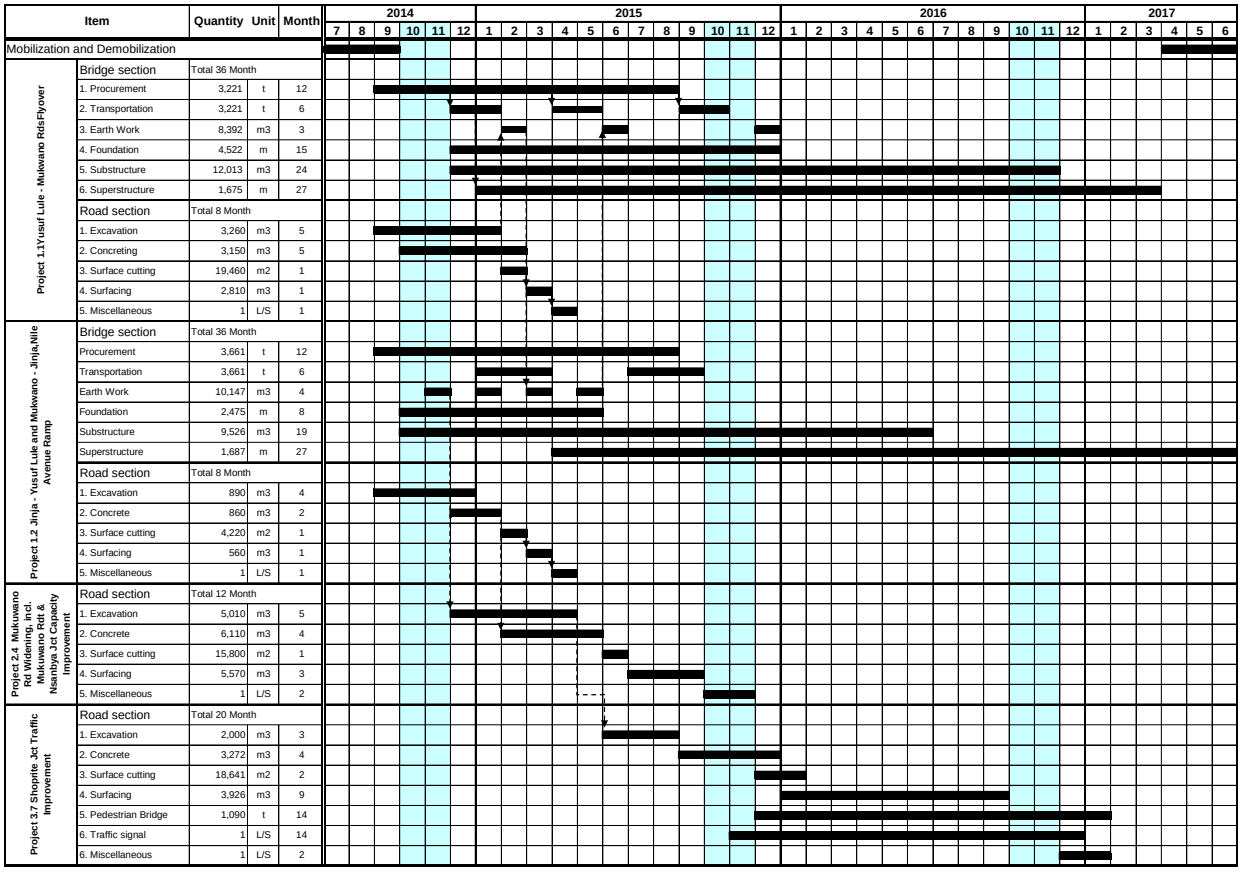
Mukwano Road Widening including roundabout and Nsambya Junction shall be scheduled to start. Midway of its construction, the Shoprite traffic improvement shall commence. The main objective is to allow continuity of traffic flow, i.e., as one section of the component is under construction, the other can be utilized by the public.

The construction period for this sub-project is scheduled to last about 26 months: 12 months for Mukwano Road widening and 20 months for Shoprite traffic improvement.

The overall Project construction schedule is shown below.

Table 7.5.2 Tentative Implementation Schedule

Item		Quantity	Unit	Month
Mobilization and Demobilization				
Project 1.1Yusuf Lule - Mukwano RdsFlyover	Bridge section	Total 36 Month		
	1. Procurement	3,221	t	12
	2. Transportation	3,221	t	6
	3. Earth Work	8,392	m3	3
	4. Foundation	4,522	m	15
	5. Substructure	12,013	m3	24
	6. Superstructure	1,675	m	27
	Road section	Total 8 Month		
	1. Excavation	3,260	m3	5
	2. Concreting	3,150	m3	5
	3. Surface cutting	19,460	m2	1
	4. Surfacing	2,810	m3	1
	5. Miscellaneous	1	L/S	1
Project 1.2 Jinja - Yusuf Lule and Mukwano - JinjaNile Avenue Ramp	Bridge section	Total 36 Month		
	Procurement	3,661	t	12
	Transportation	3,661	t	6
	Earth Work	10,147	m3	4
	Foundation	2,475	m	8
	Substructure	9,526	m3	19
	Superstructure	1,687	m	27
	Road section	Total 8 Month		
	1. Excavation	890	m3	4
	2. Concrete	860	m3	2
	3. Surface cutting	4,220	m2	1
	4. Surfacing	560	m3	1
	5. Miscellaneous	1	L/S	1
Project 2.4 Mukwano Rd Widening, incl. Mukwano Rdt & Nsanbya Jct Capacity Improvement	Road section	Total 12 Month		
	1. Excavation	5,010	m3	5
	2. Concrete	6,110	m3	4
	3. Surface cutting	15,800	m2	1
	4. Surfacing	5,570	m3	3
	5. Miscellaneous	1	L/S	2
Project 3.7 Shoprite Jct Traffic Improvement	Road section	Total 20 Month		
	1. Excavation	2,000	m3	3
	2. Concrete	3,272	m3	4
	3. Surface cutting	18,641	m2	2
	4. Surfacing	3,926	m3	9
	5. Pedestrian Bridge	1,090	t	14
	6. Traffic signal	1	L/S	14
	6. Miscellaneous	1	L/S	2



Source: The Study Team

7.6 MAINTENANCE PLAN AND COST

7.6.1 MAINTENANCE PLAN

Road maintenance activities, which are required after completion of the project, are generally divided into two categories, i.e., routine maintenance work and periodic maintenance work. Each maintenance work consists of the following items:

i) Routine Maintenance Work includes the following:

- Operation cost: Costs for electricity for street lighting, signal operation, etc,
- Clearing cost: Costs for clearing the road and bridge surfaces, drainage facilities, traffic sign boards, traffic devices, trimming/cutting of trees/grass, etc.
- Repairing cost: Costs for pavement repair including pot hole patching and crack sealing for AC pavement, re-painting road markings, repair of sign boards, safety devices and traffic control facilities, repair/seal of concrete cracks of bridge decks, handrail, girders, abutment and piers, replacement deck drainage pipe, etc.

ii) Periodic Maintenance includes the following:

- Overlay for AC pavement (every 5 years)
- Repainting of steel girder and replacement of expansion joint of bridge which includes reconstruction of water proofing of pavement surface, minor repair of damaged deck girder, etc. (every 15 years)

7.6.2 MAINTENANCE COST ESTIMATE

Taking the above activities into account, the maintenance cost for the Jinja Flyover, Clock Tower Flyover, Mukwano Road Widening and Shoprite & Clock Tower Traffic Improvement projects were estimated as shown in Table 7.6.1.

Table 7.6.1 Estimated Maintenance Costs of Each Project

No.	Project Name	Routine Maintenance Cost (M.Sh.)	Periodic Maintenance Cost (M. Sh.)	
		Every Year	Every 10 Years	Every 15 Years
1-1	Jinja Flyover Project	1,930	1,800	61,300
1-2	Clock Tower Flyover	160	0	5,630
2	Mukwano Road Widening Project	330	3,350	0
3	Shoprite & Clock Tower Traffic Improvement Project	260	2,610	0

Source: JICA Study Team

The above cost estimate was developed based on the assumption shown in the following Table 7.6.2:

Table 7.6.2 Estimated Ratio of Maintenance Costs for Construction Cost

No.	Project Name		Construction Cost excluding General Cost (M. Sh.)	Routine Maintenance Cost (Every Year)		Periodic Maintenance Cost (Every 10 Years)		(Every 15 Years)	
				Ratio for A	Amount (M.Sh.)	Ratio for A	Amount (M.Sh.)	Ratio for A	Amount (M.Sh.)
			(A)	(%)	(B)	(%)	(C)	(%)	(D)
1-1	Jinja Flyover Project	Road Sec.	6,005	3.0%	180	30.0%	1,800	-	0
		Bridge Sec.	175,133	1.0%	1,750	-	0	35.0%	61,300
		Total	181,138		1,930		1,800		61,300
1-2	Clock Tower Flyover		16,077	1.0%	160	-	0	35.0%	5,630
2	Mukwano Road Widening Project		11,160	3.0%	330	30.0%	3,350	-	0
3	Shoprite & Clock Tower Traffic Improvement		8,686	3.0%	260	30.0%	2,610	-	0

Source: JICA Study Team

7.6.3 MAINTENANCE ORGANIZATION AND CAPACITY

Currently all Pre-FS roads will be under administration of the KCC as other national roads which are located in the city centre. The number of engineers of KCC in civil engineering sectors is a few and their capacity is very limited. The budget of KCC for road and bridge is also very small (refer to Section 3.2.1). Therefore, the road and bridge maintenance by KCC would not be possible or very limited as other infrastructures. However, the GOU has planned to move the administration of national roads and other urban trunk roads located in the city centre from KCC to UNRA in a few years.

The GOU established UNRA in 2006 as one of the products of the road sector reforms and it became fully operational on 1st July 2008. The UNRA is responsible for both development and maintenance of national roads. Since the salary scale of UNRA staff is more than 5 – 7 times higher than that of MoWT and KCC, their motivation is high and UNRA can employ the staffs who have better capacity. In addition, EU has conducted capacity building of UNRA, including planning and implementation of maintenance projects.

As to the maintenance budget, the GOU established Uganda Road Fund (URF) in 2008 and it has a duty to finance the implementation of the Annual Road Maintenance Programs that are carried out by UNRA and the other designated road agencies responsible for district, urban and community access roads. Since the current URF is approximately US$ 100 million, it will be sufficient to cover the maintenance cost required for the Pre-FS flyovers.

The Study Team understands that as capacity of UNRA is insufficient for steel structures (bridges) maintenance, development of the maintenance capacity should be incorporated in the project at the implementation stage. The Study Team also recommends that introduction of a performance-based maintenance and management contract (PMMC) would be appropriate for the flyover maintenance reducing life cycle costs, increasing in maintenance efficiency and reducing the government burden.

CHAPTER 8 ROAD TRAFFIC SAFETY PLAN

8.1 INTRODUCTION

Road traffic safety is a great concern in GKMA. As part of the Study on Greater Kampala Road Network and Transport Improvement, a road traffic safety study is conducted to improve road traffic safety situation in GKMA.

8.1.1 BACKGROUND AND OBJECTIVE

(1) Study Background

The economic growth of Uganda has been steady since the early 1990s. While the demand for passengers and goods transport has increased together with the growth of the economy, the road system in GKMA is being built or improved with domestic funding as well as aid funds from donor organizations. In recent years, income growth and improvement of transport infrastructure have both contributed to a rapid increase in the number of motorized vehicles. As traffic volume expanded, traffic-related problems also increased, i.e., traffic conflicts and bottlenecks became evident and traffic accidents began to rise. On the other hand, the level of understanding and compliance to traffic safety requirements remains very low among the public. Also, authorities have not been always aware of their critical role in restoring traffic safety and order.

Thus, traffic accident has become a major social problem and consequently, traffic safety is now regarded as one of the most urgent policy issues of the Government of Uganda (GOU).

(2) Study Objectives

The objectives of the Road Traffic Safety Study are as follows:

(i) To develop a Road Traffic Safety Strategic Plan up to 2023, and

(ii) To formulate an Action Plan for Road Traffic Safety in GKMA, 2011-2015.

The Road Traffic Safety Strategic Plan will provide various comprehensive strategies and develop sustainable fundamentals for the road traffic safety in GKMA. The proposals are based on the existing conditions of the country, and thus, will be deemed feasible. They will address all aspects of the road transport system, namely: (i) infrastructure; (ii) road users; (iii) vehicle; and (iv) legal framework, especially traffic safety policies and institutional issues. The activities included in the Action Program of 2011-2015 will form the first phase of the implementation process for the whole complex of strategies for the Road Traffic Safety Strategic Plan.

8.1.2 STUDY AREA AND COVERAGE

The study area of the Road Traffic Safety Study follows the study area described in Chapter 1.3.2. The related local government authorities as stakeholders of the Road Traffic Safety Study are as follows:

1. Kampala City Council
2. Entebbe Municipality
3. Mukono Town Council
4. Kira Town Council (except for Kimwanyi Parish)
5. Wakiso Town Council
6. Mukono District (part of Mukono District)
7. Wakiso District (part of Wakiso District)

The Road Traffic Safety Study focuses on the road sector, as well as on road-railway crossing.

8.2 CURRENT TRAFFIC SAFETY SITUATION, PROBLEMS AND ISSUES

8.2.1 CHARACTERISTICS OF THE STUDY AREA AND ROAD TRAFFIC ACCIDENTS

(1) Profile of the Study Area

1) Population Growth in GKMA

The population in GKMA has increased from 2,047,000 in 2003 to 2,503,000 in 2008, with an annual growth rate of 4.1% more than that of total national population, and reached 8.5% of the total national population in 2008 as shown in Tables 8.2.1 and 8.2.2. Moreover, considerable number of squatters seems to live in GKMA.

Table 8.2.1 Population Projections for GKMA

(Unit: '000)

No.	Area	2003	2008	2013	2018	2023
1	Kampala	1,235.2	1,480.2	1,788.6	2,137.4	2,521.4
2	Mukono (GKMA)	93.5	119.3	152.3	189.8	233.1
3	Wakiso (GKMA)	718.6	904.1	1,142.9	1,424.3	1,749.6
	Total, GKMA	2,047.3	2,503.6	3,083.8	3,751.5	4,504.1

Source: NTMP (May 2009), MOWT

Steady high population growth up to 2023 is projected.

Table 8.2.2 Population Growth Rates in GKMA

(%)

No.	Area	2003/2008	2008/2013	2013/2018	2018/2023
1	Kampala	3.69	3.86	3.63	3.36
2	Mukono (GKMA)	4.99	5.01	4.50	4.20
3	Wakiso (GKMA)	4.70	4.80	4.50	4.20
	Total, GKMA	4.11	4.26	4.00	3.72

Source: NTMP (May 2009), MOWT

2) Growth of Gross Domestic Product (GDP)

Uganda achieved annual GDP growth of around 8% from 2000 to 2008. However, GDP growth fell to 6.2% in 2003 and 5.8% in 2004. Thereafter, GDP growth rose up again. GDP per capita, however, is still at a low level but has increased to 626,895 Shillings (= US$ 303, US$ 1 = UShs 2,070) in 2008 as shown in Table 8.2.3.

Table 8.2.3 Gross Domestic Product and Per Capita GDP in Uganda

(Unit of GDP: Bln Shs)

Year	GDP (Current Price)	GDP (Constant Prices)	Real Annual Growth Rate (%)	Per Capita GDP (Current Price)	Per Capita GDP (Constant Prices)	Real Annual Growth Rate (%)
2000	10,030	10,297	-	437,251	448,860	-
2001	11,132	11,199	8.8	469,976	472,816	5.3
2002	11,990	11,990	7.1	490,190	490,190	3.7
2003	13,843	12,728	6.2	548,137	503,980	2.8
2004	15,271	13,467	5.8	585,622	516,420	2.5
2005	17,878	14,814	10.0	663,971	550,193	6.5
2006	20,166	15,859	7.1	725,343	570,410	3.7
2007	23,351	17,156	8.2	813,425	597,638	4.8
2008	28,340	18,582	8.3	956,081	626,895	4.9

Note: constant price are for 2002

Source: Statistical Abstract 2009, UBOS

(2) Motorization and Road Transport Demand

1) Registered Vehicles

The estimated number of vehicles rapidly increased with high annual growth rates of 13%-23% in recent years. Meanwhile, high annual growth rates of 17%-44% for newly registered vehicles were recorded over the same period as shown in Table 8.2.4.

Table 8.2.4 Newly Registered and Estimated Number of Motor Vehicles

Category	2004	2005	2006	2007	2008
Newly Registered	35,538	51,107	59,617	77,305	101,240
Growth Rate (%)	-	44	17	30	31
Estimated Number of Vehicles	247,045	278,594	315,903	382,773	470,488
Growth Rate (%)	-	13	13	21	23

Source: MOWT and Uganda Revenue Authority

As for the annual growth of newly registered vehicles, station wagon and motorcycle record constant high growth rates of over 30% in recent years. Alternatively, the annual growth rate of cars is rather smaller than the average annual growth rate of newly registered vehicles as shown in Table 8.2.5. Most of the newly registered vehicles are imported used cars except for motorcycles.

Table 8.2.5 Newly Registered Vehicles by Type

Vehicle Type	2004	2005	2006	2007	2008
Car	7,614	10,001	9,639	11,218	11,950
Growth Rate (%)	-	31.4	-3.6	16.4	6.5
Mini Buses	229	135	177	223	275
Growth Rate (%)	-	-41	31.1	26	23.3
Pick-up	3,714	4,006	3,443	4,062	3,193
Growth Rate (%)	-	7.9	-14.1	18	-21.4
Van	1,984	2,599	1,722	2,389	2,739
Growth Rate (%)	-	31	-33.7	38.7	14.7
Bus	45	75	73	151	262
Growth Rate (%)	-	66.7	-2.7	106.8	73.5
Lorry	990	1,353	1,819	1,661	3,750
Growth Rate (%)	-	36.7	34.4	-8.7	125.8
Tractor	373	273	195	206	346
Growth Rate (%)	-	-26.8	-28.6	5.6	68
Trailer	202	313	349	258	237
Growth Rate (%)	-	55	11.5	-26.1	-8.1
Tanker	20	25	41	48	92
Growth Rate (%)	-	25	64	17.1	91.7
Station Wagon	2,761	3,709	4,247	5,546	7,684
Growth Rate (%)	-	34.3	14.5	30.6	38.6
Semi-Trailer	7	24	22	25	46
Growth Rate (%)	-	242.9	-8.3	13.6	84
Forklift	9	26	40	42	30
Growth Rate (%)	-	188.9	53.8	5	-28.6
Earth Equipment	217	125	169	209	332
Growth Rate (%)	-	-42.4	35.2	23.7	58.9
Ambulance	43	27	23	29	28
Growth Rate (%)	-	-37.2	-14.8	26.1	-3.4
Omnibus	140	36	8	11	17
Growth Rate (%)	-	-74.3	-77.8	37.5	54.5
Tipper	705	304	496	1,202	1,472
Growth Rate (%)	-	-56.9	63.2	142.3	22.5
Motor Cycles	19,398	27,885	35,057	46,921	68,787
Growth Rate (%)	-	43.8	25.7	33.8	46.6
Total	38,451	50,916	57,520	74,201	101,240

Source: Uganda Revenue Authority

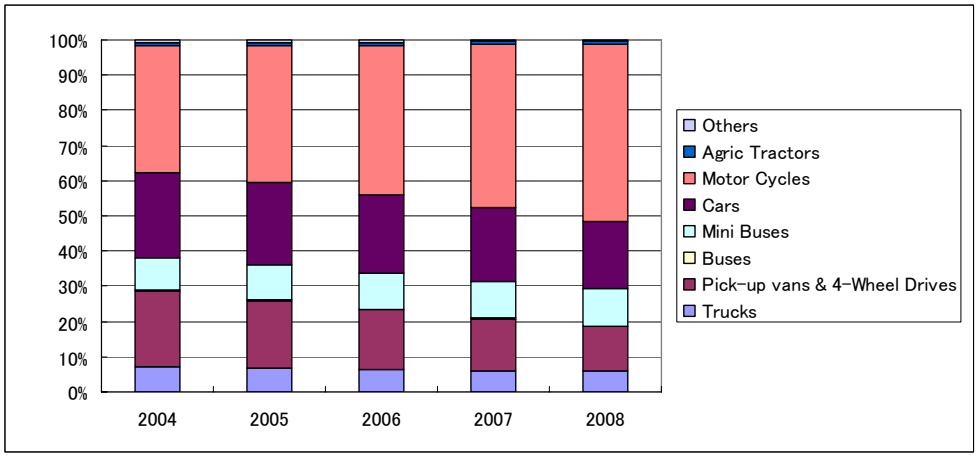
The number of cars and motorcycles has increased from 59,800 and 89,200 in 2004 to 90,900 and 236,500 in 2008, respectively. In 2008, the vehicle ownership rates are 7.9 automobiles and 8.0 motorcycles per 1,000 persons as shown in Table 8.2.6.

Table 8.2.6 Estimated Number of Motor Vehicles by Vehicle Type

Vehicle Type	2004	2005	2006	2007	2008
Trucks	17,530	18,684	20,496	23,323	28,501
Growth Rate (%)	-	6.6	9.7	13.8	22.2
Pick-up vans & 4-Wheel Drives	52,685	53,203	53,137	55,950	58,317
Growth Rate (%)	-	1	-0.1	5.3	4.2
Buses	878	868	857	995	1,237
Growth Rate (%)	-	-1.1	-1.3	16.1	24.3
Mini Buses	22,565	27,568	32,006	39,476	49,235
Growth Rate (%)	-	22.2	16.1	23.3	24.7
Cars	59,786	65,471	70,652	81,320	90,856
Growth Rate (%)	-	9.5	7.9	15.1	11.7
Motor Cycles	89,212	108,207	133,985	176,516	236,452
Growth Rate (%)	-	21.3	23.8	31.7	34
Agric Tractors	2,574	2,717	2,778	2,958	3,306
Growth Rate (%)	-	5.6	2.2	6.5	11.8
Others	1,815	1,876	1,991	2,235	2,584
Growth Rate (%)	-	3.4	6.1	12.3	15.6
Total	247,045	278,594	315,902	382,773	470,488

Source: MOWT

The number of motorcycles in Uganda has rapidly increased. The share of motorcycles accounts for over 50% of total number of vehicles in Uganda in 2008 as shown in Figure 8.2.1. Boda-boda shares a dominant proportion of the total number of motorcycles.



Source: MOWT

Figure 8.2.1 Vehicle Share by Vehicle Type

3) Road Transport Demand

Road transport shares a dominant proportion of the total transport demand in GKMA. Transport demand of people and goods in GKMA is absolutely increasing. Minibuses/taxis, bus and motorcycle share about 43% of total vehicle-km as commercial passenger transport while light goods vehicles and trucks share about 35% as goods transport. Share of private passenger transport is about 22% of total vehicle-km. Motorcycles share about 50% of commercial passenger transport demand as shown in Table 8.2.7.

Table 8.2.7 Estimates of Vehicle-Kilometer in Uganda (2003)

(Unit: Million)

Vehicle Type	Veh-Kms	Share (%)
Cars and Taxi (special hire)	817.4	21.8
Light Goods Vehicle (inc 4WD)	785.8	20.9
Minibuses and Taxis (Kamunye)	752.2	20.0
Buses	59.2	1.6
Trucks (Single-unit)	417.8	11.1
Trucks (Trailers and Articulated)	118.9	3.2
Sob-Total	2,951.3	78.6
Motor Cycles	804.4	21.4
Total	3,755.7	100.0

Source: NTMP Interim Report 3 (2004), MOWT

About 49% of total motorcycle vehicle-km is estimated as total vehicle-km on less traffic roads as shown in Table 8.2.8. It seems that minibus and motorcycle consider roominess and flexible access of vehicles in choosing their roads. Trunk roads with high traffic demand are mainly covered by minibuses while collector streets with low traffic demand are covered by motorcycles (Boda-boda).

Table 8.2.8 Estimated Total Annual Traffic by Surface Type and Traffic Range (2003)

Traffic Range in ADT		Length (km)	Motorised Traffic Totals (million vehicle-kms)			
			exc. MC	MC	Inc. MC	MC Share (%)
Paved Roads	0 - 2,499	1,835	668.3	170.2	838.5	20.3
	2,500 - 4,999	572	653.8	129.8	783.6	16.6
	5,000 - 9,999	143	346.4	28.2	374.6	7.5
	10,000 - 19,999	74	346.1	38.2	384.3	9.9
	20,000 and over	22	179.4	13.7	193.1	7.1
	Total	2,646	2,194.0	380.1	2,574.1	14.8
Unpaved Roads	0 - 2,499	7,895	729.8	373.7	1,103.5	33.9
	2,500 - 4,999	73	27.5	50.6	78.1	64.8
	5,000 and over					
	Total	7,968	757.3	424.3	1,181.6	35.9
All Roads	0 - 2,499	9,730	1,398	544	1,942.0	28.0
	2,500 - 4,999	645	681	180	861.7	20.9
	5,000 - 9,999	143	346	28	374.6	7.5
	10,000 - 19,999	74	346	38	384.3	9.9
	20,000 and over	22	179	14	193.1	7.1
	Total	10,614	2,951.3	804.4	3,755.7	21.4

Source: Consultancy Services for Preparation of National Transport Master Plan, Interim Report 3 (February 2004), Tahal Consulting Engineers

3) Traffic Conditions on Major Roads

Most of main radial routes from Kampala have large traffic volumes. The range of average annual growth rates from 2001 to 2008 is from 6.6% to 16.6% except for unpaved road sections as shown in Table 8.2.9. Outstanding growth is recorded on radial routes heading to northwest direction such as Nansana-Busunju-Lwamata route and Busega-Mubende-Kabarole route due to recent housing developments.

Table 8.2.9 Traffic Growth on Main Radial Routes from Kampala (2001/2008)

Route	Length (km)	Daily Traffic in Veh-kms ('000)		Growth Rate (%)
		2001	2008	
Kibuye - Entebbe Airport	36.9	383.3	733.6	9.7
Kibuye - Masaka - Lyantonde	198	822.8	1291.2	6.6
Busega - Mubende - Kabarole Brd	177.9	166.2	431.3	14.6
Nansana - Busunju - Lwamata	96.3	94.9	278	16.6
Kalerwe - Lwero - Kafu Bridge	178.5	361.7	569.8	6.7
Kalerwe - Gayaza - Kalagi	34.5	129.6	279.5	11.6
Gayaza - Zirobwe*	31.5	53.8	56.6	0.7
Mukono - Kayunga	33.8	65.4	102.1	6.6
Kayunga - Galiraya*	77.5	75.5	60.1	-3.2
Nakawa - Mukono - Njeru	71.4	455.1	923.6	10.6
Total	936.3	2,608.3	4,725.8	8.9

Note: * Unpaved sections
Source: Traffic Census on National Road Links in Central Uganda, Draft Final Report (April 2008), Prome Consultants

(3) Traffic Accident Analysis

1) Road Traffic Accidents in Uganda

i) Definition of Accident Classification

Accident statistics classify accident into three categories, namely: fatal accident, serious accident, and minor accident, based on annual traffic accident report filled out by the Uganda Police Force (UPF).

Traffic accidents:

Traffic accidents refer to collisions between vehicles; between vehicles and pedestrians; between vehicles and animals; or between vehicles and fixed obstacles.

Accident Severity:

Accident Severity is determined by or classified according to the most severe casualty involved in the accident. Severity is also used to rank accidents. For instance, if an accident results in one fatal casualty, two hospitalized casualties and two non-hospitalized casualties, the accident is referred to as a 'fatal accident'.

Fatal accident: is defined as one in which death occurs on the scene of the accident and/or within a given period of time as a result of injuries sustained in the accident.

Serious accident: is defined as an accident in which a person is detained in the hospital as an "in-patient" or has suffered any of the following injuries, whether or not he or she is detained in the hospital: fractures, concussion, internal injuries, crashing, severe cuts and lacerations.

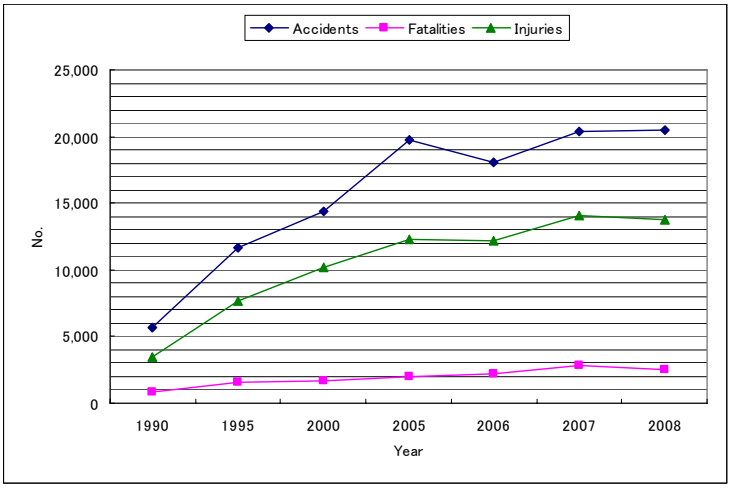
Minor accident: is one in which a person is treated for minor injuries and released to go home thereafter. It can also be an accident with damage only where no persons are injured at all.

Juvenile: (As per the children statute 1997) is a person below 18 years of age.

Adult: A person aged 18 years and above as per the Constitution of Uganda.

ii) Trend of Road Traffic Accidents

Figure 8.2.2 and Table 8.2.10 show the annual number of road traffic accidents, fatalities and injuries from 1990 to 2008. In 2008, there were 20,522 road traffic accidents which resulted to 2,488 fatalities and 13,753 injuries. The road traffic accidents increased rapidly from 1990 to 2007, with an annual increase rate of 7.8%. During this 17-year period, the number of fatalities has increased 3.6 times. The numbers of accidents, fatalities and injuries have reached 20,413, 2,807 and 14,073, respectively (Figure 8.2.2 and Table 8.2.10).



Source: Traffic Accident Report, Uganda Police Force.

Figure 8.2.2 Road Traffic Accidents in Uganda

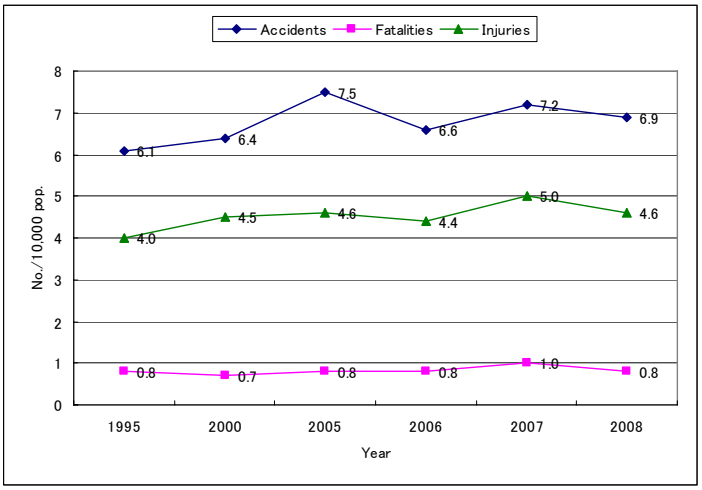
Table 8.2.10 Road Traffic Accidents in Uganda (1990-2008)

Year	Accidents				Fatalities				Injuries			
	No.	Growth Rate (%/yr.)	No. per 10,000 persons	No. per 10,000 vehicles	No.	Growth Rate (%/yr.)	No. per 10,000 persons	No. per 10,000 vehicles	No.	Growth Rate (%/yr.)	No. per 10,000 persons	No. per 10,000 vehicles
1990	5,674	-	-	-	788	-	-	-	3,460	-	-	-
1995	11,638	15.5	6.1	-	1,538	14.3	0.8	-	7,693	17.3	4.0	-
2000	14,384	4.3	6.4	-	1,678	1.8	0.7	-	10,213	5.8	4.5	-
2005	19,783	6.6	7.5	709.1	2,034	3.9	0.8	72.9	12,275	3.7	4.6	440.0
2006	18,092	-8.5	6.6	572.5	2,172	6.8	0.8	68.7	12,158	-1.0	4.4	384.7
2007	20,413	12.8	7.2	533.0	2,807	29.2	1.0	73.3	14,073	15.8	5.0	367.4
2008	20,522	0.5	6.9	436.6	2,488	-11.4	0.8	52.9	13,753	-2.3	4.6	292.6

Source: Traffic Accident Report, Uganda Police Force (accident data); Statistical Abstract 2009, UBOS (population data); MOWT (vehicle data)

iii) Traffic Accident per Population

Figure 8.2.3 shows the fluctuation of indices of traffic accidents per 10,000 persons. The fluctuation trend is almost the same over the recent years because the increase of population is constant at a growth rate of about 3.3%. Rates of accidents and injuries were increasing until 2007.

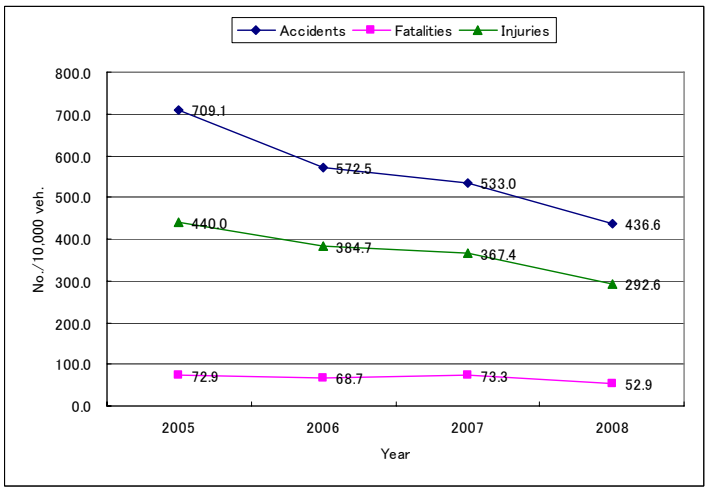


Source: JICA Study Team

Figure 8.2.3 Road Traffic Accidents per 10,000 Populations (1995-2008)

iv) Traffic Accident per Motorized Vehicles

The number of road traffic accidents has been increasing as the number of motorized vehicles including motorcycles increased. This is due to the rapid motorization that Uganda has been experiencing. As statistics would show, from 2004 to 2008, the number of motorized vehicles has sharply increased 1.9 times (1.5 times for cars and 2.6 times for motorcycles). On the other hand, as shown in Figure 8.2.4, the rates of accidents and injuries are decreasing through the years. However, fatality rate still remains at a critical level of 52.9 per 10,000 motorized vehicles.



Source: JICA Study Team

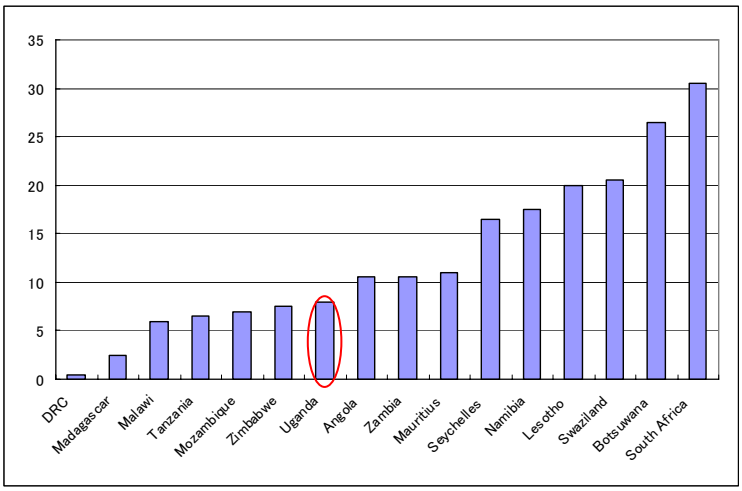
Figure 8.2.4 Road Traffic Accidents per 10,000 Motorized Vehicles (2005-2008)

2) Comparison with Other African Countries

According to the Global Road Safety Partnership (GRSP) statistics, nearly 1 million people are killed and more than 10 million people are injured in road traffic accidents in the world every year. More than 75% of these occur in developing and transitional countries.

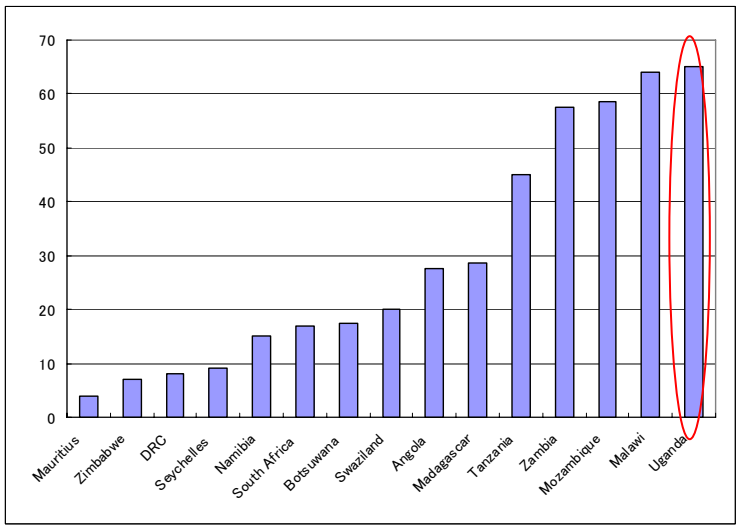
According to the traffic accident data of African countries (refer to Figure 8.2.5), the level of traffic safety in Uganda is very low.

In terms of fatalities as against the rate of population, Uganda's figure is 8.0 per 10,000 persons. In terms of fatalities as against motorized vehicles including motorcycle, Uganda's figure is 65 per 10,000 vehicles. It ranked the worst as shown in Figures 8.2.5 and 8.2.6. In comparison, fatalities in Japan are 0.45 per 10,000 persons and 0.63 per 10,000 motorized vehicles in 2007.



Source: WHO

Figure 8.2.5 Road Accident Fatalities per 100,000 Population in SADC countries



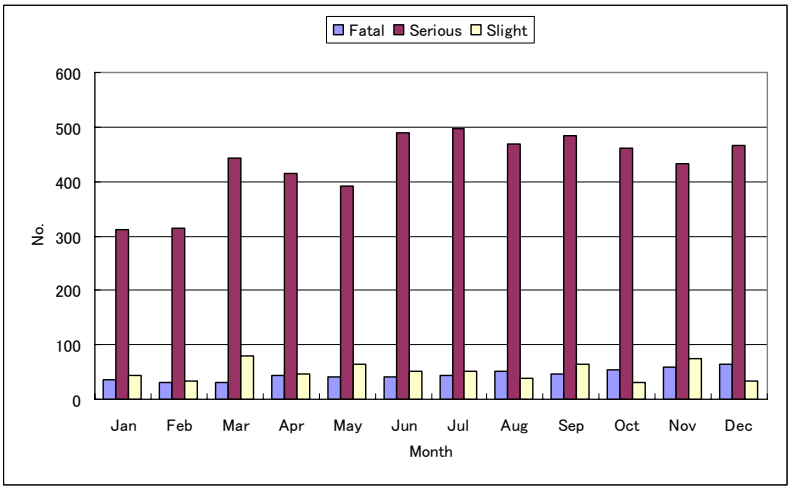
Source: WHO

Figure 8.2.6 Road Accident Fatalities per 10,000 Vehicles in SADC countries

3) Analysis of Traffic Accident Data

i) Monthly Fluctuation

Figure 8.2.7 shows the monthly fluctuation of traffic accidents which occurred in 2009.As shown in this figure, December has the highest number of fatalities. January and February have lower levels of accident in comparison with other months which have almost equivalent level of accident indicators.

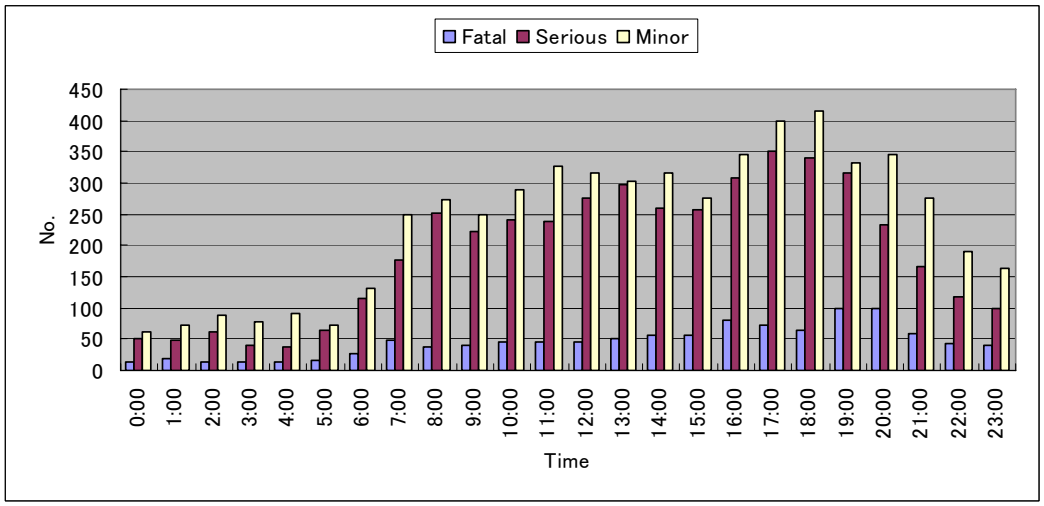


Source: Uganda Police Force

Figure 8.2.7 Monthly Fluctuation of Traffic Accidents in Kampala (2009)

ii) Time Fluctuation

Figure 8.2.8 shows the time fluctuation of traffic accidents which occurred in the first semester of 2009. As shown in this figure, traffic accidents tend to occur in the afternoon, with the highest instance during the period between 17:00 and 18:00.



Source: Uganda Police Force

Figure 8.2.8 Time Fluctuation of Traffic Accidents in 2009 (January-June)

iii) Age Distribution

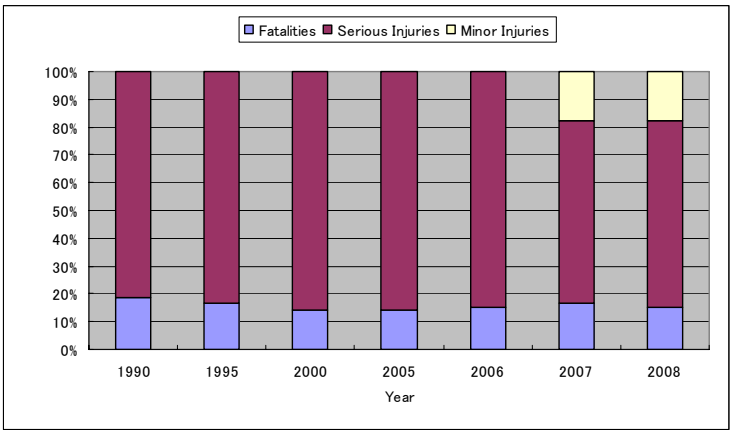
Since accident report filled out by traffic police at accident site does not require the age of the accident parties, age distribution analysis based on the police accident statistics is not available. However, about 40% of the fatalities are below 25 years old according to interview with Uganda Police.

iv) Accident Type

Figure 8.2.9 shows the composition of traffic accidents by accident type from 1990 to 2008. Accident type is not clearly defined by UPF, and classification is basically dependent on the seriousness of accident such as number of fatalities, injuries and property losses, etc.

As shown in this figure, in 2008, the fatal accidents accounted for about 12% of the

total accidents and serious and minor accidents accounted for 53% and 14% of the total, respectively. Proportion of the serious accidents has been increasing since 2007.

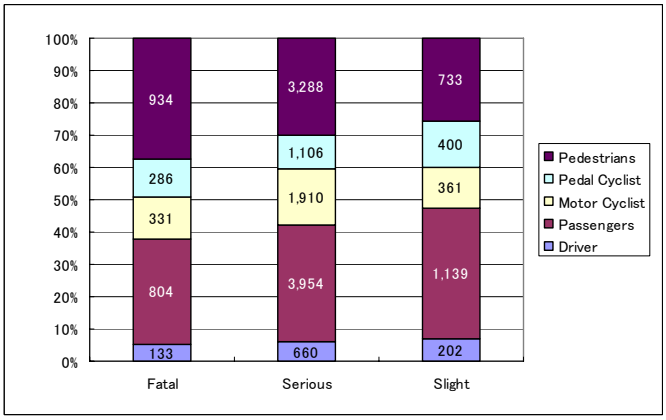


Note: Number of serious and minor injuries was combined before 2005.
Source: Traffic Accident Report, Uganda Police Force

Figure 8.2.9 Traffic Accidents by Accident Type (1990-2008)

v) Vehicle Type

Figure 8.2.10 shows the composition of traffic accident victims by road user category. In terms of fatal accidents, 38% of traffic accident victims were pedestrians, 32% were passengers and 13% were motorcyclists. As regards serious injury accidents, 30% of traffic accident victims were pedestrians, 36% were passengers and 18% were motorcyclists.



Source: Uganda Police Force

Figure 8.2.10 Accident Victims by Road User Category in 2008

vi) Ownership

Table 8.2.11 shows the composition of ownership of vehicles involved in road traffic accidents. Almost 90% of road accidents are caused by private owned vehicles. Public transport vehicles such as minibus and boda-boda were counted as private owned vehicles.

Table 8.2.11 Ownership of Vehicles Involved in Road Accidents

Registration	2006		2007		2008	
	Number	%	Number	%	Number	%
Private	18,322	89.0	17,641	88.7	19,883	87.7
Government	537	2.6	604	3.0	669	3.0
Foreign	428	2.1	394	2.0	419	1.8
Diplomatic	126	0.6	115	0.6	120	0.5
Army	128	0.6	113	0.6	53	0.2
NGO	125	0.6	105	0.5	119	0.5
Police	118	0.6	99	0.5	111	0.5
Unregistered	64	0.3	91	0.5	144	0.6
Prison	9	0.0	8	0.0	9	0.0
Unknown	741	3.6	724	3.6	1,136	5.0
Total	20,598	100.0	19,894	100.0	22,663	100.0

Source: Traffic Department, Uganda Police

vii) Accident Causes

Table 8.2.12 shows the composition of traffic accidents by cause in the entire Uganda and Kampala Metropolitan in 2008. Most road traffic accidents in Uganda are caused by road users' errors, among which, careless driving and reckless/dangerous driving are the primary causes accounting for about 70%. Although road infrastructure has improved in recent years, drivers' mindset has not changed accordingly. As a result, road users tend to commit traffic offences. Under these circumstances, strict enforcement of traffic rules and effective traffic education of road users are crucial in reducing traffic accidents. In addition, physical measures such as improvement of surface conditions, paving of shoulders, re-designing of roads, and installation of traffic signs and lights are also necessary.

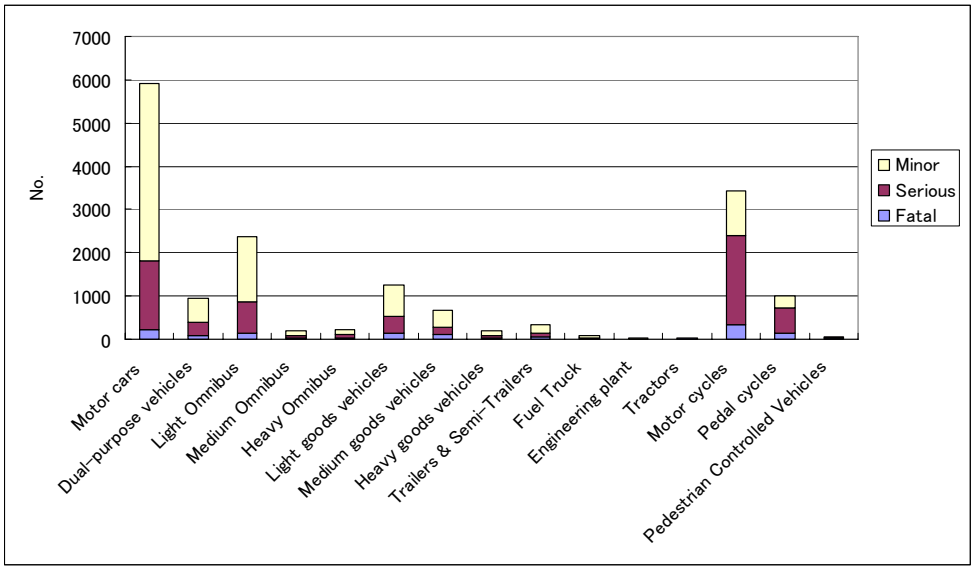
Table 8.2.12 Traffic Accidents by Cause and Area in 2008

Causes of Accident	Entire Uganda		Kampala Metropolitan	
	Number	%	Number	%
Careless Driving	7688	37.5	5,678	47.2
Reckless/Dangerous Driving	6,306	30.7	2,726	22.7
Hit & Run	2,172	10.6	1,603	13.3
Careless Pedestrian	1,015	4.9	453	3.8
Vehicle Defect	678	3.3	286	2.4
Obstacle on Carriage Way	71	0.3	18	0.1
Over Speeding	639	3.1	221	1.8
Passengers Falls from MV	256	1.2	87	0.7
Over/Dangerous Loading	184	0.9	69	0.6
Influence of Drinking/Drug	247	1.2	221	1.8
Dazzled Light MV	115	0.6	55	0.5
Other Causes	1,153	5.6	604	5.0
Total	20,524	100.0	12,021	100.0

Source: Uganda Police Force

viii) Collision Type

Figure 8.2.11 shows the number of vehicles involved in traffic accidents by vehicle type. By vehicle type, 35% of road traffic accidents were caused by car, 14% by minibus and 21% by motorcycle.



