CHAPTER 10 TRAFFIC MANAGEMENT PLAN

10.1 CURRENT CONDITION AND KEY ISSUES FOR TRAFFIC MANAGEMENT

(1) Traffic Congestion and Key Issues

The current population of Kampala City and GKMA is 1.5 million and 2.5 million, respectively and are both increasing at a rate of 4-5% per annum. The population of GKMA will reach 4.5 million in 2023 and approximately 9-10 million in 2040. One of the serious problems which GKMA has been facing is traffic congestion especially in the morning and evening peak periods, caused by not only inadequate capacity of the road network, but also the lack of traffic management. Although Kampala is the driving force of national economic development, its performance has been suffering from serious transportation problems resulting in higher transportation costs, less productivity and unstable commercial activities.

Both road capacity increase and traffic management are main pillars for alleviation of traffic congestion. As hereinafter defined, some related agencies in GKMA have already started a countermeasure of traffic congestion by traffic management. It is therefore, after review of current situations, some countermeasures by traffic management were proposed in this study.

Demand of road travel in GKMA is projected to continue growing as the population increases, economy grows and rapid urbanization progresses. However, construction of new highways and enhancement of efficient public transport to accommodate growing travel demand has not been realized well as planned in NTMP/GKMA. There are also other reasons behind serious traffic congestions, including urban structures which concentrates the traffic on the CBD/City Center, poor quality of road facilities, lack of traffic demand management, inappropriate traffic control, including on-street (curb) parking, insufficient capacity of road administration and human resources, etc.

Many agencies and organizations are involved in traffic management of Kampala City and GKMA. They have to address many challenges with the limited available resources. In particular, institutional reinforcement is required for traffic management and enforcement. The Study Team identified the following major weaknesses:

- Lack of urban development and structure plans to guide development and land use
- Lack of effective traffic management policy, strategy and plans
- Insufficient coordination among various government and private organizations, and NGOs
- Insufficient capacity and availability of human resources
- No concrete and sustainable plans and policies on capacity development
- Low incentives and motivation due to low salary and allowances
- Insufficient funds to equip traffic management facility and means.

Inter/intra agency coordination and cooperation are critical for the successful overall or integrated traffic management, since it needs to involve many stakeholders and the public.

(2) Strategy for the Improvement of Traffic Flow in Kampala

The key agencies involved in traffic management and enforcement of Kampala City are MoWT, KCC, UPF, MoLG and UNRA. They formed a joint task force (Task Force) through their own initiative and prepared short-term (1-2 years) and medium-term (3-5 years) low cost measures that will address the worsening traffic situation in Kampala City. The Task Force studied critical

locations and causes of traffic jam in both general and specific ways. The major findings as to the traffic management and enforcement are as follows:

- In general terms, a parking policy is needed to address parking issues holistically. On-street parking is potentially hazardous and induces congestion at public road space, and thus, it should be restricted whenever practical along major roadways.

- The centralized taxi terminals and general lack of big buses are the major cause of congestion in the CBD. There must be a shift of transport mode from paratransit to mass transit.

- Although only about 5% of the population of the city own cars, it lacks road facilities for pedestrians and bicyclists. This reflects the lack of realization regarding the importance of such facilities, and general lack of equity in resource allocation. In contrast, most modern cities are providing better Non Motorized Transport (NTM) facilities and promotion of NTM use due to associated health and economic benefits.

- Creation of a Greater Kampala Metropolitan Area Transport Authority (MATA) has been recommended in NTMP/GKMA. This is a welcomed recommendation but it is not likely to be achieved immediately due to the need for change of existing legislation. In light of this, an "Urban Traffic Unit" should be set up, which could later be absorbed into the MATA once it is established.

The Task Force compiled major findings, general measures for traffic management, specific measures by junction / road section, public transport measures, required costs for implementation and action plans for implementation into a report entitled "Strategy for the Improvement of Traffic Flow in Kampala" in December 2009. The Task Force suggested the following traffic management measures:

- Removal of obstructions, such as stalled vehicles being repaired, 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 on on-street parking on very busy links;

- Restriction on the passing of heavy vehicles from specific city centers during day time;

- Restriction on train crossings at critical road sections during peak hours;

- Reorganizing traffic flow patterns, like banning right-turning movement wherever necessary;

- Introduction of appropriate signage 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 transport (NMT and motorized traffic is inevitable, vehicle speeds must be restricted using prominent road signs. The pedestrian's risk of being killed in a road traffic accident was found to be about 10% due to vehicle speeds of 30 km/h. This even reaches 40-80% due to 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 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, is crucial. The police should be motivated to educate the public and enforce the new measures.

(3) Parking in the City Center

1) Current Condition of On-Street Parking

Kampala is the capital city and the business/commercial center of Uganda. However, activities of the Central Business District (CBD) have been obstructed by legal and illegal on-street parking. Even trunk roads like Jinja Road and Luwum Street in the CBD (photographs below) are occupied by private and business car parking as there are only limited off-street parking spaces and facilities available. The existing spaces and facilities are used only for public transport and tenants/customers of the large office buildings and shopping malls.

On-street Legal Parking on Jinja Road (at both curbing)

On-street Legal Parking on Luwum Street (at center and both curbs)

Source: JICA Study Team

Figure 10.1.1 On-Street Parking in the CBD

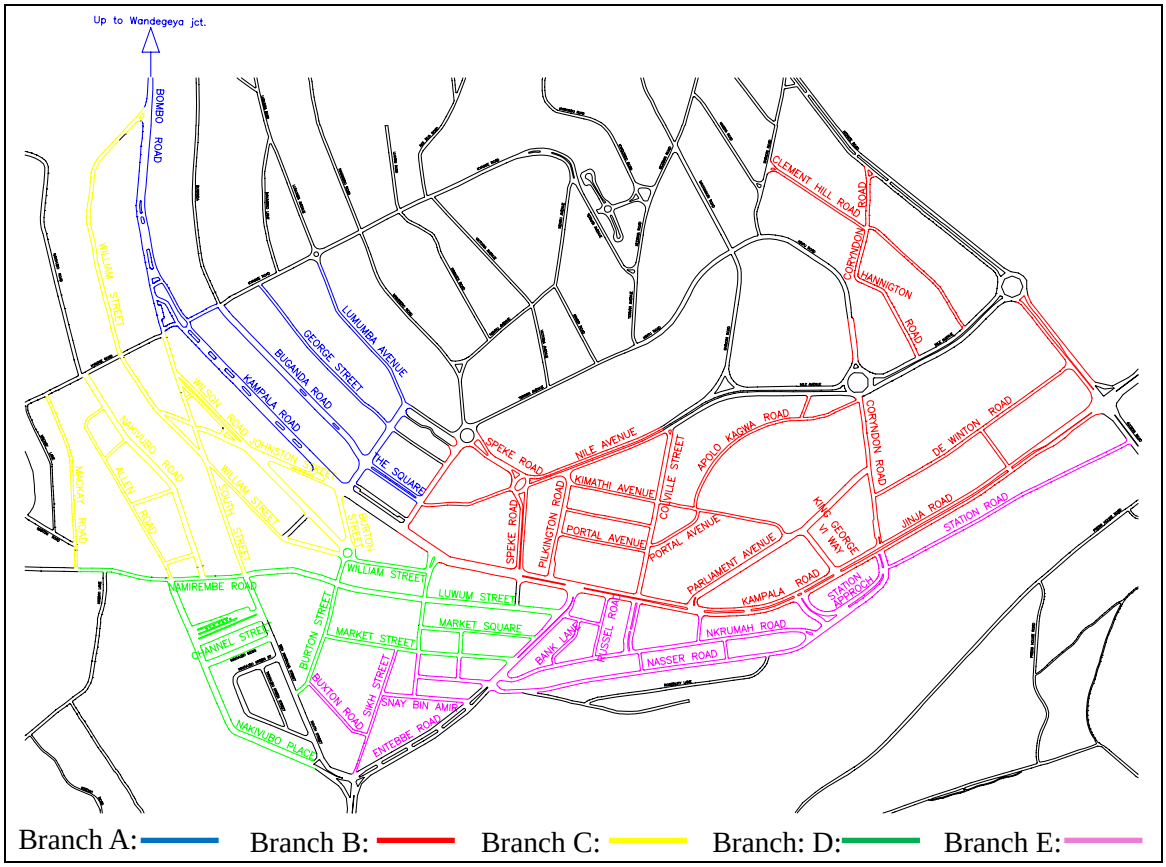
According to the parking demand survey conducted by KUTIP, the highest demand was observed on Kampala Road followed by William Street. In addition, a part of Jinja Road and Said Barre Avenue also had high parking demand. Short period demand of less than one hour was predominated as shown in the following table and figure. The average on-street parking duration in the entire survey area was estimated to be approximately 45 minutes.

However, as the vehicle population more than doubled compared with the KUTIP Study in 2003, it seems that medium to long-period parking has increased considerably.

Table 10.1.1 Duration of On-Street Parking (During Peak Hour), 2003

Branch		Parking Duration					Total
		Short Period		Medium Period		Long Period	
		0-1 hr	1-2 hr	2-4 hr	4-6 hr	>6 hr	
Branch A	No of Car	3,281	139	15	7	1	3,443
	Share (%)	95.29	4.04	0.44	0.20	0.03	100.0
Branch B	No of Car	5,440	337	222	0	18	6,017
	Share (%)	90.41	5.60	3.69	0.00	0.30	100.0
Branch C	No of Car	2,997	177	72	22	52	3,320
	Share (%)	90.27	5.33	2.17	0.66	1.57	100.0
Branch D	No of Car	5,738	478	132	41	64	6,453
	Share (%)	88.92	7.41	2.05	0.64	0.99	100.0
Branch E	No of Car	4,724	142	45	8	5	4,924
	Share (%)	95.94	2.88	0.91	0.16	0.10	100.0

Source: KUTIP Final Report (June, 2003)



Source: KUTIP Final Report (June, 2003)

Figure 10.1.2 On-Street Parking Survey Results (KUTIP)

2) Recommendation of Task Force on On-Street (Curb) Parking Restriction

The Task Force recommended restriction on on-street parking that causes considerable reduction of traffic capacity on very busy city center streets and roads listed below.

Table 10.1.2 CBD Roads Recommended to be Subject to On-Street Parking Restriction

Road Name	From	To	Restriction
Entebbe Road	Kampala Road	Shoprite Junction	Both Sides
Jinja Road	Kitgum House Junction	Kampala Road	Both Sides (Create Bus Lane)
Kampala Road	Jinja Road	Bombo Road	Both Sides (Create Bus Lane)
Katwe Road	Kibuye	Mutebi Road	One side
Ben Kiwanuka Street	Entebbe Road	Bombo Road	One side; and Lorries 7am-8pm
Nakivubo Place	Ben Kiwanuka Street	Namirembe Road	One side; and Lorries 7am-8pm
Namirembe Road	Mackay Road	Ben Kiwanuka Street	Both sides
Allen Road	Namirembe Road	Nakivubo Road	One side
William Street	Luwum Street	Kyagwe Road	Lorries 7am to 8pm
Johnstone street	Kampala Road	Ben Kiwanuka Street	Both sides
Wilson Road	Ben Kiwanuka street	Burton street	One side
Burton Street	Ben Kiwanuka street	Luwum Street	Both Sides (and one side for remaining sections)
Speke Road	Nile Avenue	Kampala Road	One side
Market Street	Entebbe Road	Duster Street	One side
Mackay Road	Kyagwe Road	Namirembe Road	One side
Kisenyi Road	Mwanga 2 Road	Namirembe Road	One side
Kafumbe Mukasa Road	Kisenyi Road	Mengo Hill Road	One side
Other Roads			Keep 20 m from junction clear of parking
Other Roads			Keep 20 m from junction clear of parking

Source: Task Force

The BRT Pre-FS also strongly recommended to ban or strictly restrict parking in the city center, even currently legal, to divert the transport mode from private cars to BRT.

3) Insufficient Off-Street Parking Facilities, especially in the CBD/City Center

The number of registered vehicles on road had increased by 285% from 2004 to 2008, and has been further increasing at an even accelerated rate. In general, parking demand has strong correlation with the number of registered vehicles. The KUTIP report pointed out that:

"The traffic problem has been further aggravated by the absence of adequate off-street parking facilities at traffic generating and attractive areas. The shortage of proper parking spaces has resulted in motorists parking wherever a vehicle can physically fit, including prohibited zones close to busy junctions. This situation also brings adverse effects on road safety by hampering visibility at junctions."

4) Overview of the Study Team on Parking Problems

From field surveys, the Study Team found that the demand of on-street parking is mostly higher for the following reasons:

- Large scale off-street parking facilities (taxi parks and bus terminals) are provided only for public transport.
- Available off-street parking spaces, especially basement parking facilities, are mainly reserved for building tenants/customers.
- It is more convenient for drivers to park close to their destination.

Both legal and illegal on-street parking should be restricted since curb parking causes not only reduction of road capacity, but also increases traffic accident risks. Currently approved parking spaces on street have been managed by concession of private company. It is clear that the current parking demand far exceeds the capacity, and this trend will continue in the future.

The GOU should establish concrete parking policy, strategy, system and facilities addressing the current situation in order to reduce serious traffic congestion in the CBD area. As a CBD parking study is planned under TSDP, it should address the above issues and recommendations.

(4) Institutional Arrangements for the Creation of a Traffic Unit

KCC is responsible for the maintenance of urban road infrastructure. However, they do not have clear mandate in urban traffic management, and they have institutional weaknesses, as follows:

- No traffic management institution or unit in structures of government agencies (except the police).
- The absence of a traffic unit has led to the lack of capacity in traffic management.
- Lack of funds for maintenance and upgrading of transport infrastructure.
- Weak enforcement of traffic laws and regulations due to manpower and financial constraints in the police, and the lack of traffic wardens as backup.

Considering the above deficiencies, a traffic unit should be set up with adequate staffing, funding and mandate to undertake the following principal responsibilities:

Table 10.1.3 Areas, Functions and Responsibilities to be undertaken by the Traffic Unit

Area	Functions and responsibilities
Traffic management policy	Formulate and implement citywide traffic management policies to comply with objectives defined by the city council to include, at least, such areas as determination of (a) a functional road hierarchy, (b) the appropriate balance between transport system users (private transport–public transport—NMT vehicles–pedestrians), (c) priority programs for action, and (d) "five-year" investment plans.
Traffic research	Survey, monitor, and evaluate all traffic and accident data to enable trends to be identified, problems quantified, and traffic management plans and improvements prepared.
Traffic management plans and improvements	Plan, design, implement, monitor, evaluate, fine-tune, and continuously update traffic scheme plans and improvements and policies to realize the agreed-on traffic management policy. The program would cover all motorized road-based modes (cars, public transport, trucks, and so on) and all NMT modes (pedestrians and cycles). Plans and improvements would range from simple intersection improvements, or marking and signing programs, through to far-reaching citywide strategies such as extensive bus priority or pricing. Accident programs and countermeasures would be included.
Traffic control devices	Plan, design, install, operate, and maintain all traffic control devices including: (a) traffic signal systems, including computer-controlled systems; (b) road markings; (c) road signs; and (d) enforcement devices (cameras, and so on).
Traffic regulations	Formulate traffic regulations to realize the proposed traffic management plans and improvements, for enactment by city government and for enforcement by the traffic police.
Parking management	Prepare off- and on-street parking policies and programs, including approval for the location of, and access to, parking areas proposed by others. Parking enforcement and administration, where pay parking applies, would be carried out by a private firm as per current practice.
Approvals and coordination	Evaluate and advise city government on all schemes (such as new roads) and developments (developed both by public and private sector agencies, and including major new land or building developments) that have significant traffic impact to ensure that they are consistent with agreed-on traffic policy.
Consultation	Consultation with the public and stakeholders on traffic policy and on the impacts of specific schemes and measures.
Budget	Preparation of an annual budget for submission to the city government for: (a) implementation of traffic management plans and improvement schemes, (b) traffic operations and maintenance of control devices, and (c) the continuous work of the traffic management agency itself.

Source: JICA Study Team

(5) NMT and Traffic Control Facilities

1) Pedestrians

Significant pedestrian and vehicle flows concentrate in/around shopping centre/markets, commercial areas and three taxi parks in the CBD downtown area. Of the 116 km principal roads surveyed in KUTIP, 60% of the network has no footpath (sidewalk) on either side. At some locations, narrow footpaths in poor condition are provided at only one side of the road. In addition as these spaces are often utilized for commercial purposes and by vendors, building construction and illegal parking, pedestrians are forced to walk along the carriageway. According to the police, although there are some regulations on parking and vending activities on sidewalks, new regulation or amendment is further required. More considerations and priority should be given to pedestrians, especially at the busy CBD downtown area. Except along trunk roads, vehicle-free streets or hours should be implemented, especially on weekends.


Source: JICA Study Team

Figure 10.1.3 Pedestrians on Road of City Center

From the driver's point of view, disorderly pedestrian flows and road crossings not only cause traffic congestion but also endanger their safety.

2) Bicycle taxies (boda-bodas)

Other unique NMT in Kampala are bicycle taxies (boda-bodas) operated on major streets and roads with gentle slopes. Since the drivers and users belong to the poor class, considerations are required in order for them to deal with their daily lives and avoid conflict with vehicles while reducing accident risks.


Shoprite Junction **Queen's Way near Clock Tower**

Source: JICA Study Team

Figure 10.1.4 Mixed Traffic of NMT (Boda Boda) and Motorcycles on Trunk Roads

3) Pedestrian bridges

There are several pedestrian bridges on major roads. However, they are not popular and rarely used since such facilities are in poor condition, e.g., steep steps to access the bridge, and no public promotion to use such facilities. However, as well-designed pedestrian bridges are convenient and effective for reducing accident risks, it is recommended to provide such structure, which have gentle access slopes (similar to the one on the Northern Bypass as shown in photographs below) at strategic points of trunk roads in KCC.

Exiting Pedestrian Bridge at Nakawa on Jinja Road

Exiting Pedestrian Bridge on Northern Bypass

Source: JICA Study Team

Figure 10.1.5 Recommended Type of Pedestrian Bridge (Right)

4) Road Markings and Guard Rails

The road markings guide flow and movement of both vehicles and NMT. They contribute to traffic safety and regulate traffic flow. However, most of the markings have faded since no maintenance (re-painting) is carried out. The type of road paint is also not appropriate for busy urban road use. Its specifications should be the "Reflectorized Thermoplastic Pavement Markings" which is more durable than ordinary road paint.

5) Rumble Strips (Humps)

Rumble strips (humps) are raised or grooved patterns on the roadway that serve as an audible warning (rumbling sound) and physical vibration to alert drivers that they are swerving from their lane.

Rumble strips in most of the developing countries, including Uganda, are used as effective speed control measures at the entrance and within residential areas, school crossings, sharp curves, etc. However, the design of humps should be standardized. Visually good humps for prior identification (warning), in combination with information signs, should be provided with reflective road paints.

(5) Motorcycles

About 50% of registered vehicles on road are motorcycles, which is 30% of all traffic. The new population of registered motorcycles increased over 30% per annum in 2007-2008. Most of the motorcycles operated in Kampala are motorcycle taxies (boda-bodas), which are quite different from South Asian countries.

These motorcycle taxies are running on the road with passenger cars and swerve indiscriminately. This situation heightens the risk for accident, especially for passengers on rear seats, and disturbs smooth vehicle flow. The Study Team recommends a new regulation stating that motorcycle taxies should run only on the left side of the carriageway and prohibit their operation on the trunk arterial roads in the city center.

(6) One-Way Operation of City Center Roads

There are advantages and disadvantages of a one-way traffic flow operation. The advantages include:

- Increase capacity and traffic speed,
- Reduce risk of accidents,
- Alleviate chaotic situation at intersections, and
- Apply coordinated signal systems.

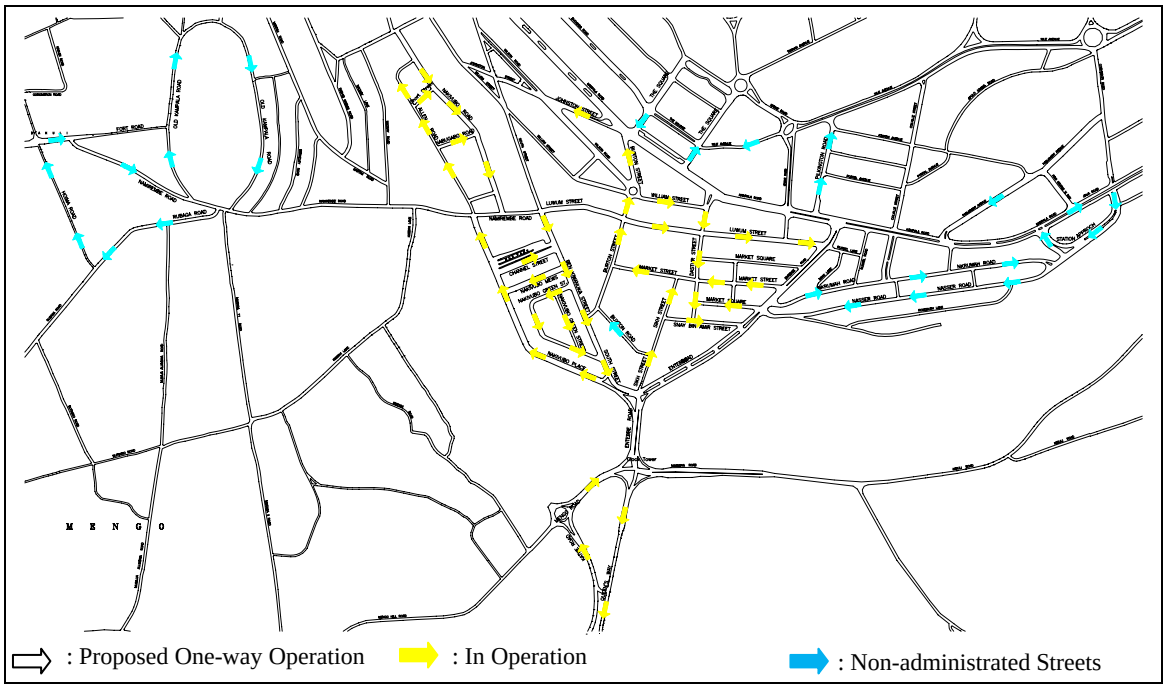
These are beneficial to streets with large traffic volume which also cause positive impact on traffic capacity of a two-way street.

Meanwhile, the disadvantages of a one-way operation include:

- Longer trip distances which result to higher fuel consumption;
- Higher speeds in business, commercial and residential areas;
- More turns and concentration of turns at certain intersections; and
- Possible increase of lane changes and mid-block crashes.

The one-way operation system was planned and introduced at many small roads in the city center in order to maximize the limited road space in accordance with the proposals in KUTIP. It was implemented under the Nakivubo Channel Rehabilitation Program (of WB) and continued under KIIDP.

A total of 19 roads in Kampala City started operating as one-way streets in June 2004. These include Short Street, Nakivubo, Nabugabo, Allen, Channel Street, Nakivubo Mews, Nakivubo Green, Nakivubo Channel, Nakivubo Place, Green Street, Ben Kiwanuka, Johnstone, William, Luwum, Burton, Dastur, Market, Market Square and Snay Bin Amir Street. Queensway (end of 2004) and the roads around the Constitution Square were also changed to one-way streets (2005). The current one-way operation and plans are as shown in Figure 10.1.2.



Source: KUTIP Final Report (June, 2003)

Figure 10.1.6 Proposed One-way Operation (KUTIP) in and around the CBD area

KCC is preparing to improve the traffic flows in the city centre under KIIDP. According to the travel speed survey conducted by the Study Team, traffic on Queensway was clearly eased while that at Katwe Road became more congested. However, the one-way operations in the city center have shown no proven benefits due to chaotic movement and parking of mini-buses.

(7) Fuel Stands and Open Markets

The Study Team observed that there are fuel stands at or near major junctions. They have caused irregular movement of vehicles entering the fuel stand. Hence, the location of fuel stands should be at least 100 m away from junctions.

Fuel Station at Makerere Roundabout

Fuel Station at Shoprite Junction

Source: JICA Study Team

Figure 10.1.7 Fuel Stations at the Corner of Busy Junctions

Open Market at Kibuye Junction

Open Market at Kasubi Junction

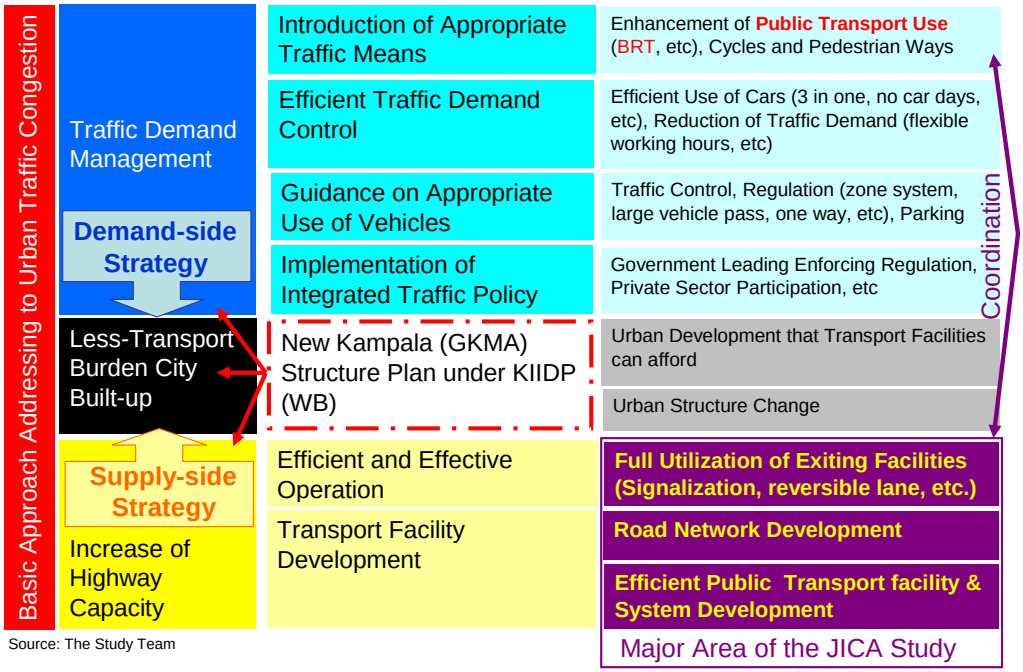
Source: JICA Study Team

Figure 10.1.8 Open markets at Busy Junctions

10.2 BASIC APPROACHES AND APPLICATION OF TRAFFIC DEMAND MANAGEMENT

(1) Basic Approaches for Traffic Management

Effectively addressing traffic congestion, and employing all available strategies and means are required. New infrastructure projects – from roads to bridges to transit facilities – remain a core element of comprehensive transportation improvement programs ("**supply-side strategy**"). Supplementing these "supply-side" approaches are a broad array of "**demand-side strategy**" intended to make existing transportation facilities work better. Managing both the "growth of" and periodic "shifts in" traffic demand are important elements of managing traffic congestion. Figure 10.1.1 shows the "Concept of Integrated Traffic Demand Management" approaches, which the Study Team suggested, with its relation to the on-going studies by JICA and WB. The JICA Study mostly covers the increase of highway capacity and the development of efficient public transport facility and system which is coordinated with the BRT.



Source: The Study Team

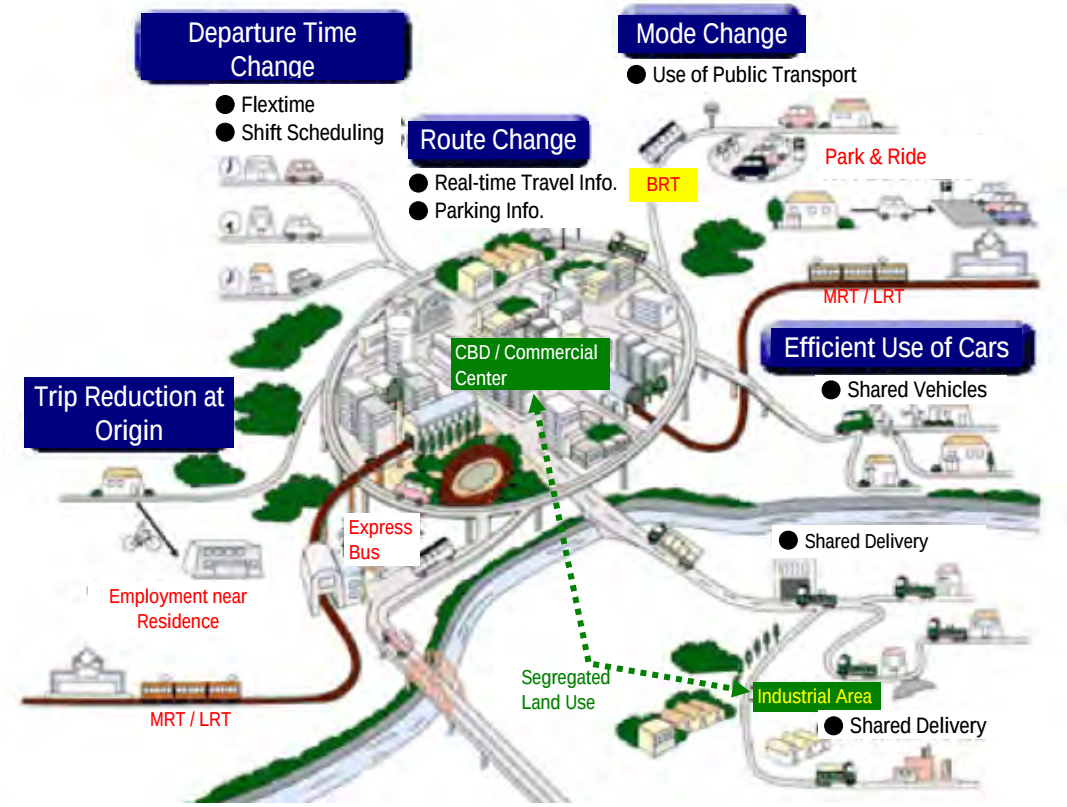
Figure 10.2.1 Concept of Integrated Traffic Demand Management and Relation with the Studies

Today's approaches are not only limited to facilitating shifts in travel mode – they also address shifts in travel routes and travel departure times (for all travelers, including single-occupant vehicle drivers). Moreover, **an integrated traffic demand management and development of less transport-burden urban structures are required** as no metropolis and cities can afford continuous huge investments on providing sufficient transport infrastructures to meet the increasing transport demand. **Strong political will and understanding of all stakeholders and people are required for its realization**.

(2) Demand-side Strategy

Demand-side strategies are designed to better balance people's need to travel on a particular route at a particular time with the capacity of available facilities, including public transport. This is intended to efficiently handle the demand. Figure 10.1.2 illustrates an image of the typical demand-side strategy.

MoWT in cooperation and coordination with other concerned ministries and agencies should initiate a study for the establishment of integrated traffic demand management plan and implement them as priority projects and programs in the medium to long-term. However, it should be noted that long-term urban development plan is required for the establishment of the integrated traffic demand management plan.



Source: the Study Team based on Ministry of Land and Transport, Japan

Figure 10.2.2 Illustration (image) of the Demand-side Strategies

MoLG in conjunction with MoLHUD and KCC will conduct a study to update the Kampala Structure Plan established in 1994 under KIIDP, to address the requirements for the next ten years. The Study Team recommends that such plan should cover long-term aspects for 25 years (or Vision 2035), or 30 years as in the NDP. Even BRT could not accommodate the traffic demand when the population of GKMA reaches approximately six million after 2030, unless one area concentration of the current urban structure is strategically changed (refer to Section 2.4.6). **Long-Long Term Integrated Urban Development Plan, including development of new towns, and Strategy are required to accommodate the increasing population**.

(3) Traffic Demand Management recommend by a JICA Expert of MoWT

A JICA Technical Advisor, Mr. T. Arakawa, submitted a report on "An Emergency Measure for Traffic Congestion in Kampala City" to MoWT in 2009 based on his experience in Japan and observation in Kampala. He advised the following effective and quick impact measures, both **supply and demand - side approaches**, that could be implemented in short periods:

- If 10% of excess volume of traffic is removed at road and junctions at the peak period, traffic congestion will be improved considerably.

- There are two different ways; one is to increase capacity of traffic on the road and the other is to control traffic demand. The latter means to cut the peak hour traffic volume by decreasing or diverting road traffic through managing the traffic demand. **The best solution is the coordinated combination of these two ways**.

<u>Capacity Increase of Existing Road Facilities:</u>

1) Remove obstacles from congested routes (illegal on-street parking and legal street vending)

2) Promotion of utilization of the Northern Bypass (advertisements on advantage for use of the bypass)

3) Proper control of traffic signals (wiser use of existing traffic signals rather than traffic police control irrespective of functioning signals)

Traffic Demand Control:

1) Flexible business hours (change working hours of factories and offices to ease commuting congestion). This measure needs no additional cost but requires the cooperation and initiative of business associations.

2) Flexible school starting date (some schools already adopted this principle and the Ministry of Educations should encourage all schools to participate in this movement.)

3) Divert road traffic to other modes (utilization of the existing railways to resume passenger train operation)

Mr. Arakawa concluded that the implementation of the measures above require strong leadership of concerned authorities who will commit to prioritizing the welfare of the public and road users. At the same time, it is imperative for the public sector to spearhead this initiative and even sacrifice to show good examples to the general public.

10.3 COOPERATION OF INTERNATIONAL DEVELOPMENT PARTNERS

(1) On-going Cooperation of International Development Partners

Development partners play an important role in financing road development projects, maintenance programs and various capacity development activities. Development partners currently playing active roles in the road sector include EU, World Bank, AfDB, NDF, JICA, BADEA and DFID. MoWT with other concerned ministries and agencies, and these development partners, hold periodic Sector Working Group Meetings to share knowledge and discuss various issues.

The on-going projects in cooperation with the development partners related to traffic management and enforcements in GKMA/Kampala City are listed in the following table.

Table 10.3.1 On-Going Projects Related to Traffic Management and Enforcements

<table>
<tr><th colspan="2">The World Bank</th><th>EU</th><th>DFID</th></tr>
<tr><th>KIIDP</th><th>TSDP</th><th></th><th>TSDP</th></tr>
<tr><td rowspan="2">• Drainage system improvement
• Traffic management (area traffic management, Jct signalization, etc)
• Road maintenance and upgrading</td><td>• BRT Pilot Project FS & DD
• CBD parking study
• Bicycle path master plan study</td><td></td><td></td></tr>
<tr><td rowspan="2">Support to MoWT:
• Set up Transport Master Plan Office
• Transport Sector Data Management System
• Start up MTRA
• Establishment of MATA
Support to UNRA:
• Axle load control
• Monitoring and evaluation of UNRA projects
• Investment of up to date system
• Other technical areas
Various Studies:
• Traffic accident black spot study and road safety audit
• Cost estimate unit study
• Environmental and social impact studies</td><td rowspan="2">• Capacity building of UNRA</td><td rowspan="2">• Cofinance of TSDP (The WB) for capacity develop-ment of MoWT & UNRA</td></tr>
<tr><td>Support to KCC:
• Organization development and governance
• Human resources management
• Urban planning (Update of Kampala Structure Plan and GIS)</td></tr>
</table>

Note: KIIDP (Kampala Institutional and Infrastructure Project), TSDP (Transport Sector Development Project)
Source: JICA Study Team

KCC is the key administration in the field of traffic management of GKMA, especially in the city center. WB has assisted organizational and human resources development of KCC under KIIDP. However, its capacity seems to be still weak in terms of funding, human resources and incentives. Assignment of a long-term JICA adviser, specialized in traffic demand management, could enhance the capacity development program of KCC/GKMA.

10.4 AXLE LOAD CONTROL

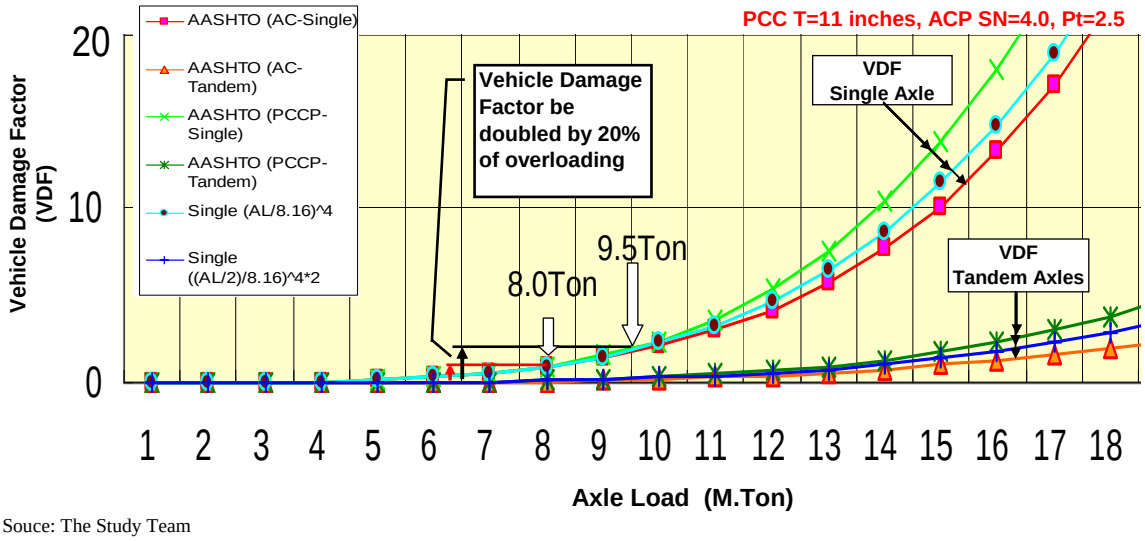
10.4.1 AXLE LOAD REGULATION AND NEGATIVE EFFECTS OF OVERLOADING TO PAVEMENT LIFE

(1) Current Situation

Kampala is the hub for both local and international freight movement. Despite the opening of the Northern Bypass in October 2009, most of the goods vehicles (large trucks and trailers) still prefer to pass through the city or travels to the inland depots and factories located at Nakawa and industrial areas.

Sustainability of road facilities (assets) after development by upgrading or rehabilitation is the most important issue. Roads are normally designed to withstand specific traffic loading throughout their lifetime. As overloading leads to rutting, cracking and other fatal deformations, and shortens the pavement life significantly, its strategic and systematic control should be established and sustained.

It should be noted that overloading has a highly negative effect on pavements, road safety and traffic capacity. Effects of a vehicle on pavement are assessed by the Vehicle Damage Factor (VDF) or Equivalent Standard Axle Load (ESAL). The VDF increases to the 4.0-4.5th power of the axle load as shown in Figure 10.4.1. This means that if a single axle truck with 8 ton axle limit (category "S2" in Uganda in Table 10.4.1) overloads by just 20% (9.5 ton axle), this is equivalent to two passages of trucks on the pavement (double the VDF). That is why overloading control is extremely important to sustain pavement life and reduce road maintenance costs.



Souce: The Study Team

Figure 10.4.1 Relation of Axle Load and Vehicle Damage Factor on Pavement

(2) Axle Load Regulation and Axle Load Limits in Uganda

The Traffic and Road Safety Act, 1998 was gazetted, and axle load measurements and enforcement was regulated. In 2004 the Traffic and Road Safety (weighbridges) Regulations 1998 was amended to include strict measures for effective axle load control and an Axle Load Monitoring & Control Unit was established in MoWT.

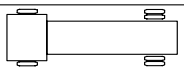
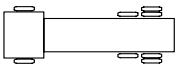
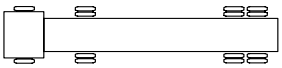
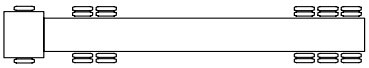
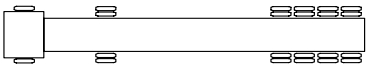
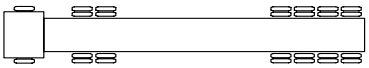
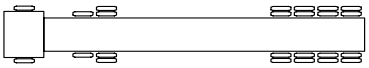
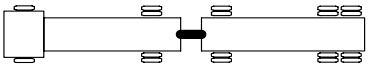
Currently, MoWT makes the decision on axle load control policy. The Directorate of Operation of UNRA, which moved its function from MoWT in 2008, is responsible for the operation, control of axle overloading, and enhancement of road safety. In order to increase the longevity of the road network and reduce overall transport costs, UNRA is looking at drawing up a comprehensive axle load control strategy. This strategy will look into the re-organization of UNRA's axle load operations and also put in place an investment plan for rolling out axle load control assets.

The regulations on axle load limits and Gross Vehicle Mass (GVM) are presented in Table 10.4.1 and Figure 10.4.2.

Table 10.4.1 Axle Load Limit in Uganda

Item	Detail		Limit in (Kgs '000)
Max Load Per Vehicle	S2		8
	S4		10
	SS4		14
	T8		16
	T12		24
	Q16		32
	T6		12
	T10		18
Gross Vehicle Mass (GVM)	SU-S2-S4		18
	SU-S2-T8		24
	SU-SS4-T8		30
	TT-S2-S4-S4-S4		38
	TT-S2-T8-S4-S4		42
	TT-S2-T8-S4-T8		50
	TT-S2-T8-T8-T8		56
	SM-S2-S4-S4		28
	SM-S2-S4-T8		32
	SM-S2-T8-T8		40
	SM-S2-T8-T12		48
	SM-S2-T8-Q16		56

Source: Traffic and Road Safety Regulations

	AXLE CONFIGURATION	LIMIT IN (Kgs '000)
	S2S4	18
	S2T8	24
	S2T6	20
	S2S4T8	34
	S2S4T12	42
	S2T8T12	48
	S2T6T12	44
	S2S4Q16	50
	S2T8Q16	56
	S2T6Q16	52
	S2S4S4T8	44

Source: Traffic and Road Safety Regulations

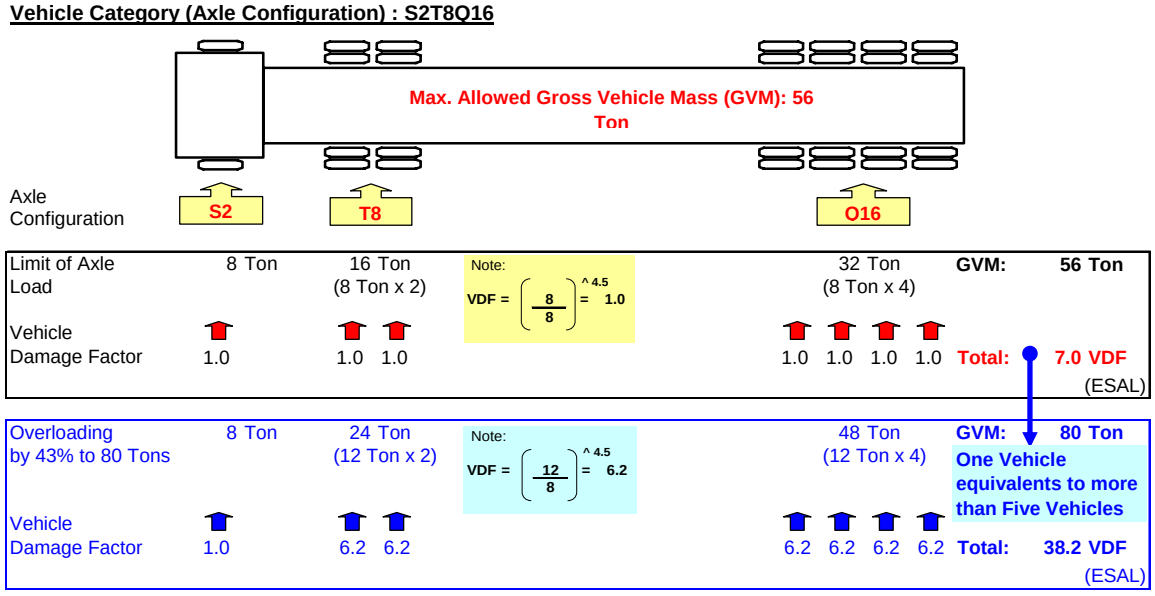
Figure 10.4.2 Axle Configuration and Load Limit

10.4.2 PAST AXLE LOAD SURVEY

(1) Axle load Control and Damage Effects of Overloaded Vehicles on Pavement

In FY 2006/07, a total of 215,412 vehicles were weighed under the Axle Load Control Project financed by WB, of which 8,310 vehicles were recorded as overloading. According to an EU report, although the maximum GVM is limited to 56 tons by regulation, some truck owners pay bribes and carry over 80 tons.

