

**THE PROJECT FOR CAPACITY  
ENHANCEMENT OF KCCA  
IN MANAGEMENT OF TRAFFIC FLOW  
IN KAMPALA CITY  
IN UGANDA**

**PROJECT COMPLETION REPORT**

**January 2022**

**JAPAN INTERNATIONAL COOPERATION AGENCY  
(JICA)**

**ORIENTAL CONSULTANTS GLOBAL CO., LTD.**

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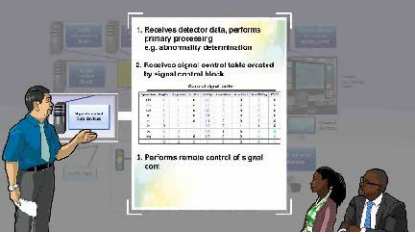
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# THE PROJECT FOR CAPACITY ENHANCEMENT OF KCCA IN MANAGEMENT OF TRAFFIC FLOW IN KAMPALA CITY IN UGANDA KAMPALA SMART TRAFFIC PROJECT [KSTP]



*For a better City*

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# 1 INTRODUCTION

## 1.1 PROJECT BACKGROUND

Uganda experienced a sharp population increase from 24.23 million in 2002 to 34.86 million in 2014, being one of African countries with the biggest population increase in the last 20 years. The increase rate in the urban zone is estimated at 5.1%, which is much higher than that of the national average of 3.3%. About 30% of the population is believed to concentrate in the urban zone in 2035.

The Kampala metropolitan area (Greater Kampala Metropolitan Area: GKMA) that is the nation's economic and political center generates 50% of its GDP as 80% of all industrial sectors concentrate there. Progress of urban sprawl development as a result of concentration of goods and people in Kampala has caused threatening of basic human needs in areas where there is an urgent need to improve the public services which include the infrastructure development as the population is sharply increasing.

The Kampala city road network is 1,218km in total length and road density is 6.44km/km<sup>2</sup>. This exceeds 4.3km/km<sup>2</sup>, baseline of urban road development and it is thus fair to say that the network length is not insufficient. However, the road is a mode of transportation with low efficiency as the pavement ratio of the road network is only 38% and the surface of 52% of the paved road is in poor condition. In addition, the network capacity is in shortage due to the automobile traffic that looks growing at an accelerating pace and trunk roads are chaotically congested.

Traffic congestion in the City has been worsening day by day in recent years with serious negative impacts on social and economic activities. In particular, queues are generated at major junctions at peak times which stretch over more than 1km due to not only capacity shortage of the junctions but also inappropriate manual traffic operation by Traffic Police. This issue has been addressed to Kampala Capital City Authority (KCCA) as the agency in charge of the capital city administration.

KCCA prepared major junction improvement designs with financial assistance of the World Bank which included geometrical improvements and signalizations. The design, however, need technical/engineering reviews to confirm consistencies of current traffic management system and relevant future plans in the City.

KCCA has recognized the need for technical assistance that experts could provide the supports in order to achieve the required performance level of operation at junctions and a future traffic management system. Hence, the technical cooperation program was requested to Japan International Cooperation Agency (JICA). JICA accepted the request and decided to provide the experts team to the country.

**Project Design Matrix**

Project Title: **The Project for Capacity Enhancement of KCCA in Management of Traffic Flow in Kampala City**  
Implementing Agency: **Kampala Capital City Authority**  
Project Site: **Kampala**

Version 1

Dated: 14<sup>th</sup> Dec.2016

Model Site:

Narrative Summary	Objectively Variable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
<p><b>Overall Goal</b> Traffic flow of the main roads in Kampala City becomes smooth</p> <p><b>Project Purpose</b> The capacity of traffic flow management on the roads in Kampala City by KCCA is enhanced</p>	<p><b>1.</b> The capacity of traffic volume throughput on the roads covered by the Immediate Action Plan (IAP) is improved</p> <p><b>2.</b> The consciousness such as traffic manner and recognition rate regarding urban traffic issues are raised</p> <p><b>1.</b> The capacity of traffic volume throughput of the junctions covered by the pilot project(s) is improved</p> <p><b>2.</b> The understanding of the traffic-flow management plan by KCCA is deepened</p> <p><b>3.</b> Campaigns for raising consciousness for traffic behaviors are conducted and recognized by citizens</p> <p><b>4.</b> Operation skill of MODERATO is built on KCCA</p> <p><b>1.1</b> IAP and the Urban Traffic Management Plan (UTMP) are approved by KCCA</p> <p><b>1.2</b> IAP and the UTMP are learnt by KCCA and related agencies</p> <p><b>2.1</b> Junctions are designed based on the related part of draft the Urban Traffic Management Guideline (UTMG)</p> <p><b>3.1</b> Plan related to traffic signal installation is formulated based on the related part of draft UTMG</p> <p><b>3.2</b> Maintenance of traffic signals is conducted based on the maintenance plan</p> <p><b>4.1</b> Campaigns for raising consciousness for traffic behaviors are continuously conducted</p> <p><b>4.2</b> X % of traffic regulators is participated in traffic management seminars</p> <p><b>5.1</b> 4 junctions are improved by KCCA through the pilot project(s)</p> <p><b>5.2</b> All the guidelines of traffic management prepared by the Project is approved by KCCA</p> <p><b>6.1</b> 4 Nos of engineers available to operate the MODERATO System</p> <p><b>6.2</b> Operation manual for the MODERATO System is prepared</p>	<p>Junction control delay</p> <ul style="list-style-type: none"> <li>Questionnaire, Interviews</li> </ul> <p>Junction control delay</p> <ul style="list-style-type: none"> <li>Examination, Interviews, Questionnaire</li> <li>The number of media coverage Journey time along the Pilot Project Network</li> </ul> <p>IAP, UTMP</p> <ul style="list-style-type: none"> <li>Examination, Questionnaire</li> </ul> <p>The draft of UTMG, Training reports, Examination</p> <p>The draft of UTMG, Training reports, Examination, Maintenance records</p> <p>The number of media coverage</p> <ul style="list-style-type: none"> <li>The draft of UTMG, Seminar records</li> </ul> <p>Pilot project(s) reports</p> <ul style="list-style-type: none"> <li>The guidelines for traffic management</li> </ul> <p>Achievement check by examination in the Training in Japan</p> <ul style="list-style-type: none"> <li>Operation manual for MODERATO System</li> </ul>	<ul style="list-style-type: none"> <li>The growth of traffic is not boosted drastically</li> <li>Activities based on IAP are implemented</li> </ul> <ul style="list-style-type: none"> <li>The capacity for traffic flow management is built within KCCA</li> </ul>		
<p><b>Activities</b></p> <p>1.1 Current policy and framework of KCCA are reviewed and suggested</p> <p>1.2 Conditions of urban traffic in Kampala City are reviewed</p> <p>1.3 Trends of urban traffic management policy in overseas are reviewed</p> <p>1.4 IAP listing the junctions to be targeted short term is prepared</p> <p>1.5 UTMP is prepared</p> <p>1.6 Seminars for urban traffic management policy for KCCA staff are conducted</p> <p>2.1 Physical structure and current traffic condition of the junctions sampled from IAP are surveyed and analyzed</p> <p>2.2 Chapter related to Junction of UTMG is drafted</p> <p>2.3 Based on the draft above, training plan is proposed and training including OJT is conducted</p> <p>3.1 Traffic signal controlling system in overseas is reviewed.</p> <p>3.2 Basic policy for the traffic signal specification and the controlling system is reviewed and a draft of their standards is formulated</p> <p>3.3 Chapter related to traffic light installation of UTMG is drafted</p> <p>3.4 Chapter related to traffic light maintenance of UTMG is drafted</p> <p>3.5 Maintenance plan of traffic signals in Kampala City is prepared</p> <p>3.6 Based on the draft above, training plan is proposed and training including OJT is conducted</p> <p>4.1 Condition of observing traffic rules and its understanding by road users are confirmed</p> <p>4.2 Campaigns for raising consciousness for traffic behaviours are planned and commenced</p> <p>4.3 Chapter related to raising consciousness of UTMG is drafted</p> <p>4.4 Seminars for traffic management and guidance skills are conducted for traffic regulator</p> <p>5.1 Pilot project(s) is/are selected from the junction(s) in align with IAP</p> <p>5.2 Based on the activities regarding Outputs 2, 3 and 4, the pilot project(s) including public relation programme are planned</p> <p>5.3 The pilot project(s) is/are designed and implemented by KCCA with technical supports of JICA experts</p> <p>5.4 The UTMG is finalized</p> <p>6.1 Parameter designing of the MODERATO System is attended by KCCA as OJT</p> <p>6.2 Pilot operation of the MODERATO System for the pilot junction is participated by KCCA</p> <p>6.3 Operation manual for the MODERATO System is prepared</p> <p>6.4 Monitoring of traffic flow along the pilot project network is conducted</p>	<p>The Japanese Side</p> <ol style="list-style-type: none"> <li>Experts Team Leader/Urban Transport Policy</li> <li>Deputy Team Leader/Urban Transport Policy</li> <li>Urban Road Network Planner</li> <li>Intersection Design Engineer</li> <li>Traffic Light System Planner</li> <li>Traffic Light Operation Engineer</li> <li>Technical Training &amp; Monitoring Planner</li> <li>Traffic Data Base Engineer/Public Relation</li> <li>Traffic Survey Engineer</li> </ol> <p>The Ugandan Side</p> <ol style="list-style-type: none"> <li>Counterpart Personnel</li> <li>Project Director</li> <li>Project Manager</li> <li>Project Coordinator</li> <li>Counterparts</li> <li>Office spaces in KCCA building</li> <li>Detailed design and installation work of pilot projects</li> <li>Operation cost for equipment provided by Japanese side</li> </ol>				





## **2 ACTIVITIES RELATED TO [OUTPUT1]: THE URBAN TRAFFIC MANAGEMENT POLICY BY KCCA IS STRENGTHENED**

### **2.1 REVIEW OF TRAFFIC MANAGEMENT POLICIES AND PLANS IN KAMPALA**

#### **2.1.1 Policy and Plan by KCCA in Kampala**

2.1.1.1 KCCA formulated its original urban traffic policy, Urban Transport Policy & Strategy for Greater Kampala Metropolitan Area (“UTPS”), in January 2014. It generally described the followings

2.1.1.1.1 A large portion of the UTPS has been allocated for improvement of public transportation. The improvement shall be carried out based on the Transit-Oriented Development (TOD) approach which is in accordance with the National Policy in Uganda. It also describes needs of establishment of the agencies to implement operation roles by mode (BRT, matatu and bodaboda).

2.1.1.1.2 The UTPS also touches upon the effective use of Non-Motorized Traffic (NMT) in CBD by saying that NMT space should be allocated on the road.

2.1.1.1.3 As for another traffic operation management policy, the road space should be allocated preferentially for public transportation. It specifically proposes installations of bus exclusive lane and giving entitlement of priority passing to public transport at junctions.

2.1.1.1.4 It also discusses switching of personal passenger cars to public transportation as a measure to curb passenger car use. As for specific measures, a regulation to restrict public parking use by personal passenger cars in CBD shall be implemented. KCCA shall also support and encourage the public transport operator to improve of service standard and safety level.

2.1.1.1.5 A need of new regulation is recognized for logistic transportation to be restricted to pass CBD area at peak time. A development policy regarding establishment of new logistics base at outside GKMA as large-vehicle traffic management shall also be introduced.

2.1.1.1.6 Harmonization of land management and new road network development shall be considered since road traffic demand cannot be controlled and managed unless well-planned land management is implemented.

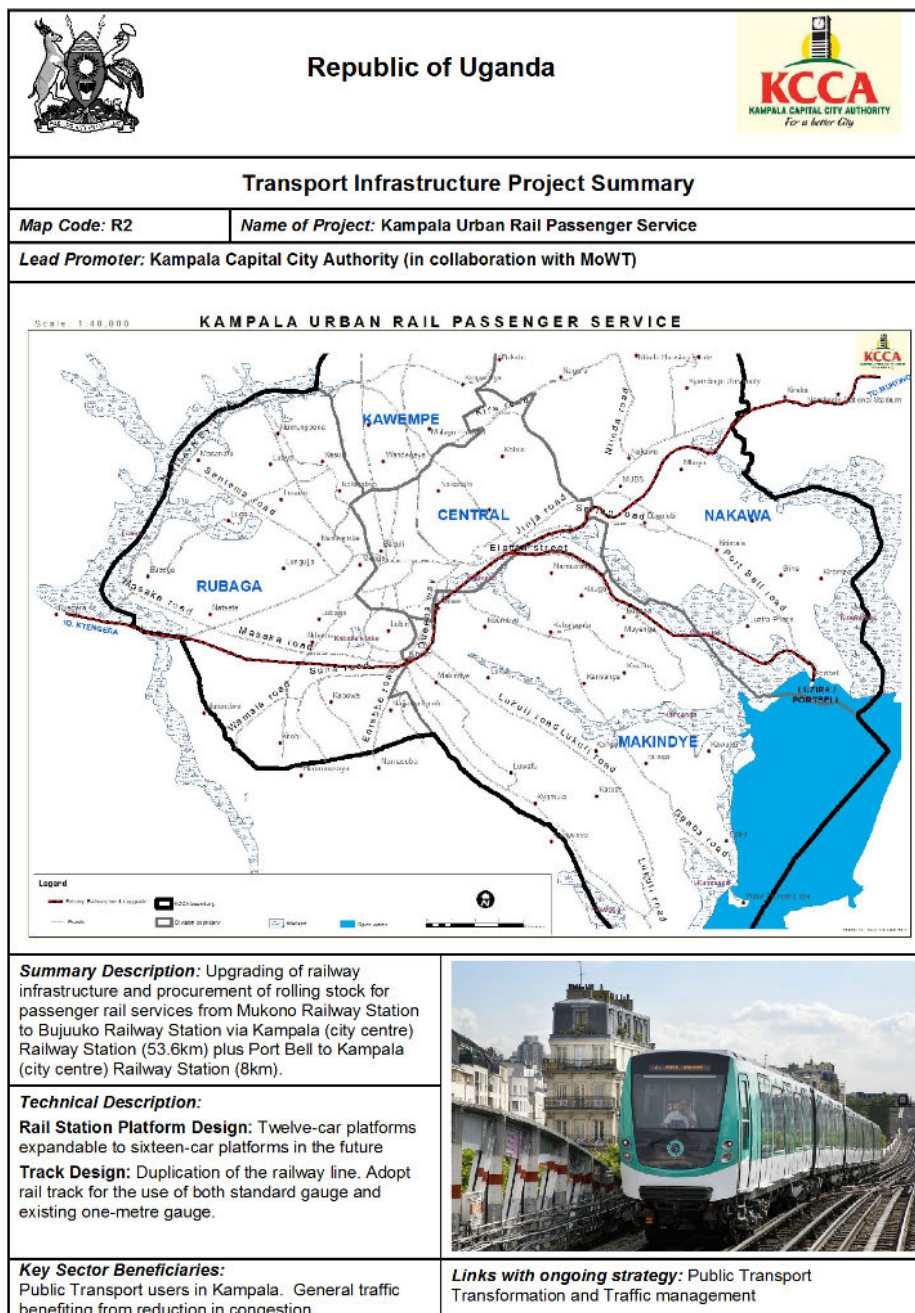
2.1.1.2 Decongestion Plan for Kampala, an action plan of traffic management, was prepared in March, 2015. The plan proposes the action plans by terms.

2.1.1.2.1 In short terms (target year: 2015), the following actions are planned,

- (1) Using the GOU and NTR, KCCA is improving the road network in Kampala by filling potholes, maintenance of the paved and unpaved links, maintaining road drainage, replacing street

furniture, maintaining the street lighting network, managing the traffic lights and repairing walkways. Major bypasses across divisions like Lugoba Road and Mutundwe Road will decongest the Bombo Road and Entebbe Road respectively.

- (2) KCCA working with URC and RVR on the resumption of passenger rail services along the existing rail network starting with a service from Kampala to Namanve. The target is to have four (4) round trips split as follows; two trips in the morning peak period and two trips in the evening. URC is working on platforms design and making arrangements for the fare collection system. The service should start running regularly in March 2015.





 <b>Republic of Uganda</b> 	
<b>Transport Infrastructure Project Summary</b>	
<b>Map Code:</b> R2	<b>Name of Project:</b> Kampala Urban Rail Passenger Service
<b>Economic Cost (USD):</b> estimated to be in the range of 53 to 69million. The sum of the economic cost could be reduced if proper environmental measures are put in place.	<b>Economic Benefits (USD):</b> estimated to be 3.3million in the opening year rising to 5.9million annually. <i>A feasibility study will be commissioned to review this estimate</i>
<b>Traffic Forecast :</b> With existing current demand we see 8 to 11 million passengers per year to grow possibly to 15 million in the next 10years	<b>Traffic Growth Rate:</b> Estimated to be in the range of 8% - 12% in early years.
<b>Design Status :</b> Concept	<b>Proposed Delivery Mechanism :</b> Either 20 year lease for construction, operation and transfer, or PPP with profit share
<b>Key Features</b> <ul style="list-style-type: none"> <li>• Level Crossings Signal Protected(Using Barricades)</li> <li>• Double Track alignment everywhere</li> <li>• Two-Track formations at Rail Stations</li> <li>• Non-paper fare collection</li> <li>• Diesel Multiple Units</li> <li>• Off vehicle fare collection &amp; smartcard technology</li> </ul>	
<b>Estimate Construction Period (Years) :</b> 2	<b>Time to start of construction (years) :</b> 2
<b>Proposed Financing Mechanism:</b> Private investment in rolling stock and operations. Public investment will be principally in infrastructure	
<b>Potential for Private Investment:</b> Financial recovery plan through passenger fare collection and revenue at stations. Currently it costs 2500UGX to travel from Mukono to Kampala by taxi (matatu) and takes on average 2hours. The proposed passenger railway cost is estimated cost 3000UGX (1.2USD) with an estimated travel time of 40minutes or less to make this journey once the project has been completed.	
<b>Land Needed to be Acquired:</b> No, but resettlement will be required to be dealt with by GoU as there are some encroachers on sections of the railway	<b>Status of land acquisition:</b> To use and upgrade existing rail track in rail road reserve. Negotiations to be held with the government rail concessionaire to seek agreement on use of infrastructure.
<b>Forecast Income :</b> \$4.3million per year, rising to 7.2million USD after 10years	
<b>Expected Operating Costs :</b> \$5.2million per year	
<b>Status in National Plans:</b> In National Development Plan and National Transport Masterplan (pages 116-120)	
<b>Regional Issues:</b> SUSTRAN (a UN-HABITAT project) providing support to the cities of Kenya, Uganda and Ethiopia to design and implement high quality, efficient public transport that integrates NMT. UNEP through its better air quality cities program promoting the use of sustainable urban transport systems that are safe	<b>Project Cost Summary(USD):</b> Capital Construction: 400 to 500 Million Rolling Stock: 100 to 150 Million Total Cost Range : 500 to 650 Million
<b>Contact Person:</b> Jacob Byamukama, Transport Planning & Traffic Management Manager, Kampala Capital City Authority, Tel: 0794660980 <a href="mailto:jbyamukama@kcca.go.ug">jbyamukama@kcca.go.ug</a>	

Figure 2-1 Passenger Rail Service

- (3) KCCA is also reviewing the street parking to make it more efficient and using it as a measure to reduce car use in certain areas of the city. The Multiplex contract must be reviewed and the Statutory Instruments for street parking shall be signed. After which the new parking regime can be introduced to the general public and the parking revenues collected directly by KCCA with Multiplex being paid a percentage. The Towing Contract for vehicles wrongly parked or obstructing road junctions should be reviewed and implemented.
- (4) KCCA has advertised the city bus services and will now systematically improve public transport by regulating effectively to ensure the travelling public enjoys a reliable service at a predictable cost.
- (5) Pioneer Easy Bus (PEB) operations are set to begin in the first week of March 2015. KCCA is

working with PEB, to ensure that the agreement is reviewed and signed off this month. KCCA also has to make good the bus stops that have been vandalized or destroyed by the general public and contractors improving the state of our roads.

(6) KCCA has observed that most people that come to work in the city use non-motorized transport (Walking and Cycling); therefore, the repair of the walkways and the reduction of streets without pedestrian infrastructure must continue throughout the city.

(7) KCCA has already determined the Boda bodas exclusion zone (Figure 2-2 shows the proposed Boda boda exclusion zone) and this is to be implemented in the month of March 2015. The design and specifications of the Traffic signs restricting the entry of boda bodas in to this zone are currently awaiting approval by way of a management decision on their suitability before they can be rolled out.

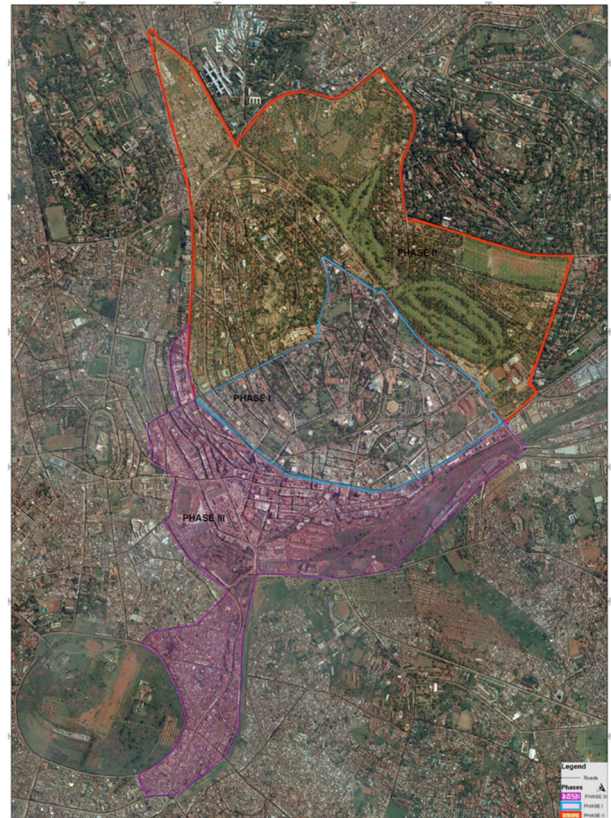


Figure 2-2 Proposed Phased Boda-Boda Free Zone

(8) The Statutory Instrument on Road User Charges is now complete and should be signed off by the Minister for the Presidency and KCCA.

(9) In preparation for the medium term measures, KCCA is in the process of engaging consultants using World Bank funding to develop a city wide multi-modal transport master plan that shall be coordinated with the land use plan for the metropolitan area. This detailed master plan will provide the basis for providing transport infrastructure for the growing urban population in the metropolitan area.

(10) The Statutory Instrument on the Restriction of movement of Heavy Goods Vehicles in the Capital City is being reviewed by the Transport Regulation Department in the Ministry of Works and Transport before it can be signed off by the responsible Minister.

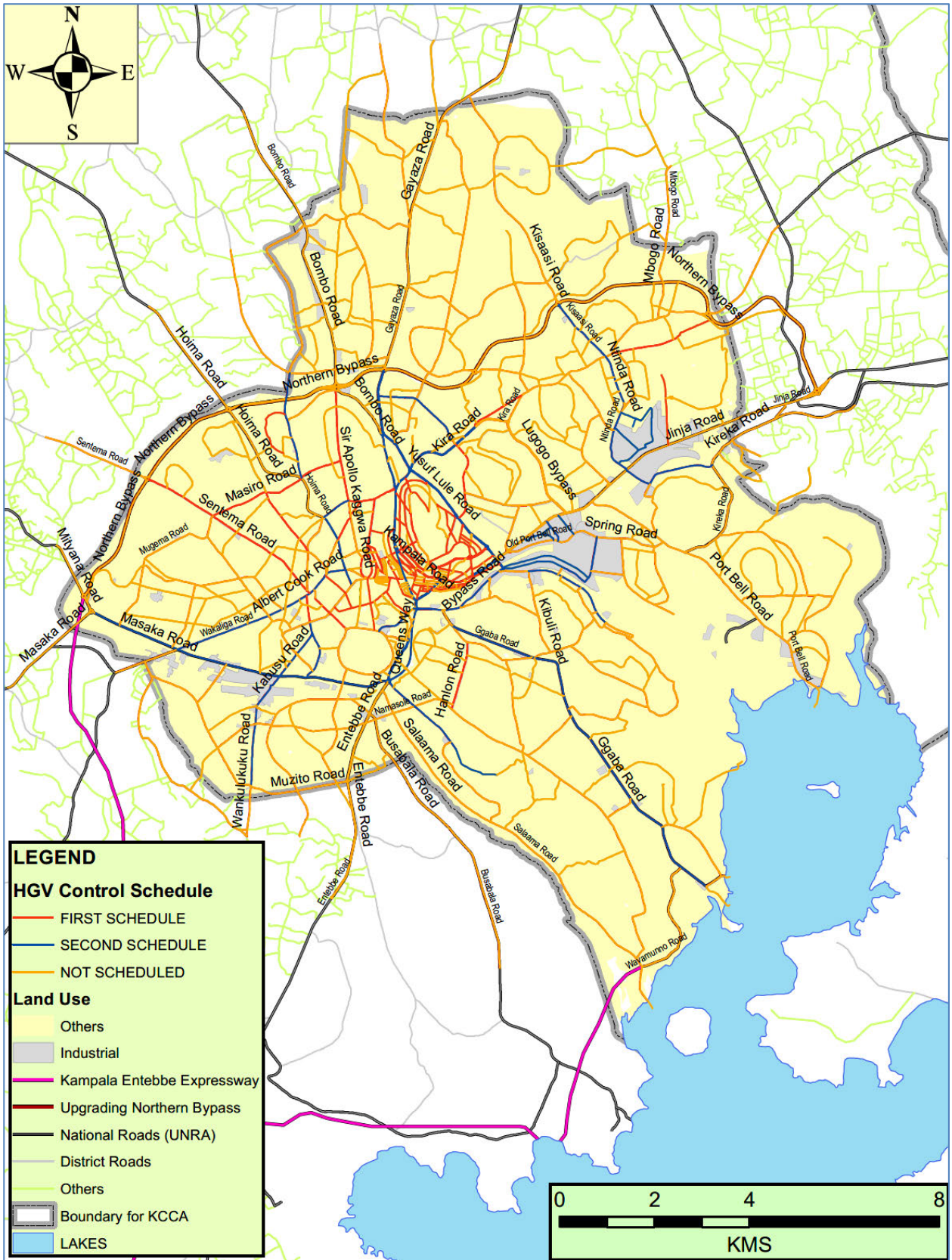


Figure 2-3 Heavy Goods Vehicle Restricted Roads

- The roads are also divided into 2 schedules, the goods vehicle exceeding a Gross Vehicle Weight (GVW) of 12 tonnes or length of 10 metres whichever is applicable on the city roads specified in Schedule 1 cannot enter during day time. The goods vehicles exceeding 12 tonnes but less than 22.5 tonnes Gross Vehicle Weight (GVW) or 10 metres in length are not restricted on the City Roads specified in Schedule 2 at any time. However, no person shall use, drive or park a goods vehicle exceeding a Gross Vehicle Weight (GVW) of 22.5 tonnes or length of 16 metres whichever is applicable on the city roads specified in Schedule 2 except during the prescribed hours.

(11) KCCA has gazetted public transport terminals that currently belong to individuals. KCCA will work to promote their use deliberately so that they can relieve the city of especially long distance travel coaches that penetrate the city and mostly use the city streets to load and off load. The city bus services that will ply designated routes for public transport will help to regulate travel in the city and also provide smooth linkages to these terminals from which long-distance travel will be based.

2.1.1.2.2 In medium terms (target year: 2016 to 2019), the following actions are planned. The Authority has developed a programme for the second phase of the Kampala Institutional and Infrastructure Development Programme (KIIDP2) of the in line with the new 5-Year Development Plan (2013/14 -2017/18). The Plan sets out an ambitious capital investment programme aimed at transforming service delivery in the City. This programme has two sub-components that include; Infrastructure and Civil Works, and Institutional Development. Under the sub programmes, a number of projects that are aligned to the objectives of the World Bank credit (KIIDP) have been identified and require significant funding if we are to transform Kampala into a better city. The Authority has requested funding requirements amounting to about USD\$175 million to the World Bank for the next phase of KIIDP2. In Batch1 of this project, about 6km of city roads will be expanded to dual carriageway along the most congested links of Makerere Hill Road, Hoima Road, eleven more junctions(include Bwaise and Fairway) will be signalized, the drainage master-plan for Kampala will reviewed.

- (1) KCCA will complete KIIDP2 Batch 2 that will include design and construction of several kilometres of roads, construction of an urban traffic control centre and installation of 22 traffic signal controlled junctions.
- (1) The Authority has developed a proposal to the Chinese government for infrastructure work worth USD 25million that shall construct a multi-storey car park and a bus station at the new taxi park in 2015.
- (2) KCCA will continue to work with URC to extend the passenger service to Kyengera via Nalukolongo.

- (3) UNRA is leading the JICA Kampala Flyover Project that will see the construction of flyovers at Kitgum House and Clock Tower with Mukwano Road being widened to a dual carriageway in the next three years (2015 - 2017) by the Japanese Loan to Government of Uganda. KCCA will play a key role in the construction phase in preparation for the specialized Flyover Operation & Maintenance.
- (4) KCCA worked together MoWT to ensure that the BRT Pilot project design was completed. The World Bank insisted that construction and operation of BRT may only be carried out by an implementing agency with the responsibility for Transport in the Metropolitan Area .The BRT project now requires an implementing agency that can be guided by MOFPED to source funding for the project. The current status is that MOWT has now acquired a certificate of financial implication from MOFPED for the formation of Metropolitan Area Transport Authority (MATA), which Authority can only be formed after the Attorney General has satisfied KCCA on the difference in roles between Metropolitan Physical Planning Authority (MPPA), KCCA and MATA. KCCA requests for parliament's support to ensure that this project is funded as it will be the backbone of the future transport network in the metropolitan area.
- (5) Using the GOU and Non Tax Revenue (NTR) funds, KCCA will continue to improve the road network in Kampala by making road improvements and carrying out road maintenance by filling potholes, maintenance of the paved and unpaved links, maintaining road drainage, replacing street furniture, maintaining the street lighting network, managing the traffic lights and repairing walkways.
- (6) KCCA is working on developing several transport solutions and will implement the Non-motorised transport network.
- (7) KCCA will plan to provide more off-street parking in the city, convert the new and old taxi parks into multi-storey developments that include bus interchanges and deliberately promote the removal of taxis through regulation.

2.1.1.3 In long terms (target year: beyond 2019), the following actions are planned,

2.1.1.3.1 KCCA is in an integrated manner beginning the process of land use planning that is coordinated with transport infrastructure in line with the Kampala Physical Development Structure Plan (KPDP) that promotes the use of mass transport for inter-satellite cities transport, which will predominantly be through Bus Rapid Transit (BRT), mass commuter rail and light rail transit. The main emphasis shall be the promotion of efficient public transport as the choice mode for a city whose population will definitely double in the next 15years.

2.1.1.3.2 KCCA prepares Multi-Modal Urban Transport Master Plan for Greater Kampala Metropolitan

Area (GKMA) on July, 2016. The Consultant is ROM from Israel which is the same one has prepared Kampala Physical Development Plan (KPDP).

- (1) The Greater Kampala Metropolitan Area is facing a number of transportation problems which result from rapid growth in vehicular traffic and lack of adequate transport infrastructure, traffic management and services. The current modal share in the city is around: 48% walk, 33% taxi (matatus), 10% boda-boda and 9% other including private car.
- (2) While walking is the dominant mode, there are almost no safer and attractive walkways. Public transport, the second used mode, has very poor level of service with no timetables, no fixed fares, no fare structure, no formal stops, no regulated terminals, no fixed routes and old and polluting vehicles.
- (3) Boda-boda, the third used mode, is offering a public transport service which is dangerous, noisy, polluting and relatively expensive.
- (4) All forecasts produced so far, show that GKMA population will continue to grow rapidly (at ~6%/year!) and will reach ~10 M inhabitant around 2040. Obviously, there is an urgent need to prepare now, the infrastructure and services that will enable GKMA and KCCA to function well in the future.
- (5) Thus, the objectives of the project is to propose and promote multi-modal master plan for infrastructure, services and institutional measures that will meet the future urban and transport challenges.
- (6) ToR defined the study area as GKMA, a ~900 KM<sup>2</sup> area (4.5 times larger than KCCA), as shown in Figure 2-4
- (7) The Master plan described the followings,
  - a. The Study estimates 10 million residents in GKMA that needs mass rapid transit system, not by road new roads for more cars.
  - b. Preliminary demand analysis using a "desired lines" technique shows that along some corridors, peak hour demand may exceed 20,000 passengers per hour per direction! These high demand figures show that the backbone of GKMA transport system can't be

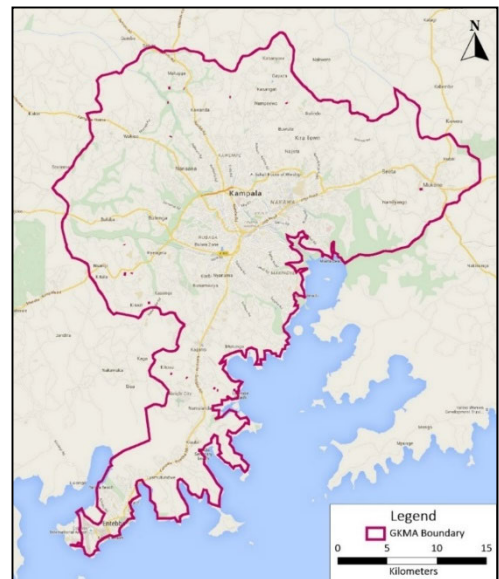


Figure 2-4 Study Area for Multi-Modal Urban Transport Master Plan

roads, cable car or BRT.

- c. A very small part of this rail based network is already under development, as part of Uganda Standard Gauge Rail (SGR) project. However, there is need for additional high speed and high capacity urban rail based system, that will be supplemented by integrated bus network and supported by attractive large network of NMT lanes and supporting traffic management system.

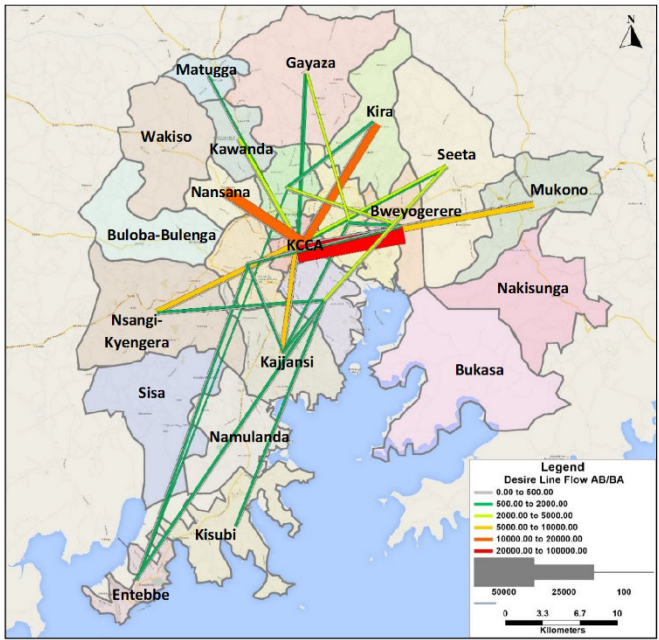


Figure 2-5 GKMA-KCCA PT Desire Lines 2040 AM Peak, 500+ Passengers for OD Set

- d. There are many challenges affecting the development of this system. The main ones are:

- Severe budget constraint, an
- Severe shortage in available land and right-of-way to develop the new system
- e. Therefore, the consultant is proposing two transport scenarios for 2040:

- Metro based system (underground or elevated) based system, which has relatively high capacity, can transport more than 25,000 pax/hr./direction, but is very expensive, and

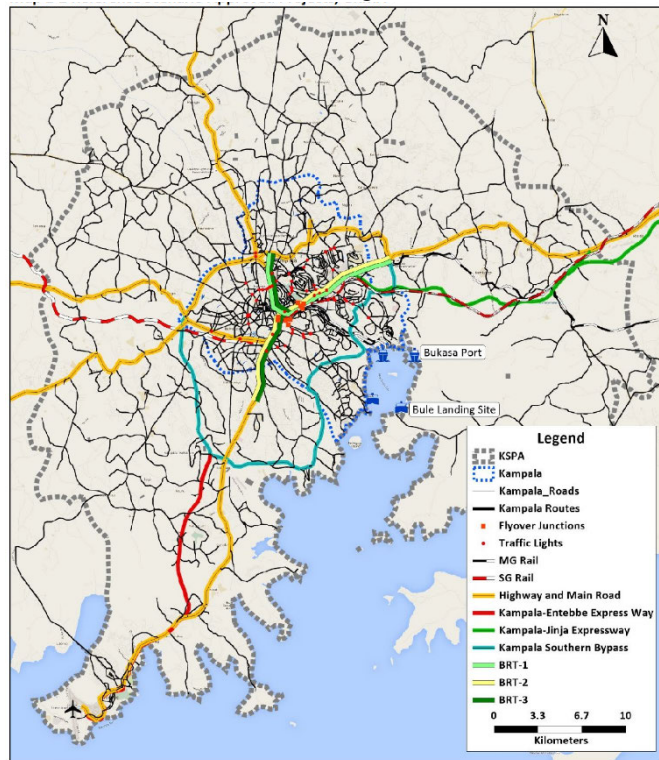


Figure 2-6 Reference Scenario Approved Projects, GKMA

- LRT based system that has lower capacity but also has lower implementation costs.
- f. These backbone systems will be complemented by additional integrated bus network,

where part of this network will consist of BRT lines.