Source: Uganda Police Traffic Department

Figure 8.2.11 Traffic Accidents by Vehicle Class (2009 Bi-annual)

ix) Road Section

Table 8.2.13 shows accident numbers and densities in main radial highway of GKMA. Entebbe Road and Jinja Road record the densest accident ratio, while Masaka Road records the highest number of accident fatalities.

Table 8.2.13 Accident Statistics on the Four Main Highways of Kampala (2008)

Highway	Fatal	Serious	Slight	Total	Length (km)	Acc/km
Entebbe	60	188	242	490	37	13.2
Jinja	132	363	562	1057	80	13.2
Masaka	157	272	233	662	130	5.1
Guru	145	239	219	603	332	1.8
Total	494	1062	1256	2812	579	Average:
						4.9

Source: Road Safety Management Capacity Review in Uganda, Draft Final Report, Dec 2009, Consia

8.2.2 TRAFFIC SAFETY INSTITUTIONAL FRAMEWORK, DEVELOPMENT POLICIES AND PLANS

(1) Organizational Framework for Traffic Safety

Composition of relevant organizations and their responsibilities on traffic safety are shown in Figure 8.2.12.

	Comprehensive Policy Institution	Engineering	License Inspection	Enforcement	Education	Propaganda	Emergency
Lead Agency	NRSC (MOWT)					NRSC (MOWT)	
Ministries (Group Leader)		MOWT	MOWT	MOIA	MOES		MOH
Governmental Agencies		UNRA	TLB UNBS	UPF			
Private Sector NGO's	NGO's		AAU UDSIOA UTODA NAFEBO		NGO's		ICC-U URCS
Local Government		KCC Entebbe Mukono Kira Wakiso					

Note: NRSC; National Road Safety Council
MOWT; Ministry of Works and Transport
MOIA; Ministry of Internal Affaire
MOES; Ministry of Education and Sport
MOH; Ministry of Health
UNRA; Uganda National Road Authority
TLB; Transport Licencing Board
UPF; Uganda Police Force
UNBS; Uganda National Bureau of Standards
AAU; Automobile Association of Uganda
ICC-U; Injury Control Center-Uganda
UDSIOA; Uganda Driving School Operators and Instructors Association
URCS; Uganda Red Cross Society
UTODA; Uganda Taxi Operators and Drivers Association
NAFEBO; National Federation of Boda Boda Operators
KCC; Kampala City Council

Source: JICA Study Team

Figure 8.2.12 Composition of Relevant Organization and Their Role on Traffic Safety

Responsibilities for traffic safety of each organization are as follows:

1) National Road Safety Council (NRSC)

NRSC is responsible for coordinating traffic safety efforts and reporting the entire country's traffic safety situation to the Government.

2) Ministry of Works and Transport (MoWT)

The functions and responsibilities of MoWT are to set strategies and policy directions, and, through its statutory agencies, to ensure the operations and regulatory functions and duties are being carried out.

4) Uganda National Road Authority (UNRA)

The Uganda National Road Authority (UNRA) is responsible for managing, monitoring and investing in transport infrastructures of its sub-sectors. The UNRA was established in 2007 as a subordinate agency to the MoWT responsible for national road administration from planning through construction and maintenance.

5) Transport Licensing Board (TLB)

TLB is responsible for regulating operations of public service vehicles (PSV), commercial buses

and freight cars.

6) Ministry of Education (MOE)

MOE is responsible for educating and disseminating traffic laws and regulations in schools and universities.

7) Ministry of Health (MOH)

MOH is responsible for giving emergency treatment, supporting and curing injuries caused by traffic accidents.

8) Injury Control Center – Uganda (ICC-U)

ICC –U is a non - governmental, non - profit organization that was incorporated in May 1996. It was established in response to the escalating burden of injury in Uganda. The ICC-U addresses injury in its broadest scope, in a scientific, sustainable, collaborative and political manner with the guiding principles of equity and integrity.

9) Ministry of Internal Affair (MOIA), Uganda Police Force (UPF)

UPF is responsible for managing and monitoring road traffic accidents and enforcing road traffic rules and regulations. UPF consists of following departments:

- Criminal Investigations Directorate
- Immigration Department
- Legal Department
- Traffic and Road Safety Department
- Uganda Prisons Services
- Uganda Police Force

10) Uganda National Bureau of Standards (UNBS)

UNBS is a standards-setting body. It has set several standards regarding road safety.

11) Kampala City Council (KCC)

KCC is responsible for traffic management and road infrastructure in Kampala City.

12) Entebbe Municipal Council

Entebbe Municipal Council is responsible for traffic management and road infrastructure in Entebbe Municipality.

13) Mukono Town Council

Mukono Town Council is responsible for traffic management and road infrastructure in Mukono Town.

14) Kira Town Council

Kira Town Council is responsible for traffic management and road infrastructure in Kira Town.

15) Wakiso Town Council

Wakiso Town Council is responsible for traffic management and road infrastructure in Wakiso Town.

15) Uganda Taxi Operators and Drivers Association (UTODA)

UTODA is an association of public transport service providers.

16) Non-government Organizations (NGOs)

Several NGOs participated in road traffic safety development sector in Uganda. Arrive Alive Uganda was launched in 2007 as a coalition of private companies aiming to contribute reduction of road traffic accidents and support or oppose legislative action related to road traffic safety in Uganda. ICC-U is a research center that conducts injury surveillance, research and advocacy. URCS is an organization providing humanitarian support for victims of various accidents including traffic accidents with ambulances and quality first aid kits.

(2) Traffic Safety Development Plans and Projects

1) GOU "Road Sector Development Program (RSDP)"

RSDP was prepared in 1996 by GOU with the assistance of development partners (WB/IDA, ADB, EU/EDF) as a 10-year road sub-sector rolling program to maintain and improve road network including road traffic safety measures (Table 8.2.14).

Table 8.2.14 Outline of RSDP

Phase	Period	Estimated Cost (billion US$)
RSDP-1	1996/97 – 2005/06	1.5
RSDP-2	2001/02 – 2010/11*	2.28
RSDP-3	2009/10 – 2018/19	4.46
Programs of RSDP-3		
Cost of institutional development and capacity building of UNRA/MoWT		0.256
Development and improvement of national roads		2.605
Rehabilitation and maintenance of national roads		0.720
Rehabilitation and maintenance of district, urban and community access roads		0.881

Note: RSDP-1 was updated and rolled over to RSDP-2 in 2002.
Source: TSDP Project Information Document (PID), WB

Roads Development Program (RDP) is one of the road improvement projects under RSDP founded by IDA. It has implemented several traffic safety related projects as follows:

- Road Safety Improvement of Black Spots (RDPP-2)
- Road Safety Improvement Institutional Development (RDPP-2)
- Purchase of Road Safety Equipment for Uganda Police (RDPP-2)

2) World Bank (WB) "Road Safety Audit and Improvement Study, 2000", Phoenix Engineering Research Ltd.

This study was carried out under RSDP and its objective is to formulate a 3-year Road Safety Action Plan and 5-year Road Safety Improvement Program in the following road safety areas:

- Black sport identification and treatment through improved roadway;
- Accident statistics collection and analysis;
- Police enforcement capacity development;
- Road safety education program development and implementation; and
- Public information strategy execution and health care and accident response capacity improvements.

Implementation of the proposed plan and program is as follows:

GOU approved the 3-year Road Safety Action Plan and 5-year Road Safety Improvement Program. Governmental departments, private sector, NGOs and other concerned organizations started to implement the 3-year Road Safety Action Plan and 5-year Road Safety Improvement Program under supervision and coordination of NRSC. Proposed traffic safety measures are shown in Table 8.2.15.

Table 8.2.15 Proposed Measures by "Road Safety Audit and Improvement Study"

Sub-sector	Organization/Implementation/ Institution/Budget	Infrastructure/Equipment/Activity/ Human Resource
General Institution	- Development of the Highway Code	-
Infrastructure/Traffic Management	- Revised sections of the MoWT's Road Design Manual (A new traffic sign system together with a Traffic Signs Manual, New manual on Safety at Road works)	- Training staff and developing regulations - Implementation of physical road safety improvement at 12 out of the 58 black spots identified
Transport Operation	-	- Driver training curriculum - Training program for driving instructors
Enforcement	-	- Provision of road safety enforcement equipment to the Uganda Police
Education and Information Campaign/Propaganda	-	- Materials for road safety education in primary schools
Medical Emergency	- F/S on the establishment of a public emergency ambulance system for Kampala District, improving the local trauma research and surveillance capacity of the Injury Control Center of Mulago Referral Hospital; updating and expanding the national trauma care training program and setting up a trauma surveillance system	-

Source: TSDP Project Appraisal Document (PAD) , WB

3) WB "National Road Safety Action Plan Phase 1, 2003-2004"

National Road Safety Action Plan Phase 1 was formulated under RDP by SweRoad together with TRL. The action plan includes:

- Development, drafting and presentation of a number of manuals and specifications
- Training of MOWHC and RAFU staff
- Development of a curriculum of a course for driving instructors
- Development of a curriculum for driving schools
- Promoting defensive driving techniques
- Feasibility study for the establishment of a public emergency ambulance system for Kampala District

Together with the action plan formulation, establishment of Road Safety Authority was

recommended along with replacement of NRSC to strengthen coordination and supervision functions for traffic safety improvement.

4) WB, DIFID "Transport Sector Development Project (TSDP)"

TSDP is the successor project to the Fourth Road Development Program (RDPP-4) planned as one of the programs under RSDP. It is intended to support RSDP-3 aimed at improving the sector performance through contributing jointly with other development partners in a sector-wide approach.

TSDP consists of following five components (2011-2013) according to its project information document:

- Component A: Upgrading/rehabilitation of national roads (US$ 161.4 million)
- **Component B: Enhanced Road Safety (US$ 4.2 million)**
- Component C: Preparation of a Kampala Urban Transport Project (US$ 3.2 million)
- Component D: Support to MoWT (US$ 12.3 million)
- Component E: Support to UNRA (US$ 17.1 million)

Several traffic safety-related projects had been implemented by RDP and others program under RSDP-2. However, the number of traffic accidents, fatalities and injuries has coincidentally increased up to the present in parallel with the rapid growth of the number of vehicles in Uganda. The "Enhanced Road Safety" component was formulated against such background.

Proposed projects and costs for the "Enhanced Road Safety" component are shown in Table 8.2.16. "Study for Road Safety Management Capacity Review in Uganda" financed by GRSF has been conducted to prepare the proposed projects since 2009.

Table 8.2.16 Proposed Projects for "Enhanced Road Safety"

Project	Proposed Cost (million US$)
Initial technical assistance to NRSA	0.5
Various road safety related studies	0.5
Road safety related training activities	0.6
Equipment support for the police and initial equipment for the NRSA secretariat	1.3
Initial operating cost of NRSA	0.5
Operationalization of the crash data base (done with the help of consultants in one single service agreement)	1.1
Total	4.5

Source: TSDP Project Appraisal Document (PAD), WB

5) WB, "Road Safety Management Capacity Review in Uganda"

Road Safety Management Capacity Review in Uganda (hereinafter referred to as "RSMCR") was commenced in October 2009 with the objectives below. The final report is scheduled to be submitted in March 2010.

- Review safety management capacity in Uganda in accordance with the guidelines set out in the World Bank Transport Note TN-1; and
- Reach consensus with the government and development partners on a road safety policy and strategy and short-term measures (action plan) by the year 2020 to overcome revealed capacity weakness for inclusion in a forthcoming investment project, in accordance with the World Bank guidelines.

RSMCR sets a target for road traffic accident reduction which is to reduce road traffic accident fatalities to a maximum level of 1,400 fatalities by the year 2020 through the action plan.

Ten strategic objectives with corresponding projects are proposed as shown in Table 8.2.17. Total cost of the short-term activities amounting to US$ 10.2 million is envisaged to be funded solely by WB or co-funded with EU.

Table 8.2.17 Proposed Strategies and Projects by RSMCR

No.		Projects	Cost '000 US$
1	S	Amend the Traffic and Road Safety Act to create the National Road Safety Authority	-
Establish lead agency	S	Appoint the NRSA Board	-
	S	Recruit Executive Director and staff	-
	S	Provide capacity building (TA and training) to the NRSA	1200
	S	Set up implementation coordination committee	-
	S	Review the Road Safety Action Plan	150
	M	Set up appropriate task forces for technical support and coordination	
	M	Set out intermediate targets for the national road safety strategy	
	M	Develop a long-term evidence based road safety strategy and action plan	
	L	Establish local government road safety coordination modalities	
	L	Roll out long-term local road safety strategies	
	L	Monitor progress at regular intervals and refine intervention output levels accordingly	

No.		Projects	Cost '000 US$
2	S	Establish Road Safety Unit in UNRA (including TA and training)	300
Build capacity among road safety institutions	S	Provide capacity building (TA and training) to Uganda Traffic Police	300
	S	Establish Traffic Planning and Road Safety Unit in Kampala City Council (including TA and training)	300
	S	Build capacity within the proposed MTRA as it will be responsible for vehicle inspection and driver testing	500
	S	Establish general training program for road safety institutions	200
	M	Provide TA on road safety research	
	M	Provide TA on vehicle inspection	
	M	Review the capacity of road safety institutions	
	L	Implement recommendations of the capacity review undertaken	
	L	Develop a long-term capacity plan for road safety institutions	

No.		Projects	Cost '000 US$
3	S	Enact legislation for driver training and testing already developed	-
Establish legal and regulatory framework	S	Review the current legislative framework for road safety and establish the legislative gaps in the Traffic and Road Safety Act 1998	100
	S	Ensure necessary road safety amendments are undertaken.	-
	S	Harmonize the regional and international traffic regulations with that of Uganda	-
	M	Monitor and evaluate the implementation of the regulations	
	M	Review the road safety legislation and regulations and align penalties with relevant road safety risks and strengthen the legislation accordingly	
	L	Monitor and review the legislative setting in relation to evidence-based accident risks.	

No.	Projects		Cost '000 US$
4	S	Secure a sustainable road safety funding from Road Fund	-
Establish sustainable financing mechanisms	S	Establish an independent vote for road safety within the consolidated funds under the MTEF	-
	S	Explore other funding sources like driver testing and licensing	-
	M	Review the funding mechanisms and framework for resource allocation	
	M	Cooperate with development partners and international organizations to support road safety programs in the country	
	M	Cooperate with the private sector and NGOs for support and resources for road safety promotion	
	L	Review the funding mechanisms for road safety at local government level	

No.	Projects		Cost '000 US$
5	S	Establish accident information system (crash database) and analysis tools providing reliable and timely statistical information about road traffic accidents	800
Develop a road safety research, monitoring and evaluation framework	S	Develop accident cost model	50
	S	Carry out systematic accident black spot identification	100
	M	Establish mechanisms for promoting road safety research at major universities in Uganda	
	M	Carry out a record linkage study to assess the level of underreporting	
	M	Carry out annual road safety performance reviews and publish annual road safety reports (NRSA)	
	M	Include road safety performance indicators in the Joint Assessment Framework.	
	L	Evaluate all major road safety initiatives in order to assess their outcome and impact on road safety, and develop catalogue of interventions and their accident reducing effect	
	L	Establish a road safety Research and Development Fund to promote and support innovations and the participation of local research professionals	
	L	Disseminate road safety research information in a systematic manner	

No.	Projects		Cost '000 US$
6	S	Develop both targeted and mass road safety campaigns on traffic regulations and accident risks	600
Education, promotion and campaigns	S	Develop and regularly circulate comprehensive public information and communication on road safety	400
	S	Coordinate existing and planned promotional programs by stakeholders including school promotion programs	-
	M	Review the mass campaign effectiveness and suggest ways of improving them	
	M	Review the information being disseminated with purpose of improving promotion programs	
	L	Roll out school curricula on road safety knowledge, skills and behavior countrywide	
	L	Review and revise education and promotion activities, and develop a new awareness program	

No.	Projects		Cost '000 US$
7	S	Implement the outputs of previous projects on driver training and testing	200
To improve driver training and testing	S	Develop and consolidate the electronic driver licensing system	-
	S	Develop the curriculum for motorcycle, PSV and HGV training program	200
	M	Interface driver permit data between the service provider with police, MoWT and NRSA	
	M	Introduce defensive driving courses for all public transport operators and heavy goods vehicle drivers	
	L	Evaluate driver training and testing interventions, and revise the curriculum accordingly	

No.	Projects		Cost '000 US$
8	S	Embrace the International Road Assessment Program (IRAP) for national road network (UNRA)	-
To develop a safe and well managed road network	S	Implement speed management projects (demonstration projects) along the Northern Corridor	350 (3,000)
		Prepare road safety plan for Kampala City	450
	M	Emphasize road safety audits on all road maintenance and rehabilitation programs, and make road safety audits on all new projects mandatory	
		Evaluate effects of demonstration sites	
		Review the IRAP methodology	
	L	Evaluate road safety engineering interventions, and revise design and operations procedures accordingly	
		Roll out design standards developed from demonstration projects	

No.	Projects		Cost '000 US$
9	S	Privatize vehicle inspection: MoWT to finalize the awarding of contract for vehicle inspection to service provider	-
To improve vehicle fleet		Review and enhance inspection of PSVs and trucks	400
	M	Revitalize the annual compulsory inspection of all vehicles above the age of five years	
		Certify and monitor private vehicle inspection operators	
	L	Review vehicle inspection schemes and procedures, and develop a long-term vehicle fleet management strategy	

No.	Projects		Cost '000 US$
10	S	Review and implement the government rescue plan study	350
To establish rescue service and victim care framework		Develop national trauma care plan (including TA)	250
	M	Increase collaboration with NGOs on victim care and first aid training	
		Implement trauma care plan: Establish and/or upgrade trauma care centers along road corridors with high accident rates	
		Train target groups (police and taxi drivers) on first aid	
	L	Promote and enhance research in injury prevention	

Note: S: short-term (1-3 years), M: medium-term (4-6 years), L: long-term (7-9 years)
Source: Road Safety Management Capacity Review in Uganda, Final Draft Report, March 2010, Consia

6) Other Donors

GOJ/JICA granted assistance to improve several congested intersections and roads in GKMA. The improvement included traffic safety facilities development such as traffic lights, guard block, and street lights.

Danida has provided several assistances on traffic safety field as follows:

- "Road Black Spot Mapping in Uganda" which is intended to guide road users on where accidents are more likely to occur on road sections in collaboration with Disability Prevention and Rehabilitation Section, MOH.
- Road Safety Campaign in collaboration with MOH

EU granted a mixed long-term and short-term TA assistance including traffic safety to UNRA.

7) Taking into consideration the activities conducted in Uganda over the past decade, the general trend of traffic safety in Uganda is that since the rate of traffic accidents is rapidly increasing and the inner nature of accidents is becoming more and more serious, the required traffic safety activities should be comprehensive and implemented in a more professional and effective manner.

(i) Middle and Long-term Activities for Traffic Safety

a) National Transport Master Plan including a Transport Master Plan for the GKMA (NTMP)

Infrastructure Development:

NTMP set out a framework for development of the transport sector over the next 15 years (2008-2023). It proposed traffic management and safety measures development plan including three major safety improvement projects as listed in Table 8.2.18.

Table 8.2.18 Proposed Safety Improvement Projects by NTMP (2008-2023)

Investment Type	Quantity	Estimated Cost (million US$)
Junction Improvement	62 locations	81.60
Railway Crossing	27 locations	12.65
Pedestrian Pavements and Crossings	1,053 km	30.26

Source: NTMP (May 2009), MoWT

Institutional Framework:

Goals and objectives of the institutional arrangement were proposed by NTMP based on principles of "liberalization", "decentralization", and "capacity building" as follows:

- Put in place effective institutional frameworks for policy making, higher level planning, funding and regulation of the transport sector;
- Enhance and sustain the coordinated delivery capacity of public sector transport actors; and
- Enhance sustainable public-private partnerships for development of a regional multi-modal transport sector.

In line with above goals and objectives, the following institutions related to road traffic safety are proposed as succession and new organizations:

- MTRA (Multi-Sector Transport Regulatory Authority)

The regulatory functions of TLB, Civil Aviation Authority (CAA), and Uganda Railways Corporation (URC) are assumed to be transferred to the prospective new institution of MTRA. MTRA is expected to ensure effective regulation of the country's transport sector with responsibility for licensing, economic regulation, safety and environmental issues, and legal services pertaining to rail, waterway, and public road passenger and freight transport sector operations.

- NRSA (National Road Safety Authority)

In order to develop the capacity needed to address deteriorating traffic safety concerns in Uganda, the functions of NRSC will be transferred to NRSA, which is expected to have adequate resources to enforce a comprehensive safety policy framework. GOU

intends to establish NRSA as a semi-autonomous statutory body.

- MATA (Metropolitan Area Transport Authority)

NTMP proposed MATA as a single-purpose urban transport authority on behalf of seven GKMA local authorities in relation to transportation planning and policy issues to address the following transport problems in GKMA:

- Inadequate coordination and harmony among the various actors/stakeholders in running the KCC affairs
- Poor planning and/or deviation from planned activities and operations related to policies, technical construction standards and the use of resources
- Inadequate and irregular resources for funding without clear disbursement criteria
- Lack of personnel to fill existing positions
- Limited capacity of contracted third party service providers
- Low levels of integrity, transparency and accountability

- MATE (Metropolitan Area Transport Executive)

MATE is proposed as a technical supporting unit of MATA consisting of transport planners, transport economists and finance specialists, traffic and highway engineers, and public transport operations specialists.

Estimated initial costs for the new institutions over the five years by NTMP are shown in Table 8.2.19.

Table 8.2.19 Estimated Initial Costs for New Institutions (2009-2013)

Cost Items	Estimated Initial Cost (million US$)		
	MTRA	NRSA	MATA / MATE
Office premises	1.50	1.50	1.50
Furniture and fittings	0.50	0.50	0.50
Office equipment	0.50	0.50	0.50
Vehicles and plant	0.50	1.00	0.50
Initial consultancy	0.75	0.50	0.75
Technical assistance	0.50	0.75	0.75
Capacity building	0.25	0.25	0.50
Sundry expenses	0.90	1.00	1.00
Total	5.40	6.00	6.00

Source: NTMP (May 2009), MoWT

Legal Framework:

NTMP proposed legal reforms in the existing transport legal framework necessary to enable establishment of prospective organizations as shown in Table 8.2.20.

Table 8.2.20 Proposed Legal Reforms for Organizational Change in Traffic Safety by NTMP

Prospective Organizations	Existing Organizations	Act of Incorporation for Existing Institutions	Legal Reform
MTRA	TLB, CAA, URC	Traffic and Road Safety Act, 1998	Necessary
NRSA	NRSC		
MATA / MATE	-	-	Not Necessary

Source: NTMP (May 2009), MoWT

b) Strategy for the Improvement of Traffic Flow in Kampala (2009)

As mentioned in Chapter 4.5 about the strategy, MoWT in partnership with the City Council of Kampala, Uganda Police Force, Ministry of Local Governments and Uganda National Roads Authority, appointed a joint task force to prepare short-term (1-2 years) and medium-term (3-5 years) measures that will address the worsening traffic situation (traffic jam and traffic accidents) in Kampala City.

Several traffic management measures for mitigation of traffic congestion in Kampala have been proposed by the task force. The following are some of the measures that would also be effective for traffic safety:

- Removal of obstructions, such as broken down vehicle repairs, street vendors, markets, shop displays, hoardings and chains and bollards, from the carriageways and footways;
- Improvement and signalization of junctions and upgrading road links that are under capacity;
- Restrictions of on-street parking on very busy links;
- Restriction of heavy vehicles from specific city center locations during day time;
- Restriction of train crossings at critical road sections to off-peak periods;
- Reorganizing traffic flow patterns, like banning right turning movements where necessary;
- Introduction of appropriate signing and lining together with extensive publicity;
- Provide convenient taxi loading and unloading stops, and ban stopping at undesignated locations;
- Designate parts of the footway where it is possible and acceptable to accommodate street trading, and establish a fee paying permit and enforcement system;
- Reinforce speed limits with physical speed control measures, especially on through roads in trading centers and towns. The most effective speed control measure in Uganda is the use of humps. However, the design of humps is not standardized;
- In situations where humps are undesirable but interactions between non-motorized traffic (NMT) and motorized traffic are inevitable, vehicle speeds must be restricted using prominent road signs. The risk of a pedestrian being killed in a road traffic accident has been found to be about 10% for vehicle speeds of 30 km/h but it jumps to 40-80% for vehicle speeds of 50 km/h. Therefore, a speed limit of 30 km/h is recommended in all cases when cars and pedestrians/bicyclists interact, and it should in no case be allowed to exceed 50 km/h under these circumstances;
- Safe night driving depends on the night visibility of pavement markings. High priority should be given to the application of markings with high night visibility;
- The serious safety issues associated with boda bodas must be addressed by a combination of measures, including regulation, sensitization/education and law enforcement; and

- Continuous road safety education campaigns targeted at different categories of road users, including school children, are crucial. The police should be facilitated more to educate the public and enforce the new measures.

The task force also recommended strengthening of traffic enforcement by recruiting and deploying traffic wardens, and establishing an Urban Traffic Unit since the creation of a Greater Kampala Metropolitan Area Transport Authority (MATA) would take time due to the need for change in existing legislation.

(ii) Current Activities for Traffic Safety

In consideration of the fact that traffic accidents in Uganda have become an extremely serious and crucial social concern, the government aims at having a series of high impact activities.

Road Safety Improvement Action Plan (RSIAP)

The RSIAP was proposed by MoWT as urgent national road safety improvement action plan for the period from January 2009 to June 2009 to ensure minimization of road traffic accident rates as shown in Table 8.2.21. The RSIAP focuses on reduction of accident risk factors associated with public transport vehicle, impaired driving and raising awareness of stakeholders on key aspects of road safety.

Uganda Road Safety Action Plan by NGO

Arrive Alive Uganda prepared Uganda Road Safety Action Plan from 2006 to 2008 which introduced comprehensive approach. The Uganda Road Safety Action Plan clearly stipulated resolution areas, monitored status and responsible organization for each project. Outline of the Uganda Road Safety Action Plan is shown in Table 8.2.22.

Table 8.2.21 Outline of Countermeasures Proposed by RSIAP

Action Plan	Actions/Measures	Key Agencies	Proposed Funds (million UShs)
Inspection and licensing of public service vehicle (PSV)	• PSV inspection on upcountry towns • PSV licensing on upcountry towns	• TLB • MOIA (UPF) • Local government authorities	128
Road safety education and publicity	• Sensitization workshop • Television talk shows • Radio talk shows	• MoWT (NRSC, UNRA, TLB) • MOIA (UPF) • Local government authorities • NGOs • Driving schools and driving instructors	187
Driver education and training	• Institute a team to review the regulations • Sensitization workshops	• MoWT (NRSC, TLB) • MOIA (UPF) • Local government authorities • NGOs • Driving schools and driving instructors • Boda-boda management • Local leaders • SHODAU • General public	199
Enforcement and monitoring of PSV operators	• Provide fuel support for the highway traffic patrol police to facilitate continuous highway surveillance • Monitor the operations of PSVs • Design and enforce usage of speed check list form for PSVs	• MoWT (TLB) • MOIA (UPF) • Terminal management	43
Road safety audits	• Carry out survey to identify sections of the road that are either not marked or wrongly marked in terms of hazardous spot	• MoWT (NRSC, UNRA, TLB) • MOIA (UPF)	15
Boda-boda motorcycle safety	• Mobilize and coordinate training of boda-boda riders, assist to acquire driving permit • Mobilize and educate/sensitize riders on basic traffic rules and regulations • Liaise with relevant local government authorities within CBD to gazette boda-boda stages • Mobilize and carry out mass licensing of boda-boda motorcyclists within the CBD	• MoWT (TLB) • MOIA (UPF) • Local government authorities • Local government	91
		Total	663

Source: RSIAP

Table 8.2.22 Outline of Uganda Road Safety Action Plan

Resolution Areas	Major Projects
1. Legislation and Regulations	National road safety policy, Review/reinstatement of the traffic act, Sustainable funding, Institutionalized coordination
2. Awareness Programs	Sustainable funding, School curriculum
3. Basic Vehicle Inspection	License control for non compliant operators, Development of standards related to traffic safety, Quality control for imported vehicles
4. Training, Testing and Licensing	License Withdrawal, Standardized Training and Rigorous Testing, Training and Regulation of PSV Drivers, Permits Security
5. Enforcement Agencies	Effective and sustained enforcement, Supplement Road Safety Efforts
6. Data Collection	Data exchange regarding fine, MAAP, Setting up of data center

Source: Uganda Road Safety Action Plan, Arrive Alive

Several traffic safety activities are implemented at each traffic safety sub-sector as

shown in Table 8.2.23. The activities are implemented by various traffic safety stakeholders and involvement of the traffic safety stakeholders in the traffic safety activities has been accelerated.

Table 8.2.23 Recent Outstanding Traffic Safety Activities by Sectors

Activities	Infrastructure/Traffic Management	Driver/Vehicle/ Transportation	Enforcement	Education/Awareness Campaign	Medical Emergency
Intersectoral	• NGO (Arrive Alive) developed an action plan which brought together stakeholders to promote road safety • GOU proposes to establish NRSA for road traffic safety management and coordination				
Institutional	• Training for International Road Assessment Program (IRAP) operation in UNRA	• GOU has implemented privatization of vehicle inspection • Implementation of pre-inspection vehicle importation directive from November 2009.	• Company basis alcohol management.		
Countermeasures	• Introduction of IRAP by UNRA • Black spot treatment by UNRA	• A new driver curriculum was developed in 2004 by TRL and WB • GOU introduced computerized driving permits system including databank system		• Traffic safety awareness campaign	• Study for establishment of a feasibility of the setting up an ambulance system was conducted by GOU in 2004

Source: JICA Study Team

(3) Road Traffic Law and Regulation

Traffic and Road Safety Act was commenced on 11 September 1998. This is the second law on transportation and road safety in Uganda. The Traffic and Road Safety Act has been amended to meet transitional change of the motoring society as follows:

- Traffic and Road Safety Act, 1998
- Traffic and Road Safety (Public Service Vehicles) Regulations, 1998
- Traffic and Road Safety (Parking of Motor Vehicles) Regulations, 2001
- Traffic and Road Safety (Speed Governor) Regulations, 2004
- Traffic and Road Safety (Weighbridges) Regulations, 2004
- Traffic and Road Safety (Prescribed Alcohol Limit) Regulations, 2004
- Traffic and Road Safety (Rules of the Road) Regulations, 2004
- Traffic and Road Safety (Express Penalty Scheme for Road Traffic Offenders) Regulations, 2004
- Traffic and Road Safety (Speed Limits) Regulations, 2004
- Traffic and Road Safety (Wearing of Safety Belts) Regulations, 2004
- Traffic and Road Safety (Motorcycles) Regulations, 2004
- Traffic and Road Safety (Driving Permits) Regulations, 2005
- Traffic and Road Safety (Driving School) Regulations, 2010
- Traffic and Road Safety (Driver Instructors) Regulations, 2010
- Traffic and Road Safety (Commencement of sections 107,108,109 and 110) Regulations, 2008
- Traffic and Road Safety (Motor Vehicle Inspections in the centers) Regulations, under preparation

- Traffic and Road Safety (Motor Vehicle Inspectors on the side of the road) Regulations, under preparation
- Traffic and Road Safety (Driving Tests) Regulations, under preparation
- Traffic and Road Safety (Driver Examiners) Regulations, under preparation
- Traffic and Road Safety (Traffic Signs) Regulations, under preparation
- Traffic and Road Safety (Mobile Phones) Regulations, under preparation
- Traffic and Road Safety (Seat Belts) Regulations, under preparation

Successful implementation of the law and the regulations will contribute remarkably in ensuring traffic order and safety. This, however, is not expected to be easy since there are various regulations that require very careful implementation planning.

There are two major important tasks that should be undertaken for the successful implementation, namely:

1) Establishment of a full legal framework for implementation, and
2) Dissemination of the law to every road user.

(4) Traffic Safety Budget and Allocation

Even though several road traffic safety action plans are formulated in the past in Uganda, most of the measures proposed in the action plans were not put in practice. This was mainly caused by lack of funding and resource allocation.

1) Traffic Safety Expenditures

Traffic safety expenditure for implementation of comprehensive traffic safety activities, both public and private, is divided into the following six major categories:

・ Traffic Safety Agencies (Routine administrative and traffic safety activities expenditure) Annual budget of NRSC is only 150 million Shillings.

・ Engineering (e.g., road safety audit, safe road plan and design, safe road construction, black spot improvement, traffic management improvement, etc.). This expenditure takes a dominant part of the whole budget for traffic safety.

・ Driver Training/Testing and Vehicle Inspection

・ Enforcement

・ Education and Awareness Campaign

・ Emergency

2) Traffic Safety Financial Resources

The following financial resources are generally utilized for traffic safety activities. The application of these financial resources for the traffic safety activities has not been fully implemented in Uganda:

・ National and local government budget (e.g., UNRA 913,922 million Shillings (2009/2010 draft estimates including donor fund), KCC (Works) 5,570 million Shillings (2009-2010 budget

cash flow))

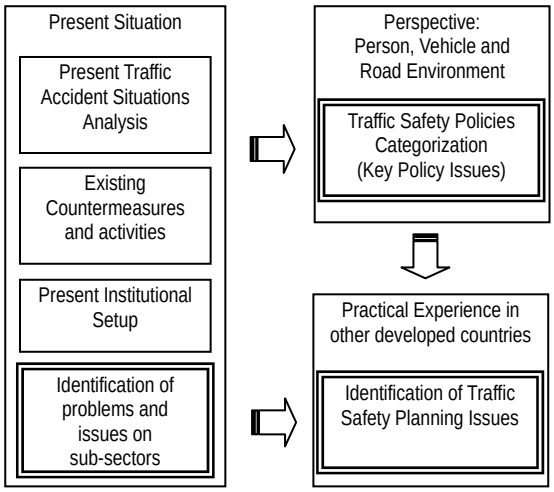
- Road fund (116,241 million Shillings (2009/2010 draft estimates))
- Traffic fine (3,157 million Shillings (Express Penalty Scheme returns in 2008))
- Sponsors (CSR, etc.)
- Insurance firms
- Donor funding (WB, Danida, EU, GOJ/JICA, etc.)

8.2.3 IDENTIFICATION OF CURRENT TRAFFIC SAFETY ISSUES

(1) Identification of Key Traffic Safety Policy Issues

Formulation of systematic traffic safety measures as well as its implementation has not been fully realized and traffic accident situation is getting more serious due to the rapid expansion of the motorization in GKMA. Traffic safety issues being subjected to policy consideration and strategic planning will be identified based on the analysis of the present situation and shall be categorized into specific themes. Three fundamental elements of traffic accident, namely: person, vehicle and road environments, will be taken into consideration to identify policy issues.

Road traffic safety institutional capacity building, which includes human and financial resources development, is essential besides the development of effective road traffic safety measures. Therefore, the strategic plan is required to focus on both aspects of traffic safety, namely, formulation and implementation of effective countermeasures and institutional development. Figure 8.2.13 shows the issue identification flow.



Source: JICA Study Team

Figure 8.2.13 Identification Process of Traffic Safety Issues

(2) Summary of the Existing Traffic Safety Problems and Issues

Intersectoral and sectoral traffic safety problems were examined to identify policy and planning issues based on present traffic safety situation in Uganda including accident analysis, traffic safety measures, and traffic safety institution which are discussed in the foregoing sections. Identified major problems and issues are summarized in Tables 8.2.24 and 8.2.25 respectively.

1) Traffic Safety Problems

Table 8.2.24 Summary of the Current Traffic Safety Situation and Problems

	Infrastructure/Traffic Management	Driver/Vehicle	Enforcement	Education/Awareness Campaign	Medical Emergency
Intersectoral Situation and Problems	• Weak traffic safety initiative of responsible governmental agencies especially NRSC (policy making, coordination, traffic safety awareness, traffic safety measures implementation) • Lack of coordinating framework among traffic safety stakeholders (legislation and mandatory, etc.) • Legal fatigue of Traffic and Road Safety Act due to rapid motorization and diversification of life style • Lack of national traffic safety fundamental plan including implementation, monitoring and evaluation system • Poor political support to traffic safety policy due to lack of awareness and consciousness on traffic safety and vested interest security • Poor planning and implementing capacity of traffic safety measures in the responsible governmental agencies (inconsistent, inappropriate) • Limitation of human and financial resources • Lack of integrated traffic safety database and its communication system (accident data, driver's data, vehicle data, road and traffic data, etc.) • Lack of traffic safety research and development institute • Lack of continuous monitoring and evaluation on the traffic safety activities				
Sectoral Institutional Problems	・ No independent traffic safety section in MoWT, UNRA and KCC ・ Lack of comprehensive traffic safety strategic plan in engineering sector ・ Lack of traffic safety budget in UNRA and KCC ・ New systems are introduced but not in full operation in UNRA (Road Safety Audit, Design standards, etc.) ・ Unclear regulation of PSV's passage and parking	・ Delay of new driving test system introduction ・ Slow transition to computerized driving license system ・ Lack of licensed driver management system (periodic renewal, etc.) ・ Lack of communication system between computerized driving license database and related agencies such as police, courts and revenue authority ・ Suspension of compulsory vehicle inspection system due to lack of vehicle inspection capacity on both human resource and equipment ・ Incomplete vehicle registration system (owner record, owner inhabitancy, etc.) and communication system among related agencies	・ Insufficient legislation for newly emerging traffic offence and toughen regulation and penalty for flagrant violations (drunk driving, etc.) ・ Inconsistency of enforcement regulation (e.g., speed governors) ・ Lack of effective traffic regulation and law enforcement plans ・ Lack of capacity on traffic regulation and law enforcement due to inadequate police training system ・ Lack of human power for traffic control and enforcement ・ Defaulting of the Express Penalty Regulations ・ Lack of licensed driver management system (violation record, etc.) ・ Lack of guidelines and standards for traffic control ・ Corruption by site enforcer ・ Non-completion of the traffic accident and enforcement database and communication system	・ Inadequate consistent school education opportunity for children (low school enrollment ratio) ・ Lack of policy direction and mandate on traffic safety school education ・ Lack of consistent traffic safety education system from nursery to university ・ Lack of involvement and institutionalization of community traffic safety ・ Unclear responsibility among concerned parties on traffic safety awareness campaign and publication activities	・ Undeveloped medical emergency system in the hospitals and its deployment ・ No standards of crash rescue and evacuation ・ Insufficient training system for emergency medical technology and first-aid technique ・ Inadequate financial compensation system for accident victims due to insurance system

	Infrastructure/Traffic Management	Driver/Vehicle	Enforcement	Education/Awareness Campaign	Medical Emergency
Present Situation and Problems on Traffic Safety Countermeasures	• Over-concentrated traffic on restricted central area due to present urban structure • Mixed traffic due to high number of motorcycles • High through traffic on tertiary roads due to lack of efficient road network and hierarchical road functions • Improper and unrestricted access road connection especially with frequent vehicle access facilities • Inadequate consecutive road space and safety facilities for non-motorized road users • Narrow width road constructed in line with old design standards • Hazardous intersections (Improper configuration, Unclear passage right among inflow traffic, incongruent traffic light phasing) • Inadequate effective traffic safety facilities and traffic signs (guard block, median, speed hump, street light, regulation and caution sign, etc.) • There are neglected black spots especially on minor roads • Heavy traffic congestion in central area due to inadequate traffic management such as parking management and directional regulation • Street encroachment on commercial areas • Lack of efficient public transport system and its necessary facilities • Lack of safety measures for road railway crossings	• Lack of appropriate standard of facility, equipment, trainer, and training curriculum in driving schools • Low licensing standard especially for PSV's driving license • Lack of education system for driving instructors • Less consideration of licensing system for novice drivers • No driving school for commercial, trucks and buses drivers • Old facilities in driving training center and testing center • Lack of the training and testing centers to meet the recent increased demand • Frequent accident by poor condition vehicles especially PSVs • Poor vehicle qualities due to dominant imported used vehicle • Poor vehicle standards due to lack of vehicle assembly plants and factories	• Lack of facilities and equipment for enforcement (speed gun, breath analyzer, etc.) • Lack of efficient traffic surveillance system • Lack of efficient and effective highway patrol plan and implementing resource (mobile traffic police patrol units, etc.) • Inefficient manual traffic control at signalized intersections • Inefficient regulation and enforcement for PSVs due to unclear enforcement law and political stress. • Poor enforcement of seat belt restrictions and helmet regulation especially for PSVs • Lack of inspection for seat belt and helmets standards • Inadequate vehicle inspection system for PSVs • Inadequate enforcement on encroachment, illegal parking, and overloading, etc. • Inadequate traffic accident investigation system and its data management	• Lack of knowledge and awareness of the traffic rules and regulation • Youth drivers cause frequent accident by their careless and reckless driving • Traffic safety education is not introduced into curriculum • Lack of traffic safety education methodology and materials for teachers • Lack of traffic safety education materials and facilities in school • Lack of resource for community traffic safety activities (promoter, finance, materials, etc.) • Unsafe driving behaviors and less safety awareness of PSVs drivers • Inadequate attention to safety education, assessment, and monitoring in concerned organizations (e.g., UTODA) • Lack of permanent and periodic traffic safety awareness campaign and publication	• Inefficient emergency medical information system (emergency call system, etc.) • Insufficient levels of first aid education for communities and PSVs drivers • Insufficient on-site emergency care system (lack of specialty of rescue staff and their education system) • Inadequate ambulance vehicle and network system • Shortage of hospital manpower and equipment • Inadequate medical preparedness for mass casualty in hospital

Source: JICA Study Team

2) Traffic Safety Issues

Table 8.2.25 Summary of Intersectoral and Sectoral Issues

	Infrastructure/Traffic Management	Driver/Vehicle	Enforcement	Education/Awareness Campaign	Medical Emergency
Intersectoral Issues	• Strengthening of traffic safety administrative functions at each responsible governmental agencies especially NRSC • Empower traffic safety lead agency to initiate and coordinate responsible government agencies • Enhancement of Traffic and Road Safety Act/regulations or enactment of new traffic safety act/regulations to enhance implementation of new traffic safety strategic plan • Development of statutory national traffic safety fundamental plan and supporting institution • Establishment of inter-ministerial traffic safety promotion framework for decision-making (e.g., Minister level, Permanent secretary level, Secretariat level, etc.) • Establishment of exclusive traffic safety policy making bureau in lead agency • Development of adequate and sustainable traffic safety financial source • Development of integrated traffic safety database and communication system (accident data, driver's data, vehicle data, road and traffic data, etc.) by lead agency in cooperation with related agencies • Establishment of traffic safety research and development center under lead agency (including human resource development function) • Development of monitoring and evaluation system for traffic safety activities by lead agency				
Sectoral Institutional Issues	・ Establishment of traffic safety unit in MoWT or UNRA and KCC ・ Development of national and regional comprehensive traffic safety strategic plan in engineering sector ・ Development of traffic safety budget based on cost-benefit analysis in UNRA and KCC ・ Implementation of new systems (Road Safety Audit, Design Standard, etc.) by UNRA ・ Establishment of regulation for PSV's passage and parking	・ Implementation of new driving test system ・ Promotion of computerized driving license system ・ Introduction of licensed driver management system ・ Development of communication system between computerized driving license database and related agencies such as police, courts and revenue authority ・ Development of vehicle inspection standard by UNBS, and implementation of compulsory vehicle inspection with promotion of privatization of vehicle inspection including the use of subsidy ・ Enhancement of vehicle registration system (owner record, owner inhabitancy, etc.) and communication system among related agencies	・ Enhancement of law and regulation for newly emerging traffic offence and toughen regulation and penalty for flagrant violations ・ Correction of inconsistent enforcement regulation (e.g., speed governors) ・ Development of effective traffic regulation and law enforcement plans ・ Improvement of effective police training system and career development system ・ Increase number of traffic police ・ Strengthening of penalty collection system ・ Development of licensed driver management system (violation record, etc.) ・ Development of guidelines and standards for traffic control and training system ・ Strengthening of anti-corruption monitoring system ・ Development of traffic accident and enforcement database and communication system	・ Promotion of school enrollment ・ Development of traffic safety policy and mandate on traffic safety school education ・ Development of consistent traffic safety education system from nursery to university ・ Promotion of involvement and development of institutionalization of community traffic safety ・ Designation of responsibility among concerned parties on traffic safety awareness campaign and publication activities	・ Development of medical emergency system in the hospitals and its deployment ・ Development of standards of crash rescue and evacuation ・ Development and promotion of training system for emergency medical technology and first-aid technique ・ Development of efficient financial compensation system for accident victims in cooperation with insurance system

	Infrastructure/Traffic Management	Driver/Vehicle	Enforcement	Education/Awareness Campaign	Medical Emergency
Sectoral Traffic Safety Issues	• Development of comprehensive urban plan to improve urban problem especially over-concentrated urban functions and traffic • Development of practical segregation measure for mixed traffic especially motorcycle based on international good practice • Development of missing radial and ring roads • Formulation of hierarchical consistent road network and improvement of roads in line with appropriate road functions • Introduction of new road improvement method especially dense commercial and residence area (e.g., land readjustment) • Obligating Traffic Impact Assessment to road side large scale developers • Development of consecutive road space and safety facilities for non-motorized road users • Prioritized improvement for bottleneck sections and intersections with non-standard road width • Improvement of black spot intersections complying with appropriate road safety audit guidelines • Installation of traffic safety facilities and traffic signs complying with new design standards • Facilitation of black spot improvement with utilizing IRAP • Development of comprehensive traffic management plan for central area (including TDM, parking plan, etc.) • Enforce restriction of street encroachment on commercial areas by KCC • Development of efficient and safety public transport system and its necessary facilities • Development of safe road railway crossing system	• Development of appropriate standard of facility, equipment, trainer, and training curriculum in driving schools • Strengthening of PSV's driving licensing standard and monitoring • Development of education system of driving instructors • Development of licensing and monitoring system for novice drivers • Development of curriculum for commercial and professional driving license • Improvement of facilities in driving training center and testing center • Increment of training and testing centers • Strengthening of vehicle inspection and inspection standard for PSVs • Promotion of pre-import vehicle inspection	• Procurement of necessary facilities and equipment for enforcement • Development of traffic surveillance system plan • Development of highway patrol plan and implementing resource procurement plan • Enhancement of enforcement law and regulation for PSVs • Strengthening of enforcement of seat belt restrictions and helmet regulation especially for PSVs • Strengthening of inspection for seat belt and helmets standards • Allocation of road side vehicle inspection equipment • Strengthening of enforcement on encroachment, illegal parking, and overloading, etc. in cooperation with responsible authority • Improvement of traffic accident investigation system and its data management	• Promotion of road safety awareness for youth drivers in college and university • Introduction of traffic safety education into curriculum • Development of traffic safety education methodology and materials for teachers • Development and utilization of traffic safety education materials and facilities in school • Development of community traffic safety environment in cooperation with NGOs • Introduction of drivers education, assessment, and monitoring system for PSVs drivers in concerned organizations in cooperation with NGOs • Formulation of coordination system for permanent and periodic traffic safety awareness campaign and publication	• Development of emergency medical information system (emergency call system, etc.) • Promotion of first aid education for communities and PSVs drivers • Strengthening of on-site emergency care system (Improvement of specialty of rescue staff and their education system) • Allocation of ambulance vehicle and development of ambulance network system • Improvement of hospital manpower and equipment • Development of medical preparedness for mass casualty in hospital

Source: JICA Study Team

Key policy issues are identified based on identified subsector issues, and are categorized into focus areas based on the three fundamental elements and respective responsible sectors as shown in Table 8.2.26.