As trial computation in Figure 10.4.2, a trailer truck (Axle Configuration: S2T8Q16 in Figure 10.4.3) with GVM of 80 tons, which is approximately 40% overloaded, will cause more than five times damage on pavement compared with a non-overloaded trailer (GVM 56 tons). Damage effects on pavement of a trailer with GVM of 80 tons are equivalent to 38 two-axle trucks.



Source: JICA Study Team

Figure 10.4.3 Trial Computation of Negative Effects of Overloaded Vehicle on Pavement

In order to address the above situation, the government installed fixed weighbridges at Mbarara and Busia Kenya borders, and mobile weighbridges on the highways of Kampala-Masaka-Mutukula, Kampala-Mubende-Fort Portal, Iganga-Malaba, and Tororo-Mbale.

(2) Axle Load Survey Data

The Study Team analyzed the axle load survey data of MoWT conducted at eight locations (Busia, Asinge, Magodes, Bukedea, Namagumba, Busembatia, Kaliro, Buwenge) in August 2007. Approximately 20% of the surveyed vehicles exceed the load limits (Table 10.4.2). Overloaded vehicles consist of almost all types of large vehicles. Overloading is particularly significant for heavier vehicles (S2T8Q16, S2T6Q16 and S2S4S4T8). The maximum GVM in all samples was 64.4 tons, which is equivalent to 115% of the load limit (56 tons).

Table 10.4.2 Axle Load Survey Results in August 2007 on Trunk Roads of Uganda

Configuration	Axle Load Limit in Tones	Sample No.	Over Loaded Vehicles		
			No.	Ratio	Max. Load
S2S4	18	93	17	18%	21.7
S2T8	24	15	2	12%	34.0
S2T6	20	1	0	0%	13.9
S2S4T8	34	2	0	0%	27.9
S2S4T12	42	12	2	17%	50.6
S2T8T12	48	12	3	25%	56.7
S2T6T12	44	10	1	10%	47.7
S2S4Q16	50	13	0	0%	48.5
S2T8Q16	56	52	12	23%	64.4
S2T6Q16	52	51	16	31%	59.2
S2S4S4T8	44	3	3	100%	56.2
Total		264	56	**21%**	**64.4**

Source: Axle Load Survey (MoWT, 2007)

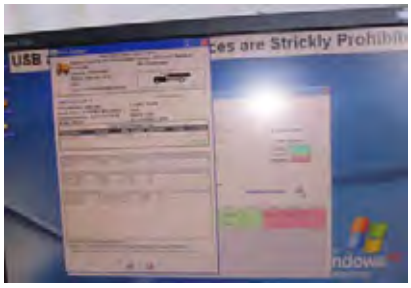
(3) Suggestion on Axle Load Control Facilities and System

The key issue for effective overloading prevention is accountability and transparency in axle and gross weight control operations. The main objective of weighbridge stations should be to educate the vehicle owners and drivers to not repeat overloading. At the same time, strict corruption prevention is also required to enforce axle load limit regulation.

The Study Team recommends the introduction of a computer-assisted system, which has become more popular in developing countries, at strategic weighing stations like Kenyan Borders (Malaba and Busia), Jinja Bridge, etc. Consequently, when a heavy vehicle passes on a weigh-in-motion bridge, its axle loads and gross vehicle weight are transmitted to a computer wherein the magnitude of overloading are automatically determined and indicated on the screen (photographs below). As the driver's name and truck's owners are recorded, it can identify how often they breach overloading laws. Stricter warning and penalties can be given to drivers and owners who repeatedly violate overloading laws.

Weigh-in-motion Weigh Bridge

Record of Driver and Vehicle Owners



Automatic Recording and Overload Record

Source: JICA Study Team

Figure 10.4.4 Example of Computer-Assisted Overloading Control System in the Philippines

10.5 TECHNICAL ASSISTANCE FOR TRAFFIC SIGNAL OPERATION AND MAINTENANCE IN KAMPALA CITY

10.5.1 PURPOSES OF TECHNICAL ASSISTANCE

(1) Background

In the past years, the GOJ installed nine traffic signals by grant aid projects. However, diverse problems such as damaged facility, power shortage, etc. have been occurring in several places.

Given the situation above, JICA decided to execute Technical Assistance for Traffic Signal Operation and Maintenance under this Study.

(2) Purpose of Technical Assistance

1) The purpose of technical assistance is to provide indirect support for appropriate maintenance and technology upgrade with regard to traffic signal.

2) Establishment of maintenance and planning manual for traffic signals intended for Kampala City is another purpose of technical assistance.

(3) Components of Technical Assistance

The Study Team will perform necessary planning and engineering analysis, field investigation, and related works to attain the purpose of technical assistance mentioned above.

- Present condition survey (Traffic Volume, Facility, etc)
- Capacity assessment (Institution, Equipment, etc)
- Preparation of procurement plan
- Preparation of manual for planning and maintenance
- Assistance of field training for maintenance
- Proposal of required places of signalized junctions
- Proposal of systematic control
- Recommendation and future vision

10.5.2 PRESENT CONDITION OF SIGNALIZED JUNCTION AND MAINTENANCE

(1) Present Condition of Signalized Junctions

Traffic signals are essential facility to control and regulate traffic flows at junctions to ensure appropriate operations. Traffic signals also contribute to traffic safety for both pedestrians and vehicles.

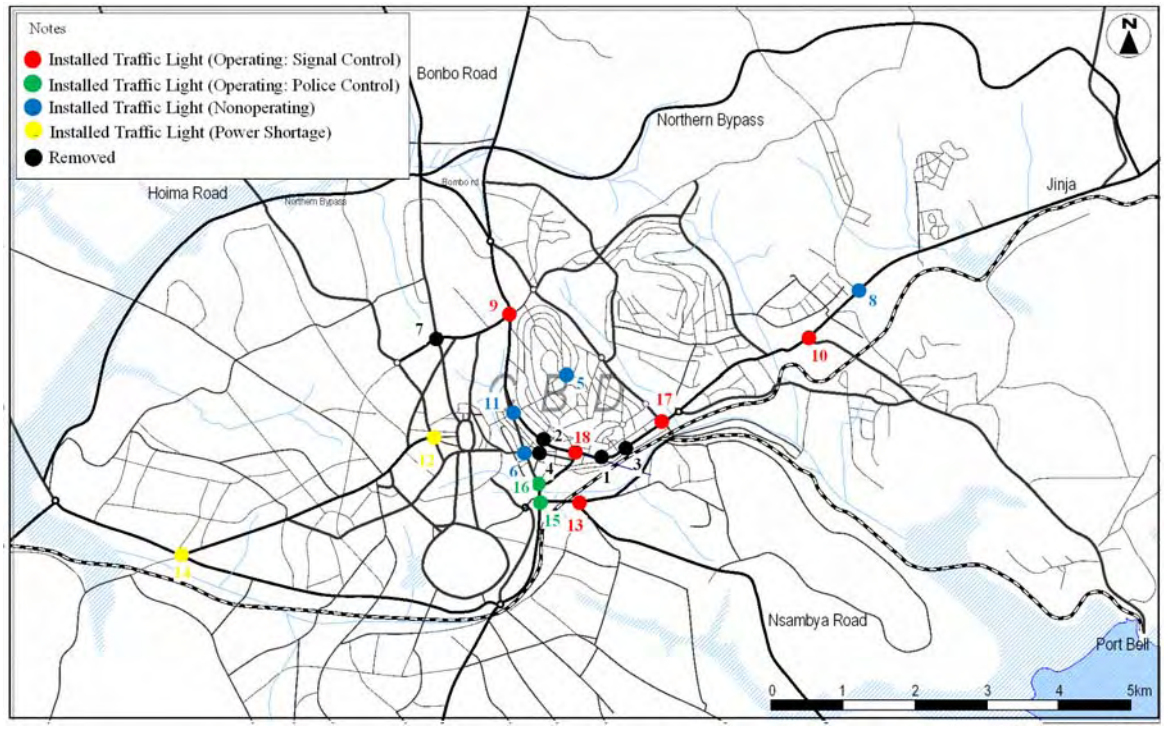
Table 10.5.1 and Figure 10.5.1 show the list and location of the signalized junctions in Kampala City. Of the 18 traffic signalized junctions, 13 traffic signals still exist while five signals were already removed. Of the nine traffic signals installed through the grant aid of GOJ, seven are in

operation while the remaining two are no longer functioning due to power shortage[1].

Table 10.5.1 List and Condition of Traffic Signalized Junctions in Kampala City

No.	Jct. Name	Installation Year	Procurement	Condition	Remarks
1	Kampala/Parliament	1957	UK	Non-operating	Removed
2	Kampala/Burton	1957	UK	Non-operating	Removed
3	Udyum House/Jinja Rd	1957	UK	Non-operating	Removed
4	Luwum Street/Burton Jct	1957	UK	Non-operating	Removed
5	Nile Avenue Shimon/Siad Barre	1972	Germany	Non-operating	
6	Namirembe/Luwum	1987	India	Non-operating	
7	Makerere Hill Rd/ Sir Apollo Kaggwa	1987	India	Non-operating	Removed
8	Nakawa/Spear Motors	1997	Germany	Non-operating	
9	Wandegeya Jct	1998	Japan (Grant)	Operating	Signal Control
10	Port Bell Jct	1998	Japan (Grant)	Operating	Signal Control
11	Kyagwe Rd	2000	Germany	Non-operating	
12	Bakuli Jct	2002	Japan (Grant)	Non-operating	Power Shortage
13	Nsambya (Kibuli) Rd Jct	2002	Japan (Grant)	Operating	Signal Control
14	Natete Rd Jct	2002	Japan (Grant)	Non-operating	Power Shortage
15	Clock Tower Jct	2005	Japan (Grant)	Operating	Police Control
16	Shoprite Jct	2005	Japan (Grant)	Operating	Police Control
17	Jinja Rd Jct	2005	Japan (Grant)	Operating	Combined Control (Signal + Police)
18	Kampala/Entebbe Rds Jct	2005	Japan (Grant)	Operating	Signal Control

Source: JICA Study Team



Source: JICA Study Team

Figure 10.5.1 Location of Traffic Lights in Kampala City

However, of all the operating traffic signals at seven junctions, two junctions (No. 15, 16) are controlled by traffic police although the signals are functioning. In addition, one junction (No.17) is controlled by a combination of traffic police and traffic signal. The cause of this phenomenon

[1] Traffic signal operation at Natete Junction was resumed recently.

is not only due to the inefficiency of the traffic light operation but also due to geometric problems such as the absence of queue lanes required to meet rapid increases in traffic volume. All other major junctions in Kampala City require traffic signalization to replace current control by traffic police.

Source: JICA Study Team

Figure 10.5.2 No.16 (Clock Tower Jct) Control by Police

Source: JICA Study Team

Figure 10.5.3 No.18 (Kampala/Entebbe Rd Jc.) Control by Traffic Signal

(2) Present Traffic Condition and Saturation Degrees

The Study Team surveyed cycle times, the phasing of signals and traffic volume in peak hours. The traffic survey data were already explained in Chapter 5. The cycle time and phasing data is illustrated in Figure 10.5.4 and 5. The following table shows existing saturation degrees calculated based on the traffic survey data and existing phasing data. In addition, the survey results will be analyzed in detail about required adjustments in signal phasing.

Table 10.5.2 List and Traffic Condition of Signalized Junctions in Kampala City

Junction	Saturation		Junction	Saturation	
Wandegeya	AM	1.31	Clock Tower	AM	1.01
	PM	1.48		PM	1.03
Port Bell	AM	1.05	Shoprite	AM	1.72
	PM	0.85		PM	1.07
Natete	AM	1.21	Jinja	AM	1.15
	PM	0.86		PM	1.10
Bakuli	AM	1.27	Entebbe/Kampala	AM	0.65
	PM	0.96		PM	0.72
Kibuli	AM	1.34			
	PM	1.00			

Source: JICA Study Team

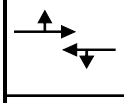
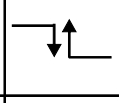
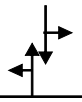
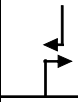
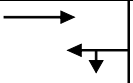
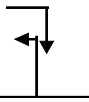
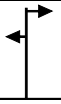
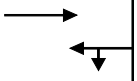
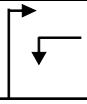
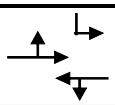
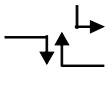
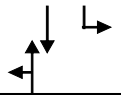
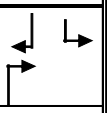
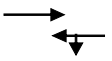
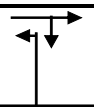
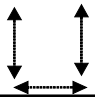
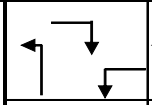
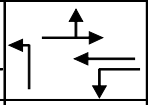
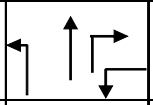
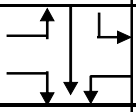
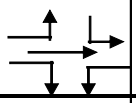
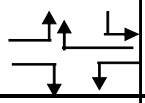
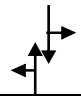
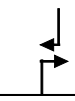
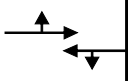
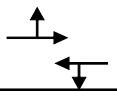
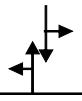
The result of calculated saturation degrees is normally evaluated as follows:

Table 10.5.3 Evaluation of Signalized Junction by Saturation Degree

Saturation Degree	Situation
$0.8 > S$	Desirable Situation
$0.8 \leq S \leq 1.0$	Acceptable Situation
$1.0 < S$	Capacity Shortage (Bottleneck)

Source: JICA Study Team

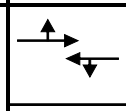
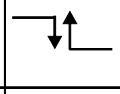
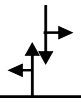
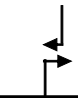
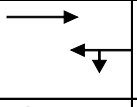
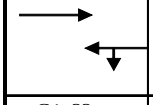
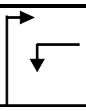
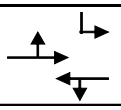
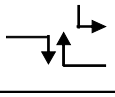
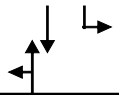
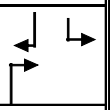
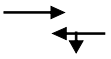
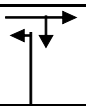
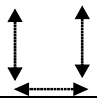
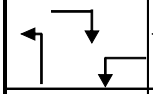
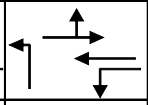
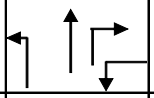
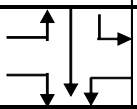
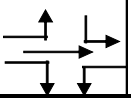
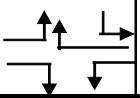
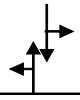
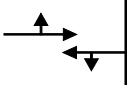
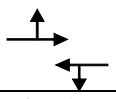
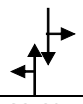
AM Peak (8:00)

Jct. Name	G1	G2	G3	G4	Total
Wandegeya jct. Makerere Haji Bombo					-
	G1: 43sec Y1: 4sec R1: 0sec	G2: 25sec Y2: 4sec R1: 3sec	G3: 32sec Y1: 4sec R1: 0sec	G4: 18sec Y1: 4sec R1: 3sec	**140**
Port Bell jct. Jinja Old Port Bell				-	-
	G1: 44sec Y1: 4sec R1: 0sec	G2: 15sec Y2: 5sec R1: 3sec	G3: 23sec Y1: 4sec R1: 3sec	-	**101**
Kibuli jct. Nsambya Kibuli Gaba				-	-
	G1: 33sec Y1: 4sec R1: 2sec	G2: 53sec Y2: 4sec R1: 2sec	G3: 16sec Y1: 4sec R1: 2sec	-	120
Jinja rd. jct. Yusufu Jinja Access					-
	G1: 84sec Y1: 3sec R1: 2sec	G2: 50sec Y2: 3sec R2: 4sec	G3: 48sec Y3: 3sec R3: 2sec	G4: 43sec Y4: 3sec R4: 4sec	249
Kampala/Entebbe rd. jct. Kampala Jinja Entebbe					-
	G1: 40sec Y1: 5sec R1: 2sec	G2: 25sec Y2: 5sec R2: 2sec	G3: 40sec Y3: 5sec R3: 2sec	G4: 16sec R4: 2sec (for pedestrian)	**144**
Shoprite jct. Sikh St Ben Kiwanuka Entebbe Clock				-	-
	G1: 23sec Y1: 3sec R1: 5sec	G2: 55sec Y2: 3sec R2: 5sec	G3: 78sec Y3: 3sec R3: 5sec	-	**180**
Clock Tower jct. Shoprite Mengo Hill Nsambya Queen's				-	-
	G1: 23sec Y1: 3sec R1: 5sec	G2: 55sec Y2: 3sec R2: 5sec	G3: 78sec Y3: 3sec R3: 5sec	-	**180**
Natete jct. Natete Masaka Old Masaka					-
	G1: 34sec Y1: 4sec R1: 0sec	G2: 11sec Y2: 4sec R1: 3sec	G3: 55sec Y1: 4sec R1: 0sec	G4: 8sec Y1: 4sec R1: 3sec	**130**
Bakuli jct. Natete Fort Hoima					-
	G1: 40sec Y1: 4sec R1: 0sec	G2: 20sec Y2: 3sec R1: 3sec	G3: 38sec Y1: 3sec R1: 0sec	G4: 15sec Y1: 3sec R1: 3sec	**132**

Source: JICA Study Team

Figure 10.5.4 Survey Results of Cycle Time and Phasing (AM peak hour)

PM Peak (18:00)

Jct. Name	G1	G2	G3	G4	Total
Wandegeya jct. Makerere Haji Bombo					-
	G1: 43sec Y1: 4sec R1: 0sec	G2: 25sec Y2: 4sec R1: 3sec	G3: 32sec Y1: 4sec R1: 0sec	G4: 18sec Y1: 4sec R1: 3sec	140
Port Bell jct. Jinja Old Port Bell				-	-
	G1: 44sec Y1: 4sec R1: 0sec	G2: 15sec Y2: 5sec R1: 3sec	G3: 23sec Y1: 4sec R1: 3sec	-	101
Kibuli jct. Nsambya Kibuli Gaba				-	-
	G1: 33sec Y1: 4sec R1: 2sec	G2: 53sec Y2: 4sec R1: 2sec	G3: 16sec Y1: 4sec R1: 2sec	-	120
Jinja rd. jct. Yusufu Jinja Access					-
	G1: 61sec Y1: 4sec R1: 2sec	G2: 34sec Y2: 4sec R2: 4sec	G3: 43sec Y3: 4sec R3: 2sec	G4: 73sec Y4: 4sec R4: 4sec	239
Kampala/Entebbe rd. jct. Kampala Jinja Entebbe					-
	G1: 45sec Y1: 5sec R1: 2sec	G2: 30sec Y2: 5sec R2: 2sec	G3: 35sec Y3: 5sec R3: 2sec	G4: 17sec R4: 2sec (for pedestrian)	150
Shoprite jct. Sikh St Ben Kiwanuka Entebbe Clock				-	-
	G1: 28sec Y1: 3sec R1: 5sec	G2: 83sec Y2: 3sec R2: 5sec	G3: 45sec Y3: 3sec R3: 5sec	-	180
Clock Tower jct. Shoprite Mengo Hill Nsambya Queen's				-	-
	G1: 28sec Y1: 3sec R1: 5sec	G2: 83sec Y2: 3sec R2: 5sec	G3: 45sec Y3: 3sec R3: 5sec	-	180
Natete jct. Natete Masaka Old Masaka					-
	G1: 34sec Y1: 4sec R1: 0sec	G2: 11sec Y2: 4sec R1: 3sec	G3: 55sec Y1: 4sec R1: 0sec	G4: 8sec Y1: 4sec R1: 3sec	130
Bakuli jct. Natete Fort Hoima					-
	G1: 40sec Y1: 4sec R1: 0sec	G2: 20sec Y2: 3sec R1: 3sec	G3: 38sec Y1: 3sec R1: 0sec	G4: 15sec Y1: 3sec R1: 3sec	132

Source: JICA Study Team

Figure 10.5.5 Survey Results of Cycle Time and Phasing (PM peak hour)

(3) Present Condition of Facilities

The results of field survey for traffic signals are shown in Table 10.5.4. The traffic lights in the nine junctions surveyed consist of three bulb types and six LED types. At some junctions with bulb type, traffic signals are not functioning because the light bulbs have already burned-out. This situation is hazardous for road users.

Uninterruptable power supply systems composed of uninterruptable power system (UPS), automatic engine generator (AEG) and automatic voltage regulator (AVR) are utilized at four junctions.

Table 10.5.4 Outline of Facilities for Traffic signals

No.	Jct. Name	Year	Operation	Lamp	Power Voltage	UPS	Remarks
1	Wandegeya	1998	Operating	Bulb	AC240V	No	*1,*3
2	Port Bell	1998	Operating	Bulb	AC240V	No	*1,*2
3	Natete	1998	Resumed	Bulb	AC240V	No	*1
4	Bakuli	2002	Operating	LED	AC100V	No	*1
5	Kibuli	2002	Non-operating	LED	AC100V	No	*2
6	Clock Tower	2005	Operating	LED	AC100V	Yes	*2
7	Shoprite	2005	Operating	LED	AC100V	Yes	*1,*2
8	Jinja	2005	Operating	LED	AC100V	Yes	
9	Kampala/Entebbe	2005	Operating	LED	AC100V	Yes	

*1: A few lamps do not light. (New bulbs have already requested from vendor)
*2: Signals for pedestrian are damaged by traffic accidents.
*3: Controller is made in Uganda.
Source: JICA Study Team

At three junctions where traffic signals were installed in 1998, UPS of large size should have been installed. However, great care and high maintenance costs were required due to failure caused by recurring power interruptions and voltage surge. For this reason, the power supply system of traffic signals had been changed to automatic shutoff system. Hence, UPS is not utilized presently at said junctions.

Lamp fittings at Wandegeya Jct. have been operated by controllers made in Uganda. According to KCC, the controller is a test installation. After completion of the test, the controller will be replaced with a Japanese product. Traffic signals at Bakuli Jct. have not been operated due to failure of the controller. Such failure was due to the burnout surge absolver caused by unexpected high voltage. In addition, security circuit for unexpected high voltage is not set at Bakuli Jct.

Overall, traffic signal lights are not visible to the drivers due to the grimness of the lenses. In addition, some hoods of traffic signals for pedestrians require repair or replacement due to deformation and/or disrepair.

(4) Present Condition of Maintenance

Traffic signal facilities have been maintained by the electric department of KCC. Two staff members (principal engineer and assistant of principal engineer) are working for this department. Both staff started to work for KCC from July 2010.

The Study Team checked the existing maintenance system and equipment for traffic signals together with KCC staff and the former principal engineer. The results were as follows:

1) Equipment and Tools for Maintenance

KCC does not have essential equipment and/or tools such as screw drivers, wrenches, pincers

and multimeters, etc. Staff members have been using their individually owned tools when needed. In addition, KCC does not have essential safety equipment (helmet, safety footwear, safety fence, etc.) for their workers and road users during maintenance works. On the other hand, KCC purchased last year service vehicles made in China to be utilized while working at high places. The service vehicle is useful for maintenance of not only traffic signals but also street lights.

2) Maintenance System

Normally, information about traffic signal troubles is obtained through messages from road users and/or radio broadcast. In case of emergency such as a traffic accident, information is directly informed to traffic police.

According to KCC staff,, the frequency of each routine maintenance activity is as follows:

- Cleaning of control room: once a week (by air blower)
- Refuel: once in a few days
- Cleaning of lens of traffic signals: once in one or three months
- Checking of bulbs: every half year (all bulbs (green, yellow, red) are changed as needed)

However from the results of the field survey, routine maintenance works mentioned above were not executed as scheduled. In fact, theses maintenance works have not been recorded. Moreover, essential documents such as as-built drawings, connection diagrams, etc. were not filed. This means that maintenance works are being carried out based on experience and at the discretion of skilled staff. This situation compromises an effective maintenance system.

10.5.3 PRESENT CONDITION OF PROCUREMENT

(1) Budget for Maintenance of Traffic Signals

The following table shows the budget and result of maintenance survey in the electric department of KCC from 2007 to 2010. According to this table, the budget for maintenance of equipment is very wide. Therefore, ensuring the maintenance budget in a planned and consistent way is a considerable issue.

Table 10.5.5 Budget and Result of Maintenance Survey in the Electric Department of KCC (2007-1010)

Year		2007 - 2008			2008 - 2009			2009 - 2010*	
		Budget	**Used**	%	**Budget**	**Used**	%	**Budget**	**Used**
1	General Staff salaries	15,000,000	13,689,310	91.3%	15,000,000	13,200,100	88.0%	15,000,000	11,200,567
2	General Supply of Goods & Services	10,000,000	9,400,000	94.0%	-	-	-	-	-
3	Electricity for street Lights	75,000,000	84,000,000	112.0%	148,167,364	89,000,000	60.1%	480,000,000	66,490,422
4	Fuel, Lubricants and oils street lights patrol	10,000,000	3,567,000	35.7%	11,441,000	6,000,500	52.4%	50,000,000	14,640,300
5	Other structures (Lights, Signals, Instain poles)	20,000,000	7,890,000	39.5%	393,207,629	200,050,000	50.9%	150,000,000	111,507,938
6	Maintenance of equipment	-	-	-	252,510,020	252,510,020	100.0%	20,000,000	-
7	Transport Equipment (Platform Vehicle)	-	-	-	-	-	-	150,000,000	-
8	Others	736,449	0	0.0%	-	-	-	-	-
Total		130,736,449	118,546,310	90.7%	820,326,013	560,760,620	68.4%	865,000,000	-

* Used Amount for 2009 - 2010 is not finalized ammount because of under calculation.

Source: KCC

(2) Condition of Procurement for Maintenance

Regarding facilities for traffic signals, power supply devices, output units and lamp fittings for vehicle and pedestrian control are stocked in KCC. As for other facilities, UPS, AEG and AVR have also been purchased from Japan. In the maintenance plan of KCC, facilities of power units for interruptible power supply will be used for Bakuli Jct. As just discussed, KCC purchased sufficient spare parts for the traffic signals scheduled for repair. However facilities and tools for routine maintenance such as for changing oil and/or bulbs are not available. After completion of construction of each junction, some maintenance facilities were supplied by the contractor. These facilities have been kept in KCC as it is. This means that adequate maintenance works have not been executed.

10.5.4 ADEQUATE MAINTENANCE PLAN

Periodic maintenance is absolutely imperative for continued utilization of traffic signals. Responsible organization should establish necessary maintenance items such as periodic inspection of facilities, supply of consumable goods, etc. These items should be managed and recorded.

(1) Periodic Inspection of Facilities

Each facility should be inspected and monitored periodically. In case that inspector finds out a failure of some kind, that facility should be immediately repaired or replaced to avoid traffic disturbance.

Inspection works should be executed in accordance with the “Maintenance Manual” and recorded in the “Check Sheet for Inspection Work”. Recorded items include “date”, “inspection items” and “inspection results”. This check sheet should be filed and kept properly.

1) Inspection for Traffic Signals

Items to be inspected for traffic signals are as follows:

- Controller
- Lamp fittings
- Post
- Hand hole (hatch)
- Power cable

2) Inspection for Power Supply Units

Items to be inspected for power supply units are as follows:

- Incoming circuit and distribution board
- Transformer and AVR
- AEG
- UPS

(2) Emergency Maintenance

In case of emergency events such as failure caused by traffic accident, that facility should be immediately restored to good condition depending on damage and local circumstance.

The most important matter is to identify the causes of damage and prevent its future recurrence.

(3) Necessary Equipment and Tools

1) Tools, Measurement Instruments and Service Vehicles

Before inspection, the inspectors should confirm necessary number of tools, equipment and vehicles. In addition, the inspector should perform operation checks of measurement instruments.

In case of emergency work, site conditions should be checked ahead in conjunction with the works mentioned above.

2) Safety Facilities

At the site, working spaces should be provided with facilities such as signages, fences, etc. to ensure the safety of road users.

3) Stock for Spare Parts and Materials

Spare parts which need replacement periodically and/or facilities which disturb operation should be kept in stock and recorded in the list of spare parts and materials.

After spare parts and/or materials are used, same items should be immediately supplied to maintain the same quantity as before. These activities should be recorded in a consumption list and analyzed statistically. Responsible personnel should review necessary number of stocks based on this statistics.

4) Drawings

The drawings for each junction should be prepared and updated based on changes carried out. Revised dates and contents should be recorded on the drawings. The updated drawings should be used as the latest version. Necessary drawings are as follows:

- Overall view: junction configuration, location of facilities, etc.
- Wire diagram: kinds of cable, number, length and/or distance, etc.
- Connecting diagram: terminal number, cable number, color, etc.

10.5.5 TECHNICAL TRANSFER FOR OPERATION AND MAINTENANCE

(1) Training Session

The training session regarding the role of traffic signal, planning and maintenance had been held for KCC staff. Lessons of oil change and filter cleaning for AEG had been carried out at field site as on-the-job training.

Through this training, the following matters were requested by KCC:

- Intensive and consecutive training for new members, covering the technical functionality

and maintenance of the entire traffic signal control system (i.e. the controller and the associated power systems switch gear).

- Equipment (i.e. computer with Tsec loaded software) to facilitate spot analysis of the operation of traffic signals controls, effect quick changes to the controls where necessary and to maintain the database of all changes done on the systems so as to ensure efficient communication with Japanese experts on the Tsec software when necessary.

- Tools to be utilized for carrying out maintenance works in the most efficient manner.

- A motor vehicle to assist patrol and/or maintenance.

(2) Manual for Planning & Maintenance of Traffic Signals

At the same time, the Study Team created the "Manual for Planning & Maintenance of Traffic Signals" for future works relevant to traffic signals. In addition to the manual, operation manuals for the existing facilities were also reformed. Contents of these manuals are as follows:

1) Planning Manual

- Role of traffic signals

- Cycle time and phasing

- Setting of invariable number for traffic signals

2) Operation Manual

- Controller

- UPS

- AEG

- AVR

3) Maintenance Manual

- Periodic maintenance manual

- Check sheets for maintenance

- Lists of necessary tools, equipment, measurement instruments and vehicles

- List of necessary spare parts, consumption goods

- List of stock record

4) Operation Manual for existing facilities

- Controller: produced by Kyosan and TSEC

- UPS: produced by FUJI Electric Systems

- AEG: produced by FUJI Electric Systems
- AVR: produced by Matsunaga Manufacturing

10.6 ACTION PLAN

10.6.1 MAJOR FINDINGS

Major findings of the Study are summarized as follows:

1) Key Issues on Traffic Management

Key issues on traffic management are as follows:

- Lack of efficient traffic demand management strategy and plan
- Weak Traffic Management and Enforcement
  - There is no traffic management institution or unit in government agencies.
  - The absence of a traffic unit has led to the lack of capacity in traffic management.
  - Lack of funds for maintenance/ upgrading of transport infrastructure.
  - Weak enforcement of traffic laws and regulations due to manpower and financial constraints in the police force and the lack of traffic wardens as backup.

2) Insufficient Walkway and Road Markings

Widths and lengths of existing walkways for pedestrians are not sufficient. In addition, almost all walkways are occupied by not only illegally parked cars, but also some advertisement displays and/or some public facility such as an electric transformer. For these reasons, pedestrians utilize the space allotted for vehicle carriageways. Consequently, insufficient walkways are susceptible to traffic accidents.

In addition, some risky behaviors, such as disregarding stop-lines at junctions by drivers and unregulated road crossing by pedestrians, were due to unmarked roadways.

3) Insufficient Parking Space

Illegal and on-street parking have generated some road safety problems such as occupancy of pedestrian ways, reduction of road capacity, etc. For these reasons, “Measures to Improve Traffic Flow in Kampala City” has been urgently proposed to restrict on-street parking as follows:

In general terms, a parking policy is needed to address parking issues holistically. On-street parking represents a potentially hazardous and congestion, inducing use of public road space, and it should be restricted whenever practical along major roadways.

However, it needs not only urgent measures, but also long term provisions in consideration of introduction of BRT.

4) Inadequate Maintenance System for Traffic Signals

The most noted upgrades in traffic control system are the traffic signals, signs and markings. However, the following issues presently exist in Kampala City:

- Some traffic signals are not effectively functioning due to failure/damage and poor maintenance
- Cycle time and phasing do not satisfy existing traffic flow and volumes
- Major signalized intersections without proper signal control
- Traffic signs and markings do not exist on roads and streets.

10.6.2 ACTION PLAN

(1) Traffic Management

1) Implementation of Low Cost Measures Suggested by the Task Force

The Study Team recommends implementation of many measures in the "Strategy for the Improvement of Traffic Flow in Kampala in December 2009" suggested by the **Task Force of MoWT, KCC, UPF, MoLG and UNRA, as these can be implemented at relatively low costs** while waiting the introduction of permanent measures like BRT and flyovers.

2) Traffic Demand Management for GKMA / Kampala City Environment

The "demand-side strategy and measures" are more important in addressing traffic demand management since availability of budget is insufficient and land acquisition to increase road facilities is difficult. This is expected to meet the rapidly increasing traffic demand. Table 10.6.1 shows a preliminary study on major traffic demand management methods which could be applicable to GKMA. **The private sector participation and initiative are among the key issues for the implementation of measures. Government initiative, strong political will and understanding of all stakeholders and people are also required for its realization**.

Table 10.6.1 Preliminary Study on the Application of Traffic Demand Management Methods

Item	Measures	Applicability in Uganda (GKMA)			Current Stage	Key Issue
		Effectiveness[1]	Ease[2]	Cost[3]		
Introduction of Appropriate Traffic Means	Enhancement of Public Transport Use (BRT)	A	B	C	FS / DD Stage (WB)	Investor, Land acquisition
	Enhancement of Public Transport Use (Large Bus)	B	B	B	Initial Study (JICA)	Investor, Road improvement
	Cycles Ways	B	B	B	A study in TSDP (WB)	Narrow roadway, Hilly topography
	Pedestrian Ways	B	B	A		Narrow roadway, Hilly topography
Efficient Traffic Demand Control	Efficient Use of Cars (3 in one, Shared use)	B	B	A		
	Efficient Use of Cars (no car days)	NA	NA	A		No alternative transport means
	Reduction of Traffic Demand (flexible working hours)	A	C	A	Recommendation by JICA Expert	Private sector initiative
Guidance on Appropriate Use of Vehicles	Traffic Control (regulation, etc)	B	B	A		
	Regulation (zone system, large vehicle pass, one way, etc)	B	A	A	On going KIIDP	
	Parking Control	A	C	A	A study in TSDP (WB)	No alternative spaces and facilities, Poor public transport
Implementation of Integrated Traffic Policy	Government Leading Enforcing Regulation, Private Sector Participation, etc	B	B	C		Strong government initiative, Private sector participation
	Urban Structure Change	A	C	A	New structure plan (KIIDP)	Long term plan and strategy, Private sector participation

Notes: 1. A; very effective, B; effective, C; possible
2. A; very easy, B; easy, C; possible
3. A; low, B; medium, C; high

Source: JICA Study Team

The Study Team recommends that MoWT jointly establish and operate a committee, participated by the multiple sectors of government, agencies, business associations and academics, etc.

It is considered that dispatch of a team of advisors, long-term and short-terms experts specialized in traffic management is necessary to assist in the establishment of the committee and its operation.

3) Organizational and Institutional Arrangement of Traffic Unit

The Study Team recommends the establishment of a **Traffic Unit** as suggested by the Task Force of MoWT, KCC, UNRA, UPF and MoLG, to perform overall traffic management of GKMA. As availability of personnel and capacity is insufficient, planning and implementation of capacity development is required. Expertise in traffic management is also insufficient to organize relevant agencies and private sectors, and to operate the Traffic Unit.

The above recommended JICA advisors could assist in operation of the Traffic Unit.

(2) Development of Pedestrian Friendly Walkways (Footpath)

Although walking is one of the dominant and most economical modes of transport, the current condition of the walkway facilities is very poor. The Study Team recommends conducting a walkway development master plan study with the cooperation of the development partners. The study should cover walkway (footpath) inventory, including width, condition, utility poles and other obstructions, for KCC roads of about 600 km, pedestrian flow survey (volume, OD), walkway development plan, including skywalks (pedestrian bridges) and implementation plan preparation.

Walkways (Foot Path) in the CBD

Walkways (Foot Path) in the CBD

Source: JICA Study Team

Figure 10.6.1 Example of Walkways (Footpath) in the CBD

(3) Parking in the CBD / City Center

1) Parking Study

Conduct a parking study as planned in TSDP, analyze current situations and establish a concrete policy, strategy and plan to address parking and traffic congestion issues.

2) Efficient Utilization of Existing Parking Spaces and Facilities

The Study Team suggests the following:

- Maximize use of existing car parking spaces and facilities in the city center to minimize

on-street parking.

- Increase on-street car parking fees in order to give pressure to parking users. Also, it would encourage participation of private investors interested in building off-street car parking facilities.

- Establish car park sharing scheme, in which car parking users are allowed to park at any building within a particular zone, from which the management of the buildings share the income generated from parking fees.

- Introduction of parking guide system to maximize parking space utilization and reduce the traffic congestion caused by drivers looking for vacant parking spaces.

3) Development of New Parking Spaces and Facilities

Appropriate parking spaces and facilities are required to sustain business activities in the city center as MRT/LRT network has not been provided yet. Since parking control would not be much effective unless provided with alternative parking system and facilities and/or alternative convenient public transport means, the Study Team also recommends:

- Construction of car parking complexes at vacant lands, including railway yards, in the city center, without sacrificing green spaces and parks.

- Underground parking should also be considered with the participation of the private sector (PPP).

- Redevelopment of open markets of Owino and Nakasero in the city center with the provision of parking facilities at the basement.

- Move old and new taxi parks outside the city center, and construct combined facilities of parking and commercial establishments as a part of downtown redevelopment.

These measures and redevelopment should be planned as part of the comprehensive urban development planning for the long-term.

(4) Traffic Signal Operation and Maintenance in Kampala City

1) The Necessity of Upgrading Existing Facilities

- Change traffic lights to LED and/or Fluor Lamp Type

  The production of bulbs for traffic signals was discontinued with the changing social background. Consequently, procurement of bulbs takes forever lot of time. Hence traffic signals with bulb type should be replaced with LED type. Advantages of LED type are: a) reduction of maintenance cost, b) reduction of operation cost with its energy saving feature, c) improvement of visibility.

- Enhancement of Power Supply System

  Power supply system combined with UPS, AEG and AVR has a high advantage. In fact, KCC is preparing to install this supply system to Bakuli Jct. Such supply system should also be installed at other junctions.

2) Upgrading of Maintenance System

- Systematic purchase of spare parts and tools

  Sufficient quantities of necessary spare parts are procured by KCC. However, these spare parts are not effectively used because essential tools for maintenance and repairs are not sufficiently available. Hence, systematic purchase is required to carry out effective maintenance.

- Sustainable maintenance system

  In this study, a maintenance manual was prepared in line with the current condition of KCC. However, accumulation of know-how and continuous trainings are still necessary for the establishment of a sustainable maintenance system. Hence, continuous follow-up by an expert or dispatching of an expert to KCC is recommended. In addition, construction of traffic parks for conducting traffic safety education and/or training of maintenance of traffic signals are also recommended.

3) Junction Configuration and Phasing

Change of cycle time of junctions with oversaturation (S>1.0) is described as ineffective. However, from the viewpoint of service level, cycle time and/or phasing should be reviewed.

Table 10.6.2 Definition of Service Level for Signalized Junctions

Service Level	Cycle Time (second)
A	70 s and below
B	70 s to 100 s
C	100 s and above

Source: JICA Study Team

In case that service level "C" is required, maximum cycle time should not be over 120 s. Even if 120 s and above is applied as necessary, 180 s should be set as the practical limit.

Frequently, long cycle times generate blockage of straight traffic due to queue of right-turning traffic. Therefore, the reduction of cycle time can possibly alleviate traffic jam at junctions as the queue is reduced.

Readjustments of cycle time, phasing and sprits are normally among the effective measures for ensuring smooth traffic at junctions. The cycle time and phasing for traffic signals are decided and adjusted based on actual demand. For this purpose, annual traffic survey will be necessary. Of course, setting changes to traffic signals do not bring solution to all the problems encountered at junctions. Geometric change including necessary lane-number and new road markings are also required in conjunction with setting changes.

(5) The Supply of Traffic Control Facilities

Signalization of four priority junctions (Equatoria, Pride Theater, Nakulabye, Bwaise) in Kampala City is currently in progress under KIIDP (World Bank financed). However, as the current number of traffic lights is far from actual requirements on both traffic volume (management) and safety, the Study Team will suggest a signalization plan and program.

Details of traffic signal planning are described in the manual prepared by the Study Team. The following cases are generally the criteria for the introduction of traffic signal in Japan:

Case-1: In case the purpose is to control a traffic flow at junction:

- Both main roads and connecting roads have a width of 10 m or more,
- Traffic volume in 12-hours is more than 7,000 vehicles, or
- Traffic volume in peak-hour (1 hour) is more than 700 vehicles.