- g. The cable car system or the BRT discussed for Kampala can be part of the total system, although it can't be its backbone.
- h. The two scenarios (Metro based and LRT based) will be compared to the base case scenario, which is called Business-As-Usual (BAU).
- i. The 2040 Reference transport scenario is in fact a Business as Usual scenario consisting

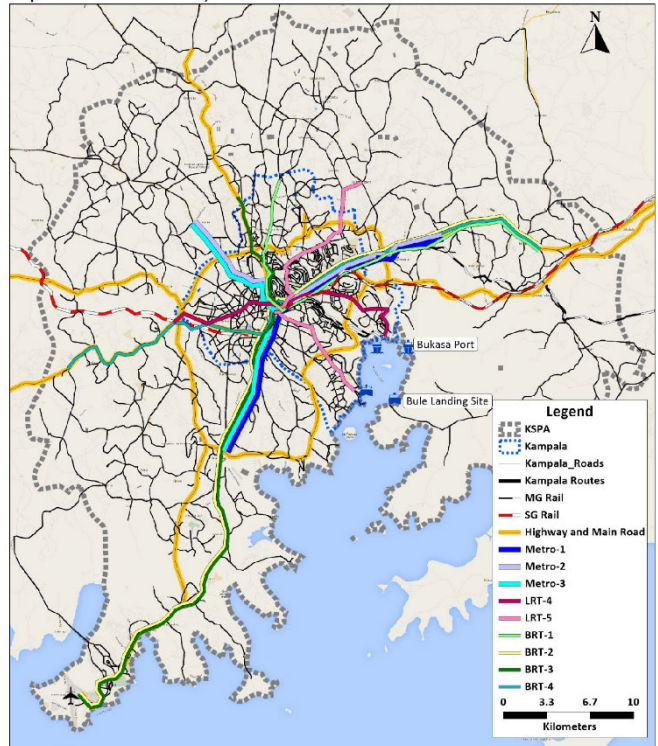


Figure 2-7 Metro Base Scenario

of the existing network with the addition of all projects and services that are either: (1) under implementation, or (2) approved fully for implementation, or (3) committed for implementation. This includes the pilot BRT project. Figure 2-6 illustrates this scenario.

- j. The proposed 2040 metro scenario consists of the Base scenario with an addition of a Metro based MRT network, operating in conjunction with complementary LRT and BRT systems, as illustrated in Figure 2-7.

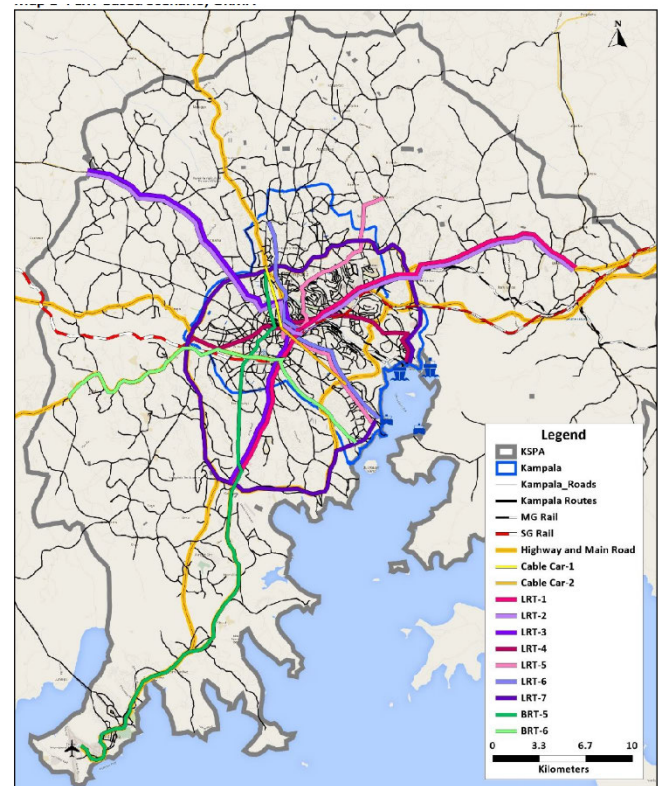


Figure 2-8 LRT Base Scenario

- k. The 2040 LRT scenario consists of the Reference scenario components with an addition of an LRT based MRT network, operating in conjunction with complementary BRT systems, as illustrated in the following map. The

LRT network is different than the metro network, as it is longer and extensive reaching more destinations and servicing more stations.

2.1.1.4 KCCA promotes non-motorized traffic and in this regard in the process of establishing NMT corridor at Namirembe Road and Shimoni/Speke Road.

2.1.1.5 KCCA through MPPA will continue to review the land use and transport master-plan every 10years to ensure that it takes note of new advancements in design and construction technology, overall global development, new innovations in information technology and always promoting a better life &work balance for the city dwellers.



Figure 2-9 NMT Corridor

2.1.1.6 KCCA announced a proposal of KIIDP3 consisting of signalization for 50 junctions and dualing for 8 roads on 4<sup>th</sup> January 2016. The proposal includes roads outside KCCA's boundary.

Table 2-1 Proposed Programme under KIIDP3

PHASE-1: JUNCTION IMPROVEMENT  
3A: JUNCTIONS

No	Junction	Connecting Roads	Division	Required Intervention	Length (Km)	Lane length	Required reserve width(m)	Est Cost (USD M)	Consult	Est Cost (million USD)	Status of Design	RAP COST*(UGX)
1	Kamwokya Junction	Mawanda Road, Acacia Avenue Kira	Central	Signalisation				3.00	6.50%	3.20	None	-
2	Mulago Roundabout	Kira Road , Yusuf Lule	Central	Signalisation				3.00	6.50%	3.20	Complete	
3	Mortuary Roundabout	Binaisa Road, Hospital Road	Central	Signalisation				2.00	6.50%	2.13	Complete	
4	Kubiri Roundabout	Bombo Road , Gayaza Road	Central	Signalisation				2.20	6.50%	2.34	Complete	
5	Queens Lane Jcn	Bombo Road , Queens Lane	Central	Signalisation				2.00	6.50%	2.13	Complete	
6	Watoto Junction	Ben Kiwanuka, Kampala Road	Central	Signalisation				4.00	6.50%	4.26	Complete	
7	City Square Junction	Square 1, Kampala Road	Central	Signalisation				3.00	6.50%	3.20	Complete	
8	Rwenzori Courts Jcn	Square 2, Nile Avenue	Central	Signalisation				2.50	6.50%	2.66	Complete	
9	Subway Roundabout	Kintu Road, Said Barre Avenue	Central	Signalisation				3.00	6.50%	3.20	Complete	
10	Nkrumah Road Jcn	Nasser Road, Entebbe Road	Central	Signalisation				2.00	6.50%	2.13	Complete	
11	Mini Price Junction	Namirembe Road, Ben Kiwanuka	Central	Signalisation				1.50	6.50%	1.60	Complete	
12	William Street Jcn	Ben Kiwanuka, Willam Street	Central	Signalisation				1.50	6.50%	1.60	Complete	
13	Johnston Street Jcn	Ben Kiwanuka, Johnston Street	Central	Signalisation				1.50	6.50%	1.60	Complete	
14	Sezibwa Jcn	Sezibwa Road, Ternan Avenue	Central	Signalisation				2.00	6.50%	2.13	None	
15	Watoto 2 Junction	Buganda Rd, Kyagwe Road	Central	Signalisation				1.50	6.50%	1.60	None	
16	Lumumba 1 Jcn	Lumumba Ave, Kyagwe Road	Central	Signalisation				1.50	6.50%	1.60	None	
17	Nakasero 1 Jcn	Nakesero Road, Kyagwe Rd	Central	Signalisation				1.50	6.50%	1.60	None	
18	Queens Lane Jcn	Buganda Rd, Queens Lane	Central	Signalisation				1.50	6.50%	1.60	None	
19	Wandegeya Lane Jcn	Buganda Rd, Wandegeya Lane	Central	Signalisation				1.50	6.50%	1.60	None	
20	Lourdell Junction	Buganda Road, Lourdel Lane	Central	Signalisation				1.50	6.50%	1.60	None	
21	Lumumba 2 Jcn	Lumumba Ave, Nakesero Hill Road	Central	Signalisation				1.50	6.50%	1.60	None	
22	Balitungwa Junction	Willis Rd, Kitakule Road, Nabalagala	Lubaga	Signalisation				3.00	6.50%	3.20	None	
23	Masiro Junction	Nabalagala Road, Masiro Rd,	Lubaga	Signalisation				2.00	6.50%	2.13	None	
24	Sentema 1 Jcn	Kitakule Rd, Sentema Road	Lubaga	Signalisation				1.50	6.50%	1.60	None	
25	Sentema 2 Jcn	Mapeera Road, Sentema Road	Lubaga	Signalisation				1.50	6.50%	1.60	None	
26	Lugala Junction	Masiro Road, Sentema Road	Lubaga	Signalisation				1.50	6.50%	1.60	None	
27	Mutundwe 1 Jcn	Mutundwe Road, Nakawuka Road	Lubaga	Signalisation				1.50	6.50%	1.60	None	
28	Mutundwe 2 Jcn	Mutundwe Road, Wankulukuku	Lubaga	Signalisation				1.50	6.50%	1.60	None	
29	Zana Roundabout	Entebbe Rd , Ssuna Rd		Signalisation				4.00	6.50%	4.26	None	
30	Lubowa Jcn	Entebbe Rd , Lubowa Rd		Signalisation				2.00	6.50%	2.13	None	
31	Soweto Rd Junction	Soweto Road, Gaba Road		Signalisation				1.50	6.50%	1.60	None	
32	Konge Road Jcn	Konge Rd, Kibaale Rd, Gaba Rd	Makindye	Signalisation				2.00	6.50%	2.13	None	
33	Mbogo Road Jcn	Mbogo Rd, Muyenga Rd	Makindye	Signalisation				2.50	6.50%	2.66	None	
34	Total Mbogo Rd Jcn	Mbogo Rd, Prince Badru Kakungulu	Makindye	Signalisation				2.00	6.50%	2.13	None	
35	Monitor Junction	Mbogo Road, Eighth Street	Makindye	Signalisation				1.50	6.50%	1.60	None	
36	Fifth Street Junction	Fifth Street, Sixth Street, Seventh	Nakawa	Signalisation				1.50	6.50%	1.60	None	
37	Mulwana Kibira Junction	Fifth Street, Mulwana(Kibira) Road	Nakawa	Signalisation				1.50	6.50%	1.60	None	
38	Kinawataka Junction	Kireka Rd, Kinawataka Road	Nakawa	Signalisation				2.00	6.50%	2.13	None	
39	Upper Kololo Junction	Upper Kololo Terrace, Wampewo	Central	Signalisation				2.00	6.50%	2.13	None	
40	Canon Road Junction	Canon Road, Kiwatule Road	Nakawa	Signalisation				1.50	6.50%	1.60	None	
41	Kiwatule Road Junction	Kiwatule Rd, Mbogo Road 1	Nakawa	Signalisation				2.00	6.50%	2.13	None	
42	Kisota Junction	Kisaasi Kyanja, Kisota Rd	Nakawa	Signalisation				1.50	6.50%	1.60	None	
43	Kisaasi Kyanja Roundabout	Kisaasi Kyanja, Kiteitika Rd	Nakawa	Signalisation				2.00	6.50%	2.13	None	
44	Kiteitika Junction	Kiteitika Rd, Gayaza Road	Kawempe	Signalisation				2.00	6.50%	2.13	None	
45	Bahai Road Junction	Bahai Rd, Gayaza Road	Kawempe	Signalisation				1.50	6.50%	1.60	None	
46	Mpererwe Junction	Mpererwe Rd, Kiteezi Road	Kawempe	Signalisation				3.00	6.50%	3.20	None	
47	Kawempe Police Jcn	Bombo Road, Kawempe Muslim	Kawempe	Signalisation				2.00	6.50%	2.13	None	
48	Jakana Rd Junction	Bombo Road, Jakana Road	Kawempe	Signalisation				2.00	6.50%	2.13	None	
49	Roko Junction	Bombo Road, Roko Lane	Kawempe	Signalisation				2.00	6.50%	2.13	None	
50	Nabweru Junction	Nabweru Rd, Kawala, Lugoba Rd	Kawempe	Signalisation				2.00	6.50%	2.13	none	
	<b>Sub total -3A</b>							<b>100.20</b>		<b>106.71</b>		-

3B DUALLING													
No	Road	From	To	Division	Required Intervention	Length (Km)	Lane length	Required reserve width(m)	Est Cost (US\$ m)	Consult	Est Cost (US\$ m)	Status of Design	RAP COST(UGX)
1	Kira Road	Mulago Roundabout	Kira Road Police	Nakawa	recycle and overlay		0.00	26.00	0.00	6.50%	0.00	Not Ready	-
2	Haji Musa Kasule Rd	Wandegeya Junction	Mulago Roundabout	Nakawa	recycle and overlay		0.00	26.00	0.00	6.50%	0.00	Not Ready	
3	Yusuf Lule	Mulago Roundabout	Kitgum House Junction	Central	recycle and overlay		0.00	26.00	0.00	6.50%	0.00	Not Ready	
4	Binaisa Road	Kubiri Roundabout	Mulago Roundabout	Central	recycle and overlay		0.00	26.00	0.00	6.50%	0.00	Not Ready	
5	Bombo Road	Watoto Church	Kubiri Roundabout	Central	recycle and overlay		0.00	22.00	0.00	6.50%	0.00	Not Ready	
6	Kampala Road	Railway Station	Watoto Church	Central	recycle and overlay		0.00	22.00	0.00	6.50%	0.00	Not Ready	
7	Jinja Road	Kitgum House	Railway Station	Central	recycle and overlay		0.00	26.00	0.00	6.50%	0.00	Not Ready	0
<b>Sub total -3B</b>						<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>0.00</b>		<b>-</b>
3C; ROAD RE-CONSTRUCTION UPGRADING													
No	Road Name	From	To	Division	Required Intervention	Length (Km)	Lane length	Required reserve width(m)	Est Cost (US\$ m)	Consult	Est Cost (US\$ m)	Status of Design	RAP COST(UGX)
1	Ben Kiwanuka Road				Recycle & Overlay		0.00	18	0.00	6.50%	0.00	Not ready	0
2	Lubiri Ring Road				recycle and overlay		0.00	18	0.00	6.50%	0.00	Not ready	0
3	Old Kampala Ring Road				Recycle & Overlay		-	18	0.00	6.50%	0.00	Not ready	0
4	Kyagwe Road				recycle and overlay		-	15	0.00	6.50%	0.00	Not ready	0
5	Rubaga Road				Recycle and overlay		0.00	13	0.00	6.50%	0.00	Not ready	0
6	Buwambo(Kitezi) Rd				Recycle & Overlay		0.00	15	0.00	6.50%	0.00	Not ready	0
7	Eigth Street/ Namuwongo Road				recycle and overlay		0.00	15	0.00	6.50%	0.00	Not ready	
8	Lukuli Road				Recycle & Overlay		0.00	12	0.00	6.50%	0.00	Not ready	0
<b>Sub total -3C</b>						<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>0.00</b>		<b>-</b>
ROAD UPGRADING													
1	Nabweru Road				Upgrade to Paved		0.00	13	0.00	6.50%	0.00	Not ready	0
2	Busabaala Road				Upgrade to Paved		0.00	15	0.00	6.50%	0.00	Not ready	0
3	Balintumwa Road				Upgrade to Paved		0.00	12	0.00	6.50%	0.00	Not ready	-
4	Masiro Road				Upgrade to Paved		0.00	12	0.00	6.50%	0.00	Not ready	0
5	Nyanama Road				Upgrade to paved		0.00	10	0.00	6.50%	0.00	Not ready	
<b>Sub total -3C</b>						<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>		<b>0.00</b>		<b>-</b>
<b>Total</b>						<b>0.00</b>	<b>0.00</b>		<b>100.20</b>	<b>0.00</b>	<b>106.71</b>		<b>-</b>

\*Notes: Estimates of RAP costs for roads due for upgrading are based on the floor area method whereas those for roads due for reconstruction are based on the unit of accommodation method. The area politicians have been contacted and they have confirmed that these road links do not have RAP costs. It has been assumed that the road alignment will not significantly deviate from the existing position. Actual costs of compensation shall be determined when road designs are completed and set out on ground.

2.1.1.7 JICA extended this technical cooperation programme for the area traffic control by using Japan's Grant. The Project is named the Project for Improvement of Traffic Control in Kampala City.

2.1.1.7.1 There are no counter measure programmes against the congestion in CBD as there was an expectation that BRT would come near future. Whatever counter measures are in place in CBD would create conflicts with future BRT. KIIDP 2 therefore focused on areas where is no conflict with BRT plan in determination of the Scope of Works.

2.1.1.7.2 Traffic congestions develop rapidly and badly in CBD. The situation gives negative impact on the economy growth with a considerable magnitude. Any traffic improvement action needs to promptly be in place which has to have minimum or no conflicts with the BRT plan.

- 2.1.1.7.3 As described, one of major traffic problems in the road network in CBD is that there are a few signalized junctions which is not appropriate to accommodate traffic volumes. As the signal is an only device that regulate and control traffic flow, any traffic management arrangements, even if they are outstanding and sophisticated, will not make sense unless the signal are provided and increased.
- 2.1.1.7.4 KCCA has understood applicability and effectiveness of the MODERATO system in Kampala. The MODERATO has a function to give priority on the public transportation (BRT) that brings an idea that it is not too early to provide MODERATO system and compatible signal devices in the CBD by Japan's Grant Aid as the devices can be mobile with small scale civil work when the BRT comes in place.
- 2.1.1.7.5 It is also early enough to propose the construction of the traffic control centre (TCC) which makes possible of a close coordination with the study of the TCC building design funded by WB which is about to be implemented. By the coordination, the study can be more realistic.
- 2.1.1.7.6 As noticed in the previous clause, the challenge in implementation of large-scale road transport improvement project in Kampala is social arrangements including land acquisition and compensation. The project will implement smoothly if there is no inclusion of these critical arrangement. A viewpoint needs to be given for that aspect when the project is newly formulated.
- 2.1.1.7.7 As described in 2.1.2.1 below, a part of the Kampala Flyover Project is under implementation that covers a busy route connecting between the Clock Tower area and Mukwano. The signal devices are designed to be compatible with MODERATO. The outstanding part will cover other busy routes connecting from Mukwano to Yusuf Lule and Jinja Road. The busiest junctions in CBD are all improved if the grant aid covers junctions along Jinja and Kampala Road together with the Kampala Flyover Project.
- 2.1.1.7.8 The proposed junctions to be covered by Grant Aid is as shown in Figure 2-11.

- 2.1.1.7.9 As for the TTC building, the future operation and maintenance shall greatly be considered that requires viewpoints on coordinated operations with both Traffic Police and BRT or public transport operator.



Figure 2-10 Architectural Image of TCC Building

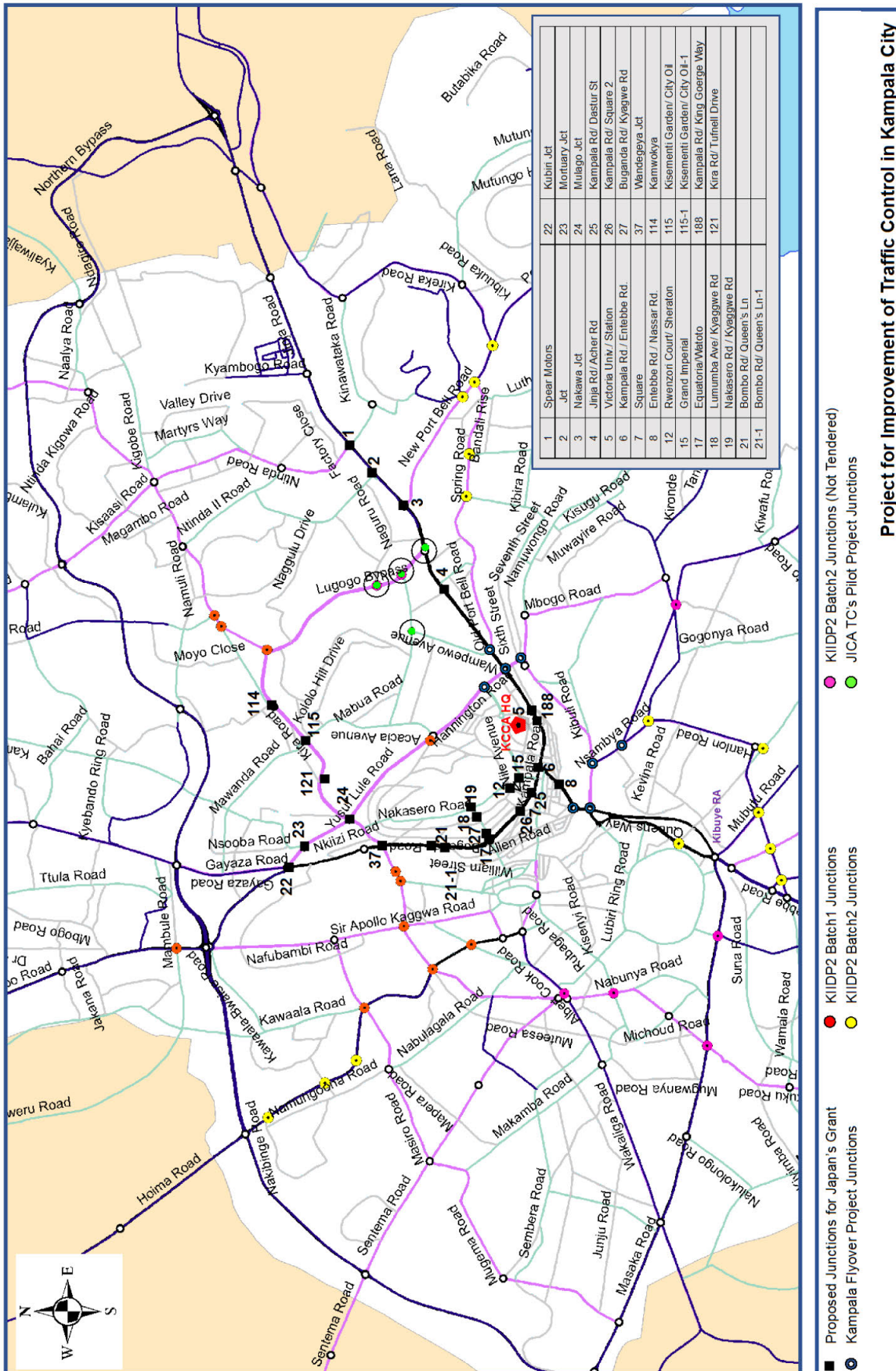


Figure 2-11 Proposed Junctions to be covered by Japan's Grant Aid

2.1.1.7.10 Unlike the traffic control centre in Japan, the TTC will be operated by road administrative body, KCCA. But upon its operation, close coordination with Traffic Police is needed especially when unusual events occur.

2.1.1.7.11 There is also a need of coordination with the public transport operator as the signal is the devices giving priority passes on the public transport at junctions.

**2.1.2 Policy and Plan by Other Actors in Kampala**

2.1.2.1 Greater Kampala Roads Improvement Project (i.e. Kampala Flyover Project) is the traffic bottleneck improvement programme focusing on busiest junctions at Central Division in Kampala. The programme includes 2 flyover bridges and 1 underpass and Government of Japan gives technical and financial intervention for its implementation with loan scheme. The construction is expected to start later in 2016.

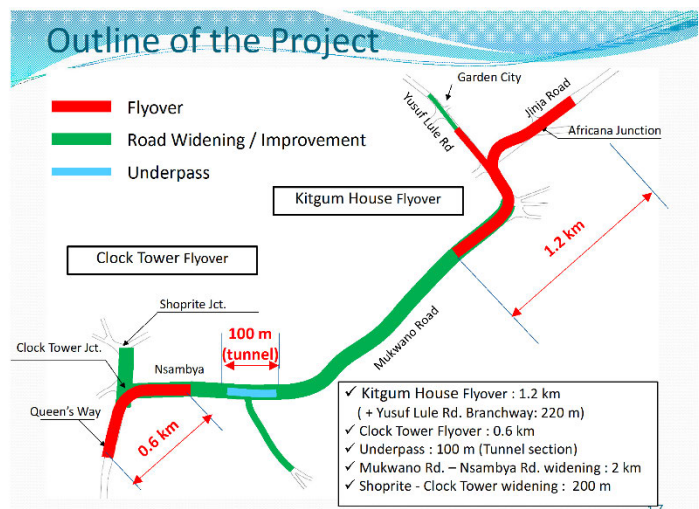


Figure 2-12 Outline of Kampala Flyover Project

2.1.2.2 UNRA proceeds with Urban Expressway Network Programme. The Kampala-Entebbe Expressway is the one of them and is under construction with financial assistance by China Exim Bank with loan for construction and PPP schemes for operation. UNRA also plans Kampala-Jinja, Kibuye-Busega-Mpigi, Southern Bypass and Kampala -Bombo Expressways. UNRA recently announced Kampala - Busunju Expressway.

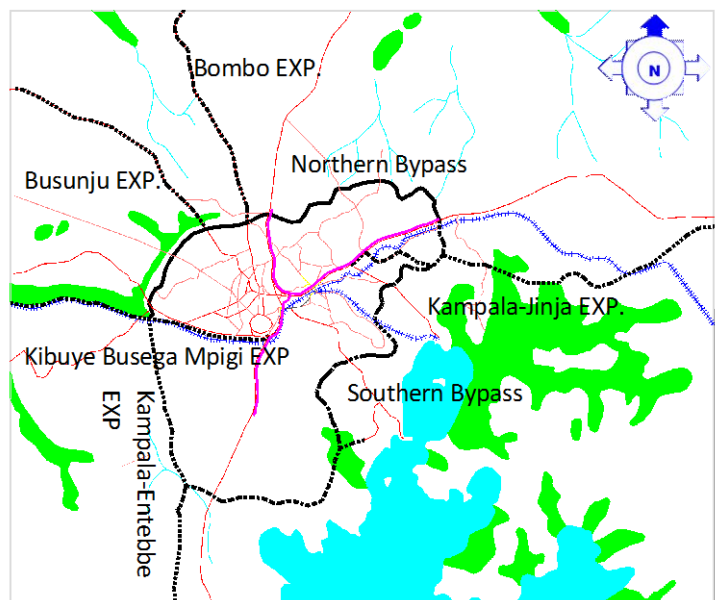


Figure 2-13 Expressway Network in GKMA

The programme covers the radial road network centered from Kampala, consequently. Further, UNRA also implements FS/DD of VVIP Expressway which connects between a point at Northern

Bypass and Nakasero, the centre of Kampala. Its primary objective to provide fast access between centre and suburban of Kampala. There is another objective that is to introduce truck access between centre of Kampala and Entebbe via this VVIP, Northern Bypass and Kampala Entebbe Expressway. It is expected to call more traffic on the Kampala –Entebbe Expressway which will help the Expressway project financially viable, eventually.

2.1.2.3 The BRT pilot project comprises a Y-shaped corridor that runs from Bwaise via Gayaza Road, Bombo Road and Jinja Road to Kireka, with a branch to the south via Entebbe Road to Zana. As it currently stands, the total length of the scheme is 22.3 km; an additional 1.0km has been earmarked at each of the three end points of the scheme. This results in nominal scheme length to 25.3km. The pilot corridor is served by three lines: from Bwaise to Kireka, from Kireka to Zana and from Zana to

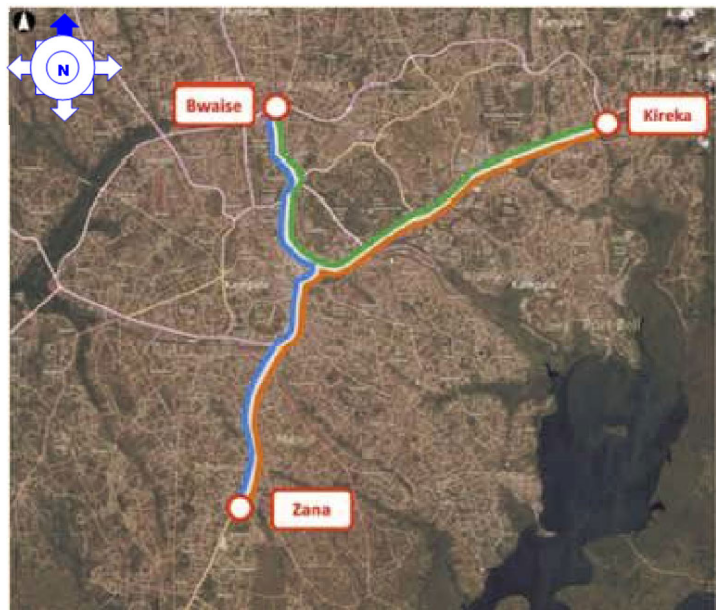


Figure 2-14 BRT Pilot Corridor

Bwaise. Thus, the BRT does not terminate in the centre and offers direct connections between the three branches of the Y-shaped corridor. The detailed engineering design has been completed and currently the project await financial intervention for the construction by World Bank which has not yet been made as discussed earlier.

2.1.2.4 Operation of Pioneer Easy Bus (PEB) was resumed in May, 2015 as Modal Shift Challenge. KCCA intends to allocate a lane exclusively to the PEB at peak hours so as to encourage the challenge which will however result in the disturbance of normal passenger traffic. The design of the exclusive lane is prepared by the engineer of KCCA. The exclusive lane system is not in place as of end of February, 2016.

2.1.2.5 Another Modal Shift Challenge was that Uganda Taxis Operators and Drivers Association (UTODA) AWAKULA ENNUME has launched its first batch of buses from Taata Uganda called Awakula Ennume on June, 2015. The Awakula Ennume is a co-operative society that is taking up a new role to provide better services in the transportation sector for the Kampala city and the area surrounding it. And provide the much need competition to the sector. There are 240 buses to be released on the Ugandan roads as per this launch,



Photograph 2-1 AWAKULA ENNUME

these have a 40 and 60 capacity in seating.

2.1.2.6 Although the improvement plans of public transportation by bus are on board, Ministry of Works and Transport announced “The Greater Kampala Light Mass Transit Project” of which proposed route is almost duplicated with that of the BRT pilot corridor. The Memorandum of understanding regarding the construction was signed by the Ministry and Chinese Government in December 2015. The magnitude from the project is very high that spoils most of on-going traffic improvement plans and projects.



Figure 2-15 The Greater Kampala Light Mass Transit Project

### 2.1.3 View of Expert Team for Transport Policy and Plan in Kampala

2.1.3.1 As discussed, there are many policy documents and plans for transport improvement in Kampala. The planning strategy is however not very firm and is likely changed and/or canceled with short-sighted viewpoints and these changes are sometime not in lines with the policy documents. Many players in the transport sector have own ideas which are not well-coordinated and the players’ plans likely to be prepared without consideration of their mandatory and geographical territories. Although new technology and/or high standard are included in the infrastructure planning, the fundamental elements including user demand taking into account user’s financial ability are not well considered. The improvement of road user manner is one of the keys to increase road capacity and to improve road safety without big investment which have not sufficiently been discussed.

## 2.2 TRAFFIC MANAGEMENT PLAN IN OTHER COUNTRIES

### 2.2.1 Traffic Management Principals

2.2.1.1 Traffic Management Principals are described as follows,

Table 2-2 Traffic Management Principals

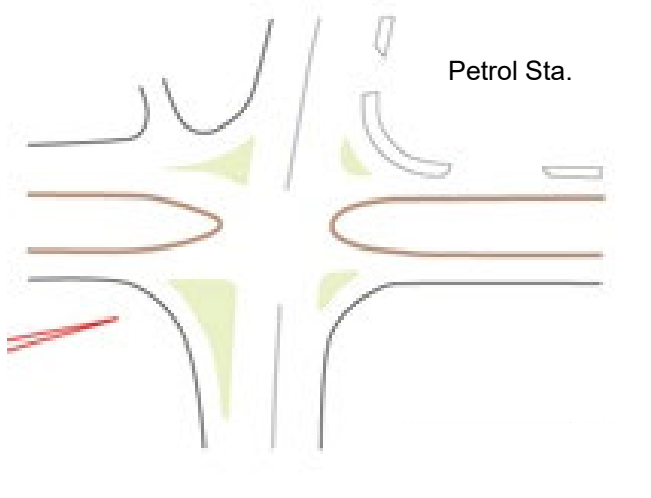
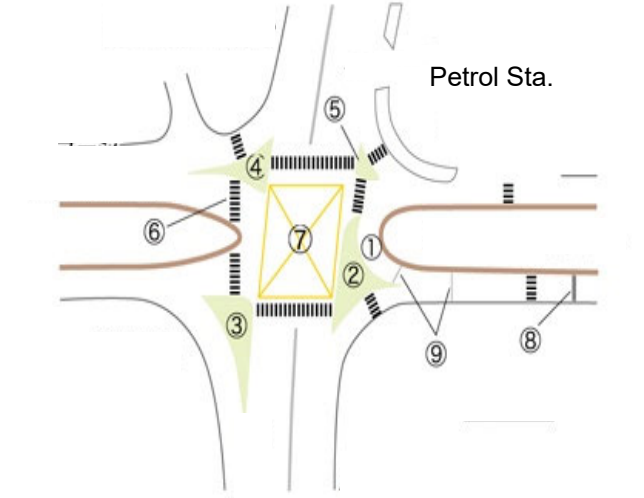
	Supply Side	Demand Side
<b>Short-Term</b>	<ul style="list-style-type: none"> <li>➤ Removal of bottleneck (intersection improvement, signalling)</li> <li>Management of existing road space (reversible lane)</li> <li>➤ Improvement of transit terminals</li> </ul>	<ul style="list-style-type: none"> <li>➤ Reduction of trip generation (ex. tele-work)</li> <li>➤ Modal shift to public transport and NMT</li> <li>➤ Management of vehicle use (ex.</li> </ul>

		truck/car ban, parking management) ➤ Peak shift ➤ Effective use of vehicle (ex. ride-share)
<b>Medium and Long Term</b>	➤ Road network improvement ➤ Transit network improvement ➤ Development of new technology	➤ Land use measures (transit-oriented development, urban development)

2.2.1.2 Demand and supply that are two major approaches in managing traffic.

2.2.1.2.1 Supply management intends to improve traffic infrastructures including road widening (capacity enhancement), junction improvement (removal of bottleneck). Intelligent Transport System (ITS) is one of the supply managements that apply information and communication technologies to transport. Computers, electronics, satellites and sensors are playing an increasingly important role in transport systems. The main innovation is the integration of existing technologies to create new services. ITS as such are instruments that can be used for different purposes under different conditions. ITS can be applied in every transport mode (road, rail, air, water) and services can be used by both passenger and freight transport.