Table 8.2.26 Identification of Key Traffic Safety Policy Issues (Focus Areas)

	Pre-Accident Policy Issue			Post-Accident Policy Issue
	Person	Vehicle	Road Traffic Environment	
MoWT/UNRA/KCC (Engineering)			1 ・ Safety Road Development ・ Effective Traffic Management	
TLB/UNBS (Driver License/Vehicle Inspection)	2a ・ Driver's License System ・ Driver Education and Management	2b ・ Vehicle Inspection System		
Uganda Police Force (Enforcement)	3 ・ Traffic Law Enforcement	・ Vehicle Registration System	3 ・ Traffic Control and Regulation ・ Accident Investigation	
MOES (Education)	4a ・ School Traffic Safety Education			
NRSC (NRSA) (Awareness Campaign)	4b ・ Awareness Campaign/Publicity			
MOH (Emergency)				5 ・ Medical Emergency System ・ Accident Insurance System
NRSC (NRSA) (Inter-sectional Themes)	6a Institutional Strengthening (Lead Agency Function, Laws and Regulations, etc.)			
	6b Research and Development (Database, Communication System, Training System, etc.)			
	6c Resource Development (Human and Finance Resource)			
1	Safety Road Environment Development			
2	Safety Driving and Vehicle Safety Development			
a	Safety Driving			
b	Vehicle Safety			
3	Traffic Control and Enforcement Development			
4	Traffic Safety Education and Awareness Campaign Development			
a	Traffic Safety Education			
b	Traffic Safety Awareness Campaign			
5	Medical Emergency and Accident Victim Support System			
6	Institution and Resource Development			
a	Administration			
b	Research and Development			
c	Resource Development			

Source: JICA Study Team

(3) Identification of Traffic Safety Planning Issues

Sectoral planning issues are examined within the ten identified key policy areas considering implementation as shown in Table 8.2.27. The current traffic accident situation, existing policies on traffic safety and experiences in other developed countries are taken into consideration.

Table 8.2.27 Proposed Planning Issues for the Strategic Plan

Policy Issues	Planning Issues
1. Safety Road Environment Development	(1) Safety road development system development - Safe-oriented Design Standards - Road Safety Audit - Traffic Impact Assessment (2) Safety road development - Hierarchical and functional road network development - New road improvement method development - Facility development for non-motorized road users - Black spots improvement (3) Traffic safety facilities development - Measures for mixed-traffic - Safe road railway crossing system (4) Traffic management - Safety improvement at intersections - Parking management in central area - Traffic demand management - Promotion of area traffic regulation plan
2. Safety Driving and Vehicle Safety Development	
a. Safety Driving	(1) Drivers' licensing system - Development of drivers' training and testing system - Promotion of computerized driving license and database system - Development of driving license management system - Promotion of driver's school privatization (2) Driver's education and management system - Promotion of professional driver education and management system
b. Vehicle Safety	(1) Vehicle inspection system - Development of vehicle inspection standard - Promotion of vehicle inspection privatization - Enhancement of vehicle inspection system (2) Vehicle registration system - Improvement of vehicle registration system - Development of vehicle registration database and communication system
3. Traffic Control and Enforcement Development	(1) Traffic control and regulation - Development of training system and guidelines for traffic control and regulation - Enhancement of traffic control and regulation capacity - Development of traffic surveillance system - Improvement of traffic light system control - Improvement of traffic regulation system (2) Traffic law enforcement - Development of traffic accident and violation database and its communication system - Enhancement of traffic enforcement activities - Strengthening of penalties and fine system during violations - Strengthening of enforcement facilities and equipment (3) Accident investigation
4. Traffic Safety Education and Awareness Campaign Development	
a. Traffic Safety Education	(1) Traffic safety education in schools - Promotion of consistent traffic safety education system - Development of teacher's training system and introduction of participatory program - Formulation of safety framework between school and community
b. Traffic Safety Awareness Campaign	(1) Campaigns/publicities - Formulation of coordination system for sustainable safety awareness activities - Development of sustainable community traffic safety program - Dissemination on traffic safety consciousness by mass media
5. Medical Emergency and Accident Victim Support System	(1) Medical emergency system - Development of emergency medical information system - Improvement of ambulance system - Promotion of first-aid technique dissemination and training - Development of mass casualty management (2) Accident insurance system

Policy Issues	Planning Issues
6. Institution and Resources Development	
a. Administration	(1) Establishment of empowered functional lead agency (2) Strengthening of traffic safety administrative capacity (3) Formulation of road traffic safety related laws and regulations framework (4) Development of statutory national traffic safety fundamental plan and implementation framework (5) Establishment of inter-ministerial traffic safety promotion framework
b. Research and Development	(1) Traffic Safety Research and Development Center (2) Traffic safety database and communication system (3) Monitoring and evaluation system
c. Resource Development	(1) Human resource development plan (2) Development of financial resource for traffic safety development plan

Source: JICA Study Team

(4) Assessment of Road Traffic Accident Risk until 2023

1) Necessity for Road Accident Costing

An accurate accident costing is necessary to provide the government appropriate basis for policy making, planning, prioritizing and investing for traffic safety. Thus, examination of appropriate accident costing method should be established based on existing practical measures such as the human capital method and the gross output method.

2) Economic Loss Caused by Road Traffic Accidents

Motorization rate in Uganda has rapidly increased and the losses due to road traffic accidents are not small in terms of the national economy. In general, from 1% to 5% of a country's GDP is lost to traffic accident.

ESCAP introduces simplified formula to roughly estimate ratio of economic loss to GDP as follows:

*Losses [% of GDP] = 0.0297 * EXP(-8*10^(-5) * (GDP per capita)*

It can be said that losses are roughly 3% in poorer developing countries and become less than 1% for developed economies according to the formula. *(Source: Road Safety in Asia and the Pacific – ESCAP document No. E/ESCAP/MCT/SGO/9, Busan, Korea, September 2006)*

As a result of the estimate, the losses due to road traffic accidents in Uganda in 2008 are roughly 2.90% of GDP.

8.3 SECTORAL TRAFFIC SAFETY DEVELOPMENT STRATEGIC PLAN AND PROGRAM

8.3.1 INTRODUCTION

The purpose of the strategic plan is to formulate long-term strategies which can reduce the number of road traffic accidents with consideration of future socio-economic situation. Moreover, the following two areas are needed to properly address the essential elements of road traffic safety:

1) Development of countermeasures which can mitigate road traffic accidents at present as well as in anticipation of the highly-motorized traffic society in the future.

2) Development of institutional fundamentals for sustainable development of traffic safety policy and measures.

An overall target and sub-sector targets shall be established. Possible strategies will be developed afterwards to achieve these set targets.

Figure 8.3.1 illustrates the strategic plan development process.

Source: JICA Study Team

Figure 8.3.1 Strategic Plan Development Approach

8.3.2 DEVELOPMENT FRAMEWORK FOR THE SECTORAL TRAFFIC SAFETY DEVELOPMENT STRATEGIES AND PROGRAM

(1) Establishment of Goals and Target

In order to show a strong policy for this strategic plan study, a numerical target will be proposed to make it possible to estimate the socio-economic benefit of the measures.

The following two targets will be proposed for the road traffic safety strategic plan:

1) To reduce the number of fatalities into half (based on 2007 figures) by the year 2023 referring to the Declaration of the 4th African Road Safety Conference held in 2007 in Accra, which requires a half reduction in road traffic accident fatalities by 2015. This target corresponds to three other considerations:

   - the fatalities rate per 100,000 population should be less than 5.0%;
   - the fatalities rate per 10,000 vehicles should be less than 36.5%; and
   - a reduction of 4.2% in traffic accidents per year against previous year, in terms of number of fatalities.

2) To strengthen the capability and functions of the organizations involved in road traffic safety, and to develop new organizations and rules/regulations necessary to ensure sustainability of traffic safety measures.

(2) Basic Strategies for the Traffic Safety Measures

Basic strategies will be discussed in two areas, namely, Basic Planning Policies and Implementation Strategies.

Basic Planning Policies

1) Five areas are identified for implementation of effective and efficient traffic safety measures based on road traffic accident elements and political demarcation of government.

   (i) Development of Safe Road Traffic Environment
   (ii) Enhancement of Safe Driving and Safety Vehicles
   (iii) Effective and Efficient Traffic Control and Enforcement
   (iv) Enhancement of Traffic Safety Education and Awareness Campaign
   (v) Development of Medical Emergency Countermeasures

2) Establishment of necessary institutions including establishment of new laws and regulations and database shall be implemented within this strategic plan period.

3) Sustainable human and financial resource development is the most important challenge of the strategic study. Responsible organizations in government need to establish necessary sections/committees for traffic safety development in their respective organizations. For financial resource development, a new mechanism with private sector involvement was examined during this strategic plan period. It is also important to fully and effectively utilize ODA projects.

Implementation Strategies

1) Appropriate mechanisms to promote comprehensive traffic safety measures shall be developed, which can be referred to as the 4Cs (communication, cooperation, collaboration, and coordination) among traffic safety stakeholders.

2) There has been remarkable technology development such as Intelligent Transportation Systems (ITS), advanced equipment for enforcement, supporting system to minimize human errors, etc. However, acquisition, operation and maintenance of such systems require massive investment, aside from the required additional highly-skilled manpower. For this strategic plan period, priority will instead be given to human resource development rather than on

investing on these advanced technologies.

(4) Focus Areas for the Achievement of the Plan's Targets

Six focus areas to reduce traffic accident efficiently are selected as follows:

(i) Accident involving vulnerable road users

(ii) Accidents involving beginning drivers

(iii) Traffic accidents involving privately-operated commercial and public transport vehicles

(iv) Black spot and black corridor

(v) Traffic congestion in the CBD areas

(vi) Caring for traffic accident victims

Institutional innovation for sustainable traffic safety development is another important target of the strategic plan. The following institutional issues shall be examined:

(i) Status of National Road Safety Agency (NRSA)

(ii) Traffic and Road Safety Act and its Implementing Guidelines

(iii) Traffic Safety Institute (R&D Center)

(iv) Traffic Safety Fund

(v) Traffic Safety Audit

(vi) Traffic Impact Assessment

(vii) New Driver Licensing System and Vehicle Inspection System

(viii) Clear Responsibility on Traffic Control and Management

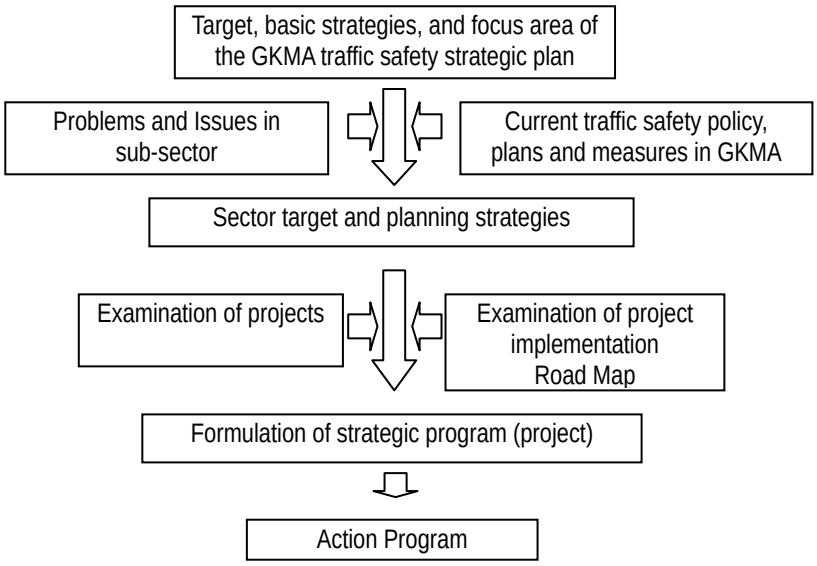
(ix) Comprehensive Automobile Insurance System and Voluntary Insurance System

8.3.3 SECTORAL TRAFFIC SAFETY DEVELOPMENT STRATEGIES AND PROGRAM

(1) Planning Approach

Sectoral strategy and target for each sub-sector are prepared based on the overall basic strategy, target, critical issues, etc. of the strategic road traffic safety plan discussed in the preceding sections.

Targets are set based on the present critical issues and problems facing traffic safety, and ongoing policy of the GOU. The development process of sectoral road traffic safety strategic plan is illustrated in Figure 8.3.2.



Source: JICA Study Team

Figure 8.3.2 Flow of Sectoral Strategic Plan Approach

(2) Development of Safe Road Traffic Environment (Engineering Sector)

1) Framework of Engineering Sector Strategic Plan

Sector Target

Three major elements of traffic safety (person, vehicle and road environment) are aimed to improve in this sector to establish comprehensive traffic safety policy. Traffic safety facilities in Uganda have not been adequately developed to respond to the currently increasing number of traffic accidents which result in high socioeconomic losses for the country. On the other hand, road network development has been implemented in accordance with the government's economic development policy. More consideration for road safety should be prioritized by the government to minimize losses of economic development.

Therefore, based on this situation, the sector goal is towards system development for a safe road traffic environment to minimize traffic accident risk.

Sector Planning Strategy

In line with the basic strategies discussed in the previous section, six strategies for the engineering sector are reformulated:

(i) To improve physical road conditions (road structure and geometric) to provide safe and comfortable driving environment;

(ii) To improve traffic control and management devices to provide safety guidance to the drivers and road users;

(iii) To develop effective measures in line with road functions and traffic conditions (accidents and demand);

(iv) To promote comprehensive traffic safety measures (black spot, residential areas, etc).

(v) To improve institutions (organization, rules and regulations, R&D, database, etc.) to ensure sustainable road safety environmental development; and

(vi) To ensure sustainable human and financial resources development.

Two perspectives are taken into account in consideration of engineering measures. One is to provide physical improvement such as geometric improvement, and other is to provide appropriate and adequate information to the road users who are not familiar with traffic rules and regulations.

2) Development Strategy for the Priority Program

(i) Black Spot Improvement Program

Objectives of the Program

Since black spot improvement is still in its early stages in Uganda, a significant traffic accident reduction is yet to be achieved by the responsible agencies.

The benefit from black spot improvement is not only limited to alleviating traffic accident at a specific location; instead, it is expected to also provide further practical guidelines for other black spot improvement as discussed below.

In general, accidents have been shown to be not completely randomly distributed but to be clustered at certain locations on any road. Also, an accident study would often show common patterns of traffic accidents. Thus, implementation of appropriate road improvement measures developed based on results of black spot accident analyses could prevent or mitigate similar occurrences in the future. Black spots are locations where many of the traffic accidents occur. Thus, prioritizing treatment of these sites would expectedly provide the highest return in terms of number of traffic accidents avoided. Moreover, cost-effective countermeasures such as use of road signs, markings to channel traffic through complex intersections and safe waiting areas for turning vehicles would provide significant traffic accident alleviation. Therefore, the black spot improvement system has to be conducted immediately as it is expected to effectively reduce traffic accidents and is highly cost-effective as well as to accumulate and utilize experiences and feedbacks.

Issues of the Program

(a) Need for legislation to designate executing agencies with clear delineation of respective obligations and responsibilities and to further promote understanding among stakeholders.

(b) Development of the black spot improvement system

• Definition or criteria of the black spot and guidelines to identify it

• Upgrading of the black spot improvement system

• Development of cost-effective measures both in terms of time and resources and to ensure stable and sustainable financial resources

(c) Training and technical upgrading system for the black spot improvement engineers

Contents of the Program

(a) Legislation designating executing agencies with clear delineation of obligations and responsibilities and further promotion of understanding

(b) Development of the black spot improvement system

(c) Training and technical upgrading system for black spot improvement engineers

(d) Utilization of the black spot improvement database, development of supporting tools and establishment of the executing agency

(e) Follow-up on the results of post-monitoring of the black spot improvement

(ii) Road Safety Audit System Development Program

Objectives of the Program

The road network development is one of the most important policies to promote economic development in Uganda. However, the budget for road development projects is too small to undertake all the planned projects. Therefore, cost effectiveness is really necessary to be able to smoothly implement the policy.

In countries where road safety audit (RSA) is already introduced, indications of effectiveness of RSA in decreasing road development costs are already documented. For example, in the United Kingdom, the average number of fatal and injury crashes at audited project sites fell by 1.25 crashes per year (from 2.08 to 0.83 crashes per year) while the post-implementation reduction in crashes at comparable, non-audited sites was only 0.26 crashes per year (from 2.6 to 2.34 crashes per year). In the United States, New York DOT reported a 20% to 40% reduction in crashes in more than 300 high-crash locations treated with low-cost improvements recommended as a result of RSAs.

Also as reported from the United States, conduct of RSAs and implementation of their recommended safety improvements in design is estimated to typically cost 5% of overall engineering design fees. In general, design cost is 7% to 10% of the construction cost of a road development project. When RSA is estimated at 5% of the design cost, it is 0.35% to 0.50% of the construction cost. Therefore, if RSA is carried out appropriately, the cost effectiveness would be quite high. So considering the huge amount of investment in road development in the future, savings may instead be allocated to the improvement of damaged sections. Then, the operation and maintenance cost which accounts for a large part of road sector budget can then be saved to enhance new road construction in the future. Based on the above discussion, the RSA system should therefore be enhanced and implemented appropriately as soon as possible. By doing so, improvement in cost-effectiveness of road sector development and the reduction in traffic casualties can be expected.

Issues of the Program

(a) Enhancement of legislations regarding obligation and responsibility of relevant authorities, and education on and expansion of RSA.

(b) Suggested contents of revised RSA system:

• Established guideline of selection of target road and traffic development plans

• Improvement of safety control method including revision of the audit checklist

• Approval and licensing/accrediting system for auditing organizations

• Estimated time and costs required, and sustainable financial sources

• Utilization of the auditing results

• Guaranteed legal support

(c) Establishment of licensing/accrediting system and human resource development mechanism for the auditors.

Contents of the Program

(a) Enhancement of legislations regarding responsibilities of relevant authorities and education and expansion of RSA

(b) Establishment of licensing/accrediting system and human resource development mechanism for the auditors

(iii) Road Traffic Safety Facility Enhancement Program

Objectives of the Program

(1) Traffic Safety Facilities

Instruction and guidelines on adoption of basic traffic safety facilities in Uganda are indicated in road design standards. However, since many traffic accidents occur due to illegal overtaking, conformity to design standards and guidelines therefore is not an absolute measure for traffic accident alleviation.

Since design standards are developed based not only on vehicle movement characteristics but also on assumed driving behaviors, effectiveness of road safety facilities become compromised by wrongful driving behaviors and inadequate traffic enforcement.

Therefore, assessment of appropriate traffic safety measures should be conducted based not only on road design standard but also on practical accident analysis of subject road.

(2) Design Standards/Guidelines

In consideration of lessons learned from the past transition of the design standard and guidelines in Uganda, simply adopting international design standards from developed countries has not resulted in levels of safety that are achieved in the developed countries because such standards are generally accompanied by effective enforcement, driver training and safety education and promotion. In addition, traffic conditions and types of traffic on the roads of Uganda are very different from those of the developed countries.

Therefore, it is necessary to review and revise accordingly the design standards and guidelines for more safety-conscious road and road safety facilities design based on the abovementioned factors, as well as based on accident analysis and assessment of relevance between the accident and road facilities.

Issues of the Program

(a) Road network development with appropriate road function sharing

• Systematic development of primary roads, secondary roads and tertiary roads according to local characteristics

(b) Enhancement of traffic control to respond to local characteristics and the road

function

• To minimize traffic noise in residential and commercial areas of black spots

• To promote traffic control according to function and roles of each road

(c) Promotion of smooth and comfortable road traffic and road accident prevention measures on general roads

• Road safety facilities and traffic control facilities development

• Development of road facilities and traffic control facilities to enhance smooth traffic

• Development of facilities to increase driver's level of comfort

• Development of safety facilities to prevent railway crossing accident

(d) Review of design standard considering traffic and local characteristics

(e) Review of design standard considering motorcycle traffic, bicycle and pedestrians

(f) Review of design standard considering variety of financial sources of urban and local governments and traffic safety level

(g) Promotion of design standard and its applicable application

(h) Unifying the design standards and preparation of instruction manuals

(i) Preparation of standard drawings

Contents of the Program

(a) Systematic road network development with appropriate function sharing

(b) Enhancement of traffic control in accordance with local characteristics and road function

(c) Promotion of smooth and comfortable road traffic and road accident prevention measures on general roads

(d) Review of design standard considering traffic and local characteristics

(e) Promotion of design standard and its applicable application

(iv) Vulnerable Road User Accident Prevention Program

Objectives of the Program

Traffic accidents involving pedestrian accounted for 38% in 2008. Pedestrians and cyclists, who are vulnerable participants in road traffic with high risk of serious damage caused by traffic accidents, should be protected. However, safety facilities for these vulnerable users have not been sufficiently installed in many road sections, with some sections not even completely passable to them. While sidewalks in urban areas may be considered well developed, many of these are not interconnected.

Crossing facilities have not been installed except for those in junctions with traffic lights. Thus, pedestrians have to cross the roads under very dangerous situations.

While bicycles are still considered to be an important mode of transport for daily activities, bicycle lanes are still not properly designated on roads which often cause traffic bottleneck and accidents.

Therefore, to ensure safety of vulnerable road users, appropriate facilities for pedestrians and bicycle riders should be prioritized.

Issues of the Program

(a) Development of safe pedestrian space

• To ensure safety of pedestrians and to promote separate traffic

• To ensure safety on school zones of kindergartens and primary schools

(b) To separate car traffic from light vehicles and to develop facilities for light vehicles

• To ensure safety of bicycle riders and to promote separate traffic

Contents of the Program

(a) Development of safe pedestrian space

(b) Separation of car traffic and development of facilities for light vehicles

(v) Traffic Safety Performance Monitoring and Maintenance Program

Objectives of the Program

The successful implementation of the traffic safety might depend on the road management authority's capacity for planning and implementation, as well as stability of financial resources. However, as human and financial resources are limited in local authorities, it might be difficult to plan and implement an effective and efficient road safety mitigation measure. Thus, the introduction of capacity development for planning, implementation and monitoring system and the establishment of the executing agencies both at the central and local governments is proposed.

Issues of the Program

(a) Capacity development on planning and implementation of traffic safety environment improvement

• Capacity development on planning and implementation of responsible government agency

• To ensure financial sources for traffic safety environment improvement in responsible government agency

Contents of the Program

(a) Capacity development on planning and implementation of traffic safety environment improvement

(vi) Urban Road Traffic Safety Plan Development Program

Objectives of the Program

Traffic safety issues in urban areas are closely related with road facility, traffic characteristics, road side land use, as well as diversified utilization of road space

independently and/or jointly. Therefore, examination of urban traffic safety measures should be implemented using comprehensive perspectives.

Major issues of urban traffic safety in Uganda are mixed traffic with motorcycle traffic, insufficient development of traffic control systems such as traffic lights and traffic signs, frequent illegal parking on sidewalks and carriageways, undesirable driving and walking behaviors, and lack of traffic enforcement and institutional framework development. Therefore, timely implementation of comprehensive traffic safety measures to meet both rapidly increasing rate of urbanization and motorization is essential. Traffic demand management activities such as encouraging modal shift from private to public transportation will be key countermeasures to address these urban traffic problems.

Issues of the Program

(a) Enhancement of traffic control to respond to local characteristics and road function

• To promote traffic control according to function and roles of each road

(b) Promotion of upgrading and efficient traffic light system development

• Strengthening of applicability for diversified traffic and traffic accident prevention

(c) Development of parking space and strengthening of enforcement for illegal parking

• Development of flexible parking regulations

• Promotion of parking development plan

(d) Improvement of traffic demand control

• Promotion of public transport usage

• Promotion of time-based traffic control measures (i.e., number coding, etc.) to mitigate congestion during peak hours

Contents of the Program

(a) Enhancement of traffic control in accordance with local characteristics and road function

(b) Promotion of upgrading and efficient traffic signal system development

(c) Development of parking space and strengthening of enforcement for illegal parking

(d) Improvement of traffic demand control

(vii) R&D, Human Resources Development Program

Objectives of the Program

The present road management structure does not have any department or unit responsible for safety control of road facility. Thus, measures to be implemented should be sustainable as well as efficient to be able to respond to increasing traffic volume and accidents.

Therefore, the establishment of an implementing unit in the road management

organization which will be exclusively responsible for traffic safety mitigation shall be proposed.

To increase efficiency and capacity of the traffic safety improvement system, the following support mechanisms shall be developed:

- Establishment of the R & D facilities including database system
- Promotion of professional human resource for traffic safety area

Issues of the Program

- Enhancement of legislations regarding obligation and responsibility of relevant authorities, and education on and expansion of RSA
- Establishment of licensing/accrediting system and human resource development mechanism for the auditors
- Utilization of database supporting the auditing, development of the supporting tools and establishment of the responsible agency
- Scientific traffic accident analysis, evaluation of the effectiveness of RSA implementation and cost-effectiveness, and feedback mechanism for the results to be appropriately utilized
- Post auditing monitoring to follow up the results and establish the responsible agency
- Scientific support for design standard preparation
- Establishment of a research and development institution to support design standard preparation and institutional development
- Utilization of the black spot improvement database, development of supporting tools and establishment of the executing agency
- Follow-up on the results of post monitoring of the black spot improvement

Contents of the Program

(a) Utilization of the black spot improvement database, development of supporting tools and establishment of the executing agency

(b) Follow-up on the results of post monitoring of the black spot improvement

(c) Establishment of licensing/accrediting system and human resource development mechanism for the auditors

(d) Utilization of database supporting the auditing, development of the supporting tools and establishment of the responsible agency

(e) Scientific traffic accident analysis, evaluation of effectiveness of RSA implementation and cost-effectiveness, and feedback mechanism for the results to be appropriately utilized

(f) Scientific support for design standard preparation

(3) Enhancement of Safe Driving and Safety Vehicles

1) Framework of Safe Driving and Vehicle Safety Strategic Plan

Sector Target

Recent increment of motorization rate and various purpose vehicles has been made road traffic situation in Uganda complicated. Meanwhile, vehicles and drivers in Uganda has not been manage properly to maintain appropriate quality for contributing safe traffic society due to lack of institution. It is therefore necessary to develop strict and comprehensive driver and vehicle management system to enhance the social responsibility of the road users and operators.

Sector Planning Strategy

In line with the basic strategies discussed in the previous section, five strategies for the Safe Driving and Vehicle Safety sector are reformulated:

(i) To improve driver's safety awareness as a responsible member of vehicle society;

(ii) To develop driving standard and vehicle standard to clarify social responsibilities of drivers and vehicle owners;

(iii) To develop continuous training and management system for each category of drivers;

(iv) To develop integrated vehicle management system (vehicle registration, vehicle inspection) to create safe and sustainable traffic safety society; and

(v) To ensure sustainable human and financial resources development.

2) Development Strategy for the Priority Program

(i) License Renewal System Development Program

Objectives of the Program

Implementation of proper driving license management system is essential to maintain appropriate quality of drivers. However, current driving license management system in Uganda has not been operated properly, and the road traffic is being exposed to high risk by non-controlled driving license holders. Moreover, the road traffic situation in Uganda is changing due to rapid motorization. Therefore, it is proposed that introduction of tangible driver licensing system and its management system to achieve a safe traffic society.

Issues of the Program

- Promotion of computerized driving license and database system

- Development of driving license management system

Contents of the Program

(a) License renewal system

(b) License renewal system by traffic violation

(c) License system for beginner drivers

(d) Development of license management system

(ii) Driver Training and Testing System Development Program

Objectives of the Program

Driver training and testing system in Uganda is still poor, and several constraints and problems are found in the existing system as mentioned in follow. To improve driver's awareness and ability for driving, priority is given to improve following issues for formulating this program.

Textbook improvement: Contents of the textbook should be more comprehensible and informative on traffic safety concerns to reflect present road traffic situation.

Periodic Driver Training System: Periodic training for drivers should be introduced in consideration of revisions on the road traffic law and emerging road environment.

Training for Lecturer & Examiner System: Skills and knowledge upgrading system for instructors should be introduced.

Management System for PSV and Commercial Driver: Serious traffic accidents were caused by PSV and commercial vehicles. It is therefore necessary to develop appropriate countermeasures.

Issues of the Program

· Development of drivers' training and testing system

· Promotion of driver's school privatization

· Promotion of professional driver education and management system

Contents of the Program

(a) Comprehensive program for driver training and testing

(b) Drivers' education in organization of PSV and transport companies

(iii) Vehicle Registration System Development Program

Objectives of the Program

The present vehicle registration system in Uganda requires initial and renewal registration. However, it is not implemented properly especially when vehicles are owned by second owners. Therefore, compulsory registration system with database development will be important and should be required. This will facilitate the police traffic enforcers to identify a traffic violator.

Issues of the Program

· Improvement of vehicle registration system

· Development of vehicle registration database and communication system

Contents of the Program

(a) Development of vehicle registration renewal system

(b) Vehicle registration database and communication system development

(iv) Vehicle Inspection System Development Program

Objectives of the Program

Vehicle inspection system for cars was already introduced in Uganda. However, implementation of compulsory vehicle inspection has been suspended due to lack of capacity and huge increment of number of vehicles. To improve soundness of vehicles and vehicle management system, the following objectives are set in formulating this program.

- Development of vehicle inspection standard

- Development of coordinated vehicle management system

- Formulation of framework to promote vehicle inspection system privatization

- Development of new vehicle taxation system

Issues of the Program

· Development of vehicle inspection standard

· Promotion of vehicle inspection privatization

· Enhancement of vehicle inspection system

Contents of the Program

(a) Vehicle inspection standard development

(b) Facilitation for implementation of vehicle inspection system

(c) Promotion of privatized vehicle inspection system enhancement

(v) Organizational and Resource Development Program

Objectives of the Program

This program is aimed to develop database among representatives of different sectors in terms of functional driver and vehicle management system development and sharing it among partner organizations.

Issues of the Program

· Formulation of inter-organizational vehicle and driver management system

· Human resource development for operating the system

· Development of vehicle and driver management database

Contents of the Program

(a) Functional demarcation by organization for transport operation

(b) Database and its interface system development

(c) Human resource development for the database operation

(4) Effective and Efficient Traffic Control and Enforcement (Enforcement Sector)

1) Framework of Enforcement Sector Strategic Plan

Sector Target

Smooth and safety traffic flow can be achieved by proper knowledge and ability of each road users. In this regard, traffic police needs to play important role as traffic regulator and traffic enforcer for inappropriate road users and vehicles. Fundamental activities of the traffic police are guiding and instructing traffic regulation to maintain road traffic order toward more effective traffic controls. In order to ensure the effectiveness and efficiency of guiding and instructing for traffic regulation and enforcement, human resource development program is prioritized with focus on the violations that are causing these traffic accidents, which were identified from the traffic accident analysis.

Planning Strategy

In line with the basic strategies discussed in the previous section, three strategies for the Safe Enforcement sector are reformulated:

(i) To develop coordinated traffic regulation planning and implementation system among concerned agencies

(ii) To promote efficient and effective traffic law enforcement activities

(iii) To develop human resource in combination with applications of modern science and technology

2) Development Strategy for the Priority Program

(i) Traffic Safety Guidance for Young and Vulnerable Road Users Program

Objectives of the Program

Based on traffic accident analysis, focus was given to high risk road user group and locations to guide and/or to educate them. Each sub-program has a specific target, i.e., sub-program (a) is focused on motorcycle taxi riders and pedestrians; sub-program (b) is focused on driving at black spots and black sections; sub-program (c) is focused on driving during peak hour; and sub-program (d) is focused on young drivers.

Issues of the Program

• Enhancement of traffic enforcement activities

Contents of the Program

(a) On-street traffic safety guidance to motorcycle taxi and pedestrians

(b) On-site traffic safety guidance at black spots and black sections

(c) Traffic safety guidance during peak hour

(d) Intensified traffic safety guidance for young drivers

(ii) Strengthening and Intensifying Traffic Law Enforcement Program

Objectives of the Program

Based on traffic accident analysis, focus was given to high risk road user group and frequent violations to eradicate traffic violators. Each sub-program has a specific target or focus point, i.e., sub-program (a) is focused on frequent violations; sub-program (b) is focused on driving at black spots and black sections, and sub-program (c) is focused on commercial drivers.

Issues of the Program

• Enhancement of traffic enforcement activities

Contents of the Program

(a) Traffic violations such as over speeding, signal ignorance, etc.

(b) Traffic violators at black spots and sections

(c) Traffic violators among commercial drivers

(iii) Coordination among Concerned Agencies Responsible for Traffic Safety Countermeasures Program

Objectives of the Program

The purpose of the program is for concerned agencies to have consensus on problems, issues and required countermeasures. Each sub-program depends on the steps of implementation. First is the examination and design of an effective coordination mechanism among concerned agencies. This is followed by the presentation and exchange of views among the participants on the current situation of traffic safety guidance and enforcement activities and then, finally, on the current issues on traffic facilities and traffic management related to traffic safety guidance and enforcement.

Issues of the Program

• Enhancement of traffic enforcement activities

• Strengthening of enforcement facilities and equipment

Contents of the Program

(a) Examination and design of public relations strategies on coordination mechanism with related agencies

(b) Presentation and exchange of views among the participants on the current situation of traffic safety guidance and enforcement activities

(c) Presentation and exchange of views among the participants on the current issues on traffic facilities and traffic management related to traffic safety guidance and enforcement

(iv) Recording and Evaluation of Traffic Safety Guidance and Enforcement Activities Program

Objectives of the Program

The purpose of the program is to enable systematic planning and evaluation of traffic guidance and enforcement activities by using the recorded activities and results of enforcement. Each sub-program depends on the steps of implementation. First is the examination of how to efficiently record, file and evaluate traffic guidance and enforcement activities as basis for formulating an effective system. This is followed by recording and filing of activity results on traffic safety guidance and enforcement, and finally, evaluation of results of activities on traffic safety guidance and enforcement.

Issues of the Program

- Development of traffic accident and violation database and its communication system
- Enhancement of traffic enforcement activities

Contents of the Program

(a) Recording of traffic guidance and enforcement activities

(b) Evaluation of the activities

(c) Activity planning based on the evaluation

(v) Human Resource Development on Traffic Safety Guidance and Enforcement Program

Objectives of the Program

Efficient and effective human resource development for traffic safety guidance and enforcement is most crucial issues in enforcement sector in Uganda. Therefore, development of consecutive and gradual human resource development program and its proper implementation is essential to develop policemen's ability on traffic guidance and enforcement.

Issues of the Program

- Development of training system and guidelines for traffic control and regulation
- Enhancement of traffic control and regulation capacity
- Improvement of traffic light system control
- Improvement of traffic regulation system

Contents of the Program

(a) Examination of human resource development policy on traffic safety guidance and enforcement

(b) Development of comprehensive training system

(c) Beginners' training system

(d) Intermediate leaders' training system

(e) Advance training system

(vi) Preparation and Development of Equipment for Traffic Safety Guidance and Enforcement Program

Objectives of the Program

Purpose of the program is to develop the equipment procurement plan based on constraint of present equipment condition for traffic police activities to increase their effectiveness on traffic guidance and enforcement.

Issues of the Program

- Development of traffic surveillance system
- Improvement of traffic light system control
- Strengthening of enforcement facilities and equipment
- Accident investigation

Contents of the Program

(a) Equipment procurement plan for traffic safety guidance and enforcement

(b) Implementation of procurement plan

(5) Enhancement of Traffic Safety Education and Awareness Campaign (Education Sector)

1) Framework of Education Sector Strategic Plan

Sector Target

Since three factors of the traffic accident are person, vehicle, and road environment and person is dominant factor on the traffic accident, education and publication to enhance traffic safety awareness is most important issues on traffic safety. Despite enhancement of traffic safety awareness for all road users is ambitious, conscientious effort with appropriate policy and efficient participation and cooperation of every concerned agency is essential.

Sector Planning Strategy

In line with the basic strategies discussed in the previous section, four strategies for the education sector are reformulated:

(i) To provide traffic safety educational practice for pre-school children
(ii) To expand traffic safety education for primary up to university students
(iii) To promote community involvement in traffic safety education
(iv) To develop organization and institutional framework

2) Development Strategy for the Priority Program

(i) Traffic Safety Educational Practice Program for Pre-school Children

Objectives of the Program

Earlier traffic safety education for young people is effective in terms of thinking behavior and intentional behavior enhancement as well as traffic safety regulation compliance. Therefore, school plays very crucial role as potential place to implement effective and sustainable traffic safety education programs. However, traffic safety education is not available to all children and students at present.

Issues of the Program

・ Promotion of consistent traffic safety education system

Contents of the Program

(a) Traffic safety education improvement at kindergarten

(b) Safe road crossing ability development

(c) Parental education development program

(ii) Traffic Safety Education for Primary School Students Program

Objectives of the Program

Objectives of the program are the development of ability for risk perception and safety practice. Through the practical traffic safety education, they will not only acquire the abilities to perceive or recognize the hazards and dangers of road traffic but should also be able to control risk-taking behaviors when participating in road traffic so as to avoid potential accident occurrence.

Issues of the Program

・ Promotion of consistent traffic safety education system

Contents of the Program

(a) Traffic safety education improvement at primary school

(b) Traffic safety zone (safe routes to/from home-school for all school levels)

(iii) Community Involvement Program

Objectives of the Program

Since deterrent force for traffic violation both on vehicles and pedestrian is expected if community act as traffic safety surveillance, community involvement in traffic safety is contribute to mitigate traffic accident. Therefore, an effective cooperation mechanism between the schools and communities shall be formulated.

Issues of the Program

・ Formulation of safety framework between school and community

Contents of the Program

(a) Framework development between school and community

(b) Black spots/hazardous spots identification in community

(c) Safe children's crossing

(iv) Organizational and Institutional Framework Development Program

Objectives of the Program

Supporting of law and regulation, budget, institution for traffic safety education sector programs is essential. Therefore, the basic strategies to ensure effective implementation of the programs are needed to be examined.

Issues of the Program

・ Development of teacher's training system and introduction of participatory program

Contents of the Program

(a) Institutionalization of school traffic safety education

(b) Curriculum development

(c) Teaching materials and safety aids development

(d) Human resource development

(e) School-police liaison system development

(f) Guideline on the management and evaluation of school traffic safety education

(v) Enhancement of Awareness Campaign Program

Objectives of the Program

Integration of proper road use and behavior of all road users to ensure road traffic safety is goal of the traffic safety awareness campaign program. To achieve the goal, systematic and constant awareness campaign through mutual cooperation among the national and local government agencies, traffic police and private organizations is essential.

Issues of the Program

・ Formulation of coordination system for sustainable safety awareness activities

・ Development of sustainable community traffic safety

・ Dissemination of traffic safety consciousness by mass media

Contents of the Program

(a) Sustainable coordinated safety awareness activities system development

(b) Sustainable community traffic safety system development

(c) Traffic safety consciousness publication by mass media

(6) Development of Medical Emergency Countermeasures

1) Framework of Medical Emergency Sector Strategic Plan

Sector Target

Appropriate post-accident system development is essential to provide prompt rescue and reduction of traffic accident fatalities. However, fundamental elements of the system such as ambulance network system, emergency rescue system, and trauma care has not developed properly.

The objectives of the sector are to develop efficient and enhanced post-accident system focusing on road accident casualties to reduce death and injury severity.

Sector Planning Strategy

In line with the basic strategies discussed in the previous section, three strategies for the medical emergency sector are reformulated:

(i) To establish an effective pre-hospital service system in the selected national/municipal roads

(ii) To strengthen capability of the emergency services units in selected localities

(iii) Ensure resources (manpower, equipment, medical conditions) to regularly fulfill effective emergency services

2) Strategy for Development Program

(i) Development of Pre-hospital Care Program

Objectives of the Program

Huge number of traffic accident victims are hospitalized and traffic accident fatalities in hospital has increased in Uganda. The role of pre-hospital care has become important to provide appropriate emergency care to accident victims as emergency service. The following objectives are needed to be incorporated in this program:

· Reduce traffic accident fatalities in hospitals by improving hospital capabilities

· Develop emergency call system to cover GKMA based on public health and private systems

· Improve training system for emergency medical service personnel

Issues of the Program

(i) Development of emergency medical information system

(ii) Improvement of ambulance system

Contents of the Program

(a) Strengthening emergency information system

(b) First aid and transportation system

(c) Development of emergency call system

(ii) Training Health Workers for Emergency System Program

Objectives of the Program

Rescuers of emergency system have very low level of first aid knowledge and skills in medical emergency. Most of rescuers do not have background on how to provide emergency services during a traffic accident such as rescue of victims and common first aid techniques on site. Thus, training system on emergency shall be established to upgrade knowledge of the health workers and community.

Issues of the Program

(i) Improvement of first aid system

(ii) Promotion of community involvement system for community traffic safety

Contents of the Program

(a) Standardization of training curriculum

(b) Design, printing and dissemination of training curriculums

(c) Formulation of emergency training centers

(d) Educating the community and school children

(iii) Capacity Development for Disaster and Mass Casualty Accident Program

Objectives of the Program

Share of the PSV vehicles in passenger traffic is huge, and public transport is promoting in Kampala city. This therefore increases the risk of mass casualty accidents. The health sector and local authorities at all levels should therefore be more concerned on the issue of mass casualty accident.

Issues of the Program

(i) Promotion of first aid technique dissemination and training

(ii) Development of mass casualty management

Contents of the Program

(a) Strengthening emergency capacity of the hospitals

(b) Satellite hospitals

(c) Organization of disaster medical assistance staff

8.3.4 INSTITUTION AND RESOURCE DEVELOPMENT STRATEGIES

(1) Formulation of Institution and Resource Development Program

Development of institution, financial resource, and human resource is essential element to ensure the sustainability of the traffic safety policy and to continue effective and efficient countermeasures. Institutional development program for the respective elements are proposed as follows:

(i) Institutional Enhancement Program

• Establishment of NRSA

• Authorization of traffic safety strategic plan

(ii) Research and Development Program

• Traffic safety research and development center development

• Traffic safety database development

(iii) Resources Development Program

• Traffic safety financial resource development

• Traffic safety human resource development

(2) Institutional Enhancement Program

1) Establishment of National Road Safety Authority (NRSA)

Establishment of national road safety authority as substitute for present responsible organization to upgrade responsibility and function of road traffic safety is essential for sustainable traffic safety development in Uganda.

Key implementation strategy to achieve traffic safety development policy by NRSA is to ensure 4Cs (communication, cooperation, coordination, and corroboration) among the agencies and organizations involved in traffic safety projects and activities. Moreover, following functions of the lead agency shall be fulfilled properly:

(a) Advise Government on road safety policy including the drafting of regulations, guidelines and policies

(b) Develop in conjunction with stakeholders, a comprehensive National Road Safety Action Plan that will be published and updated regularly

(c) Monitor and report on the progress of the National Road Safety Action Plan

(d) Develop sustainable road safety funding sources and road safety training program for persons involved in delivering road safety

(e) Serve as a central road safety body and co-ordinate activities between government departments, private sector, academic and professional institutes, NGOs, and community based organizations

(f) Improve the road traffic collision database, collection of accidents statistics and analysis and their dissemination

(g) Take the lead responsibility for road safety education and publicity and work in collaboration with others to improve road user behavior

(h) Promote and conduct research to ensure road safety policy is based on the best local data available and lesions learned from elsewhere

(i) Support the establishment and operation of the District Road Safety Committees (DRSCs) and improve communication between district and national level organizations

(j) Promote the informed participation of civil society, including private sector, in reducing death and injury on Uganda's roads

(k) Set standards for road safety equipment and ensure their compliance

2) Authorization of Traffic Safety Strategic Plan

As a first step to promote comprehensive traffic safety strategic plan, institutionalization of comprehensive approach and definition of responsibilities of responsible organizations as well as the sharing of costs among concerned agencies shall be implemented.

Most important issue of traffic safety policy development is to develop the comprehensive measures, ensure its sustainability, and develop a smooth and effective dissemination mechanism. Many government agencies shall be further involved in traffic safety development. Thus, the functions and responsibilities of these agencies and organizations and the mechanism for policy development should be clarified and finally legalized.

Policy guidelines for the Five-Year Action Program are introduced in Japan as a series of action programs since 1970 based on the Traffic Safety Policies Act. This institutional system shall be taken into account in traffic safety institution in Uganda.

(3) Research and Development Program

1) Traffic Safety Research and Development Center Development

Key role of NRSA is to be responsible for intersectoral issues on traffic safety policies and measures. Establishment of Traffic Safety and Development Center in NRSA is proposed as an organization solely responsible for the intersectoral issues to ensure efficiency and effectiveness of the traffic safety policy with following proposed framework:

(i) Mother Body: NRSA

(ii) Functions:

- Evaluation and analysis of traffic safety policies and measures
- Development of a traffic safety database and its operation including accident-violation
- Monitoring and evaluation of the traffic safety measures
- Research and development for traffic safety measures
- Others

2) Traffic Safety Database Development

Appropriate site investigation and recording of traffic accidents and traffic violations contributes to examine not only traffic safety countermeasures, but also traffic safety policy effectively and efficiently. Important element on data collection of the investigation and recording is that the data should be evidence to provide a clear picture of accident and violations, as well as the drivers' personal histories and information.

Therefore, traffic safety database system should be designed to provide adequate and clear for examination of countermeasures on each road traffic safety sub-sectors (engineering, enforcement, education) and three elements (person, vehicle, road environment).

(4) Resources Development Program

1) Traffic Safety Financial Resource Development Program

Another key role of NRSA is to develop sustainable traffic safety financial resource.

Following financial resources are introduced in motorized countries and recommendable as possible traffic safety financial resource in Uganda:

- Road Fund
- Violation fees
- Insurance premium from insurance companies,
- Gasoline tax,
- Other transport tax
- Private sector's donations and social contributions

2) Promising Traffic Safety Financial Resource Development

(i) Road Fund

Road fund is intended to establish road network development in Uganda, and definitive

budget allocation plan for road traffic safety is not included. Dominant budget allocation for road development and improvement is explicable based on present road condition in Uganda. However, safety conscious measure shall be taken into account on road development to alleviate economic losses by the traffic accident. As discussed in chapter 8.2.3 (4), economic loss by the traffic accident is estimated about 2.9% of GDP.

(ii) Road User Charges

Following road user charge can be used for financing road safety measures:

- Road safety surcharges on motor fuel
- Surcharges on compulsory vehicle insurance fees
- Surcharges on vehicle licensing fees
- Others

3) Traffic Safety Human Resource Development

Continuous upgrading of skills, knowledge and technical expertise on traffic safety sector shall be required to meet changing motorization situation in Uganda. To ensure sustainable traffic safety human resource development, the strategies that will be proposed are as follows:

(i) Development of traffic safety training system for staffs in concerned agencies

(ii) Capacity development supported by ODA projects

(iii) Promotion of research and development in the traffic safety sector

8.4 TRAFFIC SAFETY ACTION PLAN

8.4.1 INTRODUCTION

Action Plan (2011-2015) involves the first phase implementation period of the proposed traffic safety measures in the Strategic Plan. This Action Plan is important to ensure smooth and successful implementation of the proposed measures.

8.4.2 BASIC PRINCIPLES FOR MEASURES SELECTION OF THE ACTION PLAN

Basic Principle No. 1: The "4Es" approaches should guide the planning and implementation of measures indicated in this Action Plan. Participation of whole traffic safety concerned agencies is essential conditions for the success of this Action Plan.

Basic Principle No. 2: The Action Plan should be integrated with related existing policies and plans of the government.

Basic Principle No. 3: The proposed traffic safety measures should be ensured under a strong leadership and with adequate financial and human resources.

8.4.3 OBJECTIVES OF THE ACTION PLAN

- To provide a fundamental system to reduce road traffic accidents.
- To improve the knowledge, creating traffic safety awareness for road users.
- To enhance the management activities of vehicle and driver quality.
- To strengthen the capacity for the legal enforcement forces.
- To mitigate the factors causing safety losses in transport infrastructures.