Case-2: In case the purpose is to secure a traffic safety for pedestrians on road without junction:

- Traffic volume in 12-hours is more than 6,000 vehicles, or
- Traffic volume in peak-hour (1 hour) is more than 650 vehicles, or
- Number of pedestrians who cross the road is more than 200 persons per hour.

Other Cases:

- In case accident prevention is possible by traffic light.
- On school roads, at facilities for those with disabilities and at public facilities,

(6) Traffic Control Center

NTMP/GKMA planned the improvement including signalization of approximately 60 major junctions. However, change from stand-alone signals to area and line controlled signalization is required for the establishment of workable traffic control systems. As also recommended in Chapter 8 (Road Traffic Safety Plan), the Study Team recommends commencement of a centralized traffic control center establishment on traffic management aspects.

CHAPTER 11 ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

11.1 BASIC APPROACHES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

11.1.1 BASIC APPROACHES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

Environmental Impact Assessment (EIA) is a systematic and inter-disciplinary evaluation of the potential positive and negative environmental effects of a proposed project or program. EIA is a tool for better planning to permit the integration of environmental concerns into the policy and project planning process at the earliest possible planning and design stages. EIA identifies, predicts and evaluates the foreseeable environmental impacts, both beneficial and adverse, of project, with a view to eliminating, where possible, or minimizing the negative impacts while optimizing the positive impacts.

Since the proposed projects are located in the Kampala urban area, a wide rage of negative and positive impacts is anticipated for project implementation. "The JICA Guidelines for Environmental and Social Considerations," which came into force in April 2004, requires the GOU taking appropriate considerations of environmental and social factors for planning, preparation and implementation of the proposed projects.

On the other hand, in Uganda, Environmental Impact Study (EIStudy) is required for proposed activities that are likely to have significant impacts on the natural and social environment. It is stated that EIA is indispensable for all major roads and all roads in urban, scenic, wooded or mountainous area. The principal guidelines of Uganda to be used for EIA are "Guidelines for EIA in Uganda, 1997" and "EIA Guidelines for Road Projects, MoWT (MoWHC), 2007" which are to be applied for the road sub-sector.

The environmental and social considerations in this study shall be conducted in accordance with the environmental guidelines of both GOU and JICA. According to the "Minutes of Meeting on Scope of Works for the Study" in 2007, the Uganda side is responsible for the environmental and social considerations. The Study Team shall assist initiative of MoWT in the environmental and social consideration activities.

The Initial Environmental Examination (IEE in the JICA guideline) was conducted for screening and initial environmental evaluation of long list projects for selection of shortlist (priority) projects for the Pre-FS candidates. According to the screening in the IEE, EIA will be required for the Pre-FS projects in the FS stage and/or in the detailed design stage. EIStudy/EIA Study will identify items and magnitude of negative impacts and their mitigation measures to eliminate or minimize such impacts, establish recommended environmental management, and comprehensive monitoring plans for implementation of the proposed project. Throughout the EIA processes, appropriate public participation are ensured as a way of public input into the planning and design in accordance with the EIA guidelines.

However, as this is a pre-feasibility study, the Study covers project briefing, screening and scoping in the environmental guidelines of NEMA/MoWT, of Pre-FS Projects to recommend the required EIStudy /EIA Study items and scopes in the next FS and/or detailed design stages.

11.1.2 ENVIRONMENTAL ADMINISTRATION ENTITIES OF GOU

The following entities are in charge of environmental issues:

(1) National Environmental Management Authority (NEMA)

The most supreme organization of the environmental administrations in Uganda is NEMA, a semi-autonomous institution established in 1995. NEMA is responsible for undertaking enforcement, compliance, review and monitoring of the EIA. In that regard, NEMA facilitates the public participation for the environmental decision making, and exercises general supervision for all environmental issues. NEMA deploys focal point of environmental issues for ministries and local governments.

(2) Ministry of Works and Transport (MoWT)

There is an environmental section within the Ministry and two environmental officers are seconded by NEMA as focal point that deals with all the environmental issues including EIA of the projects of the Ministry. The Ministry implements all the road projects under its jurisdiction by taking into consideration environmental issues in close relationship with NEMA through these officers. MoWT has issued, in the year 2007, its own EIA guideline for all road and transport projects under its jurisdiction, named "EIA Guidelines for Road Projects". All road and transport related projects under its jurisdiction should follow this guideline.

(3) Uganda National Roads Authority (UNRA)

This organization was established in July 2008. Officially, no environmental section or unit exists within the current organization chart of UNRA, but one permanent environmental staff is working at the Planning Department of UNRA. Basically, he is in charge of all EIA related issues associated with road development projects supervised by UNRA.

(4) Local Environmental Committee

The committee members are appointed at the local government level. They are supposed to examine the environmental matters including environmental and social considerations for any development project.

(5) Ministry of Water and Environment

Key functions of the Ministry of Water and Environment (MWE) are to promote the rational and sustainable utilization and/or development of water resources while conserving a relevant surrounding watershed environment in Uganda. There are several divisions within the MWE. The Directorate of Water Development (DWD) is in charge of the promotion of a sustainable use of water resources.

(6) National Forest Authority (NFA)

The NFA was established under the National Forestry and Tree Planting Act, 2003. The NFA is under the MWE, and is mainly in charge of the sustainable usage of the forest resources of Uganda as well as stable environmental management of those resources.

11.1.3 ENVIRONMENTAL LAWS AND GUIDELINES OF GOU

The following are environmental-related laws and regulations including guidelines of GOU:

- The National Environmental Statute (Cap 153) of 1995;

- **Guidelines for EIA in Uganda, 1997, NEMA;**
- The EIA Regulations, Gazette #28 of 1998;
- The National Environment (Conduct and Certification of Environmental Practitioner), Regulations (# 85) of 2003;
- **EIA Guideline for Road Projects, 2007, MoWT (MoWHC);**
- The National Environment (Wetlands, River Banks and Lake Shores Management), Regulations (#3) of 2000;
- Water Act (Cap 152) of 1997;
- The Mining Act of 2003; and
- The National Forestry and Tree Planting Act, 2003

11.2 COMPARISON OF EIA GUIDELINES BETWEEN GOU AND JICA

11.2.1 COMPARISON BETWEEN THE EIA GUIDELINES OF GOU AND JICA

There are no substantial differences about policy, definition and contents of EIA between the EIA guidelines of GOU and JICA, except the objectives. *The objectives of JICA guidelines are to encourage the recipient governments (recipient countries of Japanese ODA) to take appropriate consideration of environmental and social factors* as well as to ensure that JICA's support for and examination of environmental and social factors are conducted accordingly.

The following table is a comparison between the Environmental Guidelines of GOU and JICA:

Table 11.2.1 Comparison between EIA Guidelines of GOU and JICA

Item	Government of Uganda (GOU) [EIA Guideline for Road Projects, 2007, MoWT]	JICA [Guidelines for Environmental and Social Considerations, 2004]
Policy	• EIA is a system in which adverse environmental impact can be foreseen, eliminated or mitigated for development projects • EIA process should be inter-disciplinary and transparent with stakeholder involvement	• Definition of EIA is the same as that of GOU's • In Japan's Official Development Assistance (ODA) activities, both countries do EIA together • EIA content and process are basically the same as those of GOU but the JICA guideline must be also reflected/included
Definition	EIA is a systematic examination and/ or study that is conducted to determine whether of not project will have any adverse impact on the environment (natural and social)	Though the terminology is different, Environmental and Social Considerations Studies means EIA
Objectives	EIA is to a tool for better planning and to permit the integration of environmental concerns into the policy and project planning process at the earliest possible planning and design stages	To encourage the recipient governments to take appropriate consideration of environmental and social factors as well as to ensure that JICA's support for and examination of environmental and social factors are conducted accordingly
Category (Screening)	• **IV:** Projects which have significant adverse impacts and detailed EIStudy is required • **III:** Projects which have some level of	• A: Projects which have significant adverse impact and required in depth EIA study

Item	Government of Uganda (GOU) [EIA Guideline for Road Projects, 2007, MoWT]	JICA [Guidelines for Environmental and Social Considerations, 2004]
	environmental impact which require Environment Impact Review (EIR) • **II:** Projects likely to have minor impacts but mitigation measures have been adequately identified • **I:** Projects not having any significant impacts. Exempt from EIA	• B: Projects which have potential adverse impact that are less than Category A • C: Projects which have minimal impact and further studies are exempted
Scoping	• "Scoping" identifies the critical biophysical, socio-economic, and cultural issues, which will need to be addressed by the EIR or EIA • Scoping exercise delineates the boundaries of the Study area, identifies preliminary alternatives, suggest a schedule of EIStudy, and public involvement • Scoping assists in the planning of EIStudy and forms the basis of Terms of Reference (TOR)	• "Scoping" of JICA has the same definitions as that of GOU's in principle • Scoping means deciding alternatives to be analyzed, a range of significant and likely significant impacts, and study methods
Public and Stakeholder Consultation	• In this study, Public Consultation means all the stakeholders including affected people and communities • Stakeholders' meeting means all the technical persons and organizations or entities including ministries and district government staff	"Local stakeholder" means affected individuals or groups, including squatters and local Non-government organizations (NGOs). "Stakeholder" means individuals or groups who have views about cooperation projects, including local stakeholders
	• Public/stakeholder consultation 1) During the conduction of EIStudy 2) After the conduction of EIStudy • Stakeholder consultation 1) Scoping 2) Review of the TOR for EIStudy	• Stakeholder (public) consultation 1) Scoping 2) During the conduction of EIA Study (EIA) 3) Draft Final Report
Decision Making	1. Review and comments on EIS (Environmental Impact Statement) 2. Approval of EIS 3. Certificate of Approval of EIA (NEMA) 4. Decision on project implementation	1. EIA Report review by JICA and recommendation to MOFA 2. Approval of EIA by Recipient Government (Certificate from GOU) 3. Approval by JICA 4. Decision on project implementation

Source: JICA Study Team

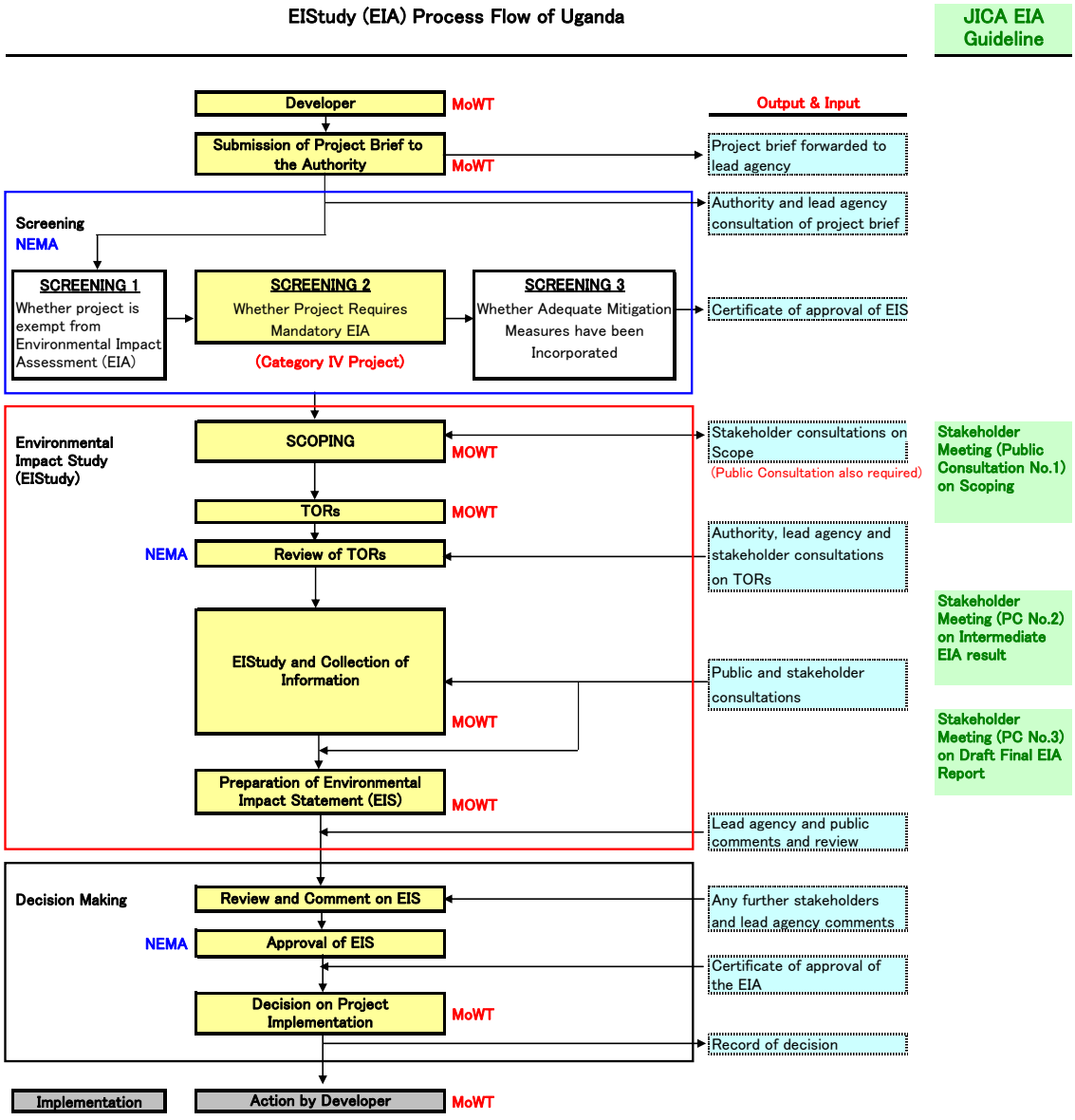
As the terminology of EIA level study in the JICA Guideline is almost the same as EIStudy in Uganda, it is hereinafter referred to as "***EIStudy/EIA Study***" or "***EIA Study***" in this report. It seems that the proposed Pre-FS projects will be categorized into "IV" according to the MoWT Environmental Guideline and Category B (or Category A) in the JICA Guideline. Hence, it requires EIStudy in the MoWT Guideline and EIA level study in the JICA Guideline at their FS and/or detailed design stages[1].

11.2.2 FLOW OF THE EIS/EIA PROCESS OF GOU AND JICA

Figure 11.2.1 shows a flow chart of the EIA process of GOU and stakeholder meeting (public consultation) requirements in the JICA guideline. The developer shall be referred to as MoWT. To satisfy both guidelines, two stakeholder meetings and three public consultations (hearing) are required during the FS.

[1] New "GUIDELINES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS" of JICA was issued in April 2010 and shall be applied for the FS and DD of the proposed Pre-FS projects in this Study.

The Study Team will assist MoWT taking appropriate actions to meet both the environmental guidelines of JICA and NEMA/MoWT. The Study covers project belief, screening and pre-scoping activities for the EIStudy/EIA Study which should be conducted in the FS and/or detailed design stages. Two stakeholder meetings will be held during this Pre-FS period. Three public consultations are required to meet the JICA guideline during the FS stage.



Note: Process Flow required for the Pre-FS Projects
Source: The Study Team, based on Guidelines for EIA in Uganda, 1997 and EIA Guidelines for Road Projects, MoWT, 2007

Figure 11.2.1 Flow Chart of EIA Process of GOU and JICA

11.3 SCREENING FOR PRE-FS LONG LIST OF PROJECTS

(1) Screening for Pre-FS Long List of Projects in Interim Report I

The Study Team studied screening items (check list for environmental impacts identification) in the environmental guidelines of Uganda and JICA, and confirmed that there are no substantial differences between these two guidelines. The Study Team designed the screening matrix (Initial Environmental Examination in the JICA Guideline) for assessment of the Pre-FS long list projects to meet the items of both guidelines. It is composed of three main items and thirty-eight

sub-items in three project phases (pre-construction, construction and post-construction) as shown in Table 11.3.1 on the next page. The three main items are socio-economic environment, natural environment, and pollution.

Of the four components of long lists projects, the first, second, and third components were subjected to implementation in the short (by 2013) to medium-term (by 2018) and the fourth component in the long-term (by 2023). The environmental screening was conducted for the short to medium-term projects since the objective of short listing is to select candidate projects for the Official Development Assistance of GOJ in the short to medium-term.

The Study Team conducted screenings for environmental and social consideration on the Pre-FS long list projects based on the site reconnaissance survey, preliminary planning, and satellite maps to identify environmental and social impacts. The following table shows screening (assessment) criteria adopted by the Study Team. Both negative and positive impacts were assessed with four levels.

Negative Impact	Positive Impact	Overall Impact*
A- ; Significant	A+ ; Significant	A ; Significant
B- ; Minor	B+ ; Minor	B ; Minor
C- ; Negligible	C+ ; Negligible	C ; Negligible
D- ; Unknown	D+ ; Unknown	D ; Unknown

Note: Positive Impact is indicated with "+" and negative impact is indicated with "-".

Special attention was paid to land acquisition and resettlement requirements as these are the most critical issues when project is implemented in urban area. These two items were considered in the multi criteria analysis for the selection of short listed projects from among those in the long list (refer to Section 6.3).

Table 11.3.2 shows a summary of negative and positive screenings for 15 long list projects in components one, two and three (refer to Annex 5 for screenings of long list projects). Major impacts are located in the items listed in the following table:

Socio-economic Environment	Natural Environment	Pollution
● Migration of populations/ involuntary resettlement ● Land acquisition ● Existing social infrastructure and services ● Vulnerable people ● Infectious diseases/public health ● Traffic jam ● Traffic accident	● Soil erosion ● Flora ● Water resources ● Drainage and flood ● Global warming	● Air ● Water ● Soil ● Solid waste ● Noise and vibration ● Emanating odor

Table 11.3.1 Screening (IEE) Matrix Form for Pre-FS Long List Projects

Item		Description of Possible Impacts	Evaluation**			
			Overall	Pre-c	Const	Post-c
Socio-economic Environment						
1	Migration of populations/ involuntary resettlement	a) Number of houses/buildings to be moved (no) * b) Number of households to be moved (no)				
2	Land acquisition	Area of land acquisition required (ha)***				
3	Land use and local resources	Change of land use system and local resources				
4	Impact on local economy	Employment, livelihood, income generating activities, etc				
5	Social institutions	Social capital, local decision-making system, etc.				
6	Existing Social infrastructure and services	Impact on access to social infrastructure and services, etc.				
7	Vulnerable people	Impact on vulnerable people (poverty)				
8	Equality in development process	Equality of benefits and losses in development process				
9	Conflict in development process	Local conflicts of interests in development process				
10	Gender	Impact on gender issues				
11	Children's rights	Interruption of children's schooling, increase of traffic accident, etc				
12	Cultural heritage	Vulnerability, aesthetic damage, etc				
13	Infectious diseases/public health	Impact on infectious disease, in particular, STD such as HIV/AIDS				
14	Traffic jam	Increase of traffic jams				
15	Traffic accident	Increase and/or decrease traffic accident				
16	Agriculture	Loss of land, crops, access to markets				
17	Livestock	Livestock movement, damage to structures				
Natural Environment						
18	Geography	Geographical conditions				
19	Geology	Geological conditions				
20	Soil erosion	Impact on soil stability				
21	Fauna	Impact on fauna ecology				
22	Flora	Impact on flora ecology				
23	Ground water	Effect on ground water				
24	Water resources	Effect on the surface water including river, lake, etc.				
25	Coastal environment (Lake Victoria)	Effect on the coastal environment				
26	Oceanographic changes (Lake Victoria)	Effect on the oceanographic change				
27	Protected areas	Effect on natural/ecological reserves and sanctuaries				
28	Drainage and flood	Effect on drainage and flood				
29	Localized climatic changes	Effect on local climatic change				
30	Global warming	Effect on the Global Warming Issues				
Pollution						
31	Air	Air pollution				
32	Water	Water pollution				
33	Soil	Soil pollution				
34	Solid waste	Solid waste, industrial discharge management				
35	Noise and vibration	Effect of noise and vibration				
36	Large scale ground settlement	Effect of ground settlement				
37	Emanating odor	Offensive odor				
38	Water bottom/sludge	Pollution on the water bottom and sludge and influence				

Notes:
*These numbers have been identified through satellite picture examination and site survey.
** Pre-c: Pre construction, Const: During construction, Post-c: Post construction period
*** Area of land required in ha (ROW area to be acquired in ha)

Source: JICA Study Team

Table 11.3.2 Summary of Screenings (IEE) for Pre-FS Long List Projects

Item / Description		Project No														
		Flyover		Road Widening with Junction Improvement						Individual Junction Improvement						
		1.1	1.2	2.1	2.1a	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	3.5	3.6	3.7
Socio-economic Environment																
1	Migration of populations/ involuntary resettlement	C	C	B-	A-	A-	A-	B-	C	B-	B-	B-	B-	C	A-	B-
2	Land acquisition	B-	B-	A-	A-	A-	A-	B-	B-	B-	B-	B-	B-	C	B-	B-
3	Land use and local resources	B+	B+	C	C	C	C	C	C	C	C	C	C	C	C	C
4	Impact on local economy	A+	B+	B+	A+	A+/B-	A+/A-	A+	B+	B+/B-	C	B+/B-	C	C	B-	A+
5	Social institutions	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B-
6	Existing Social infrastructure and services	B+/B-	B+/B-	B+/B-	B+/B-	B+/B-	B+/B-	B+/B-	C	B+/B-	C	C	C	B+/B-	B-	B+/B-
7	Vulnerable people	B+	C	B+	B+	B+	B+	B+	C	B+/B-	C	C	C	C	B-	B+
8	Equality in development process	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	Conflict in development process	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	Gender	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	Children's rights	C	C	C	C	B-	B-	C	B-	C	C	C	C	C	C	C
12	Cultural heritage	B-	B-	C	C	C	C	C	C	C	C	C	C	C	C	B-
13	Infectious diseases/public health	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
14	Traffic jam	A+/A-	A+/A-	A+/A-	A+/A-	A+/A-	A+/A-	A+/A-	B+/B-	A-/B+	A-/B+	A-/B+	A-/B+	B-	A-	A+/A-
15	Traffic accident	B+/B-	B+/B-	B+/B-	B+/B-	B-	B+/B-	B+/B-	B-	B-	B+/B-	B+/B-	B+/B-	A+/B-	B+/B-	A+/B-
16	Agriculture	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
17	Livestock	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Natural Environment																
18	Geography	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	Geology	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	Soil erosion	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
21	Fauna	B-	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	Flora	B-	C	B-	B-	B-	B-	B-	C	C	C	C	C	C	C	C
23	Ground water	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	Water resources	B-	B-	B-	B-	C	C	B-	C	C	C	C	C	C	B-	B-
25	Coastal environment (Lake Victoria)	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	Oceanographic changes (Lake Victoria)	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	Protected areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
28	Drainage and flood	C	C	B+	B+	C	C	C	B+	C	C	C	C	C	C	C
29	Localized climatic changes	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	Global warming	A+	A+	B+	B+	B+	B+	B+	C	B+	B+	B+	B+	C	C	B+
Pollution																
31	Air	A+/B-	A+/B-	A+/B-	A+/B-	A+/B-	A+/B-	A+/B-	B-	B+/B-	B+/B-	B+/B-	B+/B-	B-	B-	A+/B-
32	Water	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
33	Soil	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
34	Solid waste	A-	A-	A-	A-	A-	A-	A-	A-	B-	B-	B-	B-	B-	B-	B-
35	Noise and vibration	A-	A-	A-	A-	A-	A-	A-	A-	B-	B-	B-	B-	B-	B-	B-
36	Large scale ground settlement	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
37	Emanating odor	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
38	Water bottom/sludge	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

Note: Refer to Annex 5 as to details.

Source: JICA Study Team

The Study Team drew preliminary road alignments and junction improvement plans on the GIS and satellite maps using AutoCAD. On that, the Study Team identified buildings and houses which might be required for resettlement, and then confirmed their condition by field reconnaissance survey. The number of households, which might be moved (resettlement requirements), was estimated multiplying the number of buildings/houses that exist within the required new ROW in the preliminary plan by a factor of two to five households per buildings/houses based on site survey.

(2) Screening for Pre-FS Long List of Projects in Interim Report II / Draft Final Report

A pre-feasibility study for BRT has been conducted in parallel with the JICA Study since November 2009. Draft Final Report and Final Report of BRT Pre-FS was submitted in April and May 2010, respectively, and accepted by MoWT accordingly. Since the BRT project is one of the priority projects in the National Development Plan (NDP) and NTMP/GKMA, an introduction of BRT is a given condition for JICA Pre-FS and it is required to plan the JICA Pre-FS projects in good coordination with the BRT plan.

However, it has become clear that the short and long list projects in Interim Report I are directly or indirectly affected by the BRT introduction as analyzed in Section 6.5. Taking the latest development of BRT study, the Study Team has reviewed the sub-projects (Table 11.3.2) of the long list of projects during the Interim Report I stage as summarized in Table 11.3.3. The sub-projects in the initial long list but located on the BRT pilot project routes were omitted from the long list for improvement, including road widening and junction improvement, which shall be undertaken during the BRT FS/detailed design.

The Study Team also reviewed requirements for widening of Makerere Hill Road from four-lane dual carriageway to six-lane carriageway road as BRT is introduced on this route. The preliminary estimated cost, land acquisition, and resettlement are revised as shown in the following table.

The following Table 11.3.3 summarizes a review of the long list project.

Table 11.3.3 Review of Long List of Projects

No.	Sub-projects in Long List of Interim Report I	Review of Sub-projects in Interim Report II/ Draft Final Report	Reason of Review
1.1	Jinja-Kampala Rds Flyover	Changed to Yusufu Lule – Mukwano Rds Flyover	Change of the main traffic flows from Jinja – Kampala Rds to Yusufu Lule – Mukwano Rds Flyover by BRT introduction
1.2	Jinja - Yusufu Lule Rds Flyover (Right-turn)	• Jinja - Yusufu Lule Rds Flyover (Right-turn) as Interim Report I • Provide Mukwano – Jinja Rds Flyover (Right-turn)	Add flyovers to take the right traffic, reduce conflicts with the BRT from Mukwano Rd to Jinja Rd at Jinja Road Jct.
1.3	Kampala Rd – Queen's Way Flyover	Change to Mengo Hill - Nsambya / Mukwano Rds or Queen's Way – Nsambya / Mukwano Rds Flyover Clock Tower Jct	Since the Kampala/Entebbe Rds Jct is closed for the general traffic and a BRT station is anticipated at the start of point of the K-Q flyover, the original plan conflicts with the BRT plan.
2.1	Jinja Road (Port Bell Jct - Banda/Northern Bypass Section)	Omitted	Omission since this is on BRT Pilot Project
2.1a	Jinja Road (Banda - Northern Bypass Section)	Omitted	Omission since this is on BRT Pilot Project
2.2	Bombo Road (Makerere Rbt - Northern Bypass Section), including Makerere Rbt Flyover	Omitted	Omission since this is on BRT Pilot Project
2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	Dual carriageway from 4 lanes to 6 lanes	2 lanes x 2 ways for the general traffic and 2 dedicated lanes for BRT on this road
2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	No change in principle	
2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	No change	
2.6		Widening of Queen's Way and Flyover on Kibuye Rbt	Addition taking request of MoWT into account
3.1	Hoima Rd - Kimera/ Masiro Kawaala Rd Jct (Kasubi Jct)	No change in principle	
3.2	Kira Road - Acacia/ Babiha Av/Kayunga Rd	No change in principle	
3.3	Kira Rd - Ntinda Rd Jct	No change in principle	
3.4	Port Bell (Nakawa) - Old Port Bell Rd Jct	No change in principle	
3.5	Jinja Rd - Lugogo Bypass Junction Improvement	Omitted	Omission since this is on BRT Pilot Project
3.6	Ben Kiwanuka Rd - Luwum St Jct	No change in principle	
3.7	Shoprite & Clock Tower Jcts Traffic Safety Improvement	No change in principle	

Source: JICA Study Team

Table 11.3.5 shows a summary of the negative and positive screenings for 13 projects in the revised long list (refer to Annex 5 for screenings of the long list of projects). Major impacts are located in the items listed in the following table.

Table 11.3.4 Summary of Screenings (IEE) for Pre-FS Long List of Projects

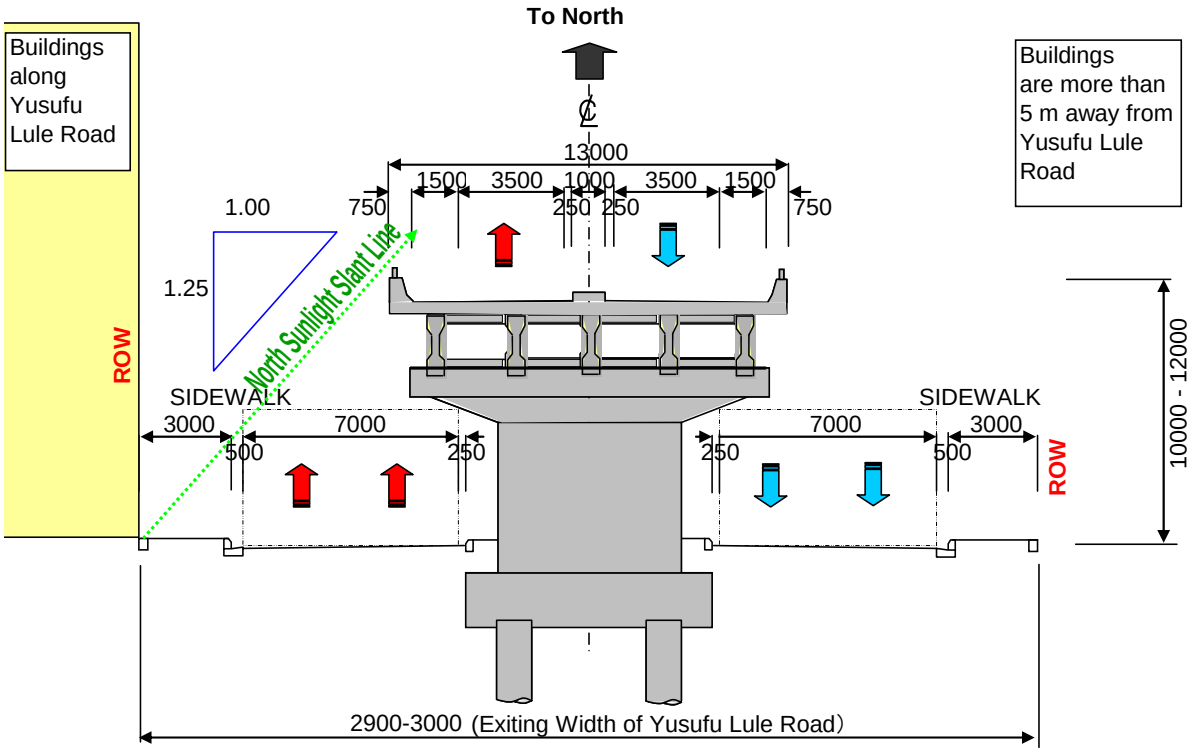
Item / Description		Project No												
		Flyover			Road Widening with Junction Improv				Individual Junction Improvement					
		1.1	1.2	1.3	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	3.6	3.7
Socio-economic Environment														
1	Migration of populations/ involuntary resettlement	B-	B-	B-	A-	B-	C	A-	B-	B-	B-	B-	A-	B-
2	Land acquisition	B-	B-	B-	A-	A-	B-	A-	B-	B-	B-	B-	B-	B-
3	Land use and local resources	B+/B-	B+/B-	B+/B-	C	C	C	C	C	C	C	C	C	C
4	Impact on local economy	A+	B+	B+	A+/A-	A+/B+	B+	A+/A-	B+/B-	C	B+/B-	C	B-	A+/B+
5	Social institutions	C	C	C	C	C	C	C	C	C	C	C	C	B-
6	Existing Social infrastructure and services	B+/B-	B+/B-	B+/B-	B+/B-	B+/B-	C	B+/B-	B+/B-	C	C	C	B-	B+/B-
7	Vulnerable people	B+	B+	B+	B+	B+	C	B+/B-	B+/B-	C	C	C	B-	B+
8	Equality in development process	C	C	C	C	C	C	C	C	C	C	C	C	C
9	Conflict in development process	C	C	C	C	C	C	C	C	C	C	C	C	C
10	Gender	C	C	C	C	C	C	C	C	C	C	C	C	C
11	Children's rights	C	C	C	B-	C	B-	C	C	C	C	C	C	C
12	Cultural heritage	B-	B-	A-	C	C	C	C	C	C	C	C	C	B-
13	Infectious diseases/public health	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
14	Traffic jam	A+/A-	A+/A-	A+/A-	A+/A-	A+/A+	A+/B-	A+/A-	A-/B+	A-/B+	A-/B+	A-/B+	A-	A+/A-
15	Traffic accident	B+/B-	B+/B-	B+/B-	B+/B-	B+/B-	B-	B+/B-	B-	B+/B-	B+/B-	B+/B-	B+/B-	A+/B-
16	Agriculture	C	C	C	C	C	C	C	C	C	C	C	C	C
17	Livestock	C	C	C	C	C	C	C	C	C	C	C	C	C
Natural Environment														
18	Geography	C	C	C	C	C	C	C	C	C	C	C	C	C
19	Geology	C	C	C	C	C	C	C	C	C	C	C	C	C
20	Soil erosion	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
21	Fauna	B-	C	C	C	C	C	C	C	C	C	C	C	C
22	Flora	B-	C	C	B-	B-	C	B-	C	C	C	C	C	C
23	Ground water	C	C	C	C	C	C	C	C	C	C	C	C	C
24	Water resources	B-	B-	B-	C	B-	C	C	C	C	C	C	B-	B-
25	Coastal environment (Victoria Lake)	C	C	C	C	C	C	C	C	C	C	C	C	C
26	Oceanographic changes (Victoria Lake)	C	C	C	C	C	C	C	C	C	C	C	C	C
27	Protected areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
28	Drainage and flood	C	C	C	C	C	B+	C	C	C	C	C	C	C
29	Localized climatic changes	C	C	C	C	C	C	C	C	C	C	C	C	C
30	Global warming	A+	A+	A+	B+	B+	C	A+	B+	B+	B+	B+	C	B+
Pollution														
31	Air	A+/B-	A+/B-	A+/B-	A+/B-	A+/B-	B-	A+/B-	B+/B-	B+/B-	B+/B-	B+/B-	B-	A+/B-
32	Water	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
33	Soil	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
34	Solid waste	A-	A-	A-	A-	A-	A-	A-	B-	B-	B-	B-	B-	B-
35	Noise and vibration	A-	A-	A-	A-	A-	A-	A-	B-	B-	B-	B-	B-	B-
36	Large scale ground settlement	C	C	C	C	C	C	C	C	C	C	C	C	C
37	Emanating odor	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-	B-
38	Water bottom/sludge	C	C	C	C	C	C	C	C	C	C	C	C	C

Source: JICA Study Team

(3) Interruption of Right to Sunlight

The Study Team conducted a desktop study to confirm interruption of sunlight to residential and commercial buildings by construction of the flyovers though there is almost no change in sunlight duration through the year since Uganda is located near the equator. The Study Team conducted the sunlight right study only for the flyover of Project 1.1, Yusufu Lule – Mukwano Rds Flyover as this is constructed along the commercial buildings and hotel. Other flyovers will not disturb private buildings.

As there are no regulations about the right to sunlight in Uganda, the Study Team conducted a study based on a Japanese common method. The planned Yusufu Lule – Mukwano Roads flyover is approximately 13 m wide and 10 – 12 m high and the flyover will interrupt sunlight as a slant angle of 1 in horizontal and 1 in vertical. As shown in Figure 11.3.1, the flyover will not interrupt the right of sunlight. In other words, there is an appropriate space between the flyover and buildings.



Source: The Study Team

Figure 11.3.1 A Study on Interruption of Right of Sunlight by Yusufu Lule – Mukwano Rds Flyover

11.4 SCOPING FOR PRE-FS PROJECTS

11.4.1 OVERVIEW

The scoping defines the boundaries of the study area, study items, study methods and schedule of the EIStudy/EIA Study (EIStudy in Uganda is equivalent to EIA level study in the JICA guideline). It identifies preliminary alternatives, a range of significant and likely significant impacts, and makes assessment on study items. The scoping also includes extent of public involvement required during the EIStudy/EIA Study, and identifies the full range of stakeholders who may be interested in or affected by the project. The scoping is basis in the planning of the EIA Study and preparation of TOR for the FS and/or detailed design stages.

The Study Team recommended to MoWT and JICA five shortlisted projects selected based on multi criteria analysis (national plans, engineering, socio-economic and environmental aspects) and giving priority to the strengthening and bottleneck improvement of the east-west corridor for the pre-FS in Interim Report I (March 2010). The Study Team held a series of meetings with key stakeholders (MoWT, UNRA and KCC) and JICA on the selection of long and short lists of pre-FS projects.

JICA and MoWT have finally agreed on three projects subjected to Pre-FS (refer to Chapter 6) from among the recommended five shortlisted projects in the Interim Report I stage. Preliminary design will be conducted for these Pre-FS projects for which both the GOJ and the GOU agreed during the Interim Report II and Draft Final Report Stage.

Only IEE (screening) will be conducted. Although the Study will mainly cover project briefing and screening, it will also include part of the scoping required for the FS and/or detailed design stage. The target projects subject to scoping for the EIStudy (full EIA) are shown in the following table and Figure 11.4.1.

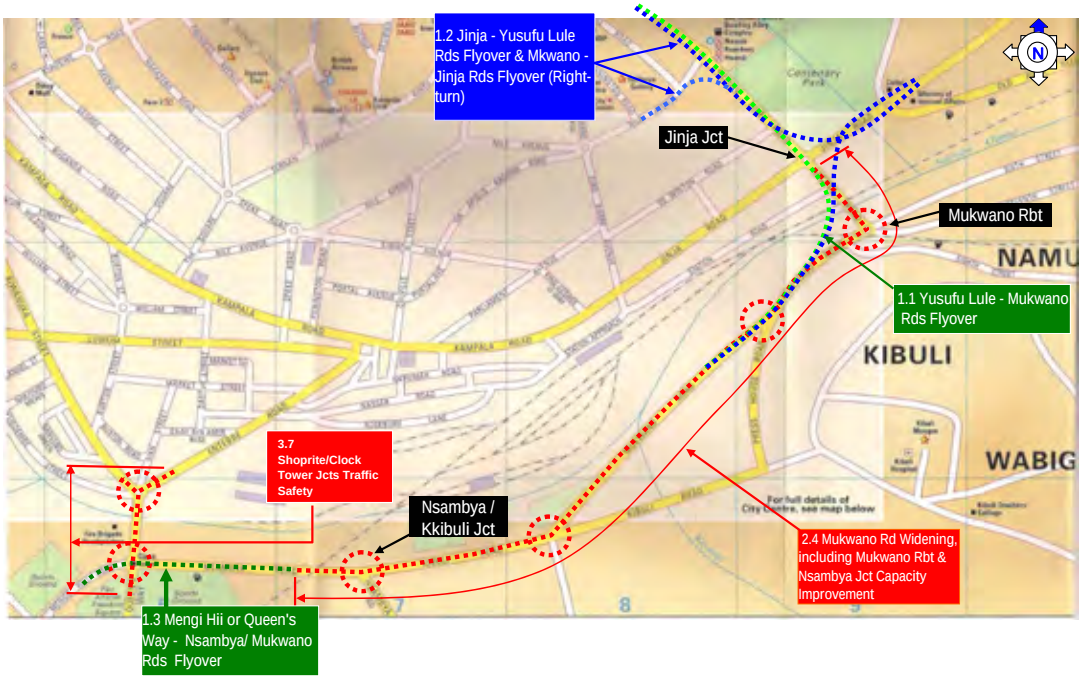
The scope of the EIA Study should cover a wide range of activities during the pre-construction, construction, and post-construction phases which might cause negative or positive impact on the natural and social environment. The EIA Study should deeply study the environmental and social impacts of the items screened (IEE) in this Pre-FS. The EIA Study needs to include planning mitigation measures and alternatives to minimize any adverse negative impact and/or to maximize positive impacts. It should also include establishment of an environmental management plan and a comprehensive monitoring plan by project.

Table 11.4.1 Pre-FS Projects subjected to the EIStudy (EIA Study) in the FS and/or Detailed Design Stages

Project No	Project Name	Basic Project Concept			Implementation Period
		Project Length (km)	Box-culvert Name (works)	Carriageway & Number of Lanes & Junction Improvement	
1 * (1.1)	･Yusufu Lule - Mukwano Rds Flyover	1.7	Nakivubo Channel (Widening)	Dual Carriageway (1-lane for each direction)	Medium Term (2013-2018)
(1.2)	･ Jinja - Yusufu Lule Rds Right-turn Flyover	1.1	Kitante Channel	One-way 2-lanes	Medium Term (2013-2018)
	･ Mukwano - Jinja Rds Right-turn Flyover	0.8	Kitante Channel	One-way 1-lane	Medium Term (2013-2018)
	･ Yusufu Lule - Nile Avenue Rds Left-turn Flyover	0.4		One-way 1-lane	Medium Term (2013-2018)
(1.3)	Mengo Hill - Mukwano Rds Flyover (over Clock Tower)	0.6		Dual Carriageway (1-lane for each direction)	Long-term (2018-2023)
2 (2.4)	Mukwano Rd Widening, including Mukwano Rbt and Nsambya Jct Capacity Improvement	1.8	Nakivubo Channel (Widening)	Dual Carriageway (Add. 2 lanes) & Mukwano Rbt and Nsambya Jct	Medium Term (2013-2018)
3 (3.7)	Shoprite & Clock Tower Jcts Traffic Safety Improvement	Two Junctions	Nakivubo Channel (Widening)	Pedestrian Bridges and Separated Left-turn Lanes	Medium Term (2013-2018)

Note: * The flyovers in Interim Report I were modified to the above in Interim Report II (refer to Section 6.6).