Table 2-3 Examples of Supply Management

Junction and Signal Improvement	Manpang, Jakarta (Indonesia)
	
<p>Improvement Principals</p> <ol style="list-style-type: none"> <li>1 Relocation of U-turn lane to avoid conflict with North-South through traffic,</li> <li>2 Revision of traffic island to ban through traffic from East side,</li> <li>3-5 Cut traffic island to increase the number of left-turn lane,</li> <li>6 Installation of pedestrian crossing,</li> <li>7 Making to avoid vehicles to stop at middle of the junction</li> <li>8 Bump to reduce speed approaching the junction</li> <li>9 Signs to prohibit tall vehicles</li> </ol>	
<p>Raised Traffic Lane Divider</p>	<p>Dar es Salaam (Tanzania)</p>

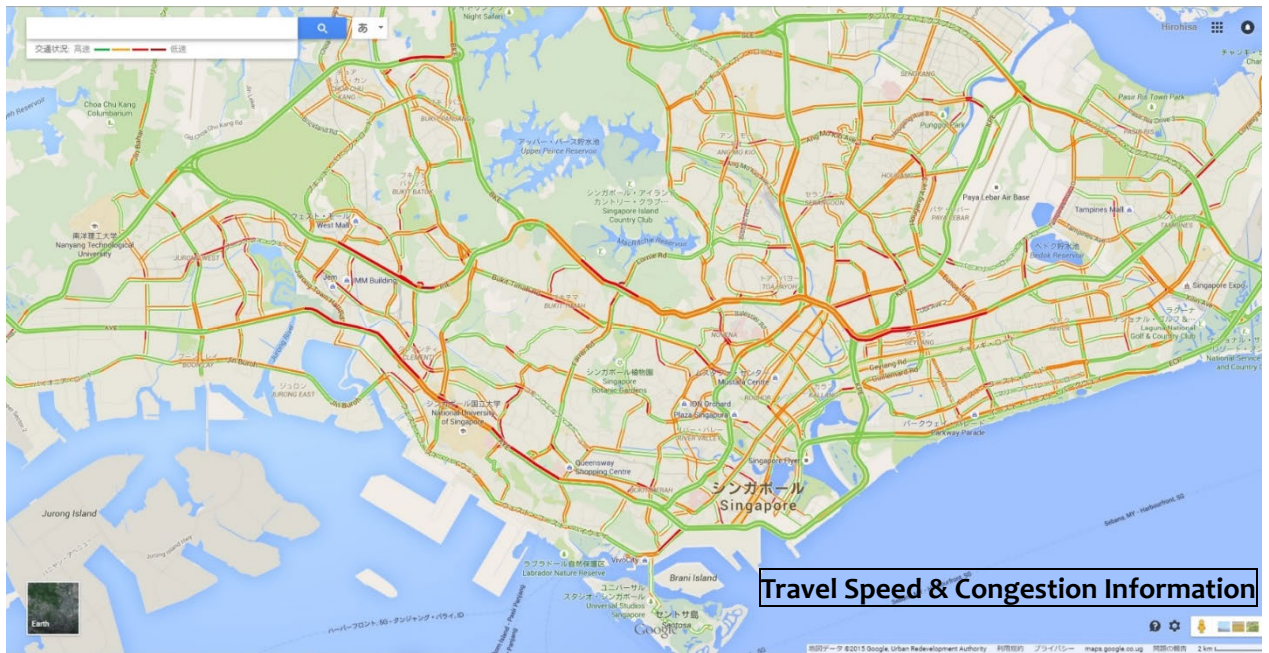


Improvement Principal

- Raised traffic lane divider is more sustainable than road lane marking
- Divider regulate more traffic flow according to lane than by lane marking

Provision of Traffic Information System

Jakarta (Indonesia)



Improvement Principal

- Development of web-site and system to provide information
- Revenue from advertisement
- Video, time lapse image,
- Use “Google Map” as a background

2.2.1.2.2 Traffic demand management (TDM) (sometimes known as ‘mobility management’) covers a range of measures aimed at reducing the adverse impacts of car use. They are complementary measures to spatial planning (and vice versa). TDM deserve distinct detailed coverage - this is a wide topic area – and there are a number of further resources available that cover some of the issues (for example Leeds University’s KonSULT database, the VTPI’s Online TDM Encyclopedia and Oxford University’s IMPACT database). The commentary here is necessarily

brief, in the context of supporting mechanisms to spatial policy. There are often overlaps in definition ('TDM measures' sometimes include land use planning; many of the organisational/behavioural change measures, and wider, are known as smarter choice 'soft' measures (after Cairns et al, 2004). This management approach is less costly compared to the supply management explained hereunder.

Table 2-4 Examples of Demand Management

No.	Measures	Example
Time Management		
a-1	Off-Peak Commuting and Flex Time	Japan
Pricing		
b-1	Road Pricing, Number Plate System, Restriction of Motorcycle, Truck Ban)	Singapore and Yangon
b-2	Higher Tax on Vehicle and Certificate of Entitlement on Vehicle Ownership	Singapore
b-3	Minimum Passenger in Peak Time	Jakarta
Modal Shift		
c-1	Park and Ride	Jakarta
c-2	Mobility Management	Japan
Working Style Change		
d-1	Tele-commuting/Working at Home	
Alternative Support Program		
e-1	High Occupied Vehicle (HOV) Lane	Jakarta
e-2	Ride Sharing	U.S.

## 2.2.2 Example of Mobility Management in Japan

2.2.2.1 The Mobility Management (MM) is one of traffic demand control approaches by governments or traffic administrative agencies and the target groups are normally society/community and/or private sectors including private firms. In accordance with the improvement strategies that have been established and officially approved, the executive agency approaches the group to remind the traffic problems in which the strategies have focused upon. Further, the agency consulted the group to increase awareness and come up with idea in order to solve the problems by themselves. The management shall continue and be sustainable.

2.2.2.2 The traffic problems in Kampala cannot be solved without intervention of the road users, the Mobility Management is considered to be applicable approach to the road users.

2.2.2.3 Kyoto Prefecture in Japan is one of the most advanced and experienced local government in Japan for this Mobility Management. The project programed a lecture of the Mobility Management at

Kyoto Prefecture in the Training in Japan.

2.2.2.4 Uji, a part of the prefecture suffered traffic congestion during peak times since traffic by passenger car increased drastically as Uji demographically developed. There was no reliable and useful public transport mode in Uji, the public has no alternative in commuting but usage of private car.

2.2.2.5 The prefecture approached the private sector in Uji in order for its employees to consider effective usage of passenger cars without bringing the traffic congestion in the consultation.

2.2.2.6 A Seminar of the Mobility Management Plan named Effort of “Mobility Management” in Kyoto was held during the 1<sup>st</sup> Training in Japan. It was by Dr. Toshimichi Murao, Transport Infrastructure Development Superintendent: Construction and Traffic Department; Kyoto Prefecture on 4<sup>th</sup> August 2016.



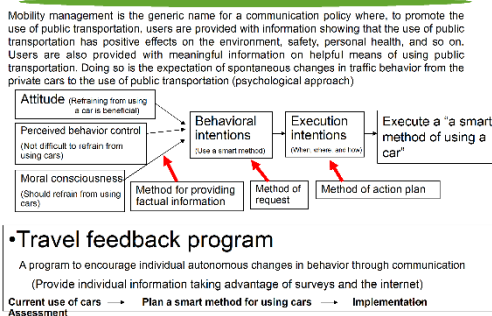
Photograph 2-2 A Scene of the Seminar for the Mobility Management Plan at Kyoto Prefecture



### The reasons for tackling MM

- Continued increases in car use and continued decreases in public transportation use
  - Left alone, public transport will disappear
- The hollowing out of city centers
  - With the advance of society focused on automobiles, lifestyles premised on the existence of cars expand and cities fade
- The arrival of population declines and super-ageing society
  - Without cars, life becomes difficult in the suburbs; hills are difficult, hospitals are far away, and stores disappear
- No stopping with the TDM up to this point
  - Change awareness of lifestyles of individuals before they move
- Can take on global warming
  - Sustainability and cost-performance are needed for achieving the Kyoto Protocol

### What is mobility management?



Formulation of the Kyoto Transportation Demand Management basic plan (March 2005)  
Formulation of the Kyoto Transportation Demand Management promotion plan (March 2006)

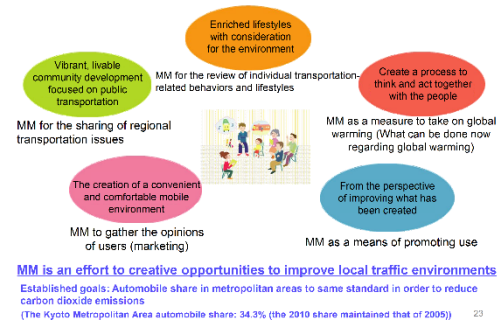


Figure 2-16 Some Presentation Slide of the Seminar for the Mobility Management Plan at Kyoto Prefecture

Table 2-5 List of Participants of the Seminar for the Mobility Management Plan at Kyoto Prefecture

Lecturer		KCCA	
Name	Position	Name	Position <sup>1</sup>
Dr. Toshimichi Muraio	Transport Infrastructure Development Superintendent	Ms. Jennifer Semakula Musisi	Executive Director
		Mr. Charles Ouma	Deputy Director, Directorate of Legal Affairs
		Eng. Andrew Kitaka	Director, Directorate of Engineering and Technical Services
		Dr. Steven Kasiima	Assistant Inspector General of Police, Director of Traffic and Road Safety, Uganda Police Force
		Mr. Martin Sekajja	Deputy Director, ICT, Office of the Executive Director
		Eng. Jacob Byamukama	Manager, Directorate of Engineering and Technical Services
		Eng. Beatrice Magumba	Transport and Traffic Engineering Specialist, Directorate of Engineering and Technical Services
		Eng. Hirohisa Kawaguchi	JICA Expert
		Eng. Pallab Debnath	JICA Expert

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1 Positions are as of the date for the Seminar

2.2.2.7 It was another seminar regarding the Advanced Urban Transportation Management researched by Nagoya University during the 1<sup>st</sup> Training in Japan. The seminar was conducted by Prof. Takayuki Morikawa, Institute of Innovation for Future Society; Nagoya University on 8<sup>th</sup> August 2016.

2.2.2.8 This IT-based traffic management approach, including those in operation in some developed countries, is expected to be applied to Kampala in the future. IT technology is essential for traffic management that requires big data, and given the ever-evolving nature of IT, it is expected to be applied to Kampala in the not-too-far future.



Photograph 2-3 A Scene of the Seminar for Advanced Urban Transportation Management at Nagoya University

**Traffic and Transportation Management by Connected Cars**

**Takayuki Morikawa**  
Professor  
Institutes of Innovation for Future Society  
Nagoya University

August 8, 2016

NU TREND Nagoya University Transport and Environment Dynamics

**“Intelligence” is the Key**

- “Intelligence” by ICT can reduce the inefficiency without harming the flexibility.
  - **Accident by human errors**
    - Advanced drive assistance, Autonomous driving
  - **Congestion by concentration**
    - Traffic information, Route guidance
  - **Inefficient driving and operation**
    - Advanced logistics, Vehicle/Ride sharing
  - **Taking up big spaces**
    - Platooning

**ITS (Intelligent Transport Systems)**

NU TREND Nagoya University Transport and Environment Dynamics

**VICS (Vehicle Information and Communication System)**

**Configuration of VICS**

JARTIC (Japan Road Traffic Information Center) → Information collection → VICS Center → Information supply → Radio beacon (express way), Infrared beacon (major trunk roads), FM multiplex broadcast

**Examples of display**

- Level-1 Character Type
- Level-2 Figure Type
- Level-3 Map Type

Without VICS vs With VICS (Accident)

NU TREND Nagoya University Transport and Environment Dynamics

**ETC (Electronic Toll Collection System)**

現在の日金所 (Current toll booth) → 約2~4倍 (2-4 times) → 約250台/h (approx. 250 vehicles/h) → 約300台/h (approx. 300 vehicles/h)

ETC started in 2001.

ETC On-board equipments

NU TREND Nagoya University Transport and Environment Dynamics

Figure 2-17 Some Presentation Slides of the Seminar for Advanced Urban Transportation Management

Table 2-6 List of Participants of the Seminar for Advanced Urban Transportation Management

Lecturer		KCCA	
Name	Position	Name	Position
Prof. Takayuki Morikawa,	Professor	Ms. Jennifer Semakula Musisi	Executive Director

		Mr. Charles Ouma	Deputy Director, Directorate of Legal Affairs
		Eng. Andrew Kitaka	Director, Directorate of Engineering and Technical Services
		Dr. Steven Kasiima	Assistant Inspector General of Police, Director of Traffic and Road Safety, Uganda Police Force
		Mr. Martin Sekajja	Deputy Director, ICT, Office of the Executive Director
		Eng. Jacob Byamukama	Manager, Directorate of Engineering and Technical Services
		Eng. Beatrice Magumba	Transport and Traffic Engineering Specialist, Directorate of Engineering and Technical Services
		Eng. Yoshikazu Asada	JICA Expert
		Eng. Pallab Debnath	JICA Expert

## 2.3 IMMEDIATE ACTION PLAN (IAP)

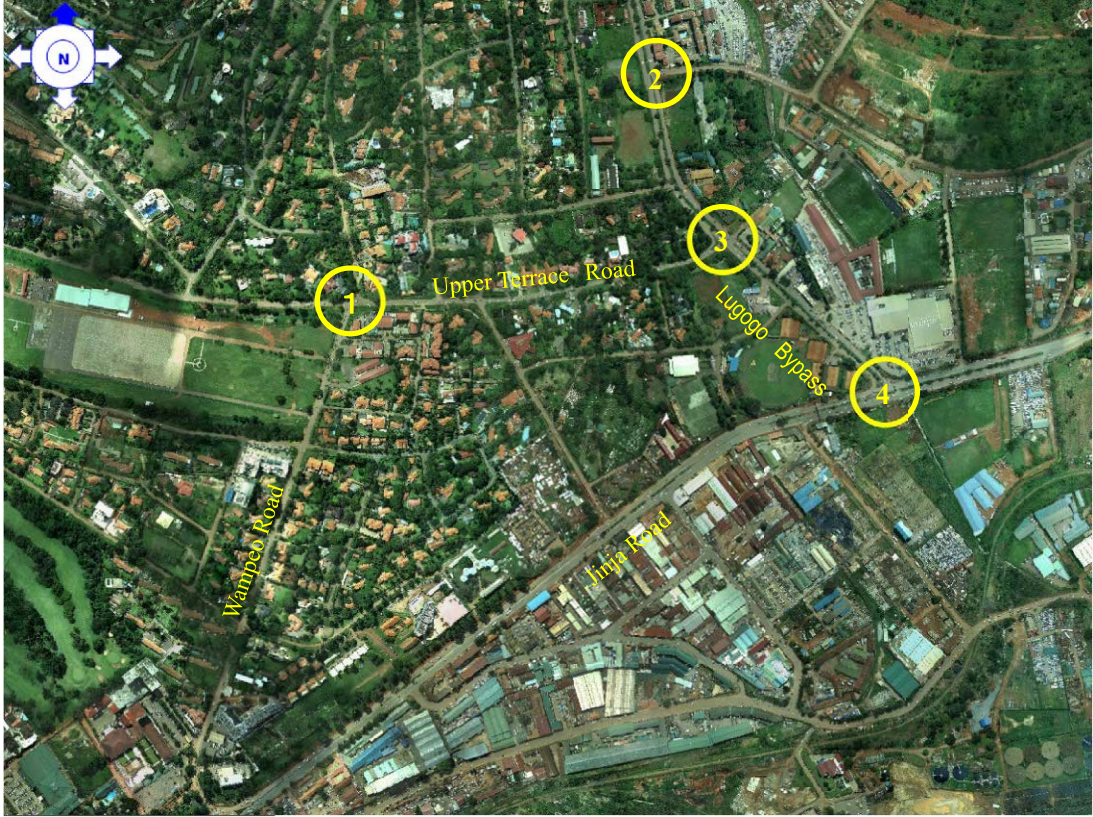
### 2.3.1 IAP1 Pilot Projects toward Area-Wide Traffic Control (ATC)

2.3.1.1 The road network in Kampala has been formed with complicated pattern due to undulated terrain. The mixtures of different junction types (i.e. Roundabout, Signalized Junction and Non-Signalized Junction) within short distance worsen traffic congestion. In general, traffic congestion in urban area is foreseeable that it has fixed traffic pattern depending on time zone and day. However, traffic in Kampala is much fluctuated and traffic behaviors without discipline makes traffic congestion chaos. ATC will definitely be needed in Kampala and the Moderato, one of the ATC systems is available to respond irregular development of traffic congestion and also gives area wide controlling. Hence, KCCA prefers to apply the Moderato in Kampala.

2.3.1.2 Since KCCA has decided to establish the Central Traffic Control Centre as it was explained in some policy documents, the Moderato is one of possible systems in the Central Control Centre. However, the establishment of the Centre is big challenge for KCCA because KCCA has no skill for how to operate. Moreover, the establishment of the Centre is huge investment that requires careful considerations with various viewpoints in selection of the system. The Central Control Centre will be very useful tool in traffic controlling, however it shall be with appropriate operation and maintenance set-up which need some time to take place. The Expert team and the C/P came up an idea of the Pilot Project containing small scale traffic control system in order for KCCA to be familiar with operation. The project outline is explained as follows,

Table 2-7 IAP1 ATC Pilot Project Outline

<b>OBJECTIVE</b>	In order to respond to the increasing road traffic demand, KCCA is utilizing funds from the World Bank to carry out an intersection and road improvement project(KIIDP2). Particularly for intersection improvement, we are recommending the adoption of demand-driven traffic signals instead of the conventional constant cycle type of traffic signals.
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	<p>In the future, we plan on networking all traffic signals and have them controlled from one Central Traffic Control Centre. In view of this trend, an Urban Transport Management Plan (UTMP) by skilled professionals will be formed for the medium and long terms. 200 junctions have been proposed for signalization and consensus has been got from KCCA that among those, 50 junctions will be under the Central Traffic Control Centre.</p> <p>Also, as a control method in this traffic management plan, and taking into account the variation in the complex Kampala road network and the irregular traffic demand, it is possible to have Area Traffic Control (ATC) and we thus are proposing Japan's MODERATO, a traffic control system that can flexibly adopt to variations in traffic demand.</p> <p>The superiority of this proposal to KCCA is the MODERATO functions and it requires one to understand the validity of its application to Kampala. There is a very positive attitude about its introduction but we still have some concerns about its operations. Therefore, our skilled professionals shall conduct a pilot project of the MODERATO system to check out its effectiveness and any other operational aspects. Especially in addition to the direct support from professionals on MODERATO operation, we shall also take advantage of the remote support by the controller manufacturer through the internet.</p>
<p><b>AREA PLANNED FOR THE PILOT PROJECT.</b></p>	<p>The selection criteria of the planned area for the pilot project was as follows:</p> <ol style="list-style-type: none"> <li>1) Covering more than one route.</li> <li>2) Area with high traffic demand, including intersections with remarkable congestion.</li> <li>3) Intersections with minimum geometric design improvement.</li> <li>4) Intersections with no existing improvement projects as well as no overlapping plans.</li> <li>5) Routes with fully equipped communication infrastructure (optical fibre)</li> </ol> <p>The above criteria was fulfilled by 4 intersections namely; Jinja road, Lugogo Bypass, Wampewo Avenue and Upper Kololo Terrace.</p> 
<p><b>PROCUREMENT METHOD )</b></p>	<ul style="list-style-type: none"> <li>• Place a public notice as JICA equipment procurement and select the contractor by bidding.</li> <li>• Detailed specifications of the equipment will not be placed in the tender documents since it's a performance ordering system.</li> <li>• Emphasis on technical proposals of the bidders, general competitive bidding, overall rating system, demonstration of selection criteria.</li> </ul>

	<ul style="list-style-type: none"> <li>In order for request for comments on the proposed technology, tender documents will all be in English.</li> <li>In order to avoid re-bidding, an approximate budget price will be disclosed. (We expect expensive proposals).</li> <li>Commissioning of the equipment, cost of operation, and 1 year technical support are all included in the bid price.</li> </ul>
<b>BUDGET PRICE (APPROX.)</b>	¥ 50 million yen
<b>C/P IN-CHARGE</b>	<ul style="list-style-type: none"> <li>Junction geometry design.</li> <li>Installation work of the traffic signals and ancillary equipment, wiring and plumbing (Procurement for wiring and piping to be done by Uganda)</li> </ul>

### 2.3.2 IAP2 One Way Traffic Flow Trial

2.3.2.1 As central business district of Kampala is observed a lot of congestion especially in the evening peak hour some of the sections can be chosen for one-way traffic control. However, as the one way traffic has many pros and cons the plan should be studied carefully before practical implementation.

2.3.2.2 In order to ease the congestion situation in Nakasero area, oneway traffic system can be introduced. The points to be considered prior to implementation are:

2.3.2.2.1 Safety measures such as truck ban, speed limit, sidewalks should be considered.

2.3.2.2.2 Alternative routes should be prepared and should not be too long.

2.3.2.2.3 If one-way is applied to parallel roads, directions of each road should be considered to minimize detour.

2.3.2.2.4 In case of grid-type road system, parallel roads can introduce one-way of opposite directions. This can increase capacity of one-way system as introduced in many cities.

2.3.2.2.5 Bicycle can be exempted from one-way rule.

2.3.2.2.6 Policy should consider area-wide point of view.

2.3.2.2.7 Opinions of residents and road users should be collected and considered before implementation.

2.3.2.3 The details of the plan are described in the Table 2-8 IAP .

Table 2-8 IAP 2 Trial on New One-Way Traffic Scheme in CBD

<p><b><u>Rationale</u></b></p> <p>The project for capacity enhancement of KCCA in management of traffic flow in Kampala city in Uganda has prepared Urban Transport Management Plan (UTMP) in order to realize smooth traffic flow in the city. A management plan (MP) is prepared in this UTMP and for each management plan details activities are listed up. One of the important activities of MP-4 is to initiate one way traffic flow.</p> <p>In Kampala, the bottlenecks condition at roundabouts and non-signalized junctions is a very common phenomenon. During the field survey to identify the reasons of bottleneck creation it was</p>
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observed that traffic from various directions merged into roundabouts and the capacity of the roundabout is always less than the supply. This trial was planned by managing traffic flow directions how the overall flow of the surrounding area can be improved.

### **Objectives**

The objective of this project is to:

- Find effective and efficient traffic management policy for Kampala through directional change
- Understanding planning, survey, implementation and evaluation methodology of traffic management policy through practice in the field of KCCA counterparts

### **Description of the Project**

Nakasero area is one of the biggest trip generating area in Kampala which is mainly surrounded by 5 major junctions: Fairway Hotel roundabout, Wandegeya junction, Mulago roundabout, Entebbe junction and Kitgum House junction. Inside the area, Rwenzori Court roundabout is also situated and it was observed the traffic queues in the evening are extended from one junction to another. As a result, all the roads inside the area is experiencing complete deadlock situation.

In order to ease the congestion situation in Nakasero area, it was proposed that one-way traffic system can be introduced for certain road. There are 5 legs which are connected towards Rwenzori Court roundabout. And out of these 5 legs, Lubumba Avenue is already one way (traffic can only come from this road to Rwenzori Court roundabout; entry is prohibited). Therefore, traffics from 5 different directions are merging at this roundabout. The pilot project proposed a one way system at Nakasero road which will eventually decrease traffic from this direction to this roundabout. It is expected that as a result of decreasing in inflow, this junction will perform more effectively in peak hour.

It is also observed that the junctions connected to this area are needed to be improved. Already Fairway Hotel roundabout is under installation of traffic signals and geometric improvement. During implementation of this pilot project it is also proposed to convert the Rwenzori Court roundabout and Mulago roundabout into signalized junctions.

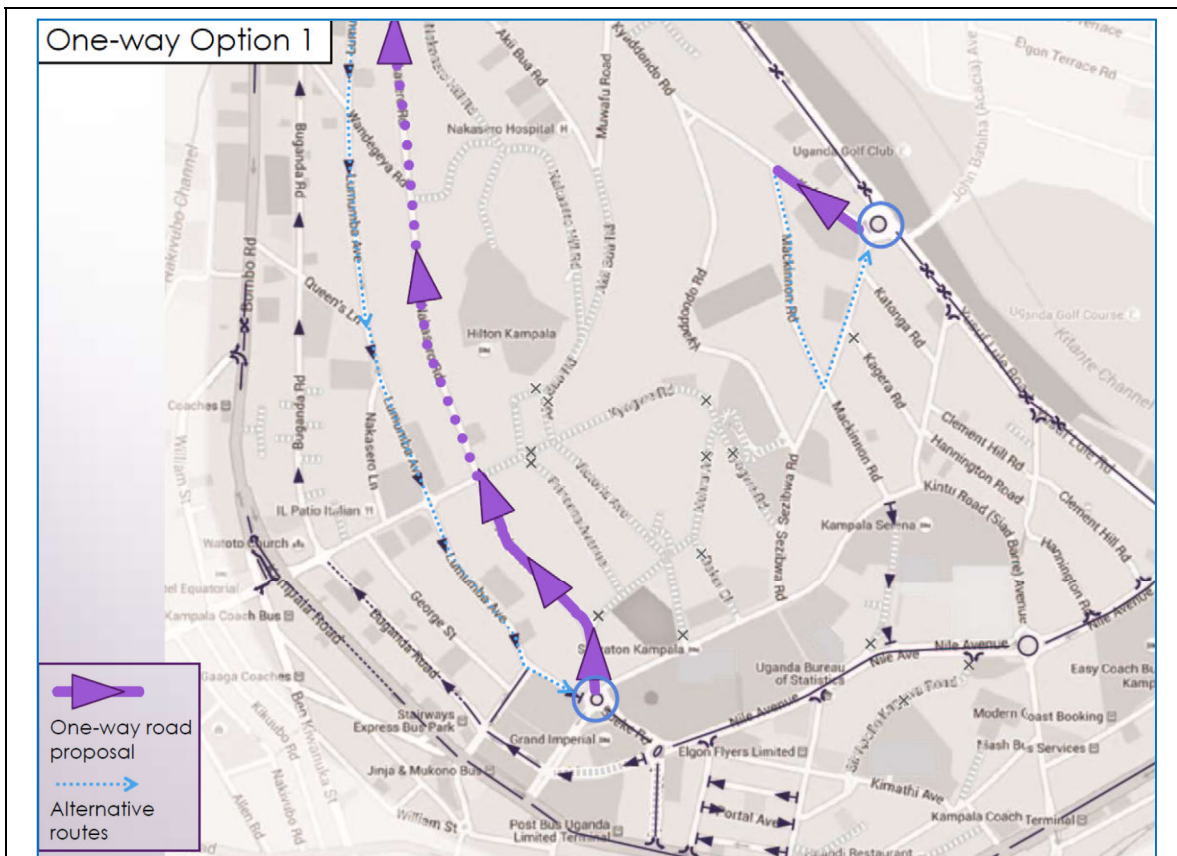


Figure 2-18 Location of Nakasero area and proposed one way route

Components of the Project

The project is comprised of the following two components:

- Phase 1 Detailed Design: Traffic Survey and detailed design of the project
- Phase 2 Implementation: Junction improvement, PR activities for the residents / users of this area and implementation of one way system
- Phase 3 Monitoring: This part will include post evaluation Traffic Survey.

Necessary Actions towards Implementing the Project

KCCA needs to prepare the civil construction budget and select the Civil Work Contractor. Installation of traffic signals at Fairway Junctions is expected to be completed before the operation of the pilot project.

END

**2.4 PREPARATION OF URBAN TRANSPORT MANAGEMENT PLAN (UTMP)**

**2.4.1 Objectives of UTMP**

2.4.1.1 While there are various transport sector policy and planning documents, traffic management was not the main focus as infrastructure development was the highlight. Taking Kampala’s geographical and topological constraint on transport infrastructure development, maximum utilization of existing road space is essential. Therefore, the objective of the Urban Traffic Management Plan is to support

smooth management of urban traffic in Kampala by;

- 2.4.1.1.1 Clarifying issues in urban traffic management,
- 2.4.1.1.2 Setting visions and goals of the traffic management,
- 2.4.1.1.3 Coordinating a number of on-going and planned projects,
- 2.4.1.1.4 Determining policy directions on road traffic management, and,
- 2.4.1.1.5 Formulating action plans on urban road traffic management.

## **2.4.2 Planning Horizon**

- 2.4.2.1 The “Uganda 2040”, the national long-term development vision, is targeting year 2040. The “Second National Development Plan (NDPII) 2015/16 – 2019/20” provides detail plan for 2015/16 – 2019/20. In terms of transport, the latest plan of the “Strategic Implementation Plan (SIP) for NTMP/GKMA 2015 – 2023” follows planning target of 2023 which is defined by the NTMP/GKMA.
- 2.4.2.2 When it comes to the KCCA, the “Kampala Physical Development Plan (KPDP)” mainly describes plans of 10 years from 2012 to 2021 while it also refers long-term goal of 2040. On the other hand, the “Decongestion Plan for Kampala” defines 2016-19 as medium and beyond 2020 for long term.
- 2.4.2.3 Since most of traffic management policy interventions can be done in short term such as 3 to 5 years, the short-term target is defined as 2020. In line with existing policies and plans, “medium-term” and “long-term” refers to 2030 and 2040 respectively in this document. As “immediate action” should be implemented within the project period of the KSTP, it refers to 2018.

### 2.4.3 Planning Area

2.4.3.1 In line with “National Transport Master Plan Including a Transport Master Plan for the Greater Kampala Metropolitan Area (NTMP/GKMA)” as well as the “Kampala Physical Development Plan (KPDP)”, the Greater Kampala Metropolitan Area (GKMA) is planning area of the this UTMP.

2.4.3.2 As the key traffic problems of traffic congestion and traffic accident are obvious in KCCA, the proposed management plans are mainly in the KCCA jurisdiction.

### 2.4.4 Planning Basis

#### 2.4.4.1 Demography

2.4.4.1.1 Population census was carried out in 1911, 1921, 1931, 1948, 1959, 1969, 1980, 1991, 2002 and 2014 in Uganda (Source: 2002 Uganda Population and Housing Census, Analytical Report). Annual average growth rate (AAGR) is varied from 1.47 to 3.85 in the whole period. However, according to the latest census which was carried out in 2014 the AAGR is 3.08.

2.4.4.1.2 Kampala is a small city of 197 (0.8% of whole country) square kilometres which is holding 4.3% of total population of Uganda. The population density in Kampala is increasing continuously in the period of 1980 – 2014. According to 2014 census, population density in Kampala was 7,696



Figure 2-19 Planning Area for UTMP

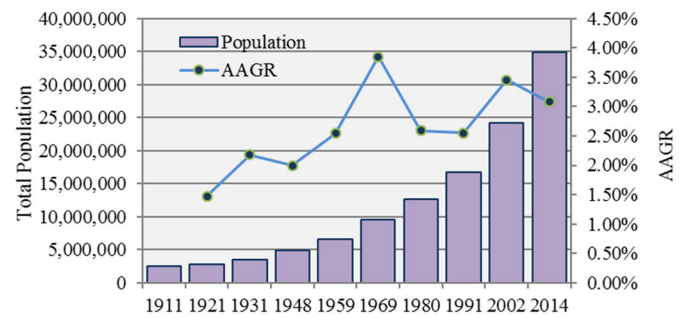


Figure 2-20 Trend of Uganda National Population Growth (1911-2014)

persons/ sq. kilometre

2.4.4.1.3 According to The Study on Greater Kampala Road Network and Transport Improvement in the Republic of Uganda the population of GKMA area was projected as 3.1 million in 2013 and will be increased up to 4.5 million in 2023.

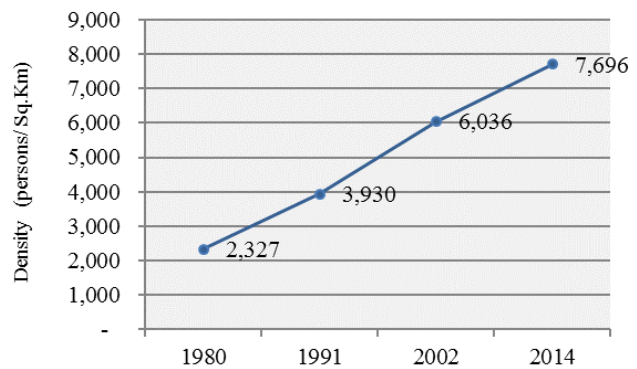


Figure 2-21 Change of Population Density in Kampala

2.4.4.1.4 According to KPDP, GKMA population is projected to be climbed up to app. 5.0 million by 2021. It is also predicted that if the in-migration accelerate the population of greater Kampala area may be climbing up to 20 million by 2040.

#### 2.4.4.2 Economy

2.4.4.2.1 The growth of GDP in Uganda is increasing at a constant rate every year from 2008-09 to 2014-15 as shown in Figure 2-22. In 2010-11, the GDP growth was quite high compare with recent years. In last 4 fiscal years, the GDP growth rate was hanging around 4%.

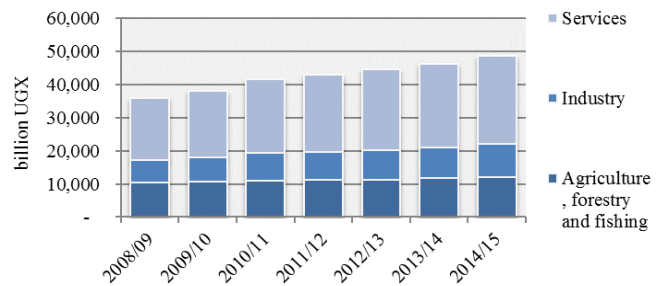


Figure 2-22 Trend of GDP Growth of Uganda in Recent Years

2.4.4.2.2 The share of services and industries in GDP composition is also increasing year by year. From Figure 2-23, it is clear that the share of agriculture, forestry and fishing are decreasing.

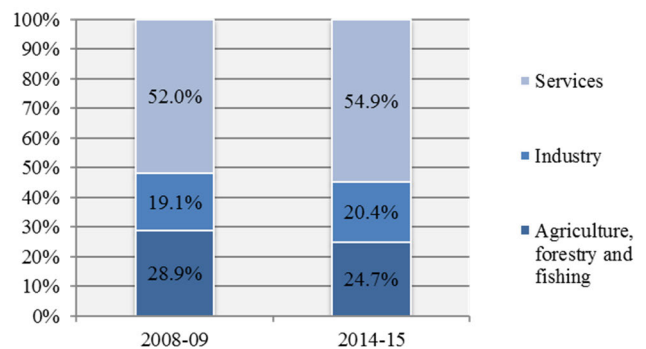


Figure 2-23 Comparison of Change in Sector-wise GDP Share in Recent Fiscal Years

#### 2.4.4.3 Land-use

2.4.4.3.1 The land use pattern in 2002 is changed drastically that was recognized in the land-use map in 2014. In 2002, land use pattern in Kampala was quite mixed up, whereas in 2012 the land use is

much more concentrated in residential and commercial areas.

2.4.4.3.2 The central business district area is redefined in 2012 compared to 2002. For example, the whole Nakasero area was a residential area in 2002 which is now converted into a mixed commercial area and now many office buildings, restaurants are built. Naturally, the demand of traffic in whole Kampala area specially CBD area is drastically changed in 2012 compared to 2002.

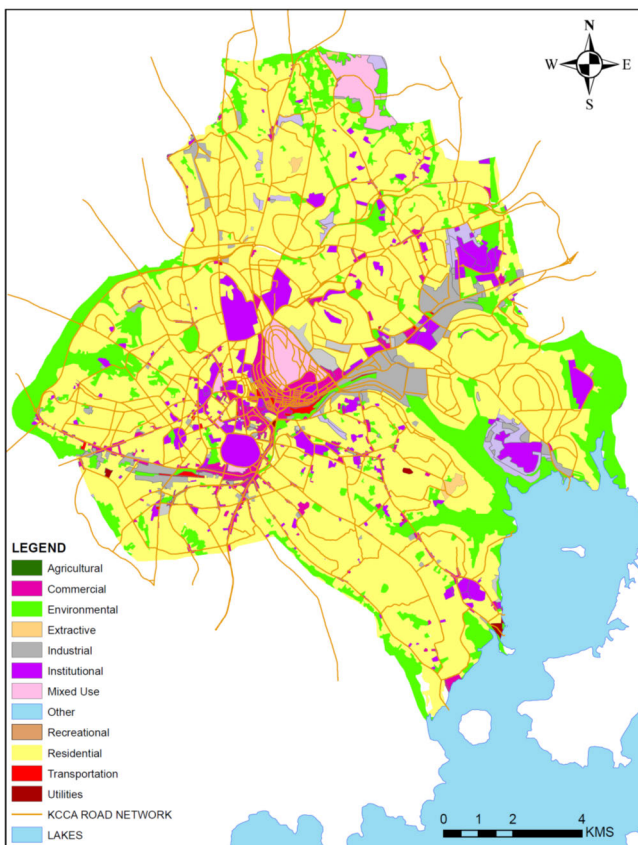


Figure 2-25 Land Use Pattern of Kampala in 2012

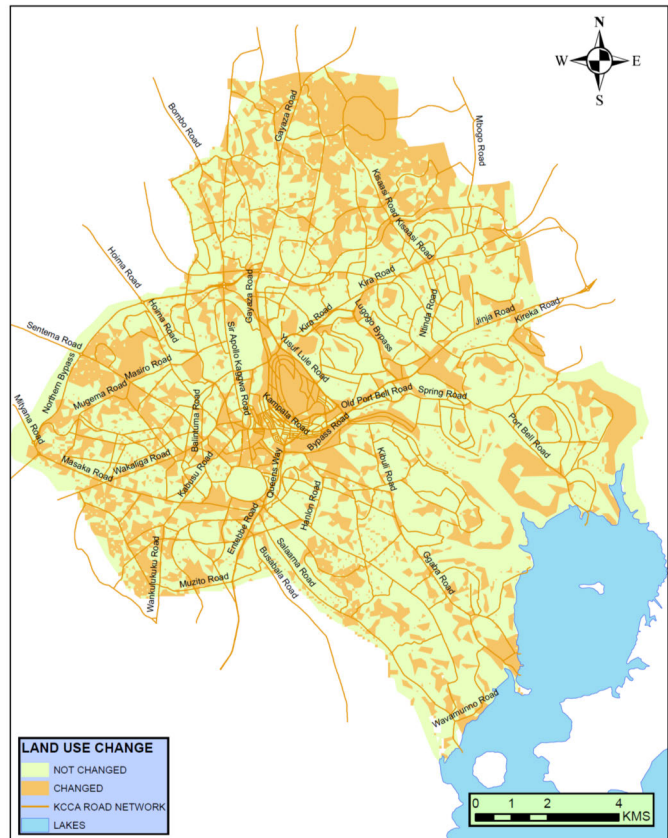


Figure 2-24 Change of Land Use Pattern of Kampala from 2002 to 2012

2.4.4.4 Traffic

2.4.4.4.1 Motorization in Uganda specially in Kampala has been rapidly increasing in recent years, as shown in Table 2-9. As the vehicles registration of Uganda is only carried out by one organization and according to current procedure it is not possible to designate the vehicles used in Kampala or rest of the country.