8.4.4 SECTORAL TRAFFIC SAFETY DEVELOPMENT ACTION PLAN

(1) Development of Safe Road Traffic Environment

(i) Black Spot Improvement Program

Table 8.4.1 Action Plan for Black Spot Improvement Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) Development of cooperative mechanism between traffic police and road management authority	2012	UNRA	POLICE, KCC	0.1	0.1				
(2) Development of black spot improvement guideline	2012	UNRA		0.3	0.3				
(3) Implementation of the black spot improvement pilot project including training for engineers and capacity development	2013	UNRA	POLICE		0.5	0.5			
(4) Utilization of the black spot improvement database, development of supporting tools and establishment of the executing agency	2014	UNRA	POLICE			0.2	0.1		
(5) Follow-up on the results of post-monitoring of the black spot improvement	2023	UNRA						0.1	0.5
Total				0.4	0.9	0.7	0.1	0.1	0.5

(ii) Road Safety Audit System Development Program

Table 8.4.2 Action Plan for Road Safety Audit System Development Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) Promotion of RSA system to the road management authorities	2023	UNRA	KCC				0.2	0.2	1
(2) Revision of RSA guideline	2013	UNRA			0.2	0.2			
(3) RSA pilot project	2012	UNRA		0.4	0.4				
Total				0.4	0.6	0.2	0.2	0.2	1

(iii) Highway Traffic Safety Facility Enhancement Program

Table 8.4.3 Action Plan for Highway Traffic Safety Facility Enhancement Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) Systematic road network development with appropriate function sharing									
(a) Safety facilities improvement for roads along residential areas	2015	KCC		0.5	0.5	0.5	0.5	0.5	
(b) Systematic road network improvement in residential and commercial zones	2020	UNRA	KCC				1	1	3
(c) Systematic road network development	2023	UNRA							10
(2) Enhancement of traffic control in accordance to local characteristics and road function									
(a) Improvement of traffic regulations and operation in accordance with local conditions	2015	UNRA	KCC			0.1	0.1	0.1	
(b) Traffic regulation improvement for trunk road	2013	UNRA		0.1	0.1	0.1			
(3) Promotion of smooth and comfortable road traffic, and road accident prevention measures on general roads									
(a) Railway crossing improvement	2013	Uganda Railways Cooperation		0.2	0.2	0.2			
(b) Traffic control and information system development for inter-city road	2015	UNRA				1	1	1	
(c) Traffic signal and control system development	2014	KCC	UNRA, POLICE		1.5	1.5	1.5		
(d) Intersection improvement	2014	KCC	UNRA		2	2	2		
(e) Traffic safety facilities improvement	2023	UNRA	KCC, POLICE			0.5	0.5	0.5	2.5
(4) Review of design standard considering traffic characteristics and budgetary situations	2013	UNRA		0.1	0.1	0.1			
(5) Promotion of design standard and its applicable application									
(a) Integration of design standards and development of design standard instruction manual	2015	UNRA					0.2	0.2	
(b) Standard design drawings development	2015	UNRA					0.2	0.2	
Total				0.9	4.4	6	7	3.5	15.5

(iv) Vulnerable Road User Accident Prevention Program

Table 8.4.4 Action Plan for Vulnerable Road User Accident Prevention Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) Development of safe pedestrian space									
(a) Pedestrian facility improvement along school routes	2014	UNRA	KCC		0.5	0.5	0.5		
(b) Pedestrian facility improvement for high-risk accident areas	2015	UNRA	KCC			0.5	0.5	0.5	
(2) Separation of car traffic and development of facilities for light vehicles	2020	KCC	UNRA						5
(3) Exclusive bicycle lane facility development	2020	KCC	UNRA						5
Total				0	0.5	1	1	0.5	10
(v) Traffic Safety Project Monitoring and Maintenance Program				0	0	0.5	0.1	0.1	0.5

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) Capacity development on planning and implementation of traffic safety environment improvement									
(a) Monitoring and evaluation system for safety planning	2023	NRSA					0.1	0.1	0.5
(b) Establishment of a monitoring and evaluation unit of road safety plan	2013	NRSA				0.5			
Total				0	0	0.5	0.1	0.1	0.5

(v) Traffic Safety Project Monitoring and Maintenance Program

Table 8.4.5 Action Plan for Traffic Safety Project Monitoring and Maintenance Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) Capacity development on planning and implementation of traffic safety environment improvement									
(a) Monitoring and evaluation system for safety planning	2023	NRSA					0.1	0.1	0.5
(b) Establishment of a monitoring and evaluation unit of road safety plan	2013	NRSA				0.5			
Total				0	0	0.5	0.1	0.1	0.5

(vi) Urban Road Traffic Safety Plan Development Program

Table 8.4.6 Action Plan for Urban Road Traffic Safety Plan Development Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) Enhancement of traffic control in accordance to characteristics and road function in urban area	2013	KCC	POLICE	0.2	0.2	0.2			
(2) Promotion of upgrading and efficient traffic signal system development									
(a) Coordinated traffic signal system development	2015	UNRA	KCC		0.8	0.8	0.8	0.8	
(b) Area wide and flexible signal control system development	2023	UNRA	KCC						2
(3) Development of parking space and strengthening of enforcement for illegal parking									
(a) Illegal parking prevention facilities development	2013	KCC		0.3	0.3	0.3			
(b) Efficient parking regulation system development	2013	KCC	POLICE		0.6	0.6			
(c) Formulation of regulations making parking facility compulsory in every building construction	2014	KCC				0.1	0.1		
(d) Comprehensive parking system plan development	2012	KCC	POLICE	0.2	0.2				
(4) Improvement of traffic demand control									
(a) Public transport prioritizing facilities development	2013	MOWT	KCC		0.8	0.8			
(a) Promotion of public transport usage facilitation	2015	MOWT	KCC			0.3	0.3	0.3	
(b) Measures promoting traffic dispersion during peak hour	2015	NRSA					0.1	0.1	
(c) Park and ride system development	2020	MOWT	KCC						1.5
Total				0.7	2.9	3.1	1.3	1.2	3.5

(vii) R&D, Human Resources Development Program

Table 8.4.7 Action Plan for R&D, Human Resources Development Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) Utilization of the black spot improvement database, development of supporting tools and establishment of the executing agency	2012	UNRA	POLICE	0.2	0.2				
(2) Follow-up on the results of post monitoring of the black spot improvement									
(a) Development of support mechanisms to increase efficiency of the black spot improvement such as database and guideline	2012	UNRA		0.1	0.1				
(b) Promotion of establishment of an independent implementing unit in the road management organization which shall be responsible for traffic safety mitigation	2012	UNRA	KCC		0.2				
(c) Legal establishment of research institution on black spot improvement	2012	NRSA	MOWT		0.5				
(3) Establishment of licensing/accrediting system and human resource development mechanism for the auditors	2014	NRSA	UNRA			0.8	0.8		
(4) Utilization of database supporting the auditing, development of the supporting tools and establishment of the responsible agency	2015	NRSA	UNRA			0.2	0.2	0.2	
(5) Scientific traffic accident analysis, evaluation of effectiveness of RSA implementation and cost-effectiveness, and feedback mechanism for the results to be appropriately utilized									
(a)Establishment of new institution in charge of traffic safety analysis	2012	NRSA	UNRA		0.2				
(6) Scientific support for design standard preparation									
(a)Establishment of research and development institute for the design standard and guideline improvement	2013	NRSA	UNRA		1	1			
Total				0.3	2.2	2	1	0.2	0

(2) Enhancement of Safe Driving and Vehicle Safety

(i) License Renewal System Development Program

Table 8.4.8 Action Plan for License Renewal System Development Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) License Renewal System									
(a)Preparatory works	2011	TLB	MOWT	2					
(b)Training of instructor	2013	TLB			0.3	0.3			
(c)Enactment of law	2014	NRSA	MOWT						
(2) License Renewal System by Traffic Violation									
(a)Database establishment	2015	TLB				1	1	1	
(b)System design and textbook development	2012	TLB		0.5	0.5				
(c)Coordination with concerned organizations	2013	NRSA	TLB		0.1	0.1			
(d)Instructor training	2015	TLB						0.5	
(e)Law enactment	2015	NRSA	MOWT						
(3) License System for Beginning Drivers	2020	TLB							2
Total				2.5	0.9	1.4	1	1.5	2

(ii) Driver Training and Testing System Development Program

Table 8.4.9 Action Plan for Driver Training and Testing System Development Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1) Driver Training and Testing									
(a)Preparatory works	2011	TLB	MOWT	5					
(b)Coordination with concerned organizations	2012	TLB	NRSA, MOWT, POLICE		0.2				
(c)Textbook preparation	2013	TLB	NRSA			1			
(d)Manual preparation for professional driver	2014	TLB				0.3	0.3		
(e)Development of instructor education system	2014	TLB				0.2	0.2		
(f)New content materials for training and testing for traction vehicle	2014	TLB				1	1		
(g)Adequate financial support to ensure sustainable operation	2023	MOWT	NRSA			0.1	0.1	0.1	0.5
(2) Safe Driving Management System for PSV and Commercial Company									
(a)Preparatory works	2011	TLB	UTODA	3					
(b)Coordination with concerned organizations	2012	TLB	UTODA		0.2				
(c)Preparation of manual for transport companies	2014	TLB	UTODA			0.3	0.3		
(d)Conduct of pilot project	2013	TLB	UTODA, POLICE			2			
Total				8	0.4	4.9	1.9	0.1	0.5

(iii) Vehicle Registration System Development Program

Table 8.4.10 Action Plan for Vehicle Registration System Development Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Preparatory works	2011	MOWT	UNBS	1					
(b)Coordination with concerned organizations	2012	MOWT	UNBS		0.1				
(c)Development of system	2013	UNBS	MOWT			0.5			
(d)Enhancement of the new standard	2015	UNBS	MOWT				1	1	
(e)Instruction to manufacturer and dealer	2015	UNBS	MOWT					0.3	
Total				1	0.1	0.5	1	1.3	0

(iv) Vehicle Inspection System Development Program

Table 8.4.11 Action Plan for Vehicle Inspection System Development Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Preparatory works	2011	MOWT	UNBS	5					
(b)Coordination with concerned organizations	2012	MOWT	UNBS		0.02				
(c)Development of system	2013	UNBS	MOWT			0.5			
(d)Enhancement of the new standard	2015	UNBS	MOWT				0.5	0.5	
(e)Instruction to manufacture and dealer	2015	UNBS	MOWT					1	
(f)Law enactment	2015	NRSA	UNBS						
Total				5	0.02	0.5	0.5	1.5	0

(v) Organizational and Resource Development Program

Table 8.4.12 Action Plan for Organizational and Resource Development Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Preparation of system and contents	2013	NRSA	MOWT,TLB		0.1	0.1			
(b)Personal training	2023	TLB	MOWT				0.3	0.3	0.3
Total				0	0.1	0.1	0.3	0.3	0.3

(3) Efficient Traffic Control and Enforcement Development Plan

(i) Traffic Safety Guidance for Young and Vulnerable Road Users Program

Table 8.4.13 Action Plan for Traffic Safety Guidance for Young and Vulnerable Road Users Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)On-street traffic safety guidance to motorcycle taxi and pedestrians	2020	POLICE	UTODA			0.2	0.2	0.2	0.2
(b)On-site traffic safety guidance on how to drive at black-spots and black-sections	2020	POLICE	UTODA			0.1	0.1	0.1	0.1
(c)Intensified traffic safety guidance for young drivers	2023	POLICE				0.2	0.2	0.2	0.2
Total				0	0	0.5	0.5	0.5	0.5

(ii) Strengthening and Intensifying Traffic Law Enforcement Program

Table 8.4.14 Action Plan for Strengthening and Intensifying Traffic Law Enforcement Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Traffic violations such as over speeding, signal ignorance,	2023	POLICE				0.2	0.2	0.2	0.2
(b)Traffic violators at black-spots and sections	2020	POLICE				0.5	0.5	0.5	0.5
(c)Traffic violators among commercial drivers	2023	POLICE	UTODA			0.1	0.1	0.1	0.1
Total				0	0	0.8	0.8	0.8	0.8

(iii) Coordination among Concerned Agencies Responsible for Traffic Safety Countermeasures Program

Table 8.4.15 Action Plan for Coordination among Concerned Agencies Responsible for Traffic Safety Countermeasures Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Examination and design of public relations strategies on coordination mechanism with related agencies	2012	POLICE	NRSA, TLB,UNRA		0.1				
(b)Presentation and exchange of views among the participants on the current situation of traffic safety guidance and enforcement activities	2014	POLICE	NRSA, TLB,UNRA			0.2	0.2		
(c) Presentation and exchange of views among the participants on the current issues on traffic facilities and traffic management related to traffic safety guidance and enforcement	2014	POLICE	NRSA, TLB,UNRA			0.2	0.2		
Total				0	0.1	0.4	0.4	0	0

(iv) Recording and Evaluation of Traffic Safety Guidance and Enforcement Activities Program

Table 8.4.16 Action Plan for Recording and Evaluation of Traffic Safety Guidance and Enforcement Activities Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Recording of traffic guidance and enforcement activities	2013	POLICE			0.3	0.3			
(b)Evaluation of the activities	2013	POLICE				0.1			
(c)Activity planning based on the evaluation	2014	POLICE					0.1		
Total				0	0.3	0.4	0.1	0	0

(v) Human Resource Development on Traffic Safety Guidance and Enforcement Program

Table 8.4.17 Action Plan for Human Resource Development on Traffic Safety Guidance and Enforcement Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Examination of human resource development policy on traffic safety guidance and enforcement	2012	POLICE	NRSA		0.1				
(b)Development of training system for sustainable human resource development	2013	POLICE	NRSA			0.2			
(c)Beginners' training	2015	POLICE					0.2	0.2	
(d)Intermediate leaders' training	2015	POLICE					0.2	0.2	
(e)Advance training	2015	POLICE					0.2	0.2	
Total				0	0.1	0.2	0.6	0.6	0

(vi) Preparation and Development of Equipment for Traffic Safety Guidance and Enforcement Program

Table 8.4.18 Action Plan for Preparation and Development of Equipment for Traffic Safety Guidance and Enforcement Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Equipment procurement plan for traffic safety guidance and enforcement	2012	POLICE			0.1				
(b)Implementation of procurement plan	2014	POLICE				0.5	0.5		
Total				0	0.1	0.5	0.5	0	0

(4) Traffic Safety Education in School Development Plan

(i) Traffic Safety Educational Practice Program for Pre-School Children

Table 8.4.19 Action Plan for Traffic Safety Educational Practice Program for Pre-school Children

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1)Traffic safety education improvement program at	2015	MOES			0.5	0.5	0.5		
(2)Safe road crossing ability development program	2014	MOES	POLICE, NGO		0.1	0.1	0.1		
(3)Parental education development program	2014	MOES	NGO		0.2	0.2	0.2		
Total				0	0.8	0.8	0.8	0	0

(ii) Traffic Safety Education for Primary School Students Program

Table 8.4.20 Action Plan for Traffic Safety Education for Primary School Students Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1)Traffic safety education improvement program at primary school level									
(a)Traffic safety zone (Safe-Routes-to/from-home-school)	2014	MOES	POLICE		0.1	0.1	0.1		
Total				0	0.1	0.1	0.1	0	0

(iii) Community Involvement Program

Table 8.4.21 Action Plan for Community Involvement Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1)Black spots/hazardous spots identification program	2015	NGO	POLICE				0.1	0.1	
(2)Safe children's crossing program	2015	NGO	POLICE				0.1	0.1	
Total				0	0	0	0.2	0.2	0

(iv) Organizational and Institutional Framework Development Program

Table 8.4.22 Action Plan for Organizational and Institutional Framework Development Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(1)Institutionalization of school traffic safety education									
(a)Curriculum development program	2012	MOES		0.1	0.1				
(b)Teaching materials/aids development/supply program	2013	MOES			0.3	0.3			
(2)Human resource development program (Training and retraining of school teachers)									
(a)School-police liaison system development program	2014	MOES	POLICE				0.2		
(b)Guideline on the management and evaluation of school traffic safety education	2015	MOES					0.1	0.1	
Total				0.1	0.4	0.3	0.3	0.1	0

(v) Enhancement of Awareness Campaign Program

Table 8.4.23 Action Plan for Enhancement of Awareness Campaign Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Sustainable coordinated safety awareness activities system development	2012	NRSA	NGO		0.2				
(b)Sustainable community traffic safety system	2014	NRSA	NGO			0.1	0.1		
(c)Traffic safety consciousness publication by mass	2014	NRSA	NGO			0.5	0.5		
Total				0	0.2	0.6	0.6	0	0

(5) Medical Emergency Development Plan

(i) Development of Pre-Hospital Care Program

Table 8.4.24 Action Plan for Development of Pre-hospital Care Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Strengthening emergency information system	2015	MOH					2	2	
(b)First aid and transportation system	2013	MOH		1	1	1			
(c)Development of emergency call System	2014	MOH			0.5	0.5	0.5		
Total				1	1.5	1.5	2.5	2	0

(ii) Training Health Workers for Emergency System Program

Table 8.4.25 Action Plan for Training Health Workers for Emergency System Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Standardization of training curriculum	2012	MOH	NGO	0.3	0.3				
(b)Formulation of emergency training centers	2014	MOH				0.5	0.5		
(c)Design, printing and dissemination of training	2015	MOH	NGO					0.1	
(d)Educating the community and school children	2023	MOH	MOES, NGO						1
Total				0.3	0.3	0.5	0.5	0.1	1

(iii) Capacity Development for Disaster and Mass Casualty Accident Program

Table 8.4.26 Action Plan for Capacity Development for Disaster and Mass Casualty Accident Program

Activities	Completed by	Core Agency Involved	Coordinating Agency	Cost (million USD)					
				2011	2012	2013	2014	2015	2023
(a)Strengthening emergency capacity of the hospitals	2015	MOH			0.5	0.5	0.5	0.5	
(b) Development of satellite hospitals along black	2023	MOH							10
(c)Organization of a disaster medical assistance team	2013	MOH			0.2	0.2			
Total				0	0.7	0.7	0.5	0.5	10

8.4.5 TRAFFIC SAFETY INSTITUTIONS

Table 8.4.27 Action Plan for Traffic Safety Institutions Development Program

Year	2011	2012	2013	2014-2015
National Road Safety Authority	• Detailed design of the structure and its legal procedure • Establishment of provisional organization • Human resource development	• Implementation by the provisional organization • Human resource development	• Establishment of permanent organization • Preparation of Five-Year Action Plan	• Start of full-scale activities • Monitoring and evaluation of the Five-Year Action Plan
	1.2	1.0	0.3	0.3
Traffic Safety Research and Development Center	• Detailed design of the structure • Establishment of provisional organization • Human resource development for the center	• Human resource development for the center	• Establishment of permanent organization • Research and analysis for Five-Year Action Plan	• Start of full scale activities • Data collection and analysis of Five-Year Action Plan • Completion of traffic safety database
	0.3	0.3	-	-
Traffic Safety Foundation	• Preparatory period		• Legal procedure	• Start of activities • Review of the organizational setup
	1.5		-	-
Total (million USD)	1.9	2.6	0.3	0.3

8.5 IMPLEMENTATION PLAN

8.5.1 MAJOR FINDINGS

Major findings of the Study are summarized as follows:

(1) Smooth economic development has brought rapid increase in the rate of motorization. As of 2008, a total of 470,000 vehicles are registered across the country, 50% of which are motorcycles.

(2) The road traffic accidents increased rapidly from 1990 to 2007, with an annual increase rate of 7.8%. During this 17-year period, the number of fatalities has increased 3.6 times. The numbers of accidents, fatalities and injuries have reached 20,413, 2,807 and 14,073, respectively, which increased economic losses to approximately 2.9% of the GDP. Fatality rate still remains at a critical level of 52.9 per 10,000 motorized vehicles.

(3) Causes of the traffic accidents are intricately intertwined between physical situation and human errors as well as mixed traffic and reckless driving behaviors. Many traffic accidents have occurred on the main trunk roads, of which 38% of total fatalities are pedestrians. The major causes of accidents are careless driving and reckless driving.

(4) The GOU has undertaken numerous countermeasures as well as enlisted the support, assistance and cooperation of international donors to alleviate one of the most pressing social problems in the country at present, which is traffic safety. While some of the countermeasures are implemented in the country, there are still further needs to develop safe driving behaviors among traffic participants in the country.

(5) Urgent traffic safety issues have been addressed by the different sectors, such as black spot improvements for the engineering sector, dissemination of school traffic safety education for the education sector, and development of the 119 system for the emergency sector. However, these efforts are still on the pilot stages and only in very limited areas.

(6) Traffic Safety Strategic Plan and its Action Plan have been developed. The Strategic Plan is aimed at developing traffic safety development policies and strategies toward 2023 while the Action Plan will be the implementation program of the proposed Strategic Plan policies and strategies for the next five years (2011-2015).

(7) The proposed Action Plan is an integration of different sectoral programs into a comprehensive program, namely: Transport Engineering, Transport Operation, Traffic Enforcement, Traffic Safety Education Development, Medical Emergency and Institutional Improvement.

8.5.2 IMPLEMENTATION PLAN

The proposed Strategic Plan will be a basic policy and guideline for the government. The Strategic Plan and Action Plan include the comprehensive measures, and the following are some of the major recommendations to facilitate key institutional setup of the strategic traffic safety plan:

- Traffic Safety Human Resource Development Project in Kampala
- Comprehensive Vehicle Management System Development Project
- Project for the Study on Development of Traffic Control Device Integration and Traffic Surveillance System

(1) Traffic Safety Human Resource Development Project in Kampala

Background

"4Cs (communication, cooperation, collaboration, and coordination)" approach proposed as one of "Implementation Strategies" on "Basic Strategies for the Traffic Safety Measures", among traffic safety stakeholders are key institutional function to implement traffic safety strategic plan effectively and efficiently. Besides, "4Es" approach is proposed as "Basic Principle" for action plan measures selection.

This project is proposed to take above traffic safety principles into practical traffic safety activities as integrated project of following action programs for coordination and human resource development:

Development of Safe Road Traffic Environment

(vii) R&D, Human Resources Development Program

Efficient Traffic Control and Enforcement Development Plan

(iii) Coordination among Concerned Agencies Responsible for Traffic Safety Countermeasures Program

Traffic Safety Education in School Development Plan

(iv) Organizational and Institutional Framework Development Program

This project is intended to improve following current inter-sectoral problems through mutual project implementation among traffic safety concerned agencies towards effective and efficient implementation of traffic safety strategic plan.

- Unclear administrative responsibility on traffic safety-related issues among concerned agencies
- Insufficient coordination and cooperation system on traffic safety measures implementation among concerned agencies
- Insufficient capacity on traffic safety measures planning and implementation in concerned agencies
- Lack of traffic safety-related ability of concerned staff in responsible agencies

Project Objective

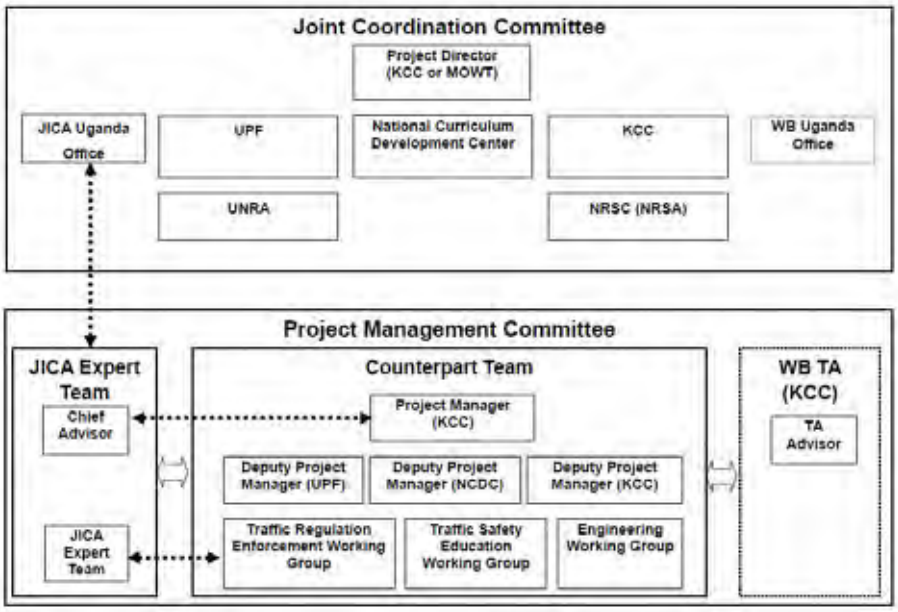
- Improvement of traffic safety measures in Kampala

Objectives (Output)

- To establish a system for planning, implementation and evaluation of comprehensive traffic safety measures in Kampala.
- To improve abilities of traffic policemen of Kampala Traffic Police Division for traffic enforcement.
- To improve abilities of traffic inspectors of KCC for traffic enforcement.
- To improve abilities of officers of KCC for traffic management and road facilities.
- To improve abilities of officers of National Curriculum Development Center (NCDC) for

traffic safety education.

Implementation Structure



Source: JICA Study Team

Figure 8.5.1 Project Implementation Structure

Implementation Plan:

- JICA Technical Cooperation Project (3 years: 2011-2013)
- Traffic safety specialist (engineering, enforcement, education, etc.), OJT, Equipment provision

(2) Comprehensive Vehicle Management System Development Project

Background

Two action plans named "(iii) Vehicle Registration System Development Program" and "(iv) Vehicle Inspection System Development Program" are proposed as driver and vehicle sector development program based on the following sector planning strategy on "Enhancement of Safe Driving and Safety Vehicles":

(ii) To develop driving standard and vehicle standard to clarify social responsibilities of drivers and vehicle owners

(iv) To develop integrated vehicle management system (vehicle registration, vehicle inspection) to create safe and sustainable traffic safety society

This project is proposed as initial setup stage for above mentioned action plan programs to provide practical planning suggestion for smooth implementation of the action plan programs towards development of new vehicle registration and inspection system with improvement following current problems:

- Defective vehicle management system (suspended compulsory vehicle inspection system, defective check system of insuring)

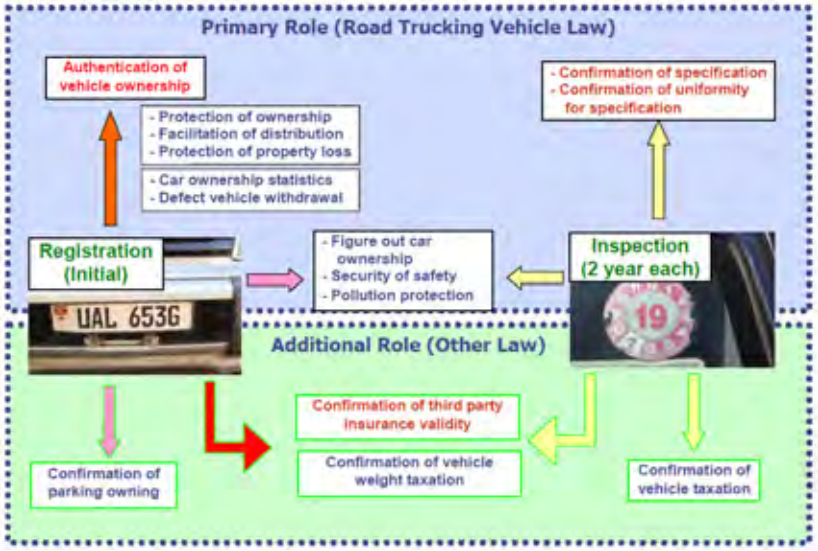
- Inefficient vehicle management system due to lack of coordinated communication system among concerned organizations (database, etc.)
- Lack of "benefit principle" perspective on traffic safety funding

Objectives

- Development of vehicle inspection standard (TLB, UNBS)
- Development of coordinated vehicle management system (URA, UNBS)
- Formulation of framework to promote vehicle inspection system privatization (TLB)
- Development of new vehicle taxation system (URA)

Implementation Plan

- Technical Cooperation for Development Planning (1 year: 2011-2012)
- Vehicle management institution specialist, vehicle taxation specialist, etc.



Source: JICA Study Team

Figure 8.5.2 Proposed Vehicle Registration and Inspection System

(3) Project for the Study on Development of Traffic Control Device Integration and Traffic Surveillance System

Background

An action plan named "(iii) Highway Traffic Safety Facility Enhancement Program, (3), c) Traffic signal and control system development" is proposed as engineering sector development program based on the following sector planning strategy on "Development of Safe Road Traffic Environment":

(ii) To improve traffic control and management devices to provide safety guidance to the drivers and road users;

This project is proposed as a pilot scheme for the above mentioned action plan to transfer

planning, design, and operational technology on the integrated traffic surveillance system. In addition to that, it is intended to make the road improvement projects which include traffic signals installation more effective towards achievement of following issues:

- Capacity expansion of existing independent traffic lights to meet future traffic demand
- Area traffic control and its surveillance system is necessary to meet motorization development
- Optimization of traffic safety resource (traffic police, equipment)

Objectives

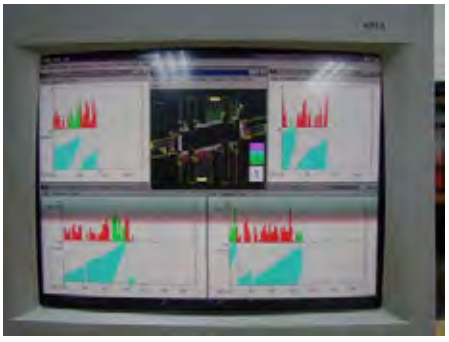
- Pilot project for advanced and coordinated traffic lights operation (KCC, UPF)
- Development of strategy for introduction of area traffic surveillance system based on the result of the pilot project (KCC, UPF)
- Development of efficient traffic police resource management system (UPF)

Implementation Plan

- Technical Cooperation for Development Planning (2 Years: 2012-2014)
- Traffic safety specialist (traffic engineer, electric engineer, enforcement specialist, etc.)

Traffic Control Center

Traffic Monitor



Auto-Traffic Light Controller

Network Traffic Light with Traffic Detector

Figure 8.5.3 Example of Area Traffic Control System

CHAPTER 9 PUBLIC TRANSPORT PLAN

9.1 MAJOR FINDINGS ACQUIRED BY TRAFFIC SURVEY

In this section, the major findings acquired from the traffic survey conducted in January 2010 are enumerated.

9.1.1 TRAFFIC FLOW AND ITS TENDENCY

(1) Traffic Flow

1) Traffic Volume

The traffic volume of minibus and motorcycles by the traffic count is shown in the following table.

Table 9.1.1 Traffic Count Result (Minibus)

Survey Point	Road Name	Minibus	Other Vehicle	Total	Composition of Minibus
No.1-1	Port Bell	1,748	9,145	10,893	16.0%
No.1-2	Jinja	8,129	15,568	23,697	34.3%
No.1-3	Kira	4,433	15,632	20,065	22.1%
No.1-4	Gayaza	3,954	6,546	10,500	37.7%
No.1-5	Bombo	3,547	8,963	12,510	28.4%
No.1-6	Sir. Apollo Kaggwa	2,616	5,550	8,166	32.0%
No.1-7	Makerere Hill	3,005	17,640	20,645	14.6%
No.1-8	Hoima	6,344	5,013	11,357	55.9%
No.1-9	Masaka	5,144	6,814	11,958	43.0%
No.1-10	Natete	2,262	10,073	12,335	18.3%
No.1-11	Entebbe	9,150	19,640	28,790	31.8%
No.1-12	Gaba	4,187	11,211	15,398	27.2%

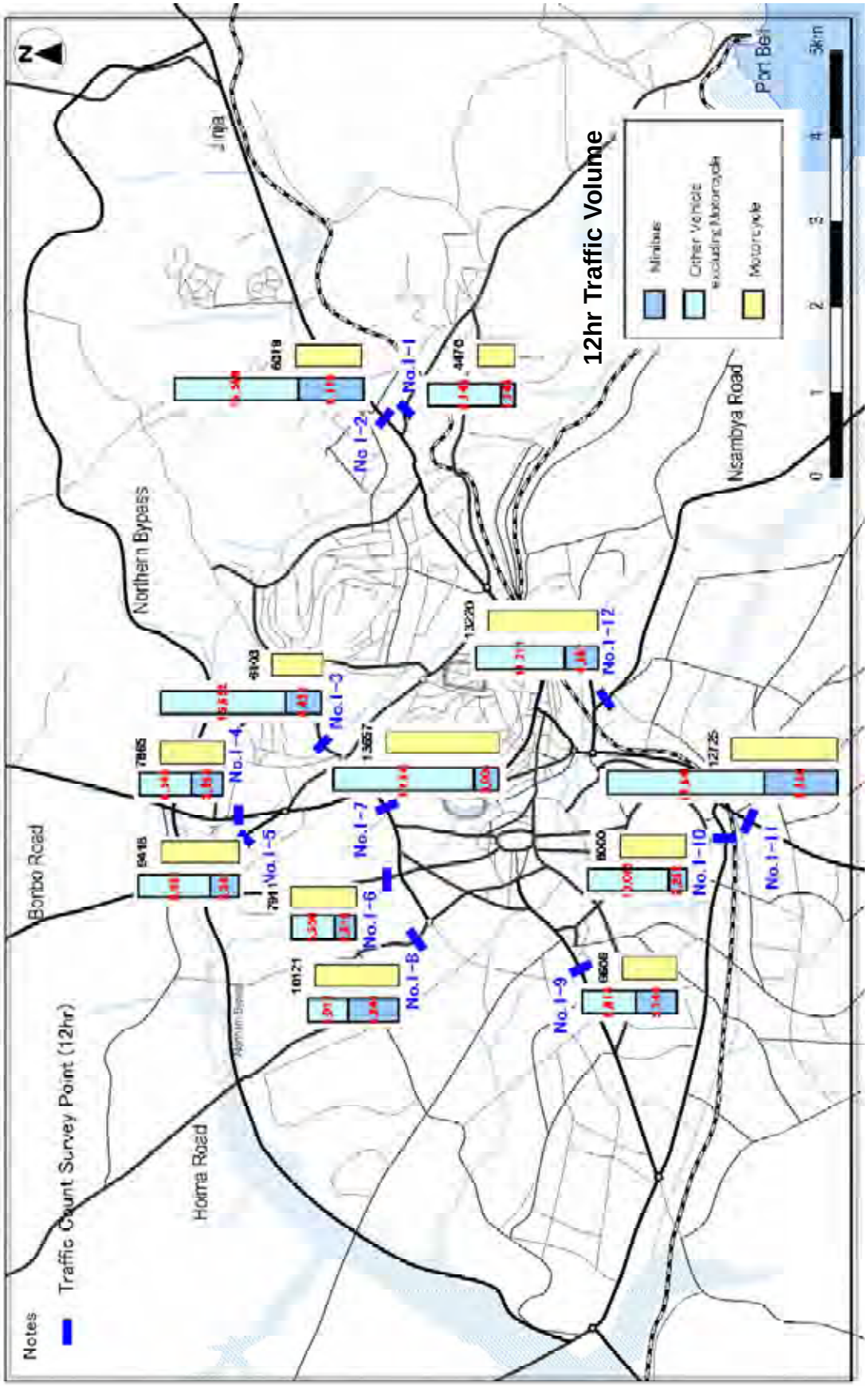
Note: Motorcycle is excluded
Source: JICA Study Team

Table 9.1.2 Traffic Count Result (Motorcycle)

Survey Point	Road Name	No. of Motorcycle
No.1-1	Port Bell	4,470
No.1-2	Jinja	8,019
No.1-3	Kira	6,103
No.1-4	Gayaza	7,865
No.1-5	Bombo	9,418
No.1-6	Sir. Apollo Kaggwa	7,911
No.1-7	Makerere Hill	13,627
No.1-8	Hoima	10,121
No.1-9	Masaka	6,606
No.1-10	Natete	8,000
No.1-11	Entebbe	12,725
No.1-12	Gaba	13,220

Since most minibuses are deemed to be matatsu (minibus), the movement of matatsu is surmised by minibus here. The total traffic volume counted is highest on Entebbe Road, second highest on Jinja Road and third highest on Makerere Hill Road. Meanwhile, minibus volume is highest on Entebbe Road, second highest on Jinja Road and third highest on Hoima Road. Comparing north, south, east and west, the total traffic and minibus traffic are less in the west direction. On Hoima Road, minibus occupies more than 50% of total traffic (Table 9.1.1).

In case of boda-boda, it is more difficult to distinguish boda-boda from private motorcycle. But most of motorcycles are speculated to be boda-boda, either formal or informal. Volume of motorcycle varies more irregularly and influenced by traffic congestion on the road and activity around the survey point (Table 9.1.2). In some survey points, motorcycle volume is close to the volume of other vehicles. It is evident that the effect of motorcycles is not ignored for the road capacity. Figure 9.1.1 shows the total traffic volume and minibus volume.

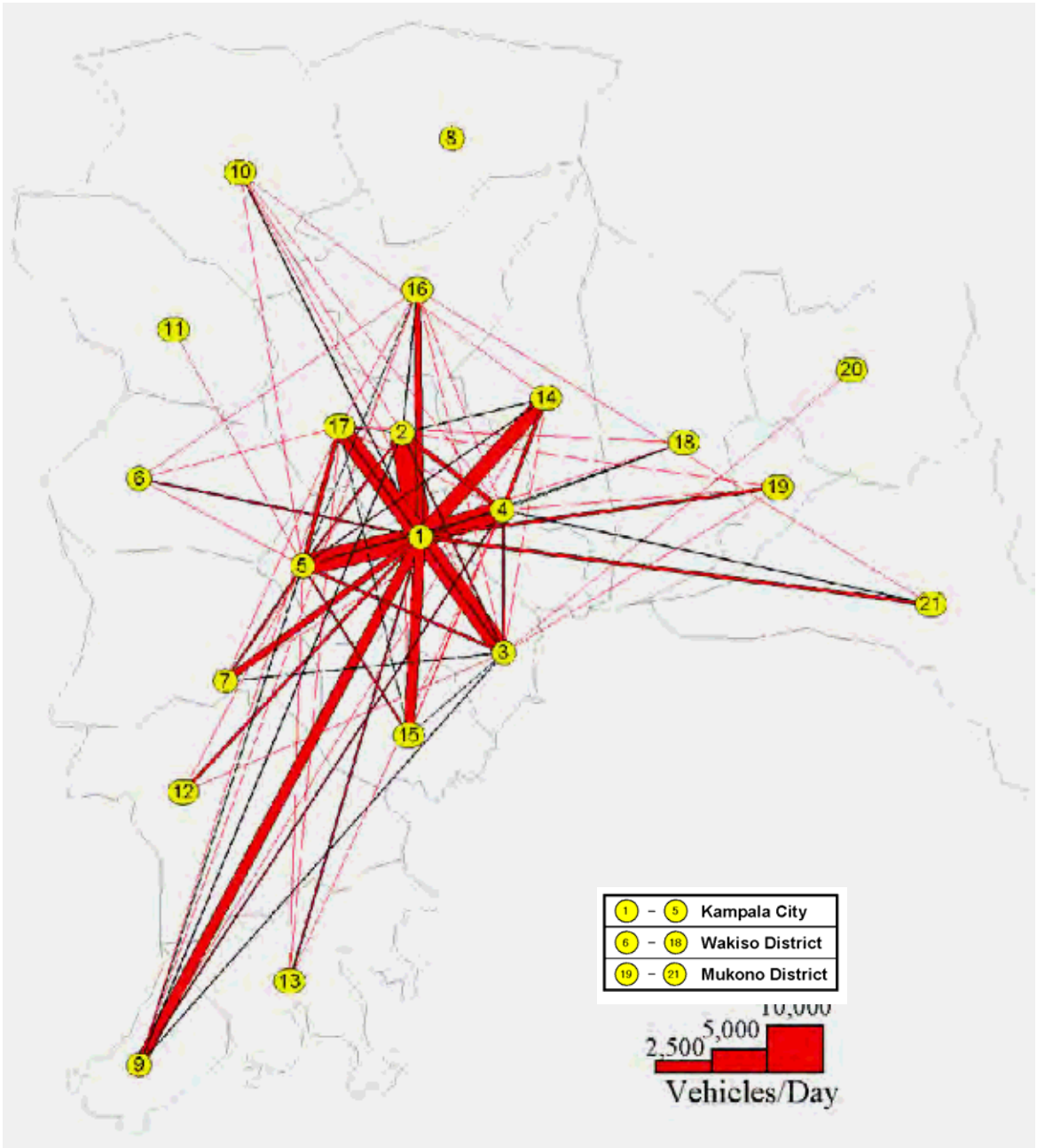


Motorcycle is excluded Source: JICA Study Team

Figure 9.1.1 Traffic volume of Minibus and Other Vehicle by Traffic Count

2) O-D Traffic Volume of Minibus

Based on the O-D table of minibus captured at road side interview, the desired line of minibus vehicle is shown in the following figure. The concentration in the Kampala City center (zone 1) is dominant. Among the incoming movements toward the city center, the movement from Kampala City (zone 2 – zone 5) is very large. Outside the Kampala City area, traffic from adjacent zones such as Kira (zone 14), Kyandondo (zone 15), Nangabo (zone 16) and Nabuweru (zone 17) is also large. Except for the adjacent zones, movement from Entebbe (zone 9) is conspicuous.



Source JICA Study Team

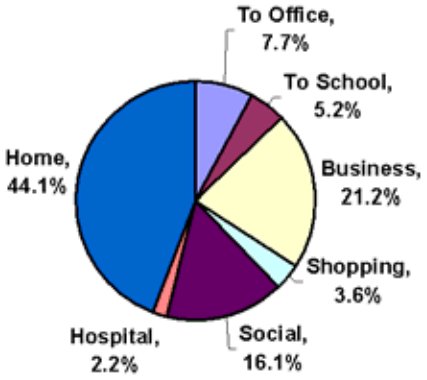
Figure 9.1.2 O-D Distribution of Minibus

(2) Trip Characteristics

1) Minibus Passenger

a) Trip Purpose

According to the passenger interview survey for minibus, the proportion of home and other related trips is highest. Office and business trips are the second highest. Shopping and hospital trips are rather low.



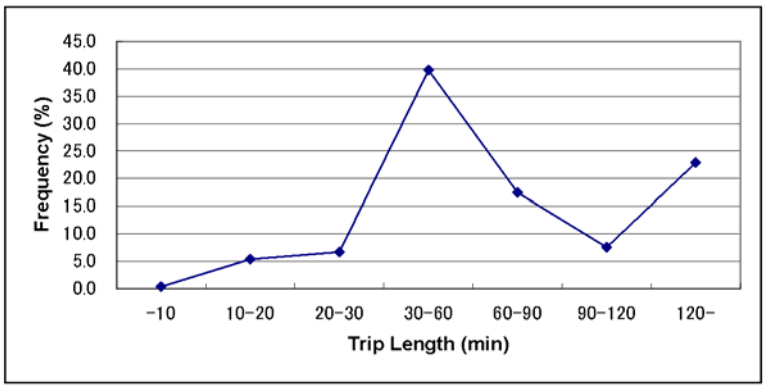
Source: JICA Study Team

Figure 9.1.3 Trip Purpose of Minibus Passenger

b) Trip Length

Trip length (time) distribution of minibus passenger is shown in the following figure. Travel time of minibus passenger is most frequently between 30 and 60 minutes. However, trips taking more than 120 minutes are also frequent.

The average time is approximately 70 minutes. It is pointed out that minibus is used for trips of various distances except for walking distance trips.

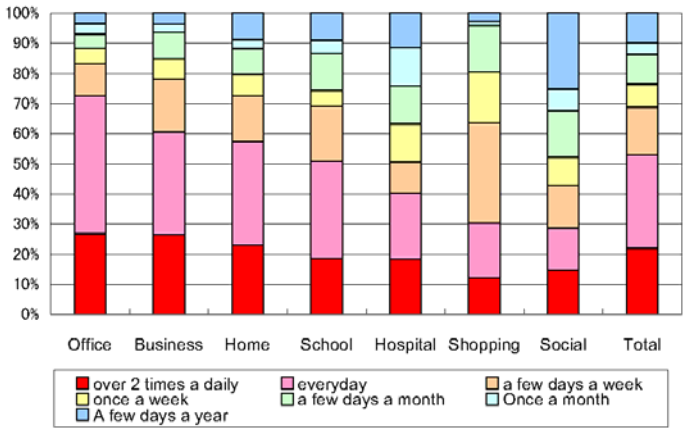


Source: JICA Study Team

Figure 9.1.4 Trip Length Distribution (Minibus)

c) Frequency of Trip

In total, more than 50% of passengers use minibus once or twice everyday. As for the frequency by trip purpose, passengers use minibuses more than once every day for office, business and home purposes. In terms of shopping and social purposes, less than 30% of passengers use minibuses everyday.



Source: JICA Study Team

Figure 9.1.5 Trip Frequency by Purpose (Minibus)

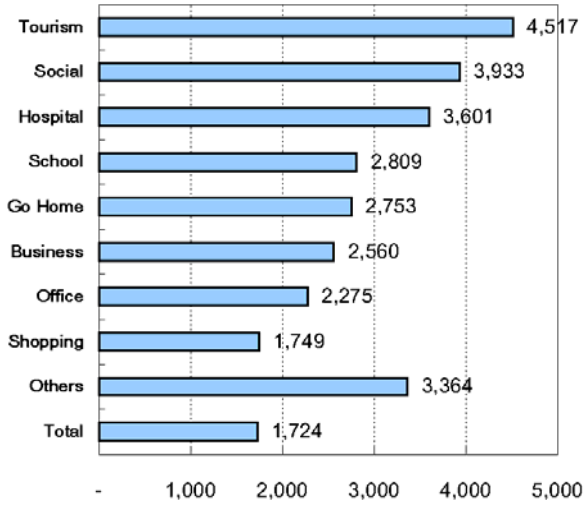
d) Fare

- Average Fare

Average fare of minibus trip for all purposes is UShs1,242. For school, home, business and office purposes, average fare is UUShs2000-3000. For shopping, average fare is lower.

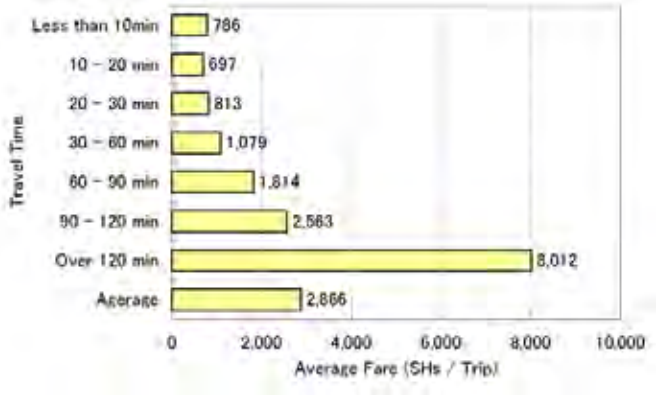
- Travel Time and Fare

Minibus fare for passengers traveling under 30 minutes is UShs 700-800. The fare increases to UShs 1,000 for 30-60 minutes travel.



Source: JICA Study Team

Figure 9.1.6 Minibus Fare by Purpose



Source: JICA Study Team

Figure 9.1.7 Minibus Fare by Travel Time

- Fare and Income

Concerning office and business trips, the average income is UShs 821,000 and minibus fare is UShs 2,500. Therefore, if minibus is used for five weekdays and for home purpose, the total minibus fare becomes UShs 100,000, which is 12% of the passenger's income.

Table 9.1.3 Monthly Income and Minibus Fare

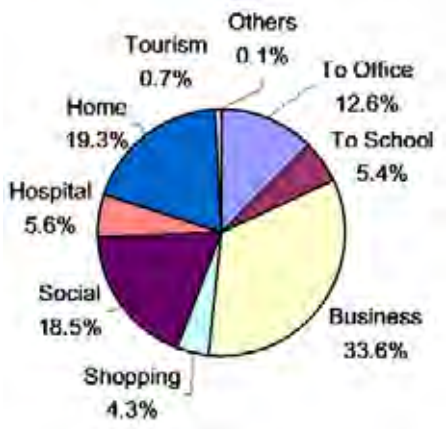
	Avarage Monthly Income	Avarage Taxi Fare
Office	475,000	2,400
Business	942,000	2,600
Total	821,000	2,500

Source: JICA Study Team

2) Boda-Boda Passenger

a) Trip Purpose

According to the passenger interview survey for boda-boda, the proportion of business trips is highest and business related purposes together with office and business trips occupy 46% of all the trips. Compared with the minibus trips, social trips by boda-boda occupy a larger share.