Source: JICA Study Team



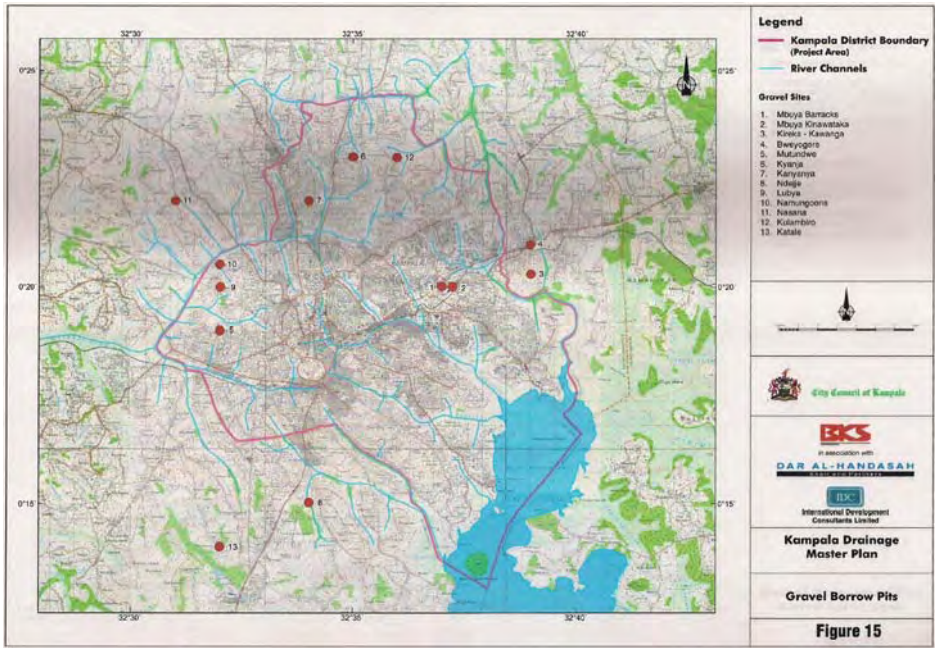
Source: JICA Study Team

Figure 11.4.1 Location Map of Short List Projects subjected to the EIStudy/EIA Study

11.4.2 SCOPING OF PROJECT

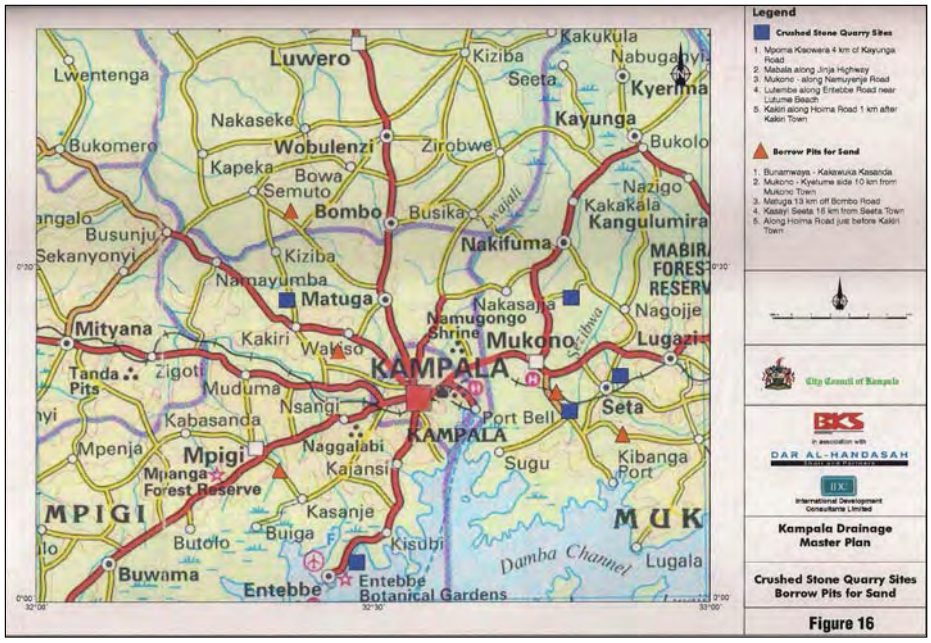
(1) Area of the EIA Study

The EIA Study Area should include the project sites in Figure 11.4.1 and their vicinity, which were influenced directly or indirectly by the Pre-FS projects. The EIA Study area shall also cover expected borrow pits/quarries of soil, sand, gravel and crushed stones, and expected camp sites for the contractors. Figures 11.4.2 and 11.4.3 show these borrow pits and quarries which might be used for the projects.



Source: Nakivubo Channel Rehabilitation Project, 2002, MoLG / KCC

Figure 11.4.2 Gravel Borrow Pits which might be used for Pre-FS Projects



Source: Nakivubo Channel Rehabilitation Project, 2002, MoLG / KCC

Figure 11.4.3 Crushed Stone Quarries and Sand Borrow Pits which might be Used for Pre-FS Projects

(2) Preliminary Alternative Plan Study

The Study Team has studied the preliminary alternative plans including "no project alternative (zero-option)" for Pre-FS projects. The results are as follows:

Project No.	Project Name	Preliminary Alternatives		Preliminary Evaluation
1.1	Yusufu Lule - Mukwano Rds Flyover	(1)	Flyover between Yusufu Lule Rd and Mukwano Rd	Best plan on technical aspects to support BRT plan (pilot route) and minimize traffic congestion
		(2)	Widening of Existing Rd from 4 lanes to 8 lanes	• Conflict with the BRT on Jinja – Kampala Rds • Requirement of more resettlement
		(3)	No project alternative (zero-option)	• Unbearable congestion on Jinja Jct and Africana Rbt • Conflict with the BRT on Jinja – Kampala Rds
1.2	Jinja - Yusufu Lule Rds Right-turn Flyover	(1)	Flyover from Jinja Rd to Yusufu Lule Rd (right-turn)	Best plan on technical aspects to support BRT plan (pilot route) and minimize traffic congestion
		(2)	Widening of Existing Rd	Conflict with the BRT on Jinja – Kampala Rds
		(3)	No project alternative (zero-option)	• Unbearable congestion on Jinja Jct and Africana Rbt • Conflict with the BRT on Jinja – Kampala Rds
	Mukwano - Jinja Rds Right-turn Flyover	(1)	Flyover from Mukwano Rd to Jinja Rd (right-turn)	Best plan on technical aspects to support BRT plan (pilot route) and minimize traffic congestion
		(2)	Widening of Existing Rd	Conflict with the BRT on Jinja – Kampala Rds
		(3)	No project alterative (zero-option)	• Unbearable congestion on Jinja Jct and Africana Rbt • Conflict with the BRT on Jinja – Kampala Rds
	Yusufu Lule - Nile Avenue Rds	(1)	Flyover from Mukwano Rd to Jinja Rd	Best plan on technical aspects to support BRT plan (pilot route) and minimize traffic congestion

Project No.	Project Name	Preliminary Alternatives		Preliminary Evaluation
	Left-turn Flyover		(right-turn)	
		(2)	No project alternative (zero-option)	• Unbearable congestion on Nile Avenue Rbt • Conflict with the BRT at Jinja Jct
1.3	Mengo Hill - Mukwano Rds Flyover (over Clock Tower) Or Clock Tower – Mukwano Rd Flyover Right-turn over Clock Tower	(1)	Flyover from Mengo Hill Rd to Nsambya Rd	• Best plan on technical aspects to support BRT plan (pilot route) and minimize traffic congestion at Clock Tower Jct
		(2)	Flyover from Queen's Way to Nsambya Rd (Right-turn)	• Further study will be required for development of Queen's Way for both BRT and the general traffic
		(3)	Extension of above flyover up to after Nsambya Jct, by crossing over the railways line	• Further study will be required for development of the future railway re-operation to Kasese and/or introduction of passenger trains between Kampala city center and for Busega
		(4)	Widening of Existing Rd and Junctions	• Conflict with the BRT at Clock Tower Jct
		(5)	No project alternative (zero-option)	• Unbearable congestion on Nile Avenue Rbt • Conflict with the BRT at Clock Tower Jct
2 (2.4)	Mukwano Rd Widening, including Mukwano Rbt and Nsambya Jct Capacity Improvement	(1)	Road widening from 2 lanes to 4 lanes	Best alternative on environmental aspects (less resettlement requirements) and cost
		(2)	No project alternative (zero-option)	As severe traffic congestion continues, this alternative will give high negative impacts on both national and regional economy
3 (3.7)	Shoprite & Clock Tower Jcts Traffic Safety Improvement	(1)	• Pedestrian bridge construction • Additional lane construction	Best alternative on traffic safety improvement and environmental aspects (less resettlement requirements) by segregating vehicles and non-motorized traffic
		(2)	Flyover construction over Shoprite and Clock Tower Jcts	• Technically best plan • High cost • Construction would not be feasible as it causes too much congestion during construction • A flyover will be planned between Mengo Hill Rd – Mukwano Road crossing over Clock Tower to minimize new traffic congestion by BRT
		(3)	No project alternative (zero-option)	As high traffic accidents and severe traffic congestion continues, this alternative will give high negative impact on both the national and regional economy

Source: JICA Study Team

The above alternative plans should be reviewed and re-evaluated at the feasibility and detailed design stage.

(3) Items for the EIStudy/EIA Study

The recommended items subjected to the EIA study should be those of which impacts are assessed as significant or minor (A+, A-, B+, B-) in the screening (IEE). No items were assessed to be of unknown impacts (D). Tables 11.4.2 - 11.4.5 show the EIA Study items recommended by the Study Team for the Pre-FS projects. It should be noted that the evaluation results are presented in a qualitative manner in accordance with the scope of the study for the Pre-FS stage, the quantitative analysis for each item would be required in the next stage of feasibility study.

Table 11.4.2 Recommended Items of Scoping for Project No.1.1, Yusufu Lule - Mukwano Roads Flyover Project

Project No: 1.1 Mukwano – Yusufu Lule Rds Flyover (Project length; 1.7km) (Final Short-List for Pre-F/S)							
Item		**Description of Possible Impacts**	**Evaluation****				
			Overall	**Pre-c**	**Const**	**Post-c**	**Reasons******
Socio-economic Environment							
1	Migration of populations/ involuntary resettlement	a) Number of buildings to be moved (no) * b) Number of households to be moved (no) in parentheses	B-	B-, 1 (1HH)			(-) Involuntary Resettlement of 1 household
2	Land acquisition	Total Area of land acquisition required (ha) and private land in parentheses	B-	B-, 0.52 (0.11)			(-) Both public and private land acquisition
3	Land use and local resources	Change of land use system and local resources	B+/B-	B-		B+	(-) Agreement on change of land use is required among different groups and stakeholders. (+) Change of the inefficient public land to business use
4	Impact on local economy	Employment, livelihood, income generating activities, etc	A+		B+	A+	(+) Employment of residents for construction. (+) Change of the inefficient public land to business use and creation of new employment
6	Existing Social infrastructure and services	Impact on access to social infrastructure and services, etc.	B+/B-		B-	B+	(-) Traffic jam of access roads to shopping centers, parks, and government offices during construction. (+) Improvement of accesses to shopping centers and government offices
7	Vulnerable people	Impact on vulnerable people (poverty)	B+		B+	B+	(+) Employment of poor people for construction. (+) Improvement of accesses to Kibuli Market and Mosque
12	Cultural heritage	Vulnerability, aesthetic damage, etc	B-		B-	B-	(-) Change of a traditional view of Kampala Main Junctions
13	Infectious diseases	Impact on infectious disease, in particular, STD such as HIV/AIDS	B-		B-	B-	(-) Many workers mobilized for work
14	Traffic jam	Increase of traffic jams	A+/A-		A-	A+	(-) Traffic congestion during construction (+) Traffic congestion improvement after construction due to capacity increase of junctions
15	Traffic accident	Increase and/or decrease traffic accident	B+/B-		B-	B+	(-) More traffic accidents due to traffic congestion and narrowed roadways during construction (+) Traffic safety improvement due to diversion of substantial traffic to flyover
Natural Environment							
20	Soil erosion	Impact on soil stability	B-		B-		(-) Earthworks during construction
21	Fauna	Impact on fauna ecology	B-		B-		(-) Birds at park
22	Flora	Impact on flora ecology	B-		B-		(-) Cut of trees along median and in the park
24	Water resources	Effect on the surface water including river, lake, etc.	B-		B-		(-) Mud and wasted water flow into Kitante Channel and Nakivubo Channel
30	Global warming	Effect on the Global Warming Issues	A+			A+	(+) CO2 reduction by traffic congestion improvement
Pollution							
31	Air	Air pollution	A+/B-		B-	A+	(-) More prolusion by traffic congestion during construction (+) Improvement of air quality by improvement of traffic congestion
32	Water	Water pollution	B-		B-		(-) Water prolusion by spilled oils from construction plant and vehicles (-) Mud water flow from construction (-) Sewage water from camps
33	Soil	Soil pollution	B-		B-		(-) Dust from construction sites
34	Solid waste	Solid waste, industrial discharge management	A-		A-		(-) Waste of excess soils from construction (-) Solid waste from camps
35	Noise and vibration	Effect of noise and vibration	A-		A-		(-) Noise and vibration by construction plant and vehicles
37	Emanating odor	Offensive odor	B-		B-		(-) Bad smell of asphalt during mixing and construction

Notes:
*These numbers have been identified through satellite picture examination and site survey.
** Pre-c: Pre construction, Const: During construction, Post-c: Post construction period
*** Area of land required in ha (ROW area to be acquired in ha)
**** (-) Reason of Negative Effects, (+) Reasons of Positive Effects

Source: JICA Study Team

Table 11.4.3 Recommended Items of Scoping for Project No.1.2, Jinja - Yusufu Lule Rds and Mukwano – Jinja Roads Right-Turn Flyovers

Project No:1.2 Jinja-Yusufu Lule Rds and Mukwano - Jinja Rds Flyover (Right-turns), Project length 2.3km (Final Short-List for Pre-F/S)							
Item		**Description of Possible Impacts**	**Evaluation****				
			Overall	**Pre-c**	**Const**	**Post-c**	**Reasons******
Socio-economic Environment							
1	Migration of populations/ involuntary resettlement	a) Number of buildings to be moved (no) * b) Number of households to be moved (no) in parentheses	B-	B-, 11 (17HH)			(-) Involuntary Resettlement of 17 households
2	Land acquisition	Total Area of land acquisition required (ha) and private land in parentheses	B-	B-, 2.50 (0.65)			(-) Both public and private land acquisition
3	Land use and local resources	Change of land use system and local resources	B+/B-	B-		B+	(-) Agreement on change of land use is required among different groups and stakeholders. (+) Change of the inefficient public land to business use
4	Impact on local economy	Employment, livelihood, income generating activities, etc	B+		B+	B+	(+) Employment of residents for construction. (+) Change of the inefficient public land to business use and creation of new employment (+) Improvement of access to Kampala Industrial
6	Existing Social infrastructure and services	Impact on access to social infrastructure and services, etc.	B+/B-		B-	B+	(-) Traffic jam of access roads to shopping centers, parks, and government offices during construction. (+) Improvement of accesses to shopping centers and government offices
7	Vulnerable people	Impact on vulnerable people (poverty)	B+		B+	B+	(+) Employment of poor people for construction. (+) Improvement of accesses to Kibuli Market and Mosque
12	Cultural heritage	Vulnerability, aesthetic damage, etc	B-		B-	B-	(-) Change of a traditional view of Kampala Main Junctions
13	Infectious diseases	Impact on infectious disease, in particular, STD such as HIV/AIDS	B-		B-	B-	(-) Many workers mobilized for work
14	Traffic jam	Increase of traffic jams	A+/A-		A-	A+	(-) Traffic congestion during construction (+) Traffic congestion improvement after construction due to capacity increase of junctions
15	Traffic accident	Increase and/or decrease traffic accident	B+/B-		B-	B+	(-) More traffic accidents due to traffic congestion and narrowed roadways during construction (+) Traffic safety improvement due to diversion of substantial traffic to flyover
Natural Environment							
20	Soil erosion	Impact on soil stability	B-		B-		(-) Earthworks during construction
21	Fauna	Impact on fauna ecology	C				(-) Birds at park
22	Flora	Impact on flora ecology	C				(-) Cut of trees along median and in the park
24	Water resources	Effect on the surface water including river, lake, etc.	B-		B-		(-) Mud and wasted water flow into Kitante Channel and Nakivubo Channel
30	Global warming	Effect on the Global Warming Issues	A+			A+	(+) CO2 reduction by traffic congestion improvement
Pollution							
31	Air	Air pollution	A+/B-		B-	A+	(-) More prolusion by traffic congestion during construction (+) Improvement of air quality by improvement of traffic congestion
32	Water	Water pollution	B-		B-		(-) Water prolusion by spilled oils from construction plant and vehicles (-) Mud water flow from construction (-) Sewage water from camps
33	Soil	Soil pollution	B-		B-		(-) Dust from construction sites
34	Solid waste	Solid waste, industrial discharge management	A-		A-		(-) Waste of excess soils from construction (-) Solid waste from camps
35	Noise and vibration	Effect of noise and vibration	A-		A-		(-) Noise and vibration by construction plant and vehicles
37	Emanating odor	Offensive odor	B-		B-		(-) Bad smell of asphalt during mixing and construction

Notes:
*These numbers have been identified through satellite picture examination and site survey.
** Pre-c: Pre construction, Const: During construction, Post-c: Post construction period
*** Area of land required in ha (ROW area to be acquired in ha)
**** (-) Reason of Negative Effects, (+) Reasons of Positive Effects

Source: JICA Study Team

Table 11.4.4 Recommended Items of Scoping for Project Mengo Hill - Mukwano Rds Flyover (over Clock Tower)

Project No:1.3 Mengo Hill - Mukwano Rds or Queen's Way- Mukwano Rds Flyover, Project length 0.6 km (Final Short-List for Pre-F/S)							
Item		**Description of Possible Impacts**	**Evaluation****				
			Overall	**Pre-c**	**Const**	**Post-c**	**Reasons******
Socio-economic Enviro							
1	Migration of populations/ involuntary resettlement	a) Number of buildings to be moved (no) * b) Number of households to be moved (no) in parentheses	B-	B-, 4 (4HH)			(-) Involuntary Resettlement of 4 households
2	Land acquisition	Total Area of land acquisition required (ha) and private land in parentheses	B-	B-, 0.60 (0)			(-) Public land acquisition
3	Land use and local resources	Change of land use system and local resources	B+/B-	B-		B+	(-) Agreement on change of land use is required among different groups and stakeholders. (+) Change of the inefficient public land to business use
4	Impact on local economy	Employment, livelihood, income generating activities, etc	B+		B+	B+	(+) Employment of residents for construction. (+) Change of the inefficient public land to business use and creation of new employment
6	Existing Social infrastructure and services	Impact on access to social infrastructure and services, etc.	B+/B-		B-	B+	(-) Traffic jam of access roads to shopping centers, markets and government offices during construction. (+) Improvement of accesses to shopping centers, markets and government offices
7	Vulnerable people	Impact on vulnerable people (poverty)	B+		B+	B+	(+) Employment of poor people for construction. (+) Improvement of accesses to Owino and Nakasero Markets, and Shopping Malls
12	Cultural heritage	Vulnerability, aesthetic damage, etc	A-		A-	A-	(-) Change of a view on Clock Tower Monument
13	Infectious diseases	Impact on infectious disease, in particular, STD such as HIV/AIDS	B-		B-	B-	(-) Many workers mobilized for work
14	Traffic jam	Increase of traffic jams	A+/A-		A-	A+	(-) Traffic congestion during construction (+) Traffic congestion improvement after construction due to capacity increase of junctions
15	Traffic accident	Increase and/or decrease traffic accident	B+/B-		B-	B+	(-) More traffic accidents due to traffic congestion and narrowed roadways during construction (+) Traffic safety improvement due to diversion of substantial traffic to flyover
Natural Environment							
20	Soil erosion	Impact on soil stability	B-		B-		(-) Earthworks during construction
24	Water resources	Effect on the surface water including river, lake, etc.	B-		B-		(-) Mud and wasted water flow into Nakivubo Channel
30	Global warming	Effect on the Global Warming Issues	A+			A+	(+) CO2 reduction by traffic congestion improvement
Pollution							
31	Air	Air pollution	A+/B-		B-	A+	(-) More prolusion by traffic congestion during construction (+) Improvement of air quality by improvement of traffic congestion
32	Water	Water pollution	B-		B-		(-) Water prolusion by spilled oils from construction plant and vehicles (-) Mud water flow from construction (-) Sewage water from camps
33	Soil	Soil pollution	B-		B-		(-) Dust from construction sites
34	Solid waste	Solid waste, industrial discharge management	A-		A-		(-) Waste of excess soils from construction (-) Solid waste from camps
35	Noise and vibration	Effect of noise and vibration	A-		A-		(-) Noise and vibration by construction plant and vehicles
37	Emanating odor	Offensive odor	B-		B-		(-) Bad smell of asphalt during mixing and construction

Notes:
*These numbers have been identified through satellite picture examination and site survey.
** Pre-c: Pre construction, Const: During construction, Post-c: Post construction period
*** Area of land required in ha (ROW area to be acquired in ha)
**** (-) Reason of Negative Effects, (+) Reasons of Positive Effects

Source: JICA Study Team

Table 11.4.5 Recommended Items of Scoping for Project No.2, Mukwano Road Widening Project

Project No 2.4: Mukwano Rd Widening, including Mukwano Rbt and Nsambya Jct Capacity Improvement, Project length 1.8km (Final Short List for Pre-FS)								
Item		Description of Possible Impacts	Evaluation**					
			Overall	Pre-c	Const	Post-c	Reasons****	
Socio-economic Environment								
1	Migration of populations/ involuntary resettlement	a) Number of buildings to be moved (no) * b) Number of households to be moved (no) in parentheses	B-	B-, 9 (15HH)			(-) Involuntary Resettlement of 15 households	
2	Land acquisition	Total Area of land acquisition required (ha) and private land in parentheses	A-	A-, 3.94 (1.19)			(-) Public and private land acquisition	
4	Impact on local economy	Employment, livelihood, income generating activities, etc	A+/B+		B+	A+	(+) Employment of residents for construction. (+) Change of the inefficient public land to business use and creation of new employment	
6	Existing Social infrastructure and services	Impact on access to social infrastructure and services, etc.	B+/B-		B-	B+	(-) Traffic jam of access roads to Kampala Industrial Area, Kibuli market and government quarters during construction. (+) Improvement of accesses to Kampala Industrial Area, Kibuli market and Gaba Area	
7	Vulnerable people	Impact on vulnerable people (poverty)	B+		B+	B+	(+) Employment of poor people for construction. (+) Improvement of accesses to Kibuli Market and Kibuli Mosque	
13	Infectious diseases	Impact on infectious disease, in particular, STD such as HIV/AIDS	B-		B-		(-) Many workers mobilized for work	
14	Traffic jam	Increase of traffic jams	A+/A-		A-	A+	(-) Traffic congestion during construction (+) Traffic congestion improvement after construction due to capacity increase of road from 2 lanes to 4 lanes	
15	Traffic accident	Increase and/or decrease traffic accident	B+/B-		B-	B+	(-) More traffic accidents due to traffic congestion and narrowed roadways during construction (+) Traffic safety improvement due to traffic safety facility improvement	
Natural Environment								
20	Soil erosion	Impact on soil stability	B-		B-		(-) Earthworks during construction	
22	Flora	Impact on flora ecology	B-		B-		(-) Cut of trees along the road	
24	Water resources	Effect on the surface water including river, lake, etc.	B-		B-		(-) Mud and wasted water flow into Nakivubo Channel	
30	Global warming	Effect on the Global Warming Issues	B+			B+	(+) CO2 reduction by traffic congestion improvement	
Pollution								
31	Air	Air pollution	A+/B-		B-	A+	(-) More prolusion by traffic congestion during construction (+) Improvement of air quality by improvement of traffic congestion	
32	Water	Water pollution	B-		B-		(-) Water prolusion by spilled oils from construction plant and vehicles (-) Mud water flow from construction (-) Sewage water from camps	
33	Soil	Soil pollution	B-		B-		(-) Dust from construction sites	
34	Solid waste	Solid waste, industrial discharge management	A-		A-		(-) Waste of excess soils from construction (-) Solid waste from camps	
35	Noise and vibration	Effect of noise and vibration	A-		A-		(-) Noise and vibration by construction plant and vehicles	
37	Emanating odor	Offensive odor	B-		B-		(-) Bad smell of asphalt during mixing and construction	

Notes:
*These numbers have been identified through satellite picture examination and site survey.
** Pre-c: Pre construction, Const: During construction, Post-c: Post construction period
*** Area of land required in ha (ROW area to be acquired in ha)
**** (-) Reason of Negative Effects, (+) Reasons of Positive Effects

Source: JICA Study Team

Table 11.4.6 Recommended Items of Scoping for Project No.3, Shoprite & Clock Tower Jcts Traffic Safety Improvement

Project No.3.7: Shoprite & Clock Tower Jcts Traffic Safety Improvement for Basic Design Level Pre-FS (Final Short List for Pre-FS)							
Item		Description of Possible Impacts	Evaluation**				
			Overall	Pre-c	Const	Post-c	Reasons****
Socio-economic Environment							
1	Migration of populations/ involuntary resettlement	a) Number of buildings to be moved (no) * b) Number of households to be moved (no) in parentheses	B-	B-, 4 (4HH)			(-) Involuntary Resettlement of 4 households
2	Land acquisition	Total Area of land acquisition required (ha) and private land in parentheses	B-	B-, 1.17 (0.64)			(-) Public and private land acquisition
4	Impact on local economy	Employment, livelihood, income generating activities, etc	A+/B+		B+	A+	(+) Employment of residents for construction. (+) Change of the inefficient public land to business use and creation of new employment
5	Social institutions	Social capital, local decision-making system, etc.	B-		B-		(-) Conflict of various stakeholders during construction, including venders and Bicycle taxies (boda boda)
6	Existing Social infrastructure and services	Impact on access to social infrastructure and services, etc.	B+/B-		B-	B+	(-) Traffic jam of access roads to Markets, Shopping Malls and Temples/Mosques during construction. (+) Improvement of accesses to Markets, Shopping Malls and Temples/ Mosques
7	Vulnerable people	Impact on vulnerable people (poverty)	B+		B+	B+	(+) Employment of poor people for construction. (+) Improvement of accesses to Owino and Nakasero Markets, and Shopping Malls (+) Improvement of safe accesses for the poor people commuting from Nsambya Area to Central Shopping Center
12	Cultural heritage	Vulnerability, aesthetic damage, etc	B-		B-		(-) Change of a view on Clock Tower Monument
13	Infectious diseases	Impact on infectious disease, in particular, STD such as HIV/AIDS	B-		B-		(-) Many workers mobilized for work
14	Traffic jam	Increase of traffic jams	A+/A-		A-	A+	(-) Traffic congestion during construction (+) Traffic congestion improvement after construction due to capacity increase of junctions
15	Traffic accident	Increase and/or decrease traffic accident	A+/B-		B-	A+	(-) More traffic accidents due to traffic congestion and narrowed roadways during construction (+) Traffic safety improvement due to construction of pedestrian bridges and segregation of vehicles and pedestrians
Natural Environment							
20	Soil erosion	Impact on soil stability	B-		B-		(-) Earthworks during construction
24	Water resources	Effect on the surface water including river, lake, etc.	B-		B-		(-) Mud and wasted water flow into Nakivubo Channel
30	Global warming	Effect on the Global Warming Issues	B+			B+	(+) CO2 reduction by traffic congestion
Pollution							
31	Air	Air pollution	A+/B-		B-	A+	(-) More prolusion by traffic congestion during construction (+) Improvement of air quality by improvement of traffic congestion
32	Water	Water pollution	B-		B-		(-) Water prolusion by spilled oils from construction plant and vehicles (-) Mud water flow from construction (-) Sewage water from camps
33	Soil	Soil pollution	B-		B-		(-) Dust from construction sites
34	Solid waste	Solid waste, industrial discharge management	B-		B-		(-) Waste of excess soils from construction (-) Solid waste from camps
35	Noise and vibration	Effect of noise and vibration	B-		B-		(-) Noise and vibration by construction plant and vehicles
37	Emanating odor	Offensive odor	B-		B-		(-) Bad smell of asphalt during mixing and construction

Notes:
*These numbers have been identified through satellite picture examination and site survey.
** Pre-c: Pre construction, Const: During construction, Post-c: Post construction period
*** Area of land required in ha (ROW area to be acquired in ha)
**** (-) Reason of Negative Effects, (+) Reasons of Positive Effects

Source: JICA Study Team

11.4.3 SPECIFIC ISSUES ADDRESSED IN THE EISTUDY/EIA STUDY

(1) List of Positive and Negative Impacts

The Study Team conducted field survey for screening and scoping for the EIA Study. The following are specific negative and positive impacts to be addressed in the EIA Study in the FS and/or detailed design stages.

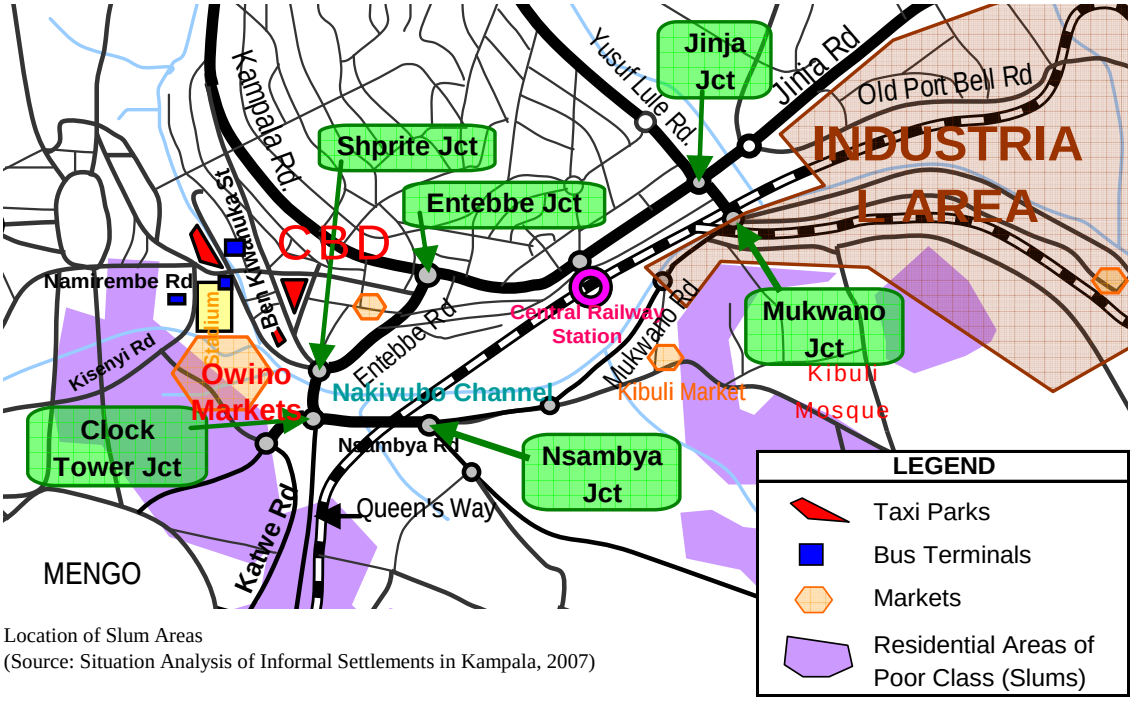
Project No.	Project	Positive Impacts	Negative Impacts
1.1 & 1.2	Yusufu Lule - Mukwano Rds Flyover & Right-Turn Flyovers	1) Support of the BRT pilot project to minimize new traffic congestion at Jinja Jct 2) Positive impact on national and regional economic activities for CBD and Kampala Industrial area 3) Traffic jam will be improved by cars and railways 4) Positive impact on global warming by reducing carbon dioxide (CO2)	1) Land acquisition of part Electro Commission, part of MoWT Central Mechanical Workshop and private lands 2) Resettlement 3) Water sources including Nakivubo channel and Kitante channel 4) Traffic jam during construction 5) Utilities relocation may be required
1.3	Mengo Hill - Mukwano Rds Flyover (over Clock Tower) Or Clock Tower – Mukwano Rd Flyover Right-turn over Clock Tower	1) Support of the BRT project (B1, B3) to minimize new traffic congestion at Clock Tower Jct 2) Positive impact on national and regional economic activities for the CBD and commercial center 3) Due to the above positive impact, vulnerable people, in particular, the project would contribute to poverty reduction 4) Traffic jam will be improved at Clock Tower Jct 5) Positive impact on global warming by reducing carbon dioxide (CO2)	1) Land acquisition of government and private land 2) Resettlement 3) Water sources including Nakivubo channel might be affected by the project 4) Traffic jam during construction 6) Utilities relocation may be required
2 (2.4)	Mukwano Road Widening	1) Positive impact on regional economic activities, which includes Kibuli market and industrial area 2) Due to the above positive impact, vulnerable people, in particular, the project may contribute to poverty reduction 3) Traffic jam will be improved 4) Positive impact on global warming by reducing carbon dioxide (CO_2)	1) Land acquisition (government and private) required 2) Resettlement 3) There is a loss of trees along side of Mukwano road 4) Water sources including Nakivubo channel and Kayunga channel, wet land might be affected by the project 5) Traffic jam during construction 6) Utilities relocation may be required 7) Small business (gardening plant) along road sides
3 (3.7)	Shoprite & Clock Tower Traffic Safety Improvement	1) Traffic accident will be reduced 2) Traffic jam will be improved 3) Positive impact on local economic activities, which includes St.Balikuddembe Market and CBD / commercial center 4) Employment of poor people in Kisenyi and Katwe during construction 5) Positive impact on global warming by reducing carbon dioxide (CO_2)	1) Land acquisition (mostly government land) required 2) Resettlement 3) Access to sports ground, Hindu temple and Shoprite shopping mall may be affected 4) A view of Clock Tower may be affected 5) Traffic jam during construction 6) Utilities relocation may be required

Source: JICA Study Team

(2) Socio-Economic Benefits on the National Economy, Regional Economy and Poverty

The Pre-FS projects would contribute to:

- Support of the BRT introduction which would become the major transport means for low and medium class people;
- National economy development through a sustainable growth of the CBD / Commercial Center in Kampala, which is the core of the service sector to achieve the MDGs;
- Reduction of poverty through securing access to the commercial center and revitalizing commercial activities at CBD downtowns, Owino Market, Kibuli Market, Kampala Industrial Area as shown in the following figure;



Location of Slum Areas
(Source: Situation Analysis of Informal Settlements in Kampala, 2007)

Source: The Study Team

Figure 11.4.4 Socio-Economic Environments around Pre-FS Project Areas

- Support of regional safety by securing accesses for Fire Brigade Headquarters located between Shoprite and Clock Tower Junctions;
- Support of culture and daily lives by improving congestion for roads and junctions accessing Hindu Temples and Mosque located near Shoprite Junction; and
- Support of the peace process and for South Sudan, Rwanda, Burundi and Northeast regions of Congo as the Pre-FS project roads are located on the international road "A109" (Northern Corridor of EAC) or its bypass of Kampala City center.

The Pre-FS projects would bring benefits for the poor people residing in slum areas near the projects by activating or sustaining market activities, which are major sources of their income, and giving opportunities of direct employment during the construction. The population of the poor who could receive benefits from the projects is estimated at approximately 100,000 as in the following table. More details should be surveyed, including at desktop and fields, influence of the projects be evaluated at the FS stage.

Table 11.4.7 Estimated Population of the Poor receiving Benefit from the Pre-FS Projects

Communities	Parishes of Residential Area of Poor People	2002 Census	2010	% of the Poor*	Population of the Poor
Kisenyi	Kisenyi I, Kisenyi II, Kisenyi III	19,310	26,000	80%	20,800
Kibuye	Kibuye 1, Kibuye 2	33,012	44,300	60%	26,580
Ndeeba	Ndeeba	16,734	22,500	50%	11,250
Katwe	Katwe I, Katwe II	22,136	29,800	80%	23,840
Kibuli	Nsambya Police, Kibuli	30,138	40,500	60%	24,300
Total		121,330	163,100	65%	106,770

Note: * Estimated by satellite photographs

Source: JICA Study Team

(3) Land Acquisition and Resettlement Requirements

The Study Team estimated land acquisition and resettlement requirements based on the preliminary design drawings and site reconnaissance survey. Land acquisition, 6.14 ha of government owned land and 2.59 ha of private land, and resettlement are required to implement the Pre-FS projects (Table 11.4.8). The government (or public) land acquisition includes part of the MoWT Central Mechanical Workshop, Electoral Commission, Telecommunication, Postal Office, National Railways and parks.

Table 11.4.8 Estimated Land Acquisition and Resettlement Requirements

Project No.	Project Name	Land Acquisition Estimate				Resettlement				
		ROW to be acquired (Private Land)	Secured ROW (Government Land)		Total Area of Land required	Number of Buildings			Resettlement	Remarks
						Private	Government	Total		
		(ha)	(ha)	(%)	(ha)	(number)	(number)	(number)	(household)	
1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	0.11	0.41	79%	0.52	0	1	1	1	Government (Railways, Electoral Commission, Park)
1.2 (Phase 1)	Jinja - Yusufu Lule Rds Flyover & Mukwano - Jinja Rds Flyover	0.65	1.85	74%	2.50	2	9	11	17	Private and Government (MoWT, MoLHUD, Electoral Commission, Park)
1.3 (Phase 3)	Mengo Hill - Mukwano Rds Flyover (over Clock Tower) or Clock Tower - Mukwano Rd Flyover	0.00	0.60	100%	0.60	0	4	4	4	Park
2.4	Mukwano Rd Widening	1.19	2.75	70%	3.94	2	7	9	15	Private & Government (Railways Quarters, Police Quarters)
3.7	Shoprite & Clock Tower Jcts Traffic Safety Improvement	0.64	0.53	45%	1.17	0	4	4	4	Private & Government (Railways, Telecommunications, Post Office)
Total		2.59	6.14	70%	8.73	4	25	29	41	

Source: The Study Team

The Study Team obtained information that there is no difficulty to use the above government lands since they are not currently much actively used, except the Electoral Commission Office part which is required to use for the flyover construction. The MoLHUD informed the Study team that move of the Electoral Commission Office to the suburb is under planning. The availability of these lands and schedule should be confirmed during the FS.

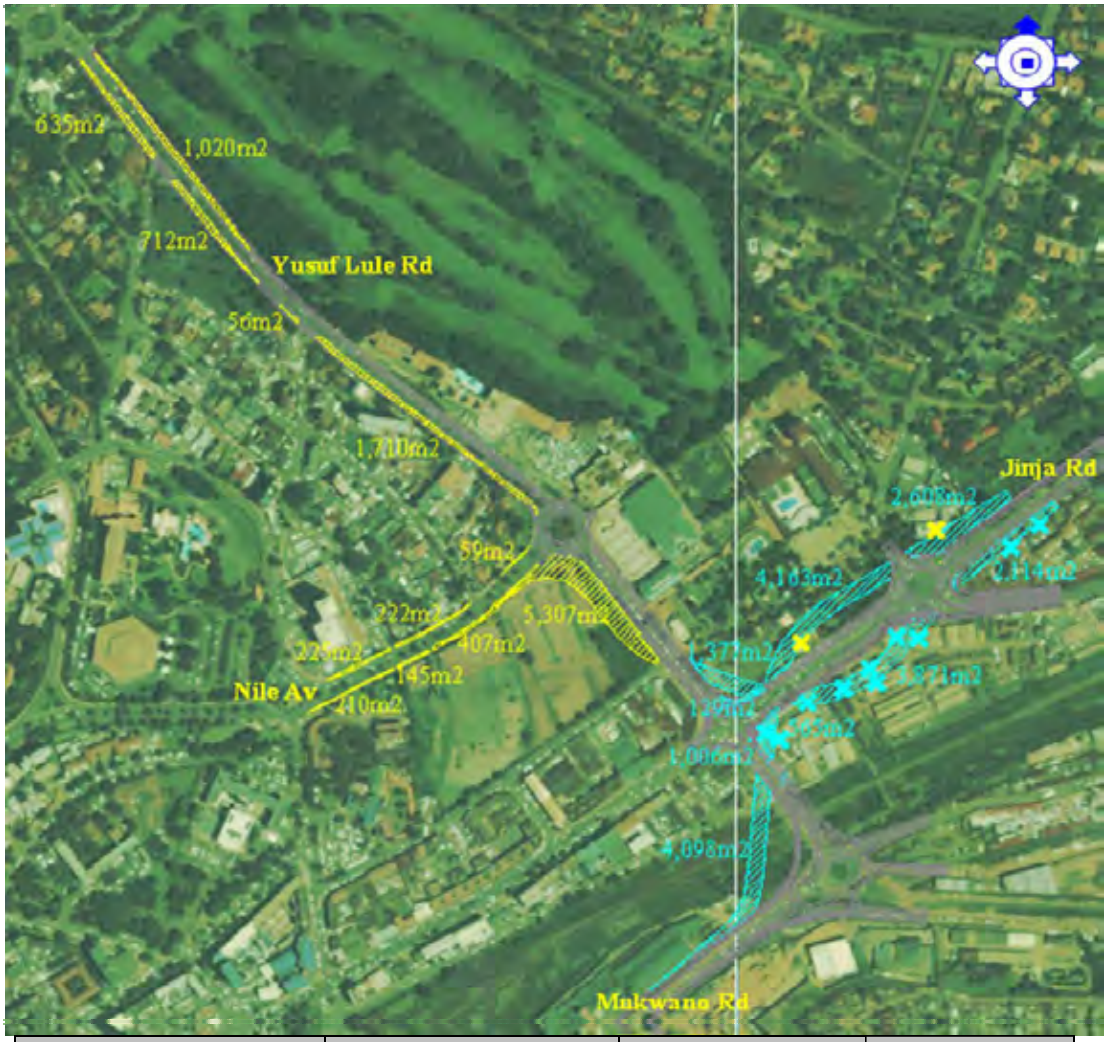
As for the people who will be affected by the projects (PAP), in Uganda, PAP is regarded as owners of land/properties, who are affected by the project and willingly sell their properties. For those who will be displaced involuntarily (Involuntary resettlement), if any, the projects' implementers must prepare resettlment action plans (RAPs) and the World Bank, JICA and other

multilateral and bilateral donors, and other organizations emphasize this.

The Study Team estimated the number of households as 1 household per government building and 4 households per private house or building. The compensation should also include illegal occupation. Furthermore, it is necessary to confirm that compensation shall be made at market prices which are not subject to depreciation in EIStudy/EIA Study to be conducted in FS or Detailed Design stage.

The data for these land acquisition and resettlement (buildings/houses) estimates by sub-project are shown below.