2.4.4.4.2 The number of registered cars has

Table 2-9 Newly Registered and Estimated Number of Road Vehicles in Uganda (2005-2009)

Item	2005	2006	2007	2008	2009	Average Increase Rate (%) P.a.
<b>Newly Registered</b>						
Motor Cars	9,870	9,764	11,375	11,975	8,445	-3.8%
Pickups/ Vans	4,206	3,658	4,407	3,486	2,597	-11.4%
Minibuses	6,583	6,367	8,431	10,943	14,578	22.0%
(Big) Buses	78	76	155	262	240	32.4%
Trucks	2,030	2,747	3,237	5,644	5,494	28.3%
Sub-Total	22,767	22,612	27,605	32,310	31,354	8.3%
Motorcycles	27,916	36,599	49,230	70,527	69,998	25.8%
Total	50,683	59,211	76,835	102,837	101,352	18.9%
<b>On the Road (*)</b>						
Motor Cars	65,471	70,652	81,320	90,856	96,575	10.2%
Pickups/ Vans	53,203	53,137	55,950	58,317	59,747	2.9%
Minibuses	27,568	32,006	39,476	49,235	62,336	22.6%
(Big) Buses	868	857	995	1,237	1,453	13.7%
Trucks	18,684	20,497	23,324	28,501	33,425	15.7%
Sub-Total	165,794	177,149	201,065	228,146	253,536	11.2%
Motorcycles	108,207	133,985	176,516	236,452	292,263	28.2%
Total	274,001	311,134	377,581	464,598	545,799	18.8%

increased at 10.2% between 2005 and 2009 which was quite significant. Motorcycles commonly known as Bodaboda have increased with the highest rate (28.2% per annum) and followed by minibuses (22.6% per annum) during the same period. Trucks also indicated a significant increment in growth rate (15.7% per annum).

2.4.4.4.3 The Study on Greater Kampala Road Network and Transport Improvement in the Republic of Uganda was completed in 2010. According to the travel demand forecast of this project, total 733,000 trips per day were found in 2010 in the GKMA and projected that 788,369 trips would have been generated in 2013.

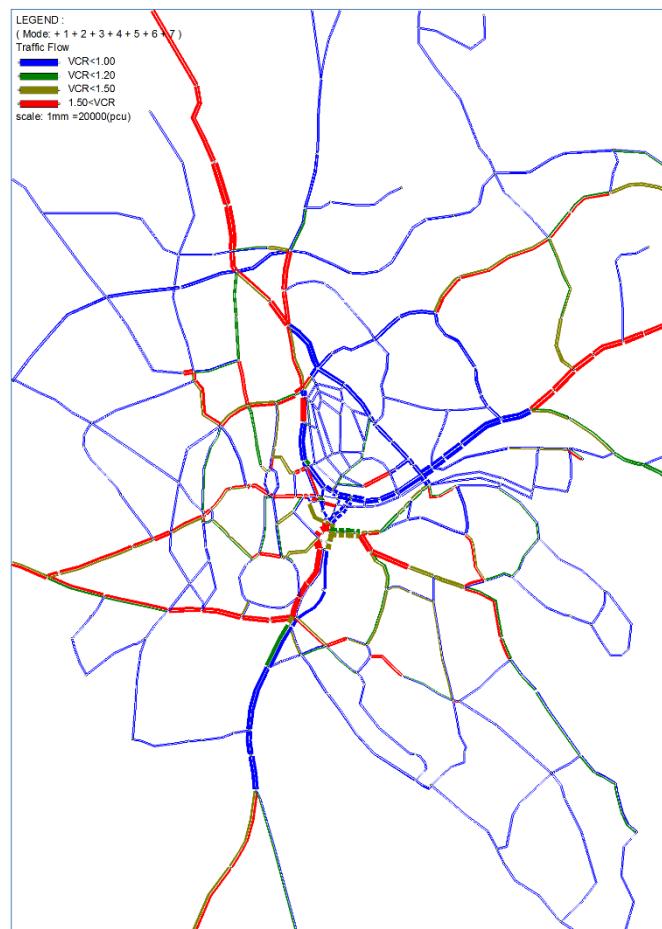


Figure 2-26 Result of 2013 Traffic Volume estimated by Assignment Model

2.4.4.4.4 The interesting finding was that despite large traffic volume in CBD, the network capacity was still large enough to accommodate exiting traffic according to the traffic assignment result.

#### 2.4.4.5 Travel Speed

2.4.4.5.1 Travel speed identifies the congested road sections and also gives quick identification of traffic bottlenecks in the network. The travel speed survey therefore has been conducted covering major road network including UCI, UCII and UCIII roads according to KCCA's classifications. The survey road length was approximately 309 Kilometer.

2.4.4.5.2 KSTP conducted travel speed surveys in order to identify the traffic bottle necks.

2.4.4.5.3 There are some interesting observations on the results which are:

- Lowest average travel speed on Kampala roads was observed at 08:00~09:30 and 18:30~20:00.
- Average travel speed is 20~30 Km/hour was observed for most of the roads for over the day.

- Average speed of less than 10 Km/hour was observed at 18:30~20:00 for most of the sections. T
- Therefore, the evening peak is more severe than morning peak in Kampala.
- There was no significant difference in travel speeds between normal working day (i.e. Tuesday - Thursday) and extensive working day (i.e. Monday and Friday)
- In division wise, the travel speed in Central Division is obviously different as low from others and second lowest is Kawempe while the others are almost the same.

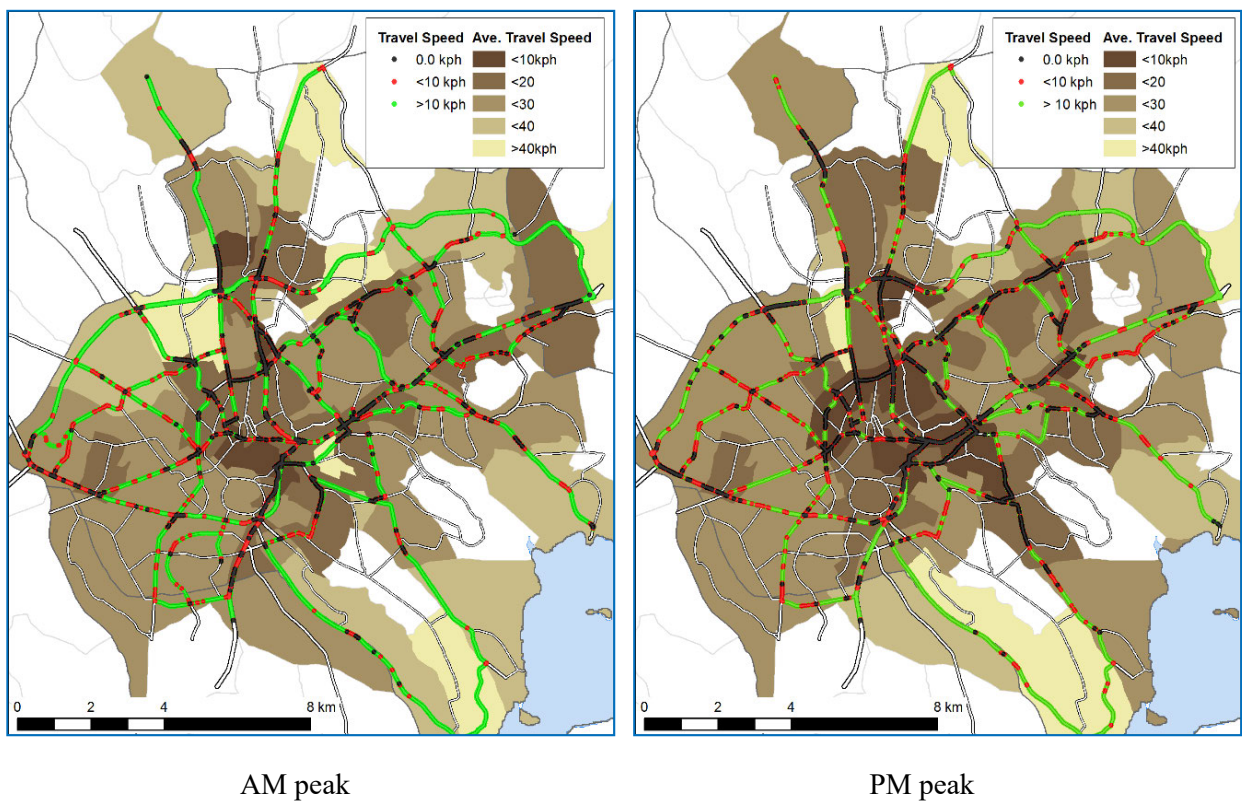
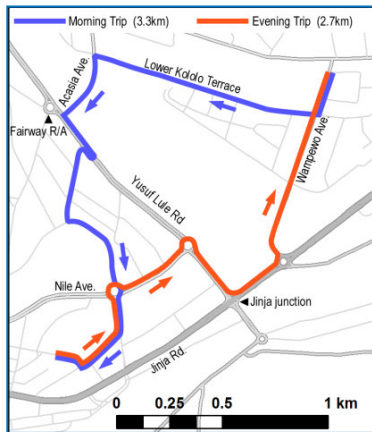
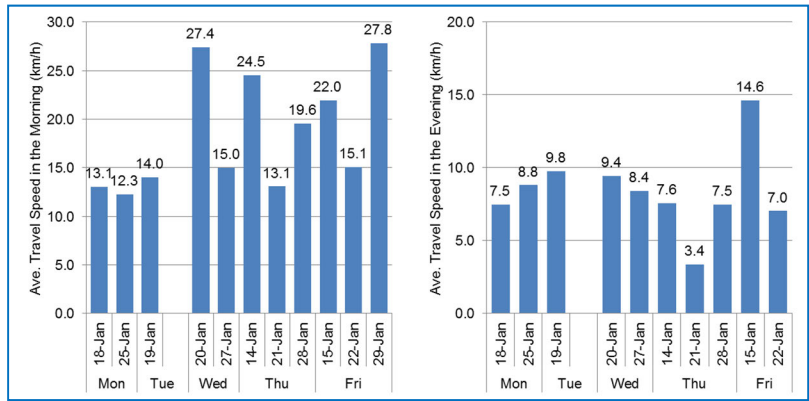


Figure 2-27 Low Speed Point based on Travel Speed Survey in June-August 2015

2.4.4.5.4 Traffic conditions by the travel speed of vehicle are fluctuated by time and day because of inconstant traffic demand and flows, subjected to traffic control at junction/roundabout, incidents including broken-down vehicle or VIP traffic. Figure 3 20 shows the average travel speed in morning and evening peak for two weeks. In morning peak around 8:00 – 8:30, average travel speed is fluctuated between 12 – 27 km/h based on travel speed survey. In evening peak travel speed is fluctuated between 3 – 15km/h.



Sample Route



Hourly Speed Variation

Figure 2-28 Average Travel Speed in Peak

2.4.4.5.5 A spatial fluctuation of traffic flow is also recognized as a result of the travel speed survey on the alternative routes as shown in Figure 2-30. According to the result of travel speed survey between Clock Tower and Cemetery near Ministry Works and Ministry of Land carried out in 2013, average travel speeds of Kampala - Entebbe Rd. – Jinja Rd. and Mukwano – Nsabya Rd. are quite different by day. Average travel speed of westbound via Mukwano – Nsabya Rd., especially, is more than 2 times of westbound via Kampala-Entebbe Rd. – Jinja Rd. for four survey days.

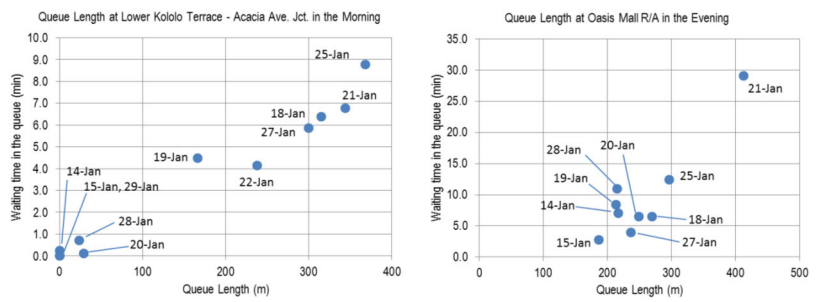
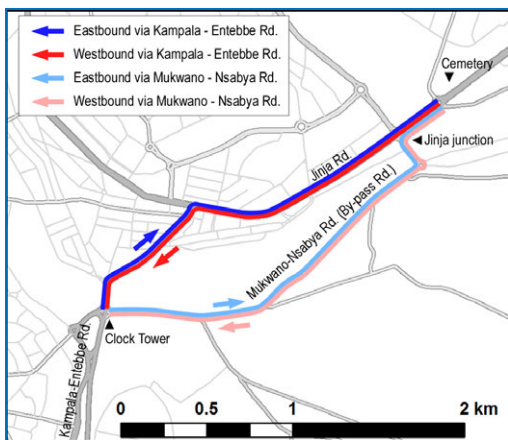
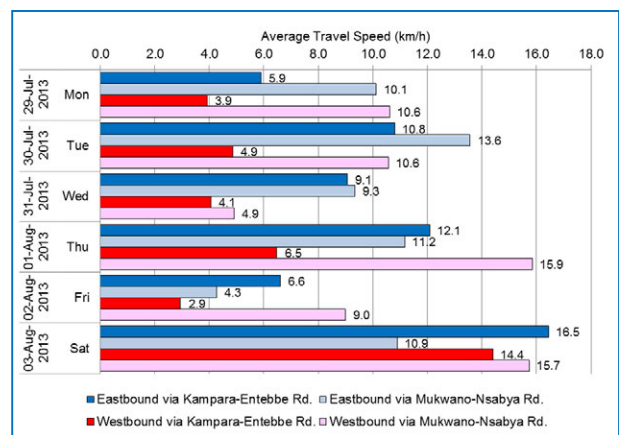


Figure 2-29 Queue Length and Waiting Time at Congested Junction (left: morning, right: evening)



Sample Route



Daily Variation

Figure 2-30 Results of Travel Speed Survey in PM Peak

2.4.4.5.6 In order to respond a spatial fluctuation of traffic flow, traffic signal timing design by each sub-area is not sufficient enough and the signal timing be designed by larger area which is desirable.

#### 2.4.4.6 Road Safety Infrastructures (as of 2016)

2.4.4.6.1 Signal is the major device to control traffic flow and it also contributes to improve of road safety. In other words, the effective provisions and uses make traffic flow optimum and safe which the UTMP focus upon.

2.4.4.6.2 Signalizations in Kampala were started in 1957. Since the year, 10 junctions have been signalized with various type of devices from different source (countries).

2.4.4.6.3 As seen, though these are all old, none of them are in function. Major reason of in functioning can be identified that no maintenance and support set-ups were insufficient.

2.4.4.6.4 Against a backdrop of the above, the Government of Japan arranged a series of the junction improvement projects including installations of signals under Japan's Grant Aid scheme. The project principals were to convert roundabouts to signalized junctions for the purposes of increase capacities and safeties at the junctions.

2.4.4.6.5 In 2015, KCCA decided to replace the signals which were installed in 1998 with the

Table 2-10 Signalization History in Kampala

	Junction Name	Inst. Year	Devise Origin	Failure on Year	Cause of Failure
1	Kampala/Entebbe	1957	India	NA	NA
		1972	Germany	1986	Destruction due to Civil War
		1986	India	1999	Failure on control panel due to fluctuation of electricity
2	Namirenbe/Luwum	1987	India	2003	Nocked by vehicle
3	Makerere Hill/Apollo Kagawa	1987	India	2003	Failure on control panel due to short circuit
4	Kampala Parliament	1957	UK	1986	Destruction due to Civil War
5	Kampala Burton	1957	UK	1986	Destruction due to Civil War
6	Kyagwe Road	2000	Germany	2001	Mechanical failure caused by adjacent construction work
7	Nakawa/Spear	1997	Germany	1998	NA
8	Udyum House/Jinja Road	1957	UK	1986	Destruction due to Civil War
9	Luwam Street/Burton	1957	UK	1986	Destruction due to Civil War
10	Nile Avenue/Sadi Barre		Germany	1986	Destruction due to Civil War

Table 2-11 Junction Improvement Projects in Past Japan's Grant Aid

	Jct. Name	Year	Operation	Lamp	Power Voltage
1	Wandegeya	1998	Replaced in 2015	Bulb	AC240V
2	Port Bell	1998	Replaced in 2015	Bulb	AC240V
3	Natete	1998	Replaced in 2015	Bulb	AC240V
4	Bakuli	2002	Operating	LED	AC100V
5	Kibuli	2002	Not operating	LED	AC100V
6	Clock Tower	2005	Operating	LED	AC100V
7	Shoprite	2005	Operating	LED	AC100V
8	Jinja	2005	Operating	LED	AC100V
9	Kampala/Entebbe	2005	Operating	LED	AC100V

demand driven type signals. Main reasons the replacement was a problem of spare parts that bulbs were no longer available in the market.

2.4.4.6.6 KCCA was in an opinion that the signals should be demand responsive while these provided in 1998 were phase fixed type that seems inappropriate in present Kampala.

2.4.4.6.7 KCCA lunched the KIIDP2 which includes junction and road capacity improvements with financial assistance of 175million USD by World Bank. The project aimed at removable of the traffic bottlenecks in the city road network. The project however did not include the junctions/roundabouts along the future BRT corridor as these were expected to be improved during the BRT project although these are more seriously congested than the selected junctions.

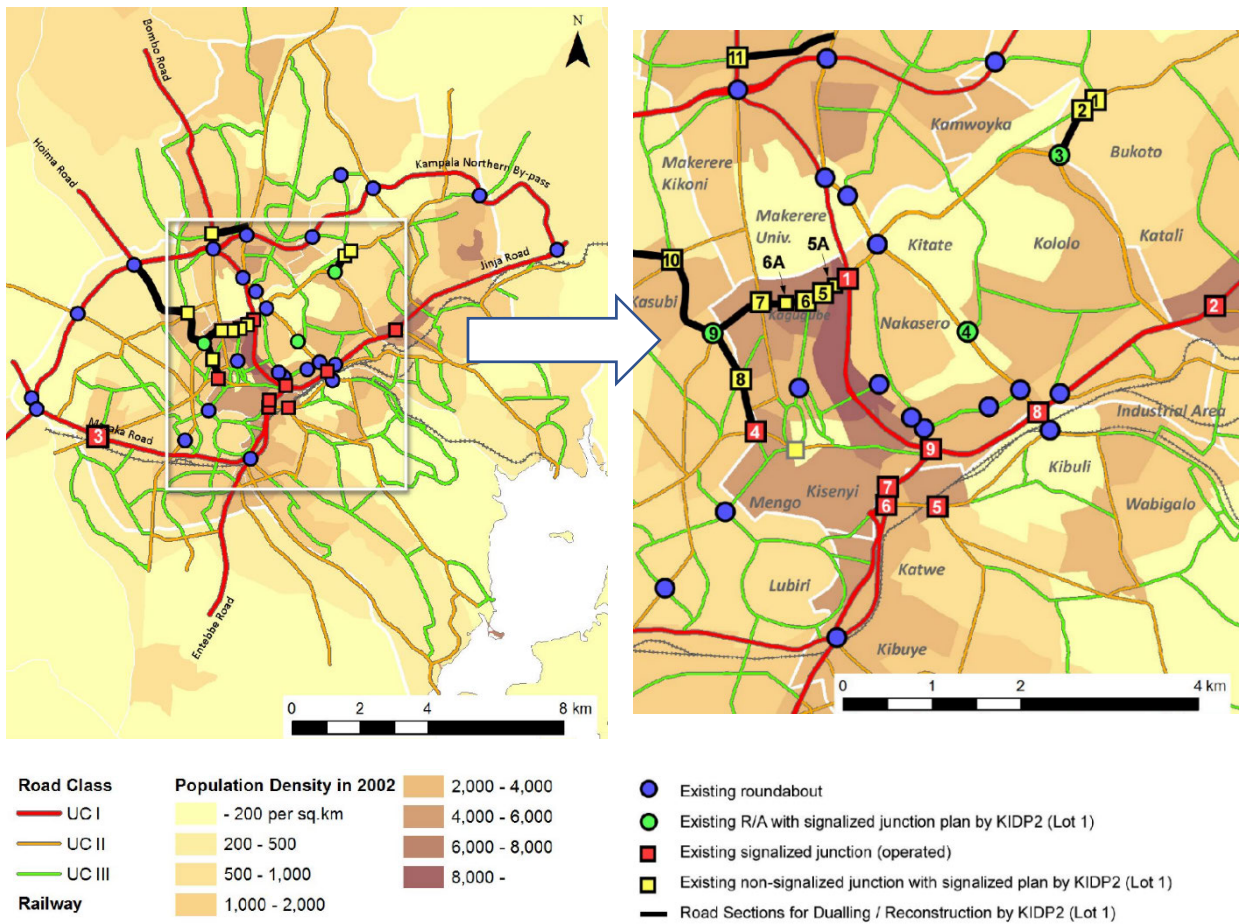


Figure 2-31 Existing Signalized Junctions and Roundabouts

2.4.4.7 Public Transport and Paratransit

2.4.4.7.1 Taxi (Matatu and Minibus) is the main mode of public transport in Kampala. A taxi is kind of a minibus which is licenced to carry up to 14 passengers. Usually every taxi starts from one of the old or new taxi parks, bound for different destinations. Most of the taxis are owned by individuals and the individual owners assign drivers to operate them and the drivers remit an

- agreed-upon amount of money on a daily, weekly or monthly basis.
- 2.4.4.7.2 However, some taxi owners actually drive one and assign the rest of the taxis to other drivers. This helps them in monitoring their taxi operations. Each taxi, upon registration, applies for a route which they wish to ply. This depends on how much money one would like to make as agreed upon with the taxi owner. There are a few designated taxi stops within the city, but the taxis will stop anywhere as long as a passenger would like to disembark, or to load a passenger if there is space in the taxi. Time is not a factor to these taxis and at designated stages; the taxis will not depart until they are filled to capacity. This leads a lot of time loss on the passengers' side (who actually don't seem to mind a lot about it). It should however be noted that for shorter distances, or at critical times, passengers will opt not to take the taxi, and use the faster and versatile bodaboda means.
- 2.4.4.7.3 Taxi fares vary from place to place. But the range is UGX500 for the shortest distance, to UGX 2,000 for the longest distance within the city. These fares are not fixed and they usually increase especially during the evening peak, and on days when it rains heavily as bodabodas cannot operate.
- 2.4.4.7.4 In order to mitigate the traffic congestion problem, KCCA introduced mass transport means by engaging private bus companies to run a bus system within the city. Pioneer bus, Awakula Ennume are two of the most prominent companies that are handling this system. The buses have a seating capacity of about 30~35 passengers and a standing capacity of 30, thus can each carry about up to 70 passengers at a go.
- 2.4.4.7.5 KCCA divided the city into 4 regions; Northern, Eastern, Southern and Western regions. Each region is to be run by the best bidder of any of the companies that apply to run that particular region. For example, the Eastern region is run by Pioneer Bus Company.
- 2.4.4.7.6 The bus fares are between UGX1,000 and UGX2,000. The bus system has been hugely welcomed by many people who work within, but reside outside the city, since the fares will not fluctuate during peak hours and even with heavy rains. For the beginning, only a few routes are being covered, with a view of rolling out the system to cover all the major routes leading in and out of the capital city.
- 2.4.4.7.7 Bodaboda (motorcycle taxi) is the other main modes of public transport in Kampala. It's the faster mode to use when passenger wants to get from one point to another in the shortest time possible. Bodabodas do not observe any traffic rules and takes any direction on the road as long as it's the shortest distance to their destinations. It is because of this same reason that bodaboda is also the most dangerous transport mode in Uganda.
- 2.4.4.7.8 Bodabodas have no fixed fare and thus the fare is determined based on one's negotiating power.

However, it should be noted that the smallest amount charged is UGX 1,000. The usual fares almost double or triple on the days when it rains so heavily. This is due to the fact that only a few of them are willing to risk riding through the murky waters that are always dangerous.

2.4.4.7.9 Safety while riding on a bodaboda is determined by how strict one is otherwise they are rushed through dangerous manoeuvres by the riders as they rush to pick as many customers as possible. Helmets are only worn by the bodaboda riders despite having laws that require each rider to carry an extra helmet to be worn by their passengers. A few safety-conscious passengers (especially foreigners) always carry their own helmets.

2.4.4.8 Freight Traffic Management

2.4.4.8.1 According to the manual traffic count survey under the Preparatory Survey on the Greater Kampala Roads Improvement Project in the Republic of Uganda (Flyover project), there are 3.4% heavy vehicles was counted at Jinja junction, 2.2% at Yusuf Lule Junction and 2.1% at Nsambya Junction. It means the concentration of heavy vehicles in the city centre was heavy.

2.4.4.8.2 The Statutory Instrument on the Restriction of movement of Heavy Goods Vehicles in the Capital City is being reviewed by the Transport Regulation Department in the Ministry of Works and Transport before it can be signed off by the responsible Minister.

2.4.4.8.3 According to this Statutory Instrument, the heavy goods vehicles can only enter the city only in the prescribed hours. Prescribed hours mean the times:

- Between 10:00PM and 6AM on Mondays to Fridays;
- Between 8PM and 7AM on Saturdays;
- Between 8PM and 7AM on public holidays falling on Mondays to Fridays; and

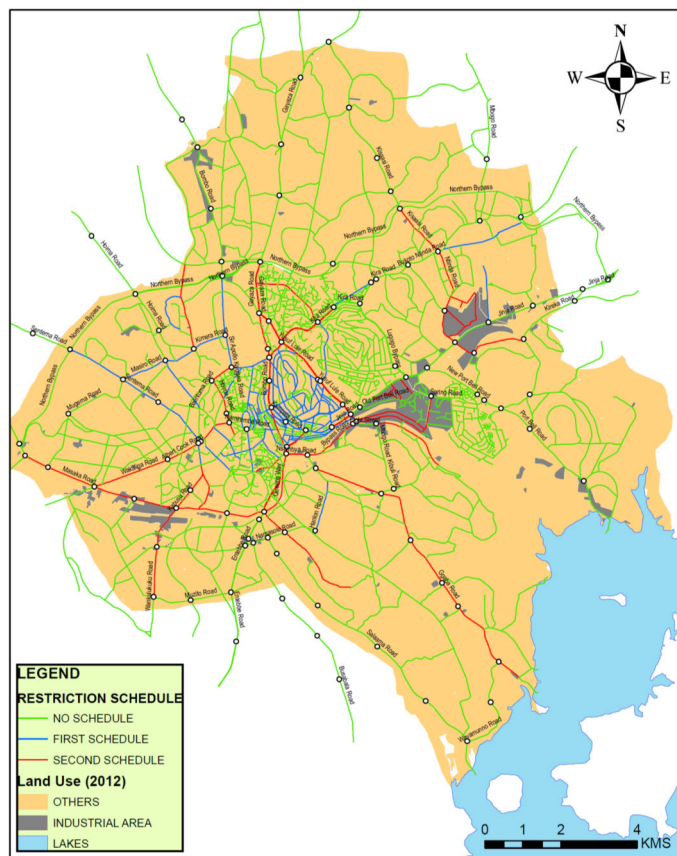


Figure 2-32 Restricted Roads for Heavy Vehicles in Kampala City

- At any time on Sundays

2.4.4.8.4 The roads are also divided into 2 schedules, the goods vehicle exceeding a Gross Vehicle Weight (GVW) of 12 tonnes or length of 10 metres whichever is applicable on the city roads specified in Schedule 1 cannot enter during day time. The goods vehicles exceeding 12 tonnes but less than 22.5 tonnes Gross Vehicle Weight (GVW) or 10 metres in length are not restricted on the City Roads specified in Schedule 2 at any time. However, no person shall use, drive or park a goods vehicle exceeding a Gross Vehicle Weight (GVW) of 22.5 tonnes or length of 16 metres whichever is applicable on the city roads specified in Schedule 2 except during the prescribed hours.

#### 2.4.4.9 Projection of Future Traffic

2.4.4.9.1 In the Study on Greater Kampala Road Network and Transport Improvement (Kampala Flyover Project), the PT production model and CT model was used for the previous JICA study known as NTMP/GKMA were adopted to maintain consistency with the master plan. PT production model considers population growth and number of employees as parameter for trip generation. This PT model is applied to passenger cars, buses and motorcycles. Growth rate derived from this model was recalculated using the latest data for population and employment.

2.4.4.9.2 As a result, the number of trips in 2018 was estimated as almost 0.95 million per day and in 2023 to be approximately 1.1 million per day.

2.4.4.9.3 Figure 2-33 shows the trip distributions for all purpose in 2010 and 2023. These distribution patterns were derived from the OD table calculated for traffic assignment model. The major trip flows are limited within Kampala City in 2010. Distribution pattern in 2023 is basically the same pattern as that in 2010. Only the share of external trips (through trips) will slightly expand because future population and employment outside Kampala City are expected to be developed.

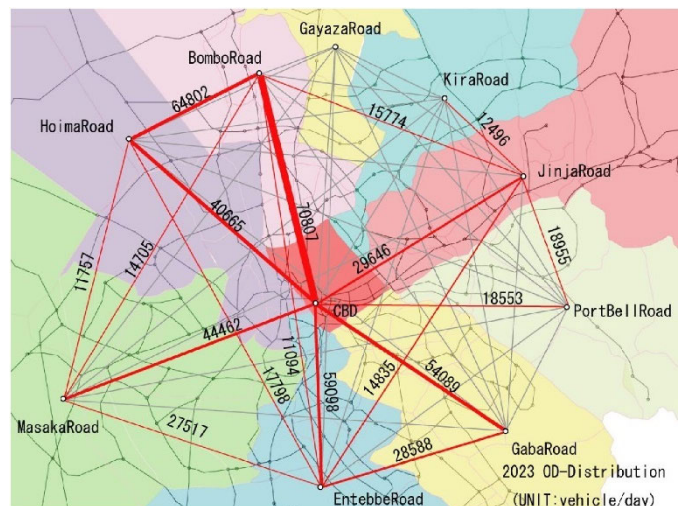


Figure 2-33 Estimated O-D Distribution (2023)

2.4.4.9.4 The future traffic assignment result of 2023 in the Flyover Project assumed that the Kampala Flyover and other ongoing major projects such as dual carriageways & Kampala-Entebbe Expressway are already completed and BRT pilot route is under operation. All the major roads

connecting to central Kampala are highly congested to accommodate more than 1.1 million trips in KCCA jurisdiction.

2.4.4.9.5 In Figure 2-34, the ratio of traffic volume and capacity is shown using the same results. Here it is observed that all the connections to Nakasero area is red means the V/C ratio is more than 1.5. Some of the major roads towards Central Kampala where V/C Ratio will be greater than 1.5 is observed are:

- Bombo Road
- Apollo Kaggwa Road
- Makerere Hill Road
- Nile Avenue
- Acacia Avenue
- Jinja Road
- Namirembe Road
- Kampala Road
- Queen’s Way

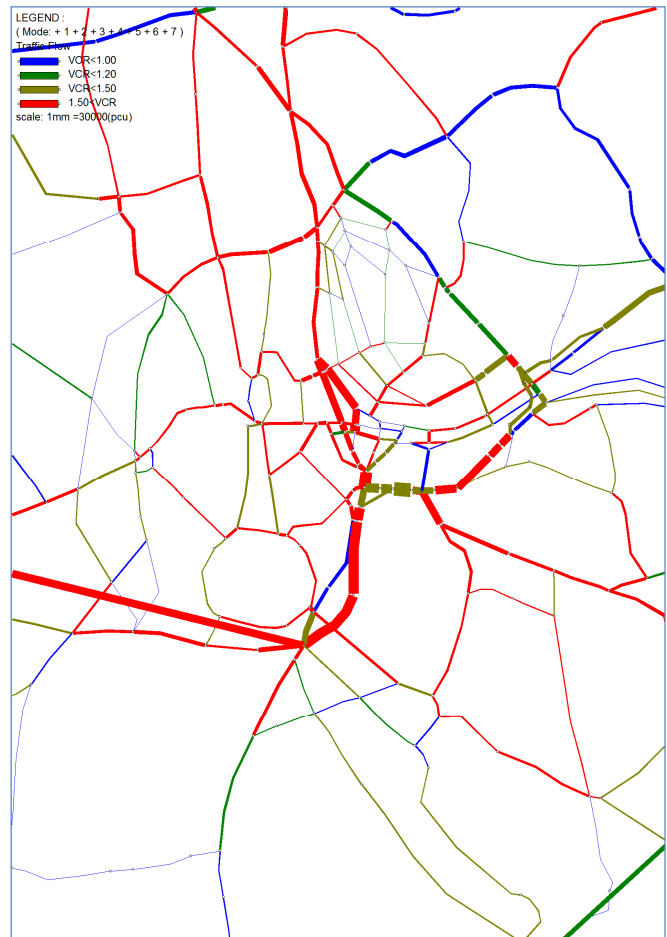


Figure 2-34 Volume Capacity Scenario of Future Traffic Assignment in Kampala (2023)

## 2.4.5 Traffic Issues

2.4.5.1 UTMP identifies issues on vehicular traffic in Kampala by aspects including Traffic Flow, Traffic Demand and Road Safety.

2.4.5.1.1 Issues related to the Traffic Flow are as follows,

- Gridlock/Deadlock phenomenon at roundabout and unsignalized junctions due to lack of discipline,
- Inadequate junction geometry, signage and road marking and poor maintenance,
- Inadequate distributions of transport node infrastructure (e.g. Bus Terminal),
- Interfering traffic flow by Boda-Boda and Heavy Vehicular Traffics due to lack of discipline

and proper enforcement,

- Traffic concentration at peak time and improper management to emergency vehicular traffics (e.g. Ambulance, VVIP),
- Inflexible signal phasing/cycle time without consideration of traffic growth and movement change,
- Inadequate parking policy and management (no requirement of nos. parking bays for new buildings)

2.4.5.1.2 Issues related to Traffic Demand are as follows,

- Traffic concentration due to radial road network and excessive traffic growth,
- Absence of reliable public transportation,
- No time management
- No practical regulation for land use (i.e. No new development control)

2.4.5.1.3 Issues related to Road Safety are as follows,

- Lack of discipline,
- Lack of education
- Insufficient infrastructure for pedestrian

## **2.4.6 Vision of UTMP**

2.4.6.1 The vision of KCCA is to have a vibrant, attractive and sustainable city in near future. Without proper traffic management, it is quite impossible, therefore the vision of the traffic management is set as to be a vibrant, attractive and sustainable city.

2.4.6.1.1 Vibrant city: The traffic management system will be in proper order and people living in this city as well as the tourists will feel comfort to move in different places.

2.4.6.1.2 Attractive city: Kampala is selected as the most comfortable city in East Africa ahead of Nairobi, Kigali and Dar es Salam, according to the latest quality of living survey of the world's top 230 cities by Mercer, a global development consulting agency based in New York, US. As the population is increasing every year, it should have proper traffic management in order to keep its charm as an attractive city.

2.4.6.1.3 Sustainable city: Whatever the projects are carried on in Kampala it should be sustainable in the long run. The traffic management plan should also be administered in a sustainable way. This

plan will provide the guidance for the future sustainable transport management by KCCA.

## 2.4.7 Strategy of UTMP

2.4.7.1 Planning Strategy of the UTMP is decided to achieve 3S, “Smooth Flow”, “Safety” and “Shifting Demand” by improving 3E, “Engineering”, “Enforcement” and “Education”.

2.4.7.2 In order to realize this strategy, the planning approach is set as shown in Table 2-12.

Table 2-12 Planning Approach Matrix of UTMP

		Management Approach		
		Engineering	Enforcement	Education
Management Target	Smooth Flow	<ul style="list-style-type: none"> <li>✚ Preparation of Road/junction Design Standards</li> <li>✚ Junction Geometry improvement</li> <li>✚ Signalization</li> <li>✚ Central Traffic Control</li> </ul>	<ul style="list-style-type: none"> <li>✚ New Regulation for Vehicular Traffic</li> <li>✚ Strengthening of Banning Heavy Vehicle Free (Time )Zone</li> <li>✚ One Way Traffic</li> </ul>	<ul style="list-style-type: none"> <li>✚ Preparation of Official Road Safety Book</li> <li>✚ Promoting Road Safety Education Curriculum</li> <li>✚ Regular Traffic Safety Campaign</li> <li>✚ Review of Driver License System</li> </ul>
	Safety	<ul style="list-style-type: none"> <li>✚ Improvement of Miscellaneous Road Infrastructure (i.e. Signage, Road Marking)</li> </ul>		
	Shifting Demand	<ul style="list-style-type: none"> <li>✚ Support and Encouragement for Improvement of Service Standard of Pubic Transport</li> </ul>	<ul style="list-style-type: none"> <li>✚ Priority to Public Transport</li> <li>✚ Boda Boda Free Zone</li> </ul>	<ul style="list-style-type: none"> <li>✚ Improvement of Public Relation for Demand Management</li> <li>✚ Capacity/Skill Development in Transport Planning for KCCA</li> </ul>

## 2.4.8 Management Plan

2.4.8.1 Based on 3S-3E planning approaches, 6 management plans have been proposed in this UTMP. Those are:

- MP1 Bottle-Neck Removing Plan: To realize smooth traffic flow with engineering approach.
- MP2 ITS utilization plan: To realize smooth traffic flow with providing information to drivers.