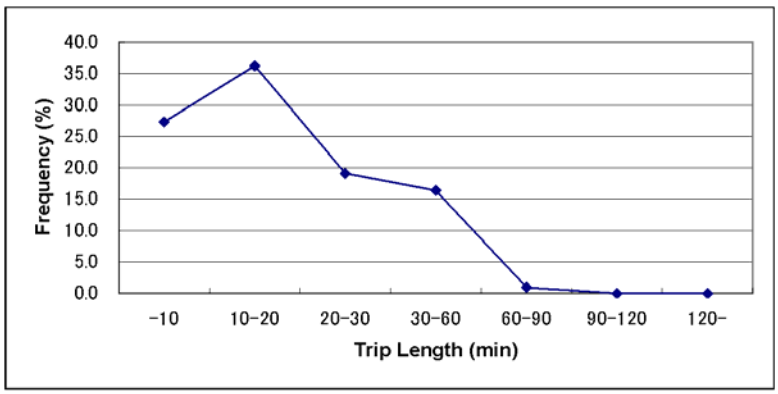
Source: JICA Study Team

Figure 9.1.8 Trip Purpose of Boda-Boda Passenger

b) Trip Length

Trip length (time) distribution of boda-boda passenger is shown in the following figure. Travel time of boda-boda passenger is most frequently between 10-20 minutes and decreases from 20 minutes. Most of the trips are completed within 60 minutes.

The average time is approximately 21 minutes. boda-boda is used for short distances including walking distances since some parts of Kampala are in the hilly areas.



Source: JICA Study Team

Figure 9.1.9 Trip Length Distribution (Boda-Boda)

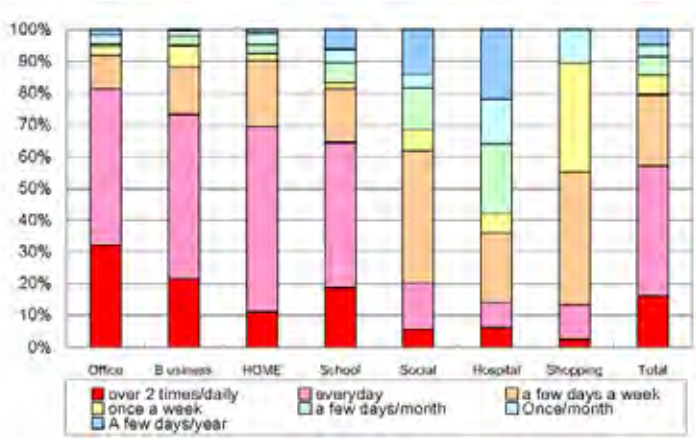
c) Frequency of Trip

In total, more than 50% of passengers use boda-boda once or twice everyday. As for the frequency by trip purpose, passengers use boda-boda more than once every day for office, business, home and school purposes. For shopping, social and hospital purposes, less than 20% of passengers use boda-boda everyday.

d) Fare

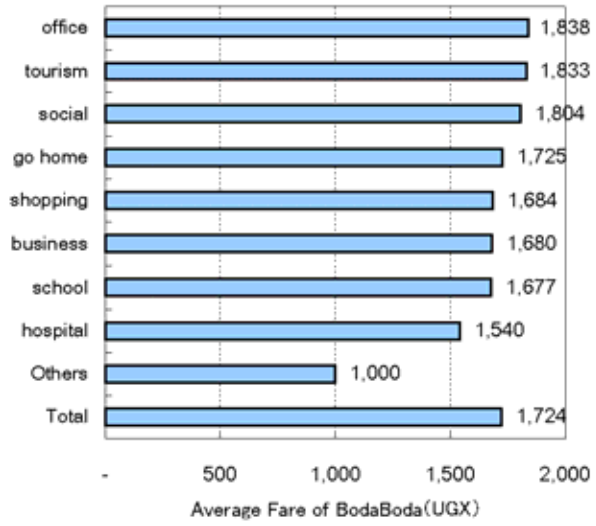
- Average Fare

Average fare for boda-boda trip for all purposes is UShs 1,724. boda-boda fare does not differ by trip purpose excluding others purpose.



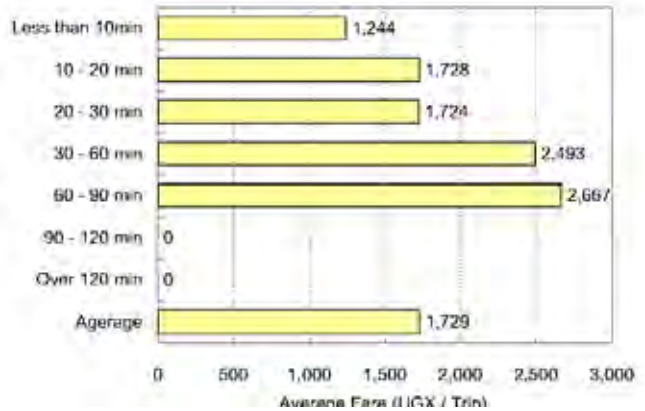
Source: JICA Study Team

Figure 9.1.10 Trip Frequency by Purpose (Boda-Boda)



Source: JICA Study Team

Figure 9.1.11 Boda-Boda Fare by Purpose



Source: JICA Study Team

Figure 9.1.12 Boda-Boda Fare by Yravel Time

- Travel Time and Fare

Boda-boda fare for passengers traveling under 30 minutes is 700-800 Shs. The fare increases to UShs 1,000 for 30-60 minutes travel.

(3) Driver's Conditions

1) Minibus Driver

a) Type of Business – Employed or Independent

Most minibus drivers are employed by the owner of the minibuses. Only 15% of drivers own and operate their minibuses.

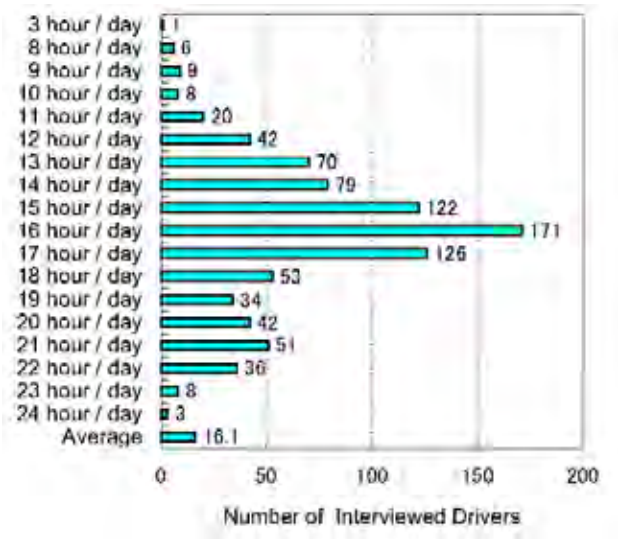
Source: JICA Study Team

Figure 9.1.13 Type of Minibus Drivers – Employed or Independent

b) Working Hour, Trip Frequency and Daily Collection

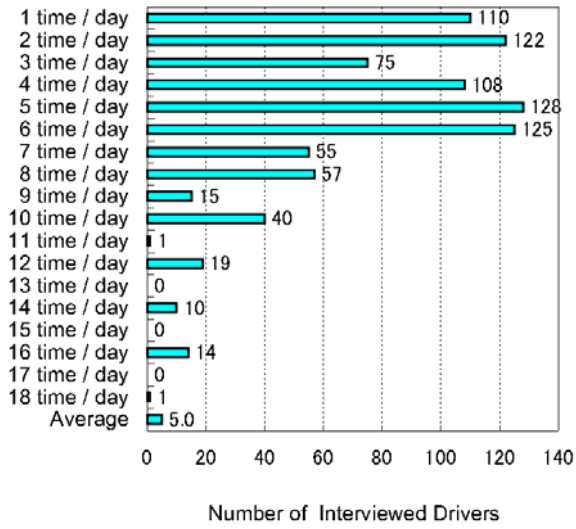
Average working hour of minibus drivers is 16.1 hour/day and trip frequency is 5.0 times/day. Average travel time for one trip (from origin to destination) is 3.22 hours. Average daily collection of minibus fee is approximately UShs 86,000 (USD 44*).

* Exchange rate in February 2010



Source: JICA Study Team

Figure 9.1.14 Work Hour of Minibus Drivers



Source: JICA Study Team

Figure 9.1.15 Trip Frequency of Minibus Drivers

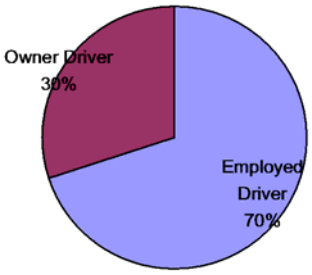
2) Boda-Boda Driver

a) Type of Business – Employed or Independent

Most boda-boda drivers are employed by the owner of the boda-boda. Compared with the minibus drivers, proportion of owner-drivers is larger.

b) Daily Collection

Average daily collection of boda-boda fee is approximately UShs21,000 (USD 11*).



Source: JICA Study Team

Figure 9.1.16 Type of Boda-Boda Drivers – Employed or Independent

9.1.2 PASSENGERS' CHARACTERISTICS AND DEMAND

(1) Characteristics of Minibus Passenger

Passengers' general information is shown in the following table.

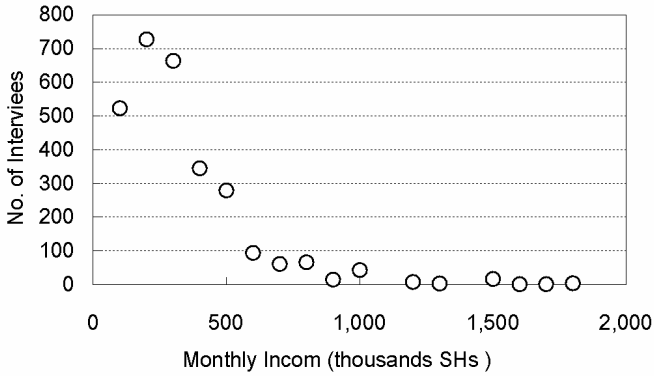
Table 9.1.4 Passengers' General Information

Sex	Ratio
Male	40.80%
Female	59.20%

Age	Ratio
10-20	3.80%
20-30	47.70%
30-40	36.00%
40-	12.50%

Source: JICA Study Team

Distribution of monthly income of minibus passengers is shown in Figure 9.1.17. Average income of minibus passengers is UShs 384,000.



Source: JICA Study Team

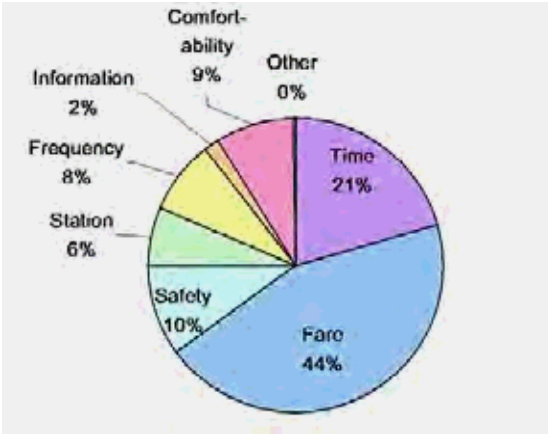
Figure 9.1.17 Monthly Income of Minibus Passengers

(2) Minibus Passengers' Demand

Minibus passengers' demand for the operation was also asked in the passenger interview survey.

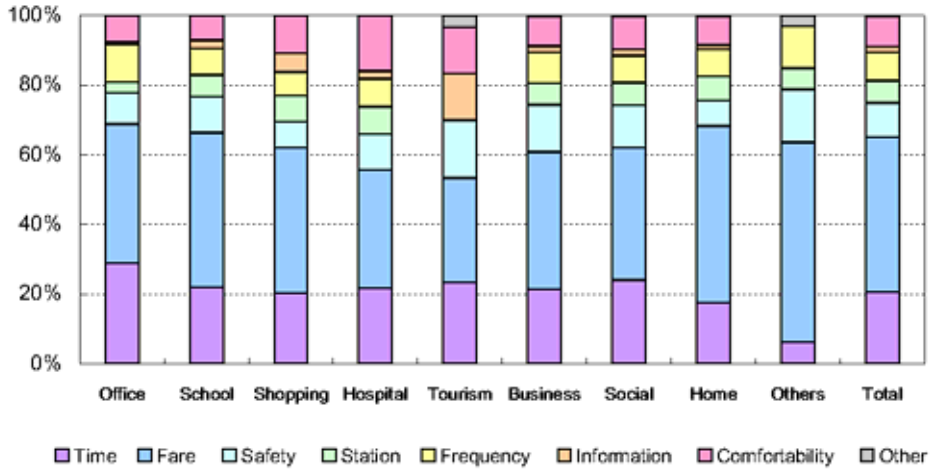
The dominant answer is fare with nearly 50% proportion of all the answers. Next dominant answer is time, which occupies one third of the answers together with fare. Safety follows with 10% and then comfort with 8%.

This order is not different by trip purpose. However, time shows a larger portion on office and business trips.



Source: JICA Study Team

Figure 9.1.18 Minibus Passengers' Demand



Source: JICA Study Team

Figure 9.1.19 Minibus Passengers' Demand by Trip Purpose

9.2 ISSUES TO BE SOLVED FOR PUBLIC TRANSPORT SYSTEM

9.2.1 OPERATION METHOD OF BUS AND MINIBUS SERVICES

Based on the traffic flow and its tendency, the Study Team pointed out the following issues which should be solved for the operation of public transport:

1) Bus

- Buses are a high capacity collective mode of transport for medium and long distance journey with well established boarding points, routes, intermediate stops and timetable。
- The traffic congestion in the bus terminals within the CBD hampers the operation of buses.
- Even more, large inter-urban buses accelerate the congestion in the central area.
- Inter-urban bus terminals inside the city center are too small and many passengers are waiting outdoor for a long time.

Therefore, the following measures are proposed:

- Relocation of inter-urban bus terminals outside the city center will contribute in decreasing the traffic congestion in the city center.
- Connection with other modes such as Bus Rapid Transit (BRT) and minibus will be convenient for inter-urban bus passengers.

2) Minibus

The main problems are pointed out as follows:

- Low capacity minibus accelerates traffic congestion on the streets and in the parks
- Road traffic congestion in the operational route
- Taxi parks are always congested and waste much time for loading
- No fixed fare, route and timetable
- Improve drivers' and conductors' maneuver for safe and comfortable trip
- Review vehicle inspection system and licensing system

The following measures are expected:

- Concentration of demand shall be shifted to BRT.
- Therefore, operation of minibus shall be within the area which BRT will not cover.
- Orderly operation with fix fare; fixed bus stop and timetable is also necessary.
- Review of licensing system and registration system is required to avoid excessive competition.
- It is necessary to select the operating body of the minibus terminal in a more open and competitive manner.

3) Boda-Boda

The main problems mentioned above are as follows:

- Accidents and heavy injuries of passengers without helmets.
- On some roads, motorcycle volume is close to half of the total volume. Motorcycles cannot be ignored in the transport plan.
- Theft of vehicles.
- Lack of access to micro-finance.

- Rough driving maneuver.

The following measures are expected:

- Clarification of role as the auxiliary mode for BRT and minibus.
- Exclusion of informal boda-boda by licensing system and sticker.
- Prohibition of running on BRT route.
- Improvement of driving manner by education and licensing system.

9.2.2 USERS' OPINION ON PUBLIC TRANSPORT SERVICES

The results of the questionnaire about the passenger's demand for minibus show that 45% of the answers are for cheaper fare, 21% for speeding up the travel, 12% for safe driving and 9% for comfortable vehicle.

The fare for public service vehicles in the existing system is not fixed. Also, the association of minibus operators and drivers is a strong political body which controls the fare by itself. In order to create orderly minibus system with fixed route, fixed fare and timetable, it is necessary to review the existing tendering system. One of the measures is to divide the minibus control into route (road) and to assign the control body for each route. The control body shall be selected by open tendering.

The second answer is to speed up the public transport. In order to solve this request, there are two ideas. One idea is to expand the road traffic capacity to meet the increasing traffic demand. The other is to control the traffic demand and give priority to public transport system. The idea of the GKMA relates to the second idea. The BRT System is proposed to be introduced on the main radial arterial roads in Kampala.

The third and fourth answers need the education, control and enforcement of safe driving and vehicle inspection for the drivers and owners of the minibuses. These items should be included in the review of the licensing system of the public service vehicles.

9.3 BASIC POLICY OF THE PUBLIC TRANSPORT PLAN

9.3.1 PRESENT ISSUES AND POLICY FOR PUBLIC TRANSPORT IMPROVEMENT

Based on the present conditions and present issues derived from Clauses 9.1 and 9.2, the strategy for the long-term and medium-term public transport improvement is articulated.

The following are the policies to solve the present issues of each public transport mode:

1) Minibus

- Conversion of minibus to the BRT and large bus on routes where demand is concentrated
- Clarification of operating route and operating area of minibus
- Orderly operation with fixed fare, fixed bus stop and timetable
- Review of licensing system and registration system
- Establishment of new minibus terminal at the proper locations outside CBD

2) Large Bus

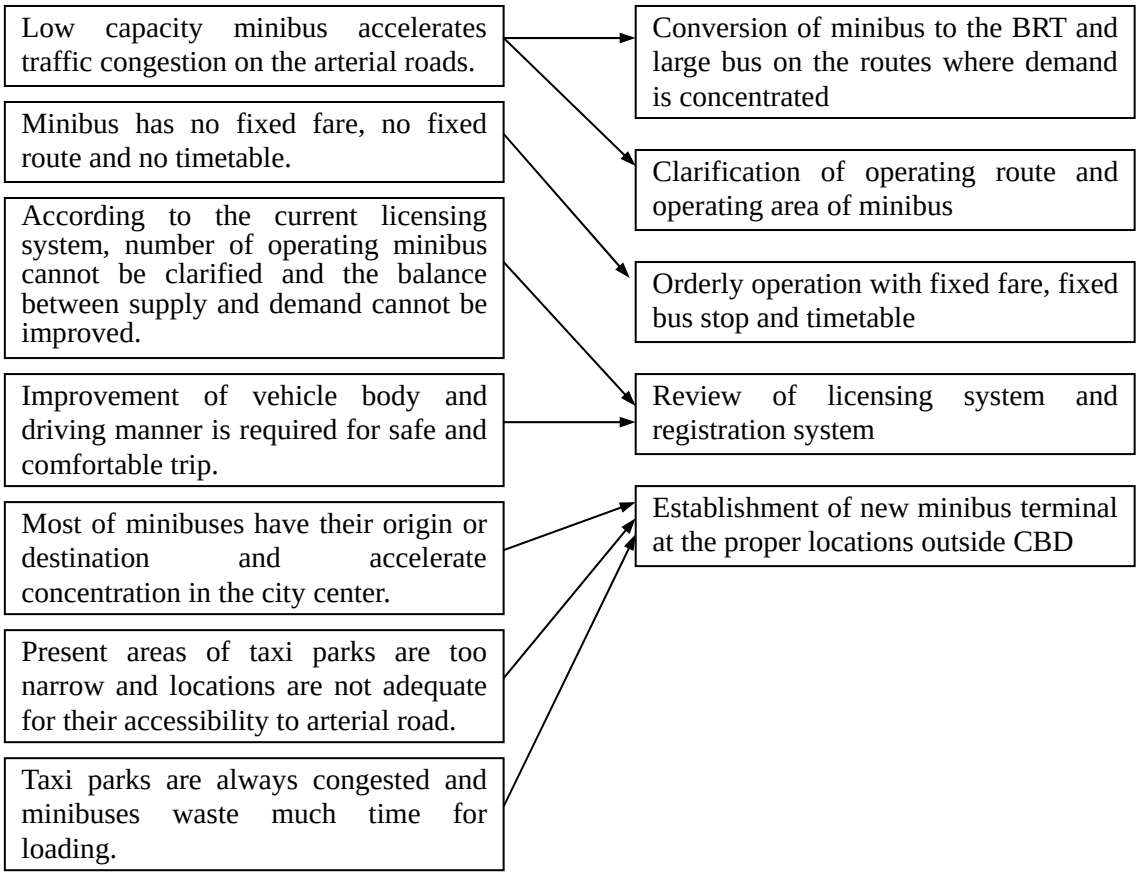
- Relocation and collection of inter-urban bus terminals with sufficient size outside the city center

3) Boda-Boda

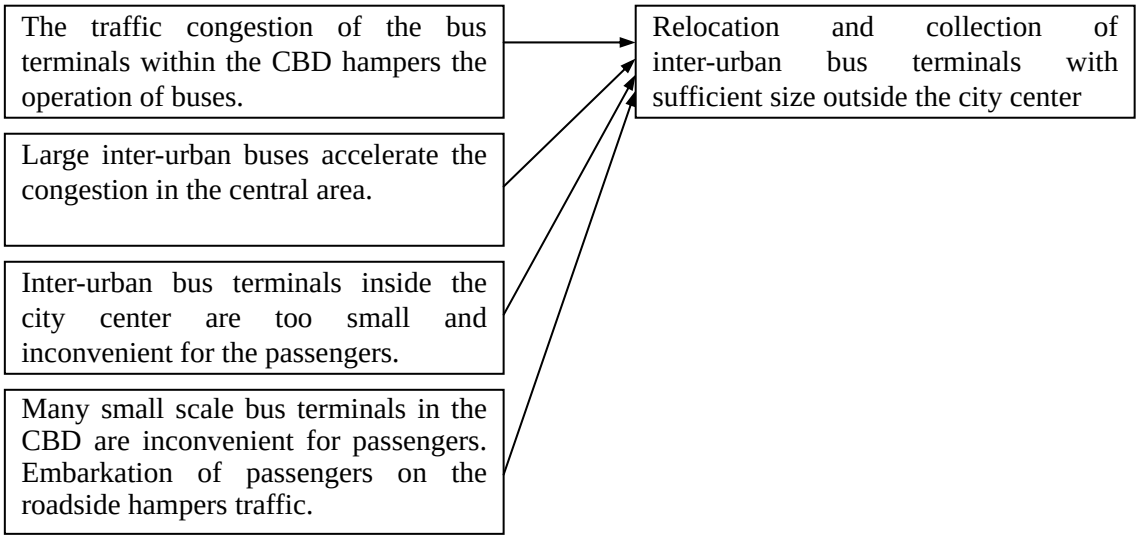
- Clarification of role as the auxiliary mode for BRT, large bus and minibus
- Exclusion of informal boda-boda by licensing system and sticker
- Prohibition of operation on BRT route and restriction of operating route
- Review of licensing system to control and improve the driving

The relation of the present issues and the above policies is shown in the following chart.

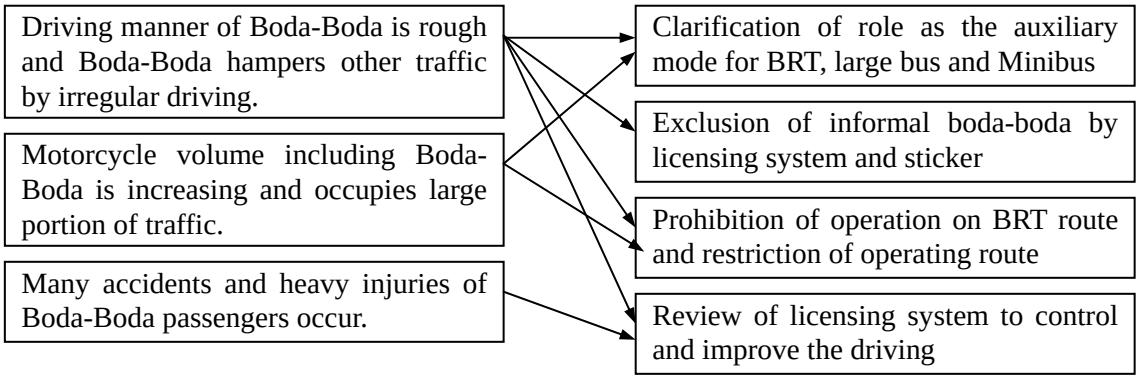
Minibus



Large-size bus



Boda-Boda



9.3.2 STRATEGY FOR THE LONG-TERM AND MEDIUM-TERM PUBLIC TRANSPORT PLAN

In this public transport plan, long-term and medium-term target years are defined as 2023 and 2018, respectively.

(1) Objectives of Public Transport Improvement

In this study, the objectives of the public transport improvement are as follows:

- To provide a reliable and stable public transport service which meets the increasing volume of passenger demand and diversification of needs of passengers

To cope with the increasing traffic demand and the worsening traffic congestion in GKMA, enhancement of utilization of public transport is required more and more. To this end, public transport should be improved and should be used by every social level of citizens. Through the provision of reliable and stable public transport service which meets the increasing volume of passenger demand and diversification of needs of passengers, utilization of public transport should be promoted and thus, traffic condition in GKMA should be improved. Operation by fixed time, fixed route and fixed fare is the most fundamental element for the reliable and stable service.

- To harmonize with other road transport modes and to secure the safety of road traffic and public transport

Road is the basic public infrastructure which various transport modes use. Public transport should use the road properly as one of the users. Public transport should operate in harmony with other traffic and should not hamper the road traffic. In this way, road safety and safety of passengers can be secured. Therefore, the basic rule for the operation of public transport on road should be established.

- To protect the interest of public transport industry properly and promote a sound evolution of the public transport industry

Public transport industry is a kind of public entity working for the welfare of general public. In order to protect the benefit of users by the provision of stable public transport, the public transport industry should be managed stably based on the proper interest. Therefore, excessive competition among industries shall be averted and competition shall be controlled. Through the stable management of industry, sound evolution of public transport industry is ensured and the beneficiary is protected.

(2) Premise to Establish Strategy

For the establishment of the long-term and medium-term strategies for the public transport, the following premises are given to each transport mode.

a) Introduction of BRT is the priority project in the transport sector of GKMA. Therefore, in this study, the strategy of the public transport is established in harmony with the BRT project and its implementation.

b) Since the number of passengers of minibus is very small and the transport efficiency is low, the minibus shall be replaced gradually by large bus, medium bus and BRT as recommended by NTMP/GKMA.

c) Bus is one of the public transport modes and it is necessary for it to be operated on fixed route and fixed time. Therefore, operation method of present minibus without route and timetable shall be gradually abolished.

d) The Transport Master Plan in GKMA (NTMP/GKMA) shows that the primary transport mode in the target year is BRT. Therefore, the railway is not considered to function as a mass transit system until the target year.

e) As for the Boda-Boda, the present operation is unsafe for passengers and hinders other traffic. It is necessary to control the operation route or the operation area of Boda-Boda for a safe and orderly operation.

(3) Objectives of Each Public Transport Development

a) BRT

- BRT will be introduced to enhance modal shift from passenger cars and minibuses to mass transit by provision of rapid and comfortable transport mode on the arterial routes where traffic demand is concentrated.

b) Large Bus

- Minibus will be replaced by large bus of approximately 50-60 passengers to improve the transport efficiency and to alleviate traffic congestion.
- Large bus system will be introduced to prepare the BRT on the route where BRT will be operated but not yet operating at present or to complement the BRT on the route where BRT will not be operated.
- Large bus system will be administered by an integrated operating entity which will enable the operation by fixed route, fixed schedule and fixed fare, as approved by the authority.

c) Medium Bus

- Since the existing minibuses are not efficient in terms of transport capacity and inferior in terms of comfort of passengers, medium size buses with 25 to 30 passenger capacity will replace the minibuses for the feeder routes of the BRT and large bus.
- Operation of medium bus will be limited to areas which the BRT and large buses will not cover.
- Medium bus will be operated with fixed schedule and fixed fare, which are controlled by the licensing authority.

d) Inter-urban Bus

- Inter-urban bus will be connected closely to the BRT and large bus to unite the whole country to GKMA.

e) Boda-Boda

- The existing terminals will function as the terminals of the medium bus and minibus along with the developed terminals for the BRT and large bus.

f) Terminal

- To facilitate passengers' mobility by connecting the BRT and large bus routes with other transport modes, the terminals will be developed. These terminals will become the base stations for operation of public service vehicles.
- Terminals will alleviate the concentration in the city center terminals by relocating them outside the city center.
- Public transport will not hamper general traffic by developing terminals outside the road.

(4) Long-term Strategy

1) Basic Strategy

- In consideration of the progress of the BRT project, large bus is operated on the route in which BRT is not introduced.
- Medium bus is operated in the area which BRT and large bus do not cover and replaces the minibus.
- Necessary terminals for the operation of the BRT, large bus, inter-urban bus and medium bus will be developed.

2) BRT

- BRT will be operated on the pilot route and the primary BRT routes.

3) Large Bus

a) Route

- Large bus will be operated on the secondary BRT route and on the major collector route where BRT will not be operated and where passenger demand will be concentrated.

b) Operation System

- Large bus will be operated on a scheduled basis and on a fixed route approved by the authority. Fare system of large bus will be set in conformity with the BRT.

c) Operation Body

- Large bus routes which connect to the BRT route will share the trackage with the BRT. In this case, large bus will bear the track access charge.
- Body of large bus will correspond to the BRT standards.
- In order to control the operation of large buses in terms of schedule, route and fare, it is necessary that large buses are operated by few enterprises which are established through joint investments.

d) Institution

- Necessary institution will be arranged for the coordinated operation of BRT and large bus with other public service vehicles and for the enhancement of introduction of BRT and large

bus.

4) Medium Bus

a) Route

- Replacement of minibus by medium bus and feeder system by medium bus will be completed.

b) Operation System

- Total number of medium buses will be controlled to avoid excessive competition and to keep the proper balance of supply and demand.

c) Institution

- Necessary institution will be arranged to realize controlled operation and to enhance the introduction of medium bus.

5) Inter-urban Bus

- New inter-urban bus terminals will be developed and become the new town center outside present urban area.

6) Boda-Boda

- Operation of Boda-Boda on the BRT and large bus routes will be prohibited. To coexist with other vehicles on the road and to prevent accident, the driving method of Boda-Boda will be restricted.

7) Terminal

- At the end of the large bus route located in the outer area, necessary bus terminals for the transfer passengers will be developed. Terminals which are planned as the future BRT terminals will be developed as the BRT terminals.
- Terminals for the medium bus will also be developed considering service area and service route.

(5) Medium-term Strategy

1) Basic Strategy

- Among the BRT and large bus routes in the long-term strategy, the pilot route is selected and operation of large bus will be commenced.
- Institutional framework for the introduction of BRT and large bus will be completed.

2) BRT

- BRT will be operated on the pilot route and development of BRT on primary route will be commenced.

3) Large Bus

- For the introduction of large bus system, large bus pilot routes will be selected and developed from the viewpoint of concentration of demand and extent of service area.
- Operation system of pilot routes will be the same as the system in the long-term with the fixed route and fixed fare. Operation body will be the enterprise by joint investment.

4) Medium Bus

- Along the BRT and pilot large bus routes, medium bus will be introduced on the access route for the BRT and large bus.

5) Inter-urban Bus

- New inter-urban bus terminals will be developed outside the present urban area.

6) Boda-Boda

- Operation of Boda-Boda on the BRT and pilot large bus routes will be prohibited and the driving method of Boda-Boda will be restricted.

7) Terminal

- Terminals along the BRT and large bus pilot routes will be developed based on the long-term strategy.

8) Institution

- Institutional framework for the introduction of BRT and large bus will be completed until the target year of the medium-term.

The following table shows the development progress of public transport in each phase including the long long-term (2030) which is the target year of the BRT.

Table 9.3.1 Development Strategy of Public Transport

	Present	Near Future	Medium-term (2018)	Long-term (2023)	Long long-term (2030)
BRT		Pilot route	Pilot route	Pilot route	All the planned route completed
Large Bus			Selected Primary Route Selected BRT Tributary route	Primary route BRT Tributary Route	
			Selected collectoer route	Collector route	Collector route
Medium Bus			Feeder for BRT and large bus	Feeder for BRT and large bus (completed)	Feeder for BRT and large bus
Minibus		Shift to BRT Pilot Route	Shift to BRT, Large bus, Medium bus	Shift to BRT, Large bus, Medium bus completed insaide the urban area	Rural Area Remained
Boda-boda			Prohibition on BRT and large bus route	Prohibition on BRT and large bus route	Prohibition on BRT and large bus route
Terminal			Development along BRT and large bus route	Development along BRT and large bus route (completed)	Development along BRT and large bus route
Institution			Framework completed	Framework completed	Framework completed

Source: JICA Study Team

Development objective and development strategy for public transport are shown in the following table.

Table 9.3.2 Development Objective and Development Strategy for Public Transport

		Mid Term	Long Term
	Basic Strategy / Objective	- Pilot route is selected and operation of large bus is commenced. - Institutional framework for the introduction of BRT and large bus is completed	- In consideration of progress of BRT, large bus is operated on the route to which BRT is not introduced. - Medium bus is operated in the area which BRT and large bus do not cover and replaces the minibus. - Necessary terminals for the operation of BRT, large bus, inter-urban bus and medium bus are developed.
BRT	- Enhancement of modal shift from passenger cars and minibuses to mass transit by provision of rapid and comfortable transport mode	- Operation on pilot route and preparation for the introduction to primary routes	- BRT will be operated on the pilot route and the primary BRT routes.
Large Bus	- Replacement of minibus to improve the transport efficiency and to alleviate traffic congestion - Introduction to prepare the BRT or to complement the BRT - Intensive operation entities	- Large bus pilot routes will be selected and developed. - Operation system of pilot routes will be the same as the system in long-term.	- Large bus will be operated on the second primary BRT route and on the major collector route where BRT will not be operated and to which passenger demand will concentrate.
Medium Bus	- Replacement of minibus for the feeder routes of the BRT and the large bus - Operation in the area where the BRT and large bus do not cover - Fixed route, fixed schedule and fixed fare	- Along the BRT route and pilot large bus route, medium bus will be introduced on the access route for the BRT and the large bus	- Replacement of minibus by medium bus and feeder system by medium bus will be completed.
Inter-urban Bus	- To unite the whole country to GKMA by connecting with the BRT and the large bus closely	- New inter-urban bus terminals will be developed outside present urban area.	- New inter-urban bus terminals will be developed and become the new town center outside present urban area.
Boda-boda	- Role as the supplemental transport mode by regulated operating method and operating route	- Operation of Boda-boda on the BRT route and pilot large bus route will be prohibited. The driving method of Boda-boda will be restricted.	- Operation of Boda-boda on the BRT route and large bus route will be prohibited. The driving method of Boda-boda will be restricted.
Terminal	- To facilitate passengers' mobility by connecting the BRT and the large bus with other transport mode - To alleviate the concentration to city center terminals by relocating to terminals outside the city center	- Terminals along the BRT pilot route and large bus pilot route will be developed based on the long-term strategy.	- At the end of the large bus route located in the outer area, necessary bus terminals will be developed. - Terminals planned as the future BRT terminals will be developed as the BRT terminals. - Terminals for the medium bus will be also developed.

Source: JICA Study Team

9.4 BRT NETWORK PLAN PROPOSED BY WB

9.4.1 CONFIRMATION OF THE ROLE AND FUNCTION OF THE PROPOSED BRT

The BRT system has been selected by the GOU as one of the most effective countermeasures for the decongestion of the traffic in the city. The proposed BRT system is characterized by a high capacity, fast, comfortable and cost-effective urban transport mode through the provision of segregated lane. The role of the BRT to cope with the existing issues is described as follows:

- To ***decongest the city*** through reorganization of public transport by utilizing high-capacity buses,
- Enhancement of modal shift from passenger car by ***shorter travel time***,
- ***Car*** users can choose convenient transport from various choices, including ***park-and-ride,***
- Commuters acquire ***safer and faster travel at lower or reasonable fares***, and waiting time at peak hours becomes less, and
- Environmentally friendly

9.4.2 BRT NETWORK FOR LONG- AND MEDIUM-TERM PLANS

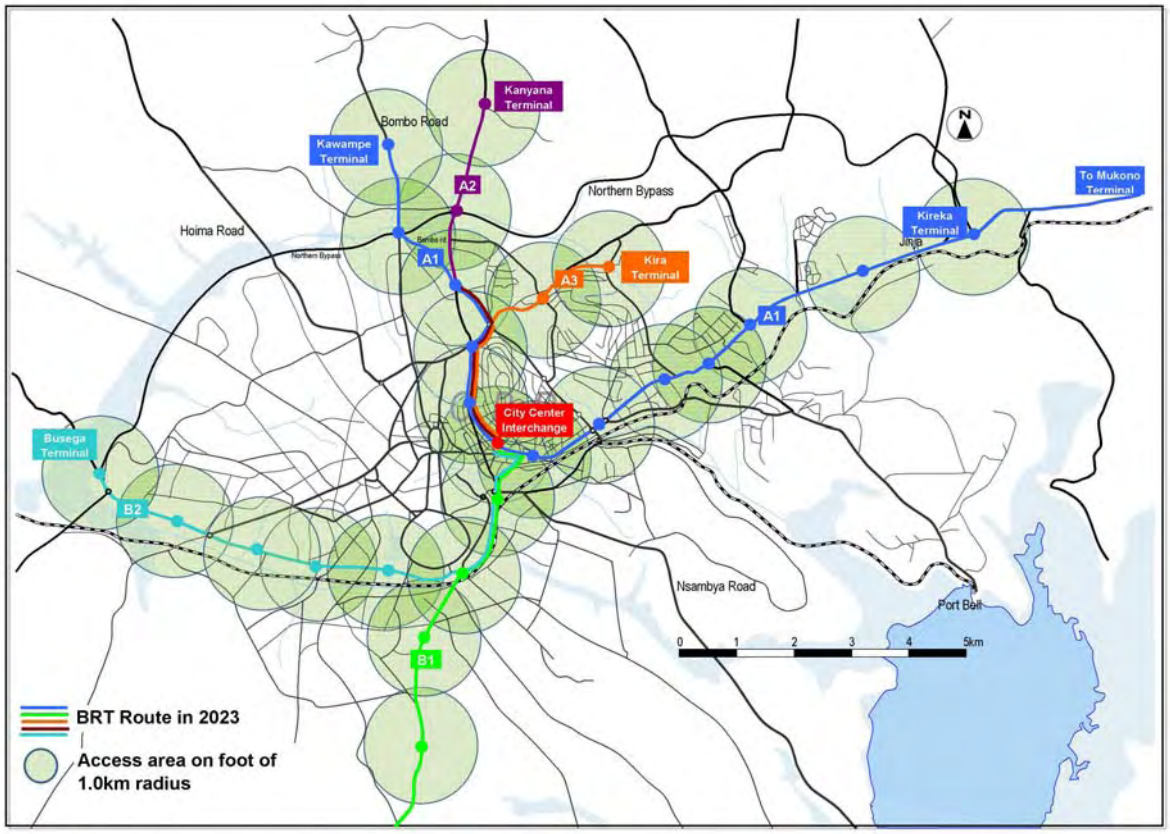
The major components of the proposed BRT are as follows. Detailed explanations of the components are mentioned in Clause 4.4.4 of Chapter 4.

- Open route (Externalized) system and open bus stations with on-board revenue collection
- Median operation and bilateral stations with passing lane at all main stations for capacity/flexibility
- High capacity bus with high quality
- Variety of selection from single door bus to articulated bus is applicable
- Existing minibuses will play a role as feeder mode for the BRT, and Boda-Boda will not operate along the BRT routes.
- Operation management and passenger information by low technology system

Through the evaluation of features of alternative routes, the following eight BRT routes have been selected and given the order of priority. Detailed evaluation is expected to be conducted in the Feasibility Study and Detailed Design in 2011.

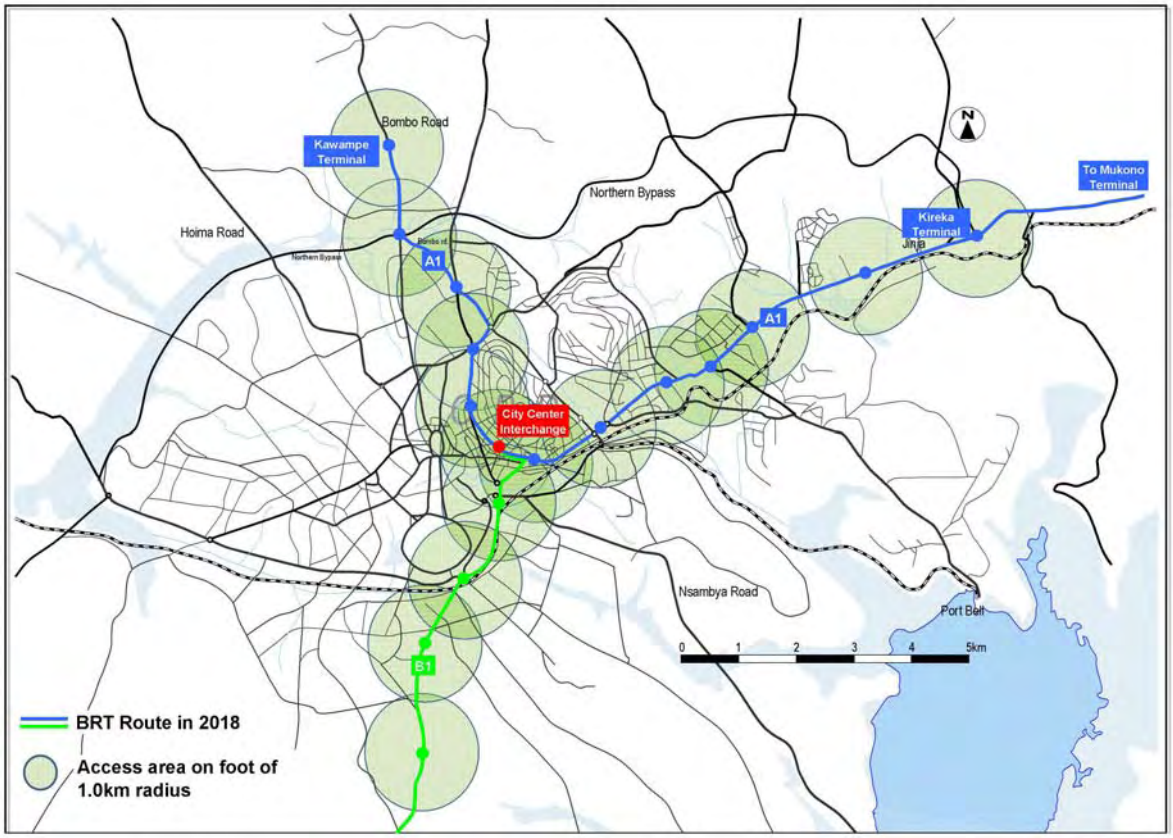
- Route A1 (Pilot Route): Jinja Road to Kireka and Bombo Road to Bwaise,
- Route B1: Route A2 + Entebbe Road to Namasuba
- Route A2: Route B1 + Gayaza Road
- Route A3: Route A2 + Kira Road
- Route A4: Route A3 + Hoima Road
- Route B2: Route A4 + Masaka Road
- Route B3: Route B2 + Gaba Road
- Route B4: Route B3 + Port Bell Road

In order to clarify the presumption of progress of BRT development in the long-term and medium-term in this study, the implementation priority, implementation cost and implementation period have been analyzed. Presumed BRT routes to be developed in the long-term and medium-term are shown in the following figures.



Source: JICA Study Team

Figure 9.4.1 Presumed Long-term BRT Network in 2023



Source: JICA Study Team

Figure 9.4 2 Presumed Medium-term BRT Network in 2018

(1) Long-term BRT Network:

The presumed long-term BRT network in 2023 consists of arterial routes such as Bombo-Jinja route (A1), Gayaza route (A2), Kira route (A3) and Entebbe route (B1). The remaining routes will function as branch routes of the arterial routes and share the road space with the general traffic until the designated runway will be constructed.

(2) Medium-term BRT Network:

The presumed medium-term BRT network consists of Bombo-Jinja route (A1) and Entebbe route (B1). The development of the BRT route will be limited due to budget, duration of land acquisition and compensation, etc. The area which is not covered by the BRT will be covered by the existing public transport means which shall be operated by fixed route, fixed time and fixed fare through the new registration system of the public service vehicle licensing.

The following table shows the relation among the appraisal ranking, development step in Pre-FS Study for BRT, and assumption in this study.

Table 9.4.1 BRT Route Length

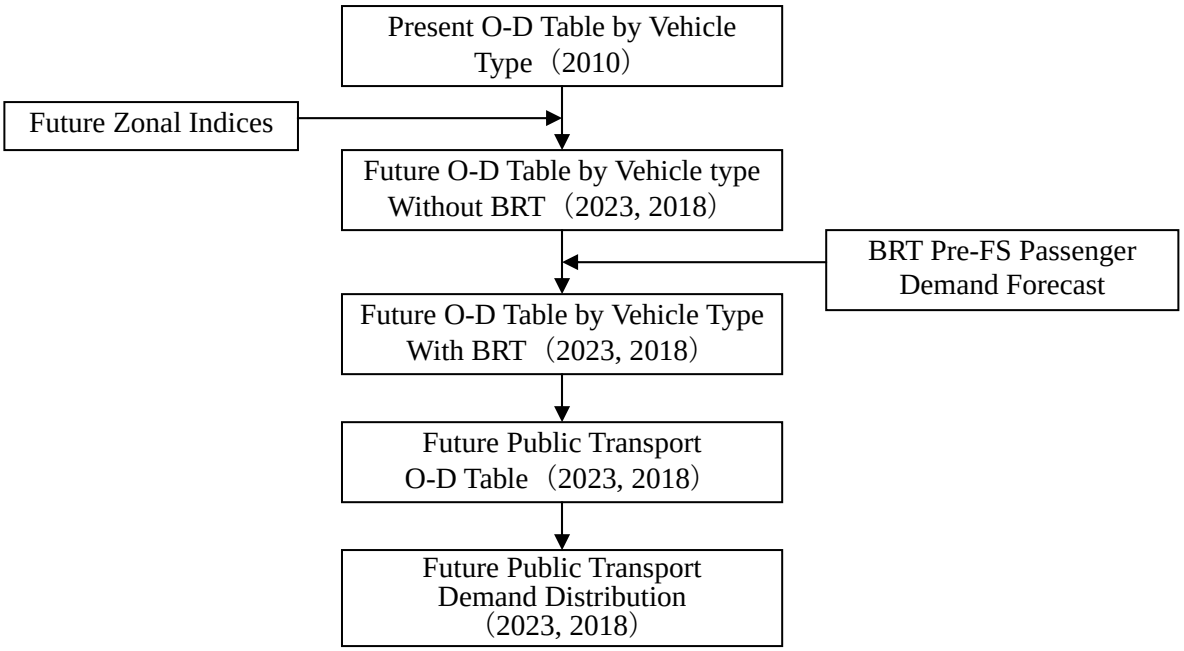
Appraisal Ranking	BRT Route Name		Length	Accumulated Length	Development Step in WB Pre-FS	Assumed Development Completion Phase
	Route No.	Name				
1	A1	Jinja Road	8.4	8.4	Step 1	Medium-term
2	A1	Bombo Road	5.6	14.0	Step 1	Medium-term
5	B1	Entebbe Road	37.1	51.1	Step 2	Medium-term
1	A1	Jinja Road East of Kireka	13.5	64.6	Step 3	Medium-term
2	A1	Bombo Road Northern Bypass North	1.6	66.2	Step 3	Medium-term
3	A2	Gayaza Road	2.4	68.6	Step 4	Long-term
4	A3	Kira Road	2.5	71.1	Step 5	Long-term
6	A4	Hoima Road	7.2	78.3	Step 6	Long long-term
7	B2	Masaka Road	6.5	84.8	Step 7	Long-term
8	B3	Gaba Road	9.3	94.1	Step 8	Long long-term
9	B4	Port Bell Road	8.3	102.4	Step 9	Long long-term
		Total	102.4			

Excluding overlapping length
Length: by JICA Study Team

9.5 FUTURE PUBLIC TRANSPORT DEMAND

9.5.1 METHODOLOGY FOR PUBLIC DEMAND FORECAST

Based on the O-D table by vehicle type acquired from traffic survey conducted by the Study Team, future public transport demand is forecasted by the following method. In order to conform to the demand forecast by the BRT pre-feasibility studies, the total volume of public transport demand in the future is made consistent with the BRT study. Detailed procedure of the traffic demand forecast can be referred to in Chapter 5.4.