1) Projects No.1.1 & 1.2, Jinja Junction Flyover Project

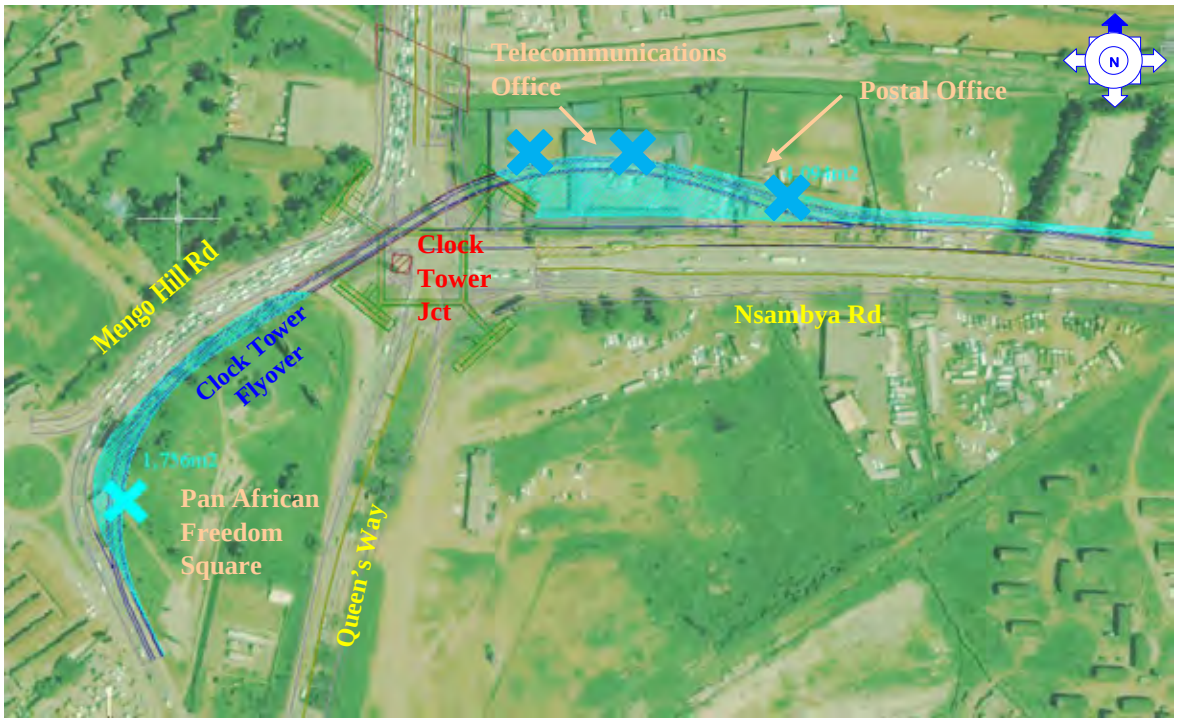


Property Type		Area (m^2)		No.		Remarks
		No.1.1	No.1.2	No.1.1	No.1.2	
Land	Private	1,100	6,500	-	-	
	Public	4,100	18,500	-	-	
Buildings	Private	-	-	0	2	
	Public	-	-	1	9	

Source: JICA Study Team

Figure 11.4.5 Affected Areas and Properties for Jinja Junction Flyover Project

2) Project No.1.3, Clock Tower Flyover Project

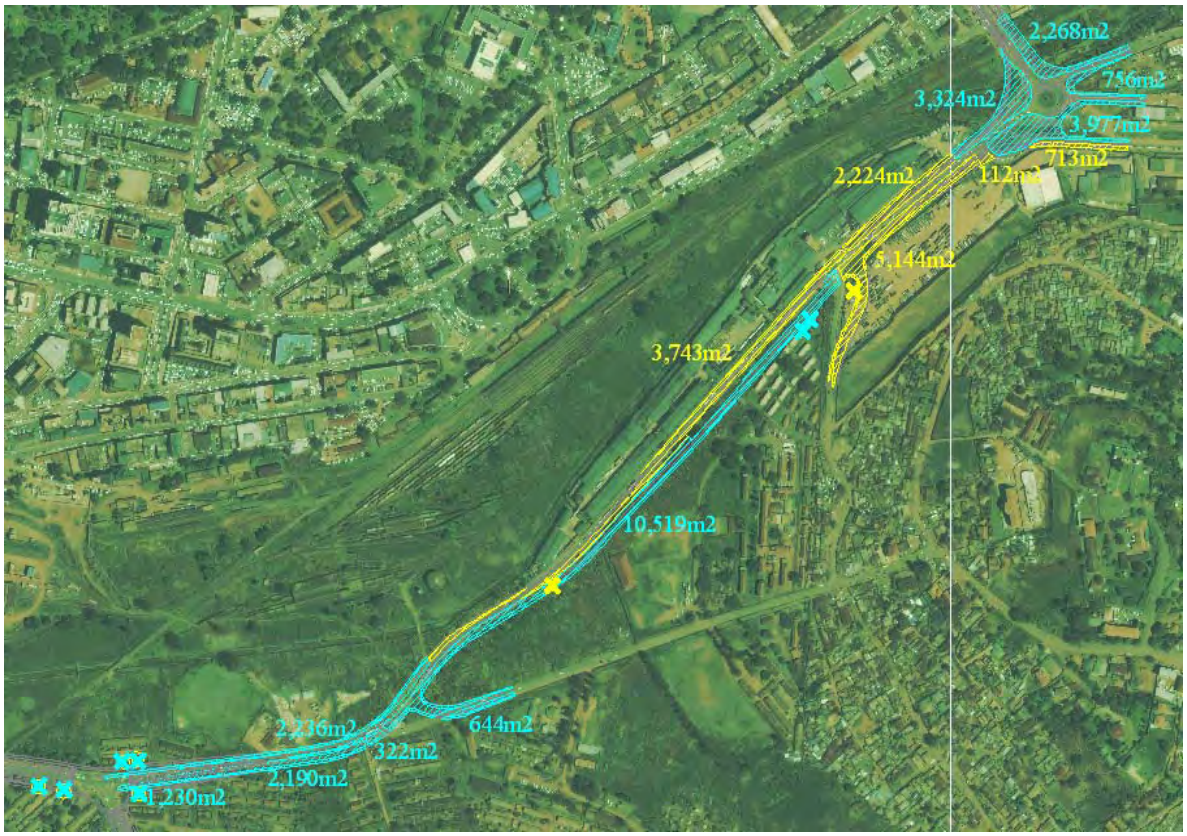


Property Type		Area (m^2)	No.	Remarks
Land	Private	0	-	
	Public	6,000	-	
Buildings	Private	-	0	
	Public	-	4	

Source: JICA Study Team

Figure 11.4.6 Affected Areas and Properties for Clock Tower Flyover Project

3) Project No.2.4, Mukwano Road Widening Project

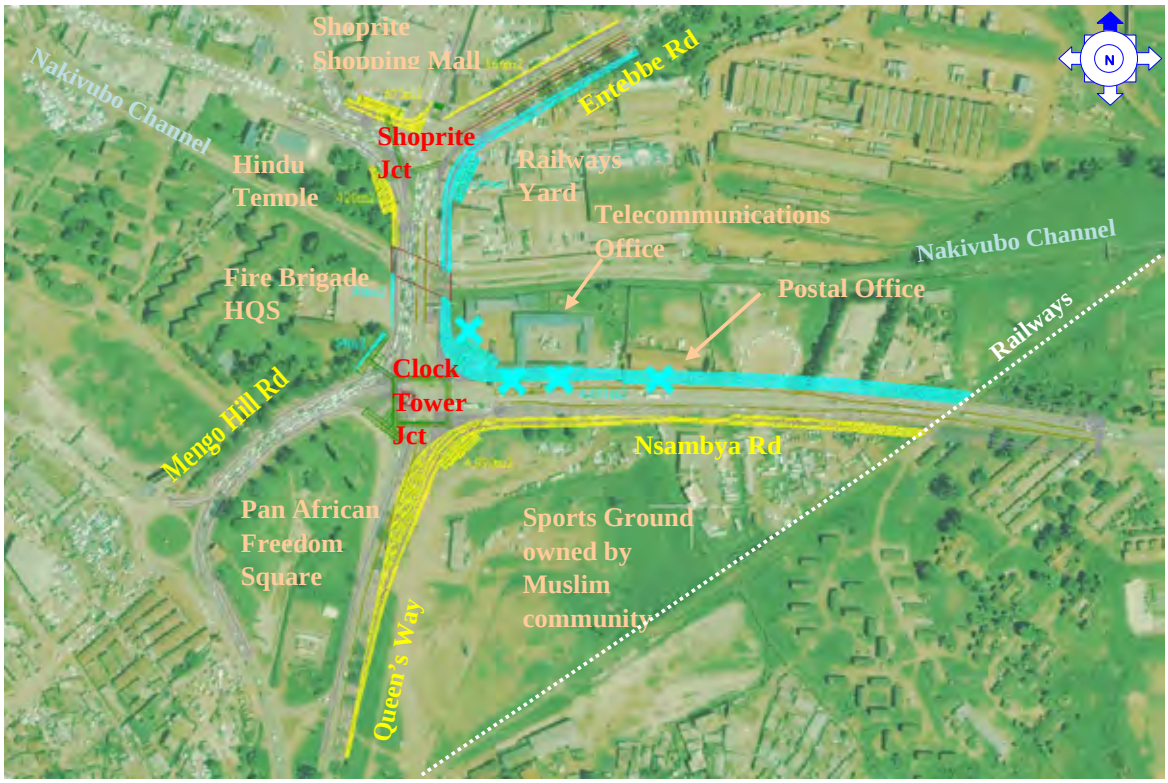


Property Type		Area (m^2)	No.	Remarks
Land	Private	11,900	-	
	Public	27,500	-	
Buildings	Private	-	2	
	Public	-	7	

Source: JICA Study Team

Figure 11.4.7 Affected Areas and Properties for Mukwano Road Widening Project

4) Project No.3.7, Shoprite and Clock Tower Junctions Traffic Safety Improvement Project



Property Type		Area (m^2)	No.	Remarks
Land	Private	6,400	-	
	Public	5,300	-	
Buildings	Private	-	0	
	Public	-	4	

Source: JICA Study Team

Figure 11.4.8 Affected Areas and Properties for Shoprite and Clock Tower Junctions Traffic Safety Improvement Project

11.4.4 METHOD OF THE EISTUDY / EIA STUDY

(1) Natural Environment Survey

Natural condition survey for water quality, air, noise and vibration survey should be conducted as listed in Table 11.4.9 during the dry season when the influence which the project might have on the water quality is more evident in principle. Traffic survey of 24-hour count by vehicle type should be required together with these natural environmental surveys to identify relations with traffic significance. Impacts of project implementation should be assessed based on these survey data.

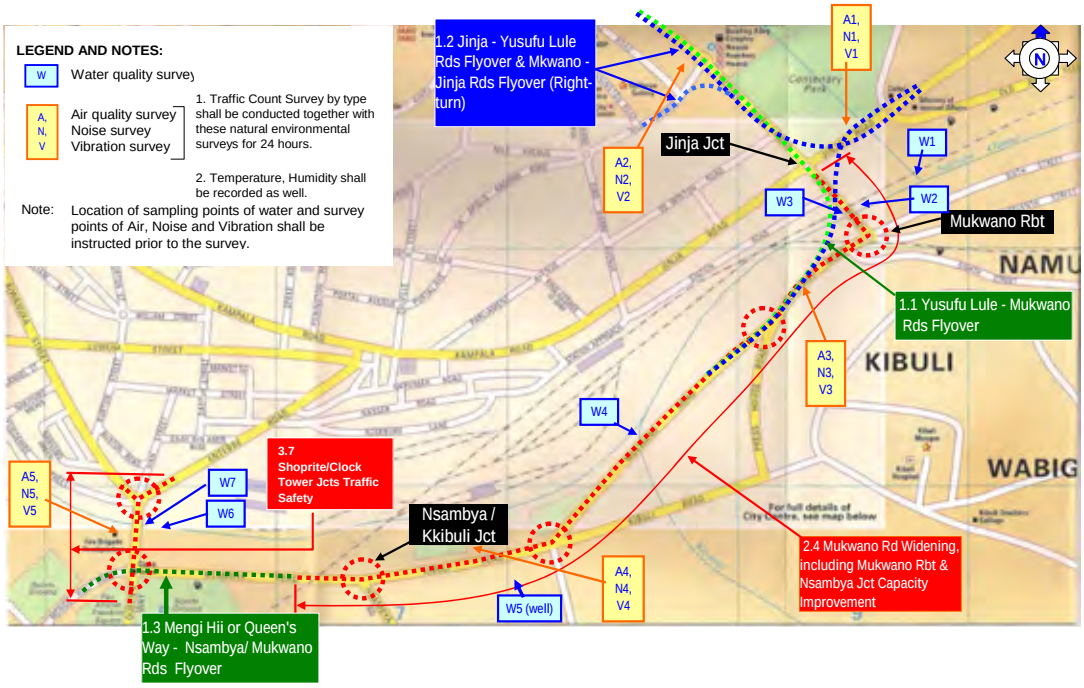
Table 11.4.9 Estimated Quantity of Water Quality, Air, Noise and Vibration Survey

Project No	Project Name	Project Length (km)	Water Quality		Air, Noise and Vibration Survey			
					Air	Noise	Vibration	Location
			Survey ID No.	Location	Survey ID No.	Survey ID No.	Survey ID No.	
1.1&1.2	Yusufu Lule - Mukwano Rds Flyover & Right-Turn Flyovers	4.0	W1	Kitante Channel	A1	N1	V1	Near Nile Avenue Rbt
			W2	Outlet of Drainage Pipe	A2	N2	V2	Centenary Park
			W3	Nakivubo Channel (Access Rd)	A3	N3	V3	Near Mukwano Rbt
1.3	Mengo Hill - Mukwano Rds Flyover (over Clock Tower) or Clock Tower - Mukwano Rd Flyover	0.6	W3	Nakivubo Channel (Access Rd)	A5	N5	V5	Fire Brigade HQS
			W6	Nakivubo Channel (Entebbe Rd)				
2 (2.4)	Mukwano Rd Widening	1.8	W3	Nakivubo Channel (Access Rd)	A3	N3	V3	Near Mukwano Jct
			W4	Kayunga River / Nakivubo Channel	A4	N4	V4	Near Clinic
			W5	A well at Kibuli				
3 (3.7)	Shoprite & Clock Tower Jcts Traffic Safety Improvement	2 Junctions	W6	Nakivubo Channel (Entebbe Rd)	A5	N5	V5	Fire Brigade HQS
			W7	Outlet of Drainage Pipe				
	Total		7 (14 samples)		**5**	**5**	**5**	

Notes: 1. The above are estimated quantities and may subject to minor change depending on site condition and project requirements.
2. Exact location of sampling points of water and survey points of Air, Noise and Vibration shall be instructed prior to the survey.
3. Two (2) samples per location shall be obtained for water quality tests. Sampling shall be made in the dry season and at least 25 hours after a rain.
4. 24-hours survey for air, noise and vibration, at week days, no-raining days and no strong windy days. (Traffic Count Survey by type shall be conducted together with these natural environmental surveys for 24 hours).
5. Weather, Temperature, Humidity shall be recorded as well.

Source: JICA Study Team

Figure 11.4.9 shows locations of the water quality test samplings and on-site survey points of air, noise, and vibration. The exact locations should be decided prior to commencement of the survey during the EIA study in the Pre-FS and/or detailed design stages.



Source: JICA Study Team

Figure 11.4.9 Location Map of Water Quality, Air, Noise and Vibration Surveys for Projects No.2 and No.3

The recommended survey category, measurement items of air, water, and vibration are as follows:

i) Water Quality and Standards

Survey Category	Survey Items	Standards*
Physical items	Temperature	-
	Color	-
	BOD5	50 mg/lt
	COD	100 mg/lt
	Total suspended solid (TSS)	-
	Electric conductivity (EC)	(μs/cm)
Chemical items	pH	6.0 – 8.0
	Total phosphate (P)	-
	Nitrate(NO2, 3-N)	2 mg/lt, 20 mg/lt
Organic Chemical Items	Oil and Grease	-
	Detergent	-
	Fenolic	-
Microorganism	Fecal coliform	-
	Total coliform	-

Source: The National Environment (Standard for Discharge of Effluent into Water on Land) Regulations, The Uganda Law Reform Commission

In Uganda, the standard for wastewater quality is called the "Standard for Discharge of Effluent into Water or on Land" and those are managed by Water Quality Management Department, Ministry of Water and Environment (MWE). The water quality can be tested by a laboratory of National Water and Sewage Corporation in Kampala.

ii) Air (no standards exist)

Survey Items	Duration
SO2	24 hours
CO	24 hours
NOx	24 hours
TSP	24 hours
Pb	24 hours

Source: JICA Study Team

iii) Noise and Vibration (24 hours)

Category	Facility	Noise Limits dB (A) (Leq) *	
		Day	Night
A	Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes of higher learning, conference rooms, public library, environmental or recreational sites.	45	35
B	Residential buildings	50	35
C	Mixed residential (with some commercial and entertainment)	55	45
D	Residential + industry or small-scale production + commerce	60	50
E	Industrial	70	60

Note: Day: 6.00 a.m. - 10.00 p.m., Night: 10.00 p.m. - 6.00 a.m.

Source: The National Environment (Noise Standards And Control) Regulations, 2003

Since standards of Uganda are not much clear as for air and vibration in The National Environmental Act, Cap 153 (1995) and other acts/guidelines, these should be established during the feasibility stage, referring to EU and other appropriate standards. As UNRA is currently developing a formal Environmental and Social Management System (ESMS) with technical

assistance of EU, these standards might be incorporated into the ESMS.

Though equipment for measurement of air, noise and vibration is available from a private laboratory (Air Water Earth Engineering), though calibrations have not been made for a long time, its measurement and assessment requires assistance of international experts for the EIA study stage as there are no staff who have good experience in these operations.

(2) Socio-Economic Environment Survey

Recommended major items and methodology of the socio-economic environment survey are as listed in Table 11.4.10. These may be subjected to some modifications and/or addition, depending on site conditions and availability of data during the EIA survey during the FS.

Table 11.4.10 Items and Methodology of Socio-economic Environment Survey

No.	Item	Data/ Information to be collected	Methodology
1	Migration of population/ involuntary resettlement	Number of houses and/or buildings to be resettled Number of household and/or population (by gender, ethnic, by age, etc.) Economic profiles of people Number and scale of structures (house, building, etc.), type of structures (permanent, temporary, flat, stories, etc) Identification of nature of building (government/public facilities, private, etc.) Willingness of resettlement (interview survey)	- Literature survey, in particular socio-economic situation of affected area - Site reconnaissance survey - Hearing (***interview***) - Others
2	Land acquisition	Land tenure type (freehold, leasehold, *mailo*, etc) Identification of land ownership Willingness of owner to sell the land (interview survey) Unit cost and estimated total cost of purchase of land per land to be acquired	
3	Impact on local economy/ economic activities	Actual condition of economic activities on the land to be acquired Identification of positive and negative impact on local economic activities as well as external influence, secondary impact, etc.	
4	Social infrastructure, institutions and services	Actual social infrastructure, institution and services (e.g. schools, health centers, hospitals, community centers, etc.) Identification of positive and negative impact on access to these facilities	
5	Vulnerable people/ poverty	Actual nature of community people, in particular, vulnerable people, including poor, disabled, aged people, people who used to be in IDP camp, etc. Identification of positive and negative impact on those communities and people	
6	Cultural heritage	Identification of actual cultural heritage in the affected area Identification of both positive and negative impact on these cultural heritages	
7	Infectious disease/ public health	Identification of actual public health conditions particularly infectious disease in the affected area Identification of both positive and negative impact in terms of public health	
8	Traffic jam	Identification of actual conditions of traffic jams in the affected area Identification of both positive and negative impact in terms of traffic jams	
9	Traffic accident	Identification of actual conditions of traffic accident Identification of both positive and negative impact in terms of traffic accident	

Source: JICA Study Team

It should be noted that clear definition is required as to “willingness of resettlement” and “willingness of owner to sell the land” prior to the interview survey.

11.5 PREPARATION OF TERMS OF REFERENCE (TOR) FOR THE EISTUDY/EIA STUDY

MoWT is primarily responsible for environmental and social considerations. The Study Team recommends MoWT to prepare the TOR draft in accordance with the scoping of the project in Section 11.4 prior to the EIA Study, which would be conducted independently or as a part of the FS, for public consultation and approval of NEMA.

It should be noted that the new JICA Guidelines for Environmental and Social Considerations (April, 2010) shall be adopted in the feasibility study to be conducted as the next step of the project.

(1) Objectives of the EIStudy/EIA Study

The objectives of the EIStudy/EIA Study should be to:

- Conduct EIA to identify negative impacts and suggest mitigation and/or minimizing measures for pre-construction, construction, and post-constructions phases. The EIA Study also includes assessment of positive impacts of the projects;
- Conduct desktop (literature) study, on-site survey and laboratory analysis to identify current situation and impacts on them by implementation of the projects;
- Compare and evaluate alternative options;
- Obtain baseline data for preparation of a policy framework of land acquisition and resettlement specific to the project implementation;
- Organize stakeholder meetings and public consultations;
- Recommend mitigation measures, and prepare environmental management and comprehensive monitoring plans; and
- Prepare EIS for approval of NEMA (and international development partners).

(2) Scope of the EIStudy/EIA Study

The scope of the EIStudy/EIA Study should cover a wide range of activities during the pre-construction, construction, and post-construction phases which might cause negative and/or positive impacts on the natural and socio-economic environments.

The scope of the EIStudy/EIA Study should include, but not be limited to the following:

- Review of legislation and regulations ;
- Collect baseline data (natural and socio-economic data);
- Conduct field survey (natural environment and socio-economic environment, including land acquisition and resettlement study) ;
- Identify and assess potential positive and negative impacts (in pre-construction, construction and post-construction phases);
- Compare and evaluate alternative options, including “Non-project (zero-option)” alternative,

using multiple criteria analysis;

- Prepare a policy framework which is specifically applicable for Land Acquisition and Resettlement Action Planning (RAP) of the Pre-FS Projects to be conducted by the GOU at the FS and/or DD stages;
- Develop appropriate mitigation measures and/or alternative plans;
- Prepare an environmental management plan (in pre-construction, construction, and post-construction phases);
- Develop a comprehensive monitoring plan;
- Assist organizing Stakeholder Meetings (SHM) and Public Consultations (PC); and
- Prepare Reports, including Inception, Draft Final Report, Final Report and Environmental Impact Statement (EIS).

The items of the EIStudy/EIA should include those of which impacts are assessed as significant or minor (A+, A-, B+, B-) in the screening (refer to Section 11.4).

(3) Study Methods

The study methods for the EIStudy/EIA should be those specified in the scoping (Section 11.4). In addition, the EIA Study should obtain baseline data required for RAP. The study would include literature survey, site assessment, willingness of selling land and resettlement (by interview), and recommendations on RAP.

(4) Public Consultations

The EIA consultant should arrange and assist MoWT in holding two to three public consultations (public hearing) in accordance with the guidelines of NEMA and international development partners during the EIStudy/EIA.

(5) Mitigation Measure and Environmental Management Plan, Environmental Monitoring Plan

Through the EIStudy/EIA Study, the EIA consultant should identify and recommend mitigation measures to eliminate or minimize negative impacts, and maximizing positive impacts for pre-construction, construction, and post-construction phases of the project. The EIA consultant could suggest alternative project implementation plans to minimize or mitigate land acquisition, resettlement, and other negative environmental issues on aspects of environmental and social considerations.

Through the EIStudy/EIA Study, the EIA consultant should formulate an environmental management plan to minimize the negative impacts by implementation of the project during pre-construction, construction, and post-construction phases. The management plan will include mitigation measures at the project preparation and design stages as well. The environmental management plan includes objective, scope of significant impacts to be managed, standards used to measure the environmental components affected by these impacts, management methodologies, and management institutions.

(6) Environmental Monitoring Plan

The EIA consultant should also formulate a comprehensive environmental monitoring plan to

monitor implementation of mitigation measures. Main objectives of the environmental monitoring are to provide a continuous feedback on project implementation to identify actual or potential problems at an earlier stage and to implement timely adjustment as part of the project management. The environmental monitoring plan will include objectives of monitoring, scope of significant impacts to be monitored, environmental indicators for monitoring, methodologies, and monitoring institutions working during the period from implementation to monitoring phase.

This monitoring plan should be considered with Environmental Monitoring System in Uganda.

For Environmental Monitoring in Uganda, there is need for information from other lead agencies including MoWT , Directorate of Water Resources Management (DWRM) and Meteorology department, nevertheless:

1) Capacity of NEMA to undertake monitoring

NEMA has two Environmental Audits and Monitoring Officers and a Laboratory Technician who are in charge of monitoring of the environment and facilities that pose a threat to the environment. NEMA will closely work with other lead ministries include MoWT.

2) Monitoring Activities of NEMA

On monitoring of the environment, NEMA undertakes on spot checks of all the physico-chemical and bacterial parameters-using the mobile laboratory housed in NEMA.

In addition, NEMA uses the external laboratories that include:

(i) National Water and Sewerage Corporation (NWSC) laboratory for physical-chemical properties;

(ii) Government Chemist -laboratory for Organic and Heavy Metals;

(iii) Makerere University(Department of Geology) for Heavy Metals; and

(iv) Chemiphar laboratories for Oil and Gas Analysis.

As for the methodologies, NEMA uses the following activities;

- sampling manuals
- Calibration of the equipment and
- documented sampling procedures.

3) Monitoring Equipment

NEMA holds the following equipment

- Photometers for physical-chemical proporties.
- PH Metres.
- Electrical Conductivity metres
- Dissolved oxygen meters
- Turbidity meters

The monitoring is conducted during the both rainy and dry seasons. However rainfall patterns will be taken into consideration for planning and timing of monitoring. For this information, the meteorology department monitors rainfall patterns during the rainy and dry seasons. The

meteorology department makes predictions on weather pattern and informs to the relevant organizations that conduct monitoring. During the FS, it is important that the implementation organization will involve all the relevant entities and closely work them in order to prepare appropriate monitoring pan and system.

(7) Land Acquisition and Resettlement Action Plan

For road projects, compensation has to be paid for land, property and crops, where land is acquired for new roads, realignments, widening and addition of carriageways, and for increasing existing road reserves. Though, thought in principle, no compensation need be paid for any buildings, property or crops that lie within a designated reserve because the *Road Act* and the *Access to Roads Act* make it an offence for anyone to develop a use within a road reserve, actually these affected people and their properties are also included compensation.

Land acquisition and resettlement action plan include the following:

- The EIA consultant (Surveyor) will see the alignment of the projects provided by the Study Team and identify land use pattern of affected area;
- The EIA consultant (Surveyor) will measure area of land which is to be acquired in each affected site based on the map and drawings provided by the Study Team and supplemental site survey;
- The EIA consultant (Surveyor) will identify land tenure conditions, land owners and renters of land of affected properties in each project site. Surveyor may obtain land title documents, if it is possible;
- Surveyor will estimate the cost of land acquisition in each project site, based on the District and City Land Board's cost estimation of land at each affected land, and at market prices;
- The EIA consultant (Valuer) will identify numbers of properties including houses and buildings which may be resettled;
- The EIA consultant (Valuer) will identify the property owners, renters and other people who are using and/or occupying those properties in each project site;
- The EIA consultant (Valuer) will estimate the cost of properties resettlement in each project site, based on the District and City Land Board's cost estimation of properties at each affected site, and also at market prices; and
- The EIA consultant will prepare briefing report on the results of the above study and include it the EIStudy/EIA Study report.

(8) Resettlement Action Plan

During implementation of the Pre-FS projects, it is likely that activities will affect communities as they include widening, which result in passing through people's properties and dwellings. Involuntary displacement of people requires compensation. Because involuntary displacement disrupts and impoverishes communities, it should be avoided whenever feasible, and if not, at least minimized. It becomes imperative that displaced persons are adequately compensated for their losses with replacement cost and given opportunities to improve their livelihood and share in road project benefits.

Resettlement including establishment of Resettlement Action Plan (RAP) is a responsibility of GOU. RAP should be established in accordance with a *RAP* policy framework, which provides guidance for resettlement and compensation package.

11.6 LAND ACT AND REGULATIONS

Since the Study anticipates requirement of land acquisition and involuntary resettlement, in this section, land statutes, laws, land tenure system, and land acquisition and resettlement process in GOU will be examined. In Uganda, apart from the Constitution, two types of sources of land law are included in Act and regulations; namely Statutory Laws and Customary Laws. Moreover, there is the common law which is not written but administered by the High Court of Uganda.

11.6.1 LAND STATUTES AND LAWS

(1) The Constitution:

The sources of Ugandan land law are the Constitution of the Republic of Uganda, 1995. The Constitution lays down certain fundamental principles with regard to land ownership. Though there is inconsistency with other land laws and it often causes land disputes in court.

(2) Statutory Laws:

1) Land Act, 1998

The most important law that is related to land, which deals with land ownership, land administration, and resolution of land disputes.

2) Registration of Titles Act (cap 205)

This Act deals with the registration and transfer of titles to land.

(3) Customary Laws

1) Land Act, (section 28) 1998

Customary land law mainly applies to land owned under customary law. Section 28 of the Land Act provides that decisions with respect to land held under customary land tenure shall be determined in accordance with the customary of the community concerned. The section precludes the application of any customary practices that discriminate against children, women, and people with disabilities contrary to articles 33, 34 and 35 of the Constitution.

2) Judicature Statute, 1996

This statute empowers the courts to apply and enforce the observance of customary practice for as long as it is not repugnant to natural justice, equity, and good conscience and provided it is not inconsistent with any written or applied law.

(4) Common Laws

"Common laws and doctrines" refer to the unwritten law of Uganda, other than customary law, which is administered by the High Court of Uganda. Uganda's common law and equity is essentially the common law and doctrines of equity as applied by the English courts prior to 1902. However, the common law applies in so far as the circumstances of Uganda and of its people permit and subject to such qualifications as the circumstances may render necessary.

11.6.2 LAND TENURE SYSTEM IN UGANDA

The Land Act, 1998, provides an institutional framework for the reform of land tenure law in Uganda. The Land Bill, formerly known as the Land Tenure and Control Bill, was debated and

enacted as Land Act. Previously, all land in Uganda was public land centrally vested with Uganda Land Commission. As a result of the land tenure law reform brought about by the Constitution and the Land Act, most land in Uganda is now privately owned in *mailo*, freehold and customary tenure. In the following section, five types of land tenure and/or ownership systems in Uganda are described[2].

(1) Government/Public Land

Government or public land is limited to the land that was in government use at the time the Constitution came into effect on 22 September 1995. Land in government use includes land where there are government offices, building, schools, hospitals, police and military quarters. If the government wants any other land, it has to purchase the land from willing sellers or by compulsory acquisition in accordance with the Constitution.

(2) Freehold Tenure

In the Land Act, "freehold tenure" is defined as a tenure that derives its legality form the Constitution and its incidents from written law. There are two types of freehold tenures. One is "conditional freehold" and the other is "freehold estate for life". In the former system, people are given ownership on certain condition of land use (i.e. agricultural land). In this case, if the person fails to develop the land, the grantor may terminate the estate. On the other hand, the latter is a perpetual ownership, regardless of the land use, and he/she has full power in terms of selling, disposing of by will, or leasing the land.

(3) Leasehold Tenure

Leasehold tenure is a form of tenure whereby one party grants to another a right to exclusive possession of land for a specified period, usually though not necessarily, in return for a periodic payment of money called rent. A lease can be granted for any duration, except in the case of a lease to a non-Uganda citizen. Section 41 (3) of the Land Act limits the maximum period for which a lease can be granted to a non-citizen of Uganda for 99 years. In addition, according to Article 237 (5) of the Constitution, this empowered parliament to enact a law whereby any lease that was granted to a Ugandan citizen out of former public lands might be converted into a freehold.

(4) *Mailo* Land[3]

Mailo tenure was a nearly freehold tenure system, which was unique to the Kingdom of Buganda. The tenure had its origins in the 1900 Uganda Agreement between the British colonial administration and chiefs of Buganda. Under the agreement, about half of the land in the Kingdom of Buganda was allocated to chiefs and notables as their private property in perpetuity and the rest of the land became crown land. The allocations were expressed in multiples or fractions of square miles. Hence, the term '*mailo*', which is a Luganda language alteration of the English word 'mile', was adopted to describe this new system of land holding. Although initially only a few privileged people owned *mailo* land, which gradually through sale, donation and inheritance, the land was subdivided and fragmented. As a result, by 1962, there were several thousands of *mailo* landowners, who mainly own small parcels. The parcels were registered and certificates of title were issued to the owners under the Registration of Title Act (cap 205). This tenure system is common up to date in actual Kampala area, where Buganda existed.

[2] Principles of Land Law in Uganda, John T. Mugambwa, 2002
[3] The Land Market in Kampala, Uganda and its Effect on Settlement Patterns, International Housing Coalition, Jan 2009

(5) Customary Tenure

The customary land tenure is the most dominant in Uganda. This is the system whereby land is owned and disposed of in accordance with customary regulations. Specific rules of customary tenure vary according to ethnic groups and regions. Often customary tenure is superimposed on other systems like *mailo* and freehold. This tenure system also exists on its own as communal land ownership. One advantage of this tenure system is that people have lived with it for a long time and therefore understand it. One disadvantage is that it does not encourage record keeping, often making it difficult to resolve land use conflicts.

11.6.3 LAND ACQUISITION LAWS AND POLICY ON THE ROAD PROJECT IN UGANDA

(1) Overview

The 1995 Uganda Constitution provides that every person has a right to own property (Article 26) and that no person shall be compulsorily deprived of property or any interest in or right over property in except where, amongst other conditions, there is payment of fair and adequate compensation, prior to the taking of possession or acquisition of the property.

The Uganda Constitution takes precedence over the Land Act (1998), as amended, and the Land Acquisition Act (1965) which read together provide the legal basis for the applicable law.

(2) Land Acquisition Regulations for Road Sector Development Programs

The Government of Uganda with assistance from various financial institutions and from bilateral arrangements developed a 10-Year Road Sector Development Program 2 (RSDP 2: 2001/02-2010/011).

Since road improvement activities are implemented for existing road alignments, land acquisition will be a major procurement. With implementation of RSDP 1 & 2 surveying and valuations of land, crops, trees, structures, and buildings affected by new road alignments and/or road widening have become mandatory under the Land Act (1998) as amended.

(3) The Road Act (1964)

The Road Act (1964) provides for the establishment of road reserves and for the maintenance of roads by empowering the Minister of Works and Transport to declare road reserves by Statutory Instrument. The Act provides that the minimum area of land acquired for road construction is the road reserve, which is defined as an area bounded by imaginary lines parallel to the land with distance of 50 ft (First Schedule) and 33 ft (Second Schedule) from the centre line of a road listed in either Schedule of the Act.

Where construction extends outside the reserve, additional areas of land are also acquired. In addition, the 20 m road reserve limit is adopted for urban authorities and selected populated urban growth centers such as the Trading Center.

The need for government to maintain basic control over developments along the road is to ensure the basic necessities of maintaining road geometry and engineering needs, e.g., site lines, horizontal curvatures, site distances, road safety considerations, etc. That control is exercised with flexibility for minimizing social economic consequences over the general public use of the Road Reserves (for cultivation).

11.7 STAKEHOLDER MEETING (SHM) AND PUBLIC CONSULTATION (PC)

(1) Stakeholder Meetings and Public Consultations (PC)

Regulation 12 of the *Environment Impact Assessment Regulations 1998* of GOU requires the developer to take all measures necessary to seek the views of the people in the communities which may be affected by the project. Public involvement is necessary for road projects of the following nature;

- Which affect local communities,
- Which require resettlement or land expropriation,
- With affirmative action for specific beneficiary groups,
- Where community cooperation is required to succeed,
- That may trigger economic and social hardships for neighboring communities, and
- For which there is doubt about the social impacts.

Public consultation requirements are stipulated in the environmental guidelines of NEMA and international development partners. MoWT (developer) needs to hold two SHM during the EIStudy/EIA Study. The JICA Environmental Guideline requires the recipient governments to consult with local stakeholders through means that induce reasonably broad public participation, in order to consider environmental and social factors in the way most suitable to local situations and to reach an appropriate consensus.

Note: In this Study, Public Consultation means all the stakeholders including affected people and communities. Stakeholder meeting means all the technical persons and organizations/entities including ministries and district government staff.

Two stakeholder meetings are scheduled during this Pre-FS. Public consultations will be held during the FS and detailed design stage.

(2) The First Stakeholder Meeting

The main objectives of the first stakeholder meeting are to disclose information about environmental and social consideration at the earliest stages of the cooperation project of GOJ, to receive opinions and suggestions of stakeholders, and to reflect on the Study.

The MoWT in collaboration with the Study Team organized the first stakeholder meeting on 8 December 2009 at the Grand Imperial Hotel in Kampala. A total of 62 persons from various stakeholders, MoWT, JICA and the Study Team participated in the meeting. The meeting was presided over by the Permanent Secretary, through the Acting Engineer in Chief/Director of Engineering of MoWT. Refer to Annex 7 as to the details.

The main topics are the presentation outline and schedule of the Study, and the initial findings of the Study on key issues and future development of the road network in GKMA and public transport. The following is the program of the first stakeholder meeting:

Time	Description	Presenter/Participants
9:00-9:30	Registration of participants	All the participants
9:30-9:40	Opening Remarks	MoWT Acting Engineer in Chief, Dr. A.O. Mugisa
9:40-9:50	Opening Speech	MoWT, Permanent Secretary
9:50-10:00	Greetings	JICA Uganda Office, Chief Representative Mr. Seki
10:00-10:10	Presentation of outline of JICA Study	JICA Study Team, Team Leader, Mr. Shinkai

Time	Description	Presenter/Participants
10:10-10:20	Initial findings on the road network in the Greater Kampala Metropolitan Area	JICA Study Team, Deputy Team Leader/Road Planner, Mr. Konda
10:20-10:30	Initial findings on the public transport system in the Greater Kampala Metropolitan Area	JICA Study Team, Public Transport Planner Mr. Ohwaki
10:30-11:00	Coffee Break	
11:00-11:30	Explanation of the difference of environmental study between GOU and JICA, and presentation of schedule of environmental study in the Study	JICA Study Team, Environmental and social consideration. Ms. Sato
11:30-12:00	Exchange of opinions on JICA Study	All the participants
12:00-12:05	Closing remarks	MoWT, Commissioner of Transport, Mr. Wandera

Source: JICA Study Team

The major queries and discussions are summarized in the following table:

Field of Query/ Discussion	Issues coming up/queries	Response by Study Team member	Supplementation by MoWT	Suggestions or supplementation from participants
Presentation 1 Mr. Shinkai (Team Leader)	• A participant from Kira Town council wanted to know why the Study included Kira TC but did not include Kimwanyi.	• Mr. Konda responded that he was aware of the vital role played by access roads, and informed the participant that it was within the scope of the Study.		• Revision of population figure based on official population census 2008 • Creation of tourism community in the province • Enhancement of market system for community (one product, one commune with its market)
Presentation 2 Mr. Konda, Deputy Team Leader/Road Planning I	• A participant wants planners and the Study to concentrate also on crucial access roads 'more of short cut' roads that help to decongest others but which are often neglected and are usually impassable. • Regarding flyovers in some areas, he was not so sure of the effectiveness especially since he had not yet seen the impact of the Northern By-pass. • A participant also wanted to know the time frame for any work, and when the 'project' would be expected to start.	• Mr. Konda responded that he was aware of the vital role played by access roads and informed the participant that it was within the scope of the Study. • He further added that flyovers were among the proposals for the best alternatives to reduce on the level of congestions in the city. • Mr. Konda gave clarification that this was still a feasibility study, and also it was still in its initial stages. • He added that Govt should have a strong control on the building system in the CBD area and also restriction on vehicles.		

Field of Query/ Discussion	Issues coming up/queries	Response by Study Team member	Supplementation by MoWT	Suggestions or supplementation from participants
Presentation 3 Mr. Ohwaki, Public Transport Planning	• A member asks why the Study is not concentrating on different approaches to public transport such as walking, etc. • How will the transport industry be managed • Another participant informed that taxis fill the park between 11–3 pm waiting for peak hrs, which he said was poor space management on the side of park managers. • A student member wanted to know if it was possible to have organized terminals, specific routes that taxis could ply.	• Observation was that there are a number of institutional issues such as the power to regulate the transport industry. • KCC, Transport Licensing Board, URA, Police area all are stakeholders in public transport. • Push investment companies to follow their plan and encourage industrial parks to open up outside the city. • Mr. Ohwaki also said that in order to significantly cut down on the congestion in the city, the taxi terminals should be moved outside of the CBD area.	• Road fund is for maintenance of roads. • MoWT acknowledged that all most of the terminals were owned by private organizations. • Regarding Bus rapid transport, Dr. Mugisa informed that a World Bank funded study on BRT was already on going and that the JICA study team would cooperate together with them.	• A participant proposed hiring of a foreign firm to run the transport system instead of relying on UTODA. • Government should come up with a public transport system. • Another proposal was that new plans should include pedestrian routes. • Members propose that the government should own parks. • Another suggestion was that transport planning, and the study should focus on the link between land use and transport itself. • A member having observed and appreciated the role of traffic police suggested that they should only manage what has been put in place and not completely disregard for example use of traffic signals already installed.
Presentation 4 Ms. Sato, Environmental issues and Social Considerations	• A member from Mukono asked how the Study Team or the Government proposed to handle matters like compensation and displacement.	• Ms. Sato supplemented and said that they were being careful about land acquisition and tenure system and that it would be best and easier to avoid land acquisition and settlement. • She conceded that for any successful project the community should be involved and that there should be full sensitization.		

Source: JICA Study Team

(3) The Second Stakeholder Meeting

The second stakeholder meeting was held on August 26 2010 at the Grand Imperial Hotel in Kampala to inform and consult on the Draft Final Report of Pre-FS. The participants invited to the first stakeholder meeting were also invited for the second stakeholder meeting.

A total of 94 persons from various stakeholders, MoWT, JICA and the Study Team participated in the meeting. The meeting was presided over by the Acting Engineer in Chief/Director of Engineering of MoWT. Refer to Annex 7 as to the details.