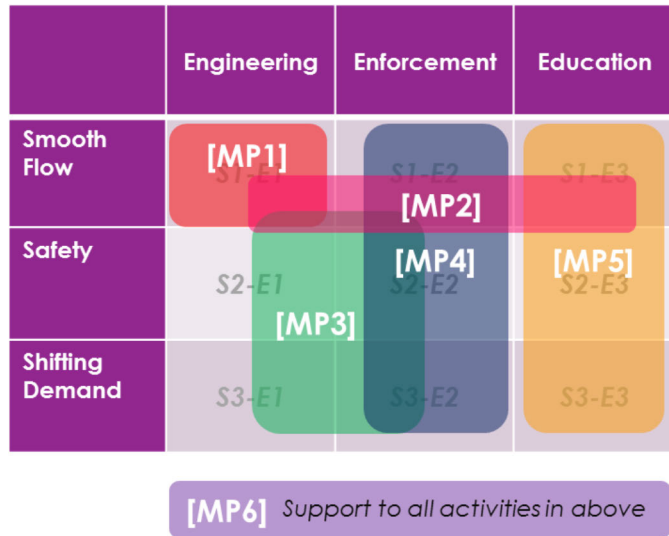


Figure 2-35 3S-3E Approach for Proposed Management Plans

- MP3 Peak Demand Movement Plan: To reduce peak traffic demand by various enforcement and engineering solutions.
- MP4 Enforcement Strengthening Plan: To ensure safe, efficient traffic flow condition by proper enforcement program.
- MP5 Public Involvement/ Awareness Plan: To educate road users for safety environments, efficient driving and reasonable modal choice.
- MP6 Creating Sustainable Funding Plan: To ensure all activities of MP1 to MP5 by dedicated financial resources.

2.4.8.2 For each of the Management Plans tentative proposals are prepared with activities and schedule over 6 years fiscal year. The detail of tentative plan is described below. Details about the activities are described in the following sections



- Table 2-14. Existing traffic signals in Kampala are classified into pre-timed multi timing plan and responsive control

with infrared vehicle detector. Pre-timed multi timing plan is adopted by Japanese grant's signals which selects adequate signal pattern from prepared signal patterns in accordance with time and day. Responsive control with infrared detectors is adopted by replaced traffic signals by KCCA which selects adequate signal pattern from prepared signal patterns in accordance with actual traffic flow. Both type of signal control requires tuning of pre-timed signal timing plan such as cycle length and signal phases which consists of combination of allowed traffic movement in green, length of green, yellow and red in accordance with actual traffic flow in the junction.

Table 2-14 Type of Traffic Signal Control Method

	Single Timing Pattern	Multi timing plan (Time of day)	Responsive control	Adaptive control
			SCOOT, SCATS, MODERATO etc.	
Number of signal timing plan	Single pattern		Multi pattern	
Vehicle detector	Not required		Required (Vehicle Actuated Control)	
Switch of signal timing plan	None	Time and day	Vehicle detection	
Signal timing plan	Pre-timed (prepared in advance)			Actuated

Table 2-15 Advantage and Disadvantage of Traffic Signal Control

	Advantage	Disadvantage
Single timing plan control	<ul style="list-style-type: none"> <li>Simplest.</li> <li>Suitable for fail-safe in local controller.</li> </ul>	<ul style="list-style-type: none"> <li>Effective for traffic demand in certain range only.</li> </ul>
Multi-timing plan (TOD)	<ul style="list-style-type: none"> <li>Effective if daily traffic demand is not varied.</li> <li>Able to cope with variation by day of the week.</li> <li>No detector is required.</li> <li>Can be incorporated in local controller (control center is not required).</li> </ul>	<ul style="list-style-type: none"> <li>Not effective if traffic demand diverges from daily pattern.</li> <li>Requires periodic update for long term change in demand pattern.</li> <li>Requires clock and calendar particularly for coordinated operation.</li> </ul>
Responsive control	<ul style="list-style-type: none"> <li>Able to cope with different traffic conditions if timing plans for such condition are prepared in advance.</li> <li>Less number of vehicle detectors required than adaptive control.</li> <li>Easy to operate in comparison with adaptive control.</li> </ul>	<ul style="list-style-type: none"> <li>Cannot response to sudden traffic change.</li> <li>Cannot adapt to gradual change in traffic over time.</li> <li>Requires periodic review and updating of timing plans.</li> </ul>
Adaptive control	<ul style="list-style-type: none"> <li>Most efficient signal operation if properly tuned.</li> <li>Fast response to unexpected change of traffic condition.</li> <li>Possible to withstand gradual change in traffic over time.</li> <li>No need to prepare many timing plans.</li> </ul>	<ul style="list-style-type: none"> <li>Does not work under saturated traffic condition.</li> <li>Requires experts to operate and maintain.</li> <li>Requires large number of vehicle detectors.</li> <li>Considerable number of parameters to be set and adjusted.</li> </ul>

- Traffic signal control technology is classified into following three (3) types, namely, isolated control, coordinated control and area traffic control (ATC), in terms of the number of traffic signals controlled and their configuration.

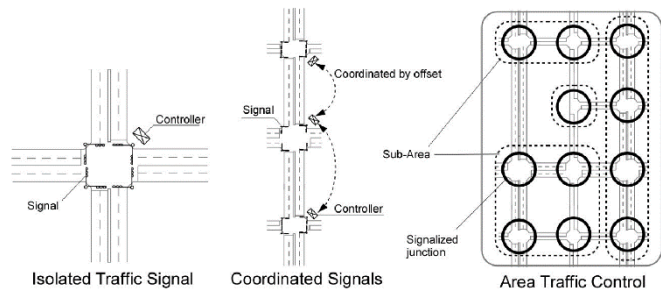


Figure 2-36 Types of Traffic Signal Configuration

2.4.9.1.4 To achieve smooth traffic flow on the trunk roads in urbanized area, the coordinated signal or the area traffic control is recommended. The coordinated signal control is applied to a group of

signalized junctions in the target area to provide green wave for drivers by using offset.

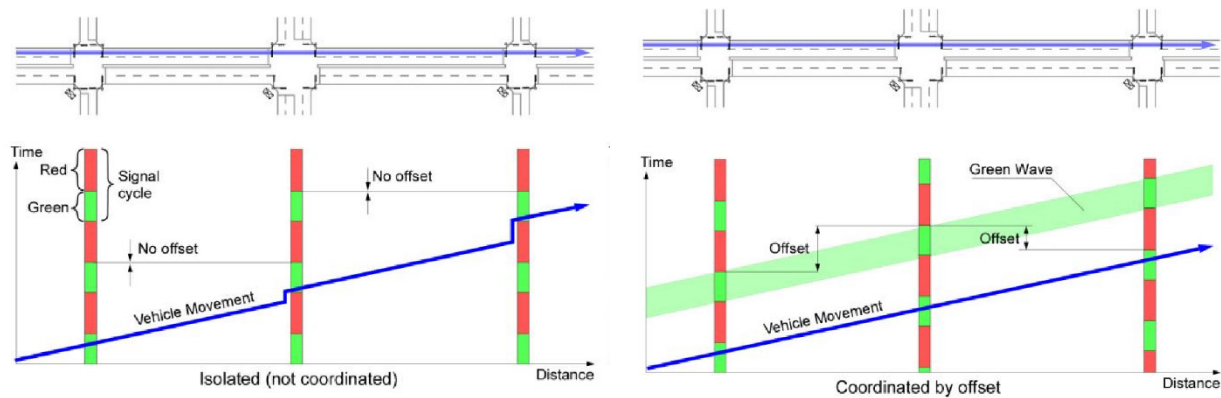


Figure 2-37 Coordinated/Not Coordinate Signal Control by Offset

- In Kampala, fluctuation of traffic flow by time and day and spatial fluctuation are observed occasionally. To manage properly fluctuated traffic flow, traffic signal control by Area Traffic Control (ATC) system is expected.

2.4.9.1.5 **MP 1-4** Pilot Project for ATC: In order to check the reliability of theory of ATC, The Expert team and the C/P came up an idea of the Pilot Project containing small scale traffic control system in order for KCCA to be trained in operation. It is proposed to have a pilot project by installing ATC in a certain road section which is comprised of more than 5 junctions. With experience from the small scale system, KCCA can realize what is necessary in terms of institutional, human resources and budgetary arrangements for full scale Central Control System. It is also expected to avoid miss-selection of the system. Details about the pilot project will be described in Immediate Action Plan.

2.4.9.1.6 **MP 1-5** Area-wide Traffic Control (ATC) Installation:

- The proposed area for traffic signal management by ATC is shown in Figure 2-38. Major junctions outside of proposed ATC area are proposed to install isolated or coordinated signal control.

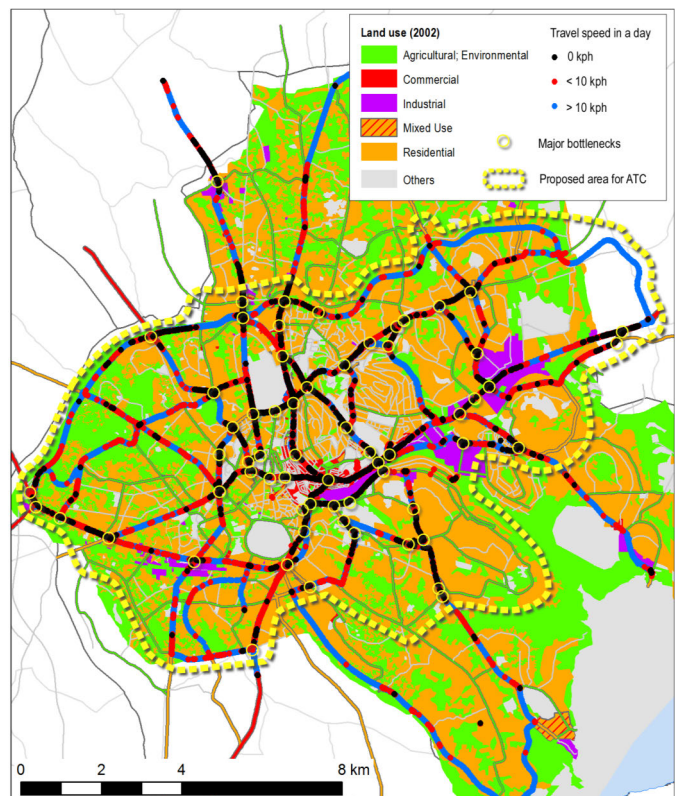


Figure 2-38 Proposed Area for ATC

- In mega cities, Area Traffic Control (ATC) is common approach which requires smart technologies and sophisticated devices. Publicity of traffic information is also common in the developed countries and its communication was conventionally radio and television which have less advantage of immediacy. As satellite communication progresses, Intelligent Transport System (ITS) is developed making user device possible to acquire real time information as user demands.

2.4.9.1.7 Figure 2-39 shows Proposed Signalized Junctions Controlled by ATC Phase 1. The Phase 1 covers 109 junctions which has been identified as high priority.

2.4.9.1.8 Phase 2 covers 162 junctions shown in Figure 2-40

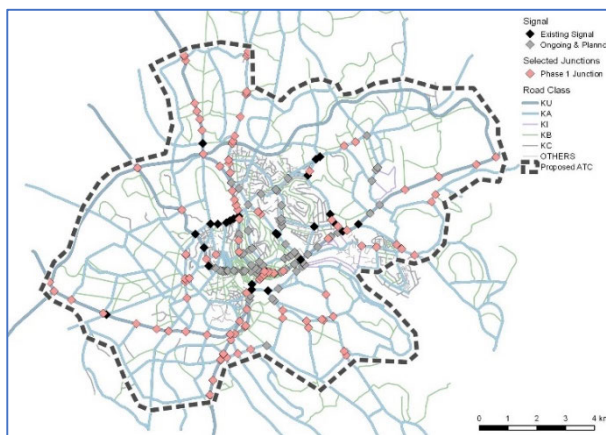


Figure 2-39 Proposed Signalized Junctions Controlled by ATC Phase 1

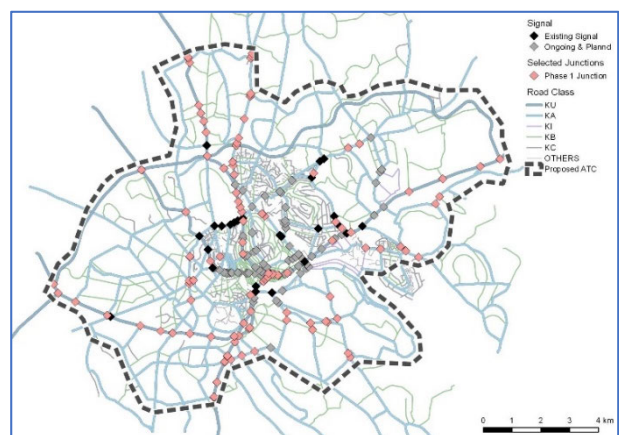


Figure 2-40 Proposed Signalized Junctions Controlled by ATC Phase 2

2.4.9.1.9 To manage and control traffic flow effectively in certain area, ATC is recommended. Basically, ATC manages a group of traffic signal junctions, called “sub-area” which has similar profile of traffic flow such as same peak period. ATC is controlled by vehicle actuated, namely, responsive signal control or adaptive signal control system which requires vehicle detectors. In general, ATC requires central computer in the control centre to select adequate signal timing in the case of responsive signal control or generate optimized signal parameters in the case of adaptive signal control. The methodology of optimization of traffic signals by sub-area is depends on the traffic signal system such as SCOOT, SCATS and MODERATO.

2.4.9.1.10 To manage traffic fluctuations of traffic demand caused by time, weather and incident, adaptive signal control is recommended. Adaptive signal control generates traffic signal parameters in accordance with actual traffic situation and it is able to cope with sudden incident rather than responsive control based on the pre-timed signal plan.

2.4.9.1.11 Considerable inbound traffic in morning peak and outbound traffic in evening peak on radius arterial road are considered causes of traffic congestion in Kampala. In general, ATC optimizes

traffic signal parameters by sub-area which is a group of several signalized junctions with similar traffic profile, and coordination of sub-areas along radius arterial roads is expected to reduce delay and waiting time at junctions. The coordination between sub-areas should be modifiable in accordance with traffic pattern such as morning peak, evening peak, off-peak on weekday and holiday.

2.4.9.1.12 In consideration of all the factors, it is highly recommended to install MODERATO type area traffic control in most important junctions Kampala.

2.4.9.2 **MP 1-3** Establishment of Central Traffic Control Centre (CTCC)

2.4.9.2.1 In order to control all the signals of Kampala Central Traffic Control Centre (CTCC) is needed. All the signals need to supervise from the centre and proper algorithm should be delivered. In addition, during emergency like VIP movements, ambulance or fire brigade the signals can be controlled according to the needs from this centre.

2.4.9.2.2 At this moment, CTCC can be established focusing traffic signal controls and disseminating messages to the users by internet to mobile phone or variable message signs etc. In future, it can be expanded and use for many other purposes such as, parking control, toll collection for city roads, and priority for BRTs etc. In addition, various relative traffic data such as, traffic volume data, accident data also can be collected which will be very useful for traffic planning in future and can save a lot of time and cost of additional surveys.

2.4.9.2.3 To have some preliminary idea of set up cost and O&M cost of CTCC it is assumed that out of 500 junctions, in the first phase app. 200 most important junctions will be controlled under CTCC. App. 50 junctions out of 200 junctions will be controlled by MODERATO technology and adaptive type control will be installed at the rest of 150 junctions.

2.4.9.2.4 Vehicle detectors will be placed at 300m intervals of the 200km length of the management area. This gives us about 665 detectors for one direction this about 1300 detectors

when considering both directions at any given junction for the Adaptive control system. For the MODERATO system, 3 detectors will be places at each leg of all the 50 junctions thus 600

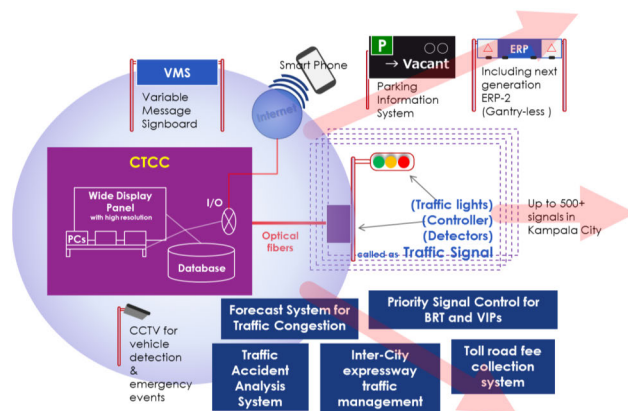


Figure 2-41 Future Expansion Plan of CTCC Related Functions

- detectors. This gives us a total of about 1900 detectors for the 200 essential junctions.
- 2.4.9.2.5 Variable Message Signboard (VMS) will be placed at 21 different locations, i.e. 2 VMSs on 8 major corridors (16) and 5 for CBD. Closed Circuit Television (CCTV) cameras will be placed at 26 locations. 21 will be mounted on each of the VMSs (21 cameras) and 5 at important junctions for VVIP (5).
- 2.4.9.2.6 The estimated annual CTCC operations cost has been placed as \$1,120,000 (One million, one hundred twenty thousand dollars).
- 2.4.9.2.7 The CTCC might also need outsourcing of some services and the estimated figure has been put at \$550,000 (Five hundred fifty thousand dollars) per year.
- 2.4.9.3 **MP2** ITS utilization plan
- 2.4.9.3.1 **MP 2-1** Research on necessary information to be provided: Intelligent Transport Systems (ITS) is a soft measure to alleviate traffic congestion using Information Communication Technology (ICT). ITS includes various types of services such as Electric Toll Collection (ETC) system, information providing of road congestion or public transport operation in real time. Road congestion information is, especially, useful to alleviate traffic congestion by staggered commuting or dispersion to alternative routes. As ITS is a vast area, it is necessary to research over what are the required items for Kampala at this stage.
- 2.4.9.3.2 **MP 2-2** Research on data collection and processing: In relation to MP2-1 it is necessary to identify the required data collection and processing. At this stage, how the data will be processed is also necessary to decide. Due to technical advance concerning ICT, considerable people including vehicle driver and public transport user have mobile phone and enable to access to information provided through internet. Thus, data collection and data processing for information providing are considered critical issues to realize ITS service.
- 2.4.9.3.3 **MP 2-3** Integration to ATC centre: Some of ATC products have optional ITS system in accordance with their ATC system, therefore, expected services of ITS such as traffic congestion information providing should be considered and discussed simultaneously with ATC.
- 2.4.9.4 **MP3** Peak Demand Movement Plan
- 2.4.9.4.1 **MP 3-1** Road Pricing and other area restriction managements: Some countries like Singapore where the road is very much limited, to control the peak hour traffic road pricing are in practice. At this process, the driver needs to pay certain amount in order to use some specific roads in peak hour. KCCA is in a process to collect toll from the commercial vehicles which will use KCCA roads in future. However, it is also necessary to control general traffic to enter the city

road pricing can be applied for certain roads or not.

- 2.4.9.4.2 **MP 3-2** Time management (Flexible office hours): In order to manage the peak demand in city centre one of the widely used options can be introducing flexible office hour. Some of the options can be-
- Government offices also can propose flexible office hour considering the role. For example, ministries can be opened from 8:30AM and service oriented government organization like KCCA can continue from 8:00AM.
  - Private offices can be operated from 9AM to 6PM
  - Banks can be opened from 10 AM
  - Schools can be opened from 7AM and closed 3PM
- 2.4.9.4.3 **MP 3-3** Parking management for Park & Ride: This is to discourage the people who drive their car from far end to city centre. They can park their car outside the city centre where the parking fee will be minimal and ride the public transportation system.
- 2.4.9.4.4 **MP 3-4** Ride sharing: As the public transport system is not developed in Kampala, this option can be proposed in order to decrease the demand in peak hour. If from same area 3-4 persons are commuting to city centre, they can share the car and share the cost as well.
- 2.4.9.4.5 **MP 3-5** Improvement of NMT environment: To get rid of traffic congestion it is necessary to encourage the residents not to use car always. To encourage them to walk or use bicycle to travel short distances it is necessary to improve the walkways with comfortable and usable for all people.
- 2.4.9.5 **MP4** Enforcement Strengthening Plan
- 2.4.9.5.1 **MP 4-1** Traffic signal violations: In order to encourage the users to trust the traffic signals, it is also quite important to have proper enforcement against those who violates traffic signals.
- 2.4.9.5.2 **MP 4-2** Time violation by HGVs: As HGVs are identified one of the issues of traffic flow once the Statutory Instrument is approved law and enforcement should be strict against all the time violators.
- 2.4.9.5.3 **MP 4-3** Violation of driving: Enforcement should also be strong against all other violation such as illegal stopping, sudden lane changing, not to give-way at roundabout etc.
- 2.4.9.5.4 **MP 4-4** Illegal parking: As in Kampala roads are limited and there are in-street parking facilities on some roads, illegal parking worsens the capacity of the road. Therefore, it is also urgent to

put strong enforcement against illegal parking.

- 2.4.9.5.5 **MP 4-5** One-way Traffic Flow: It was observed that deadlock phenomenon is occurred more frequently in roundabouts and the non-signalized junctions. One of the ideas to reduce traffic flow from different directions is to propose some roads as one-way and observe the traffic flow situation over the area. It is highly challenging as to propose one way traffic advanced public meetings and PR activities should be done. In addition, when it will be implemented, enforcement should be ensured against the rule violators.
- 2.4.9.5.6 **MP 4-6** Strengthening of TIA Process: The decision on which developments should undertake TIAs should be made by transport engineers/planners from the transport planning team in KCCA, and not by architects/urban-planners/etc. in the Draft Project Proposal. A legal framework should be set up that allows for developer contributions towards measures by KCCA to mitigate the former's impacts on the highway network.
- 2.4.9.6 **MP5** Public Involvement/ Awareness Plan
- 2.4.9.6.1 **MP 5-1** Road safety awareness campaign: In order to increase the safety awareness of the residents it is a good strategy to arrange the road safety awareness campaign in regular basis in important locations of Kampala. The schools, Central Business District Area, Pilot project locations can be the primary targets which can be expanded to all over Kampala.
- 2.4.9.6.2 **MP 5-2** Media campaign: As KCCA is very much active in social media like Facebook and Twitter, it is not a bad idea to receive the complaints directly from the users and solve this within shortest possible time. Moreover, to check the public opinion regarding any new issues it can be post first and receive the comments from the city dwellers.
- 2.4.9.6.3 **MP 5-3** Traffic congestion map (statistical, real-time): As now a good percentage of residents are using smartphone, anybody can share the traffic congestion information via internet and using the participatory information the congestion map of Kampala can be updated real time basis. Already there are some activities in some countries like Indonesia and Bangladesh.
- 2.4.9.7 **MP6** Creating Sustainable Funding Plan
- 2.4.9.7.1 **MP 6-1** Dedicated funds for traffic signal control and ATC operation:
- When there is a special requirement for addition funding for newly developed system or established facilities, URF will allocate more budget in addition to 20 billion UGX. For example, KCCA already requested URF for the maintenance budget of Kampala Flyover which is now under construction. KCCA requested to prepare 2 types of budget: routine maintenance (yearly) and periodic maintenance (every 5 years).

- However, in order to create a sustainable and self-depending Transport Management Body, Transport Department of KCCA should have its own way of fund management. It is necessary to create sustainable dedicated funding for traffic signal control and ATC operation for its proper operation. If the control centre stops for a single day, the traffic flow will be much worse than at present. Therefore, KCCA cannot afford to stop the operation for a single day.

2.4.9.7.2 **MP 6-2** Dedicated funds for road maintenance: In order to ensure proper traffic flow roads should be maintained regularly. This not only elevates the traffic flow, but also acts as a positive factor to enhance traffic safety. Therefore, dedicated fund also need to ensure proper road maintenance including signals, road surface, signage, markings etc.

2.4.9.7.3 **MP 6-3** Trials for new type of revenue related to traffic management:

- Regarding the possible source of funding in order to accommodate the operational and maintenance cost of central traffic control system, KCCA can request for additional budget from URF. If URF is unable to ensure the required budget KCCA's Non-Tax Revenue also can be used.
- KCCA is going to collect commercial road users' fee from the commercial vehicles operating within or transiting through the Kampala city area under Commercial Road Users Regulations (2015). In addition, KCCA is also collecting parking fees and advertisement fees from the city dwellers.
- Engineering Department may request to use certain portion of the total revenues collected from transport oriented facilities or total revenues of any of these sectors for the central traffic control system.
- As central control system will also be used to identify the violation of traffic laws, the fine supposed to be collected from those offenders can also be secured as earmark fund for the central traffic control system. Some of potential revenue earning methods are:

■ **HVGs using KCCA roads**

■ **Revenue earned by VMS**

■ **Introducing modern parking system**

■ **Revenue from bus/ taxi/ bodaboda route permits**

■ **Revenue from Advertisement related with Transport Service permitted by KCCA**

## 2.4.10 Urban Traffic Management Plan Seminar

2.4.10.1 Eng. Kawaguchi, Urban Road Planning Expert gave a seminar for Urban Traffic Management to KCCA Engineers on 15<sup>th</sup> June 2015.

2.4.10.2 The seminar has introduced the case studies of urban traffic flow management in various countries and studied traffic management measures that could be applicable in Kampala.



Photograph 2-4 A Scene of Urban Traffic Management Plan Seminar at KCCA



Figure 2-42 Some Presentation Slides for Urban Traffic Management Plan

Table 2-16 List of Participants of the Urban Traffic Management Plan Seminar

Lecturer		KCCA	
Name	Position	Name	Position
Eng. Hirohisa Kawaguchi	JICA Expert	Eng. Jacob Byamukama	Manager, Directorate of Engineering and Technical Services
		Eng. Joel Wasswa,	Transport & Traffic Management Engineer
		Mr. Adam Ssenooba	Transport Planning & Traffic Management officer
		Ms. Fortunate Biira	Transport Planning & Traffic Management officer
		Mr. Leonard Mwesigwa	Transport Planning & Traffic Management officer

### 3 ACTIVITIES RELATED TO [OUTPUT 2]: THE CAPACITY FOR JUNCTION IMPROVEMENT DESIGN ENHANCED

#### 3.1 EXISTING TRAFFIC CONDITION STUDY AND SURVEY

##### 3.1.1 Traffic Assignment in GKMA Network

3.1.1.1 KSTP was shared Traffic Assignment Study Result by JICA Study Team for Preparatory Study on the Greater Kampala Roads Improvement Project. It was only the study grubbing the network traffic and capacity in GKMA. Traffic Assignment Map was shown in

3.1.1.2 An interesting finding was that despite large traffic volume in CBD, the network capacity was still large enough to accommodate exiting traffic according to the traffic assignment result.

##### 3.1.2 Travel Speed Survey in 2015

3.1.2.1 Travel speed identifies the congested road section and also gives quick identification of traffic bottleneck in the network. The travel speed survey therefore has been conducted covering major road network consisting UCI, UCII and UCIII roads according to KCCA's classifications. The survey road length was approximately 309 Kilometer.

3.1.2.2 The survey details are as follows,

- Survey Period: 1st May to 31st July 2015
- Survey day: Monday to Friday (Data on Monday and Friday was processed separately)

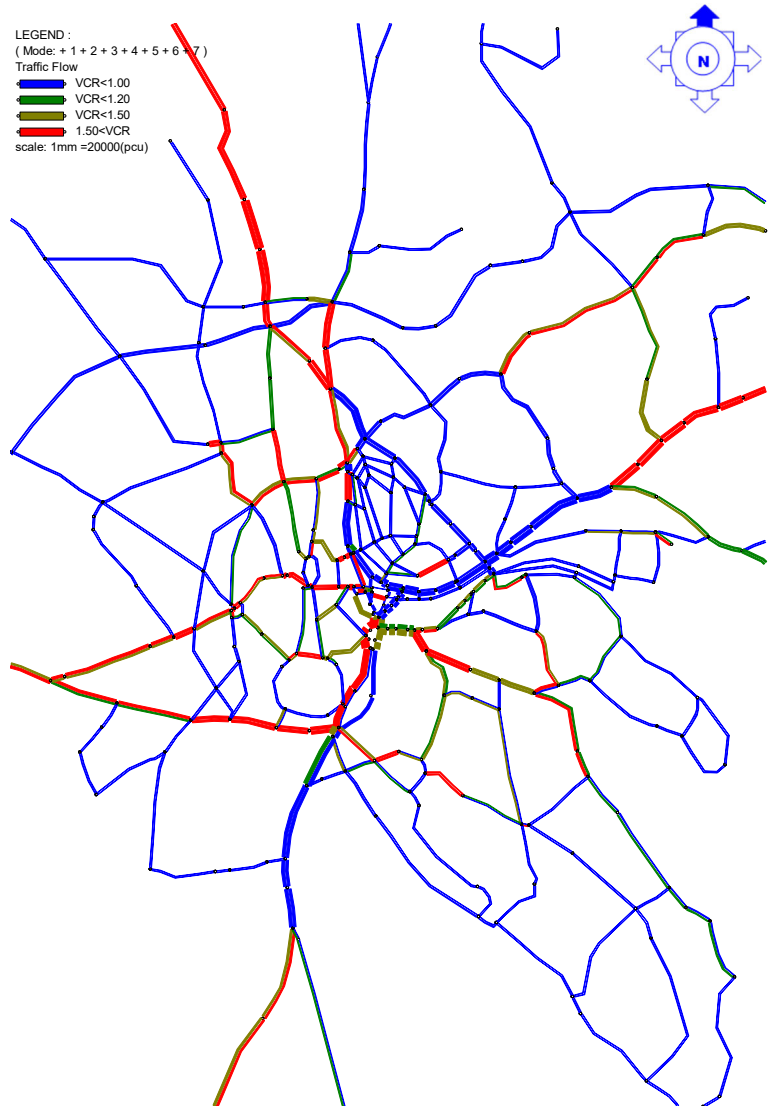


Figure 3-1 Traffic Assignment in GKMA Network

The travel speed survey therefore has been conducted covering major road network consisting UCI, UCII and UCIII roads according to KCCA's classifications. The survey road length was approximately 309 Kilometer.

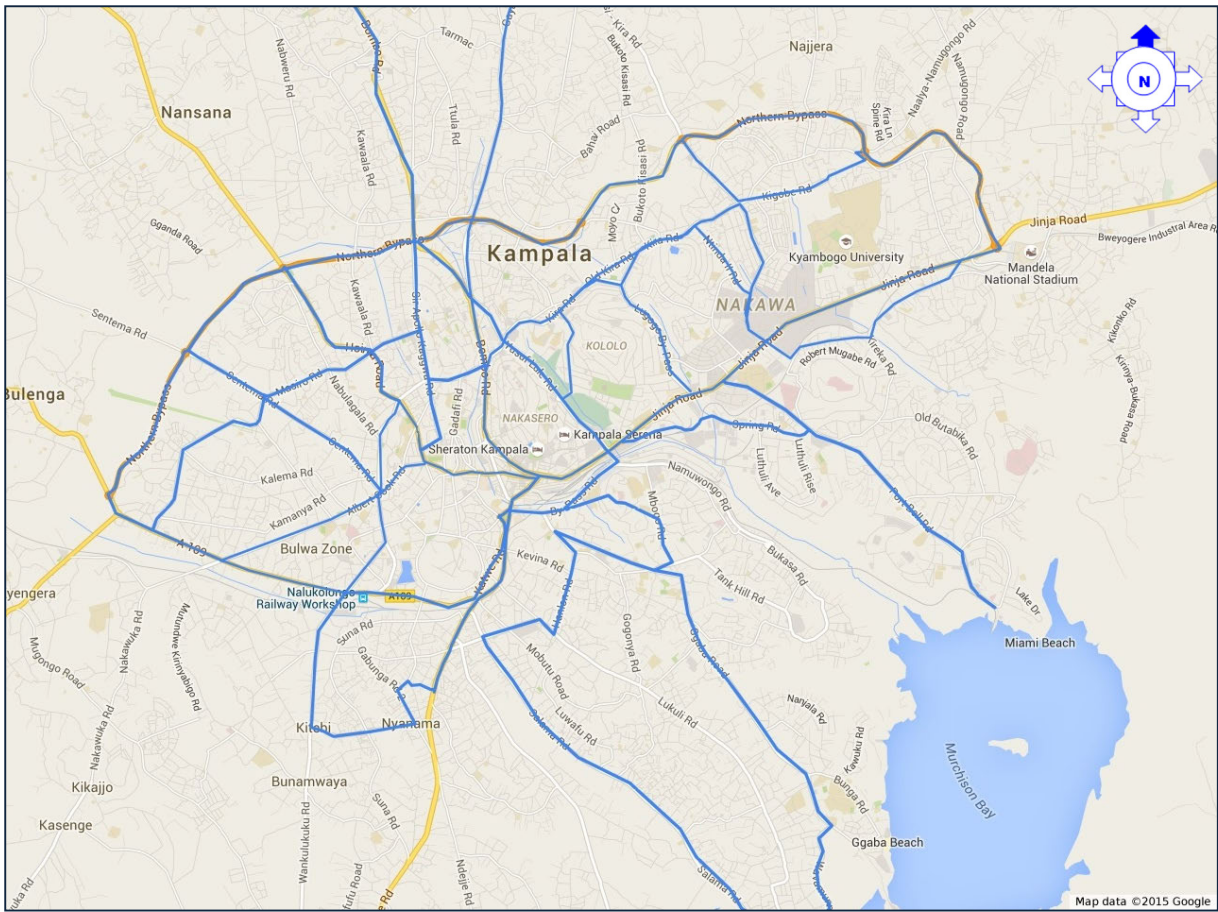


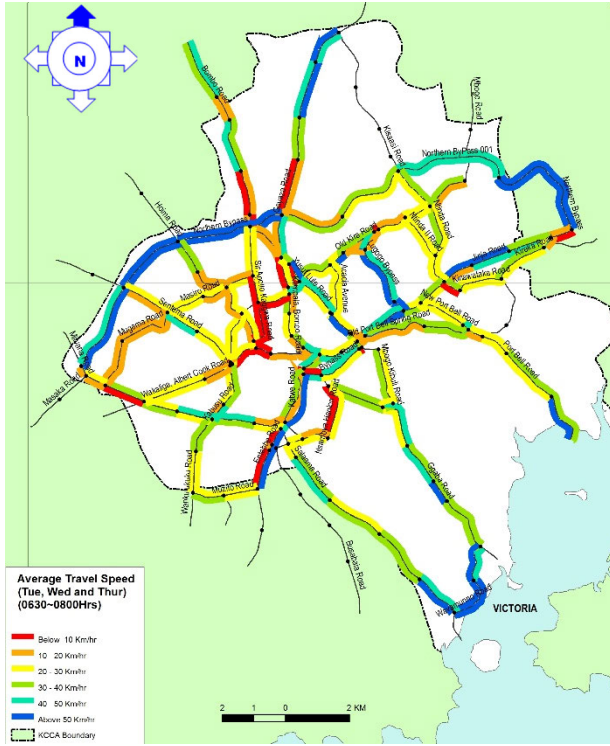
Figure 3-2 Travel Speed Survey Route

Table 3-1 Surveyed Length by Divisions

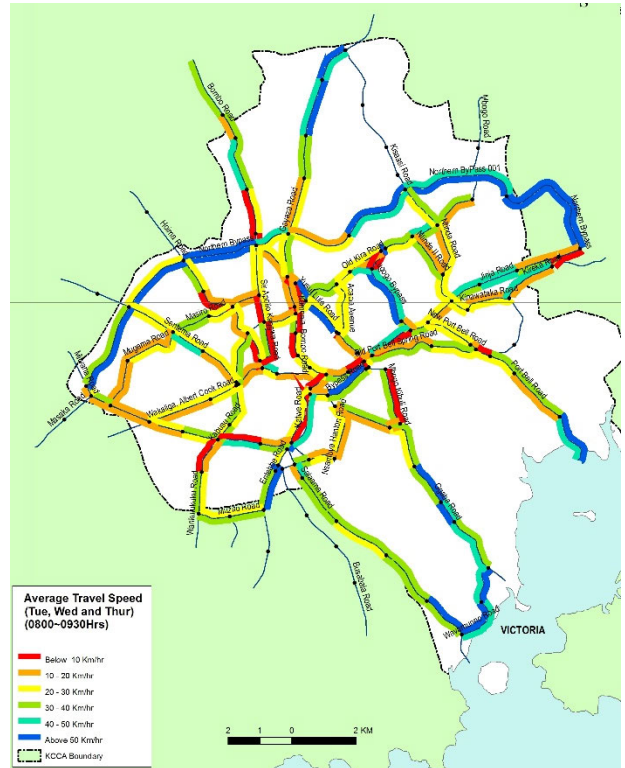
	Central	Kawempe	Makinddye	Nakawa	Rubaga	Total
Length (Km)	26.0	65.9	52.2	84.6	80.3	308.9