Source: JICA Study Team

Figure 9.5.1 Method for Public Transport Demand Forecast

9.5.2 FUTURE DEMAND FOR LARGE BUS

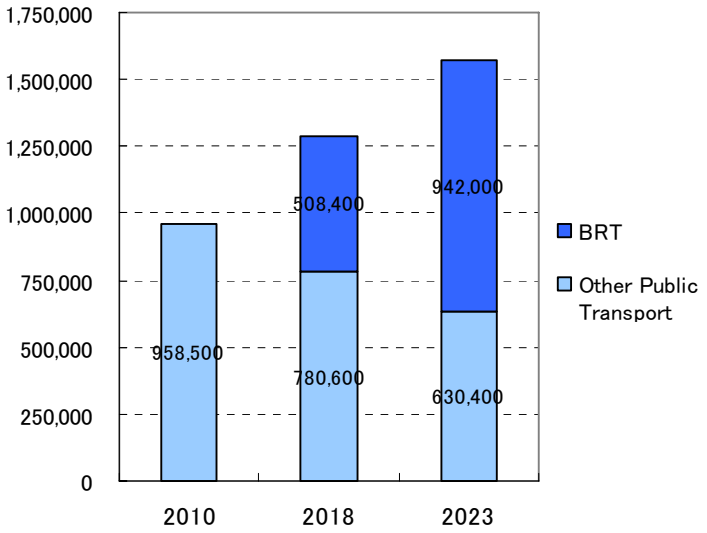
1) Total Volume of Public Transport Passenger

According to the demand forecast method in the previous section, passenger demand in the long-term (2023) and medium-term (2018) are forecasted. The total volume of public transport passengers are forecasted as shown in the following table. Growth rates per annum are 3.8% for 2010-2018 and 4.1% for 2018-2023. Growth rate will become higher in 2018-2023 due to the progress of the BRT development.

Table 9.5.1 Future Bus Passenger Demand

	2010	2018		2023	
	Passenger Volume in thousand	Passenger Volume in thousand	Growth Rate per Annum 2010-2018	Passenger Volume in thousand	Growth Rate per Annum 2018-2023
BRT	0	508	-	942	13.1%
Other Public Transport	959	781	-2.5%	630	-4.2%
Total	959	1,289	3.8%	1,572	4.1%

Source: JICA Study Team



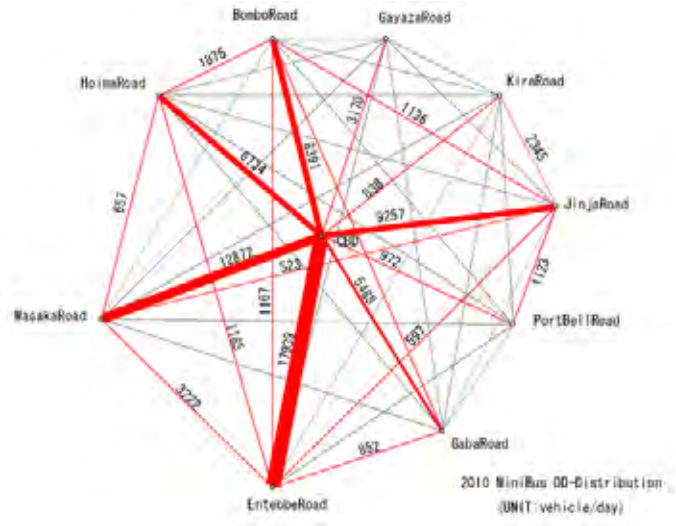
Source: JICA Study Team

Figure 9.5.2 Future Bus Passenger Demand

2) Desire Line

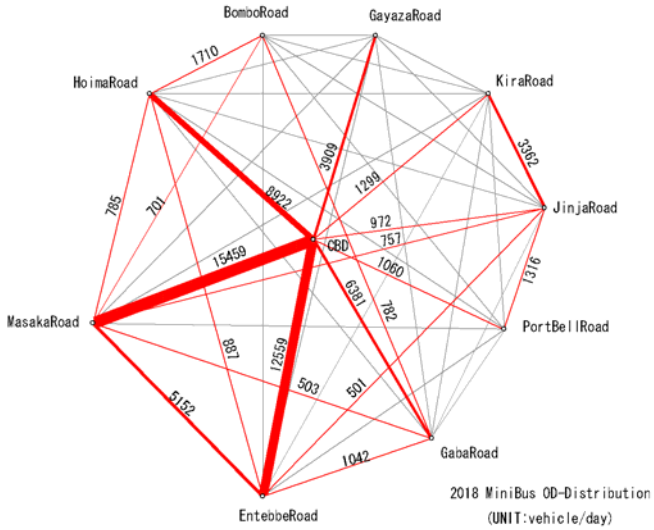
The following figure shows the present and future desire lines of public transport passenger. In these figures, estimated future BRT passenger is excluded and traffic zones are combined with the arterial road direction.

After introduction of the BRT, passenger demand decreases from city center towards Jinja Road direction and Bombo Road direction in 2018. Also, demand decreases towards Gayaza Road direction in 2023. As for the Entebbe Road direction, demand decreases compared with the present. However, a still large demand for public transport, excluding BRT, remains.



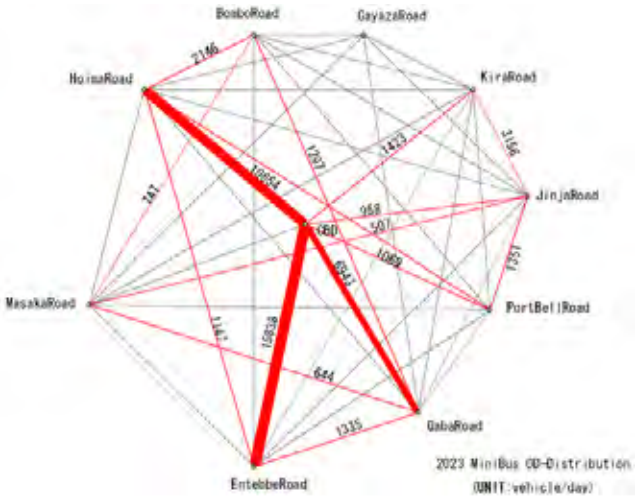
Unit: x10 Passengers / Day
Source: JICA Study Team

Figure 9.5.3 Public Transport Desire Line in 2010



Unit: x10 Passengers / Day
Source: JICA Study Team

Figure 9.5.4 Public Transport Desire Line in 2018 Excluding BRT



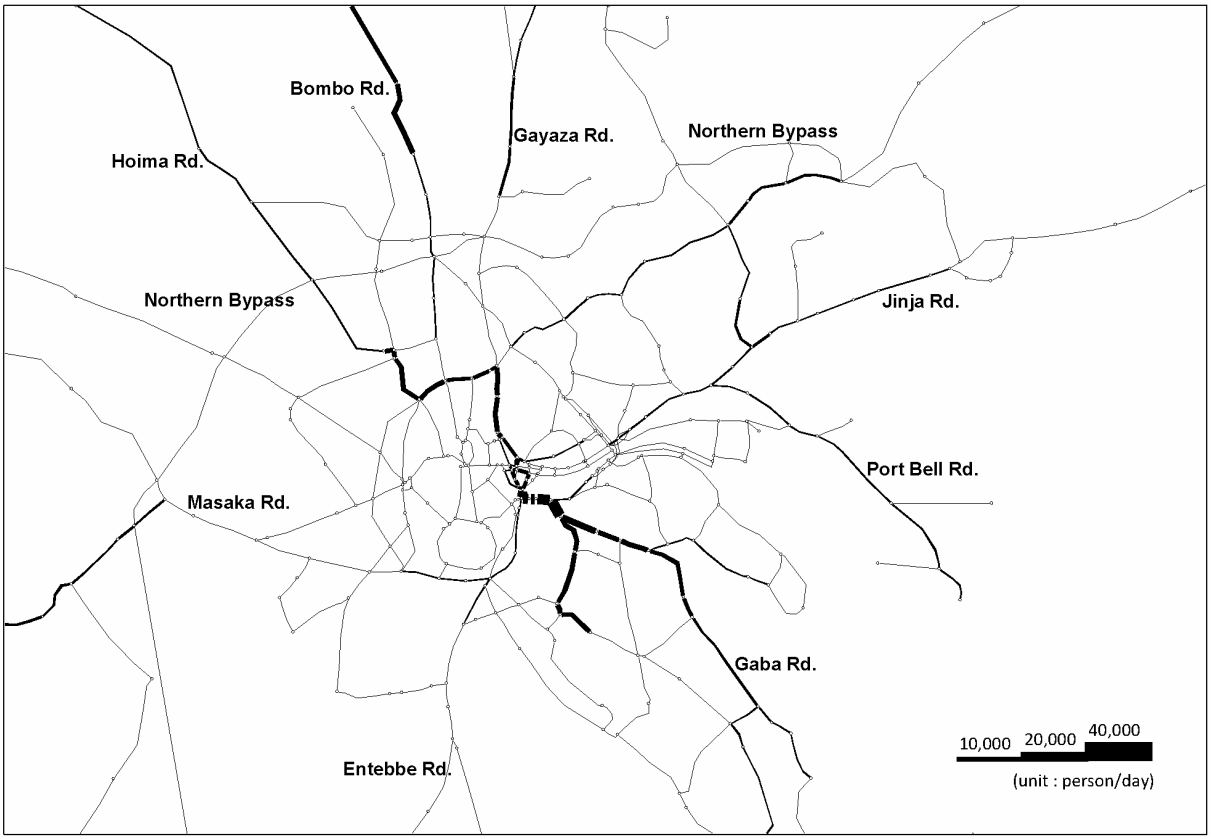
Unit: x10 Passengers / Day
Source: JICA Study Team

Figure 9.5.5 Public Transport Desire Line in 2023 Excluding BRT

In the long-term, the figure shows that public transport demand has large volume in Gaba Road, Masaka Road and Hoima Road directions since these directions are not covered by the BRT.

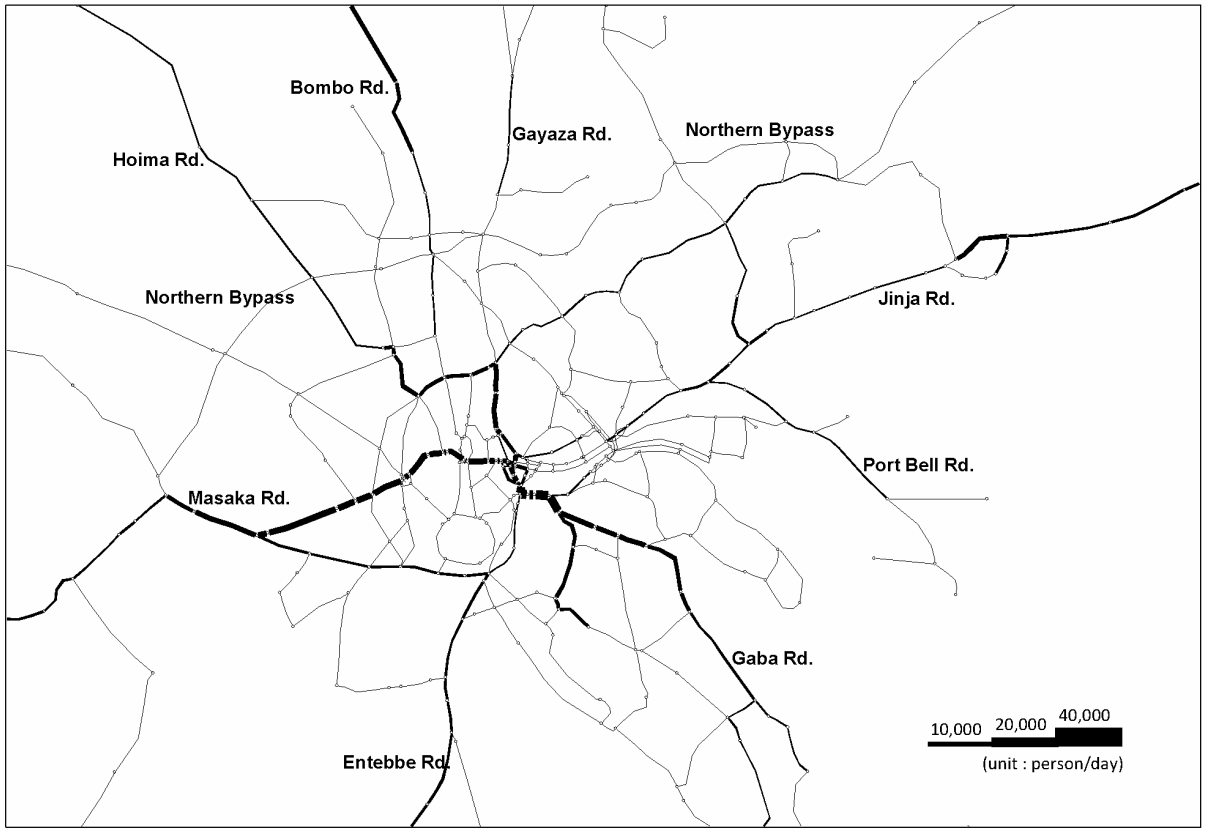
3) Traffic Assignment of Public Transport

According to the forecasted future O-D table of public transport passenger exclusive of BRT passengers, traffic assignment is conducted. Assigned passenger is shown below in terms of the width of lines.



BRT Passengers are excluded Source: JICA Study Team

Figure 9.5.6 Traffic Assignment of Bus Passengers in the Long-term (2023)



BRT Passengers are excluded Source: JICA Study Team

Figure 9.5.7 Traffic Assignment of Bus Passengers in the Medium-term (2018)

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9.6 PUBLIC TRANSPORT NETWORK PLAN

9.6.1 LONG-TERM NETWORK PLAN

(1) Large Bus Network

Large bus network is established based on the following standpoint:

- BRT route not developed but planned in the long-term (2030) will be serviced by large bus system as the BRT tributary route, such as:

  Hoima Road (Hoima Route)
  Gaba Road (Gaba Route)
  Port Bell Road (Port Bell Route)

- Large bus system is also introduced in the area not covered by BRT route or long long-term BRT network. Figure 9.4.1 shows the service area of BRT, which is defined by 1.0 km radius from bus station which is also an accessible length by foot. Examining the service area of BRT and large bus network, the following routes are selected as the collector bus route:

  Sentema Road (Sentema Route)
  Natete Road (Natete Route)
  Kiwatule Route
  Kigowa Route
  Munyonyo Route (A and B)

  Munyonyo Route is divided into two routes due to the variation of passenger demand. Route A is operated up to midway while Route B is operated up to the last terminal.

- Routes connecting to the BRT route will share trackage with the BRT as the tributary route and reach the city center. In this case, bus body should meet the BRT standards and large bus shall bear the track access charge.

- Large bus system will be operated by fixed route, fixed schedule and fixed fare. But since the large buses share the road with other traffic, it is difficult to keep the strict schedule. Operation schedule should be adjusted not at the city center interchange but at the terminals outside the city center.

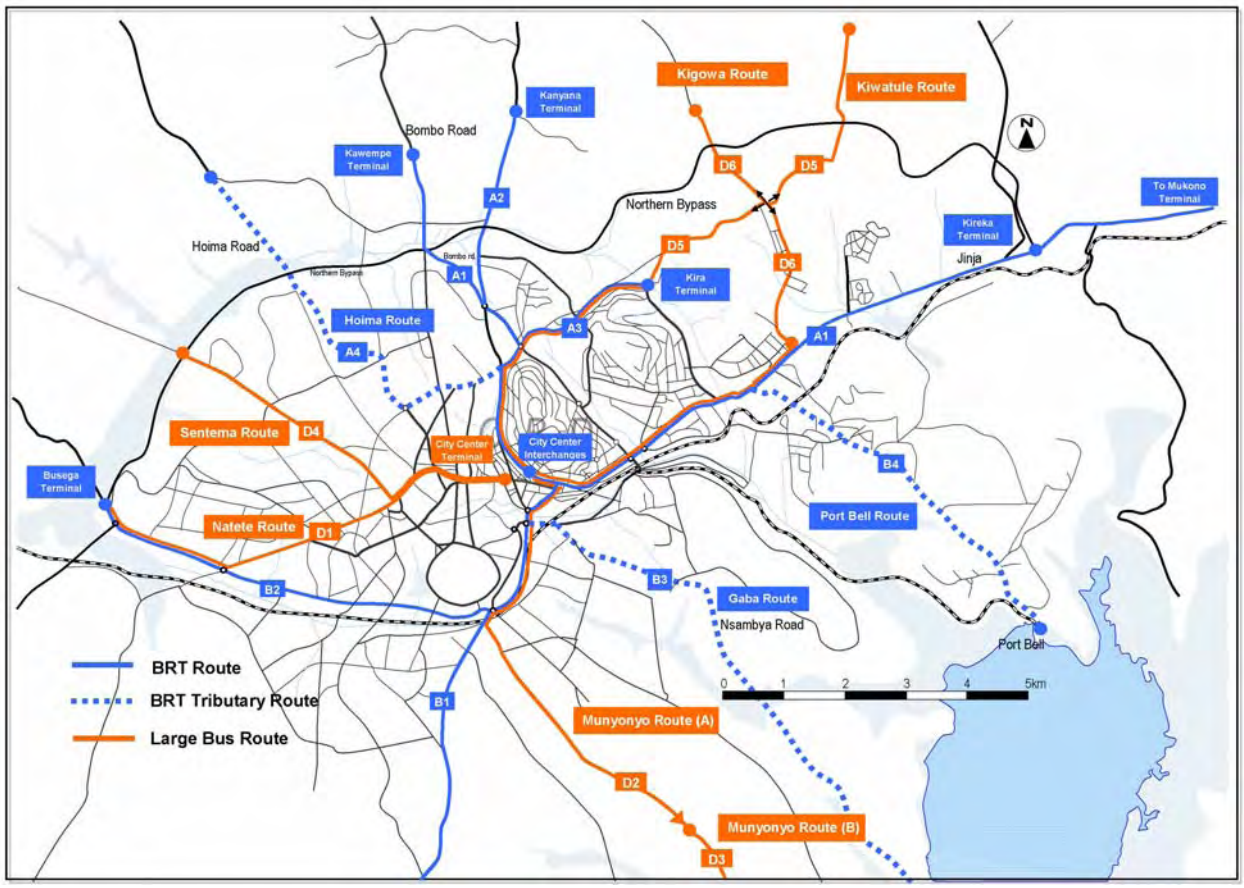
Large bus network consisting of the aforesaid routes is shown in Table 9.6.1 and Figure 9.6.1.

Table 9.6.1 BRT & Large Bus Development in the Long-term

	Route		Total Length km *	Net Length km *
	Route No.	Name		
BRT	A1	Jinja Road	21.9	21.9
	A1	Bombo Road	7.2	7.2
	A2	Gayaza Road	5.9	2.4
	A3	Kira Road	5.0	2.5
	B1	Entebbe Road	37.6	37.1
	B3	Masaka Road	9.7	6.5
	BRT Total		87.3	77.6
BRT Tributary Route	A4	Hoima Road	9.2	7.2
	B3	Gaba Road	10.8	9.3
	B4	Port Bell Road	10.6	8.3
	BRT Tributary Total		30.6	24.8
Large Bus Route	D1	Natete Route	8.1	5.9
	D2	Munyonyo Route (A)	7.1	3.8
	D3	Munyonyo Route (B)	11.2	4.1
	D4	Sentema Route	7.1	7.1
	D5	Kiwatule Route	11.4	6.4
	D6	Kigowa Route	10.7	5.6
	Large Bus Total		55.6	32.9
Total			173.5	135.3

Length: by JICA Study Team

* Total Length includes overlapping length with other BRT route or BRT route. Net Length does not include overlapping length.



Source: JICA Study Team

Figure 9.6.1 Large Bus Network in the Long-term

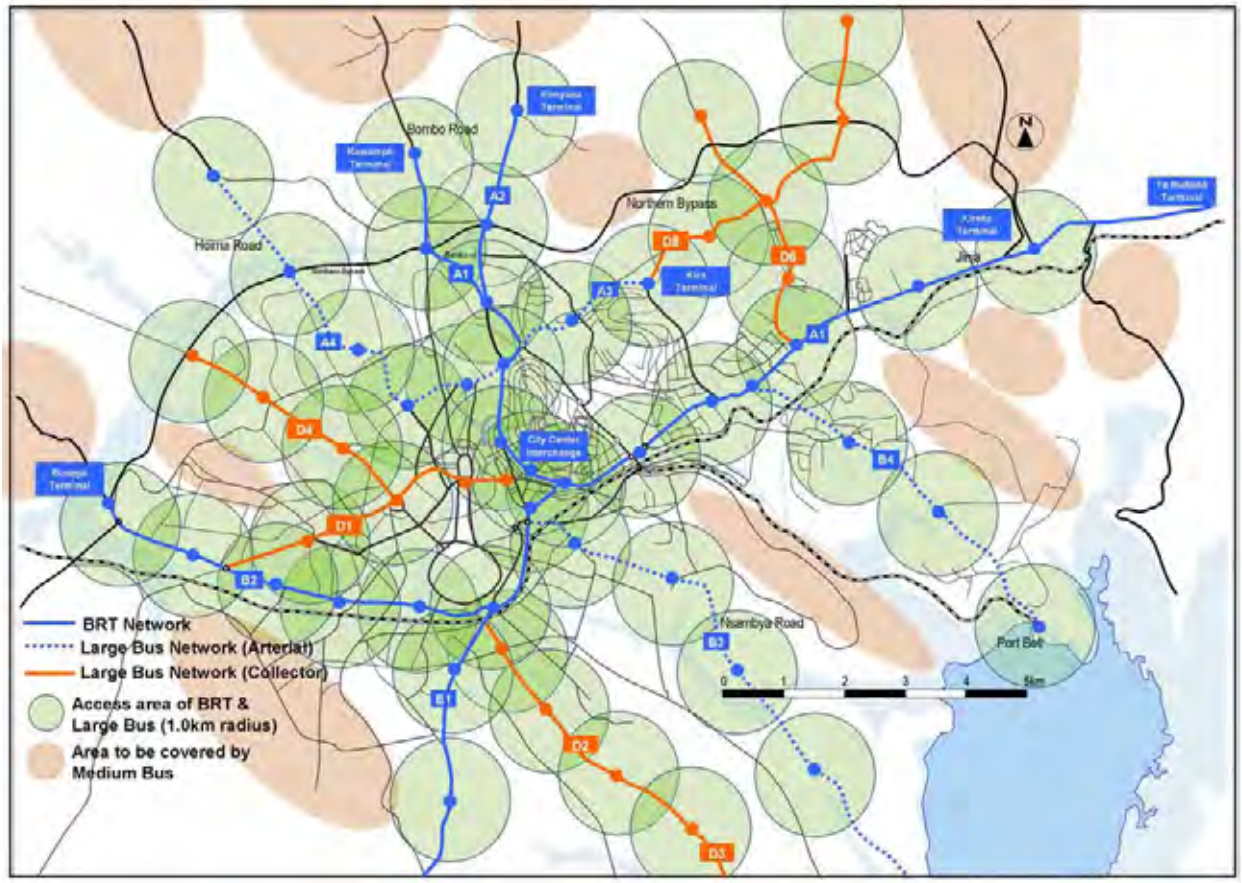
(2) Medium Bus Network

Service areas of the BRT system and large bus system are shown in Figure 9.6.2. Many areas are not covered by the BRT or the large bus network. These areas don't have the trunk roads and are not appropriate for the operation of BRT and large bus. Medium bus will be introduced in these areas and shall replace the present minibus.

- Minibuses will be replaced by medium buses gradually and until the end of the long-term, all the minibuses shall be replaced by medium buses.

- Medium bus is prohibited to operate on the BRT and large bus routes. Licensing of medium bus is area-based and operation area is limited to the area stated in the license. Fixed fare, fixed route and fixed schedule shall also be stipulated during licensing.

- These conditions require the development of the terminals along the BRT and large bus routes for the transfer to the BRT or large bus.



Source: JICA Study Team

Figure 9.6.2 BRT & Large Bus Network Service Area and Medium Bus Operation Area in the Long-term

9.6.2 MEDIUM-TERM NETWORK PLAN

(1) Large Bus Network

As development in the medium-term is the initial stage to accomplish the development of the long-term network, fundamental condition will be arranged for the introduction of large bus system. Therefore, a pilot route is selected from the long-term BRT network and large bus network. The viewpoint for the selection of pilot routes is as follows:

- The BRT route in the medium-term is assumed in Figure 9.4.2. The routes developed in the long-term but not yet developed in the medium-term will be supplemented by BRT tributary route.

  Kira Road (Kira Route)
  Gayaza Road (Gayaza Route)
  Masaka Road (Masaka Route)

  Except for the above five routes, public passengers' demand concentrates on the following routes. BRT tributary route is recommended to be introduced in the early stage.

  Gaba Road (Gaba Route)

- Considering the service area of the BRT and supplemental large bus route, auxiliary large bus routes are introduced to enlarge the service area of the large bus. The demand concentration on the route is also considered and the following routes are selected:

  Natete Road (Natete Route)

- Except for the above five routes, public passengers' demand concentrates on the following routes. Large bus is recommended to be introduced in the early stage.

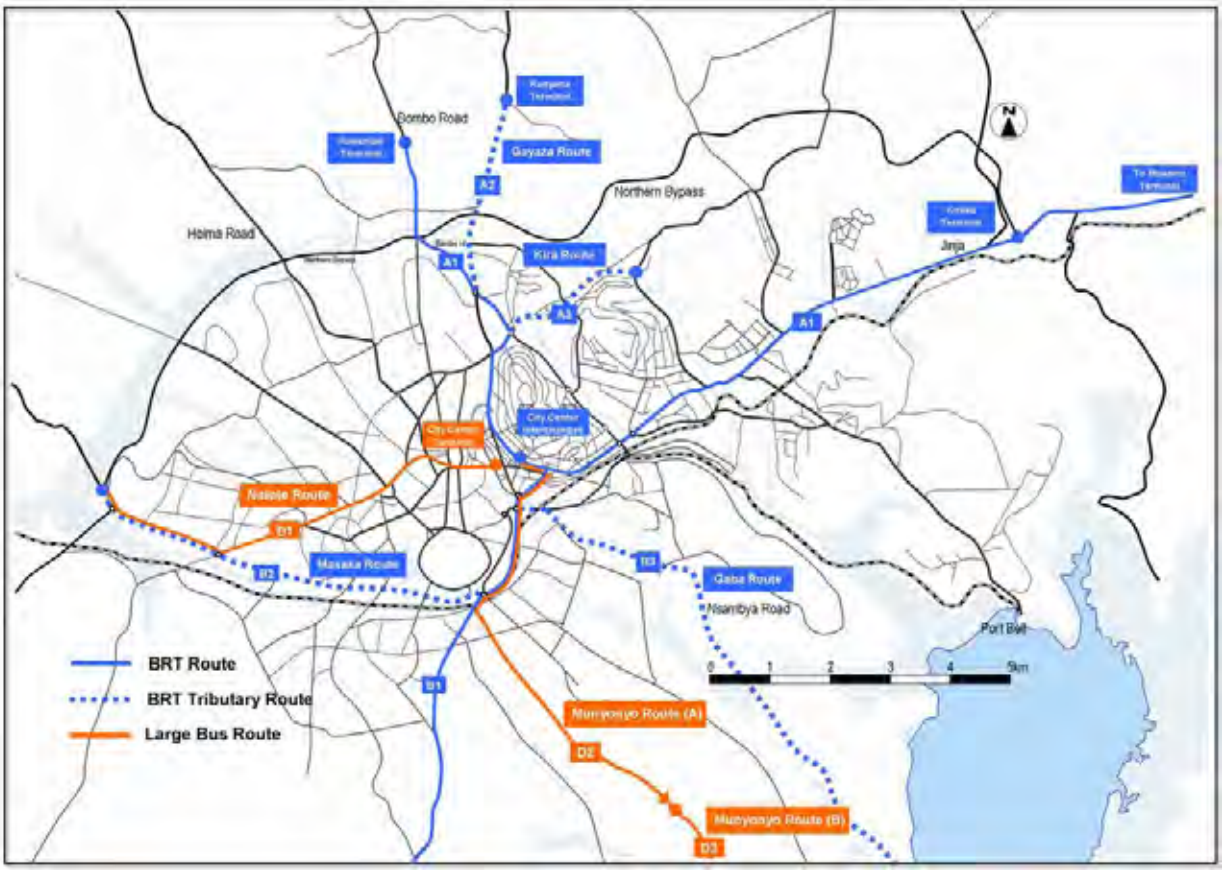
  Munyonyo Route

Large bus network in the medium-term is shown in Figure 9.6.2.

Table 9.6.2 BRT and Large Bus Development in the Medium-term

	Route		Total Length km *	Net Length km *
	Route No.	Name		
BRT	A1	Jinja Road	21.9	21.9
	A1	Bombo Road	7.2	7.2
	B1	Entebbe Road	37.6	37.1
	BRT Total		66.7	66.2
BRT Tributary Route	A2	Gayaza Road	5.9	2.4
	A3	Kira Road	5.0	2.5
	B2	Masaka Road	9.7	6.5
	B3	Gaba Road	10.8	9.3
	Arterial Total		30.6	20.7
Large Bus Route	D1	Natete Road	8.1	8.1
	D2	Munyonyo Route (A)	7.1	3.3
	D3	Munyonyo Route (B)	11.2	4.1
	Collector Total		26.4	15.5
Total			123.7	102.4

Excluding overlapping length
Length: by JICA Study Team
* Total Length includes overlapping length with other BRT route or BRT route. Net Length does not include overlapping length.



Source: JICA Study Team

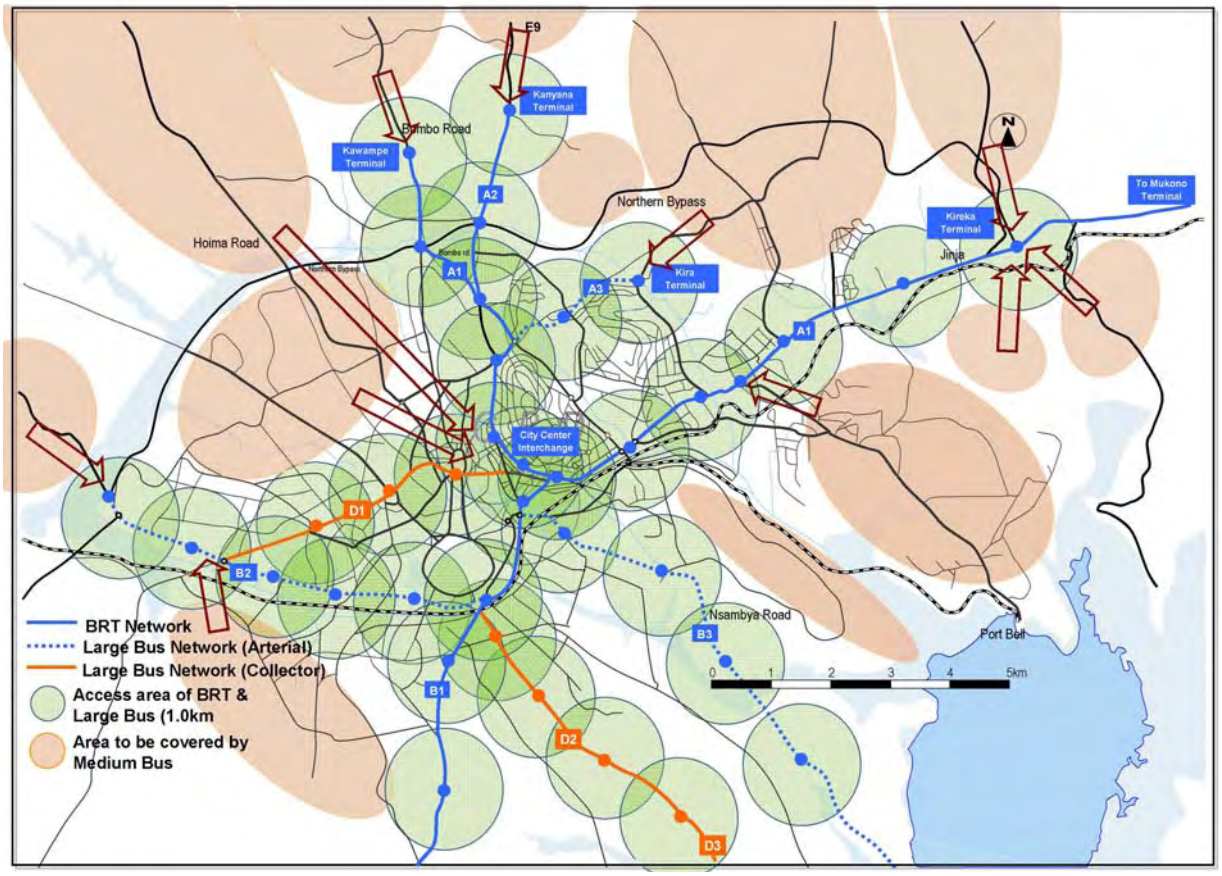
Figure 9.6.3 Large Bus Network in the Medium-term

(2) Medium Bus Network

As in the long-term, the areas not covered by the BRT system and large bus system will be serviced by medium bus or minibus. These areas are shown in Figure 9.6.4.

- The following existing terminals will function as the terminals of the medium bus and minibus along with the developed terminals for the BRT and large bus. Additional new terminal is required and this is articulated in the next section.

  Old Taxi Park, New Taxi Park
  Nakawa Terminal
  Natete Terminal



Source: JICA Study Team

Figure 9.6.4 BRT & Large Bus Network Service Area and Medium Bus Operation Area in the Medium-term

9.6.3 BUS TERMINAL PLAN

Terminals facilitate passengers' mobility by connecting the BRT and large bus routes with that of the other transport modes. The following intermodal mutual transfers are necessary as the function of the terminal.

a) Integrated Terminal:

BRT / BRT tributary route / large bus, inter-urban bus, medium bus and passenger car

Integrated Terminal is composed of the terminals of BRT and inter-urban bus as its center. This terminal is expected to become the core of the sub city center.

Kawampe Terminal (BRT route)
Kanyana Terminal (BRT route)
Kireka Terminal (BRT route)
Busega Terminal (Large bus route)
Nabweru Terminal (Large bus route)

b) BRT Terminal (BRT Combined Terminal)

BRT / BRT tributary route, medium bus and passenger car

BRT Combined Terminal collects passengers from medium bus and passenger car and contributes to decreasing the traffic volume going to the city center.

Port Bell Terminal
Gaba Terminal
Karunga Terminal
Kayunga Terminal

c) BRT Terminal:

BRT / BRT tributary route, large bus

BRT Terminal functions for the time adjustment and rotation of BRT.

City Center Interchange
Kira Terminal

d) Large Bus Terminal (Large Bus Combined Terminal):

large bus, medium bus and passenger car

Large Bus Combined Terminal collects passengers from medium bus and passenger car and contributes to decreasing traffic volume into the city center.

Masanafu Terminal
Kiwatule Terminal
Kigowa Terminal
Munyonyo Terminal

e) Large Bus Terminal:

large bus

Large Bus Terminal functions for time adjustment and rotation of BRT

City Center Terminal
Luwafu Terminal

f) Medium Bus Terminal:

BRT / BRT tributary route / large bus, medium bus

Medium Bus Terminal functions for the passengers transferring from medium bus to BRT / large bus.

Natete Terminal

The type of terminals and the function of each terminal are shown in Table 9.6.4. Planned location of terminals in the long-term is shown in Figure 9.6.5.

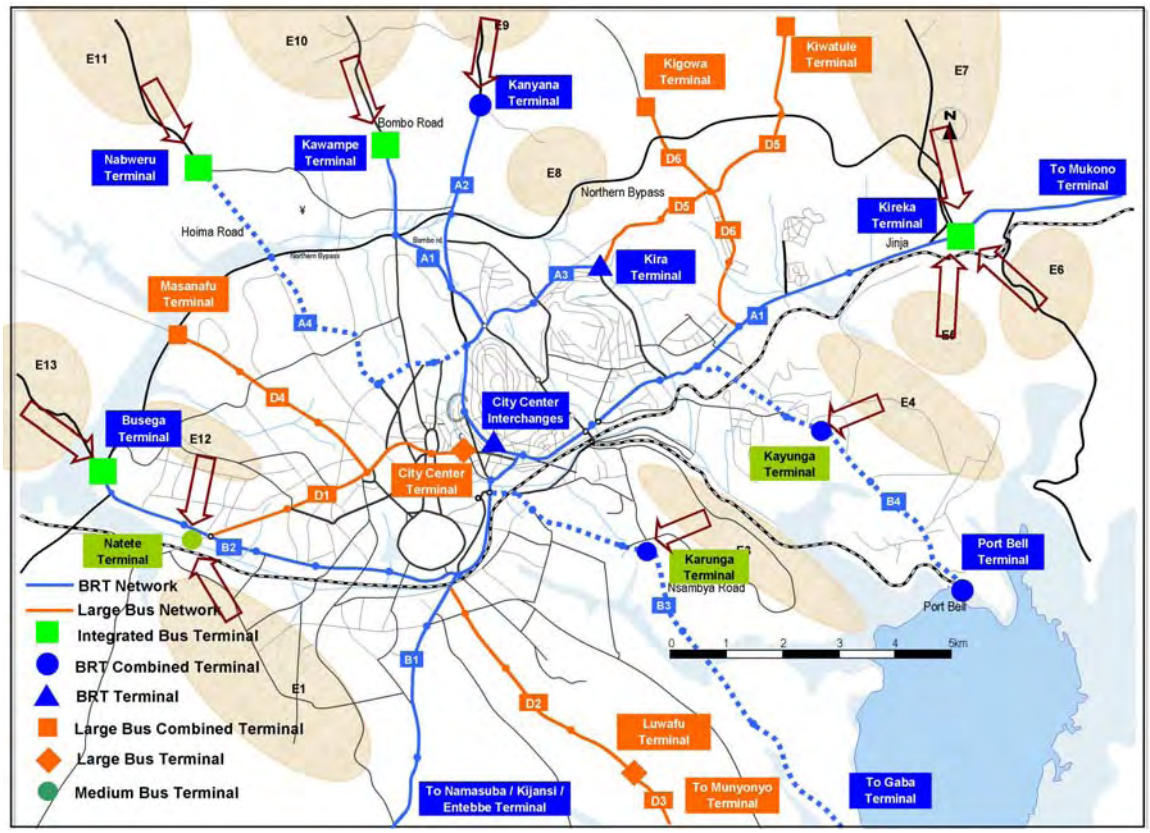
Since the terminals relating to BRT are not currently clear about their detailed conditions, the terminal plan excludes terminals related to the BRT.

The terminal plan conducted in this study is also shown in Table 9.6.3 and the location of terminals is shown in Figure 9.6.5.

Table 9.6.3 Terminal Type and Functions

Type of Terminal		Terminal Name	Long-term	Medium-term	Transport Mode	Facility
Integrated Terminal		-Kawampe Terminal (BRT route) -Kanyana Terminal (BRT route) -Kireka Terminal (BRT route) -Busega Terminal (BRT tributary route) -Nabweru Terminal (BRT tributary route)	○	○ ○ ○ ○	-BRT / BRT tributary route -Medium Bus -Inter-urban Bus -Passenger Car -Boda-Boda	-BRT Terminal / BRT Tributary Bus Terminal **-Inter-urban Bus Terminal** -Medium Bus Terminal -Passenger Car Park **-Market / Shops**
BRT Terminal	BRT Combined Terminal	-Port Bell Terminal -Gaba Terminal -Karunga Terminal -Kayunga Terminal	○ ○	 ○ ○	-BRT / BRT tributary route -Medium Bus -Passenger Car -Boda-boda	-BRT Terminal / BRT Tributary Bus Terminal -Medium Bus Terminal -Passenger Car Park
	BRT Terminal	-City Center Interchange -Kira Terminal		○ ○	-BRT -Large Bus	-BRT Terminal
Large Bus Terminal	Large Bus Combined Terminal	-Masanafu Terminal -Kiwatule Terminal -Kigowa Terminal -Munyonyo Terminal	○ ○ ○	 ○	-Large Bus -Medium Bus -Passenger Car -Boda-boda	**-Large Bus Terminal** **-Medium Bus Terminal** **-Passenger Car Park**
	Large Bus Terminal	-City Center Terminal -Luwafu Terminal		○ ○	-Large Bus	**-Large Bus Terminal**
Medium Bus Terminal		-Natete Terminal		○	-BRT / BRT tributary Route / Large Bus -Medium Bus	**-Medium Bus Terminal**

***Bold**: Terminal facilities planned in this study*
Source: JICA Study Team



Source: JICA Study Team

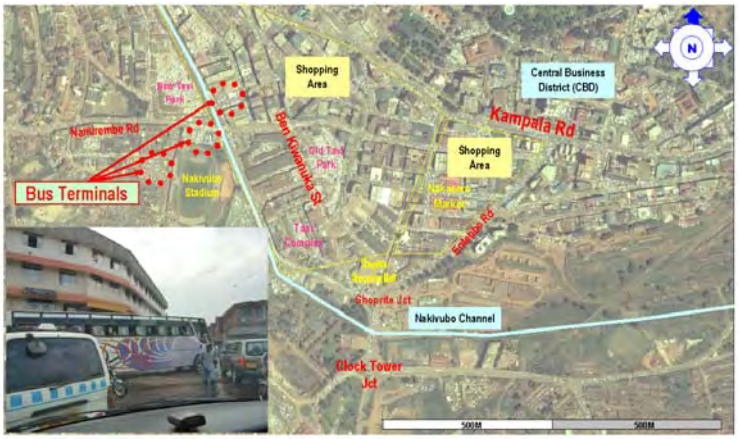
Figure 9.6.5 Bus Terminal Plan in the Long-term

9.7 INTER-URBAN BUS TRANSPORT

9.7.1 CONFIRMATION OF TRAFFIC PROBLEMS AND COUNTER MEASURES

Kampala City is facing growing traffic congestions within the urban area and city center. This issue is caused by the following reasons:

- The trunk road network in Kampala consists of one center radial network system except the Northern Bypass. Also, the width of the trunk roads remains unchanged.
- The traffic demand concentrates in the city center and traffic volume is increasing rapidly due to population growth and economic growth.
- Based on the above conditions, traffic congestion in the urban area and city center became a serious obstruction to the socioeconomic development of Kampala as the leading player of the national economic growth.
- Typical issue in the city center is the concentration of the minibuses, the citizen's most popular transport. The area of the minibus terminals is too small for the demand and the waiting queue of minibus is one of the causes of traffic jam in the center.
- The terminals of inter-urban buses, as the main transport means throughout the country, are also located in the center and the penetration of large size buses into the congested center accelerates the traffic jam.



Source: JICA Study Team

Figure 9.7.1 Concentration of Inter-urban Bus Terminals and Minibus Parks in the Center

Countermeasures are being undertaken except for the concentration of the inter-urban bus transport in the bus terminals located in the city center.

9.7.2 NECESSITY OF RELOCATION OF INTER-URBAN BUS TERMINALS

(1) Existing Operational Condition

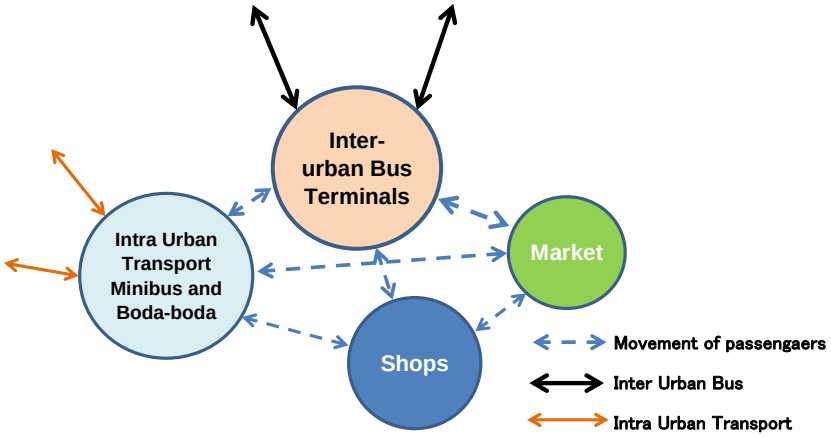
The inter-urban buses which depart from the bus terminals are mainly operated by two major associations and other companies. There are 115 companies in total operating 755 buses. The operation plan for each bus route including departure time, bus stops and bus size is discussed with each regional administration and authorized by the Transport Licensing Board (TLB) under the MoWT. Everyday, 540 large size buses depart and arrive on 83 routes to all up-country areas.

(2) Reason for Location of Terminals in the City Center

The main reasons for the location of inter-urban bus in the city center are as follows:

a) Direct connection with intra urban public transport such as minibus to and from any area within the city

b) Close location to the shops and service facilities to get services and commodities for the passengers, as well as to sell agricultural products brought from up-countries; many varieties of shops and markets located in the city center for the requirement of passengers



Source: JICA Study Team

Figure 9.7.2 Essential Linkage between Each Function

(3) Necessity of Relocation of Inter-urban Bus Terminals through the Implementation of the BRT Project

The BRT system is the essential countermeasure to strengthen the public transport system for the decongestion of the increasing minibuses in the center.

The BRT system proposes the location of the BRT terminals outside the urban area. It is necessary to connect the BRT terminals with other transport modes including the inter-urban bus transport and thus, the existing inter-urban bus terminals at the city center shall be relocated close to the proposed BRT terminals.

(4) Creation of Commercial Center

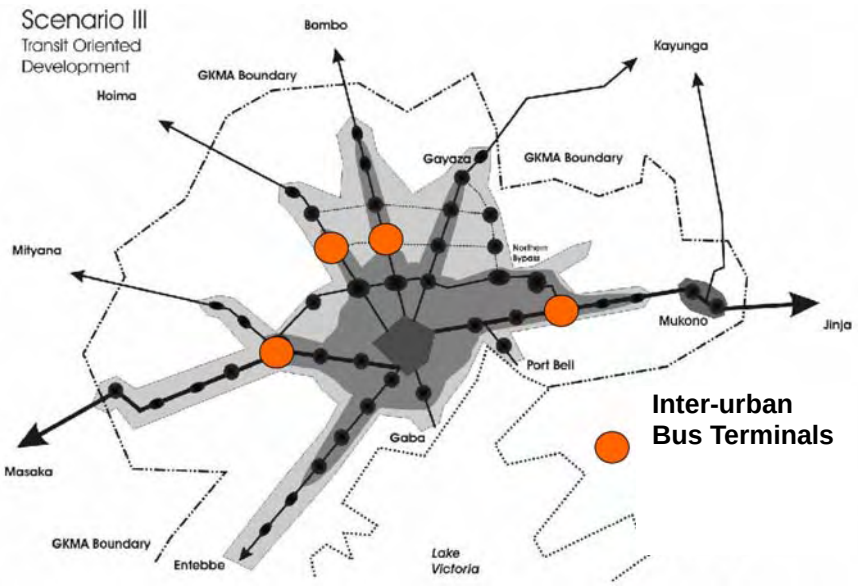
The NTMP/GKMA recommends the transport oriented development (TOD) for the GKMA's future development. The relocation of inter-urban bus terminals outside the urban area together with the commercial facilities will contribute to create the commercial centers envisaged in the NTMP/GKMA. The new commercial centers will also create more job and business opportunities for the increased population in GKMA in the near future.

(5) Positive Impact by Development of Inter-urban Bus Terminal

Relocation of Inter-urban Bus Terminal will impact on socioeconomic activity in GKMA such as;

a) Passengers who use the Inter-urban Bus will not be required to go to overcrowded city center. Relocation of Inter-uraban Bus Terminal will not only exclude the large buses but also decrease access trips of users thus contribute to the improvement of sopcioeconomic activities in the city center.

b) New Inter-urban Bus terminal will call for the commercial facilities and service facilities for the convenience of passengers. These facilities will create new job opportunity and new enterprise which contribute to the promotion of economies of surrounding area.



Source: JICA Study Team based on NTMP/GKMA

Figure 9.7.3 Transport Oriented Development and Inter-urban Bus Terminals

9.7.3 CONCEPTUAL PLAN OF THE INTER-URBAN BAS TERMINALS

(1) Existing Operation of Inter-urban Bus Transport by Large Size Buses

Currently, the inter-urban buses from the bus terminals operate at an average of 540 trips per day on 83 routes covering all areas in the country. as shown in Table 9.4 4. Most of bus operators belong to two major inter-urban bus associations named Qualice Association and Uganda Bus Association. Some operators are independent of those associates. Number of buses and operations are shown in Table 9.7.1.