The main topics were the results of Pre-FS, road safety plan, traffic management plan and public transport plan. The following is the program of the second stakeholder meeting:

Time	Description	Presenter/Participants
9:00-9:30	Registration of participants	All the participants
9:30-9:40	Opening Remarks	MoWT Acting Engineer in Chief, Dr. A.O. Mugisa
9:40-9:45	Greetings	JICA Uganda Office, Chief Representative, Mr. Seki
9:45-10:00	Welcome Remarks and Outline of the Study	JICA Study Team, Team Leader, Mr. Shinkai
10:00-10:40	Session 1: Pre-Feasibility Study including; - Traffic survey and Future Traffic Demand Forecast - Preliminary Design including Alternative Route and Structure Plans - Implementation Plan for Priority Projects	JICA Study Team, Deputy Team Leader/Road Planner, Mr. Konda JICA Study Team, Road Planner, Mr. Mizuno
10:40-11:00	Discussion	
11:00-11:15	Coffee Break	
11:15-11:40	Session 2: Road Safety Plan and Traffic Management including; - Road Safety Improvement Development and Action Plan - Traffic Management Plan including Environmental Consideration	JICA Study Team, Road Planner, Mr. Mizuno JICA Study Team, Road Designer, Mr. Iwamoto
11:40-12:00	Discussion	
12:00-12:30	Session 3: Public Transport Plan including; - Public Transport Future Traffic Demand - Public Transport Plan in the Medium and Long Terms - Infrastructure Plan of Bus Operation	JICA Study Team, Public Transport Planner, Mr. Ohwaki JICA Study Team, Public Transport Operation Planner, Mr. Muto
12:30-12:50	Discussion	
12:50-13:00	Conclusion and Recommendations	JICA Study Team, Team Leader, Mr. Shinkai
13:00-13:10	Closing Remarks and Closing	MoWT Acting Engineer in Chief, Dr. A.O. Mugisa UNRA Expert, Mr. Jerry Burton

Source: JICA Study Team

The major queries and discussions are summarized in the following table:

Field of Query/ Discussion	Issues coming up/queries	Response by Study Team member	Supplementation by MoWT	Suggestions or supplementation from participants
General	• Gave members a re-cap of the presentations by Dr. Mugisa			
General introduction and Mr. Konda	• Mrs. Maggie Kigozi (UIA) do the costs for the IUBT include compensation and land acquisition.	• Mr. Muto replied that the initial estimation does not include compensation because exact locations of the proposed locations are not determined.		
	• UIA's Maggie Kigozi asks if the internal roads and other junctions are going to be looked at. • Asks for more information/more light regarding BRC	• On why select only a few flyovers selected, Mr. Konda replied that other Projects like BRT will work on other areas and says that even then all the junctions can't be done at once.	• Mr. Jeremy Aguma enlightened that BRT works by using large buses and putting them to use separate lanes outside general traffic. • Mentioned that there is a pilot route from Nambole-city centre-bwaise funded by World Bank. He used the aid of a short presentation.	• Mrs. Maggie Kigozi supplemented that there is a flyover proposed at around Namanve.
	• Mr. Kigumba of KCC wanted to know whether the study team has been in contact with KCC regarding the development of such infrastructure and plans	• Mr. Konda on the structure plan, said that the current KCC structure plan is not workable in Kampala at the moment.		
	• Mr. David MOLG had a query especially regarding mushrooming petrol stations and their significance to congestion.	• Mr. Konda explained to him why i.e. to give input and then to report output.		
Traffic safety plans	• Babara Mwanje (Arive alive) asks about road safety features expected to be seen on the Pre-FS projects. • Viability of pedestrian bridge (economics of time and distance vs safety)	• Mr. Iwamoto says installation of fence to compel pedestrians to use the pedestrian bridges.		
	• Mr. Charles says there is need for vehicle insurance and issues regarding Third party, etc	• Concurred that there was a need for vehicle insurance.		
	• Desire (Mukono TC) pedestrian bridges and need for lighting & security on such	• Mr. Konda says lighting will be considered in the Feasibility stage.		

Field of Query/ Discussion	Issues coming up/queries	Response by Study Team member	Supplementation by MoWT	Suggestions or supplementation from participants
	bridges.			
Traffic Management Plan	• Mrs. Maggie asks about the role of the private sector to come in.	• Mr. konda acknowledged the need of the private sector to provide facilities, buses, investment in parking structures e.t.c and the government should also be able to provide assistance.	• The chairman asked when would construction be likely to start because GOU needs some time to include in the budget.	
	• Mr. Asuman UIA, shall we need a revision of the law(s) regarding traffic	• Mr. Konda explained to him why i.e. to give input and then to report output.	• Mr. Wandera (MoWT) gave more light on BRT & NTP/GKMA and the stage it has reached and the agencies / departments.	
Environmental considerations.	• Mrs. Phoebe more attention and more light regarding issues like drainage vis a vis environment (mud & dust)	• Mr. Konda said that drainage is an important aspect of road service life and that it cannot be overlooked in design but added that cooperation with authorities and networking with drainage systems like Nakivubo channel were important.		
Public transport	• Person from World bank said that requirement of ROW for widening, should be a process that starts early.	• Mr. Konda answered that ROW is a key issue and that it has been considered.		
	• A participant said that the local communities need more sensitization on the above projects in order to address things like, support & other social issues etc.	• Mr. Muto said it is important and that is one of the reason why public workshops and consultations have been held.		
	• Godfrey Kiseka Town Clerk, wakiso, how does BRT connect to railways. • Also the role of local governments, and physical planners in Town council needs to be clearly mentioned and officers involved.	• Agreed that the local authorities need to be involved.	• Dr. Mugisa supplemented that this study and that of BRT have at all stages involved the local governments that fall within GKMA. • On connection to rail of BRT he replied that there were currently no plans.	
	• Town clerk Nansana, why should the west bound terminal be in Nabweru, said that there is more demand in Nansana.	• Mr. Muto there was smaller demand on Hoima road compared to the other upcountry routes that had been selected.		

Source: JICA Study Team

CHAPTER 12 COST ESTIMATE, IMPLEMENTATION PLAN AND PROJECT EVALUATION

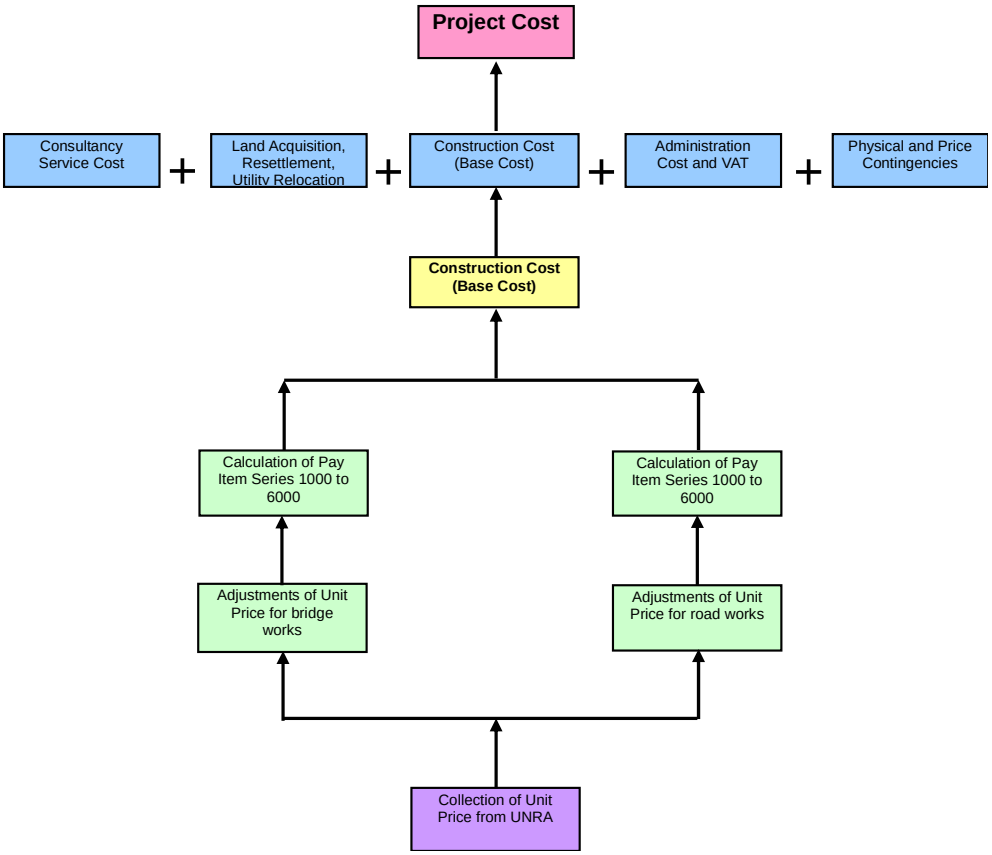
12.1 COST ESTIMATE

12.1.1 METHODOLOGY OF COST ESTIMATE

The Study Team obtained the contract data and information of sixteen road projects under Uganda National Road Authority (UNRA). The Study Team also received information and data, including Bill of Quantities (BOQ) and consultancy service contracts. Most of these construction works are executed by contractors selected through international competitive bidding (ICB) accompanied with pre-qualification.

The estimate of the Project Cost is based on the results of preliminary design of Pre-FS projects and quantity estimation by work item. The Project Cost consists of the following components (Figure 12.1.1):

- Construction Cost (Base Cost 2010)
- Consultancy Service Cost
- Land Acquisition and Compensation Cost
- Administration Cost
- Physical and Price Contingency



Source: JICA Study Team

Figure 12.1.1 Method of Diagram of Project Cost Estimation

12.1.2 ESTABLISHMENTOF UNIT PRICES

(1) Major Unit Price

For the establishment of unit prices of major pay items (Series 2000 to 6000), the average unit prices were derived from the unit prices contracted in fourteen on-going projects and two completed projects under MoWT and/or UNRA. These contracts are as listed in the following table.

Table 12.1.1 Reference Documents/Data used for Establishment for Unit Prices

No	Name of Project	Sub Section
On-going Project		
1	Kabale-Kisoro Road	
2	Masaka-Mbarara Road	
3	Soroti-Dokolo-Lira Road	3-1 Soroti-Dokolo Sec.
		3-2 Dokolo - Lira Sec
4	Fort Portal Bundibugyo-Lamia Road	4-1 Fort Portal - Itojo
		4-2 Itojo - Sempaya
		4-3 Sempaya - Lamia
5	Kampala-Gayaza-Zirobwe road	
6	Kampala - Masaka Road	6-1 Busega - Nsangi
		6-2 Kamengo - Lukaya
7	Kampala-Mityana road	7-1 Kampala-Muduma
		7-2 Muduma-Mityana
8	Kawempe-Luwero-Kafu road	
9	Matugga-Semuto-Kapeeka road	
Completed Projects		
10	Jinja - Bugili Road	
11	Northern Bypass	

Source: JICA Study Team

Unit prices from the above projects were converted to June 2010 prices using escalation adjustment factors, which were computed based on historical Consumer Price Indices issued by the Uganda Bureau of Statistics. The adjustment factors used to convert the unit prices of the sixteen projects above are shown in the following table.

Table 12.1.2 Adjustment Factors for Unit Price Escalation

F/Year	CPI	Adjustment Factor (CPI of 2010 Jun / CPI as of the Project)	Applicable Project
July-'03 to Jun-'04	86.9	1.657	(11 May-2004)
July-'04 to Jun-'05	93.8	1.535	-
July-'05 to Jun-'06	100.00	1.440	(1. April-2006) (10 June-2006)
July-'06 to Jun-'07	107.45	1.340	-
July-'07 to Jun-'08	115.34	1.248	(2 October-2007), (3-1 August-2007), (3-2. September-2007), (4-1,4-2, 4-3 September-2007) (5 March-2008), (8 December-2007)
July-'08 to Jun-'09	131.63	1.094	(6-1,6-2 January),-(2010 7-1 Jun-2009), (9 January-2009)
July-'09 to Jun-'10	144.02	1.000	(7-2 July-2009)

Source: JICA Study Team

The average unit prices were calculated as trimmed mean, which is derived by excluding a percentage of data points from the top and bottom tails of a data set. This was performed using a

statistical routine function of Microsoft Excel referred to as "TRIMMEAN (Array, Percent)". The said function returns the mean of the interior portion of a set of data values, where:

Array is the array or range of values to trim and average.

Percent is the fractional number of data points to exclude from the calculation.

For example, if Percent = 20%, four points are trimmed from a data set of 20 points (20x20), two from the top and two from the bottom of the set.

The average unit prices for the Pre-FS projects under this Study are computed by equating the formula parameter Percent to 30%, in view of the significant variability of the data. The resulting unit prices for specific pay items are as shown in the following table.

Table 12.1.3 Average Unit Prices of Major Pay Items

ITEM	DESCRIPTION	UNIT	UNIT PRICE (Ushs)
SERIES 2000	**DRAINAGE**		
Section 2100	Drains		
21.01	Excavation for Open Drains		
(a)	Excavating Soft Material	Cu/m	16,129
22.03	Concrete Pipe Culverts		-
(d)	1,000mm	Meter	676,912
22.07	Cast in Situ Concrete and Form Work	Cu/m	664,392
22.12	Removing Existing Concrete		-
(a)	Plain Concrete	Cu/m	108,086
(b)	Reinforced Concrete	Cu/m	145,523
Section 2300	Concrete Karbing, Channeling, Open Drains		-
23.01	150mm x 250mm x 600mm	Meter	53,723
SERIES 3000	**EARTHWORKS AND PAVEMENT**		
Section 3100	Clearin, Grubbing and Removal of Topsoil		
31.01	Clearing,grubbing and removal of topsoil		
(a)	Clearing and grubbing	Hectare	13,693,987
Section 3200	Removal of Existing Structures		-
32.01	Removal of Existing Structures		-
(a)	Removal of existing pipe culverts of any size	Linear Meter	164,697
Section 3300	Breaking uo Existing Pavement Laters		-
33.04	Scarification and recompaction of existing pavement layers	Sq/m	16,080
Section 3600	Earthworks		-
36.01	Excavations		-
(a)	Common excavation to spoil	Cu/m	16,001
36.02	Fill and improved subgrade layers		-
(a)	Improved subgrade layer require minimum G15 quality material	Cu/m	25,263
37.02	Natural gravel for subbase		-
(a)	Natural gravel class G45	Cu/m	32,838
39.01	Crushed Aggregate for Road Base		-
(a)	CBR=98%	Cu/m	134,891
(b)	CBR=102%	Cu/m	122,704
SERIES 4000	**BITUMINOUS LAYERS AND SEALS**		
Section 4100	Prime and Curing Membranes		
41.01	Prime coat		
(a)	MC-30 cut -back bitumen	Litter	4,135
(b)	MC-70 cut -back bitumen	Litter	3,626
Section 4200	Bituminous Base Course and Asphalt Concrete Surfacing		-
42.01	Asphalt concrete surfacing	Cu/m	285,203
Section 4700	Surfacing of Bride Decks		-
47.01	surfacing on bridge deck (T=5cm)	Sq/m	14,260
SERIES 5000	**ANCILLARY ROADWORKS**		
Section 5200	Guardrails		
52.01	Guardrails on steel posts		
(a)	Galvanised	Meter	181,817
Section 5400	Road sign		-
54.01	Road sign(standard ,state area for each type)	Number	782,920
55.03	Road marking using thermo-plastic road-marking materials		-
(a)	White lines (broken or unbroken) (width of line indicated)	Meter	4,319
SERIES 6000	**STRUCTURES**		
Section 6100	Foundations for Structures		
63.01	Steel Reinforcement for		
(i)	Mild steel bars	Tone	4,221,612
(ii)	High-yield-stress-steel bars	Tone	3,869,152
Section 6400	Concrete for Structures		-
64.01	Cast in situ concrete		-
(a)	Class 30/14 (All Precuts Work)	Cu/m	616,728
(b)	Class 25/20 (Normal RC structures)	Cu/m	703,584
(c)	Class 20/40 (Pipeline, protection etc)	Cu/m	766,289
(d)	Class 7/40 (Kerb, Foundation etc)	Cu/m	568,967
64.02	Manufacturing precuts concrete members(17.6m long 28.5t)	Cu/m	1,886,086
64.03	Transporting and erecting precuts concrete members(17.6m 28.5t)	Cu/m	559,169

Source: JICA Study Team

Estimation of general items (Pay Item Series 1000) is obtained as a percentage of the direct cost. The following percentages are established based on past projects.

Table 12.1.4 Average Unit Prices of Pay Items Series 1000

SERIES 1000	Description	Percentage
Section 1200	General Requirement and Provisions	0.84%
Section 1300	Contractor's Establishment on Site and General Obligations	3.55%
Section 1400	Engineer's Accommodation and Attendance	3.35%
Section 1500	Accommodation of Traffic	1.23%
Section 1600	Overhaul	0.04%
Section 1700	Environmental Protection and Waste Disposal	0.26%
Section 1800	Occupational Health and Safety, HIV/AIDS and Gender	0.48%
Total of SERIES 1000 (%)		9.74%

Source: JICA Study Team

(2) Unit Price for Flyover Bridge Construction

In Kampala City and Uganda, there is no experience of flyover construction works similar to Pre-FS projects. Therefore, the Study Team has established the unit prices applied for cost estimation of the flyover bridge construction, which was derived from the following reference data:

- Northern Bypass Project (UNRA)
- Northern Bypass Road Bridge at Kyebando Road Project (May 2004)
- The Feasibility Study on the Construction of a New Bridge across River Nile at Jinja (October 2009)
- Flyover Projects in Other Countries

The unit prices for estimation of construction costs were based on the conditions shown below:

a) Section 6100 Foundations for Structures

Installation of permanent pile casings for pile works was assumed by estimating from actual results in Uganda for such works and determined with the construction price for diameter of 1.0 m.

b) Section 6300 Steel Reinforcement for Structures

In Steel Reinforcement for Structures, the price of mild steel bars was cheap. However, adopted prices for Jinja Bridge were low because it was of large-scale construction.

c) Section 6400 Concrete for Structures

Concrete for Structures is arranged according to the application of concrete. The estimate used was that of the construction unit cost of Jinja Bridge.

d) Section 6700 Structural Steelwork

For Structural Steelwork, prices include material costs, processing fees and part costs, etc.

Table 12.1.5 Establishment of Unit Prices for Bridge Works

ITEM	DESCRIPTION	UNIT	UNIT PRICE (Ushs)
SERIES 3000	**EARTHWORKS AND PAVEMENT**		
36.02	Fill and improved subgrade layers		
(b)	Improved subgrade layer require minimum G7 quality material	Cu/m	19,263
SERIES 4000	**BITUMINOUS LAYERS AND SEALS**		
Section 4200	Bituminous Base Course and Asphalt Concrete Surfacing		
42.01	Asphalt concrete surfacing	Cu/m	285,203
Section 4700	Surfacing of Bride Decks		
47.01	surfacing on bridge deck (T=5cm)	Sq/m	14,260
SERIES 5000	**ANCILLARY ROADWORKS**		
Section 5800	Reinforced Earth		
58.01	Concrete Panel Type	Sq/m	1,206,392
SERIES 6000	**STRUCTURES**		
Section 6100	Foundations for Structures		
61.25	Installing permanent pile casing for piles		
(b)	Bored Pile (1,000mm)	Meter	2,676,021
Section 6300	Steel Reinforcement for Structures		
63.01	Steel Reinforcement		
(ii)	Reinforcement Bars	Tone	3,869,152
Section 6400	Concrete for Structures		
64.16	Concrete		
(i)	Structures Concrete	Cu/m	272,472
64.02	Manufacturing precuts concrete members		
(a)	PC-T Girder	Cu/m	1,138,253
(c)	PC-Box Girder	Cu/m	1,316,950
64.03	Transporting and Erectting		
(a)	Erecting Concrete Girder	Tone	822,049
(b)	Erecting Steel Girder	Tone	822,049
Section 6700	Structural Steelwork		
67.01	Manufacturing steel box girder	Tone	11,816,965
67-02	Manufacturing steel I girder	Tone	10,635,268
67-03	Manufacturing steel pier	Tone	11,816,965

Source: JICA Study Team

The unit prices for cost estimation of flyover bridge construction were based on Jinja Bridge and other projects.

(3) Estimated Quantities

For Road Works:

Major quantities of road works were computed from preliminary design and quantity estimates of Pre-FS projects.

Table 12.1.6 Estimated Quantities for Road Works

ITEM	DESCRIPTION	UNIT	Pre-FS projects (Road)					
			Project 1.1	Project 1.2	Project 1.3	Project 2	Project 3	
			Jinja Junction Main Flyover (Yusufu Lule - Mukwano Rds)	Jinja Junction Ramp Flyover (Jinja - Yusefu Lule Rds and Mukuwano - Jinja Rds)	Clock Tower Flyover	Mukwano Rd Widening (Dual Carriageway, 4 lanes)	Shoprite & Clock Tower Jcts Traffic Safety Improvement	
							Shoprite Section	Clock Tower Section
SERIES 2000	**DRAINAGE**							
Section 2100	Drains							
21.01	Excavation for Open Drains							
(a)	Excavating Soft Material	Cu/m	3,260	890		5,010	1,000	1,000
22.03	Concrete Pipe Culverts							
(d)	1,000mm	Meter	260	70		500	66	196
22.07	Cast in Situ Concrete and Form Work	Cu/m	3,150	860		6,110	907	2,365
22.12	Removing Existing Concrete							
(a)	Plain Concrete	Cu/m	1,040	280		2,030	279	828
(b)	Reinforced Concrete	Cu/m					19	
Section 2300	Concrete Karbing, Channeling, Open Drains							
23.01	150mm x 250mm x 600mm	Meter	5,210	1,420		11,200	2,094	4,868
SERIES 3000	**EARTHWORKS AND PAVEMENT**							
Section 3100	Clearin, Grubbing and Removal of Topsoil							
31.01	Clearing,grubbing and removal of topsoil							
(a)	Clearing and grubbing	Hectare	0.53	0.05		3.59	0.22	0.88
Section 3200	Removal of Existing Structures							
32.01	Removal of Existing Structures							
(a)	Removal of existing pipe culverts of any size	Linear Meter						
Section 3300	Breaking uo Existing Pavement Laters							
33.04	Scarification and recompaction of existing pavement layers	Sq/m	19,460	4,220		15,800	5,786	12,855
Section 3600	Earthworks							
36.01	Excavations							
(a)	Common excavation to spoil	Cu/m	780	210		10,840		
36.02	Fill and improved subgrade layers							
(a)	Improved subgrade layer require minimum G15 quality material	Cu/m	10,230	2,760		21,910		
37.02	Natural gravel for subbase							
(a)	Natural gravel class G45	Cu/m	1,740	150		10,730	1,355	3,512
39.01	Crushed Aggregate for Road Base							
(a)	CBR=98%	Cu/m						
(b)	CBR=102%	Cu/m	1,920	310		8,460	1,196	2,929
SERIES 4000	**BITUMINOUS LAYERS AND SEALS**							
Section 4100	Prime and Curing Membranes							
41.01	Prime coat							
(a)	MC-30 cut -back bitumen	Litter	32,870	6,830		56,660	7,439	17,587
(b)	MC-70 cut -back bitumen	Litter	57,350	11,470		96,880	16,089	37,417
Section 4200	Bituminous Base Course and Asphalt Concrete Surfacing							
42.01	Asphalt concrete surfacing	Cu/m	2,810	560		5,570	1,176	2,750
Section 4700	Surfacing of Bride Decks							
47.01	surfacing on bridge deck (T=5cm)	Sq/m						
SERIES 5000	**ANCILLARY ROADWORKS**							
Section 5200	Guardrails							
52.01	Guardrails on steel posts							
(a)	Galvanised	Meter	170			1,340	664	1,960
Section 5400	Road sign							
54.01	Road sign(standard ,state area for each type)	Number	13	4		38	21	19
55.03	Road marking using thermo-plastic road-marking materials							
(a)	White lines (broken or unbroken) (width of line indicated)	Meter	11,730	3,200		22,460	2,022	6,295
SERIES 6000	**STRUCTURES**							
Section 6100	Foundations for Structures							
63.01	Steel Reinforcement for							
(i)	Mild steel bars	Tone					19.80	21.60
(ii)	High-yield-stress-steel bars	Tone				68	73.26	53.88
Section 6400	Concrete for Structures							
64.01	Cast in situ concrete							
(a)	Class 30/14 (All Precuts Work)	Cu/m						
(b)	Class 25/20 (Normal RC structures)	Cu/m				680	733	539
(c)	Class 20/40 (Pipeline, protection etc)	Cu/m						
(d)	Class 7/40 (Kerb, Foundation etc)	Cu/m				270	198	216
64.02	Manufacturing precuts concrete members(17.6m long 28.5t)	Cu/m					146.25	290.00
64.03	Transporting and erecting precuts concrete members(17.6m 28.5t)	Cu/m					146.25	290.00

Source: JICA Study Team

For Bridge Works:

Major quantities of bridge works were computed from preliminary design and quantity estimates of Pre-FS projects.

Table 12.1.7 Estimated Quantities for Bridge Works

ITEM	DESCRIPTION	UNIT	Pre-FS projects (Bridge)				
			Project 1.1	Project 1.2			Project 1.3
			Jinja Junction Main Flyover (Yusufu Lule - Mukwano Rds)	Mukwano - Jinja Rds Flyover	Jinja - Yusefu Lule Rds Flyover	Nile Avenue Ramp	Clock Tower Flyover
SERIES 3000	**EARTHWORKS AND PAVEMENT**						
36.02	Fill and improved subgrade layers						
(b)	Improved subgrade layer require minimum G7 quality material	Cu/m	8,392	3,941	3,518	2,689	4,536
SERIES 4000	**BITUMINOUS LAYERS AND SEALS**						
Section 4200	Bituminous Base Course and Asphalt Concrete Surfacing						
42.01	Asphalt concrete surfacing	Cu/m	299	111	105	80	133
Section 4700	Surfacing of Bride Decks						
47.01	surfacing on bridge deck (T=5cm)	Sq/m	18,668	5,393	6,495	1,323	1,495
SERIES 5000	**ANCILLARY ROADWORKS**						
Section 5800	Reinforced Earth						
58.01	Concrete Panel Type	Sq/m	1,291	788	704	742	1,251
SERIES 6000	**STRUCTURES**						
Section 6100	Foundations for Structures						
61.25	Installing permanent pile casing for piles						
(b)	Bored Pile (1,000mm)	Meter	4,522	963	1,197	315	450
Section 6300	Steel Reinforcement for Structures						
63.01	Steel Reinforcement for						
(ii)	Reinforting bar	Tone	2,343	498	944	133	89
Section 6400	Concrete for Structures						
64.16	Concrete						
(i)	Structural Concrete	Cu/m	12,013	3,417	5,401	708	741
64.02	Manufacturing precuts concrete members						
(a)	PC-T Girder	Cu/m	5,434	880		479	
(c)	PC-Box Girder	Cu/m	2,711		2,380		
		Cu/m					
64.03	Transporting and Erectting						
(a)	Erecting Concrete Girder	Tone	22,144	2,288		1,244	
(b)	Erecting Steel Girder	Tone	2,339	1,651	7,928	327	890
Section 6700	Structural Steelwork						
67.01	Manufacturing steel box girder	Tone	2,339	1,651	1,392	327	890
67-02	Manufacturing steel I girder	Tone	882		291		
67-03	Manufacturing steel pier	Tone	520				

Source: JICA Study Team

12.1.3 COSTRUCTION COST

Using the quantities and unit prices in the foregoing sections, the construction cost of Pre-FS project road works and flyover bridge works were estimated at UShs 28.4 billion and UShs 207.6 billion, respectively, as shown in the following table.

Table 12.1.8 Estimated Construction Costs for Road Works

Unit:Ushs

ITEM	DESCRIPTION	UNIT	Pre-FS projects (Road)					
			Project 1.1	Project 1.2	Project 1.3	Project 2	Project 3	
			Jinja Junction Main Flyover (Yusufu Lule - Mukwano Rds)	Jinja Junction Ramp Flyover (Jinja - Yusefu Lule Rds and Mukuwano - Jinja Rds)	Clock Tower Flyover	Mukwano Rd Widening (Dual Carriageway, 4 lanes)	Shoprite & Clock Tower Jcts Traffic Safety Improvement	
							Shoprite Section	Clock Tower Section
SERIES 1000	GENERAL							
		L/S	470,888,297	114,031,758	-	1,086,996,999	294,115,227	551,930,205
SERIES 2000	DRAINAGE							
		L/S	2,713,718,730	739,666,510	-	5,299,809,590	808,855,893	2,071,109,604
SERIES 3000	EARTHWORKS AND PAVEMENT							
		L/S	883,825,683	184,592,329	-	2,420,616,163	287,251,950	693,486,181
SERIES 4000	BITUMINOUS LAYERS AND SEALS							
		L/S	1,145,288,980	229,545,950	-	2,174,156,690	424,611,788	992,704,537
SERIES 5000	ANCILLARY ROADWORKS							
		L/S	91,748,720	16,952,480	-	370,390,480	145,900,826	398,424,905
SERIES 6000	STRUCTURES							
		L/S	-	-	-	895,160,546	1,353,043,075	1,510,909,327
Sub-Total (Series 2000 to Series 6000)			4,834,582,113	1,170,757,269	-	11,160,133,469	3,019,663,532	5,666,634,554
Estimated Construction Costs			**5,305,470,410**	**1,284,789,027**	**-**	**12,247,130,468**	**3,313,778,759**	**6,218,564,759**

Source: JICA Study Team

Table 12.1.9 Estimated Construction Costs for Bridge Works

Unit:Ushs

ITEM	DESCRIPTION	UNIT	Pre-FS projects (Bridge)				
			Project 1.1	Project 1.2			Project 1.3
			Jinja Junction Main Flyover (Yusufu Lule - Mukwano Rds)	Mukuwano - Jinja Rds Flyover	Jinja - Yusefu Lule Rds Flyover	Nile Avenue Ramp	Clock Tower Flyover
SERIES 1000	GENERAL						
			9,374,938,444	2,822,818,489	3,654,884,023	695,600,721	1,265,582,866
SERIES 3000	EARTHWORKS AND PAVEMENT						
			161,645,464	75,905,851	67,757,602	51,790,501	87,369,262
SERIES 4000	BITUMINOUS LAYERS AND SEALS						
			351,474,247	108,565,991	122,563,589	41,760,650	59,364,780
SERIES 5000	ANCILLARY ROADWORKS						
			1,557,452,072	950,757,535	848,696,772	894,780,946	1,509,437,670
SERIES 6000	STRUCTURES						
			96,251,934,748	28,981,709,336	37,524,476,623	7,141,691,182	12,993,663,926
Sub-Total (Series 3000 to Series 6000)			98,322,506,531	30,116,938,713	38,563,494,586	8,130,023,279	14,649,835,638
Estimated Construction Costs			107,697,444,975	32,939,757,202	42,218,378,609	8,825,624,000	15,915,418,504

Source: JICA Study Team

12.1.4 MAINTENANCE AND OPERATION COST

Road maintenance activities, which are required after the completion of the project, are generally divided into two categories; Routine Maintenance Work and Periodic Maintenance Work. Each maintenance work consists of the following items:

i) Routine Maintenance Work including:

- Operation cost : Cost of electricity used 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.
- Repair cost : Costs for pavement repair including pot hole patching and crack sealing for AC pavement, repainting 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 of deck drainage pipe, etc.

ii) Periodic Maintenance Work including;

- Overlay for AC pavement (every 10 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)

Taking the above activities into account, the maintenance costs for Jinja Junction Flyover, Clock Tower Flyover, Mukwano Road Widening and Shoprite and Clock Tower Traffic Improvement projects were estimated as shown in Table 12.1.10.

Table 12.1.10 Estimated Maintenance Costs of Each Project

No.	Project Name	Routine Maintenance Cost (Million UShs)	Periodic Maintenance Cost (Million UShs)	
		Every Year	Every 10 Years	Every 15 Years
1-1	Yusufu Lule - Mukwano Rds Flyover	1,930	1,800	61,300
1-2	Jinja - Yusufu Lule Rds Flyover and Mukwano - Jinja Rds Flyover			
1-3	Clock Tower Flyover	160	-	5,630
2	Mukwano Rd Widening, incl. Mukwano Rbt & Nsambya Jct Capacity Improvement	330	3,350	-
3	Shoprite and Clock Tower Jcts Traffic Safety Improvement	260	2,610	-

Source: JICA Study Team

12.1.5 CONSULTANCY SERVICE COST

The consultancy service cost was at 9.57% of the civil works cost for 7-2 Kampala-Mitiyana Road and other projects, and 5.85%, 7.67%, 11.49 % were applied to previous projects of UNRA. The consultancy service cost is therefore estimated at 8.50% on average for Pre-FS projects.

The consultancy service cost for Pre-FS projects is estimated at UShs 18.7 billion, which includes the following:

- Detailed engineering design and tender documents preparation,
- Assistance in procurement of civil works contractors, and
- Construction supervision and project management.

Table 12.1.11 Consultancy Service Costs

Project Type	Financed by	Construction Cost	Consultant Cost	Percentages
Road Re-construction	GoU	34,874,876,268	3,337,165,471	9.57%
Upgrading (Paving)	NDF	37,912,132,240	2,219,124,740	5.85%
Rehabilitation & Widening (dual)	EU	151,006,183,856	11,584,039,052	7.67%
New Construction	EU	83,904,464,291	9,639,983,257	11.49%
			Average	**8.65%**

Source: JICA Study Team

12.1.6 OTHER COSTS (LAND ACQUISITION, RESETTLEMENT, UTILITY RELOCATION, ADMINISTRATION AND TAX AND DUTY)

i) ROW/Land Acquisition and Related Activities

ROW acquisition normally covers costs for: (a) land to be acquired for the project, (b) demolition and replacement of affected household/residential structures, (c) compensation for affected households/families, and (d) relocation and resettlement of affected informal settlers.

According to the preliminary design and site reconnaissance survey, the Pre-FS projects require an aggregate total land area of about 8.73 ha. Most of the land is public land (MoWT, Electoral Commission, URC, etc.) but also needs 2.59 hectares of private land as shown in the following table.

Table 12.1.12 Required Land Acquisition for G/K Pre-FS project

Project No.	Name of Place	Unit	ROW to be acquired	
			Private	Total
Project 1.1	Yusefu Lule - Mukuwano Rds Flyover	ha	0.11	0.52
Project 1.2	Jinjya - Yusefu Lule Rds Flyover and Mukuwano - Jinjya Rds Flyover	ha	0.65	2.5
Project 1.3	Clock Tower Flyover	ha	0.00	0.60
Project 2	Mukuwano Rd Widening, incl. Mukuwano Rdt & Nsanbya Jct Capacity Improvement	ha	1.19	3.94
Project 3	Shoprite & Clock Tower Jcts Traffic Safety Improvement	ha	0.64	1.17
Total		**ha**	**2.59**	**8.73**

Source: JICA Study Team

In Uganda, land acquisition and the procedure for building removal shall be performed in conformity to Land Act 1998. This procedure is very complicated and mostly, the compensation for buildings is extremely higher than the land. Kampala District Land Board is in charge of land acquisition.

Presently, lands to be acquired are valued depending on land use type, location of the area and market price by the valuer. The total cost of land acquisition is estimated to be about UShs 10.6 billion as shown in Table 12.1.13.

Table 12.1.13 Estimated Cost of ROW Acquisition

Project No.	Name of Place	Unit	Area (ha)	Amount
Project 1.1	Yusefu Lule - Mukuwano Rds Flyover	U.Shs	0.11	449,844,120
Project 1.2	Jinjya - Yusefu Lule Rds Flyover and Mukuwano - Jinjya Rds Flyover	U.Shs	0.65	2,658,169,800
Project 1.3	Clock Tower Flyover	U.Shs	0.00	0
Project 2	Mukuwano Rd Widening, incl. Mukuwano Rdt & Nsanbya Jct Capacity Improvement	U.Shs	1.19	4,866,495,480
Project 3	Shoprite & Clock Tower Jcts Traffic Safety Improvement	U.Shs	0.64	2,617,274,880
Total		**U.Shs**	**2.59**	**10,591,784,280**

Source: JICA Study Team

Based on the results of site reconnaissance surveys, there are about nine buildings/houses and forty-one households affected by the implementation of Pre-FS projects, which is estimated in Table 12.1.14.

Table 12.1.14 Estimated Number of Houses/Structures Affected

Project No.	Name of Place	Unit	Affected Building/Household			
			Private	Public	Total	Household
Project 1.1	Yusefu Lule - Mukuwano Rds Flyover	number	0	1	1	1
Project 1.2	Jinjya - Yusefu Lule Rds Flyover and Mukuwano - Jinjya Rds Flyover	number	2	9	11	17
Project 1.3	Clock Tower Flyover	number	0	4	4	4
Project 2	Mukuwano Rd Widening, incl. Mukuwano Rdt & Nsanbya Jct Capacity Improvement	number	2	7	9	15
Project 3	Shoprite & Clock Tower Jcts Traffic Safety Improvement	number	0	4	4	4
Total		**number**	**4**	**25**	**29**	**41**

Source: JICA Study Team

The resulting estimated total value of the structures is about UShs 0.2 billion, as shown in Table 12.1.15.

Table 12.1.15 Estimated Cost of Compensation for Affected Buildings and Households

Project No.	Name of Place	Unit	Building	Household	Amount (U.Shs)	
Project 1.1	Yusefu Lule - Mukuwano Rds Flyover	U.Shs	0	1		4,000,000
Project 1.2	Jinjya - Yusefu Lule Rds Flyover and Mukuwano - Jinjya Rds Flyover	U.Shs	2	17	16,000,000	68,000,000
Project 1.3	Clock Tower Flyover	U.Shs	0	4		16,000,000
Project 2	Mukuwano Rd Widening, incl. Mukuwano Rdt & Nsanbya Jct Capacity Improvement	U.Shs	2	15	16,000,000	60,000,000
Project 3	Shoprite & Clock Tower Jcts Traffic Safety Improvement	U.Shs	0	4		16,000,000
Total		**U.Shs**	**4**	**41**	**196,000,000**	

Source: JICA Study Team

Since there are no informal settlers at the land area needed for the project, no related expenses are foreseen for such compensation.

Since the relocation of utilities is the responsibility of each respective agency, its cost was not included in the project cost estimation.

ii) Administration Cost

The cost of project administration is estimated at 2.0% of the estimated total project cost.

iii) Tax and Duty

Construction equipment, materials and goods that will be used can be imported to Uganda at duty free. Then the equipment and materials will be exported to the origin after the completion of the project.

Value Added Tax (VAT) of 18 % shall not be applied for the Pre-FS projects in accordance with "VALUE ADDED TAX ACT (2005), CAP. 349. 19 Exempt Supplies (1)", stated as

"(aa) the supply of feasibility studies, engineering designs and consultancy services and civil works related to roads and bridges' construction"

Therefore, almost all materials and equipment required for the project implementation are assumed as VAT exempted, except for fuel.

12.1.7 PROJECT COST ESTIMATES

(1) Construction Cost (Base Cost 2010)

The total base cost, excluding Project No. 1.3 (Clock Tower Flyover) was estimated at UShs 220.6 billion as summarized in the following table.

Table 12.1.16 Summary of Base Costs of Pre-FS Projects

Base Cost — Unit: Ushs

ITEM	DESCRIPTION	UNIT	Pre-FS projects					
			Project 1.1	Project 1.2	Project 1.3	Project 2	Project 3	
			Jinja Junction Main Flyover (Yusufu Lule - Mukwano Rds)	Jinja Junction Ramp Flyover (Jinja - Yusefu Lule Rds and Mukuwano - Jinja Rds)	Clock Tower Flyover	Mukwano Rd Widening (Dual Carriageway, 4 lanes)	Shoprite & Clock Tower Jcts Traffic Safety Improvement	
							Shoprite Section	Clock Tower Section
SERIES 1000	**GENERAL**							
		L/S	10,047,500,433	7,595,370,228	1,426,893,991	1,086,996,999	294,115,227	551,930,205
SERIES 2000	**DRAINAGE**							
	Road section	L/S	2,713,718,730	739,666,510		5,299,809,590	808,855,893	2,071,109,604
	Bridge section	L/S						
SERIES 3000	**EARTHWORKS AND PAVEMENT**							
	Road section	L/S	883,825,683	184,592,329		2,420,616,163	287,251,950	693,486,181
	Bridge section	L/S	161,645,464	195,453,954	87,369,262			
SERIES 4000	**BITUMINOUS LAYERS AND SEALS**							
	Road section	L/S	1,145,288,980	229,545,950		2,174,156,690	424,611,788	992,704,537
	Bridge section	L/S	351,474,247	272,890,230	59,364,780			
SERIES 5000	**ANCILLARY ROADWORK'S**							
	Road section	L/S	91,748,720	16,952,480		370,390,480	145,900,826	398,424,905
	Bridge section	L/S	1,557,452,072	2,694,235,253	1,509,437,670			
SERIES 6000	**STRUCTURES**							
	Road section	L/S				895,160,546	1,353,043,075	1,510,909,327
	Bridge section	L/S	96,251,934,748	73,647,877,141	12,993,663,926			
Sub-Total (Series 2000 to Series 6000)			103,157,088,644	77,981,213,847	14,649,835,638	11,160,133,469	3,019,663,532	5,666,634,554
Construction Costs			**113,204,589,077**	**85,576,584,075**	**16,076,729,629**	**12,247,130,468**	**3,313,778,759**	**6,218,564,759**
			198,781,173,152		**16,076,729,629**	**12,247,130,468**	**9,532,343,517**	
Construction Cost (Base Cost)	General :		10,047,500,433	7,595,370,228		1,086,996,999	294,115,227	551,930,205
	Road Section Cost :		4,834,582,113	1,170,757,269		11,160,133,469	3,019,663,532	5,666,634,554
	Bridge Section Cost:		98,322,506,531	76,810,456,578		0	0	0
	Total:		**113,204,589,077**	**85,576,584,075**		**12,247,130,468**	**3,313,778,759**	**6,218,564,759**

Exchange Rates: 1.0 US$ = UShs 2,271.94 = 88.44 JP Yen, as of 30th June 2010

Civil Works Base Cost (Excluding Project No. 1.3, Clock Tower Flyover) : 220,560,647,138

Source: JICA Study Team

As shown in the above table, the base cost for Clock Tower Flyover construction was estimated at UShs 16.1 billion and it will be implemented as Phase 2 project.

(2) Physical and Price Contingencies

The physical and price contingencies were estimated considering the following:

Table 12.1.17 Summary of Price and Physical Contingencies

Category	Currency	Civil Works	Consultancy Services	Land Acquisition /Compensation / Administration
Price Contingency	FC	3.0% / annum	3.0% / annum	-
	LC	11.0% / annum	-	11.0% / annum
Physical Contingency	FC/LC	10.0 %	5.0%	10.0%

Source: JICA Study Team

(3) Foreign and Local Currency Components

The following foreign and local currency components were applied by category. These components were determined by referring to past project implementation, but the foreign component is higher since the project mostly involve flyover construction.

Table 12.1.18 Foreign and Local Currency Component for Pre-FS Project

Category	Civil Works	Consultancy Services
FC	80%	80%
LC	20%	20%

Source: JICA Study Team

(4) Foreign Current Conversion Rates

The exchange rate of the "Bank of Uganda" on June 30, 2010 was adopted for cost estimation:

"US$ 1.00 = UShs 2,272.00"

(5) Project Cost for Jinja Junction Flyovers, Mukwano Road Widening, and Shoprite and Clock Tower Junctions Traffic Safety Improvement

After adding physical and price contingencies, consultancy services, land acquisition and resettlement, and administration cost to the base cost, the total project cost has been estimated at UShs 353.5 billion or US$155.6 million as in the following table.