3.1.2.3 Survey Results

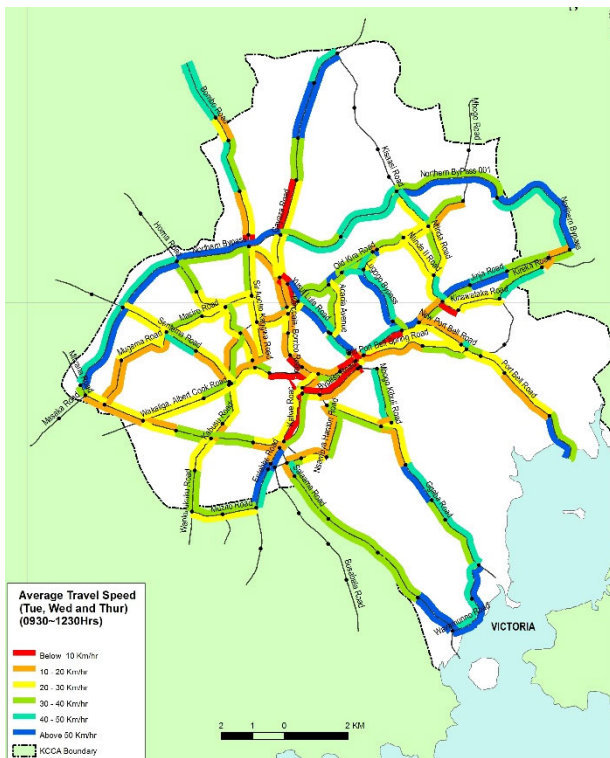
✧ Tuesday – Thursday



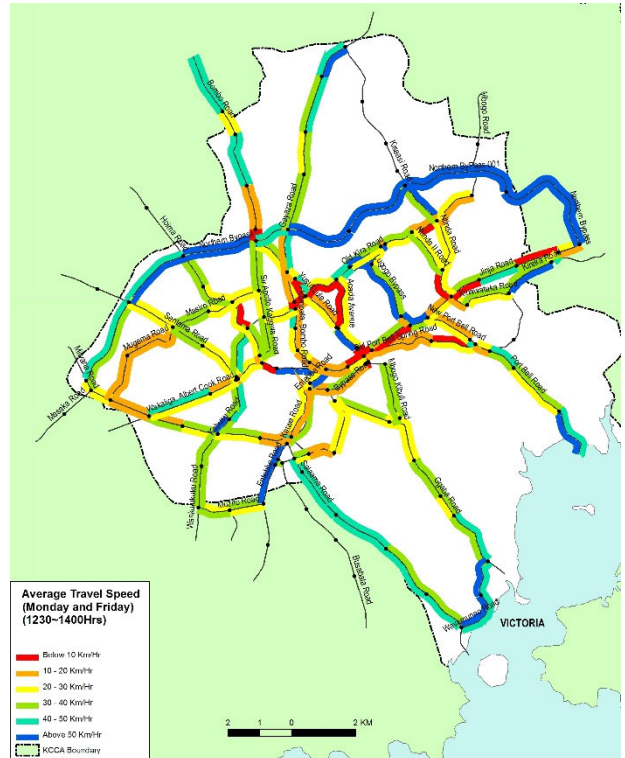
6:30-8:00



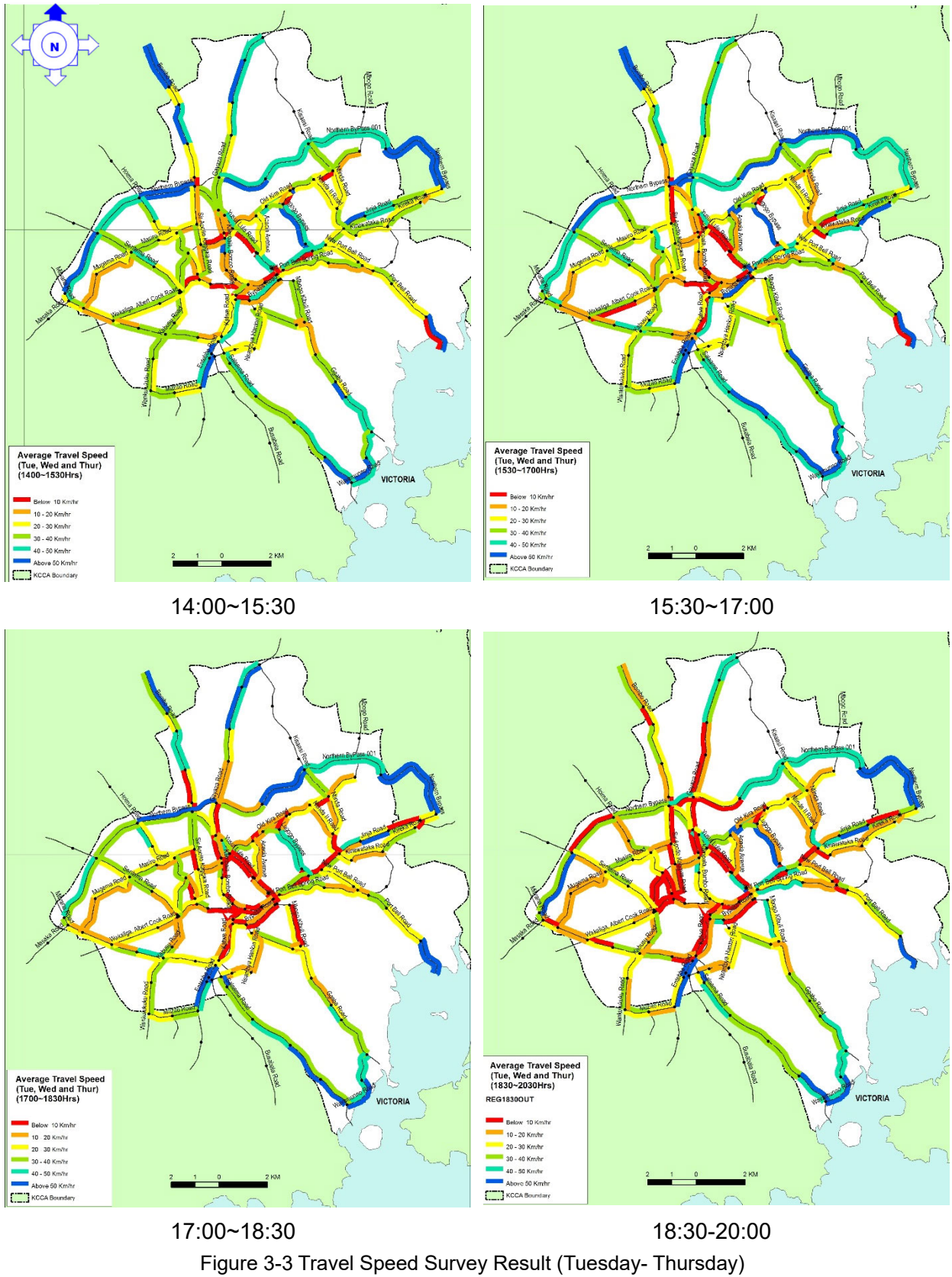
8:00~09:30



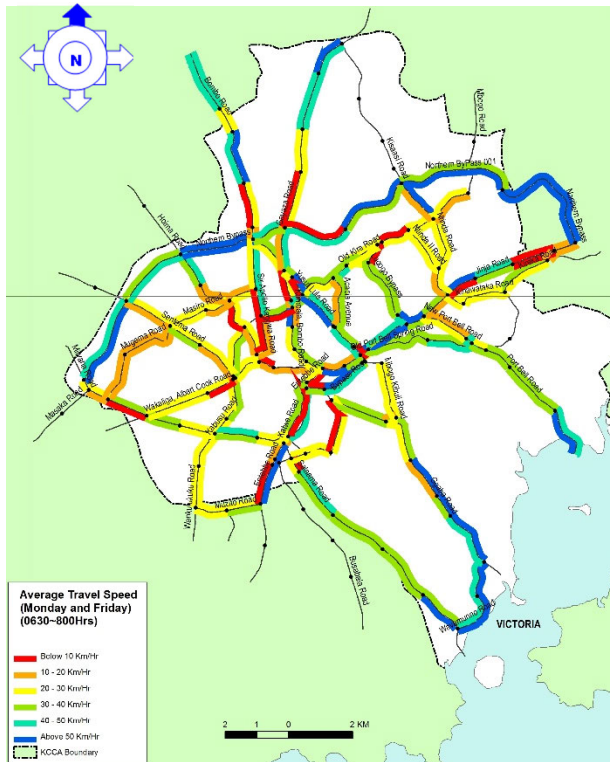
09:30~11:00



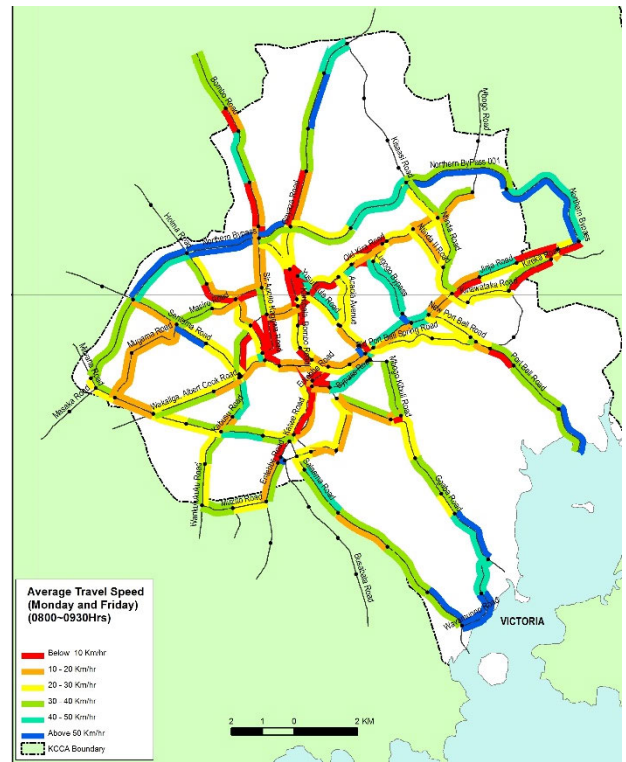
12:30~14:00



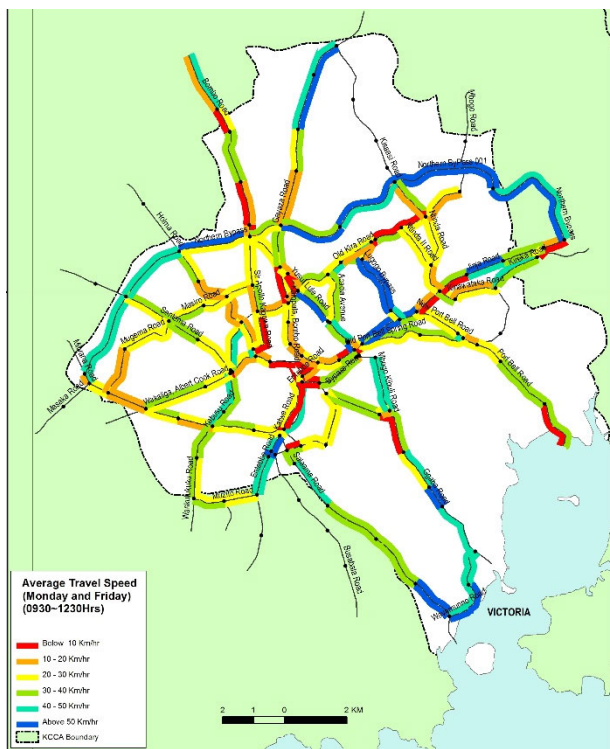
◇ Monday & Friday



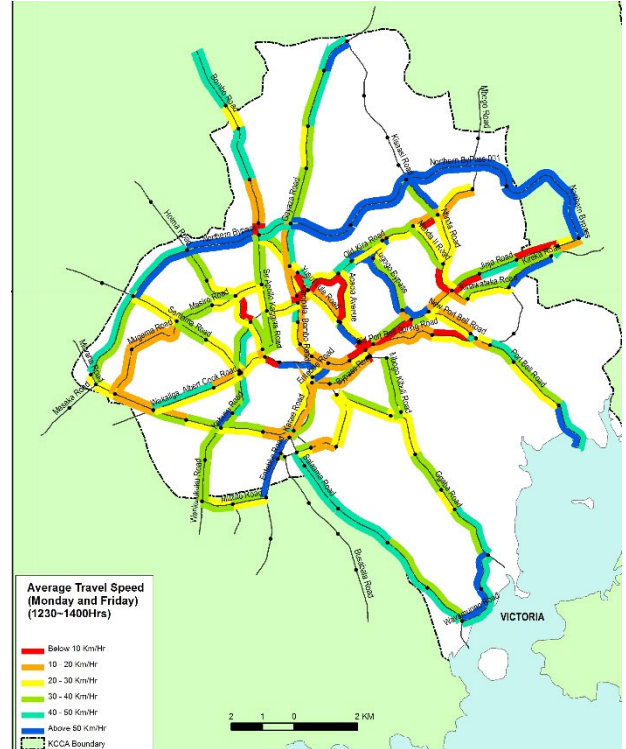
6:30-8:00



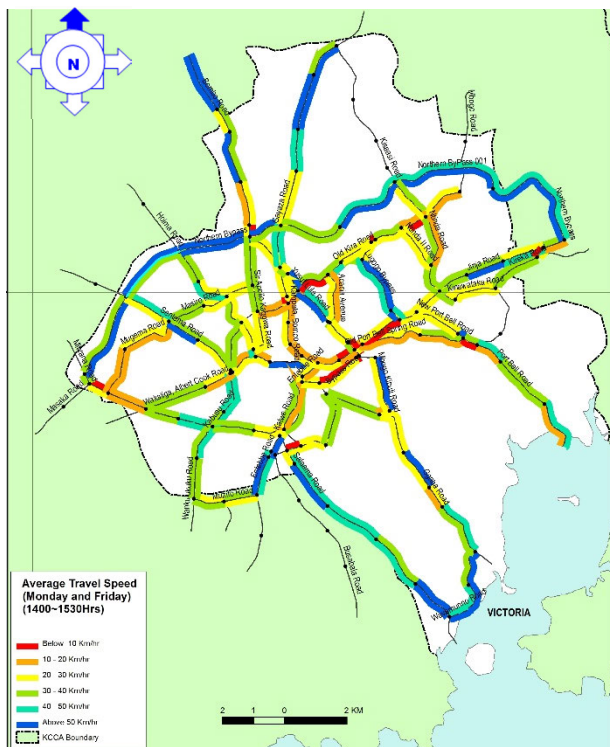
8:00~09:30



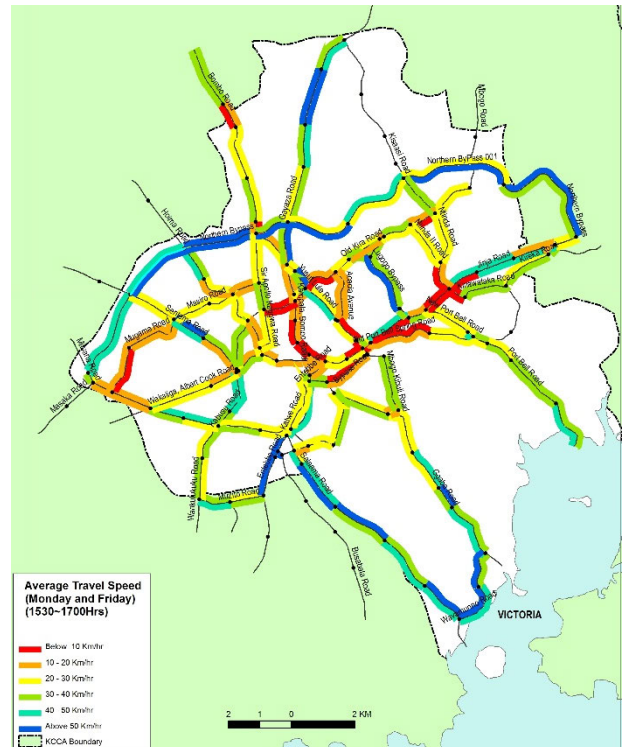
09:30~11:00



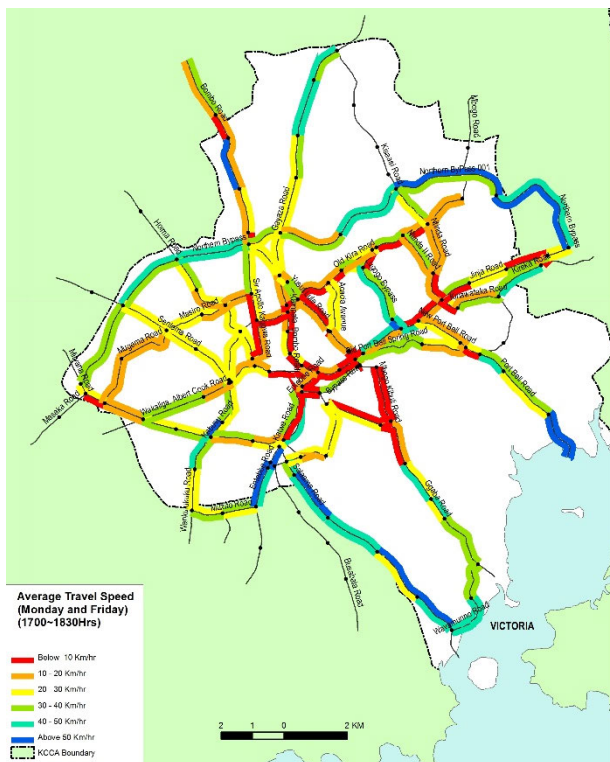
12:30~14:00



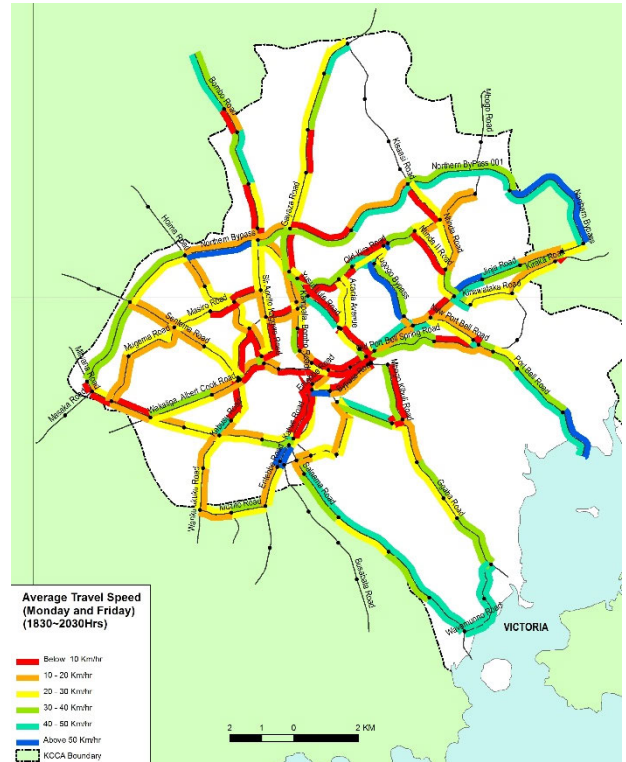
14:00~15:30



15:30~17:00



17:00~18:30

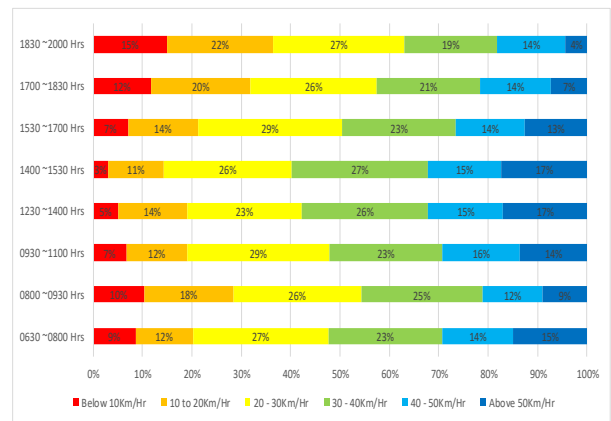
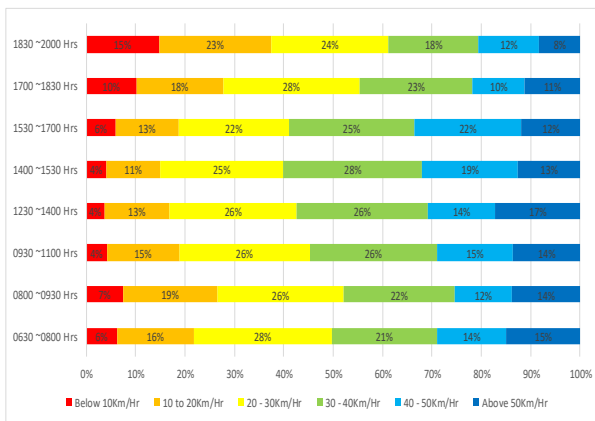


18:30~20:00

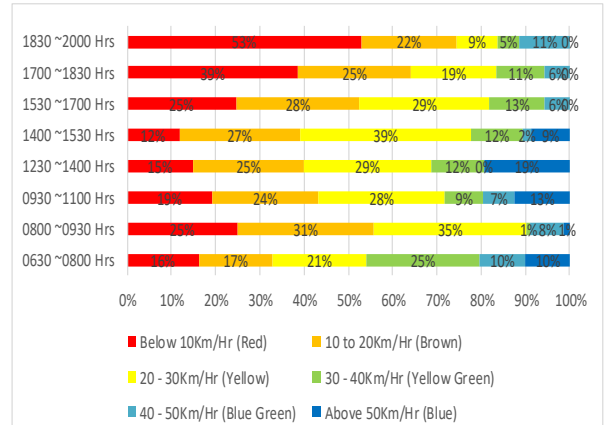
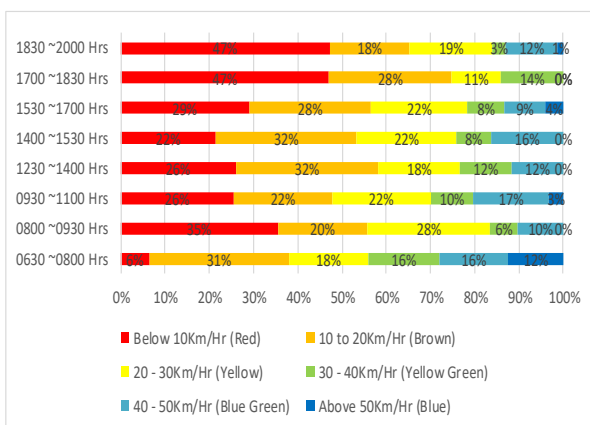
Figure 3-4 Travel Speed Survey Result (Monday& Friday)

3.1.2.4 There are some interesting observations on the results which are:

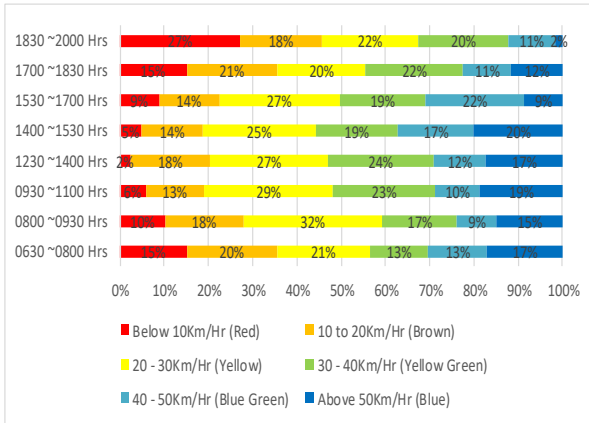
- Lowest average travel speed on Kampala roads was observed in 08:00~09:30 and 18:30~20:00.
- Average travel speed is 20~30 Km/hour is observed for most of the roads all over the day.
- Average speed of less than 10 Km/hour for most of the sections was observed in 18:30~20:00. Therefore, evening peak is more severe than morning in Kampala.
- There was no significant difference in travel speeds between normal working day (i.e. Tuesday - Thursday) and extensive working day (i.e. Monday and Friday) as shown in Figure 3-5.
- In division wise, the travel speed in Central Division is obviously different as low from others and second lowest is Kawempe while the others are almost same.



Tuesday to Thursday  
 Monday and Friday  
 Figure 3-5 Travel Speed Composition in the Network

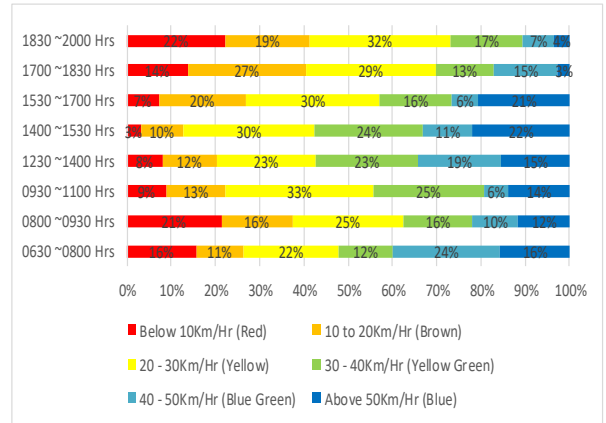


Tuesday to Thursday  
 Monday and Friday  
 Figure 3-6 Travel Speed Composition in Central Division

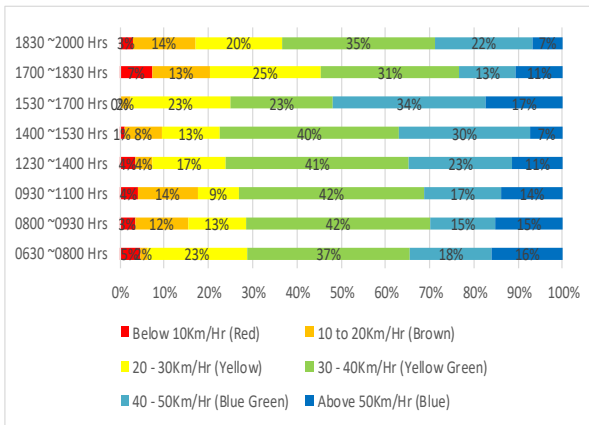


Tuesday to Thursday

Figure 3-7 Travel Speed Composition in Kawempe Division

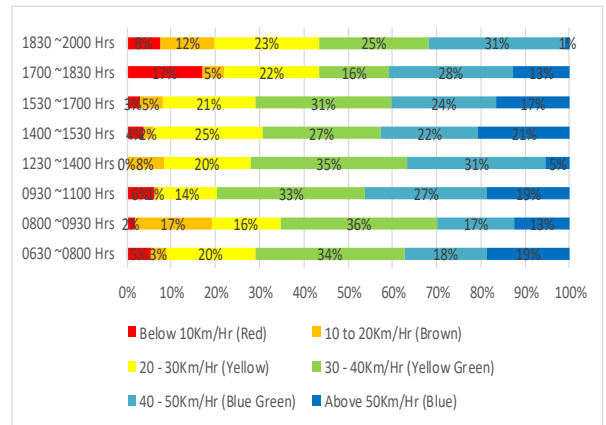


Monday and Friday

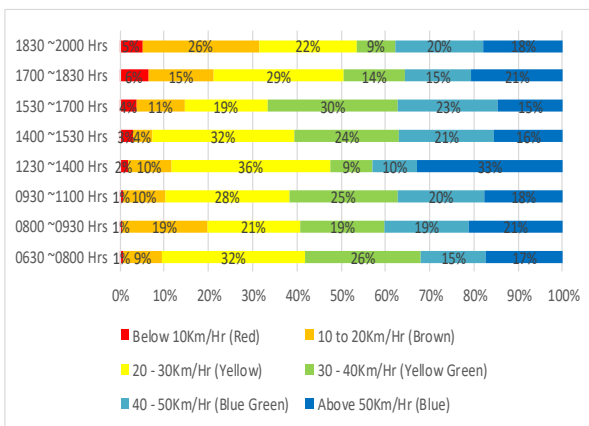


Tuesday to Thursday

Figure 3-8 Travel Speed Composition in Makindye Division

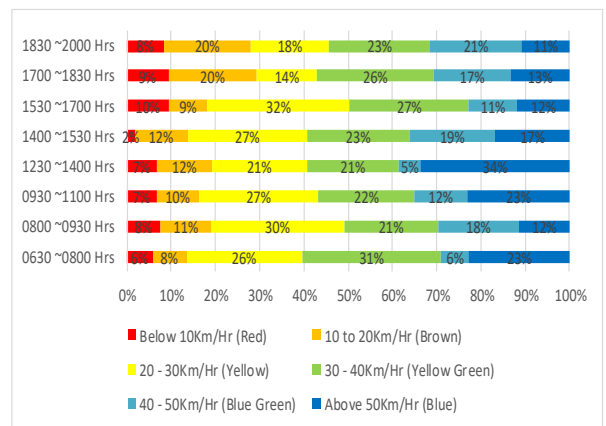


Monday and Friday

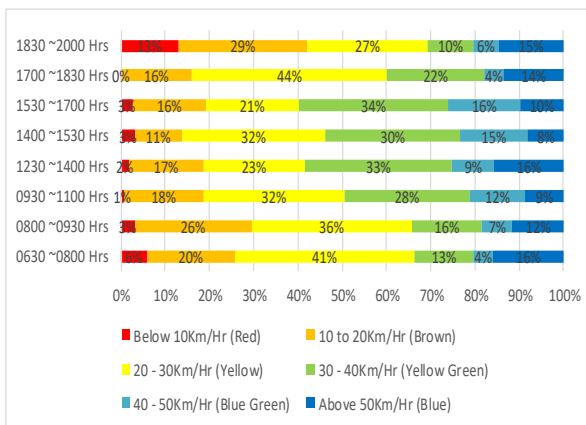


Tuesday to Thursday

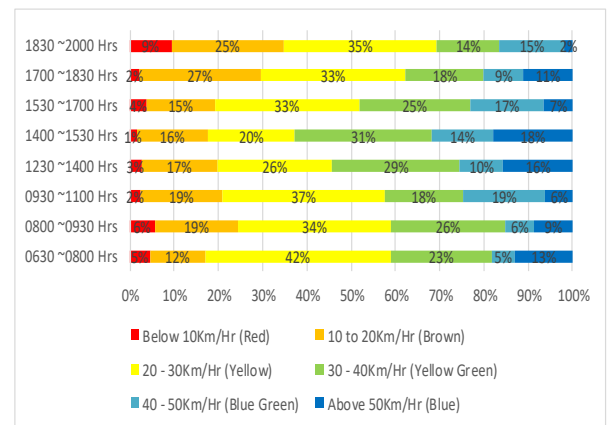
Figure 3-9 Travel Speed Composition in Nakawa Division



Monday and Friday



Tuesday to Thursday



Monday and Friday

Figure 3-10 Travel Speed Composition in Rubaga Division

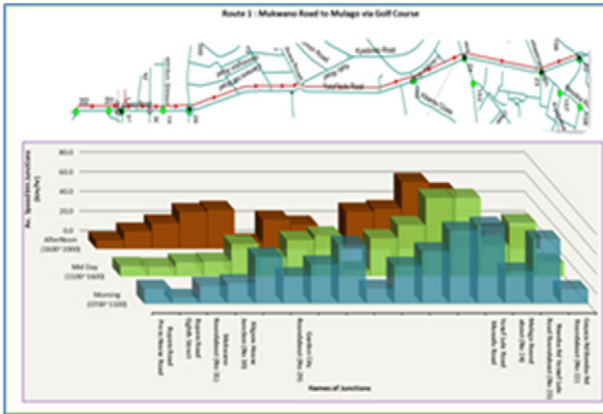
### 3.1.3 Travel Speed Survey in 2017

3.1.3.1 Under the project, travel speed survey using free car method with handheld GPS has been taken place during May, 2017. The objectives of the Travel Speed Survey are:

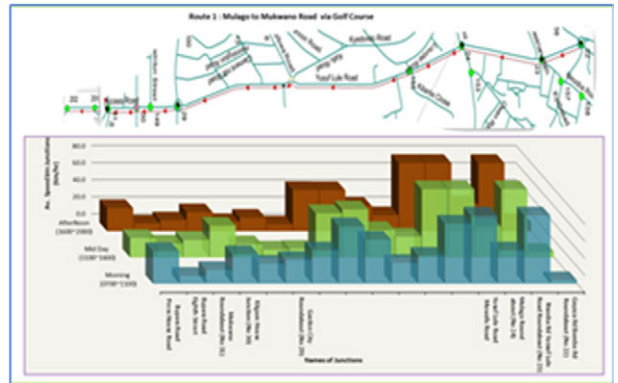
- 3.1.3.1.1 To collect the average speed of the road sections of major arterial roads in Kampala central area for different time frame of the whole day
- 3.1.3.1.2 To update the congested/bottleneck junctions of the city for improvement

#### 3.1.3.2 Survey Methodology & Schedule

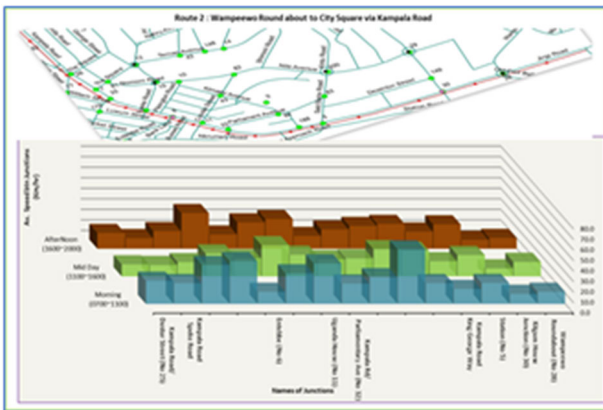
- 3.1.3.2.1 The survey was conducted on the major arterials of central Kampala in order to grasp the traffic bottlenecks of these routes during different time of the day.
- 3.1.3.2.2 After selecting the routes travel speed survey using free-flow car method was carried on from 7:00 to 20:00 every week day from mid-May to mid-June.
- 3.1.3.2.3 The survey area was divided into 6 routes and the data was collected by 3 cars for both directions. For each route minimum 4 samples were collected and analyzed in order to get a scientific average.
- 3.1.3.2.4 All the data collected are averaged into three time segments as of morning (7:00~11:00), midday (11:00~16:00) and afternoon (16:00~20:00) and results are analyzed.
- 3.1.3.2.5 The data processed separately as regular weekdays (Tuesday~Thursday) and exceptional weekdays (Monday and Friday).