Table 9.7.1 Existing Transport Operation of Inter-urban Bus Terminals in 2010

Name of Bus Assosiations	Number of bus companies	Number of owned bus	Total number of bus departure	Total number of bus arrival	Total number of bus departure and arrival	Direction	Number of bus routes by direction (d)	Number of bus departure and arrival (e)	Operation frequency by routes (e/d)	Average distance (f) 100km	Frequency by average 100km (e/d/f)
Qualice bus terminal total (A)	89	312	108	96	204	East	8	36	4.5	2.3	2.0
						North	11	80	7.1	3.9	1.8
						West	4	10	2.5	2.0	1.3
						Southwest	18	78	4.3	3.2	1.4
						Total	41	204	4.9	2.7	1.8
Uganda bus terminal total (B)	14	180	47	44	91	East	4	31	7.8	2.7	2.9
						North	4	11	2.8	1.8	1.6
						West	1	0	0.0	0.0	0.0
						Southwest	8	49	6.1	3.0	2.0
						Total	16	91	5.7	2.6	2.2
Other private buses total (C)	12	263	130	115	245	East	2	65	32.5	2.3	14.1
						North	8	71	8.9	5.0	1.8
						West	0	0	0.0	0.0	0.0
						Southwest	16	109	6.8	3.8	1.8
						Total	26	245	9.4	2.8	3.4
Grand total (A+B+C)	115	755	285	255	540	East	14	132	9.4	2.4	3.9
						North	23	162	7.0	3.6	2.0
						West	5	10	2.0	1.3	1.5
						Southwest	42	236	5.6	3.3	1.7
						Total	83	540	6.5	2.7	2.4

Source: JICA Study Team

The existing relation between the number of departures and arrivals and the number of bus berths/lay-bys is as follows:

- To the east direction through Jinja Road, average of 132 buses depart and arrive on 14 bus routes from the city center bus terminals. Average of 3.6 buses depart and arrive every half hour during the 18 hours bus operation. If new east bound bus terminal is relocated, at least four bus berths/lay-bys will be necessary depending on the bus operation schedule.
- To the north direction through Bombo Road, average of 162 buses depart and arrive on 23 bus routes from the city center bus terminals. Average of four buses depart and arrive every half hour during the 18 hours operation. If new north bound bus terminal is relocated, minimum of four bus berths/lay-bys will be necessary.
- To the west direction through and Fort Portal Road, average of 10 buses depart and arrive on 5 bus routes from the city center bus terminals. One bus depart and arrive every half hour during the 18 hours operation. If new west bound bus terminal is relocated, minimum of two bus berths/lay-bys will be necessary.
- To the south west direction through Masaka Road, average of 236 buses depart and arrive on 42 bus routes from the city center bus terminals. Average of six buses depart and arrive every half hour during the 18 hours operation. If a new west bound bus terminal is relocated, minimum six bus berths/lay-bys will be necessary.

Based on the above, the operation frequency per hour is highest for the direction to the western region, then to the northern region and followed by the direction to the eastern region.

(2) Future Travel Demand of Inter-urban Transport

The travel demand of the public transport from the GKMA will also increase in response to the increasing population and increasing economic activity. Based on the estimated travel demand of passenger transport in the Master Plan of the GKMA, a future travel demand of inter-urban public transport has been estimated applying the estimated travel demand and the revised future population of each region for the year 2023 as shown in Table 9.7.2.

The existing public transport for inter-urban travel consists of inter-urban large bus and minibus. According to the traffic survey by the Study Team, 1,450 trips per day are through large buses and 95,852 trips per day are by minibus. As a result, about 118,000 passengers per day comprise the existing travel demand of inter-urban transport. The future travel demand will become about 300,000 passengers in 2023 with a growth ratio of 255% from 2010 to 2023.

Table 9.7.2 Future Travel Demand of Inter-urban Transport by Large Bus and Minibus (in 2010, 2018 and 2023)

Direction	Total number of departure and arrival in 2010				Total Passenger of inter-urban in 2010				Projected Passengers and Bus Trips of inter-urban in 2018					Projected Passengers and Bus Trips of inter-urban in 2023		
	Number of Large Bus	Passengers per a bus	Number of Minibus (a)	Passengers per a minibus	Large Bus	Minibus	Total	Proposed Terminals to be relocated	Growth rate 2018/2010	Future passenger demand of shifting terminals (b)	Number of Minibus trips (c=a/2)	Number of Large Bus trips ((b-c×10)/40)	Total Bus rips	Growth rate 2023/2010	Future passenger demand of shifting terminals (d)	Total number of Large Bus trips (d/40)
East	155	40	2,140	10	6,200	21,400	27,600	Kireka	1.9	52,440	1,070	1,044	2,114	2.6	72,864	1,822
North	226	40	1,224	10	9,040	12,240	21,280	Kawampe	1.9	39,645	613	838	1,451	2.6	56,022	1,400
West	31	40	840	10	1,240	8,400	9,640	Nabweru	1.9	17,930	420	343	763	2.5	24,004	600
South-west	453	40	4,122	10	18,120	41,220	59,340	Busega	1.9	110,372	2,061	2,244	4,305	2.5	147,757	3,694
Total (A)	865	40	8,326	10	34,600	83,260	117,860		1.9	220,387	4,163	4,469	8,633	2.6	300,646	7,516
Total GKMA trips (B)	1,450		95,852													
% of inter-urban minibus (A/B)	59.7%		8.7%													

Source: JICA Study Team

If the main transport means for inter-urban transport are not changed, the transport demand by

minibus will become the majority and the area and size of the inter-urban bus terminals will require a huge area for the minibus transport.

On the other hand, the large size bus transport is efficient, comfortable and economical compared with the minibus for the steadily growing demand. Therefore, it is recommended that the government instruct the minibus operators to gradually change their vehicles into large buses. The transition period from the minibus to large bus will be necessary. Almost half of the existing minibus will remain unchanged in 2018 and the transition will be completed in 2023 as shown in Table 9.7.2.

Table 9.7.3 also shows the estimated future transit demand by each access transport mode in 2023. Modal share of access mode is assumed as shown in the table.

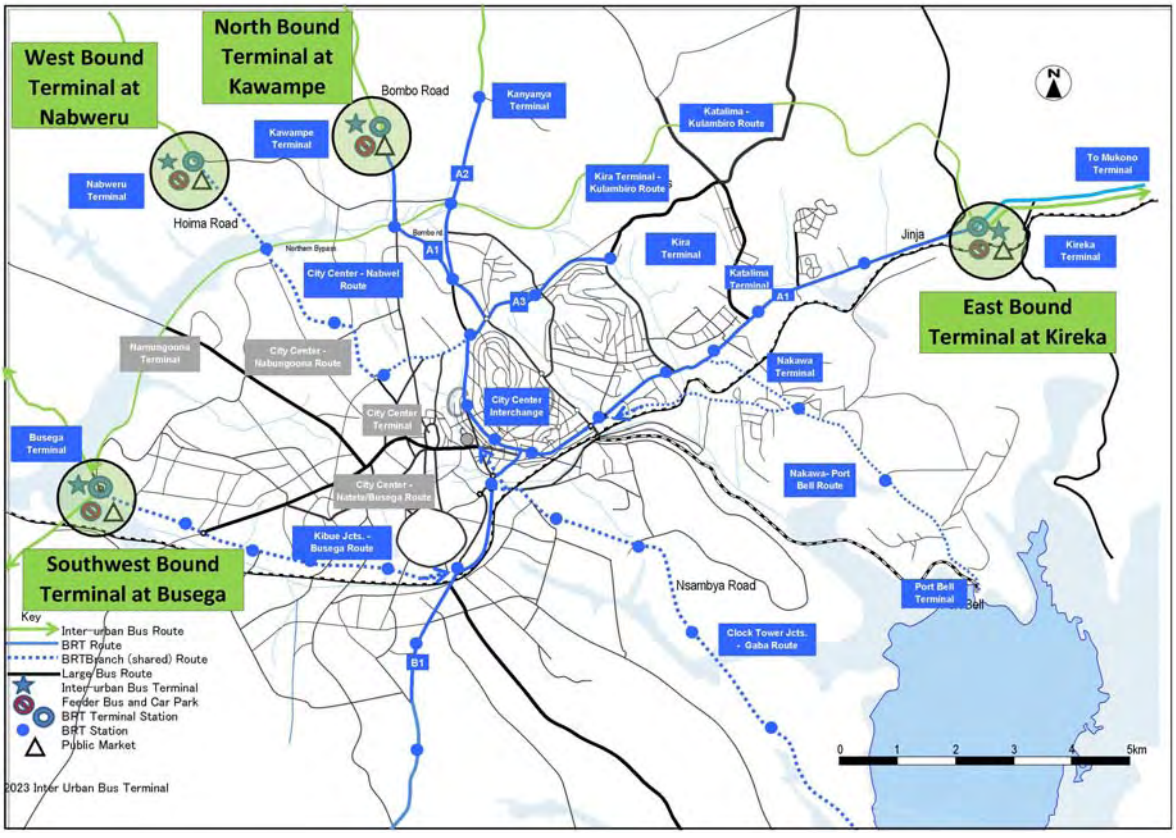
Table 9.7.3 Future Access Demands by Transport Modes for Inter-urban Bus Terminals

Direction	Teminal name	2023 IUB passnger thousand	2023 IUB access demands by mode thousand					
			BRT/BRT tributary	large bus	medium bus	passenger car/taxi	boda boda	walk
East	Kireka/Jinja rd	72.9	51.0	0.0	7.3	3.6	3.6	7.3
North	Kawampe/bombo rd	56	39.2	0.0	5.6	2.8	2.8	5.6
West	Nabweru/hoima rd	24.0	16.8	0.0	2.4	1.2	1.2	2.4
Southwest	Busega/masaka rd	147.8	103.5	0.0	14.8	7.4	7.4	14.8
-	Modal Share	-	70%	0%	10%	5%	5%	10%

Source: JICA Study Team

(3) Appropriate Location of New Inter-urban Bus Terminals (IUBT)

Figure 9.7.4 shows the areas for both BRT and inter-urban bus terminals.



Source: JICA Study Team

Figure 9.7.4 Proposed Location of Inter-urban Bus Terminals

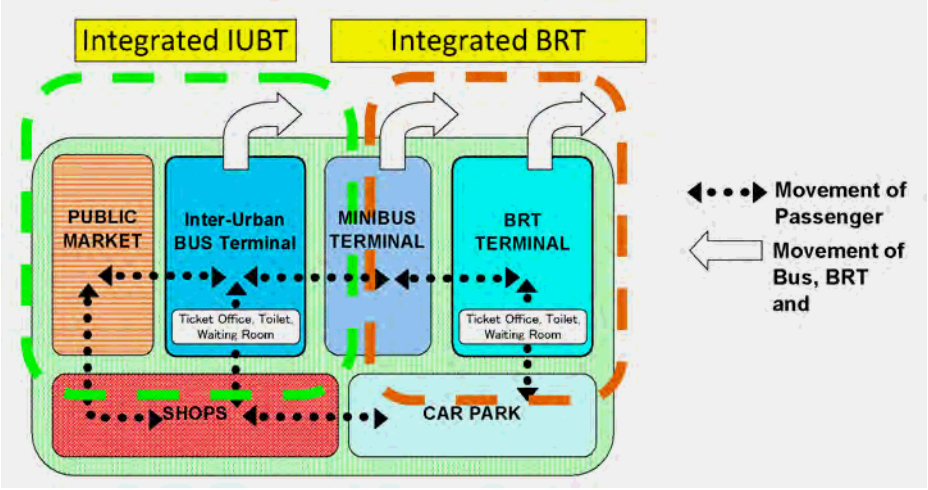
- The proposed location for the east bound IUBT is an open space near the intersection between the Northern Bypass and Jinja Road.
- The proposed location for the north bound IUBT is either an open space at Kako area along Bombo Road, 1.5 km north from the Northern Bypass or the open space at Kanyana area along Gayaza Road, 1.5 km north from the Northern Bypass.
- The proposed location for the southwest bound IUBT is a wet land located near the intersection of Masaka Road and the Northern Bypass.
- The proposed location for the west bound IUBT is an open space near Nabweru area along Hoima Road.

(4) Proposed Functions of the New Inter-urban Bus Terminals

The functions required for the IUBT are not only for transport but also for the following service facilities:

- **IUBT:** departure and arrival bus lay-by, bus road, ticket offices, passenger waiting room, toilet, drivers and conductors office, shops, bus and car parking.
- **BRT Terminal:** departure and arrival bus lay-by, bus road, ticket offices, passenger waiting room, toilet, drivers and conductors office, BRT bus and car parking, minibus and boda-boda parking/terminal.
- **Public Market:** vegetable and meat market, general store, market office, toilet, truck and car parking.

After preparation of the infrastructure, the proposed administration of the terminals, car parks and bus parks as well as service shops will be conducted by the new private associations under a contract with the government.



Source: JICA Study Team

Figure 9.7.5 Conceptual Layout of Bus Terminals and Other Required Function

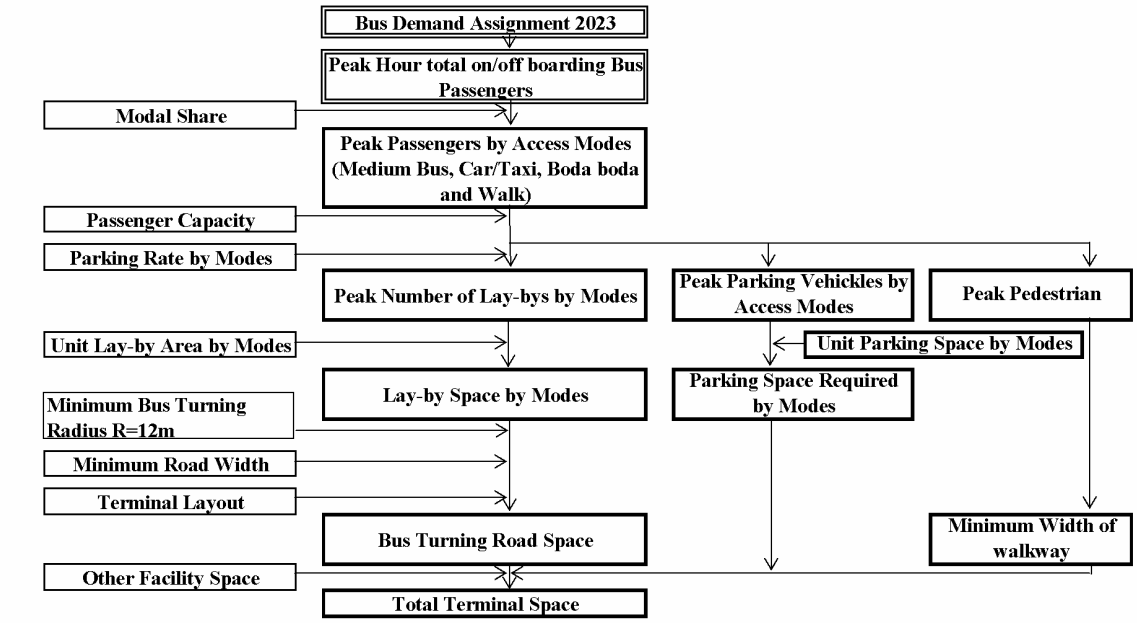
(5) Proposed Plan of the New Inter-urban Bus Terminals (IUBT)

The proposed transit functions of the new IUBT shall require space for inter-urban bus, medium bus, car/taxi and Boda-Boda as well as temporary parking during peak hours. The procedure for the estimation of each terminal facility required is shown in Figure 9.7.6.

The peak hour rate for each transit demand is 4.5% of average daily traffic according to the traffic survey by the Study Team. In order to estimate each terminal facility, the future traffic

demand of inter-urban bus transport and the modal share ratio by each access mode shall be determined as shown in the above section.

Based on each transit demand by transport modes, the peak hour departing/arriving lay-by demand by type of transport is assumed. The peak hour parking demand by type of modes is assumed through the typical passenger capacity of each transit mode and the parking rate by modes during peak hour as shown in Figure 9.7.6 and Table 9.7.4.



Modal Share:
Modal Shareing Rate by each access mode has been selected considering the type of terminal.
Walking will be the major access mode and the medium bus will be the second mode.
Passengers par Modes:
Number of peak hour passengers per vehicle is assumed as 60 passengers per Large Bus, 29 passengers per Medium Bus, 2 passengers per passenger car and 1passenger per Bodaboda
Parking Rate by Modes:
Parking Rate by Modes has been also assumed by type of terminal.
Unit Lay-by Area by Modes:
Unit Lay-by Space is established as 70 m2 for Bus Lay-by which is consisting with (13m length of bus +6m of room) * 3.25m of bus width, 20 m2 for Car/Taxi and 1.5 m2 for Boda boda
Unit Parking Space by Modes:
Unit Parking Space is established as 100 m2 for Bus, 30 m2 for Car/Taxi and 2 m2 for Boda-boda
Minimum Bus Turning Radius:
Minimum Bus Turning Radius is the key condition of Layout of the Bus Turning Road in the Terminal and 12 m Out-side Rudius of Turning Road is the minimum requirment.
Minimum Road Width:
Minimum Road Width is also the key condition of the Layout of the Bus Turning Road and 3 m width + room will be the minimum requirement.

Source: JICA Study Team

Figure 9.7.6 Procedure of Estimation of Inter-urban Bus Terminal Facilities

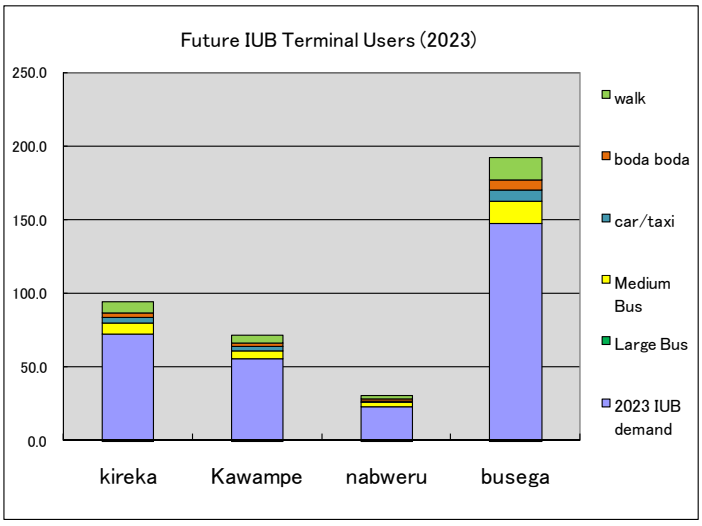
After the estimation of each lay-by and parking demand, unit lay-by by modes, unit parking space and the layout plan of each bus terminal, the total terminal area shall be determined following the procedure shown in Figure 9.7.6. Minimum bus turning radius of 12 m and minimum road width of 6 m for circulation are applied.

Table 9.7.4 shows the future numbers of inter-urban bus, medium bus, car/taxi, Boda-Boda and temporary parked vehicles as well as total rough area required for each facility. Figure 9.7.7 shows the typical lay-out plan of each inter-urban bus terminal which includes the minimum area for shops, toilet, passenger waiting rooms, ticket office and terminal maintenance office.

Table 9.7.4 Proposed Inter-urban Bus Terminal Area in 2023

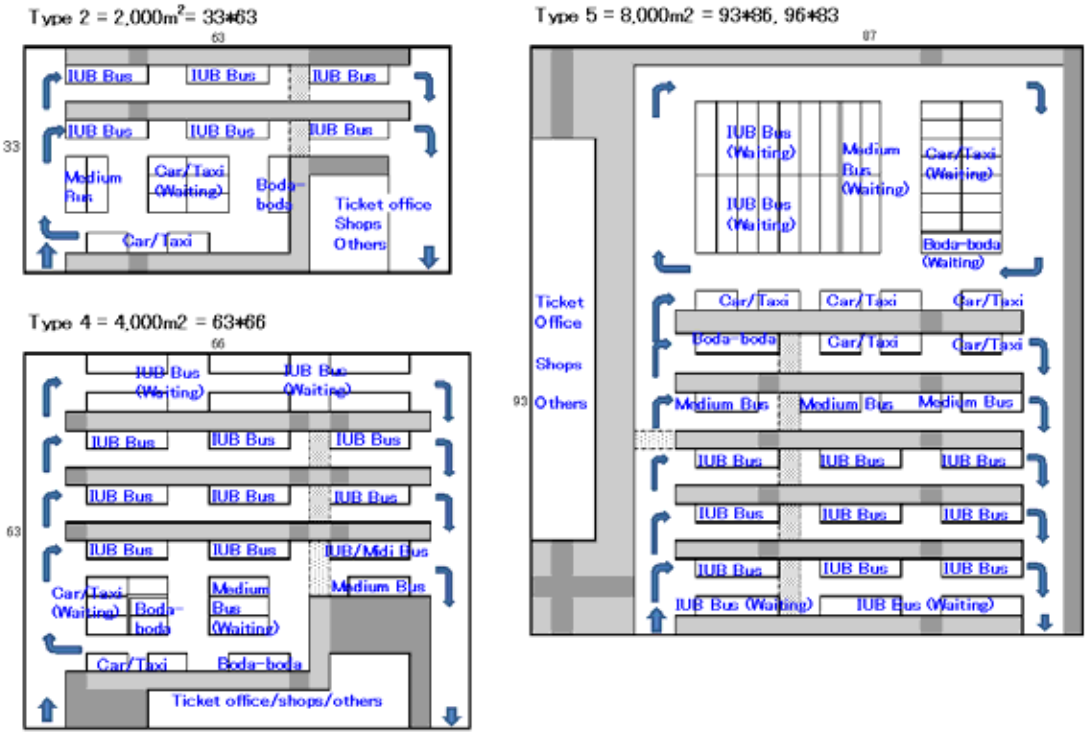
Direction	IUB direction/Items	2023 IUB total demand	2023 Access Traffic demand					Terminal area /Terminal Type
			Large Bus	Medium Bus	car/taxi	boda boda	walk	
Calculation Index	Modal share	100%	0%	10%	5%	5%	10%	
	Peak hour rate	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	
	Passenger capacity per vehicle	60	60	29	2	1	1	
	Necessary time for on/off boarding per berth (min)	5	5	5	2	0.5	-	
	Unit berth area per vehicle m^2	150	150	150	100	10	-	
	Unit parking area per vehicle m^2	150	100	100	50	5	-	
East (Kireka)	Daily passenger demand (thousand)	72.9	0.0	7.3	3.6	3.6	7.3	4,000m^2/ Terminal Type4
	Peak hour passenger (thousand)	3.3	0.0	0.3	0.2	0.2	0.3	
	Number of departures in peak hour	55	0	11	82	164	328	
	Operation interval (min)	1.1	0.0	5.3	0.7	0.4	-	
	Necessary number of berth/lay-by	5	0	1	3	1	-	
	Park rate (2 times of departure)	0.17	0.00	0.17	0.07	0.02	-	
	No. of parking vehicles	9	0	2	5	3	-	
	Berth area and park area m^2 (A)		0	330	547	27	-	
	Total terminal area m^2 (A×1.5)	3,050	0	495	820	41	-	
North (Kawampe)	Daily passenger demand (thousand)	56	0.0	5.6	2.8	2.8	5.6	4,000m^2 / Terminal Tyee 4
	Peak hour passenger (thousand)	2.5	0.0	0.3	0.1	0.1	0.3	
	Number of departures in peak hour	42	0	9	63	126	252	
	Operation interval (min)	1.4	0.0	6.9	1.0	0.5	0.0	
	Necessary number of berth/lay-by	4	0	1	2	1	0	
	Park rate (2 times of departure)	0.17	0.00	0.17	0.07	0.02	0.00	
	No. of parking vehicles	7	0	1	4	2	0	
	Berth area and park area m^2 (A)		0	253	420	21	-	
	Total terminal area m^2 (A×1.5)	2,363	0	380	630	32	0	
West (Nabweru)	Daily passenger demand (thousand)	24	0.0	2.4	1.2	1.2	2.4	2,000m^2 / Termonal Type 2
	Peak hour passenger (thousand)	1.1	0.0	0.1	0.1	0.1	0.1	
	Number of departures in peak hour	18	0	4	27	54	108	
	Operation interval (min)	3.3	0.0	16.1	2.2	1.1	0.0	
	Necessary number of berth/lay-by	2	0	0	1	0	0	
	Park rate (2 times of departure)	0.17	0.00	0.17	0.07	0.02	0.00	
	No. of parking vehicles	3	0	1	2	1	0	
	Berth area and park area m^2 (A)		0	109	180	9	-	
	Total terminal area m^2 (A×1.5)	1,013	0	163	270	14	0	
Southwest (Busega)	Daily passenger demand (thousand)	147.8	0.0	14.8	7.4	7.4	14.8	8,000m^2/ Terminal Type 5
	Peak hour passenger (thousand)	6.7	0.0	0.7	0.3	0.3	0.7	
	Number of departures in peak hour	111	0	23	166	333	665	
	Operation interval (min)	0.5	0.0	2.6	0.4	0.2	0.0	
	Necessary number of berth/lay-by	9	0	1	5	3	0	
	Park rate (2 times of departure)	0.16	0.00	0.09	0.06	0.02	0.00	
	No. of parking vehicles	18	0	2	10	6	0	
	Berth area and park area m^2 (A)		0	350	1000	55	-	
	Total terminal area m^2 (A×1.5)	6,075	0	525	1,500	83	0	

Source: JICA Study Team



Source: JICA Study Team

Figure 9.7.7 Future Transit Demands by Modes in Peak Hour



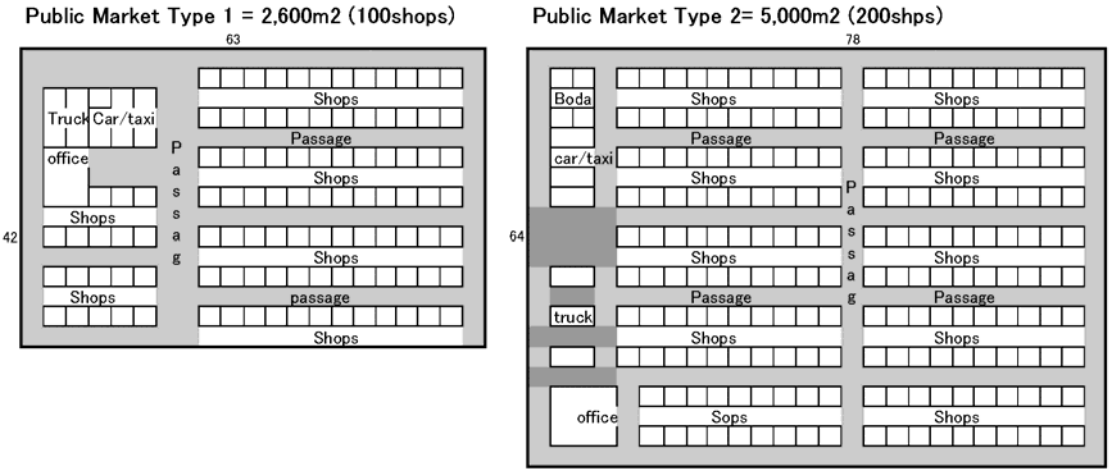
Source: JICA Study Team

Figure 9.7.8 Typical Layout Plan of Inter-urban Bus Terminals

(6) Proposed Plan of the New Public Market

Public market is also one of the components of the terminals. There are two types of public market, namely, standard type which has 100 shops and larger type which has 200 shops. The minimum number of public market users will be determined from the size of the inter-urban bus transport users. In case of Kiraka and Kawampe terminals, the urbanization in the nearby area is already starting. Therefore, large type of public market is planned at Kireka, Kawampe and Busega terminals based on the number of future terminal users and the urbanization of surrounding area. The standard type of public market will be considered for the Nabweru Terminal.

Proposed typical layout plan for each public market is shown in Figure 9.7.8.



Source: JICA Study Team

Figure 9.7.9 Typical Layout Plan of New Public Market

(7) Construction Cost

The construction cost of each IUBT and public market is assumed as shown in Table 9.7.5. For the assumption of the cost estimate, the development of the terminals shall be done by the government and the properties of the terminals shall belong to the government. The operation and maintenance of the terminals as well as the markets will be done by private associations.

The estimated construction cost for the major integrated IUBT such as the Kawampe and Kireka terminals will be around UShs13 billion (USD 5.8 million). The cost for the Busega Terminal will be UShs15 billion (USD 7 million). The cost for the Nabweru Terminal will be UShs7.5 billion (USD 3.4 million). The grand total will become UShs 48.6 billion (USD 22 million).

Table 9.7.5 Construction Cost Estimates for IUBTs and Public Market

Direction	East			North			West			Southwest			IUB Terminal Total	Public Market Total	Grand Total
Name of Location	Kireka/Jinja Rd			Kawampe/Bombo Rd			Nabweru/Hoima Rd			Busega/Masaka Rd					
IUB Terminal/Public Market	IUB Terminal	Public Market	Total	IUB Terminal	Public Market	Total	IUB Terminal	Public Market	Total	IUB Terminal	Public Market	Total			
Type of Terminal/Public Market	Type 4	Type 2		Type 4	Type 2		Type 2	Type 1		Type 5	Type 2				
Land & House Compensation Cost	1,262	832	2,094	1,262	832	2,094	912	495	1,407	1,412	832	2,244	4,848	2,991	7,839
Land reclamation & Road Pavement	300	125	425	300	125	425	172	65	237	1,110	125	1,235	1,883	440	2,323
foot walk pavement	103	386.4	489	103	386.4	489	51	223	274	269	386.4	655	525	1,382	1,907
drainage & Curbe	236	487.05	723	236	487.05	723	156	289	445	425	487.05	912	1,054	1,750	2,803
streat light	180	208	388	180	208	388	131	137	268	260	208	468	751	761	1,512
maintenance office,Toilet, waiting room	596	5720	6,316	596	5720	6,316	141	2,908	3,049	1,071	5720	6,791	2,405	20,068	22,473
fence	580	653.2	1,233	580	653.2	1,233	442	469	911	828	653.2	1,481	2,429	2,429	4,858
bus lay by	176		176	176		176	99		99	187		187	638	0	638
shops	408		408	408		408	218		218	816		816	1,850	0	1,850
water suply	1	600	601	1	600	601	1	600	601	1	600	601	2	2,400	2,402
Grand total (million shs)	3,842	9,012	12,853	3,842	9,012	12,853	2,323	5,186	7,508	6,378	9,012	15,390	16,384	32,221	48,605
Grand total (thousand USD)	1,746	4,096	5,842	1,746	4,096	5,842	1,056	2,357	3,413	2,899	4,096	6,995	7,447	14,646	22,093

Unit: Thousand
Source: JICA Study Team

9.7.4 IMPLEMENTATION PLAN

The proposed implementation of the pilot BRT project will consist of the following items and schedules:

- Detailed design for the pilot BRT project in 2011.
- Construction of infrastructure and establishment of operation body from 2013 to 2014.
- Operation of the pilot BRT from 2015.
- Other BRT project will be implemented from 2016 to 2030.
- The cost required for the construction and preparation of the BRT runway, BRT stations, BRT and minibus terminals, BRT depot and BRT vehicles will be financed by the government and World Bank.
- The operation cost for the BRT will be financed by the private BRT operator.

The preparation of the detailed plan and financing for the pilot BRT terminals, which are the east bound IUBT located near Kireka Stadium and the north bound IUBT located at Kako area along Bombo Road, will be on schedule. The proposed areas for the north bound IUBT are located

either in the swamp area or the former farm land which require official approval for development by the Environmental Authority.

Under these conditions, the proposed IUBT shall be implemented through the following process:

- Firstly, start the selection of the appropriate land and find financing agencies for the feasibility study, detailed design and the implementation of the priority IUBT project after the determination of the location of the pilot BRT terminals.
- Secondly, prepare the total development plan, feasibility study, selection of priority project and environmental assessment for the approval of the authority,
- Thirdly, identify proposed land/areas for future governmental development and control or restrict their land use plans.
- Fourthly, prepare the detailed design, cost estimate, bus operational plan and tender documents and purchase the land for the IUBT.
- Tendering, evaluation, contracting and monitoring the project operation.

The financial resources for the IUBT project are proposed in Section 9.10.

9.8 BUS OPERATION PLAN

In this section, based on the future public transport demand and bus network plan, the bus operation plan is established and the financial condition of the operating entity is analyzed. The extent of bus operation plan is as follows:

- The operation plan is established for large bus routes. BRT and BRT tributary routes are excluded.
- The operation plan is analyzed in the beginning year of operation. Therefore, three routes are in 2023 and other three routes are in 2018.

9.8.1 BUS OPERATION PLAN

(1) Large Bus Operation Plan

1) Total Passenger and Peak Hour Passenger

In Section 9.5 of this chapter, future public transport demand is forecasted and the number of passengers is distributed to the bus routes. The following table shows the future passenger demand on large bus routes.

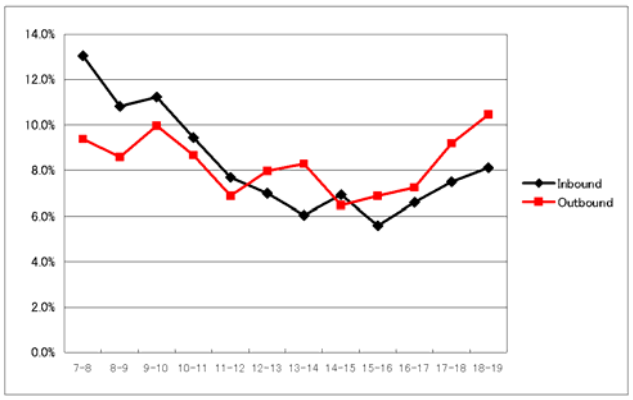
Table 9.8.1 Future Passenger Demand on Large Bus Routes

Route		No. of Passengers in 2023 ('000)	No. of Passengers in 2018 ('000)
No.	Name		
D1	Natete Route	12	13
D2	Munyonyo Route (A)	99	85
D3	Munyonyo Route (B)	21	11
D4	Sentema Route	4	Not yet operated
D5	Kiwatule Route	54	〃
D6	Kigowa Route	42	〃

Source: JICA Study Team

Peak hour passenger is estimated from the traffic survey result conducted by the Study Team. Number of minibuses from the traffic count and average passenger from the roadside interview are applied to acquire the hourly variation of passengers.

The rate of 12 hour minibus traffic volume to 24 hour traffic volume is 0.74 according to the traffic survey. Hourly traffic variation of minibus during daytime is shown in the following figure. Peak hour traffic volume in one direction is 6.0% of daytime traffic volume in both directions. Therefore, peak hour demand of public passenger in one direction is 4.5% of all day passenger demand in both directions. Also, the peak appears from 7:00 to 8:00 to the city center direction.



Source: JICA Study Team

Figure 9.8.1 Hourly Variation of Minibus Passenger

Future passenger demand is converted to peak hour demand in one direction by applying the peak hour rate.

Table 9.8.2 Peak Hour Passengers of Large Bus

Route		Peak Hour Passengers in one direction in 2023	Peak Hour Passengers in one direction in 2018
No.	Name		
D1	Natete Route	540	590
D2	Munyonyo Route (A)	4,460	3,830
D3	Munyonyo Route (B)	950	500
D4	Sentema Route	180	not yet operated
D5	Kiwatule Route	2,430	〃
D6	Kigowa Route	1,890	〃

Source: JICA Study Team

2) Bus Operation and Number of Bus

Considering road condition and flexibility of operation, passenger capacity of large bus is determined to be 50-60. Loading factor or occupancy rate of large bus is set to be 0.85. Peak hour operation of large bus is calculated from the average number of passengers which is 46.8. Total number of operation of bus per day is estimated from the hourly variation of inbound and outbound traffic. The following table shows the daily and peak hour operation of large bus.

Table 9.8.3 Daily and Peak Hour Operation

Route		2023		2018	
No.	Name	Peak Hour Operation	Daily Operation	Peak Hour Operation	Daily Operation
D1	Natete Route	12	144	13	156
D2	Munyonyo Route (A)	95	1,189	82	1,021
D3	Munyonyo Route (B)	20	252	11	132
D4	Sentema Route	4	48	Not yet operated	
D5	Kiwatule Route	52	649	〃	
D6	Kigowa Route	40	504	〃	

Source: JICA Study Team

Table 9.8.4 Peak Hour Operation Interval

Route		Operation Interval in 2023 (min)	Operation Interval in 2018 (min)
No.	Name		
D1	Natete Route	5.2	4.7
D2	Munyonyo Route (A)	0.6	0.7
D3	Munyonyo Route (B)	3.0	5.7
D4	Sentema Route	15.6	not yet operated
D5	Kiwatule Route	1.2	〃
D6	Kigowa Route	1.5	〃

Source: JICA Study Team

3) Operation Distance and Travel Time

Average operation speed on BRT route including stopping at bus stations is presumed at 25 km/hr. It is presumed at 20 km/hr on ordinary roads referring to the traffic survey result. Travel time for one way is calculated as follows:

Table 9.8.5 Operation Distance and Travel Time

Route		2023			2018		
		Operation Distance (km)		Travel Time (min)	Operation Distance (km)		Travel Time (min)
No.	Name	BRT Route	Ordinary Road		BRT Route	Ordinary Road	
D1	Natete Route	2.2	5.9	23.0	0.0	8.1	24.3
D2	Munyonyo Route (A)	3.3	3.8	19.3	3.3	3.8	19.3
D3	Munyonyo Route (B)	3.3	7.9	31.6	3.3	7.9	31.6
D4	Sentema Route	0.0	7.1	21.3	Not yet operated		
D5	Kiwatule Route	5.0	6.4	31.2	〃		
D6	Kigowa Route	5.1	5.6	29.0	〃		

Source: JICA Study Team

According to the daily operation and operation distance, annual travel distance of each route is shown in the following table:

Table 9.8.6 Annual Operation Distance

Route		Annual Travel Distance in 2023 ('000 km)	Annual Travel Distance in 2018 ('000 km)
No.	Name		
D1	Natete Route	852	923
D2	Munyonyo Route (A)	6,163	5,291
D3	Munyonyo Route (B)	2,062	1,080
D4	Sentema Route	249	not yet operated
D5	Kiwatule Route	5,397	〃
D6	Kigowa Route	3,940	〃

Source: JICA Study Team

4) Peak Vehicle Requirement and Necessary Bus

When ten minutes layover for the time adjustment is added, the operation frequency by one bus is calculated as the following table.

Table 9.8.7 Operation Efficiency by a Bus

Route		Operation Efficiency by one Bus (time/hour)	
No.	Name	2023	2018
D1	Natete Route	1.07	1.02
D2	Munyonyo Route (A)	1.23	1.23
D3	Munyonyo Route (B)	0.82	0.82
D4	Sentema Route	1.14	Not yet operated
D5	Kiwatule Route	0.83	〃
D6	Kigowa Route	0.88	〃

Source: JICA Study Team

Based on the above table, peak vehicle requirement is calculated. Then, the necessary fleet is estimated taking into account a spare of 10% for maintenance and breakdown.

Table 9.8.8 Peak Vehicle Requirement and Necessary Fleet

Route		2023		2018	
No.	Name	Peak Vehicle Requirement	Necessary Fleet	Peak Vehicle Requirement	Necessary Fleet
D1	Natete Route	11	12	12	13
D2	Munyonyo Route (A)	77	85	66	73
D3	Munyonyo Route (B)	25	28	13	14
D4	Sentema Route	3	4	Not yet operated	
D5	Kiwatule Route	63	69	〃	
D6	Kigowa Route	46	51	〃	

Source: JICA Study Team

(2) Effect to Road Traffic

In this section, effect of the shift from minibus to large bus is calculated and the effect to the road is clarified. The calculation is done on all six routes.

Firstly, assuming passengers are carried by minibus, the total number of minibus and large bus (both in pcu) are calculated by applying 10 passengers for a minibus and 46.8 passengers for a large bus.

Table 9.8.9 Comparison of Number of Minibus and Large Bus on Large Bus Routes (2023)

(Assuming passengers are carried by minibus)

Total number of large bus on 6 routes	pcu Conversion factor	Total number of large bus in pcu	Total number of minibus on 6 routes	pcu Conversion factor	Total number of minibus in pcu
5,573	2.40	13,375	26,054	1.15	29,962

Source: JICA Study Team

The decreased number of vehicles on bus routes and its effect to road traffic and road capacity are shown in the following table.

Table 9.8.10 Effect to Road traffic by Introduction of Large Bus

Decreased number of vehicles in pcu (a)	Forecasted traffic volume on large bus routes in pcu (b)	Reduction rate to traffic volume (a/b)	Road capacity of large bus routes in pcu (c)	Reduction rate to road capacity (a/c)
16,587	117,900	0.141	148,000	0.112

Source: JICA Study Team

Based on the calculation, it is noted that the introduction of large bus cannot change the traffic condition drastically. But considering the congestion in GKMA, the introduction of large bus is one of the necessary efforts to alleviate congestion.

9.8.2 FINANCIAL ANALYSIS

In order to clarify the necessary measure for stable large bus operation that meets the passengers' demand, financial analysis is conducted by two methods in this section.

- **Financial analysis**: Balance sheet of all six bus routes is estimated for a single year and effective measures for improving the financial condition are proposed.
- **Estimation of financial internal rate of return (IRR)**: Effectiveness of the proposed measures is verified by estimation of financial IRR.

(1) Financial Analysis

1) Items for Analysis

Based on the frequency and fleet by operation plan, financial analysis for the six large bus routes is conducted. Base year of the analysis corresponds to the commencement year of the routes and in this section, calculation is conducted for a single year.

Natete Route, Munyonyo Route (A), Munyonyo Route (B): 2018
Sentema Route, Kulambiro Route (A), Kulambiro Route (B): 2023

Financial items for the analysis are shown in Table 9.8.11.

Table 9.8.11 Items for Financial Analysis

Operating Revenue	
Operating Receipts	Receipt by regular operation
Operation Costs and Expenses	
Variable Costs	・Fuel ・Tire ・Spare parts ・License and insurance
Fixed Costs	・Staff Costs ・Rent for bus depot, office
Administrative Costs	Water, electricity, office supplies, building maintenance, etc.
Refund	Refund for loan of bus body
Tax	
Tax	Income Tax

Source: JICA Study Team

2) Estimation Method for Financial Items

Estimation of financial items described in the previous table is conducted following the operation plan. Applied indices are surmised referring to the Final Report of BRT pre-feasibility studies and the financial statements of public bus organizations in adjacent countries such as Rwanda and Burundi. The following table shows the indices and methods for the estimation of the financial items.

Table 9.8.12 Estimation Method for Financial Items

Operating Revenue		
	Operating Receipts	120 shillings per kilometer, base fare of 500 shillings, leakage of 10%
Operation Costs and Expenses		
	Variable costs	
	Fuel	Consumption of 0.35 L/km for total running distance, fuel cost of USD 1 /L
	Tire	USD 0.04 /km of total running distance
	Spare parts	USD 0.125/km of running distance
	License and insurance	USD 2,400 per year per vehicle including KCC trading license, TLB PSV license and comprehensive insurance
	Fixed costs	
	Driver	2 shifts for 16 hour operation and reserves for change, 500,000 shillings per month
	Service staff	Equivalent to number of drivers, 250,000 shillings per month
	Maintenance staff	0.3 person per vehicle, 400,000 shillings per month
	Office staff	0.6 person per vehicle, 350,000 shillings per month
	Manager	1 person for a company, 750,000 shillings per month
	Rent for bus depot	105 ㎡ per vehicle
	Rent for office	10 ㎡ per office staff
	Administrative costs	Equivalent to fixed costs
Refund		
	Bus body	USD 67,700 per vehicle including transport from Mombasa to Kampala, 55 seats diesel bus, 2009 model
	Import tax	49% of bus body
	Loan	22% interest rate, 8 years of operation life
Income Tax		30% of income, interest for borrowed money is allowable

Source: JICA Study Team

Summary of the elements for the calculation is shown in the following table. The detailed method is shown in the annex.

Table 9.8.13 Major Items for Calculation (Base Case)

No.	D1	D2	D3	D4	D5	D6
Route Name	Natete Route	Munyonyo Route (A)	Munyonyo Route (B)	Sentema Route	Kiwatule Route	Kigowa Route
Base year	2018			2023		
Fleet	13	73	14	4	69	51
Annual running distance ('000 km)	923	5,291	1,080	249	5,397	3,940
Number of drivers	37	214	37	10	178	132
Number of service staff	37	214	37	10	178	132
Number of maintenance staff	4	22	4	1	21	15
Number of office staff	9	45	9	3	42	32
Total staff	87	495	87	24	419	311
Base fare (shillings)	500					
Fare from city center to terminal (shillings)	1,000	900	1,300	900	1,400	1,300

Source: JICA Study Team

3) Balance Sheet

Two measures are considered for the improvement of financial condition of bus operation. One is to ease the tax burden and the other is to increase the fare. Balance sheets of the following three cases are calculated in consideration of these measures.

Case	Condition
Base Case (Case 1)	Current import tax, current minibus fare level
Case 2	Import tax exemption, current minibus fare level
Case 3	Import tax exemption, raising fare

a) Base Case (Case 1):

Condition for calculation:

- Bus fare is at the level of present minibus fare, 120 shillings per kilometer.
- Base fare is 500 shillings according to the fare frequency of present minibus.
- Taxes are based on the laws of Uganda.

Table 9.8.14 Financial Analysis for Base Case (Case 1)

No.	D1	D2	D3	D4	D5	D6
Route Name	Natete Route	Munyonyo Route (A)	Munyonyo Route (B)	Sentema Route	Kiwatule Route	Kigowa Route
Base year	2018			2023		
Operating Revenue						
Operating Receipts	1,382	8,303	1,466	391	7,288	5,413
Operation Costs and Expenses						
Variable cost	507	2,900	590	138	2,945	2,151
Fixed cost	197	1,097	197	57	939	699
Administrative cost	197	1,097	197	57	939	699
Refund	359	2,018	387	83	1,907	1,410
Total Expenses	1,261	7,112	1,372	335	6,731	4,960
Income	122	1,191	94	56	557	454
Income Tax	-	25	-	3	-	-
Net Profit	122	1,165	94	52	557	454
Profit Rate (Profit/Revenue)	8.9%	14.0%	6.4%	13.5%	7.6%	8.4%

Unit: thousand USD Source: JICA Study Team

Result of Calculation:

Profit rate varies among the large bus routes. Variation of profit rate is affected by the operation efficiency (Table 9.8.7). Low efficiency route requires additional fleet which becomes a burden for finance. As a whole, profit rates of all the bus routes are too low to attract investors' interest in the large bus business.

b) Import Tax Exemption (Case 2):

Condition for calculation:

- Bus fare is the same level as Base Case (Case 1)
- Since the cost for the bus fleet affects financial condition, import duty (25%) among other import taxes will be exempted to lessen the cost for leasing large bus.

Table 9.8.15 Financial Analysis for Case 2

No.	D1	D2	D3	D4	D5	D6
Name	Natete Route	Munyonyo Route (A)	Munyonyo Route (B)	Sentema Route	Kiwatule Route	Kigowa Route
Base year	2018			2023		
Operating Revenue						
Operating Receipts	1,382	8,303	1,466	391	7,288	5,413
Operation Costs and Expenses						
Variable cost	507	2,900	590	138	2,945	2,151
Fixed cost	197	1,097	197	57	939	699
Administrative cost	197	1,097	197	57	939	699
Refund	164	923	177	69	1,593	1,177
Total Expenses	1,200	6,779	1,307	321	6,416	4,727
Income	182	1,523	158	70	872	686
Income Tax	5	180	-	9	-	13
Net Profit	176	1,343	158	60	872	674
Profit Rate (Profit/Revenue)	12.8%	16.2%	10.8%	15.4%	12.0%	12.4%

Unit: thousand USD Source: JICA Study Team

Result of Calculation:

The profit rates of all the bus routes are improved but are still low to attract investors' interest in the large bus business.

c) Raising Fare (Case 3):

Condition for calculation

- Since large bus operation gives passengers additional services compared with present minibus, bus fare is raised by 10%.
- Base fare is 600 shillings following the raising of bus fare.
- Import duty (25%) is also exempted as in Case 2.

Table 9.8.16 Financial Analysis for Base Case (Case 3)

No.	D1	D2	D3	D4	D5	D6
Name	Natete Route	Munyonyo Route (A)	Munyonyo Route (B)	Sentema Route	Kiwatule Route	Kigowa Route
Base year	2018			2023		
Operating Revenue						
Operating Receipts	1,554	9,539	1,634	440	8,123	6,045
Operation Costs and Expenses						
Variable cost	507	2,900	590	138	2,945	2,151
Fixed cost	197	1,097	197	57	939	699
Administrative cost	197	1,097	197	57	939	699
Refund	164	923	177	69	1,593	1,177
Total Expenses	1,200	6,779	1,307	321	6,416	4,727
Income	353	2,580	327	119	1,706	1,318
Income Tax	56	497	45	25	250	202
Net Profit	296	2,083	282	95	1,456	1,116
Profit Rate (Profit/Revenue)	19.1%	22.3%	17.2%	21.5%	17.9%	18.5%

Unit: thousand USD Source: JICA Study Team

Result of Calculation:

The profit rates of all the bus routes reach more than 15%. But even at this rate, large bus business has some risk for the investors to invest. Therefore, additional assistance by the government is necessary.