Table 12.1.19 Summary of the Project Cost Estimate for Jinja Junction Flyovers, Mukwano Road Widening and Shoprite and Clock Tower Junctions Traffic Safety Improvement

Category	Cost in UShs (billion)				Cost equivalent to US$ (million)			
	Base Cost	Price Escalation	Physical Contingency	Total	Base Cost	Price Escalation	Physical Contingency	Total
Civil Works	220.56	58.62	27.92	307.10	97.08	25.80	12.29	135.17
Consultancy Services for DD & CS	18.75	4.20	1.15	24.10	8.25	1.85	0.51	10.61
Land Acquisition & Resettlement	10.77	3.23	1.40	15.40	4.74	1.42	0.62	6.78
Administration Cost	5.00	1.32	0.61	6.93	2.20	0.58	0.27	3.05
Value Added Tax (No VAT)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	255.08	67.37	31.08	353.53	112.27	29.65	13.68	155.60

Notes: 1. Currency Exchange Rate US$1.00 = UShs 2,272 as of 30th June 2010.
2. Construction starts in the 1st quarter of 2014/15 and complete in 3 years.

Source: JICA Study Team

(5) Project Cost for Clock Tower Flyover

The project cost has been estimated at UShs 34.9 billion or US$ 15.4 million as in the following table.

Table 12.1.20 Summary of the Project Cost Estimate for Clock Tower Flyover Construction

Category	Cost in UShs (billion)				Cost equivalent to US$ (million)			
	Base Cost	Price Escalation	Physical Contingency	Total	Base Cost	Price Escalation	Physical Contingency	Total
Civil Works	16.08	12.68	2.88	31.64	7.08	5.58	1.27	13.93
Consultancy Services for DD & CS	1.37	1.02	0.12	2.51	0.60	0.45	0.05	1.10
Land Acquisition & Resettlement	0.02	0.03	0.00	0.05	0.01	0.01	0.00	0.02
Administration Cost	0.35	0.27	0.06	0.68	0.15	0.12	0.03	0.30
Value Added Tax (No VAT)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	17.81	14.01	3.06	34.88	7.84	6.17	1.35	15.35

Notes: 1. Currency Exchange Rate US$1.00 = UShs 2,272 as of 30th June 2010.
2. Construction starts in the 1st quarter of 2021/2 and complete in 2 years.

Source: JICA Study Team

12.2 PROJECT IMPLEMENTATION PLAN

12.2.1 IMPLEMENTATION SCHEDULE

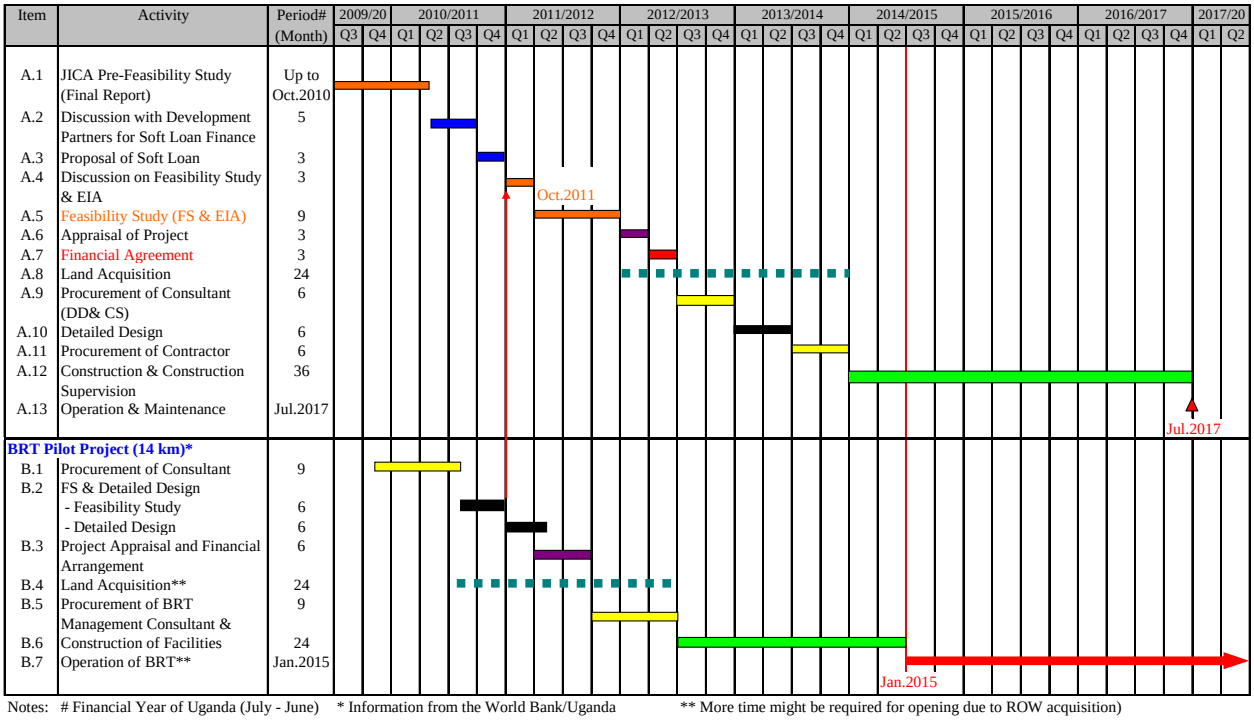
(1) Implementation of Pre-FS Projects in 2 Phases

UNRA will be the executive agency responsible for the implementation of Pre-FS Projects, including feasibility study, detailed design, procurement and supervision of consultant and contractors, under overall supervision and management of MoWT.

The Pre-FS Projects are recommended to be implemented in two phases on aspects of their urgency and to meet the BRT operation. Phase 1 is implementation of Jinja Junction Flyovers, Mukwano Road widening and Shoprite and Clock Tower Junction Traffic Safety Improvement Projects at earliest appropriate timing. Since these three projects are related each other, it is better to implement them as one package if budget is available,.

Since the traffic capacity of Clock Tower Junction will become sufficient after its intersection improvement in Phase 1, the project implementation of Phase 2, Clock Tower Flyover, could be undertaken approximately 6-7 years later.

Figure 12.2.1 shows the project implementation schedule for Phase 1 projects. A feasibility study should be conducted as a next step to project implementation after the completion of this Pre-FS. It is necessary for the feasibility study on the project to confirm the concrete plan of BRT project such as the exact route where the BRT would be introduced and specific drawings for the facilities. Since this information will become available only after a BRT feasibility study which will be conducted during the period from around February 2011 to June 2011, the feasibility study should be commenced from around October 2011 when the BRT feasibility study and preparatory discussions will be completed. The project implementation period has been planned from September 2011 (commencement of FS/EIA) to June 2017 (completion of construction).



Notes: # Financial Year of Uganda (July - June) * Information from the World Bank/Uganda ** More time might be required for opening due to ROW acquisition)

Source: JICA Study Team

Figure 12.2.1 Project Implementation Schedule for Phase 1 Project (Jinja Jct Flyover, Mukwano Road Widening and Shoprite & Clock Tower Jcts Traffic Safety Improvement)

However, as the Pre-FS projects are deeply related with the BRT pilot project, the feasibility study of Pre-FS projects should commence after confirming the following conditions:

- Submission of the draft final report of the BRT pilot project feasibility study, which is commenced in early 2011 and completed within about 6 months, and its approval by the World Bank and MoWT
- No substantial objection to the introduction of BRT and traffic operation restriction by Uganda Taxi Operators & Drivers Association (UTODA), the Uganda Association of Motorcycle & Bicycle Operators (UAMBO) and other main stakeholders
- No objection to close of the Kampala – Entebbe Road Junction to the general traffic at the public consultations held during of the BRT pilot project feasibility study
- Substantial completion of the EIA study for the BRT pilot project feasibility study.

(2) Implementation of Phase 1 Projects by Stage

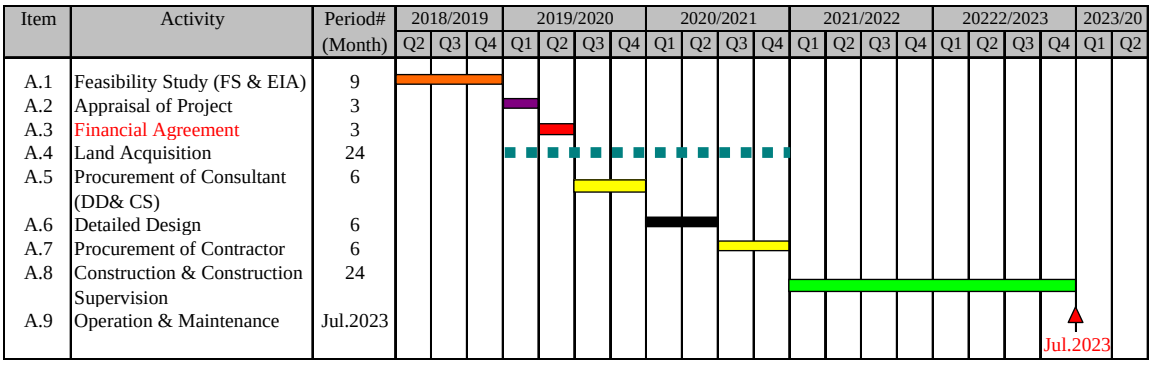
If available budget is limited, the Phase 1 projects can be implemented in 2 stages; Stage 1 for Project No.1.1 (Yusufu Lule – Mukwano Roads Flyover), Project 2.4 (Mukwano Road Widening) and Project No.3.7 (Shoprite & Clock Tower Junction Traffic Safety Improvement) and Stage 2 for Project 1.2 (Jinja – Yusufu Lule Roads and Mukwano – Jinja Roads Right-turn Flyovers).

Other possibility is implementation of the Phase 1 projects with co-finance of two international development partners; Stage 1 (Projects No.1.1, No.2.4 and No.3.7) for a co-financer and Stage 2 (Project 1.2) for other financers. The Mukwano Road Widening and Shoprite & Clock Tower Junctions Traffic Safety Improvement Projects could be implemented prior to the Jinja Junction Flyover, if there is further difficulty in the availability of budget.

A further implementation study should be conducted at the feasibility stage, including implementation package, schedule and co-financing.

(3) Implementation of Clock Tower Flyover Project in Phase 2

The assumed project implementation schedule of Phase 2 (Clock Tower Flyover construction) is shown in the following figure. However, it may subject to change since the implementation plan of the planned BRT B1 on this route is still uncertain.



Notes: # Financial Year of Uganda (July - June)

Source: JICA Study Team

Figure 12.2.2 Assumed Project Implementation Schedule for Phase 2 Project (Clock Tower Flyover)

12.2.2 FINANCING PLAN

(1) Financing Plan for Phase 1 Projects

Since the project cost is very large, the Pre-FS Projects should be financed by the GOU and a soft loan from international development partners. The envisaged financing scheme is as follows:

Category		GOU		International Development Partners		
		FC	LC	FC	LC	Type of Finance
Consultancy Services	Feasibility Study & EIA	-	0%	100%	100%	Grant
	Detailed Design	-	0%	100%	100%	Grant or Soft Loan
	Construction Supervision	-	0%	100%	100%	Soft Loan
Civil Works		-	100%	100%	0%	Soft Loan
Land Acquisition & Resettlement		-	100%	-	-	
Administration Cost		-	100%	-	-	

Source: JICA Study Team

The financing scheme may include a soft component of capacity building for MoWT, UNRA and KCC for the enhancement of project implementation management, quality assurance and asset management (operation and maintenance). It may include various minor baseline studies, such as update of road inventory (both carriageway and walkways) for GKMA, traffic survey, road drainage study and introduction of performance based maintenance.

The total project cost for implementation of Phase 1 Pre-FS projects (Jinja Junction Flyovers, Mukwano Road Widening and Shoprite & Clock Tower Junction Traffic Safety Improvement Projects) has been estimated at US$157 million, which includes price escalation and physical contingency. It is envisaged to be financed as in the following table.

Table 12.2.1 Financing Plan for Pre-FS Project Phase 1

Category	GOU		Development Partners			Total	% of External Finance
	FC	LC	FC	LC	Sub-Total		
Civil Works		36.11	99.06		99.06	135.17	73.3%
- Base Cost		19.42	77.66		77.66	97.08	
- Price Contingency (Escalation)		13.41	12.39		12.39	25.80	
- Physical Contingency		3.28	9.01		9.01	12.29	
Consultancy Services			7.87	2.73	10.61	10.61	100.0%
- Base Cost			6.60	1.65	8.25	8.25	
- Price Contingency (Escalation)			0.90	0.95	1.85	1.85	
- Physical Contingency			0.37	0.13	0.51	0.51	
Land Acquisition & Resettlement		6.78			0.00	6.78	0.0%
Administration Cost		3.05			0.00	3.05	0.0%
Value Added Tax (No VAT)	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.00	45.94	106.93	2.73	109.67	155.60	70.5%
(% to the total project cost)	0.0%	29.5%	68.7%	1.8%	70.5%	100.0%	
Note: Currency Exchange Rate	US$ 1.00=	UShs	2,272				
	UShs 1.00=	US$	0.000440				

Source: JICA Study Team

Table 12.2.2 shows the total annual funding plan with breakdowns.

Table 12.2.2 Annual Financing Plan for Pre-FS Project Phase 1

1. Annual Disbursement Schedule by %

Category	Total	Year 0	1	2	3	4	5	6
Construction Cost:	100.0%					30.0%	40.0%	30.0%
Consultancy Services:	100.0%				35.3%	21.6%	21.6%	21.6%
Land Acquisition and Resettlement:	100.0%			50.0%	50.0%			
Administration Cost:	100.0%			2.2%	4.8%	28.1%	36.9%	28.1%

2. Project Cost (Base Cost)

Civil Works Base Cost (Exclud. VAT): 97.08 Mill US$ Land Acquisition and Resettlement: 4.74 Mill US$
Consultancy Services (Exclud. VAT): 8.25 Mill US$ Administration Cost: 2.20 Mill US$ at 2.00%
Construction Cost: FC: 80% LC: 20% Consultancy Services: FC: 80% LC: 20%

3. Annual Funding Plan Unit: Mill US$

	Category		Total	2010/2011 Base	2011/2012 P1	2012/2013 P2	2013/2014 DD	2014/2015 C1	2015/2016 C2	2016/2017 C3
(I)	**Foreign Currency Portion (Mill US$)**									
	Civil Works (Base Cost)		77.66	0.00	0.00	0.00	0.00	23.30	31.06	23.30
	Price Escalation (%/ann.)	3.0%	12.39	0.00	0.00	0.00	0.00	2.92	4.95	4.52
	Physical Contingency	10.0%	9.01	0.00	0.00	0.00	0.00	2.62	3.60	2.78
	Sub-Total		99.06	0.00	0.00	0.00	0.00	28.85	39.61	30.60
	Consulting Services (Base Cost)		6.60	0.00	0.00	0.00	2.33	1.42	1.42	1.42
	Price Escalation (%/ann.)	3.0%	0.90	0.00	0.00	0.00	0.22	0.18	0.23	0.28
	Physical Contingency	5.0%	0.37	0.00	0.00	0.00	0.13	0.08	0.08	0.09
	Sub-Total		7.87	0.00	0.00	0.00	2.67	1.68	1.73	1.79
	Total		106.93	0.00	0.00	0.00	2.67	30.53	41.35	32.39
(II)	**Local Currency Portion (Mill US$)**									
	Civil Works (Base Cost)		19.42	0.00	0.00	0.00	0.00	5.82	7.77	5.82
	Price Escalation (%/ann.)	11.0%	13.41	0.00	0.00	0.00	0.00	3.02	5.32	5.07
	Physical Contingency	10.0%	3.28	0.00	0.00	0.00	0.00	0.88	1.31	1.09
	Sub-Total		36.11	0.00	0.00	0.00	0.00	9.73	14.40	11.98
	Consulting Services (Base Cost)		1.65	0.00	0.00	0.00	0.58	0.36	0.36	0.36
	Price Escalation (%/ann.)	11.0%	0.95	0.00	0.00	0.00	0.21	0.18	0.24	0.31
	Physical Contingency	5.0%	0.13	0.00	0.00	0.00	0.04	0.03	0.03	0.03
	Sub-Total		2.73	0.00	0.00	0.00	0.84	0.57	0.63	0.70
	Land Acquisition and Resettlement		4.74	0.00	0.00	2.37	2.37	0.00	0.00	0.00
	Price Escalation (%/ann.)	11.0%	1.42	0.00	0.00	0.55	0.87	0.00	0.00	0.00
	Physical Contingency	10.0%	0.62	0.00	0.00	0.29	0.32	0.00	0.00	0.00
	Sub-Total		6.78	0.00	0.00	3.21	3.57	0.00	0.00	0.00
	Administration Cost (Base Cost)		2.20	0.00	0.00	0.05	0.11	0.62	0.81	0.62
	Price Escalation		0.58	0.00	0.00	0.01	0.03	0.13	0.21	0.20
	Physical Contingency		0.27	0.00	0.00	0.01	0.01	0.07	0.10	0.08
	Sub-Total		3.05	0.00	0.00	0.06	0.14	0.82	1.13	0.90
	Total		48.67	0.00	0.00	3.28	4.54	11.11	16.15	13.58
(III)	**VAT Tax Portion (Mill US$)**									
	Civil Works (Base Cost)	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Price Escalation	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Physical Contingency	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Consulting Services (Base Cost)	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Price Escalation	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Physical Contingency	0.0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(IV)	**Total Project Cost (Mill US$)**		155.60	0.00	0.00	3.28	7.22	41.64	57.50	45.97
(V)	**Eligible Portion (Grant Amount)* in Mill US$:**									
	Civil Works FC	100%	99.06	0.00	0.00	0.00	0.00	28.85	39.61	30.60
	Civil Works LC	100%	36.11	0.00	0.00	0.00	0.00	9.73	14.40	11.98
	Consultancy Services (FC)	100%	7.87	0.00	0.00	0.00	2.67	1.68	1.73	1.79
	Consultancy Services (LC)	100%	2.73	0.00	0.00	0.00	0.84	0.57	0.63	0.70
	Total	93.7%	145.77	0.00	0.00	0.00	3.51	40.82	56.37	45.07

4. Summary of Estimated Annual Funding Requirement

Category	Funded by	Total		2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017
Foreign Currency (Mill US$)	Soft Loan	106.93	68.7%	0.0	0.0	2.7	30.5	41.3	32.4
Local Currency (Mill US$)*	Soft Loan	2.73	1.8%	0.0	0.0	0.8	0.6	0.6	0.7
Local Currency (Mill US$)**	GOU(GA)	45.94	29.5%	0.0	3.3	3.7	10.5	15.5	12.9
Local Currency (Mill US$)	GOU(VAT)	0.00	0.0%	0.0	0.0	0.0	0.0	0.0	0.0
FC + LC Total (Mill US$)	Total	155.60	100.0%	0.0	3.3	7.2	41.6	57.5	46.0

Note: * 0 % of Local Currency Portion of Civil Works and 100% of Local Currency Portion of Consultancy Services
** 100 % of Local Currency Portion of Civil Works and 100% of Land and Administration

Source: JICA Study Team

(2) Financing Plan for Phase 1 Projects with 2 Stages

If budget availability or sources is limited, the Phase 1 projects could be implemented in 2 stages; Stage 1 for Projects No.1.1, No.2.4 and No.3.7 and Stage 2 for Project 1.2. The base costs are as follows:

Table 12.2.3 Base Cost of Pre-FS Projects for Stage 1 and Stage 2 in Phase 1

Unit: Mill US$

Project No.	Project Name	Phase 1, Stage 1			Phase 1, Stage 2			Total
		Civil Works	Land Acquisition & Resettlement	Sub-Total	Civil Works	Land Acquisition & Resettlement	Sub-Total	
1.1	Yusufu Lule and Mukwano Rds Flyover	49.83	0.20	50.03				50.03
1.2	Jinja - Yusufu Lule Rds Flyover & Mukwano - Jinja Rds Flyover (Right-turn)				37.67	1.21	38.87	38.87
2	Mukwano Rd Widening, including Mukwano Rbt and Nsambya Jct Improvement	5.39	2.18	7.57				7.57
3	Shoprite & Clock Tower Jcts Traffic Safety	4.20	1.16	5.35				5.35
	Total	59.41	3.53	62.95	37.67	1.21	38.87	101.82

Source: JICA Study Team

The total project cost for implementation of Stage 1 Pre-FS projects (Jinja Junction Flyovers, Mukwano Road Widening and Shoprite & Clock Tower Junction Traffic Safety Improvement Projects) has been estimated at US$96.2 million, which includes price escalation and physical contingency. It is envisaged to be financed as in the following table.

Table 12.2.4 Financing Plan of Pre-FS Projects for Stage 1 in Phase 1

Unit: Mill US$

Category	GOU		Development Partners			Total	% of External Finance
	FC	LC	FC	LC	Sub-Total		
Civil Works		22.10	60.63		60.63	82.72	73.3%
- Base Cost		11.88	47.53		47.53	59.41	
- Price Contingency (Escalation)		8.21	7.58		7.58	15.79	
- Physical Contingency		2.01	5.51		5.51	7.52	
Consultancy Services			4.82	1.67	6.49	6.49	100.0%
- Base Cost			4.04	1.01	5.05	5.05	
- Price Contingency (Escalation)			0.55	0.58	1.13	1.13	
- Physical Contingency			0.23	0.08	0.31	0.31	
Land Acquisition & Resettlement		5.05			0.00	5.05	0.0%
Administration Cost		1.89			0.00	1.89	0.0%
Value Added Tax (No VAT)	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.00	29.04	65.44	1.67	67.12	96.15	69.8%
(% to the total project cost)	0.0%	30.2%	68.1%	1.7%	69.8%	100.0%	

Note: Currency Exchange Rate US$ 1.00= UShs 2,272
UShs 1.00= US$ 0.000440

Source: JICA Study Team

The total project cost for implementation of Stage 2 Pre-FS project, Jinja - Yusufu Lule Rds Flyover & Mukwano - Jinja Rds Flyover (Right-turn Flyovers), has been estimated at US$59.5 million, which includes price escalation and physical contingency. It is envisaged to be financed as in the following table.

Table 12.2.5 Financing Plan of Pre-FS Project for Stage 2 in Phase 1

Unit: Mill US$

Category	GOU		Development Partners			Total	% of External Finance
	FC	LC	FC	LC	Sub-Total		
Civil Works		14.01	38.44		38.44	52.44	73.3%
- Base Cost		7.53	30.13		30.13	37.67	
- Price Contingency (Escalation)		5.20	4.81		4.81	10.01	
- Physical Contingency		1.27	3.49		3.49	4.77	
Consultancy Services			3.06	1.06	4.12	4.12	100.0%
- Base Cost			2.56	0.64	3.20	3.20	
- Price Contingency (Escalation)			0.35	0.37	0.72	0.72	
- Physical Contingency			0.15	0.05	0.20	0.20	
Land Acquisition & Resettlement		1.73			0.00	1.73	0.0%
Administration Cost		1.17			0.00	1.17	0.0%
Value Added Tax (No VAT)	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.00	16.90	41.49	1.06	42.55	59.45	71.6%
(% to the total project cost)	0.0%	28.4%	69.8%	1.8%	71.6%	100.0%	
Note: Currency Exchange Rate	US$ 1.00=	UShs	2,272				
	UShs 1.00=	US$	0.000440				

Source: JICA Study Team

12.2.3 PROJECT IMPLEMENTATION AGENCY

All Pre-FS roads are currently under administration of KCC. However, since the trunk roads of KCC, which connect to the national roads, will be transferred from KCC to MoWT/UNRA in the near future, all Pre-FS roads, except Nile Avenue and Shoprite Junction, shall be part of the UNRA's National Road Network.

Therefore, management and supervision of the feasibility study of Pre-FS roads will be transferred from MoWT to UNRA. Though Nile Avenue and Shoprite Junction would still remain under administration of KCC, UNRA should also manage these road and junction as part of the Phase 1 program at the feasibility study and project implementation stages. KCC should remain as one of the key members of Steering Committee for the Feasibility Study.

12.3 PROJECT EVALUATION

12.3.1 METHODOLOGY FOR ECONOMIC EVALUATION

(1) Purpose of Economic Evaluation

The investment for infrastructure projects including construction/improvement of roads and bridges generally requires a huge amount of cost. However, an implementation body such as the central government usually does not have enough budget. Under this situation with budget/resource constraint, the implementation of a project should be checked whether the project can generate sufficient social/economic benefits or not, in comparison to its cost. In addition, even if implementation of the project is justified, the government has to compare with other important projects and prioritize the order among all projects before allocating the scarce budget/resources of the national economy. Economic evaluation is carried out in order to provide necessary information for decision making on whether a project should be implemented or not from the aspect of national economy and information on the priority order of candidate projects.

(2) Methodology for Quantification of Economic Evaluation

1) Quantified Economic Benefits

In this evaluation, the following two types of economic benefits were estimated quantitatively:

- Savings in Vehicle Operating Cost (VOC)
- Savings in Passenger Travel Time Cost (TTC)

Although the project of Shoprite & Clock Tower is a traffic safety improvement project, the benefits of accident reduction (particularly for pedestrians) were not estimated quantitatively due to lack of necessary information in relation to accident cost. The calculated benefits of this project come from savings in VOC and TTC generated from the widening/ additional lanes of the road section between Shoprite and Clock Tower Junctions. An analysis on qualitative effect of traffic safety improvement by this project is given in the latter part of this chapter.

2) Evaluated Projects and Target Years for Benefit Estimation

The following four projects were selected for the pre-feasibility study as explained in the short list project evaluation:

Table 12.3.1 Evaluated Projects

No.	Project Name	Planned Opening Year	Years for Traffic Demand Forecast
1-1/1-2	Jinja Junction Flyover Project	2017	2018, 2023
1-3	Clock Tower Flyover Project	2023	2023
2	Mukwano Road Widening Project	2017	2018, 2023
3	Shoprite/ Clock Tower Junction Traffic Safety Improvement Project	2017	2018, 2023

Source: JICA Study Team

3) "With and Without Project" Comparison Method

The economic benefits were estimated based on "With and Without Project" Comparison Method. "With Project" situation means that one of the target projects (Pre-FS projects) is implemented independently and/or combined projects are implemented. On the other hand, the "Without Project" situation means that all target projects are not implemented. The economic benefits are quantified from savings in VOC and TTC savings, which is derived from the difference between "Without Project" and "With Project" cases.

Two development scenarios are prepared for "Without Project" case as shown below:

- Scenario 1: This scenario is a standard development plan with approximately 17% higher investment cost compared with the NTMP/GKMA plan in which part of BRT and flyovers will be invested after 2023.

- Scenario 2: This scenario is an aggressive development plan with approximately 38% higher investment cost compared with the NTMP/GKMA plan, due to Kampala-Entebbe Airport Expressway, flyovers and BRT.

Economic evaluation was carried out for Scenario 1 because its assumptions are more realistic than Scenario 2 in considering investment size. However, the results of evaluation based on Scenario 2 are presented in Annex 10 as well.

4) Evaluation Cases

The combination of the four target projects are expected to generate the highest effect after implementation of all target projects. This is in comparison with cases of evaluation for each project implemented independently. For example, when the Project 1-1/1-2 (Jinja Junction Flyover) is implemented, its economic effect will be reduced if Project 2 (Mukwano Road widening) is not implemented simultaneously because the effect of the flyover by Project 1-1/1-2 will be limited due to the connected two-lane Mukwano Road (before widening).

However, for the purpose of economic evaluation of each project, the following cases were prepared:

Case 1: "Without Project" case + Only Project 1-1/1-2 for years 2018 and 2023
Case 2: "Without Project" case + Only Project 1-3 for years 2018 and 2023
Case 3: "Without Project" case + Only Project 2 for years 2018 and 2023
Case 4: "Without Project" case + Only Project 3 for years 2018 and 2023
Case 5: "Without Project" case + Projects (1-1/1-2) +2+3 for years 2018 and 2023 excluding Project (1-3)
Case 6: "Without Project" case + Projects (1-1/1-2) +2+3 in 2018, and all Projects with Project (1-3) in 2023

5) Input Data from Results of Traffic Demand Forecast and Benefit Calculation

Benefit estimations for savings in VOC and TTC are strongly connected with the results of traffic demand forecast. Effects on traffic flow by each project will spread over the whole road network. Therefore, savings in vehicle-km and vehicle-hours were calculated covering the entire network in GKMA, and then applied for benefit estimation.

The formulas for benefit calculation are shown below:

$$\text{VOC(B)} = \sum_{n} \sum_{m} [(Q_{w/o})_{n.m} * (L^m) * (UVOC_n)] - \sum_{n} \sum_{m} [(Q_{with})_{n.m} * (L^m) * (UVOC_n)]$$

$$\text{Time(B)} = \sum_{n} \sum_{i} \sum_{j} [(OD_{n.i.j} * TIM(W/O)_{i.j} * TV_n] - \sum_{n} \sum_{i} \sum_{j} [(OD_{n.i.j}) * TIM(WITH)_{i.j} * TV_n]$$

Where:

VOC (B)	:	Total VOC saving benefit
$(Q_{w/o})_{n.m}$	:	Traffic volume of vehicle type (n), on Link(m) in "Without Project" case
L^m	:	Length of link (m)
$UVOC_n$	:	Unit VOC of vehicle type (n)
$(Q_{with})_{n.m}$	:	Traffic volume of vehicle type (n), on Link (m) in "With Project" case
Time (B)	:	Total time saving benefit
$OD_{n.i.j}$	:	O-D traffic volume of vehicle type (n) from (i) zone to (j) zone
$TIM(W/O)_{i.j}$	:	Travel time between (i) zone and (j) zone in "Without Project" case
$TIM(WITH)_{i.j}$	:	Travel time between (i) zone and (j) zone in "With Project" case
TV_n	:	Travel time value of vehicle type (n)

(3) Existing Data and Guidelines Reviewed for Project Evaluation

The following existing data, guidelines and previous studies were reviewed prior to benefit estimation and economic evaluation:

a) "The Feasibility Study of Improvement of Trunk Road at Kampala Urban Interface Sections", Final Report, November 1997, JICA

b) "Procedural Guide to Economic Road Feasibility Studies", Updated, March 2006, Road Agency Formation Unit (RAFU), Ministry of Works Housing & Communications

c) "Road Economic Decision Model (RED)", Sub-Saharan Africa Transport Policy Program, July 2004, World Bank

d) "National Transport Master Plan (NTMP)", Interim Report (2004/05) and Final Report 2009

e) "Kampala Urban Traffic Improvement Plan (KUTIP)", Final Report, Vol.1, June 2003

f) "The Feasibility Study on the Construction of a New Bridge across River Nile at Jinja", Final Report, October 2009, JICA

12.3.2 ECONOMIC COSTS AND BENEFITS

(1) Economic Costs

1) Economic Investment Costs

The project investment costs consist of construction cost (civil works), land acquisition and compensation cost, consulting services cost, and administration cost. Economic costs are obtained by deducting transfer items such as import duties and taxes from financial costs at market prices. Value Added Tax (VAT) is exempted for construction works of roads and other public transport facilities in accordance with Value Added Tax Act CAP 349 in Uganda. However, import duties are levied on petrol, fuel and raw materials by customs (in ports). The purpose for this is not specified even if these are used for road construction in Kampala afterward. Therefore, construction costs are necessarily converted into so called "border prices" by applying the following conversion factor:

$$\text{Standard Conversion Factor (SCF)} = \frac{(\text{Import} + \text{Export})}{(\text{Import} + \text{Import Taxes}) + (\text{Export} - \text{Subsidies})}$$

The recent values of SCF in Uganda are shown in Table 12.3.2. An average value of 0.87 for 2005/06 to 2008/09 was applied in this Study (only to the civil work costs).

Table 12.3.2 Past Trend of SCF Values

Breakdown	Calendar Year (2000-2002) 2000	2001	2002	Average (2000--2002)	Fiscal Year (2005/06--2008/09) 2005/06	2006/07	2007/08	2008/09	Average (2005/06-2007/08)
Imports ('000 US$)	1,599,835	1,895,250	2,162,945	1,886,010	2,186,917	2,839,301	3,904,216	4,434,660	3,341,274
Exports ('000 US$)	754,481	832,125	1,011,210	865,939	1,031,350	1,495,705	2,607,236	3,085,275	2,054,892
Taxes on Imports ('000 US$)	349,200	383,000	427,400	386,533	616,388	738,202	961,419	991,694	826,926
Subsidies of Exports ('000 US$)	0	0	0	0	0	0	0	0	0
Standard Conversion Factor (SCF)	0.87	0.88	0.88	0.88	0.84	0.85	0.87	0.88	0.87

Source: Year 2000 - 2002: National Transport Master Plan (NTMP:2004), Interim Report, Appendix A
Year 2005/06 - 2008/09: Bank of Uganda, Annual Report 2008/2009

	2005/06	2006/07	2007/08	2008/09
Taxes on International Trade (UShs Billion)	1,125	1,314	1,631	1,914
Average Exchange Rate (UShs per 1 US$)	1,825.15	1,780.00	1,696.45	1,930.03

Source: Year 2005/06 - 2008/09: Bank of Uganda, Annual Report 2008/2009

Source: JICA Study Team

2) Shadow Prices

According to the "Procedural Guide to Economic Road Feasibility Studies", open market economy coupled with free movement of Uganda's exchange rate and the absence of any foreign exchange control, the Uganda Shilling is not overvalued with respect to international currencies. At the same time, there are no minimum wage laws or regulations. Therefore, neither shadow exchange rate nor shadow wage rate is necessary.

3) Economic Maintenance Costs

Maintenance costs consist of routine maintenance cost every year, and periodical maintenance cost at the timing of 10 years and 15 years after construction and opening to traffic. These costs were also converted into economic costs by applying the conversion factor above.

(2) Economic Benefits

1) Vehicle Operating Cost

An analysis of the data on Unit Vehicle Operating Cost (VOC: US$/km/vehicle) in Uganda was done in reference to the "Procedural Guide to Economic Road Feasibility Studies, updated, March 2006" and "Road Economic Decision Model (RED)". In addition, the latest basic VOC data was obtained from "The Feasibility Study on the Construction of a New Bridge across River Nile at Jinja, Final Report, 2009, JICA".

Updating work for "Procedural Guide 2006" is scheduled to start in August 2010 therefore its latest version is not available at this moment. On the other hand, UNRA provided a set of 2008 VOC data, which was derived from the World Bank's "Road Economic Decision Model (RED)", for reference. Comparing the two sets of VOC data, i.e. JICA Study and RED Model, some discrepancies were observed due to the differences in original data source, exchange rates, terrain types (flat, rolling and mountainous), and other mechanical/technical factors applied.

In this Pre-Feasibility Study, the unit VOC data by the JICA Study on the New Nile Bridge Project was applied after updating the fuel cost into 2010 prices. The effects of using VOC data of the RED Model will be analyzed in a sensitivity analysis.

The breakdown of VOC data above is presented in Annex 10.

Table 12.3.3 Vehicle Operating Cost (Economic Cost, 2010)

	Items	Sedan, SW	Mini Bus	Large Bus	Truck	Trailer	Motorcycle
Time Related VOC (US$/ year)	Crew Cost	-	1,647	8,943	19,357	19,357	-
	Maintenance Cost (Labor Cost)	107.9	161.8	313.8	313.8	313.8	13.3
	Insurance Cost	496.0	613.0	580.0	357.0	357.0	328.0
	Depreciation Cost	722	1,299	2,438	2,244	3,456	128
	Sub-Total	1,326	3,721	12,275	22,272	23,483	469
	Overhead Cost	-	372	1,228	2,227	2,348	-
	Total	1,326	4,093	13,503	24,499	25,832	469
US$/ Hour		0.177	0.546	1.800	3.267	3.444	0.063
Distance Related VOC (US$/ year)	Fuel Cost	4,650.7	5,315.1	14,205.0	13,021.2	14,205.0	295.3
	Lubricant Cost	46.8	83.2	638.0	725.2	791.2	20.8
	Tire Cost	207.3	173.3	582.8	884.1	2818.1	25.7
	Maintenance Cost (Spare Parts)	136.2	263.0	774.1	591.4	910.5	21.8
	Depreciation Cost	1,341	2,413	4,529	4,168	6,417	237
	Sub-Total	6,382.4	8,247.3	20,728.5	19,390.1	25,142.2	600.6
	Overhead Cost	-	824.7	2,072.8	1,939.0	2,514.2	-
	Total	6,382.4	9,072.1	22,801.3	21,329.1	27,656.4	600.6
US$/ 1000km		170.2	226.8	380.0	387.8	460.9	36.0

Original Source: The Feasibility Study on the Construction of a New Bridge across River Nile at Jinja, Final Report, 2009, JICA. Fuel cost and lubricant costs were revised applying a 9.5% of escalation rate to JICA data.

2) Travel Time Cost of Passengers

The saving in passenger TTC is another important component of economic benefit from road projects. The unit TTC (US$/hour/vehicle) by vehicle type is usually derived from passenger's income, wages and earnings. Existing data and information such as per capita GDP at current price, GDP per labor force, and household income data presented in the Uganda National Household Survey 2005/06 were collected and analyzed. In addition, a review of past data on travel time values was carried out based on existing/previous studies. There was a wide range of values estimated in those studies (refer to Table 12.3.5).

According to an interview survey of minibus passengers conducted by the Study Team in January 2010, the average monthly income of minibus passengers, whose trip purpose is for business or work-related, was calculated at 821,000 Shs/month. Considering 194 hours of working time per month, the time cost of minibus passengers for their work trip has been estimated at 4,232 Shs/hour (equal to 1.86 US$/hour). The proportion of time value of non-work trips was taken at 25% of work trips (1.86 US$ x 25% = 0.47 US$/hour) as proposed by the "Procedural Guide 2006".

On the other hand, TTC for a passenger car (sedan) was assumed to be 1.6 times (60% higher) of minibus passengers as decided in reference to the welfare indicators by "Uganda National Household Survey 2005/06".

Other necessary data/information in estimating TTC by "vehicle base" are as listed below and TTC by vehicle type adopted in this Study are shown in Table 12.3.4.

- Trip purpose composition (percentage share of work trip and non-work trip purposes)
- Average number of passengers by vehicle type
- Growth rate of future travel time values

Table 12.3.4 Estimation of Travel Time Costs

Vehicle Type	Travel Time Value (2010) (US$/hour/person)		Trip Purpose Composition (*)		Weighted Average Value (US$/hr/person)	Average No. of Passengers (*)	Time Value by Vehicle Type (2010) (US$/hr/vehicle)
	Work	Non-work	Work	Non-work			
Car	2.98	0.75	56.3%	43.7%	2.00	2.35	4.71
Minibus	1.86	0.47	28.9%	71.1%	0.87	10.36	9.01
Large bus	1.86	0.47	28.9%	71.1%	0.87	39.88	34.67
Motorcycle	1.86	0.47	28.9%	71.1%	0.87	1.16	1.01

Source: JICA Study Team
Note: (*): From the results of traffic survey by JICA Study Team.

Future travel time values were assumed to grow with the same rate of real per capita GDP. Table 12.3.5 indicates a comparison of time values estimated in various studies/guidelines in Uganda.

Table 12.3.5 Comparison of Time Values with Other Studies/ Data

	Year	US$/hour/person			No. of Passengers/vehicle			US$/hour/vehicle		
		Car	Mini Bus	Large Bus	Car	Mini Bus	Large Bus	Car	Mini Bus	Large Bus
New Nile Bridge FS	2009	0.66	0.66	0.66	2.51	13.03	46.36	1.65	8.55	30.41
Procedural Guide 2006 (Appendix to NTMP)	2004	Average 5.58	0.32	0.32	3.00	13.00	53.00	16.74	4.16	16.96
	2009 Estimate	9.15	0.52	0.52	3.00	13.00	53.00	27.45	6.76	27.56
RED Model 2004	2002	1.50	0.75	0.75	2.00	10.00	40.00	3.00	7.50	30.00
	2009 Estimate	3.00	1.50	1.50				6.00	15.00	60.00
KUTIP (Time value for work trip)	2002		778 Shs (0.34US$)	778 Shs (0.34US$)						
	2009 Estimate		0.68	0.68						
NTMP Interim Report, (District & Urban Roads)	2004	1.07	0.52	0.46				2.14	5.19	18.36
	2009 Estimate	1.75	0.85	0.75				3.50	8.50	30.00
NTMP Interim Report (Ferry Evaluation)	2004	6.40	1.35	0.35				12.80	13.50	14.10
	2009 Estimate	10.50	2.21	0.57				21.00	22.10	22.80
This Study	2010	Weighted Average								
		2.00	0.87	0.87	2.35	10.36	39.88	4.70	9.01	34.70

Source: JICA Study Team

Note: "Estimate" means that the time values of each source were escalated to 2009 applying a growth rate of per capita GDP to original sources.

It is found that the time value varies in a quite wide range depending on studies/ guidelines and the year of study. From the above table, TTC in this Study are considered to be reasonable and appropriate. There is another piece of evidence that gives validity to adopted time values. The average monthly income of minibus passengers (for all trip purposes) obtained from the above interview survey was at 384,000 Shs/month (2010). On the other hand, the average monthly earning of an employee of selected manufacturing establishments was at 373,341 Shs/month in 2008 ("2009 Statistical Abstract", Uganda Bureau of Statistics). The value of these two figures is very near to each other, from which reveals that the results of the interview survey are reliable.

3) Benefits of Flyovers (Benefit of Reducing Delay Time at Junctions)

As it is widely understood, many drivers recognize that bottlenecks and long delays at junctions/ roundabouts (Rbt) of the trunk roads in Kampala cause enormous time losses and huge amounts of economic loss. The main purpose of the construction of flyovers at congested junctions is to smoothen traffic flow to and from CBD during morning and evening peak hours.

In order to determine the economic delay cost at existing junctions/roundabouts, the results of delay time analysis at main junctions (such as Africana Rbt., Garden City Rbt., Mukwano Rbt., and Clock Tower Junction) were incorporated into the benefit estimation and separately from the results of traffic assignment simulations.

12.3.3 RESULTS OF ECONOMIC EVALUATION

(1) Pre-conditions for economic cost benefit analysis

Cost-benefit cash flow analyses were carried out under the following pre-conditions:

1) Price Level : 2010 prices
2) Evaluation Period : 20 years after opening year
3) Residual Values : No residual values were counted.
4) Opportunity Cost of Capital (Discount Rate) :12%

The results of economic evaluation are summarized in Table 12.3.6.