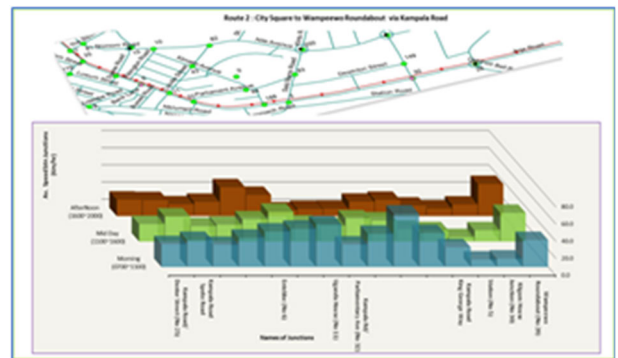
Mukwano Road to Mulago via Golf Course



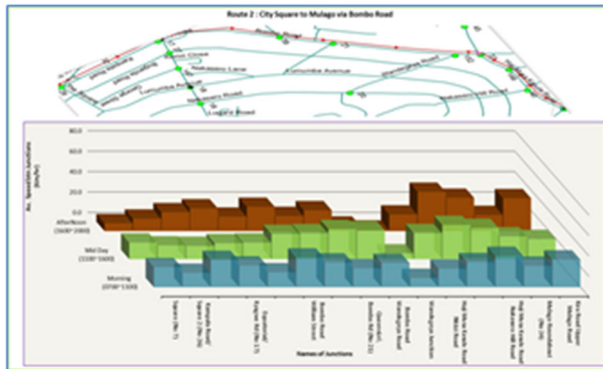
Mulago to Mukwano Road via Golf Course



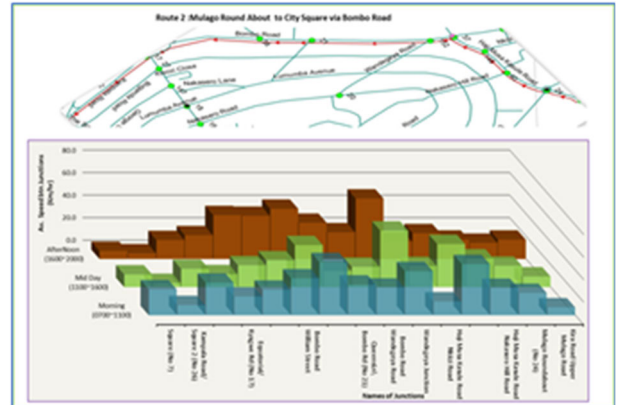
Wampewo Roundabout to City Square via  
 Kampala Road



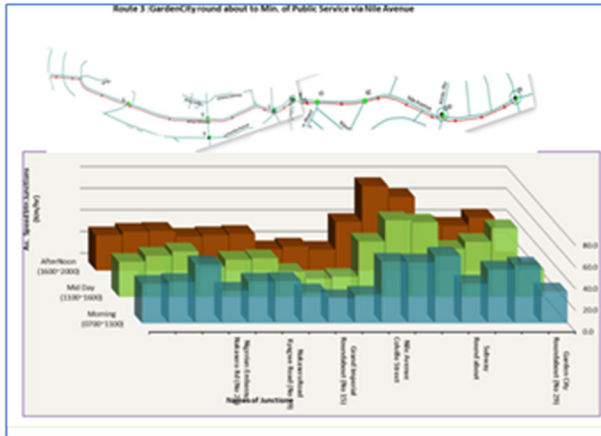
City Square to Wampewo Roundabout via  
 Kampala Road



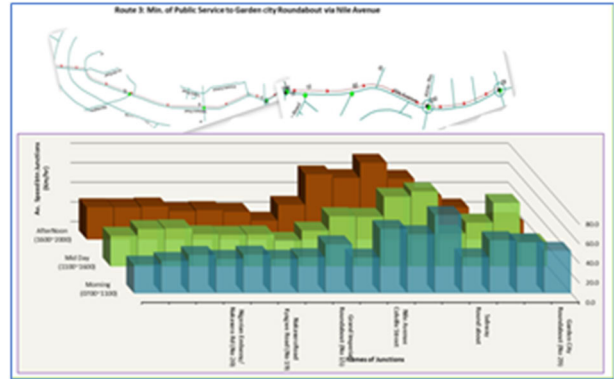
City Square to Mulago via Bombo Road



Mulago Roundabout to City Square via Bombo  
 Road

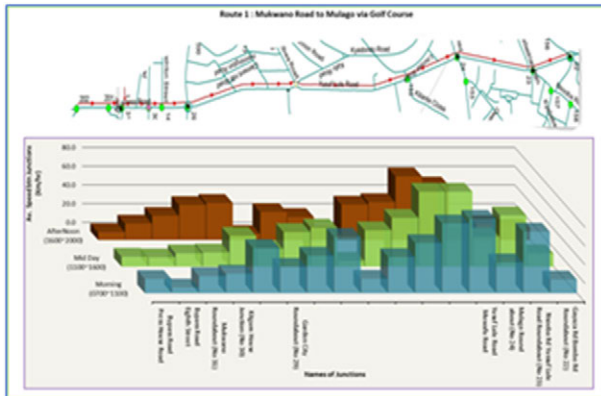


Garden City Roundabout to Min. of Public Service  
 via Nile Avenue

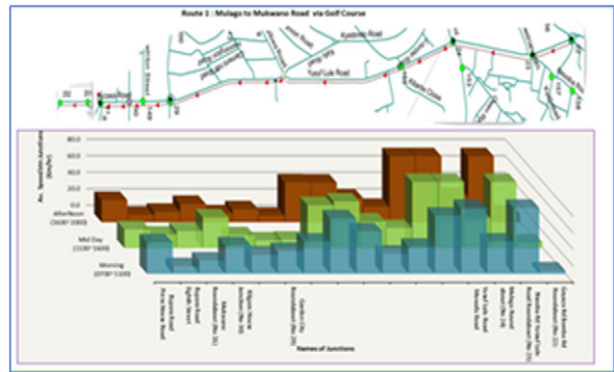


Min. of Public Service to Garden City Roundabout  
 via Nile Avenue

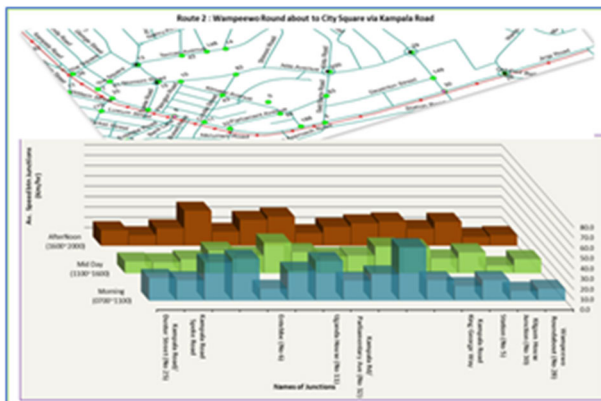
Figure 3-11 Travel Speed at Different Time of the day (Tues:Thurs) in 2017



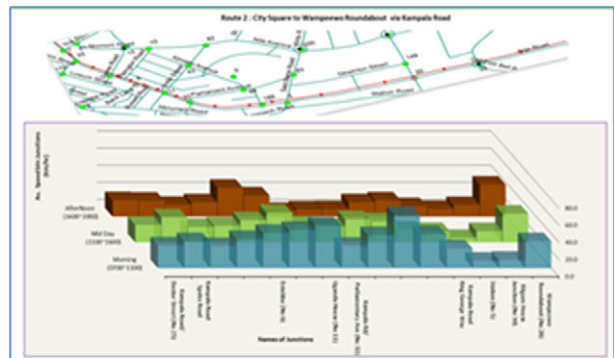
Mukwano Road to Mulago via Golf Course



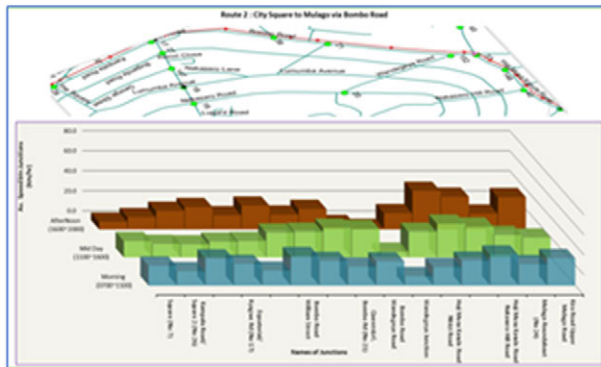
Mulago to Mukwano Road via Golf Course



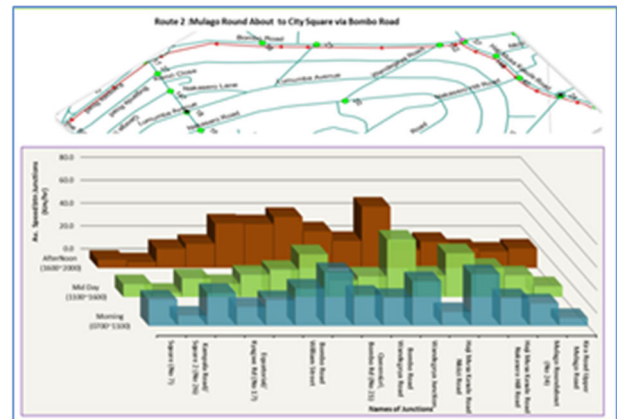
Wampewo Roundabout to City Square via  
 Kampala Road



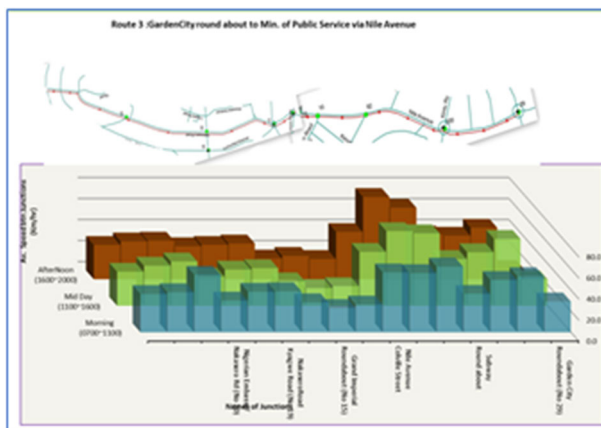
City Square to Wampewo Roundabout via  
 Kampala Road



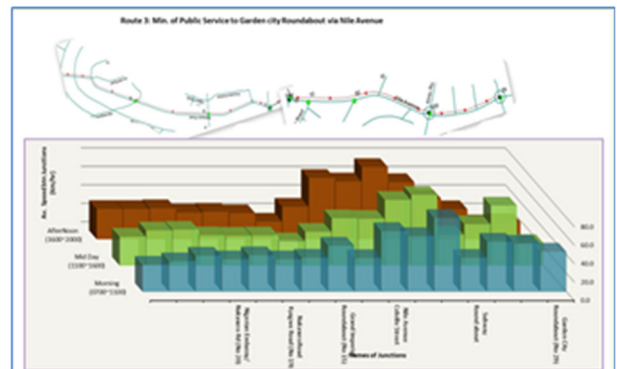
City Square to Mulago via Bombo Road



Mulago Roundabout to City Square via Bombo Road



Garden City Round about to Min. of Public Service  
via Nile Avenue



Min. of Public Service to Garden city Roundabout  
via Nile Avenue

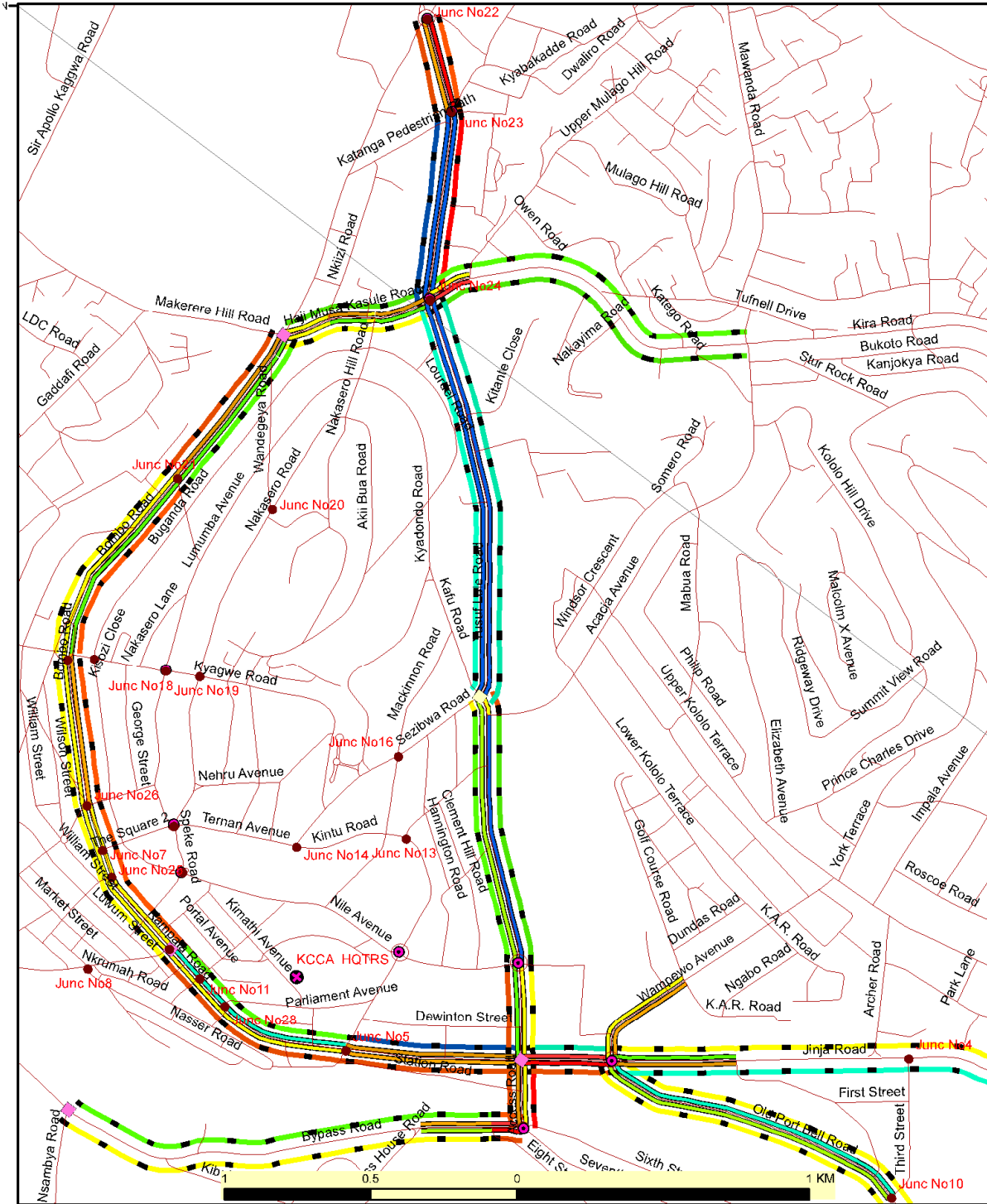
Figure 3-12 Travel Speed at Different Time of the day (Mon;Fri)

### 3.1.3.3 Comparison with previous survey of 2015

3.1.3.3.1 In 2015, under this project similar travel survey was conducted in large scale. The routes covered under the present survey were also a part of the previous survey.

3.1.3.3.2 Comparison of the travel speeds between 2015 and 2017 are shown in Figure 3-13 and Figure 3-14. Road sections are identified for 6 different speeds: 10kmph, 20kmph, 30kmph, 40kmph, 50kmph and 60kmph and presented in different color. Red and Orange are the lowest section where the blue and green are the highest. The dotted lines are representing the old survey results beside the current data.

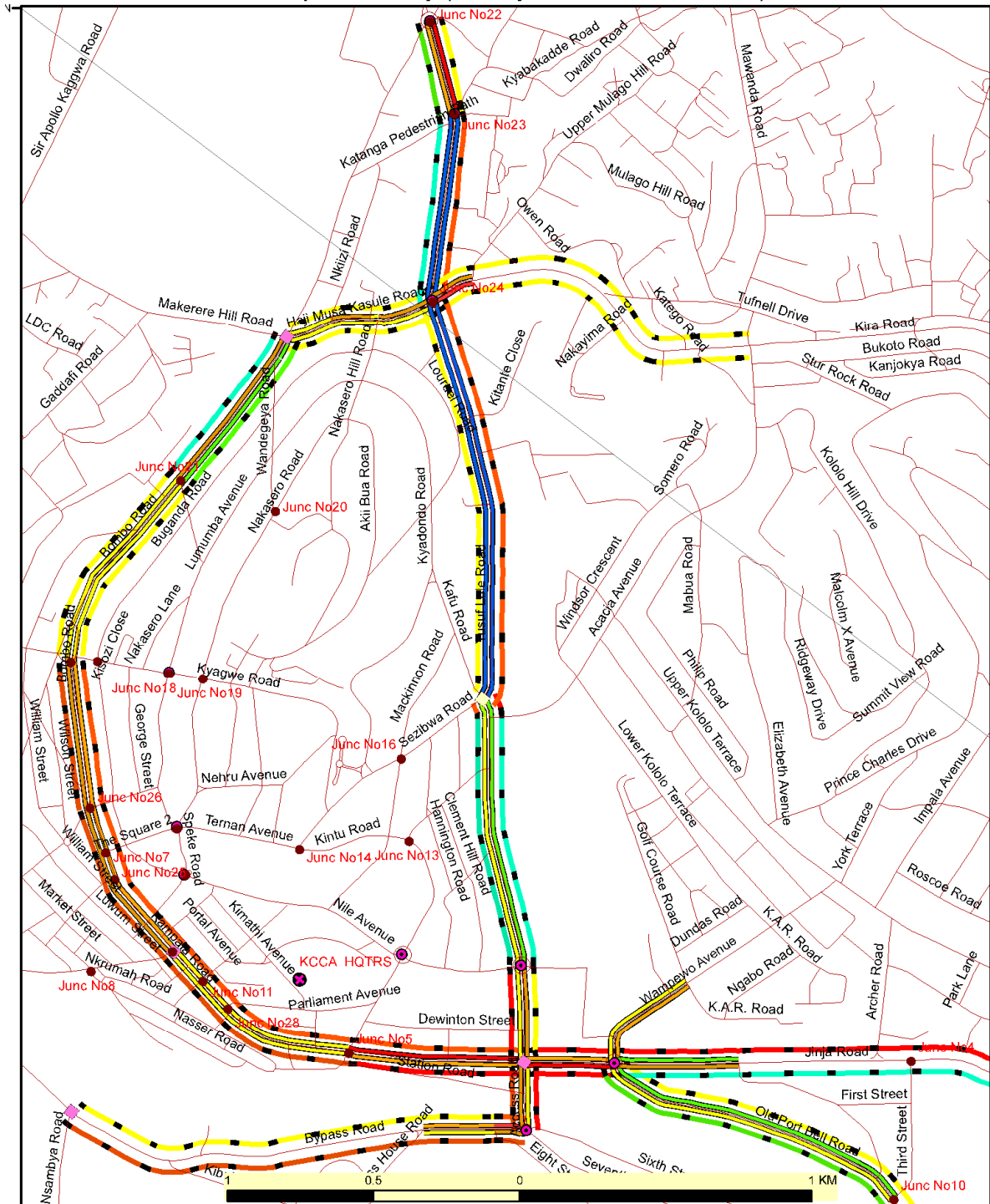
Travel Speed Survey (Morning ~ Tue, Wed and Thur)



First Survey (2015)	Below 10 Km/Hr	10 - 20 Km/Hr	20 - 30 Km/Hr	30 - 40 Km/Hr	40 - 50 Km/Hr	Above 50 Km/Hr
First Survey (2017)	Below 10 Km/Hr	10 - 20 Km/Hr	20 - 30 Km/Hr	30 - 40 Km/Hr	40 - 50 Km/Hr	Above 50 Km/Hr
● KCCA    ● Signals (Old)    ● Signals (New)    ● Other Junctions    ● Roundabouts						



Travel Speed Survey (Midday ~ Tue, Wed and Thur)



First Survey (2015)	Below 10 Km/Hr	10 - 20 Km/Hr	20 - 30 Km/Hr	30 - 40 Km/Hr	40 - 50 Km/Hr	Above 50 Km/Hr
First Survey (2017)	Below 10 Km/Hr	10 - 20 Km/Hr	20 - 30 Km/Hr	30 - 40 Km/Hr	40 - 50 Km/Hr	Above 50 Km/Hr
KCCA                     Signals (Old)                     Signals (New)                     Other Junctions                     Roundabouts						



Travel Speed Survey (Afternoon ~ Tue, Wed and Thur)

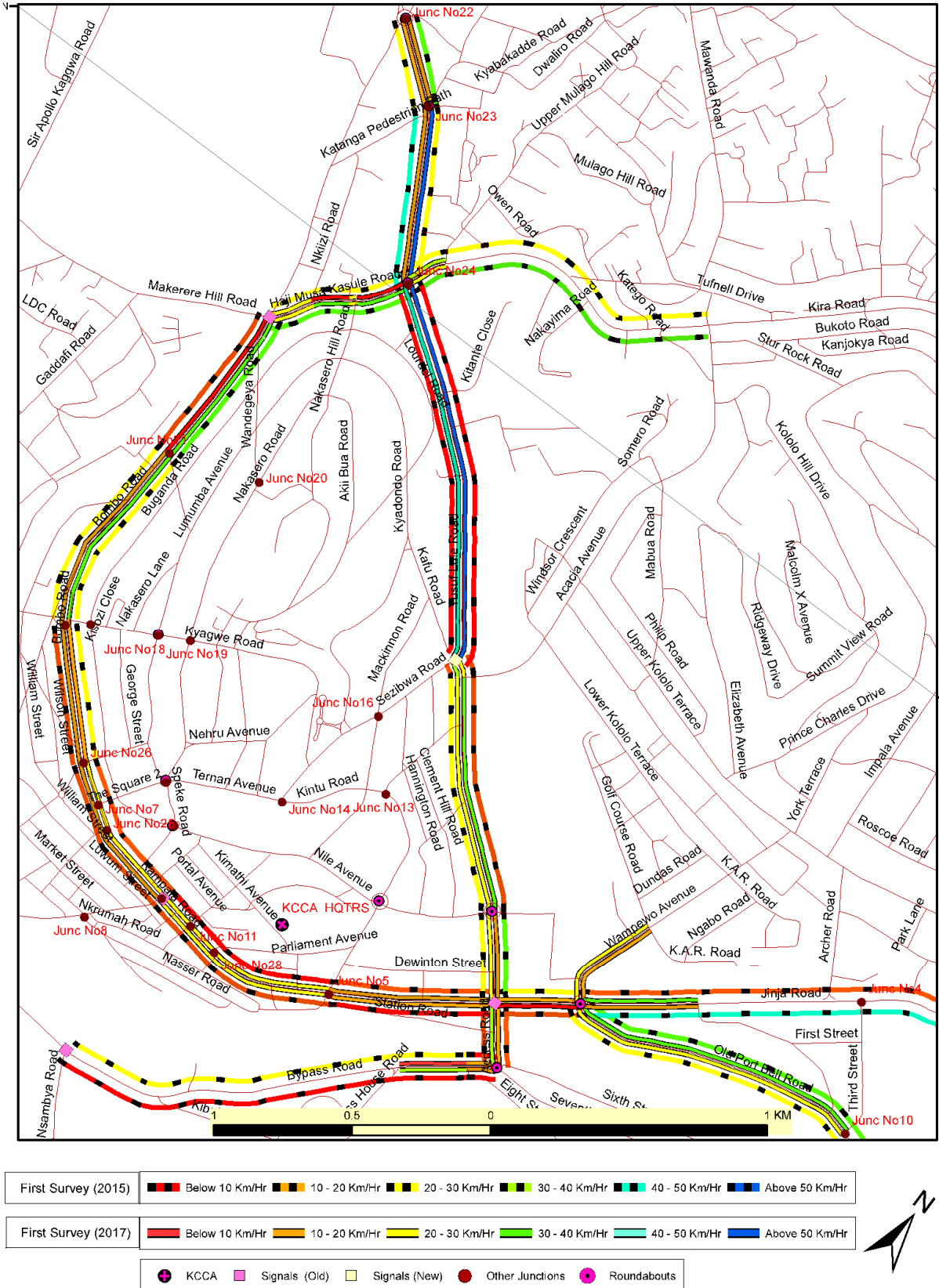


Figure 3-13 Comparison of Travel Speed in 2015 and 2017 (Tues-Thurs)

Travel Speed Survey (Afternoon ~ Mon and Fri)

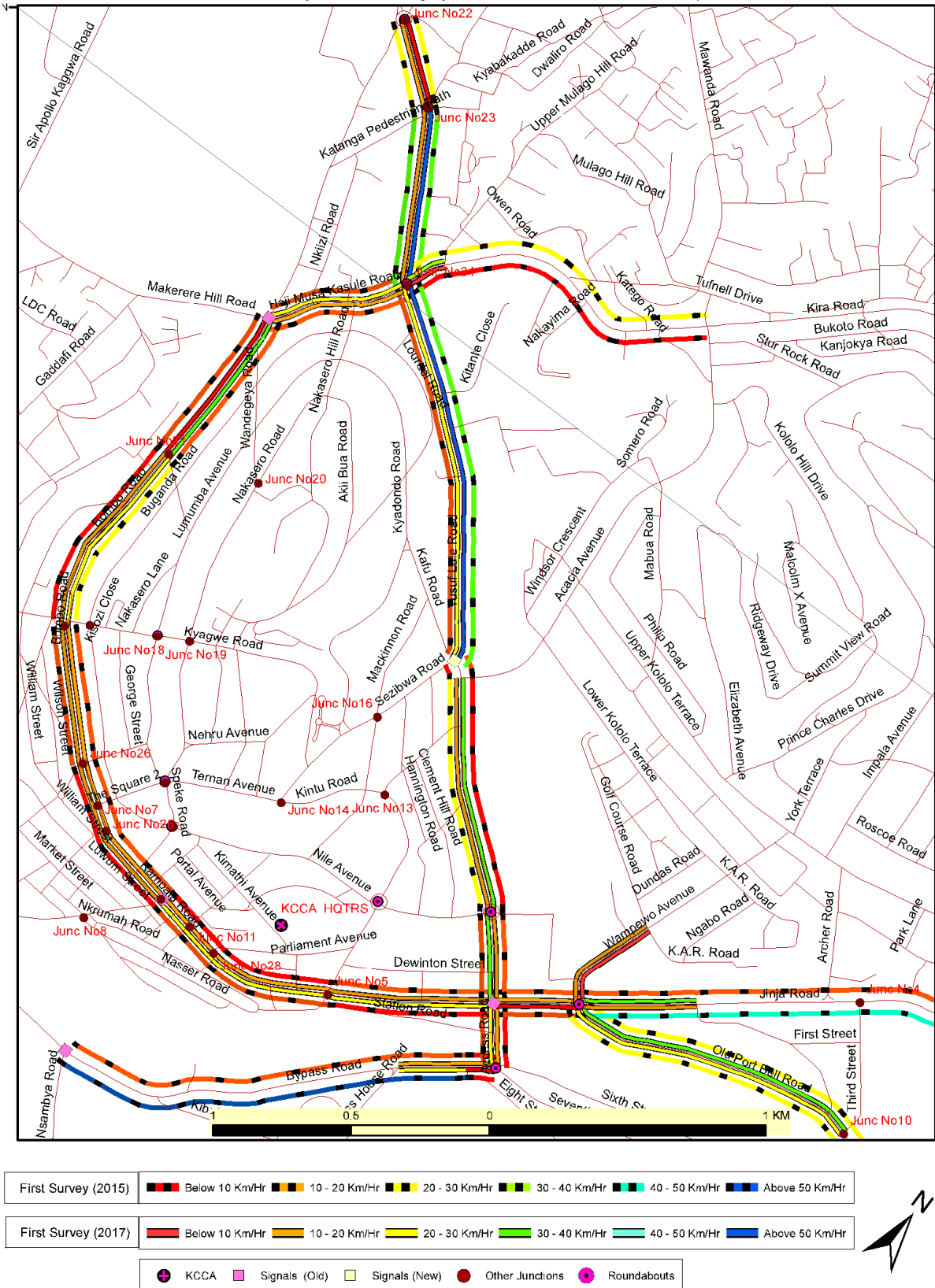


Figure 3-14 Comparison of Travel Speed in 2015 and 2017 (Mon, Fri)

### 3.1.3.4 Survey Observations

#### 3.1.3.4.1 Observations from the travel speed survey are:

- a. Travel speed reduced drastically at roundabout junctions. Specially, Wampewo, Garden City, Mukowano, Grand Imperial, Mulago and Rwenzori are identified as the most congested roundabouts in the city centre. In particular, during the evening peak all these junctions have been turned out as bottlenecks.
- b. Subway roundabout is identified as less congested roundabout and it is observed from field survey that when the nearby junctions such as Garden city starts to be congested the congestion affects this junction and traffic from certain direction create gridlock situatin.
- c. Signalized junctions such as Wandegay, Kitgum have also experienced huge congestion during peak hours of the day.
- d. In some sections such as Jinja road towards Kitgum junction traffic congestion is observed during the off peak as well.
- e. On Monday and Friday, traffic on Kampala roads seemed to be more; as a result, the travel speed decreased in certain sections compared to other regular weekdays (Tues-Thurs).
- f. It is observed that travel speeds at some sections in morning and afternoon are improved compared to previous survey of 2015. However, the junctions with roundabouts located at Mulago, Garden City and Wampewo conditions have turned into worse.

### 3.1.4 The Workshop for Portable Traffic Survey Instruments (MOVTRA)

3.1.4.1 A demonstration of a traffic survey using a portable traffic survey instrument (MOVTRA) and a workshop on its use were conducted on 26<sup>th</sup> June 2015.

3.1.4.2 MOVTRA is a Japanese portable traffic survey instrument that uses long-range infrared distance sensors. It can automatically survey the number of vehicles, passing speed and vehicle length. The data is built as a CSV file. Two sensors are installed for each lane. The number of vehicles is counted by blocking the infrared rays. Speed is calculated by the difference in reaction time between the two sensors. The calculated speed is multiplied by the reaction time of infrared rays. The calculated speed is multiplied by the reaction time of infrared rays to calculate the vehicle length.



Photograph 3-1 A Scene for Traffic Survey using MOVTRA





Photograph 3-2 A Scene for Workshop for Portable Traffic Survey Instruments (MOVTRA)

**APPLICATION OF MOVTRA TO TRAFFIC SURVEY IN KAMPALA**

26<sup>th</sup> June, 2015

Kampala Smart Traffic Project  
The Project for Capacity Enhancement of KCCA in Management of Traffic Flow in Kampala City in Uganda

with Single Pillar (e.g. Guardrail)      with Temporary Unit Pipes      with Road corn (Kampala's Trail)

os.

"MOVTRA" is one of the **portable traffic counter** and system with sensors, applied at various locations in Japan.

Set-up of MOVTRA requires only side of lane **without any traffic violations**. In addition, time required for set-up is short, therefore, MOVTRA can be used for **quick survey implementation** if KCCA has

ons.

Bus bay, Parking lot must be avoided.

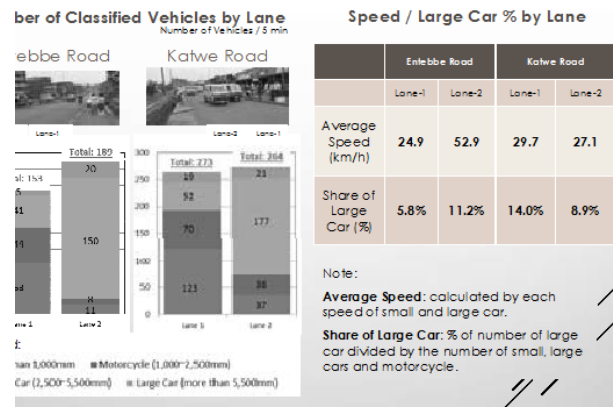
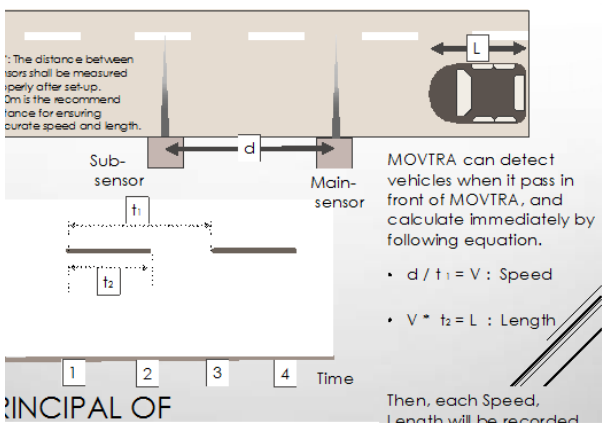


Figure 3-15 Some Presentation Slides of Workshop for Portable Traffic Survey Instruments (MOVTRA)

Table 3-2 List of Participants of Workshop for Portable Traffic Survey Instruments (MOVTRA)

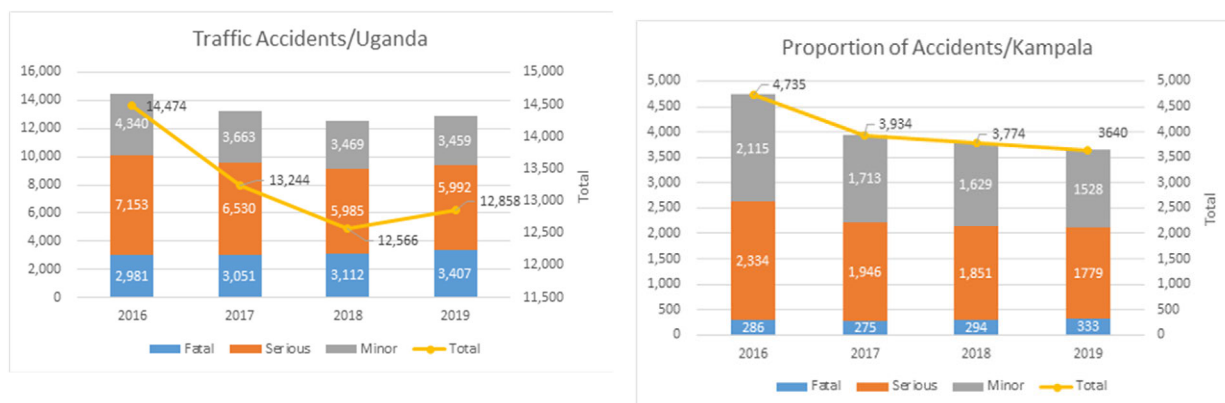
Lecturer		KCCA	
Name	Position	Name	Position
Eng. Yoshikazu Asada	JICA Expert	Mr. Adam Ssenooba	Transport Planning & Traffic Management officer
Eng. Takafumi Kawachi	JICA Expert	Ms. Fortunate Biira	Transport Planning & Traffic Management officer
Eng. Kiminori Matsumoto	JICA Expert	Mr. Leonard Mwesigwa	Transport Planning & Traffic Management officer

## 3.2 TRAFFIC ACCIDENTS

### 3.2.1 Accident Statistics in the Country

3.2.1.1 Uganda Police Force (UPF) provided the traffic accident data for the period between 2016 and 2019.

These data are most recent and available ones in the country as of Jan. 2022. These data cover nation-wide cases.



Accidents in the Country

Accidents in Kampala

Figure 3-16 Traffic Accidents (2016 to 2019)

3.2.1.2 The number of accidents decreases year by year in the country as well as Kampala. However, the fatal case remains flat while the minor case drops. It contributes to the decreasing trend.

Table 3-3 Average Road Accident Fatalities for 4 years

Year	Region	City	Pop	DESCRIPTION OF ACCIDENT				Acd/100Thd	Acd w/o Fatal/100Thd	Killed Total	Person Killed /100Thd
				FATAL	SERIOUS	MINOR	TOTAL				
Aaverage	Central		9,996,477	1,318	3,621	2,519	7,459	74.6	61.4	1,502	15
		Kampala	1,580,975	297	1,978	1,746	4,021	254.3	235.5	338	21
	Eastern		9,451,082	595	1,060	421	2,075	22.0	15.7	710	8
	Western		9,310,014	768	841	435	2,043	21.9	13.7	871	9
		Fort Portal	56,423	42	55	24	120	213.1	139.6	48	85
	Northern		7,540,582	457	894	358	1,709	22.7	16.6	522	7
		Gulu	142,097	39	102	37	178	125.1	98.0	41	29
		Arua	48,661	48	62	33	143	292.8	195.2	51	105
	Total		36,298,156	3,138	6,415	3,733	13,286	36.6	28.0	3,604	10
		City Total	1,828,157	425	2,197	1,840	4,461	244.0	220.8	478	26

3.2.1.3 According to Table 3-3, the average number of fatalities over four years is a low as ten death per 100,000 inhabitants, while in Kampala, it is almost double that, at 21. The highest number records at 105 in Arua, North-West Region.

### 3.2.2 Accident Statistics in the Kampala

3.2.2.1 Detailed analysis of UPF's data for Kampala was conducted. The analysis was done for each police station and by adult/ non-adult and types of road user.