4) Proposals for Improvement of Financial Condition

Through the analysis, it is clarified that large bus business cannot operate stably without assistance from the government. The following measures are proposed:

a) Import tax exemption for the large bus body is at least a necessary measure for the bus entities.

b) In addition to import tax exemption, funds with low interest rate through government financing are expected for the bus entities.

c) For the routes with low efficiency of bus operation, different fare system shall be introduced.

(2) Estimation of Financial IRR (Munyonyo Route)

Following the conclusion of the financial analysis, financial IRR is analyzed to verify the effectiveness of the proposed measures. To this end, Munyonyo Route (A) is selected for the analysis.

1) Precondition

In the analysis, the following items are supposed to be the basic preconditions:

- Tax: Import tax exemption is the basic condition for the analysis.
- Traffic increase: Annual traffic increase rate from 2010 is 1.51% based on the traffic demand forecast.
- Analysis period is eight years according to the operation life of large bus.
- Price index: According to the composite consumer price index from the Statistical Abstract of Uganda Bureau of Statistics, annual price index is set to be 9.37%, which is the average of all items from 2004 to 2008.
- Fare raising: 7.36% is applied as the annual large bus fare increase rate which is also based on the transport and communication price index from the Statistical Abstract

Table 9.8.17 Composite Consumer Price Index, Uganda (Base 2005/06=100)

	All Items	Transport and Communication
2004	89.2	87.7
2005	96.9	95.1
2006	103.9	104.5
2007	110.2	111.1
2008	123.5	122.2
2009	139.6	125.1
Average annual % change	9.37%	7.36%

Source: Uganda Bureau of Statistics

The assumed cases for analysis are shown in the next table. Lending interest rate in Case 1 is assumed at 22% based on the present lending rate. It is set to be 17% in Case 2, presuming the establishment of the fund for the bus business as proposed in the previous section. In both Case 1 and Case 2, three cases with different levels of bus fare are examined. Case A involves the present minibus level, Case B involves a 5% increase from the minibus level and Case C involves a 10% increase from the minibus level.

Table 9.8.18 Cases for IRR Estimation

	Lending Interest Rate	Fare
Case 1-A	22%	Present minibus level
Case 1-B	22%	5% increase from minibus level
Case 1-C	22%	10% increase from minibus level
Case 2-A	17%	Present minibus level
Case 2-B	17%	5% increase from minibus level
Case 2-C	17%	10% increase from minibus level

Source: JICA Study Team

2) Result of Calculation

The following table shows the result of financial IRR estimation. In Case 1-C and Case 2-C, IRR rates exceed more than 10%. It is verified that both measures of reduction of interest rate and raising fare are effective to improve the financial condition of bus operating entities.

Table 9.8.19 Result of IRR Estimation in Six Cases

	Condition		Financial IRR
	Interest rate	Supposed average fare per person in UGX	
Case 1-A	22%	676	-11.9%
Case 1-B	22%	719	3.1%
Case 1-C	22%	762	13.0%
Case 2-A	17%	676	-5.0%
Case 2-B	17%	719	7.4%
Case 2-C	17%	762	16.5%

Source: JICA Study Team

The following tables show the financial balance in every year of the analysis period for the six cases.

Table 9.8.20 Financial Structure of Case 1-A

	Operating Revenue	Operation Cost	Refund	Income	Income Tax	Net Profit	Profit rate
Initial investment	-12,485						
2018	14,657	10,430	3,450	777	233	544	3.7%
2019	15,973	11,562	3,501	910	273	637	4.0%
2020	17,408	12,836	3,558	1,014	304	710	4.1%
2021	18,971	14,322	3,682	967	290	677	3.6%
2022	20,675	15,897	3,749	1,029	309	720	3.5%
2023	22,532	17,552	3,749	1,231	369	862	3.8%
2024	24,556	19,574	3,911	1,071	321	750	3.1%
2025	26,761	21,719	3,999	1,042	313	730	2.7%
2026	29,164	24,116	4,193	856	257	599	2.1%

Unit: thousand USD

Table 9.8.21 Financial Structure of Case 1-B

	Operating Revenue	Operation Cost	Refund	Income	Income Tax	Net Profit	Profit rate
Initial investment	-12,485						
2018	15,584	10,430	3,450	1,704	511	1,193	7.7%
2019	16,983	11,562	3,501	1,920	576	1,344	7.9%
2020	18,509	12,836	3,558	2,115	634	1,480	8.0%
2021	20,171	14,322	3,682	2,167	650	1,517	7.5%
2022	21,983	15,897	3,749	2,337	701	1,636	7.4%
2023	23,957	17,552	3,749	2,656	797	1,859	7.8%
2024	26,108	19,574	3,911	2,624	787	1,837	7.0%
2025	28,453	21,719	3,999	2,735	820	1,914	6.7%
2026	31,009	24,116	4,193	2,700	810	1,890	6.1%

Unit: thousand USD

Table 9.8.22 Financial Structure of Case 1-C

	Operating Revenue	Operation Cost	Refund	Income	Income Tax	Net Profit	Profit rate
Initial investment	-12,485						
2018	16,511	10,430	3,450	2,631	789	1,842	11.2%
2019	17,994	11,562	3,501	2,930	879	2,051	11.4%
2020	19,610	12,836	3,558	3,215	965	2,251	11.5%
2021	21,371	14,322	3,682	3,367	1,010	2,357	11.0%
2022	23,290	15,897	3,749	3,644	1,093	2,551	11.0%
2023	25,382	17,552	3,749	4,081	1,224	2,857	11.3%
2024	27,661	19,574	3,911	4,177	1,253	2,924	10.6%
2025	30,146	21,719	3,999	4,427	1,328	3,099	10.3%
2026	32,853	24,116	4,193	4,545	1,363	3,181	9.7%

Unit: thousand USD
Source: JICA Study Team

Table 9.8.23 Financial Structure of Case 2-A

	Operating Revenue	Operation Cost	Refund	Income	Income Tax	Net Profit	Profit rate
Initial investment	-12,485						
2018	14,657	10,430	2,968	1,260	378	882	6.0%
2019	15,973	11,562	3,012	1,399	420	980	6.1%
2020	17,408	12,836	3,061	1,511	453	1,058	6.1%
2021	18,971	14,322	3,167	1,482	445	1,037	5.5%
2022	20,675	15,897	3,225	1,553	466	1,087	5.3%
2023	22,532	17,552	3,225	1,755	527	1,229	5.5%
2024	24,556	19,574	3,364	1,618	485	1,132	4.6%
2025	26,761	21,719	3,441	1,601	480	1,121	4.2%
2026	29,164	24,116	3,607	1,442	433	1,009	3.5%

Unit: thousand USD

Table 9.8.24 Financial Structure of Case 2-B

	Operating Revenue	Operation Cost	Refund	Income	Income Tax	Net Profit	Profit rate
Initial investment	-12,485						
2018	15,584	10,430	2,968	2,186	656	1,530	9.8%
2019	16,983	11,562	3,012	2,410	723	1,687	9.9%
2020	18,509	12,836	3,061	2,612	784	1,828	9.9%
2021	20,171	14,322	3,167	2,682	804	1,877	9.3%
2022	21,983	15,897	3,225	2,861	858	2,002	9.1%
2023	23,957	17,552	3,225	3,180	954	2,226	9.3%
2024	26,108	19,574	3,364	3,170	951	2,219	8.5%
2025	28,453	21,719	3,441	3,293	988	2,305	8.1%
2026	31,009	24,116	3,607	3,286	986	2,300	7.4%

Unit: thousand USD

Table 9.8.25 Financial Structure of Case 2-C

	Operating Revenue	Operation Cost	Refund	Income	Income Tax	Net Profit	Profit rate
Initial investment	-12,485						
2018	16,511	10,430	2,968	3,113	934	2,179	13.2%
2019	17,994	11,562	3,012	3,420	1,026	2,394	13.3%
2020	19,610	12,836	3,061	3,713	1,114	2,599	13.3%
2021	21,371	14,322	3,167	3,881	1,164	2,717	12.7%
2022	23,290	15,897	3,225	4,168	1,250	2,918	12.5%
2023	25,382	17,552	3,225	4,605	1,381	3,223	12.7%
2024	27,661	19,574	3,364	4,723	1,417	3,306	12.0%
2025	30,146	21,719	3,441	4,986	1,496	3,490	11.6%
2026	32,853	24,116	3,607	5,130	1,539	3,591	10.9%

Unit: thousand USD
Source: JICA Study Team

(3) Conclusions

According to the financial analysis and estimation of IRR, the following conclusions are derived:

a) Bus business cannot operate stably without assistance from the government.

b) Necessary measures by the government to support large bus industries are:

- Import tax exemption for the large bus body
- Establishment of funds with low interest rate through government financing for the bus operating entities.

c) Measures to be tackled by bus operating industries are:

- It is reasonable to raise the fare from the minibus level because large bus system provides higher service level such as fixed time, fixed route and fixed fare.
- But it is also necessary to make efforts toward provision of refined and comfortable services

for passengers.

- Application of proper fare system is necessary to keep the profitability of bus routes where passenger demand is less.
- It is necessary to gain additional income through various measures such as attaching advertisements outside and inside bus body like those introduced in developed countries.

Figure 9.8.2 Advertisement on Bus Body in Japan

9.9 INFRASTRUCTURE PLAN

9.9.1 BUS TERMINALS

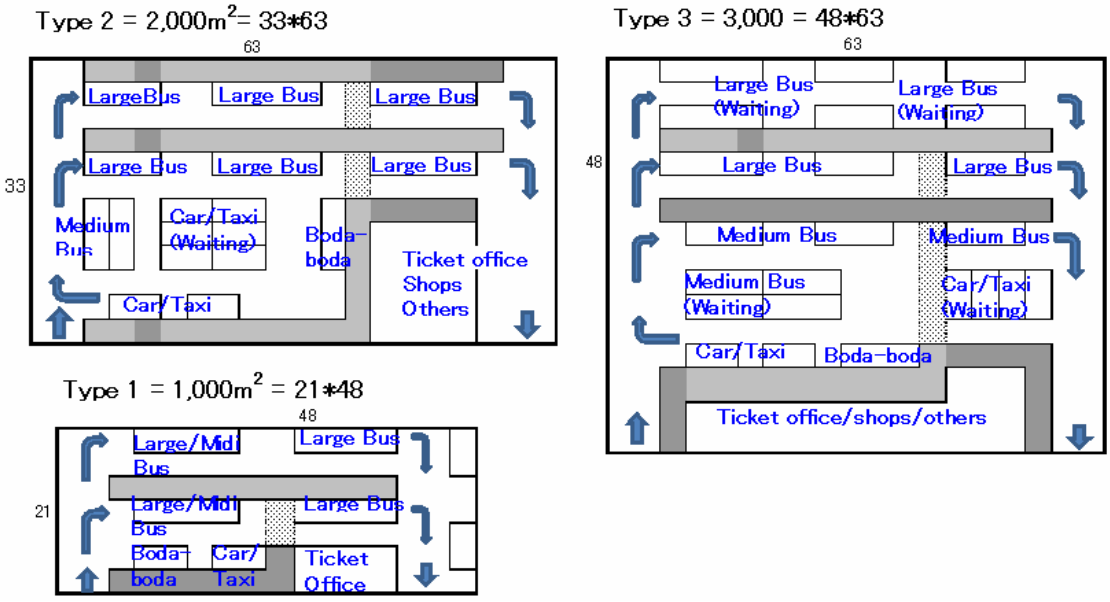
The required areas for facilities for large bus terminals and medium bus terminals are estimated based on the same procedure in the estimation of IUBT facilities. Table 9.9.1 shows the future transit passenger demand of the main transport and access transport. The number of lay-by and parking facilities required for peak hour transport in each terminal is also shown in the table. 4.5% of the daily demand is applied for peak hour rate. Expected modal share of access transport mode is also shown in Table 9.9.1.

As a result, Masanafu, Munyonyo and City Center terminals are to be small size terminals (Type 1) with a required area of 1,000m2, Kiwatule, Kigowa and Natete terminals are to be medium size terminals (Type 2) with a required area of 2,000 m^2, and Luafu terminal is to be a large size terminal (Type 3) with a required area of 3,000m2 as shown in Table 9.9.1. Typical layout plan for small and medium size terminals are shown in Figure 9.9.1.

Table 9.9.1 Estimation of Required Bus Terminal Facilities

Name of Bus terminals	Name/No. of Bus Route	Items	2023 main mode demand	2023 Access Traffic demand				Terminal area m^2 /Terminal Type
				Medium Bus	Car/Taxi	Boda-boda	Walk	
Calculation Index		Peak hour rate	4.5%	4.5%	4.5%	4.5%	4.5%	
		Passenger capacity per vehicle	60	29	2	1	1	
		Necessary time for on/off boarding per berth (min)	5	5	1	0.5	0	
		Unit berth area per vehicle m^2	150	150	100	10	0	
		Unit parking area per vehicle m^2	150	100	50	5	0	
Masanafu	Sentema Route/ D4	Daily passenger demand (thousand)	4.0	3.2	0.2	0.2	0.4	1,000/ Terminal Type 1
		Modal share		80%	5%	5%	10%	
		No. of departure in peak hour	3	5	5	9	18	
		Operation interval (min)	20.0	12.1	13.3	6.7	0.0	
		Necessary number of berth/lay-by	2	2	0	0	0	
		Park rate (2 times of departure)	1.33	0.81	0.03	0.02	0.00	
		No. of parking vehicles	0	0	0	0	0	
		Berth area and park area m^2 (A)	300	300	15	1.5	0	
		Total terminal area m^2 (A×1.5)	450	450	23	2	0	
Kiwatule	Kiwatule Route/ D5	Daily passenger demand (thousand)	10	8.0	0.5	0.5	1.0	2,000/ Terminal Type 2
		Modal share		80%	5%	5%	10%	
		No. of departure in peak hour	8	12	11	23	45	
		Operation interval (min)	8.0	4.8	5.3	2.7	0.0	
		Necessary number of berth/lay-by	2	2	0	0	0	
		Park rate (2 times of departure)	0.53	0.32	0.07	0.02	0.00	
		No. of parking vehicles	2	1	1	0	0	
		Berth area and park area m^2 (A)	600	400	75	3.75	0	
		Total terminal area m^2 (A×1.5)	900	600	113	6	0	
Kigowa	Kigowa Route/ D6	Daily passenger demand (thousand)	2	1.6	0.1	0.1	0.2	2,000/ Terminal type 2
		Modal share		80%	5%	5%	10%	
		No. of departure in peak hour	1.5	2.5	2.3	4.5	9.0	
		Operation interval (min)	40.0	24.2	26.7	13.3	0.0	
		Necessary number of berth/lay-by	2	2	0	0	0	
		Park rate (2 times of departure)	2.67	1.61	0.07	0.02	0.00	
		No. of parking vehicles	2	0	0	0	0	
		Berth area and park area m^2 (A)	600	300	15	0.75	0	
		Total terminal area m^2 (A×1.5)	900	450	23	1	0	
Munyonyo	Mnyonyo Route B / D3	Daily passenger demand (thousand)	6	0.0	0.0	0.6	5.4	1,000/ Terminal Type 1
		Modal share		0%	0%	10%	90%	
		No. of departure in peak hour	4.5	0.0	0.0	27.0	243.0	
		Operation interval (min)	13.3	0.0	0.0	2.2	0.0	
		Necessary number of berth/lay-by	2	0	0	0	0	
		Park rate (2 times of departure)	0.89	0.00	0.00	0.02	0.00	
		No. of parking vehicles	0	0	0	0	0	
		Berth area and park area m^2 (A)	300	0	0	4.5	0	
		Total terminal area m^2 (A×1.5)	450	0	0	7	0	
City Center	Sentema Route/ D4 and Natete Route / D1	Daily passenger demand (thousand)	19	0.0	0.0	1.9	17.1	1,000/ Terminal Type 1
		Modal share		0%	0%	10%	90%	
		No. of departure in peak hour	14.3	0.0	0.0	85.5	769.5	
		Operation interval (min)	4.2	0.0	0.0	0.7	0.0	
		Necessary number of berth/lay-by	2	0	0	1	0	
		Park rate (2 times of departure)	0.28	0.00	0.00	0.02	0.00	
		No. of parking vehicles	1	0	0	1	0	
		Berth area and park area m^2 (A)	450	0	0	14.25	0	
		Total terminal area m^2 (A×1.5)	675	0	0	21	0	
Luafu	Mnyonyo Route A/ D2	Daily passenger demand (thousand)	22.8	2.3	0.0	2.3	18.2	3,000/ Terminal Type 3
		Modal share		10%	0%	10%	80%	
		No. of departure in peak hour	17.1	3.5	0.0	102.6	820.8	
		Operation interval (min)	3.5	17.0	0.0	0.6	0.0	
		Necessary number of berth/lay-by	6	1	0	1	0	
		Park rate (2 times of departure)	0.70	0.57	0.00	0.02	0.00	
		No. of parking vehicles	2	0	0	2	0	
		Berth area and park area m^2 (A)	1200	150	0	17.1	0	
		Total terminal area m^2 (A×1.5)	1,800	225	0	26	0	
Natete	Natete Route/ D1	Daily passenger demand (thousand)	12	7.2	0.6	0.6	3.6	2,000/ Terminal Type 2
		Modal share		60%	5%	5%	30%	
		No. of departure in peak hour	9.0	11.2	13.5	27.0	162.0	
		Operation interval (min)	6.7	5.4	4.4	2.2	0.0	
		Necessary number of berth/lay-by	2	2	0	0	0	
		Park rate (2 times of departure)	0.44	0.36	0.07	0.02	0.00	
		No. of parking vehicles	1	1	1	0	0	
		Berth area and park area m^2 (A)	450	400	90	4.5	0	
		Total terminal area m^2 (A×1.5)	675	600	135	7	0	

Source: JICA Study Team



Source: JICA Study Team

Figure 9.9.1 Typical Layout Plan of Bus Terminals

The construction costs of the bus terminals have been estimated as shown in Table 9.9.2. The required cost varies from UShs1.3 billion (USD 0.6 million) for small terminal of Type 1 (1,000 m^2) to UShs 2.8 billion (USD 1.3 million) for medium size terminal of Type 3 (3,000 m^2). The total construction cost for the large and medium bus terminals will amount to UShs13.7 billion shillings (USD 6.2 million).

The implementation period of each bus terminal will be determined taking into account the implementation period of the large bus route and the medium bus route as shown in Section 9.6.

Table 9.9.2 Construction Cost of Bus Terminals

(unit: milion shs)

Name of Terminal	Masanafu	Kiwatule	Kigowa	Munyonyo	City Center	Luafu	Natete	Grand Total
Name/ No. of Nus Route	Sentema Route/ D4	Kiwatule Route/ D5	Kigowa Route/ D6	Munyonyo B/ D3	Sentema & Natete/ D4, D1	Munyonyo A/ D2	Natete Route/ D1	
Type of Terminal	Type 1	Type 2	Type 2	Type 1	Type 1	Type 3	Type 2	
Land & House Compensation Cost	511	912	912	511	511	1,032	912	5,301
Land reclamation & Road Pavement	90	172	172	90	90	321	172	1,106
foot walk pavement	18	51	51	18	18	71	51	280
drainage & Curbe	96	156	156	96	96	263	156	1,021
streat light	55	131	131	55	55	180	131	738
maintenance office,Toilet, waiting room	88	141	141	88	88	301	141	990
fence	317	442	442	317	317	255	442	2,532
bus lay by	44	99	99	44	44	132	99	561
shops	82	218	218	82	82	272	218	1,170
water suply	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4
Grand total (mil shs)	1,302	2,323	2,323	1,302	1,302	2,828	2,323	13,703
Grand total (000 USD)	592	1,056	1,056	592	592	1,286	1,056	6,229

Source: JICA Study Team

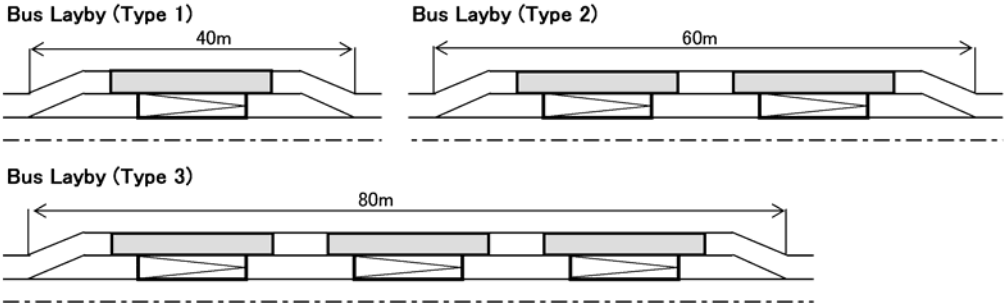
9.9.2 BUS LAY-BY

Bus lay-by is a basic facility for the stable operation of bus transport. Approximate interval of lay-by will be around 400-500 m. The detailed location of each bus lay-by shall depend on the detailed condition of the route. Typical size of bus lay-by is assumed from the amount of passenger demand in each bus route as shown in Table 9.9.3.

Table 9.9.3 Typical Bus Lay-by by Passenger Demand of Bus Route

Future passenger demand		Bus	Peak Bus	Bus head	Average	Number	Type of
daily demand	peak demand	Capacity	departure		Stopping time	of layby	Lay-by
thousand/day	thousand/hour	men/bus	bus/hour	min/depart	min/stop	Number	
10	0.5	60	8	8	0.66	1	Type 1
20	0.9	60	15	4	0.66	1	Type 1
50	2.3	60	38	1.6	0.66	1	Type 1
100	4.5	60	75	0.8	0.66	2	Type 2
200	9.0	60	150	0.4	0.66	3	Type 2
300	13.5	60	225	0.3	0.66	3	Type 3

Source: JICA Study Team



Source: JICA Study Team

Figure 9.9.2 Typical Layout Plan of Bus Lay-by

Based on the preconditions described above, Table 9.9.4 shows the total number of typical bus lay-by necessary for each bus route. The total construction cost is estimated to be UShs 6.5 billion (USD 3.0 million) excluding the Natete Road where the bus lay-bys are already improved.

Table 9.9.4 Total Number and Cost Required for Bus Lay-by Improvement Route

Route name	2023 Daily Passengers thousand/day	Type of Lay-by	Route Distance exclude BRT Route (km)	Number of bus lay-by	Unit Construction Cost (million shs)	Total Construction Cost (million shs)
Natete Route	12	Type 1	5.9	20	61	1,220
Munyonyo A	99	Type 2	3.8	10	90	900
Munyonyo B	21	Type 1	7.9	28	61	1,708
Sentema Route	4	Type 1	7.1	24	61	1,464
Kiwatule Route	54	Type 1	6.4	22	61	1,342
Kigowa Route	42	Type 1	5.6	18	61	1,098
Total	232	-	36.7	122	-	7,732

Source: JICA Study Team

9.9.3 BUS INFRASTRUCTURE IMPLEMENTATION PLAN

The total investment cost and schedule for public transport infrastructures including the IUBT have been estimated as shown in Table 9.9.5. The total amount is about UShs 68.9 billion (USD 31.3 million). The total amount is divided into two phases, i.e., UShs 51.5 billion (USD 23.4 million) will be invested in the medium-term period from 2014 to 2018 and the UShs 17.4 billion (USD 7.9 million) will be invested in the long term period by 2023.

Compared to the total amount of USD 1,380.4 million for the NTMP/GKMA from 2008 to 2023, the expected total amount of bus infrastructures in the GKMA occupies 2.3% of the NTMP/GKMA total amount. The investment in bus infrastructure plays the most important role among the national transport items in terms of mass passenger transport for both inter-urban and intra-urban transportation.

Table 9.9.5 Total Investment Cost for Public Transport Infrastructures

Middle Term/Long Term		Middle Term Period							Long Term Period						
Type of Facility		Intra-urban Bus Facility					Inter-urban Bus Terminal			Intra-urban Bus Facility					Inter-urban Bus Terminal		
		Bus Terminal			Bus Lay-by					Bus Terminal			Bus Lay-by				
		Location	Type	Cost (million shillings)	Type	Cost (million shillings)	Location	Type	Cost (million shillings)	Location	Type	Cost (million shillings)	Type	Cost (million shillings)	Location	Type	Cost (million shillings)
(1) Intra-urban Bus Operation Route																	
D1: Natete Route		Natete	Type 2	2,323	Type 1	1,220											
D2: Munyonyo Route (A)		Luzfu	Type 3	2,828	Type 2	900											
D3: Munyonyo Route (B)		Munyonyo	Type 1	1,302	Type 1	1,684											
D4: Santama Route										Masanafu	Type 1	1,302	Type 1	1,488			
D5: Kiwaatule Route										Kiwaatule	Type 2	2,323	Type 1	1,318			
D6: Kigowa Route										Kigowa	Type 2	2,323	Type 1	1,122			
D1: Natete & D4: Santama		City Center	Type 1	1,302													
(2) Inter-urban Bus Operation Route																	
East Bound	Terminal						Kireka	Type 4	3,842								
	Market							Type 2	9,012								
North Bound	Terminal						Kawempe	Type 4	3,842								
	Market							Type 2	9,012								
West Bound	Terminal														Nalweru	Type 2	2,323
	Market															Type 1	5,186
Southwest Bound	Terminal						Busega	Type 5	6,378								
	Market							Type 2	9,012								
Total in million shillings				7,755		3,804			41,098			5,948		3,928			7,509
				52,657								17,385					
Total in million USD				3.5		1.7			18.7			2.7		1.8			3.4
				23.9								7.9					

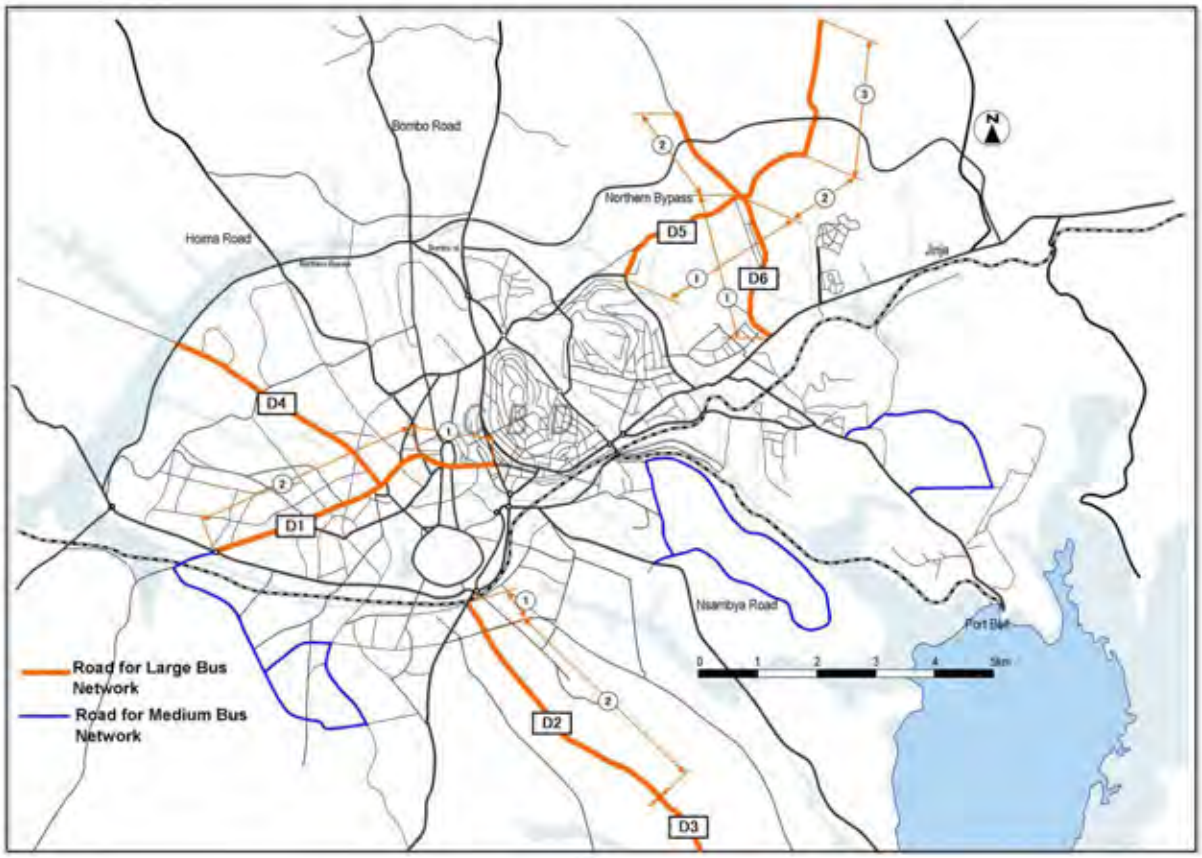
Source: JICA Study Team

9.9.4 ROAD IMPROVEMENT FOR LARGE BUS OPERATION

In this section, in order to compose the large bus network in harmony with the general traffic, roads for the operation of large bus are evaluated and necessary measures to enhance smooth operation of large buses are proposed. Necessary investment cost for the improvement is included I NTMP/GKMA.

1) Target Roads

Target roads for evaluation and proposal are the roads on which large buses will be operated. However, the roads which will be improved for the installation of the BRT network are excluded.



Source: JICA Study Team

Figure 9.9.3 Target Roads for Evaluation and Proposal

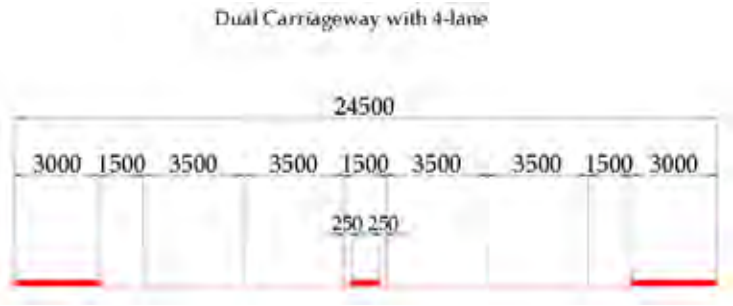
2) Evaluation and Proposal

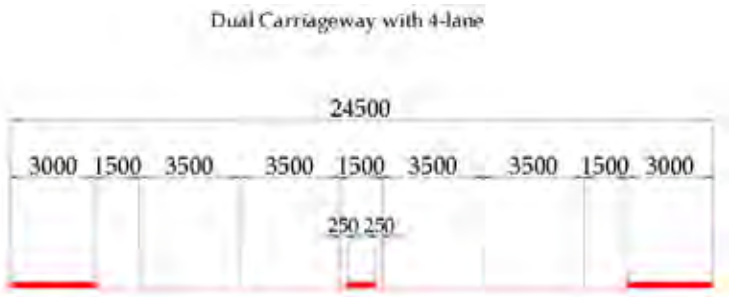
a) D1: Natete Route

D1-1	
Present traffic volume	Heavy (Survey not conducted) Great number of minibuses queuing to enter into small taxi park
Future traffic volume	2018 19,600－30,100
	2023 17,800－31,600
Surface condition	Partially deteriorated
Road width	Total: 12-14 m Carriageway: 5-7 m
Gradients	Flat
Roadside land use	Office, commercial Old taxi park at the beginning point
View	 
Problem and issue	- Future traffic volume exceeds the road capacity. - Long queue of minibuses waiting to enter into taxi park.
Proposed improvements	- Since this road is one of the trunk roads within the city center, improvement of the road shall be analyzed in the context of the improvement of whole network within the city center. - Improvement of taxi park is proposed in the infrastructure plan for public transport.

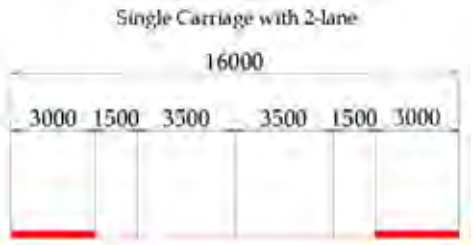
D1-2	
Present traffic volume	11,958 vehicle/12hr. (Jan, 2010, JICA Study Team exclusive of motorcycle)
Future traffic volume	2018 19,300－29,100
	2023 12,600－22,100
Surface condition	Good
Road width	Total: 12-15 m Carriageway: 6-7 m
Gradients	Steep almost all the way
Roadside land use	Residential, office
View	 
Problem and issue	- Future traffic demand exceeds road capacity. - BRT route development on Masaka Road will decrease the traffic demand, but effect is not still clear.
Proposed improvement	- This road was developed through Japanese grant aid in April 2004. - Improvement in the long long-term is proposed

b) D2: Munyonyo Route (A)

D2-1	
Present traffic volume	Heavy (Survey not conducted)
Future traffic volume	2018 ¦ 15,700
	2023 ¦ 20,900
Surface condition	Good
Road width	Total: 12-13 m Carriageway: 5 m
Gradients	Flat
Roadside land use	Commercial
View	 
Problem and issue	- Traffic jam at the crossing with the Entebbe Road. - Kibue Junction near the crossing is one of the major congested points in Kampala. - No trunk road in the area between Entebbe Road and Gaba Road - Future traffic demand exceeds capacity.
Proposed improvements	- Improvement of Kibue Junction is proposed in this study. - In the long-term, trunk road covering the area between Entebbe Road and Gaba Road is required. - Improvement method for the whole area shall be subject to further study.
Cross section to be introduced	

D2-2	
Present traffic volume	Heavy (Survey not conducted)
Future traffic volume	2018 ¦ 11,500
	2023 ¦ 15,900
Surface condition	Good
Road width	Total: 10-12 m Carriageway: 5-6 m
Gradients	Small undulation
Roadside land use	Residential
View	 
Problem and issue	- No trunk road in the area between Entebbe Road and Gaba Road. - Future traffic demand exceeds capacity.
Proposal for improvement	- Road improvement method for the whole area shall be subject to further study.
Cross section to be introduced	

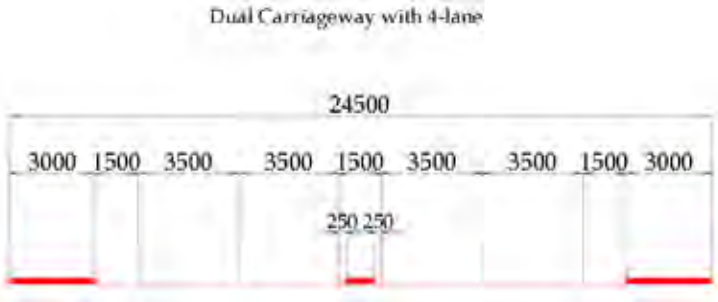
c) D3: Munyonyo Route (B)

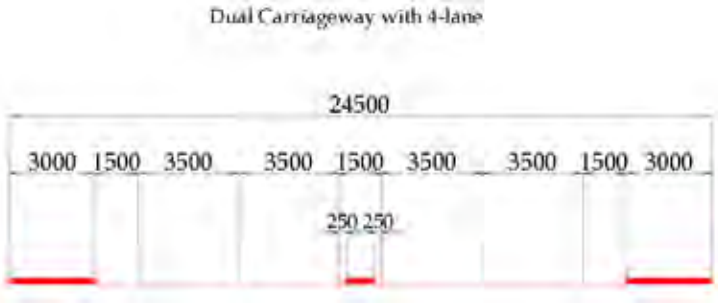
D3	
Present traffic volume	Light (Survey not conducted)
Future traffic volume	2018 | 2,000
	2023 | 3,400
Surface condition	Good
Road width	Total: 12-15 m Carriageway: 5-7 m
Gradients	Small undulation
Roadside land use	Residential, farm
View	 
Problem and issue	- Development along the road is foreseeable in the long term.
Proposed improvement	- Improvement by two lanes is required.
Cross section to be introduced	

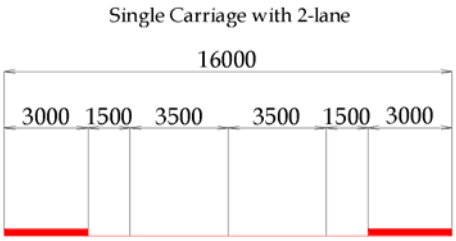
d) D4: Sentema Route

D4	
Present traffic volume	Light (Survey not conducted)
Future traffic volume	2018 | 8,400－10,800
	2023 | 3,700－6,6000
Surface condition	Partially deteriorated
Road width	Total: 6-9 m Carriageway: 4-5 m
Gradients	Steep all the way
Roadside land use	Residential, farm
View	 
Problem and issue	- Land use along the road is sparse because of poor condition of service road. - No trunk road is provided around the area.
Proposed improvements	- Development of trunk road is required to enhance development of the town along the road. - Different route shall be selected to avoid steep hills. - Development of two lane road is necessary.
Cross section to be introduced	

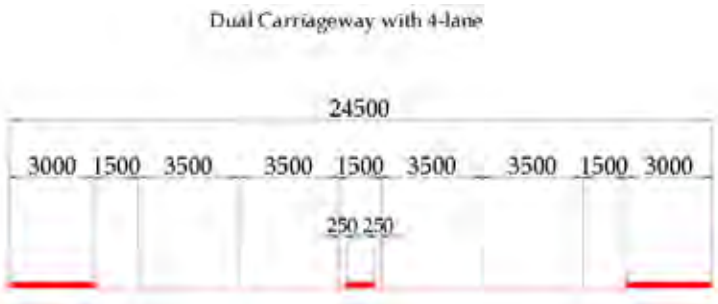
e) D5: Kiwatule Route

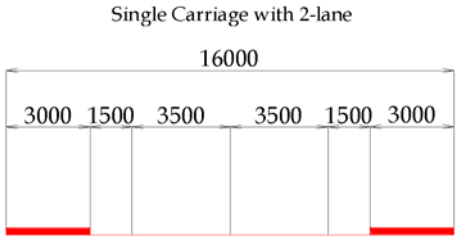
D5-1	
Present traffic volume	Heavy (Survey not conducted)
Future traffic volume	2018 | 15,000－18,600
	2023 | 23,200－26,200
Surface condition	Partially deteriorated
Road width	Total: 13-15 m Carriageway: 9-11 m
Gradients	Partially gentle slope
Roadside land use	Office, commercial
View	 
Problem and issue	- Future traffic demand exceeds capacity. - Parked vehicles on roadsides are hampering the traffic.
Proposal for improvement	- Development of four lane road is required.
Cross section to be introduced	

D5-2	
Present traffic volume	Heavy (Survey not conducted)
Future traffic volume	2018 ¦ 13,600
	2023 ¦ 21,700
Surface condition	Heavily deteriorated
Road width	Total: 10-14 m Carriageway: 6-8 m
Gradients	Partially steep
Roadside land use	Office, factory
View	 
Problem and issue	- Future traffic demand exceeds capacity. - Parked vehicles on roadsides are hampering the traffic.
Proposed improvement	- Development of four lane road is required.
Cross section to be introduced	

D5-3	
Present traffic volume	Light (Survey not conducted)
Future traffic volume	2018 ¦ 500
	2023 ¦ 5,800
Surface condition	Deteriorated
Road width	Total: 9-13 m Carriageway:
Gradients	Gentle slope
Roadside land use	Residential
View	 
Problem and issue	- Development along the road is foreseeable.
Proposed improvement	- Improvement by two lanes is required.
Cross section to be introduced	

f) D6: Kigowa Route

D6-1	
Present traffic volume	Heavy (Survey not conducted)
Future traffic volume	2018 12,800－18,800
	2023 28,200－22,100
Surface condition	Good
Road width	Total: 10-15 m Carriageway: 7-9 m
Gradients	Steep
Roadside land use	Generally residential, warehouse and factory at the beginning point
View	 
Problem and issue	- Future traffic demand exceeds capacity.
Proposed improvement	- Development by four lanes is required.
Cross section to be introduced	

D6-2	
Present traffic volume	Light (Survey not conducted)
Future traffic volume	2018 | 1,000－2,900
	2023 | 1,500－7,400
Surface condition	Partially deteriorated
Road width	Total: 10-14 m Carriageway: 6-8 m
Gradients	Gentle slope all the way
Roadside land use	Generally residential
View	 
Problem and issue	- Intersection with Kira Road is too narrow. - Parked vehicles and minibuses at the beginning point
Proposed improvement	- Improvement by two lanes is required. - Improvement of intersection is required.
Cross section to be introduced	

9.10 INVESTMENT PLAN

The following Table is a summary of the investment plan required to achieve the targets of the Public Transport Plan.

Table 9.10.1 Summary of Investment Plan

Description	Investment Cost (million Ushs)	
	Mid-term (2018)	Long-term(2023)
1. Procurement Cost of Large Bus		
Total (1)	22,112	27,400
2. Infraqstructure Cost for Large Bus Operation		
2-1 Bus Terminal Cost	7,755	5,948
2-2 Bus Lay-by	3,804	3,928
Total (2)	11,559	9,876
3. Inter-urban Bus Terminal (N. Bound, W. Bound, SW. Bound and E. Bound)		
Total (3)	41,098	7,509
Ground Total (1)+(2)+(3) (million Ushs)	74,769	44,785
Equivalent to Million USD	33.99	20.36

Source: JICA Study Team

9.11 INSTITUTION AND REGULATION

9.11.1 INSTITUTION AND REGULATION FOR INTRODUCTION OF LARGE BUS AND MEDIUM BUS

(1) Organization

1) Organization for Licensing

Currently, the TLB is the organization which licenses public service vehicle operation. The TLB is required to reinforce and strengthen its functions and staffs for the introduction of large bus and medium bus systems.

The BRT pre-feasibility studies proposed the Multi-sectoral Transport Regulatory Authority (MTRA) and Metropolitan Area Transport Authority (MATA) as the control bodies for transport. The ministry to control TLB will be reviewed if these institutions are realized.

2) Bus Fund

Establishment of fund is recommended to assist the bus operating entities. The government shall finance the fund or introduce an international financing partner for the fund.

Table 9.11.1 Necessary Fund for Large Bus

Route	D1	D2	D3	D4	D5	D6
	Natete Route	Munyonyo Route (A)	Munyonyo Route (B)	Sentema Route	Kiwatule Route	Kigowa Route
Implementation Term	2018			2013		
Necessary Fund (‘000 USD)	2,900	16,100	3,100	900	15,300	11,300
Term Total (‘000USD)	22,100			27,400		

In case import tax is not exempted, interest rate is 22%.
Source: JICA Study Team

3) Operator of Public Transport

Operating industries of large buses will be led to organize a few unified operation entities from the current large number of operators. Subsequently, it will become possible to adjust the integrated timetable.

As for the maintenance of buses, operator should make a contract with bus supplier for bus maintenance and the supplier shall appoint an adequate garage for repair and maintenance work.

4) Reinforcement of Public Transport Section in MoWT

In order to strengthen the organization in terms of licensing, and to induce investments for bus operators, the authority and extent of governance of the public transport section in MoWT shall be reinforced.

(2) Institution and Regulation

1) Licensing System of Large Bus

a) Large Bus

Basically, it is necessary to grant license to large buses on an individual route basis. In order to provide the stable and steady service to passengers, the soundness of finance of the operating industry will be evaluated and the fixed route, fixed fare and fixed schedule will be the preconditions for licensing and will be obligatory. Supply of the number of buses will be controlled in consideration of the demand along the route for the sake of avoidance of excessive competition.

If two or more companies operate on a single route, the license authority will adjust the timetable. Operating company will continue to operate at least five years to protect the beneficiary. License will be renewed periodically but withdrawal without reason will not be approved. Moreover, the company which caused heavy accident cannot continue to operate.

b) Medium Bus

Medium bus will replace the minibus gradually. The current licensing of the minibus will be abolished in consideration of the progress of the introduction of the BRT and large bus and the expansion of the service area of BRT and large bus.

The fixed route, fixed fare and fixed schedule will be the preconditions for licensing and will be obligatory like in the large bus. Supply of the number of buses will be controlled in consideration of the demand in the area for the sake of the avoidance of excessive competition. License will be renewed periodically but withdrawal without reason will not be approved.

2) Import Tax Exemption of Bus Body

As articulated in Section 9.8, import tax exemption of bus body is requested for the reduction of the burden of purchasing bus body. It will help in improving the financial condition of bus operators.

3) Traffic Regulation

Basically, it is necessary to prohibit the running of minibus and Boda-Boda on the BRT and large bus routes. But since enforcement of this regulation requires the approval of stakeholders, large bus should follow the result of the BRT which will precede the introduction of large bus.

On common roads, the large bus should keep the regulation like other vehicles. However, when the large bus tries to start from the bus stop, other vehicles should not interfere with the confluence of the large bus.

Posts with sign board and timetable should be installed at the bus stops. Passengers should not embark and disembark at places other than bus stops. Bus company should install the bus depot outside the urban area to restrict the long parking time at the terminals.

(3) Stakeholders

It is important to gain the understanding and cooperation of various stakeholders, especially public transport operators and passengers. Since the introduction of the BRT will precede the large bus, the method and attitude in obtaining the understanding of stakeholders shall follow the outcome of the BRT introduction.

9.11.2 FRAMEWORK FOR INFRASTRUCTURE DEVELOPMENT OF PUBLIC TRANSPORT

1) Institution for Infrastructure

The infrastructure of public transport such as the terminals and bus lay-bys should be part of the road. The development and maintenance should be conducted as for the road because the terminal and bus lay-by contribute toward the reduction of traffic congestion on the road. Therefore, the resources for the development and maintenance of road will be invested to the infrastructure for public transport. The authorities in charge of road will be responsible for the development of infrastructure for public transport.

In this context, the road-related laws and regulations such as the Traffic and Road Safety Act shall cover the terminal and bus lay-by.

2) Resources for Development

The government needs to obtain assistance from donors to develop large scale bus terminal such as the integrated terminal. Other small scale terminals will be developed by the government from the budget for road development.

3) Market

Two methods are considered for the development of public market. One is to request the assistance by the partners in the design and development. The other is to call for the investment of private sector. In this case, the area surrounding the public market is developed simultaneously for expanding commercial facilities. If the bus terminal and public market become the focus of commercial activities, there will naturally be demand for commercial development in the surrounding area. In spite of the fact that the investor cannot profit from public market, investor can gain the profit from the sale of surrounding area.

The government shall select a corporation through proposal, give permission and assist the corporation in the acquisition of land and necessary procedure.

9.11.3 REALIZATION OF PUBLIC TRANSPORT PLAN

The following are the proposals for the realization of public transport plan:

1) Introduction of Large Bus

a) Direction to the public transport section in MoWT

MoWT shall employ and request specialist from outside the government for direction in the following aspects:

- Institution and organization
- Management of bus operation
- Finance and accounting

b) Establishment of bus fund

The investors of the bus fund compose the committee for the administration of the fund. The committee will employ a specialist if necessary.

c) Direction for bus operating company

Direction for the bus operators will be conducted by the specialists employed by the government.

2) Development of Terminal

The following procedure is recommended for the development of bus terminal:

a) Recognition of responsible organization in the government

The government will clarify the responsible organization for the infrastructure of public transport, and the government as a whole will approve and recognize the authority.

b) Technical cooperation for the organization

The government will request the foreign partner for technical assistance in the following sphere:

- Institution and regulations for the development and maintenance of public transport infrastructure
- Introduction of instances of infrastructure development
- Demarcation of tasks between the government and the donor
- Assistance on the tasks of the government

c) Implementation of feasibility study

The government shall request the partner for the implementation of the feasibility study for the development of the infrastructure. In the feasibility study, the following items are scrutinized:

- Establishment of overall plan of terminals and lay-bys
- Selection of land for the development
- Setting the priority of terminals
- Basic design for selected terminal(s)

d) Implementation of development

9.11.4 ENVIRONMENTAL AND SOCIAL CONSIDERATION FOR PUBLIC TRANSPORT

Since the Study covered only formulation of conceptual model for the public transport plan, and

since the proposed locations of bus terminals are subject to the specific plan of BRT project, environmental study such as IEE was not carried out for the public transport plan. Therefore, in the feasibility study for the public transport plan proposed in the previous section, appropriate environmental and social consideration should be conducted. The essential subjects to be analyzed are the following two points.

a) Impact by the Large Bus operation

Present minibus operators, drivers and passengers are the most affected PAPs by the reformation of public transport system. Introduction of BRT will give an enormous impact to those PAPs. Introduction of large Bus will also give a heavy impact to those people. Therefore the stake holder meetings which will be conducted by the BRT Feasibility Study will give significant lessons. Based on those lessons, environmental and social consideration shall be implemented in the feasibility study proposed in the previous section.

b) Impact by the development of terminals

This study proposed basic concept, function and distribution of terminals but exact location of each terminal is not yet decided. In the proposed feasibility study which will decide the location of terminals, necessary procedure for the environmental and social consideration shall be carried out.