Table 12.3.6 Results of Economic Evaluation

No.	Project Name	Base Case		
		EIRR	B/C (*)	NPV (*)
1-1/1-2	Jinja Flyover Project	20.7%	1.70	34.126
1-3	Clock Tower Flyover Project	32.4%	2.49	2.786
2	Mukwano Road Widening Project	38.8%	4.32	15.823
3	Shoprite & Clock Tower Traffic Safety Improvement Project	22.3%	2.21	4.069
	Combination of Project (1-1)+(2)+(3)	22.6%	1.88	50.349
	Combination of All Projects (1-1)+(1-2)+(2)+(3)	23.0%	2.01	59.421

Source: JICA Study Team
Note: (*): Discount Rate = 12%
NPV: in US$ Million

The above results indicate that all projects and all evaluation cases are economically feasible with values of EIRR (Economic Internal Rate of Return) higher than the opportunity cost of capital (> 12%), B/C (Benefit/ Cost Ratio) higher than unity (>1.0) and positive values of NPV (Net Present Value) (> 0).

The cost benefit stream by each project and by evaluation case is shown in Annex 10.

12.3.4 SENSITIVITY ANALYSIS

(1) Alternatives for Sensitivity Analysis

In order to check the robustness of economic feasibility of the projects, sensitivity analyses were done by changing the cost and benefit values within a probable range against the base case. In addition, sensitivity was also tested for the case of 20% reduction in unit travel time values below 20%, and for the case when unit VOC by RED 2008 was applied against the base case.

The prepared alternative cases for the sensitivity analyses are as follows:

1) Project costs go up by: +10%, +15%, and +20%
2) Project benefits go down by: -10%, -15%, and -20%
3) Combinations of all above
4) Unit time values (US$/hour/vehicle): reduced by 20%
5) Unit VOC values (US$/km/vehicle): values of RED

(2) Results of Sensitivity Analysis

Summarized results of the sensitivity analyses are shown in Table 12.3.7.

Table 12.3.7 Results of Sensitivity Analyses

No.	Project Name	Base Case			Sensitivity Analysis (EIRR), against Base Case				
		EIRR	B/C (*)	NPV (*)	Cost +10% Benefit -10%	Cost +15% Benefit -15%	Cost +20% Benefit -20%	Unit Time Value -20%	Unit VOC = RED 2008
1-1/1-2	Jinja Flyover Project	20.7%	1.70	34.126	17.2%	15.5%	13.9%	16.9%	20.6%
1-3	Clock Tower Flyover Project	32.4%	2.49	2.786	26.9%	24.4%	22.0%	26.3%	27.6%
2	Mukwano Road Widening Project	38.8%	4.32	15.823	34.2%	32.0%	29.9%	33.8%	32.4%
3	Shoprite & Clock Tower Traffic Safety Improvement Project	22.3%	2.21	4.069	19.5%	18.1%	16.8%	19.6%	20.4%
	Combination of Project (1-1)+(2)+(3)	22.6%	1.88	50.349	18.9%	17.2%	15.5%	18.6%	21.7%
	Combination of All Projects (1-1)+(1-2)+(2)+(3)	23.0%	2.01	59.421	19.4%	17.8%	16.2%	19.6%	22.3%

Source: JICA Study Team
Note: (*): Discount Rate = 12%, NPV: in US$ Million

The results of sensitivity analyses show the robustness of economic feasibility of the projects. Even if the project costs go up by 20% and economic benefits go down by 20% simultaneously, all projects will maintain values of EIRR higher than the opportunity cost of capital (> 12%). Furthermore, even when the time values are estimated at 20% lower than the base case, all projects are still economically feasible. Regarding the change of unit UOC values, no significant differences are observed between base case and RED case.

12.3.5 SOCIO-ECONOMIC BENEFITS AND CONTRIBUTION TO MITIGATION OF GLOBAL WARMING

(1) Socio-Economic Benefits of Pre-FS Projects

The Pre-FS projects will contribute to various socio-economic benefits, global warming and regional peace enhancement. Table 12.3.8 shows a summary of these benefits by category and degree.

Table 12.3.8 Contribution of Pre-FS Project

Project No	Project Name	International Corridor Road (A109)	Improvement of Traffic Congestion	Air Pollution	Global Warming (CO2 Reduction)	Traffic Safety	Sustainability of National Economy (CBD)	Support of Regional Economy Development	Reduction of Poverty
1.1 & 1.2	Jinja Junction Flyovers	Yes	Very High Positive Benefit	Very High Positive Benefit	High Positive Benefit	High Positive	Very High Positive Benefit	Positive Benefit	Positive Benefit
2.4	Mukwano Rd Widening	A109 Bypass*	High Positive Benefit	Positive Benefit	Positive Benefit	No Change	High Positive Benefit	High Positive Benefit	High Positive Benefit
3.7	Shoprite & Clock Tower Jcts Traffic Safety Improvement	Yes	High Positive Benefit	Very High Positive Benefit	High Positive Benefit	Very High Positive	High Positive Benefit	High Positive Benefit	Very High Positive Benefit

Note: Mukwano Road is a bypass of the Kampala city center section of A109 (International Corridor)
Source: JICA Study Team

(2) Benefits of Traffic Safety Improvement of Shoprite & Clock Tower Junctions

1) Traffic Accidents at Shoprite and Clock Tower Junctions

According to the traffic accident record provided by the Uganda Police Force, there was a total of 226 accidents at the Shoprite and Clock Tower junctions in 2009 (original data is presented in Annex 10). This figure means that traffic accidents are occurring about 19 times per month and/or 4.3 times every week in this area. Of the total 226 accidents, 99 were seriously injured in which 58% were pedestrians. Regarding pedestrian accidents in this area, about 64 pedestrians were injured by various types of vehicles as shown in Table 12.3.9. This means that 1.2 pedestrians are injured every week in this place. Two of the main vehicle types that cause pedestrian accidents are minibuses (39.1%) and motorcycles (26.6%). In addition, there may be many accidents which are unreported or unrecorded. The situation is very severe thus effective measures should be taken as early as possible.

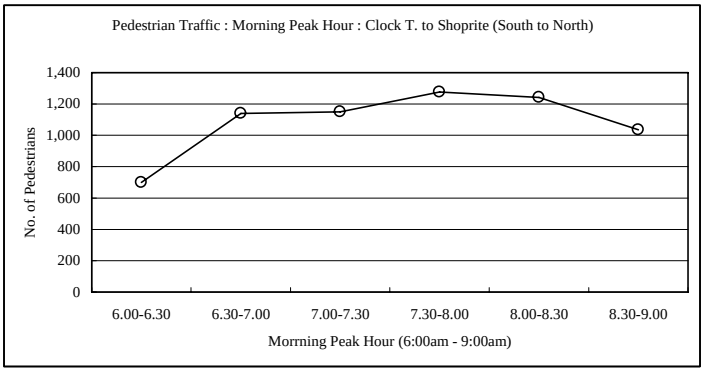
Table 12.3.9 Pedestrian Traffic Accidents at Shoprite & Clock Tower Junctions (2009)

Vehicle Type / Victimes	Car	Truck	Motorcycle	Minibus	Pickup	Others	Total	%
Female	4	0	5	4	1	1	15	23.4%
Male	6	1	12	21	0	9	49	76.6%
Total	10	1	17	25	1	10	**64**	100.0%
%	15.6%	1.6%	26.6%	39.1%	1.6%	15.6%	100.0%	

Original Source: Uganda Police Force (UPF), compiled by JICA Study Team

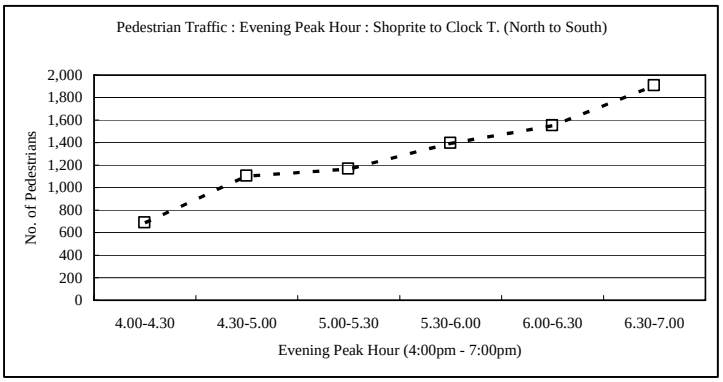
2) Pedestrian Movements at Shoprite/ Clock Tower Junctions

Pedestrian volume counts at Shoprite and Clock Tower junctions were carried out by the JICA Study Team in August 2010 for morning peak hours (6:00am – 9:00am) and evening peak hours (4:00pm -7:00pm). The survey location was at the middle point between Shoprite Junction and Clock Tower Junction. Figure 12.3.1 and Figure 12.3.2 indicate the number of passengers along Entebbe Road by direction for morning and evening peak hours respectively. In the morning, the highest number of pedestrians towards CBD direction was about 1,300 persons in 30 minutes (7:30am – 8:00am), which result to a rate of more than 40 persons a minute. In the evening, the number of pedestrians towards the south direction started to increase from around 4:00pm and continuously increases even after 6:00pm. The number reaches to about 1,900 persons from 6:30pm to 7:00pm, which result to a rate of more than 60 pedestrians per minute. These analyses revealed that pedestrian traffic in the area of Shoprite and Clock Tower Junctions is very high beyond expectation, and the risk of pedestrian accidents still remain.



Source: JICA Study Team

Figure 12.3.1 Pedestrian Traffic at Shoprite & Clock Tower Junctions (Morning Peak), South to North



Source: JICA Study Team

Figure 12.3.2 Pedestrian Traffic at Shoprite & Clock Tower Junctions (Evening Peak), North to South

The same kind of pedestrian counting was conducted at the same survey point as in the study of "Kampala Urban Traffic Improvement Plan (KUTIP)" in 2001. Table 12.3.10 shows a comparison of the results between the two surveys.

Table 12.3.10 Comparison of Pedestrian Survey with KUTIP

Average Pedestrian Traffic	KUTIP (2001)	JICA Study (2010)	Growth Ratio (2010/2001)
Morning Peak Hour (N→S)	464/hour	1,041/hour	2.24
Evening Peak Hour (N→S)	597/hour	2,600/hour	4.35

Source: JICA Study Team

Therefore, pedestrian traffic at the Shoprite and Clock Tower Junctions increased about 2.2 times in morning peak hours and 4.4 times in evening peak hours as compared to 2001. This high growth of pedestrian traffic to/from CBD via the two junctions is expected to continue in the future.

3) Necessity and Benefits of Traffic Safety Improvements by the Pre-FS Project

Under the circumstances explained above, the risk of pedestrian traffic accidents will worsen if no countermeasures are taken. Some traffic safety improvements are urgent and necessary. The proper and most effective solution is to separate the traffic flow between vehicle and pedestrian.

After the construction of pedestrian bridges proposed by the Pre-FS project, all pedestrians crossing and walking along the dangerous Entebbe Road will have to use the bridges, which will therefore avoid the possibility of pedestrian accident. Gentle slopes for the use of handicapped and aged people are necessary.

(3) Support and Promote Urban/Regional Economic Development

As broadly known, the urban road network is one of essential facilities to support daily life of residents. This road network provides necessary access to economic/business opportunities in CBD, and to human basic need. However, the present road traffic condition in GKMA is in a very severe situation. If the present situation is left without taking any countermeasures, it will result in more serious problems, such as stagnation of CBD, worsening of urban environment, and preventing regional/national economic development.

Introducing the BRT system is one of the effective policies to improve the current and future traffic problems in GKMA. Although, road widening and intersection improvement are partly required at some sections of BRT routes before its introduction. In addition, it is necessary to improve the whole road network including areas not served by the BRT system because it

provides only trunk route services for passengers as a mass transit. "Door to door services" are necessary for smooth logistic support and daily business activity by individual trip takers.

Improvements made to individual intersections are also effective measures but insufficient to handle the recent unexpected growth of traffic demand, which has become very rapid. More fundamental strategy should be recommended, i.e., construction of flyovers at bottlenecks (Jinja and Clock Tower flyovers) combined with widening a bypass (Mukwano Road widening). As the Entebbe Junction is planned to be closed to general vehicles except for BRT, main traffic of east–west direction will be forced to take the route via Mukwano Road. Therefore, the Pre-FS Projects (construction of flyovers and the road widening along this route) are consistent with the above policy and will be in concord with the demand of main traffic flows, which then will realize or recover/maintain smooth traffic flow.

In conclusion, the implementation of Pre-FS projects will be one of the strong measures to support and promote urban/regional economic development by reducing the burden of chronic traffic congestion in GKMA.

(4) Contribution to Regional Peace Enhancement as International Corridor Road

The Pre-FS Projects are located on the Northern Corridor (Mombasa – Nairobi – Kampala – Katua (Rwanda)) of the East African Community, and part of the international truck road "A109". Kampala is a logistic base for inland countries including South Sudan, North East Congo and Rwanda.

The following table shows the number of international cargo traffic (semi-trailers and truck trailers) at Jinja Bridge. Approximately 30% of this traffic is transit (through) traffic towards South Sudan, North East Congo and Rwanda. Though the Northern Bypass was opened in October 2009, most of the international transit traffic still pass through the city center (A-109) since they need to report to the Uganda Revenue Authority at Nakawa.

Table 12.3.11 International Cargo Traffic at Jinja Bridge (2008)

Unit: Vehicle/Day

Trailer Type	E/B: From Kampala To				W/B: To Kampala from				Grand Total
	Nairobi	Mombassa	Other Kenya	Total	Nairobi	Mombassa	Other Kenya	Total	
Semi Trailer	10	6	0	16	8	20	0	28	44
	11%	6%	0%	17%	9%	23%	0%	32%	25%
Truck Trailer	68	173	38	279	0	135	108	243	522
	16%	41%	9%	66%	0%	35%	28%	63%	65%
Total	78	179	38	295	8	155	108	271	566
	26%	61%	13%	100%	3%	57%	40%	100%	57%

Note: International Cargo Traffic includes transit traffic from/to Rwanda, DR Congo

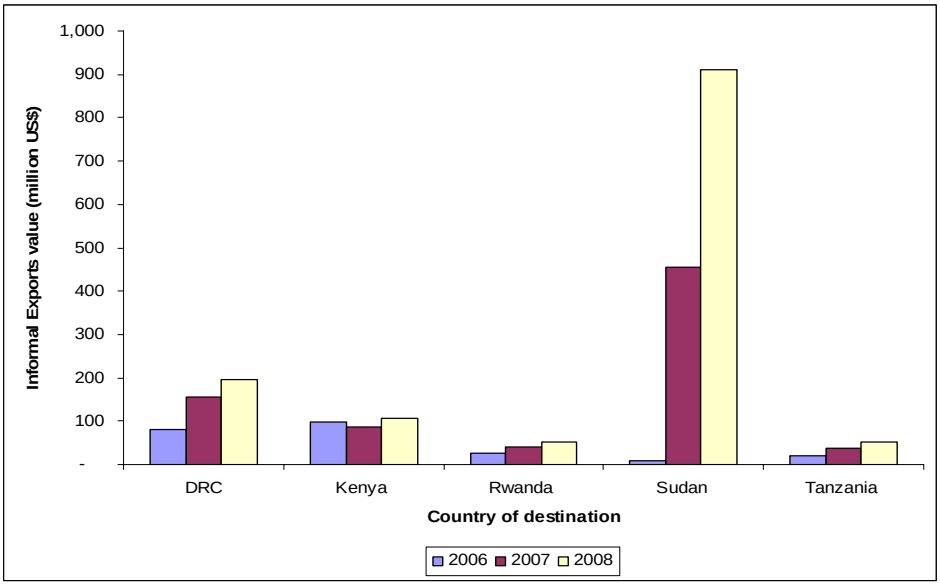
Source: The Study Team based on New Nile Bridge FS, JICA

According to UBOS, formal export (US$1,724 million) and informal export (US$1,316 million) are almost equal in 2008. Of the total informal export, Sudan shares 69% (US$909 million) while Congo shares 15% (US$1,724 million) as shown in Table 12.3.12. Since the increase from 2006 to 2008 was significant, these exports were used for reconstruction and peace enhancement of South Sudan and North East Congo (Figure 12.3.3).

Table 12.3.12 Informal Export and Import in 2008

Country	Exports		Imports		Total Trade		Trade Balance	
	1000 US$	%	1000 US$	%	1000 US$	%	1000 US$	%
DRC	195,167	15%	19,671	27%	214,838	15%	175,496	14%
Kenya	105,831	8%	39,748	54%	145,579	10%	66,083	5%
Rwanda	53,263	4%	1,137	2%	54,401	4%	52,126	4%
Sudan	909,938	69%	7,504	10%	917,443	66%	902,434	73%
Tanzania	51,736	4%	5,433	7%	57,169	4%	46,304	4%
Overall	1,315,936	100%	73,493	100%	1,389,429	100%	1,242,443	100%

Source: Uganda Bureau of Statistics



Source: Uganda Bureau of Statistics

Figure 12.3.3 Informal Export to Neighboring Courtiers, 2006-2008

As Kampala is located at cross roads, it will contribute to peace enhancement, reconstruction after civil war, the progress of return and resettlement of refugees, and stabilization of public welfare for South Sudan, North East Congo, Burundi and Rwanda as a logistic base.

The following table shows formal re-export amount from 2004 to 2008. Since the total share of re-export to neighboring countries is 38.8% (US$148 million), it seems that some materials or products are imported to Uganda first and then re-exported to surrounding countries. The main re-export items are oil (US$44 million), sugar and sugar-based products (US$29 million), and steel (US$13 million). These items are important for reconstruction and daily life.

Table 12.3.13 Re-Exports by Region and Country of Destination, 2004 - 2008

Region/Country	2004 1000 US$	2005 1000 US$	2006 1000 US$	2007 1000 US$	2008 1000 US$	Remarks (2008 Share)	Region 1000 US$
D.R.Congo	11,365	30,778	7,554	39,063	39,985	10.6%	
Rwanda	7,127	10,083	2,911	10,854	18,100	4.8%	
Kenya	8,764	7,510	3,946	7,722	13,899	3.7%	
Sudan	1,105	11,626	3,343	34,923	65,616	17.3%	147,095
Burundi	10,063	6,774	4,460	10,782	9,495	2.5%	38.8%
Other	788	503	2,603	212	4,157	1.1%	
COMESA Total	39,212	67,274	24,817	103,556	151,252	39.9%	
Other Regions	44,930	46,594	95,176	133,800	227,720	60.1%	
Total	84,142	113,868	119,993	237,356	378,972	100.0%	

Source: Uganda Bureau of Statistics

(5) Contribution to Poverty Reduction through National and Regional Economy Development

The Pre-FS Projects are located at the eastern and southern gates of CBD and Kampala's commercial center, which is a driving engine of the national and regional development of Uganda. The largest industrial park (Kampala Industrial Area) near Jinja and Mukwano Intersections is also there. The Pre-FS Projects will contribute to sustainability of business and industrial activity through substantial reduction of traffic congestion and securing their access.

Shoprite and Clock Tower Junctions are located at the entrance of the largest market (Owino / Balikddombe Market) in KCC. According to the pedestrian survey conducted in August 2010, about 48,000 people (most from nearby poor communities (Katwe and Nsambya)) pass on these junctions daily to work at these markets and shopping areas. Annual passage to these areas is over 10 million. The planned pedestrian bridges with gentle slopes will contribute to commuter's safety.

There are also other local markets (Kibuli and Nakasero) that can receive direct benefits from the Pre-FS Projects. The total population of the poor who could receive benefits is estimated at approximately 100,000 (refer to Section 11.4.3).

(6) Contribution to Global Warming and Air Pollution Reduction

The implementation of Pre-FS Projects, wherein traffic congestion will be improved at major junctions in Kamapala, would contribute to the prevention of global warming (CO2 reduction) as well as the reduction of air pollution.

Table 12.3.14 Reduction of CO_2 by Project (Year 2023)

Projects	CO_2 Emission (ton-CO_2/day)		CO_2 Emission (ton-CO_2/year)		Reduction Amount (ton-CO_2/year)
	Without	With	Without	With	
Yusufu Lule - Mukwano Rds Flyover	23.5	21.3	8,250.2	7,460.8	789.4
Jinja-Yusufu Lule Rds Flyover & Mukwano - Jinja Rds Flyover	29.8	25.4	10,467.2	8,921.3	1,545.9
Mukwano Road Widening	39.5	22.7	13,875.1	7,971.4	5,885.6
Shoprite & Clock Tower Jcts Improvement	28.9	20.5	10,148.1	7,203.4	2,944.6
Clock Tower Flyover	23.1	15.1	8,116.9	5,293.1	2,823.8
Total	**145.0**	**105.1**	**50,839.5**	**36,850.0**	**13,989.4**

Source: JICA Study Team

Calculation results mentioned above was derived from traffic demand forecast and following emission factors.

Table 12.3.15 Emission Factors

Km/h	Emission Factor (g-CO_2/km)
10	308.5
20	215.8
30	175.5
40	151.7
50	137.4
60	130.3
70	129.2
80	133.6
90	143.4
100	158.3

Source: Civil Engineering Vol.45, 2001 (Japan)

12.3.6 CONCLUSIONS OF PROJECT EVALUATION

- The results of economic evaluation indicate that all Pre-FS projects are economically feasible.

- Roles of each Pre-FS project exactly fit with the direction of traffic demands and traffic flows as well as consistent with each other; thereby benefits generated by each project are enhanced by combined effect.

- The Pre-FS projects will contribute to reducing/mitigating severe congestion and substantial delay in junctions located at the gates to/from CBD. Also, the resulting time saving benefits are estimated to be huge.

- In addition to the direct benefits above, the projects will contribute to the realization of socio-economic impacts in various aspects, such as traffic accident reduction, promotion of urban/regional/national economic development, contribution to strengthening the international corridor, poverty reduction, and creation of better urban environment through reduction of air pollution and mitigation of global warming (CO_2).

CHAPTER 13 CONCLUSIONS AND RECOMMENDATIONS

13.1 CONCLUSIONS

13.1.1 ROAD NETWORK IMPROVEMENT

(1) Serious Traffic Congestion in NTMP/GKMA

The population of GKMA was estimated at 2.5 million in 2008 and it is projected to reach 4.5 million in 2023. The traffic congestion at major junctions and trunk roads in GKMA, especially in Kampala City, became very serious due to the combined effects of rapid urbanization, national economic growth and high traffic increase, poor road network, low quality of roads, etc. It is one of the urgent key issues to be addressed in order to achieve sustainable national and regional economic development.

(2) Review of Road Network Improvement in NTMP/GKMA

The Study Team has reviewed NTMP/GKMA and recommended that the following additional road networks should be included in the master plan of NTMP/GKMA in addressing the current urban expansion of GKMA.

1) Improvement of Gaba Road and Kira - Old Kira Road as radial trunk roads
2) Planned expressway from Kampala to Entebbe International Airport
3) Elevated Urban Ring Expressway (Viaduct) along the Inner Ring Road in the long-long term plan

(3) Selection of Short-List Projects

A Pre-FS of BRT had been conducted in November 2009 in cooperation with the World Bank, which was in parallel with this Study. Its final report was submitted in May 2010. The introduction of BRT is one of the national core projects in the National Development Plan (2010/11–2014/15). The Study Team finally selected the following shortlist projects for the Pre-FS, which support or coordinate with the BRT plan.

Short-listed Projects for Pre-FS		
1	1.1	Jinja Junction Main Flyover (Yusufu Lule – Mukwano Roads Flyover)
	1.2	Jinja Junction Ramp Flyover (Jinja – Yusufu Lule Roads Flyover and Mukwano – Jinja Roads Flyover)
	1.3	Clock Tower Flyover
2	Mukwano Road Widening to a Dual Carriageway Highway (4 lanes)	
3	Shoprite and Clock Tower Junctions Traffic Safety Improvement	

Source: JICA Study Team

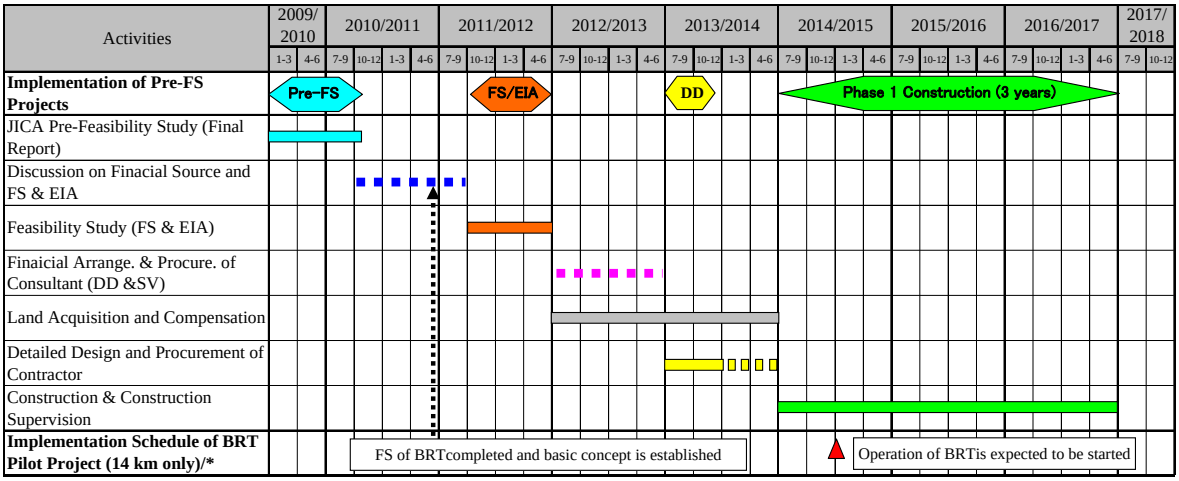
The Study Team has conducted the Pre-FS and preliminary designs of the short list projects so as not to conflict with the BRT plan, especially with the BRT pilot project.

According to the interview survey (conducted by the Study Team) on junctions with the worst traffic congestion, over 90% replied that the traffic congestion at Shoprite and Clock Tower Junctions is most serious. The Study Team has established the Shoprite and Clock Tower Junctions Safety Improvement Plan, which addresses to both pedestrian safety and traffic decongestion. Approximately 48,000 pedestrians daily, and over ten million per year would use these planned pedestrian bridges with gentle access slopes.

(4) Project Implementation

The Study Team has planned to implement the Pre-FS projects in two phases. Phase 1 includes implementation of three projects (as one package): Jinja Junction Flyovers, Mukwano Road Widening, and Shoprite and Clock Tower Junctions Traffic Safety Improvement. Phase 2 includes implementation of Clock Tower Flyover Construction. Since the traffic capacity of this junction would become sufficient by its at-grade intersection improvement in Phase 1, Phase 2 could be undertaken approximately 6-7 years later.

Based on the above, the Study Team has prepared a tentative implementation plan for Phase 1 projects, as shown below.



Notes: # Financial Year of Uganda (July - June) * Information from the World Bank/Uganda

Source: JICA Study Team

Figure 13.1.1 Implementation Schedule of the Pre-FS Projects

(5) Project Cost Estimate

The total construction cost including price escalation and physical contingency was estimated at UShs 336.3 billion or US$148.0 million. Construction cost of Phase 1 is estimated at UShs 307.2 billion or US$135.2 million as shown in the following table.

Table 13.1.1 Construction Cost Estimate (Base Cost at Year 2010)

Items of the Project Cost	Cost in Ushs (billion)				Cost equivalent to US$ (million)			
	Base cost	Price Escalation	Physical Contingency	Total	Base cost	Price Escalation	Physical Contingency	Total
Phase 1: 2014 - 2017 (3 Years)								
1 Jinja Flyover	220.6	58.6	27.9	307.2	97.1	25.8	12.3	135.2
1-1 Jinja Junction Main Flyover (Yusufu Lule - Mukwano Roads Main Flyover)	113.1	30.0	14.3	157.5	49.8	13.2	6.3	69.3
1-2 Jinja Junction Ramp Flyover (Jinjya - Yusuful Lule and Mukwano - Jinja Roads)	85.7	22.7	10.8	119.2	37.7	10.0	4.8	52.5
2 Mukwano Road Widening to 4 lanes	12.3	3.2	1.5	17.1	5.4	1.4	0.7	7.5
3 Shoprite & Clock Tower Jcts Traffic Safety Improvement	9.5	2.5	1.2	13.3	4.2	1.1	0.5	5.8
Total of Phase 1	**220.6**	**58.6**	**27.9**	**307.2**	**97.1**	**25.8**	**12.3**	**135.2**
Phase 2: 2020 - 2023 (3 Years)								
1-3 Clock Tower Flyover	16.1	10.4	2.6	29.1	7.1	4.6	1.2	12.8
Total (Phase 1+Phase 2)	236.7	69.0	30.6	336.3	104.2	30.4	13.5	148.0

Note: (1) Exchange rate: US$ 1.00 = UShs 2,272 as of 30th June, 2010
(2) Annual Price Escalation was assumed at 3.0% annum for Foregin and 11% annum for Local currency component.

Source: JICA Study Team

The project cost, including consultancy services, price and physical contingencies, land acquisition and compensation and administration, for Phase 1 projects has been estimated at UShs 353.5 billion or US$155.6 million as shown in the following table.

Table 13.1.2 Summary of Project Cost Estimate (Phase 1 only)

Items of the Project Cost	Cost in Ushs (billion)				Cost equivalent to US$ (million)			
	Base cost	Price Escalation	Physical Contingency	Total	Base cost	Price Escalation	Physical Contingency	Total
1. Construction Cost	220.6	58.6	27.9	307.2	97.1	25.8	12.3	135.2
2. Consultancy Servvices for DD and SV	18.7	4.2	1.1	24.1	8.3	1.9	0.5	10.6
3. Land Acquisition & Resettlement	10.8	3.2	1.4	15.4	4.7	1.4	0.6	6.8
4. Administration Cost	5.0	1.3	0.6	6.9	2.2	0.6	0.3	3.1
5. Value Added Tax (No VAT)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	255.1	67.4	31.1	353.5	112.3	29.7	13.7	155.6

Note: (1) Annual Price Escalation was assumed at 3.0% annum for Foregin and 11% annum for Local currency component.
(2) Consultancy Services for Detailed Desgin and Constrcution Supervision was estimated at 8.5% of Construction Cost.
(3) Foreign and Local Currency Portions was esimated at 68.9% and 31.3% resepctively.

Source: JICA Study Team

(6) Environmental and Social Considerations

The Initial Environmental Examination (IEE in the JICA Guidelines 2004) was conducted by the Study Team for screening and initial environmental evaluation purposes for Pre-FS projects. The EIStudy/EIA shall be required for the Pre-FS projects subject to approval of NEMA of the GOU in the FS stage (and/or in the detailed design stage), prior to project implementation.

(7) Project Evaluation

Economic analysis has resulted in a favorable economic feasibility (EIRR>20%) for each Pre-FS project. These projects would also support the BRT pilot project operation. Therefore, these projects should be forwarded on to the next feasibility stage at the earliest date possible.

The projects will contribute to the realization of socio-economic impacts on various aspects, such as traffic accident reduction, promotion of urban/regional/national economic development, contribution to strengthening the international corridor, poverty reduction, and creation of a better urban environment through reduction of air pollution and mitigation of global warming (CO2).

13.1.2 ROAD TRAFFIC SAFETY

(1) Target of Traffic Safety Strategic Plan

Road traffic accidents increased rapidly from 1990 to 2007 at an annual ratio of 7.8%. This is in line with the increase of vehicle population and traffic volume. The rate of fatalities with respect to motorized vehicles in Uganda is 65 persons per 10,000 vehicles, which ranks as one of the worst African countries.

The Study Team has established two targets of Traffic Safety Strategic Plan, as follows:

- To reduce the number of fatalities into half (based on 2008 figures) by the year 2015.
- To strengthen the capacity and function of the organizations involved in road safety and rules /regulations to ensure implementation and sustainability of traffic safety measures.

(2) Basic Planning Policies and Strategies

To achieve the above two targets, the following basic planning policies and implementation Strategies should be discussed:

1) Policies should cover three basic elements, i.e., person, vehicle and road environment.

2) All necessary institutions and database should be established within the strategic plan period, including new laws and regulations.

3) The appropriate environment and mechanisms should be enhanced and developed, which can be referred to as the 4Cs (communication, cooperation, collaboration and coordination) for the traffic safety stakeholders.

4) Priority will be given to human resource development rather than investing on advanced technologies.

(3) Traffic Safety Action Plan (2011-2015)

The Study Team has recommended the Traffic Safety Action Plan, which is composed of capacity enhancement/development of traffic safety institutions for 2011-2015.

13.1.3 PUBLIC TRANSPORT IMPROVEMENT

(1) Shift from Minibus to Large Bus

The total number of minibuses counted outside the city center is about 51,000 vehicles per 12 hours, which accounts for 30% of all type of vehicles. Hence it is inevitable to shift from minibuses to large buses for the alleviation of traffic congestion. To this end, supplying stable and comfortable public transport which meets passenger demand is the most expected measure for improving public transport.

(2) BRT Pre-FS

BRT Pre-FS was conducted as the advanced step for the realization of the concept of BRT which was articulated in NTMA/GKMA. Pre-FS established the overall development plan of eight routes on nine arterial roads in GKMA. All routes are expected to be operational in 2030. However, the implementation schedule of each route has not yet been decided, except for the pilot route on Jinja-Bombo road. Therefore, it is decided that this study covers areas and routes which will not be covered by the BRT project.

(3) Large Bus Introduction

The objectives of public transport improvement are as follows:

- To provide reliable and stable public transport service which meets the increasing volume of passenger demand and diversification of needs
- To harmonize with other transport modes on road, and to secure the safety of road traffic and public transport
- To properly protect the interest of the public transport industry and to promote its sound evolution

Since the number of passengers of a minibus is very small and its transport efficiency is low, minibuses shall gradually be replaced by medium and large buses, and BRT.

1) Large bus network

Five routes of large buses are planned in the area where BRT will not cover, and where passenger demand will concentrate. Among the five routes, Natete route and Munyonyo route are recommended to be operated in the medium-term of 2018. The other three routes, Sentema route,

Kiwatule route and Kiguwa route, will be operated in the long-term of 2023.

Since bus is one of public transport modes, it is necessary for buses to be operated on fixed routes in fixed times by fixed fares. Large bus systems will be administered by integrated operation entities which enable the operation of the said condition.

2) Medium bus network

Operation of medium buses will be limited in the area where BRT and large buses will not cover. Minibuses will gradually be replaced by medium buses until the end of the long-term, wherein all minibuses are replaced by medium buses.

For passenger transfer from medium bus to BRT and/or large bus, terminals will be developed along BRT and large bus routes.

(4) Improvement of Inter-Urban Bus

Relocation of existing inter-urban bus terminals (IUBT) is very important for the decongestion of traffic concentration into the city center. Four IUBTs are proposed outside the Northern Bypass Road and along radial trunk roads such as Jinja road, Bombo Road, Hoima Road and Masaka Road. The required function of the proposed IUBT is not only for passenger transit but also for functions such as shopping and other services. Therefore IUBT and incidental facilities are expected to be the focal place of the surrounding area and sub-center of GKMA.

The total construction cost of the four IUBT is estimated as UShs 48.6 billion (USD 22.1 million). Even though the total construction cost is of sizeable amount, the effect of the project in relation to decongestion and creation of new sub-centers will bring considerable benefits toward future city development and expansion.

(5) Infrastructure Development for Public Transport

A total of nine bus terminals are proposed at transfer points of BRT, large buses, medium buses and passenger cars, which aims for exclusion of parking at the roadside and convenience of passengers. Kiwatule, Kigowa and Luwafu, Natete and Karunga terminals are medium size terminals with more than an area of 2,000 m2. The others are smaller terminals requiring an area of 1,000 m2.

The total construction cost for the bus terminals will become UShs 17.3 billion (USD 7.9 million).

(6) Institution for Enhancement of Shift to Large Bus and Medium Bus

According to the financial analysis for large bus operation, financial IRR indicated more than 12% based on the following conditions:

- Import tax is exempted.
- Fund for bus operators is established with low interest rate of 17%.
- Bus fare is raised at least 5% from current minibus fare.

Following the result of analysis, exemption of import tax and establishment of bus fund by financing from the government are recommended to be introduced.

(7) Institution for Infrastructure Development for Public Transport

Infrastructures of public transport such as terminals and bus lay-bys should be part of the road.

Moreover, its development and maintenance should be conducted because terminals and bus lay-bys contribute toward the reduction of traffic congestion. Therefore, resources for the development and maintenance of roads shall be invested on infrastructures for public transport. The authorities in charge of road will be responsible for the development of infrastructures for public transport.

The government needs to obtain assistance from donors to develop large scale bus terminals such as the integrated terminal. Other small scale terminals will be developed by the government from the budget for road development.

(8) Realization of Public Transport Plan

The followings are the proposed for the realization of public transport plan:

1) Introduction of Large Bus
   - Direction and advise to the public transport section in MoWT
   - Establishment of bus fund
   - Direction and advise to bus operating companies
2) Development of Terminal
   - Recognition of responsible organizations in the government
   - Technical cooperation to the organization
   - Implementation of feasibility study
   - Implementation of development

13.1.4 TRAFFIC MANAGEMENT

(1) Major Issues in Traffic Management

The following are major issues identified by the Study Team in relation to the traffic management of Kampala City:

1) Lack of integrated traffic management strategy and plan due to inadequate coordination among various government and private organizations, the availability of personnel at key positions, and no workable plan/policy on capacity enhancement;
2) Inappropriate walkways due to poor condition of roads and/or illegal parking, and illegal facilities on roads. In addition, most road markings for traffic safety guidance and traffic flow control are also missing or already have disappeared;
3) Shortage of parking spaces corresponding to parking demand in the city center due to absence of building standards such as for ensuring o frontage area for the parking
4) Inadequate maintenance system for traffic signals due to insufficient capacity for operation and maintenance.

(2) Proposed Actions

The Study Team advises the GOU to take the following actions:

1) Implementation of measures in accordance with the “Strategy for the Improvement of Traffic Flow in Kampala in December 2009” as recommended by the Task Force. These measures could be executed at relatively low costs while waiting for the implementation of permanent measures like BRT and flyovers.

2) Introduction of traffic demand management approach and strategies in cooperation with international development partners since availability of budget is insufficient and land acquisition is difficult in providing sufficient road facilities which could meet the rapidly increasing traffic demand.

3) Development and upgrade of pedestrian friendly walkways (or footpaths) in the CBD and other city centers in conjunction with road development and rehabilitation works.

4) Establishment of building standards ensuring parking spaces. In addition, introduce car park sharing scheme and parking guide system to maximize utilization of existing parking spaces.

5) Establishment of overall signalization plan and programs, including systematic installation and maintenance plans for new traffic signals.

13.2 RECOMMENDATIONS

13.2.1 ROAD NETWORK IMPROVEMENT

(1) Earlier Implementation of Pre-FS Projects

The Study Team recommends that both governments concerned should hold meetings soon after completion of the Study to discuss on how and when the GOJ could assist the implementation of the Pre-FS projects, including a feasibility study as a forward stage, based on results of the Study.

(2) Phased Implementation of Pre-FS Projects

The Study Team recommends implementation of Pre-FS projects in two phases, as follows:

Phase 1: Jinja Junction Flyovers, Mukwano Road Widening and Shoprite and Clock Tower Junctions Traffic Safety Improvement in the mid-term by 2018, **as one package**.

Phase 2: Clock Tower Flyover Project in the long-term by 2023. Since the traffic capacity of Clock Tower Junction will remain sufficient for about 6-7 years through the intersection improvement in Phase 1, this phase could be initiated after said period.

The Study Team also recommends that Mukwano Road Widening and Shoprite and Clock Tower Junctions traffic safety improvement Projects could be implemented prior to Jinja Junction Flyovers if availability of budget is limited.

(3) Feasibility Study on Kibuye Junction Flyover

The Study Team has conducted a preliminary design for Kibuye Junction congestion improvement, taking on the requests of MoWT into consideration. The Study Team has concluded that a flyover is required when introducing BRT routes B1 and B3 which pass on this junction to relieve congestion while supporting BRT operation.

The Study Team recommends that a feasibility study of BRT route B1, Kampala – Kajansi section, should include Kibuye Junction Flyover plan and Queen's Way widening or it should be conducted as part of the feasibility study of Jinja Junction Flyover package.

(4) Follow-up Survey for BRT Pilot Project

The Study Team conducted Pre-FS and preliminary design of priority projects taking into

consideration the latest information on the BRT plan and pilot project. However, its basic concept might be changed through public consultations or the coming feasibility study and detailed design of the BRT pilot project and it would affect the basic scheme and designs of Pre-FS projects in this Study.

The Study Team, therefore, recommends conducting the follow-up survey to monitor progress of BRT FS and DD, and to discuss on the technical issues which might affect the implementation of Pre-FS projects.

13.2.2 ROAD TRAFFIC SAFETY

To achieve the target of the strategic traffic safety plan as well as to facilitate the Traffic Safety Action Plan (2011-2015), the following three development programs should be implemented at the earliest occasion:

1) Traffic Safety Human Resource Development Project

2) Comprehensive Vehicle Management System Development Project

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

13.2.3 PUBLIC TRANSPORT IMPROVEMENT

(1) Vigorous Propulsion by the Government

BRT will be introduced to GKMA and bring about drastic change to the transport situation. In order to achieve this opportunity, the impact of BRT shall be enlarged and mobility of citizens shall be improved. For this purpose, the reinforcement of organization related to public transport in the government is required for its staff and operations.

(2) Assistance by International Agencies

Uganda is inexperienced when it comes to the development of public terminals. At present, terminal standards have not been prepared, and resources are considered to be limited. Assistance by developed countries is required in technical aspects and resources.

(3) Introduction of Person Trip Survey

In the Study, movement of vehicles and passengers were captured by roadside interview surveys and also minibus terminal interview surveys. However, in order to grasp the whole movement of people which is the source of traffic, it is necessary for person trip surveys conducted at home. Modal shift from passenger car to public transport is solely able through the analysis of results of person trip surveys. Thus, the introduction and implementation of person trip surveys are recommended.

(4) Establishment of Bus Fund

Establishment of bus fund is recommended to secure a necessary finance for launching new body for bus operation. The GOU shall finance or introduce the international financial partners to the fund.

(5) Introduction of Electric Bus

For carbon dioxide reduction, the Study Team recommends that the introduction of electric bus

to the BRT system should be examined.

13.2.4 TRAFFIC MANAGEMENT IMPROVEMENT

The Study Team recommends three development programs, as follows:

1) Introduce development and enhancement programs for both administrative and engineering capacities aimed at effective traffic management, which includes traffic demand management in cooperation with international development partners.

2) Systematic and early installation of traffic signals on major junctions based on traffic volume, safety and site condition.

3) Change from current stand-alone signals to an area, and also line controlled signalization system corresponding to increase of traffic signals in the future.