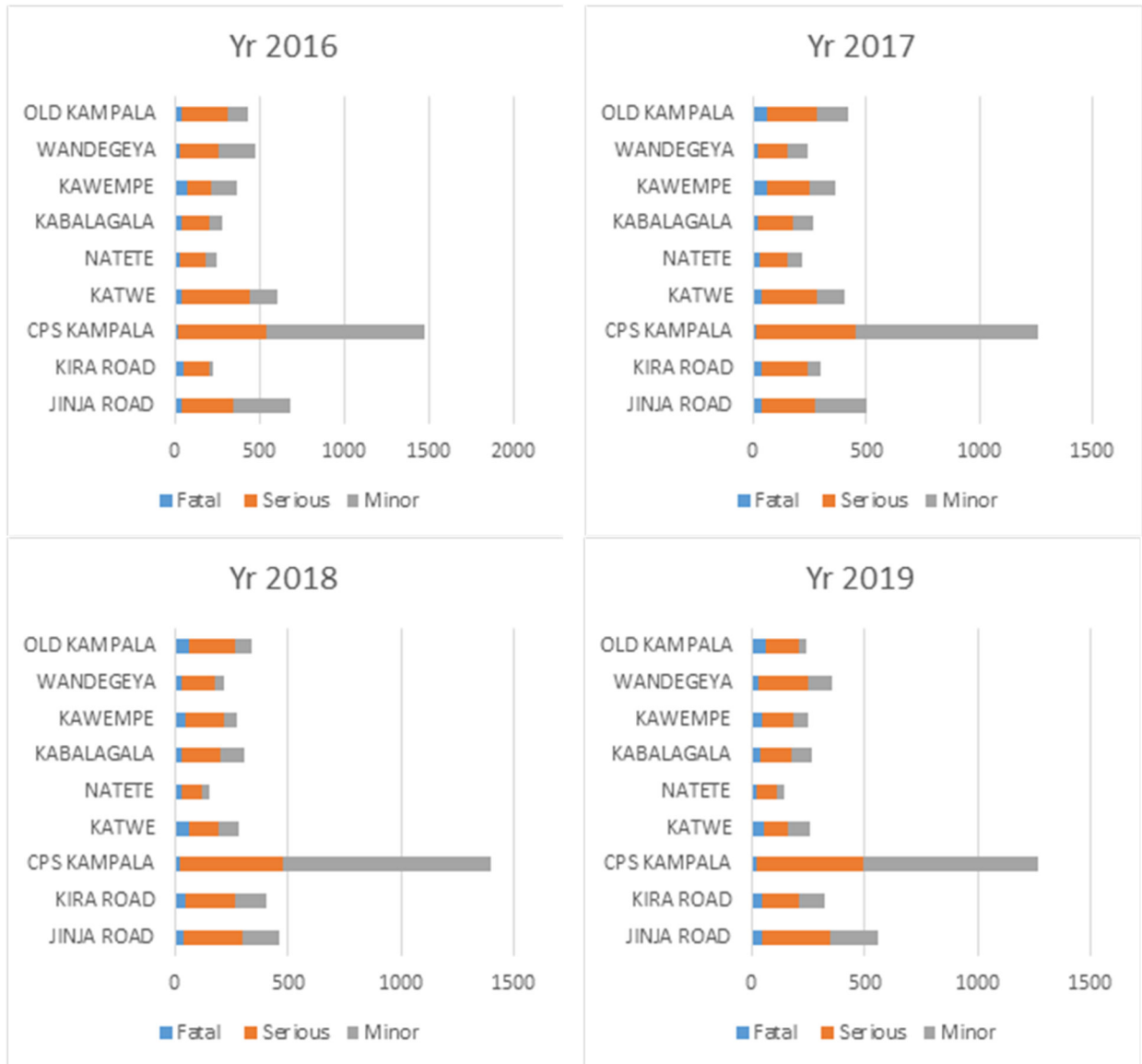


Figure 3-17 Accident Statistics by Police Station in Kampala

3.2.2.2 The number of traffic accidents is overwhelmingly in the CPS jurisdiction, however, half of them were in the Minor. It was attributed to the concentration of people in the CBD and road congestion in this area. Those might have contributed to the high numbers.

3.2.2.3 On the other hand, the fatal cases in CPS stayed at the lowest while the highest was recorded at the Old Kampala followed by Kawempe.

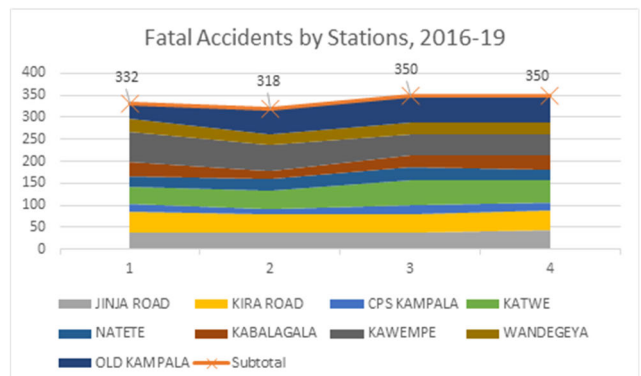


Figure 3-18 Fatal Accidents by Stations, 2016-19

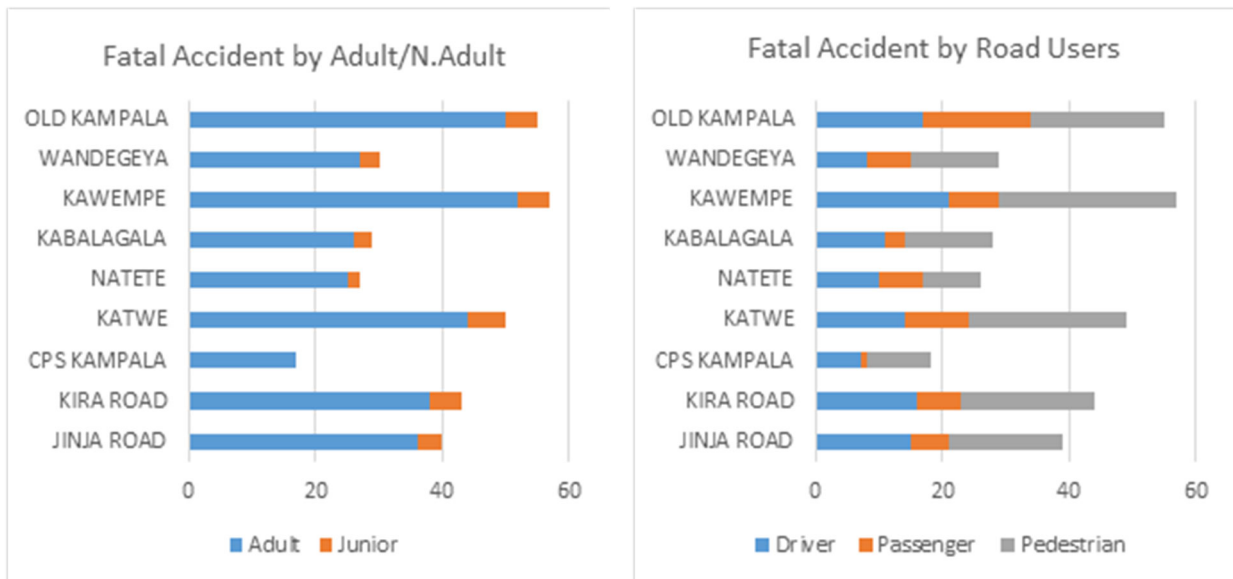


Figure 3-19 Average Number of Fatalities by Attribute/ Station for 4 years

3.2.2.4 From the analysis for each station, it can be found that the number of traffic accidents and the number of fatalities is inversely proportional. It can be interpreted that yet there are many accidents in the CBD, there are few cases that result in fatal accidents because of the severe traffic congestion letting the vehicle moving slowly, while in the suburban areas, there is minor traffic congestion and the speed of vehicles is high, resulting in many fatal accidents.



Photograph 3-3 Taxi in Accident

### 3.2.3 Traffic Accident Analysis Seminar

3.2.3.1 During the 1<sup>st</sup> Training in Japan in 2016, it was a seminar for Traffic Accident Data Analysis at Institute for Traffic Accident Research and Data Analysis (ITARDA).



Photograph 3-4 A Scene of Traffic Accident Analysis

3.2.3.2 ITARDA was founded in 1992 for this purpose, being promoted by the National Police Agency, the Ministry of Transport, the Ministry of Construction, Japan Automobile Manufacturers Association Inc., and the General Insurance Association of Japan and many other bodies. The mission of ITARDA is to contribute to reducing road traffic accidents and casualties through research and analysis of road traffic accidents from the standpoint of human factors, vehicular factors and road traffic environments. ITARDA maintains a huge and all-inclusive database of all the traffic accidents in Japan. It also conducts in-depth comprehensive investigations of selected accidents and maintains a database of those investigations' results. With those databases, it carries out studies of traffic accidents from various aspects and provides the

fruit to the government, to the institutions and companies concerned and to the general public.

3.2.3.3 In the seminar, it was explained on how traffic accident data is processed and analyzed in Japan with the smart method. Also, it was about traffic accident data base maintained by ITARDA.

3.2.3.4 During the seminar, it was presentation on how the traffic accident involving the pedestrian is detected by the system.

2. Analysis using Integrated Database

Traffic accident Statistics Analysis for Accident Prevention and Reduction of Crash severity

Yasushi NISHIDA  
Institute for Traffic Accident Research and Data Analysis, Japan

Journal of the Surface Science Society of Japan, 37-4, pp187-189 (2016)

(1) Integrated Database

~ There are several Integrated Databases built by ITARDA.

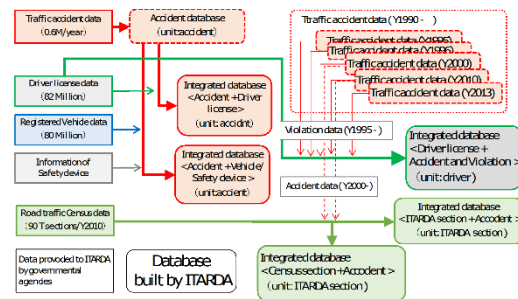


Fig. Integrated Traffic Accident Database of ITARDA

3. Presentation at SIP-adus 2015

<Extract>

Cross-ministerial Strategic Innovation Promotion Program (Cabinet Office, Government of Japan)  
Innovation of Automated Driving for Universal Services, one of 11 SIP Programs

Estimation of Traffic Fatality Reduction by Automated Driving Systems

Yasushi NISHIDA and Makoto SHIOTA  
Institute for Traffic Accident Research and Data Analysis, Japan

2nd SIP-adus International Workshop, October 27, 2015

(6) Impact Assessment of Pedestrian Detection System

~ The reduction of pedestrian fatalities might be estimated considering the distribution of TTC (Time to Collision) and survival ratio.

Table Impact Assessment of the pedestrian detection system with CCTV/Radar for fatal pedestrian accident

TTC <Time to collision> (%)	et	Target Group <Fatal occupants> (person)		Survival ratio (%)	Estimated survival occupants (person)	
		C	Estimate chance for Cut-Off		Distribution St-Order	Σ
0.0 <TTC ≤ 1.0 sec	25.0		281	0	0	
1.0 <TTC ≤ 2.0 sec	41.7	1123	468	50	234	608
2.0 <TTC ≤ 3.0 sec	33.3		374	100	374	

Reference tentative  
Source: M. Shiota, et al.: Study on fatality reduction based on analysis of traffic accidents occurred in the jurisdiction of Toyota Police Station, Presentation at JSAE Chubu-Area Workshop 2010

Figure 3-20 Some Presentation Slides for Traffic Accident Analysis Seminar

Table 3-4 List of Participants of Traffic Accident Analysis Seminar

Lecturer		KCCA	
Name	Position	Name	Position
Mr. Yasushi Nishida	Researcher	Ms. Jennifer Semakula Musisi	Executive Director
Mr.. Makoto Shiota	Researcher	Mr. Charles Ouma	Deputy Director, Directorate of Legal Affairs
		Eng. Andrew Kitaka	Director, Directorate of Engineering and Technical Services
		Dr. Steven Kasiima	Assistant Inspector General of Police, Director of Traffic and Road Safety, Uganda Police Force
		Mr. Martin Sekajja	Deputy Director, ICT, Office

			of the Executive Director
		Eng. Jacob Byamukama	Manager, Directorate of Engineering and Technical Services
		Eng. Beatrice Magumba	Transport and Traffic Engineering Specialist, Directorate of Engineering and Technical Services
		Mr.. Akira Yokoi	JICA Expert
		Eng. Pallab Debnath	JICA Expert

### **3.3 PREPARATIONS OF JUNCTION DESIGN STANDARD**

#### **3.3.1 Existing Standards**

3.3.1.1 The following the standards have been prepared by Ministry of Works and Transport/ Uganda National Roads Authority (UNRA) and they have been applied for the highway design work in Uganda.

- a. Geometric Roads Design Manual
- b. Bridge Design Manual
- c. Drainage Design Manual
- d. Pavement Design Guides
- e. MoWT General Specification for Roads and Bridge Works
- f. Traffic Signs Manual
- g. Road Safety Audit Manual
- h. Procedural Guide to Economic Road

3.3.1.2 It shall be noted that there is no design standard/manual for urban road and geometry of junction/intersection.

3.3.1.3 Past junction/intersection designs in Japan's Grant Aid seemed to refer the Road Construction Ordinance in Japan. However, they have not fully followed the Road Construction Ordinance according to observation since the Expert Team identified some design departures from the sites.

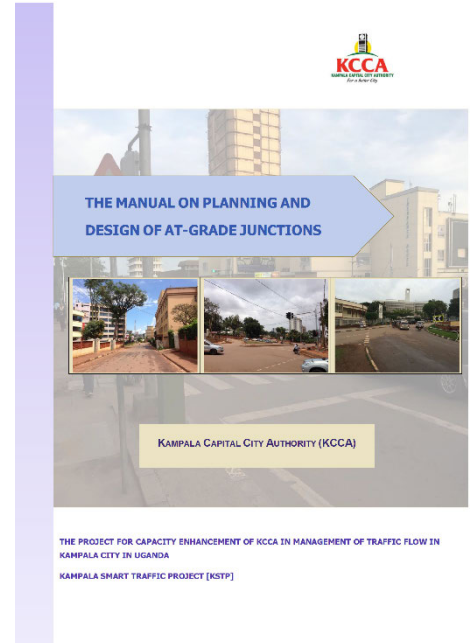
3.3.1.4 Problems in the existing Junctions are observed being unnecessarily large as opposed to the present design philosophy for the junction that junction shall be as compact as possible in order for traffic flow to be regulated and managed easily. The geometry of the existing junctions allows the vehicle to pass randomly at junction area which makes very difficult in controlling traffic flow.

3.3.1.5 Moreover, the existing junction design seems to be with no clear and consistent consideration to left turning traffic in junction that some junction allows the free turning regardless the signal phase and some do not that might be fostering less discipline in road usage.

#### **3.3.2 Preparation of the Manual on Planning and Design of At-Grade Junctions**

3.3.2.1 Considering the above, the Expert Team and KCCA has prepared of "The Manual on Planning and Design of At-Grade Junctions and its contents are as follows,

Table of Contents	
Chapter 1	Overview
1.1	Significance of Junction Planning
1.2	Integration of Geometric Design and Operation at Junctions
1.3	Special Consideration for Junction Design
1.4	Intersecting Points
1.5	Type/size of at-grade Junction
Chapter 2	Design Principle
2.1	Basics
2.2	Principle of Planning Phase
2.3	Principle of Design Phase
2.4	Procedure for Planning and Designing
Chapter 3	Accidents at At-grade Junctions and Countermeasures
3.1	Overview of Accidents at At-grade Junctions
3.2	Safety Measures
3.3	Procedures to Identify Safety Issues
Chapter 4	Capacity Analysis of a Signalized Junction
4.1	Procedure for Reviewing the Traffic Capacity of a Signalized Junction
4.2	Output
4.3	Calculation of Saturation Flow Rate
4.4	Example of Calculation of Traffic Capacity of a Signalized Junction
Chapter 5	Geometric Design of Junction
5.1	Alignment
5.2	Cross Section
5.3	Geometric Design



3.3.2.2 The Expert Team and KCCA has prepared the Junction Designs for Pilot Project.



Figure 3-21 Junction Design Examples for Pilot Project

### 3.3.3 OJT for Junction Design

3.3.3.1 The design OJT was held sampling the Kibuye and Kabalagala junction according to the Manual on June 23,2015.

3.3.3.2 Since the C/Ps themselves are not expected to actually design junction, it was focused on the perspectives and data necessary for reviewing junction designs.



Figure 3-22 Kibuye Junction for Design OJT



Photograph 3-5 A Scene of Junction Design OJT Session at KCCA

Table 3-5 List of Participants of OJT of Junction Design

Lecturer		KCCA	
Name	Position	Name	Position
Eng. Kiminori Matsumoto	JICA Expert	Eng. Jacob Byamukama	Manager, Directorate of Engineering and Technical Services
Eng. Yoshikazu Asada	JICA Expert	Eng. Joel Wasswa,	Transport & Traffic Management Engineer
		Mr. Adam Ssenooba	Transport Planning & Traffic Management officer
		Ms. Fortunate Biira	Transport Planning & Traffic Management officer
		Mr. Leonard Mwesigwa	Transport Planning & Traffic Management officer

## 4 ACTIVITIES RELATED TO [OUTPUT 3]: THE CAPACITY FOR INSTALLATION AND MAINTENANCE OF SIGNALS AT JUNCTION IS ENHANCED

### 4.1 SIGNAL TRAFFIC CONTROL SYSTEM IN VARIOUS COUNTRIES

#### 4.1.1 Split Cycle Offset Optimization Technique (SCOOT) UK

4.1.1.1 Split Cycle Offset Optimization Technique (SCOOT) is a real time adaptive traffic control system for the coordination and control of traffic signals across an urban road network. Originally developed by the Transport Research Laboratory for the Department of Transport in 1980, research and development of SCOOT has continued to present day. SCOOT is used extensively throughout the United Kingdom as well as in other countries.

4.1.1.2 SCOOT automatically adjusts the traffic signal timings to adapt to current traffic conditions, using flow data from traffic sensors. Sensor data is usually derived from inductive loops in the carriageway but other forms of detection are increasingly being used.

4.1.1.3 Adjacent signal-controlled junctions and pedestrian/cycle crossings are collected together into groups called "regions". SCOOT then calculates the most appropriate signal timings for the region. SCOOT changes the stage lengths or the splits to ensure that the delays are balanced as much as possible, changes the cycle time to ensure that delays are minimized and finally changes the offset between the signal installations to ensure that the timings are co-ordinated as well as possible.

4.1.1.4 It was said that SCOOT has been demonstrated to yield improvements in traffic performance of the order of 15% compared to fixed timing systems.

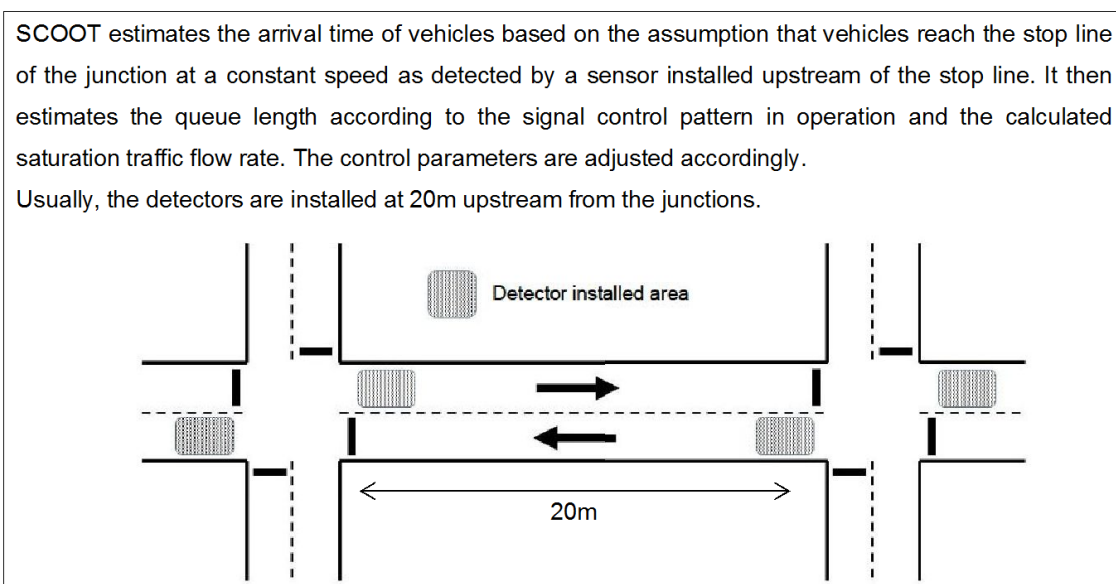


Figure 4-1 Control Principal of SCOOT System

### 4.1.2 MODERATO JAPAN

4.1.2.1 MODERATO is the abbreviation of Management of Origin-Destination Related Adaptation for Traffic Optimization; and its algorithm have been developed in Japan. MODERATO technology enables estimating the green time phases for each direction (leg) according to traffic movement collected by multiple detectors. The system also reviews the green time split in every 2.5 or 5 minutes and the cycle length in every 5 or 15 minutes. The system aims to reduce and balance delays in the network.

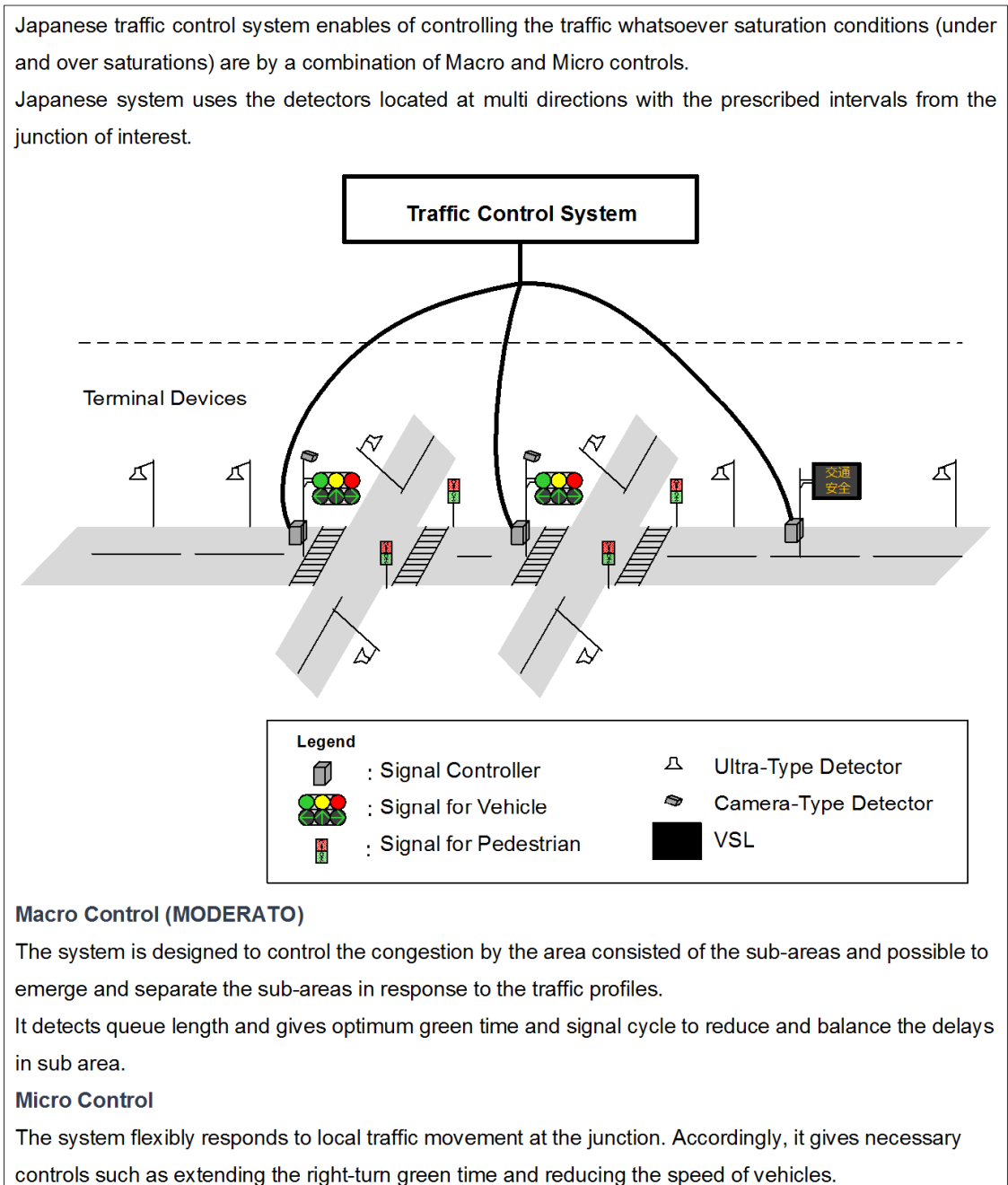


Figure 4-2 Control Principal of MODERATO System

### 4.1.3 Comparison of Control Principals

4.1.3.1 Table 4-1 summarizes the control features of MODERATO and SCOOT

Table 4-1 Summary of Controlling Features of MODERATO and SCOOT

Aspects	MODERATO(JP)	SCOOT(UK)
Detector Positions	At each leg of the critical junction At 150m 300m, 500m and 1000m upstream of the junction (stop line) for Macro Control At 30-40m, 150-200m upstream for Micro Control	At each leg of the junction At 20m upstream of the junction (stop line)
Control Target Indexes		
Macro	Saturation rate (number of vehicles in queuing considered) Queue Length Trip (Journey) Time	Delay (by detecting queue by stopping vehicle group) Congestion (yes or no) Effective green time rate (Traffic/Green Time, Saturation Flow Rate) Programmed
Saturation Flow Rate	Semi-automatic computation	
Sub-Area	Available to emerging and separating	Programmed
Cycle Length		
Review Timing	Every 5 min. or 2.5 min	Every 5 min or 2.5 min
Variation Range	Maximum $\pm 12.5\%$ of Cycle Length	$\pm C$ sec (-8,0,+8)
Adjustment Approach	Selection of the programmed patterns according to sum of saturation rates at each leg or queue lengths Optimization of the control coordination among junctions when under saturation/ Maximization of traffic flow volume when over saturation	Making maximum 90% of effective green time rate at each leg for the heaviest loaded junction in sub-area Shortening of cycle length till the shortest time when under saturation/Extending cycle length till the longest time when over saturation
Control Target	Available	Available
Double Cycle		
Split		
Review Timing	Every 5 min	Every phase
Variation Range	By 1% of split (automatic computation)	$\pm G$ sec (-4,0,+4)
Adjustment Approach	Balancing splits by saturation rates at each leg Selection among the programmed split according to the queue length Optimization of trip time or shortening of queue length	Adding G sec to the split where almost effective green time rate is observed (Balancing effective green time rates at each phase i.e. balancing of saturation rates)
Offset		
Review Timing	Every 15 min	Every cycle
Variation Range	Section from 7 programmed times and the offset when congested	$\pm O$ sec (-4,0,+4)
Adjustment Approach	Selection from the programmed times according to traffic shares by inbound and outbound directions and cycle length Selection from the programmed times to each link according the queue lengths Optimization of control coordination between the junctions when under saturation	Incorporating variation of cycle length Selection from the programmed time to each link when congested
Control Target	Realization of intervention in controlling according to the control policy and need	Optimization (minimizing) of delay and stop times
Micro Control	Gap detection control Local responsive control	Local responsive control
Device Unit Prices at Origin Country (USD)	Controller: 15,000 Signal Head: 500 Ultra-Type Detector: 1,000 Image Type Detector: 14,000	Controller: 18,000 Signal Head: 500 Ultra-Type Detector: 800

## **4.2 PREPARATION OF SIGNAL MAINTENANCE GUIDELINE**

### **4.2.1 Current Maintenance System**

4.2.1.1 In order to ensure proper and timely maintenance of existing 8 traffic signals, KCCA has engaged a contractor through framework contract since June 2017. These 8 traffic signals are: Nakawa, Wandegeya, Natete, Entebbe/Jinja Road, Jinja Road, Shoprite, Clock Tower and Bakuli.

4.2.1.2 KCCA advertised on the newspaper and called for bid from the interested contractors and the contractor was selected based on the ‘Technical Compliance Selection for Supplies and Non-Consultancy Services’ of KCCA through one envelop system. The Technical Compliance Selection methodology recommends the lowest priced bid, which is eligible, compliant and substantially responsive to the technical and commercial requirements of the Bidding Document, provided that the Bidder is determined to be qualified to perform the contract satisfactorily.

4.2.1.3 The evaluation procedure was consisted of three sequential stages –

- Preliminary examination to determine the eligibility of bidders
- Detailed evaluation to determine the commercial and technical responsiveness
- Financial evaluation

4.2.1.4 A number of companies have shown their interests and bought the bidding document. However, only one company has finally submitted the bid with a financial proposal of 527,903,692 Uganda Shilling.

4.2.1.5 Special condition of the contract is call-off order which means the contractor will response to KCCA upon their order and claim the bill as per actual work done based on the approved rate under the framework contract.

4.2.1.6 To achieve the long-term maintenance objectives of the KCCA, the following principles shall be followed:

- The Contractor shall undertake preventative maintenance, emergency repair, and the repair of accident damage within the times specified.
- The Contractor shall ensure that the supply of spare parts and back-up equipment is sufficient to maintain the operation of the signals within the times specified.
- The Contractor shall record and schedule all inspections, maintenance and repair work undertaken, including establishing baseline data for use in performance monitoring. Baseline data shall be established submitted in a report within one month from contract signature.

4.2.1.7 For the traffic signal installations, the Contractor shall carry out:

- Preventative Maintenance on a regular basis of the signal installations which includes repair or replacement of all components of lantern assemblies, posts, mast arms, controllers and cabinets, vehicle detection systems and all interconnecting cabling.
- Prompt emergency repair of any equipment that fails under normal working conditions.
- Prompt repair in the case of accident damage or vandalism.
- Supply of all spare parts as and when required to keep the system in good working order
- *The signal controller is the interface at the terminal side when the central control takes place, and it plays an important role in calculating and controlling the signal by itself according to the traffic flows when the terminal control takes place, so it is the most important and critical equipment in the signal control system and is required to be in constant operation. For this reason, when a problem occurs, it is necessary to repair or replace the equipment as soon as possible. However, Japanese-made equipment is not designed so that the user/owner can set the signal control pattern by himself, and when replacing the equipment, it is necessary to install the pattern program at the manufacturer's factory. Therefore, even if KCCA has a spare, it cannot be replaced immediately. In this respect, SCOOT is more user-friendly than the Japanese equipment, as the user can design and install the signal patterns using dedicated software. In the future, Japanese manufacturers will need to offer the same ease of use as SCOOT, and KCCA has already made a strong appeal to equip this function with Japanese manufacturers. The response of the Manufacturer in the future will affect the concept of spare parts for the signal controller.*

4.2.1.8 Regarding the standards it is mentioned that all work shall be carried out in accordance with the Ministry of Works manual and specifications or British standards where Ugandan standards do not exist.

4.2.1.9 The Contractor shall be responsible for the ready-supply and availability of consumables such as replacement lamps. The Contractor must possess, and have readily available in functioning order, all required tools, equipment, apparatus, facilities, and materials needed to perform all work necessary to maintain and repair the traffic signals. All excess materials and equipment in the



Photograph 4-1 A Scene of Discussion with KCCA regarding maintenance plan

Contractor's inventory shall be the property and responsibility of the Contractor until such materials or equipment is used or installed in the City.

#### 4.2.2 Signal Maintenance Plan

4.2.2.1 After discussion with KCCA, the detailed maintenance plan per the equipment was established as follows,

##### 4.2.2.1.1 Signal Controller

No.	Inspection Items	Objective	Frequency
	Voltage and electricity flow measurement	To measure input power-supply voltage and electricity flow (including electricity leak). To measure the voltage output from the controller. To measure the voltage used in the controller.	Every 6 months
	Grounding resistance measurement	To measure the grounding resistance of the earth cable and check it is under 100 $\Omega$ .	Every 6 months
	Time of controller	To check that the display time is the same as the proposed timings of KCCA and correct it if necessary.	Every 6 months
	Performance of controller	To check for any abnormalities in controller's performance to ensure proper performance.	Every 6 months
	Individual connection	To check connection of cables, connectors and terminals.	Every 6 months
	Performance check of the display and switches	To check proper performance of display and each switch.	Every 6 months
	Cleaning of the body and external appearance	To check installation condition of main body of the device for damage, rust, corrosion and water leaks. Inside and outside of the body will be cleaned by blowers.	Every 1 months

##### 4.2.2.1.2 Signal Light

No.	Inspection Items	Objective	Frequency
	External appearance	To check visually the angle of lantern boxes, arms and mounting hardware and installation condition for damage, deformation, corrosion and rust.	Every 3 months
	Lighting quality	To check it lights up red, yellow and green properly.	Every 3 months

#### 4.2.2.1.3 Detector

No.	Inspection Items	Objective	Frequency
	Power-supply voltage	To measure power-supply voltage.	Every 6 months
	Grounding resistance measure	To measure the grounding resistance of earth cable and check it is under 100 $\Omega$	Every 6 months
	Individual connection	To check connection of cables, connectors and terminals.	Every 6 months
	Detection performance check	To check detection area when vehicles pass with a visual check using a computer.	Every 6 months
	Cleaning of the body and external appearance	To check installation condition of main body of the device for damage, rust, corrosion and water leaks. Inside and outside of the body will be cleaned by brushes.	Every 6 months

#### 4.2.2.1.4 Push Button

No.	Inspection Items	Objective	Frequency
	Individual connection	To check connection of cables, connectors and terminals.	Every 6 months
	Performance	To check proper performance by operating the switch.	Every 6 months
	Cleaning of the body and external appearance	To check installation condition of main body of the device and damage, rust, corrosion and water leak. To check for visual defects (such as blurred letters).	Every 6 months

#### 4.2.2.1.5 Signal Pole

No.	Inspection Items	Objective	Frequency
	External appearance	To check for cracks and deformation, surface processing, rust condition and abnormality of the base and the main body of pole. If there is a poster, it shall be removed.	Every 6 months
	Terminal box	To check for damage, deformation, rust or corrosion on the body and mounting hardware.	Every 6 months
	Arm	To check for loose connection, cracks, damage,	Every 6 months

		deformation, surface processing and rust condition of arm and mounting hardware.	months
--	--	--	--------

#### 4.2.2.1.6 Pedestrian Pole

No.	Inspection Items	Objective	Frequency
	External appearance	To check for cracks and deformation, surface processing, rust condition and abnormality of the base and the main body of posts. If there is a poster, it shall be removed.	Every 6 months
	Lighting quality	To check it lights up red and green properly. Are you referring to intensity or correspondence errors?	

#### 4.2.2.1.7 Hand Hole/Manhole

No.	Inspection Items	Objective	Frequency
	External appearance	To check there is no cracks, damage, stagger in the lid or lid frame.	Every 1 months
	Inside	To check for damage on the cap frame and box by opening the hand hole / manhole.	Every 6 months

#### 4.2.2.1.8 UPS

No.	Inspection Items	Objective	Frequency
	Voltage measurement	To measure input voltage and output voltage.	Every 6 months
	Monitor lamp	To check the display and check for errors or notices as indicated in the instruction manual.	Every 3 months
	Performance	To ensure proper performance by turning off the input power.	Every 3 months
	Body cleaning	To clean the body, inlet of air etc.	Every 3 months

#### 4.2.2.1.9 Transformer

No.	Inspection Items	Objective	Frequency
	Voltage measurement	To measure input voltage and output voltage.	Every 6 months
	Overheating	To check for overheating or burning by visual and	Every

		touching	3months
	Internal appearance / external appearance	To clean the body	Every 6 months

4.2.2.1.10 AVR (automatic voltage regulator)

No.	Inspection Items	Objective	Frequency
	Voltage measurement	To measure input voltage and output voltage.	Every 6 months
	Overheating	To check for overheating or burning by visual and touching	Every 6 months
	External appearance	To clean the body	Every 6 months

4.2.2.1.11 AEG (automatic electrical generator)

No.	Inspection Items	Objective	Frequency
	Power generation parts	To check voltage and frequency of electric generation. To check for abnormal noise or vibration when the engine is on.	Every 6 months
	Controller	To measure generate detection voltage and charge voltage. To check whether the manual start and stop condition is good and its performance when the signal controller is active and automatic control is correct.	Every 6 months
	Engine	To check start condition of the engine and check for irregular spin. To check the dust condition of the drive belt. If necessary, to replace air filter, fuel filter, oil filter and oil.	Every 3months
	Cleaning of the body and external appearance	To check installation condition of the main body for damage, rust or corrosion. To clean the body inside and outside.	Every 6 months
	Battery	To check the installation date of the battery and measure battery voltage. (does this refer to monitoring number of discharge cycles?) To replace batteries those will complete their working life before the next inspection.	Every 3 months
	Wiring / pipework	To check loose connection, terminal and screw.	Every 6

			months
--	--	--	--------

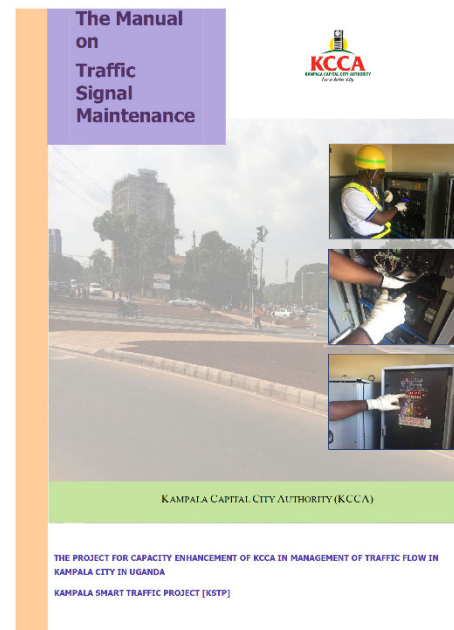
#### 4.2.2.1.12 Controller House

No.	Inspection Items	Objective	Frequency
	External appearance	To check for damage or cracks in the roof, external wall, door, window, and controller box. To check the performance of the light. To check it has been locked up.	Every 6 months
	Internal Appearance	To check for moisture intrusions and pests.	
	Internal function	To ensure the proper performance of distribution board, light and wiring. To check there is no unnecessary items inside.	Every 6 months

### 4.2.3 Preparation of the Manual on Traffic Signal Maintenance

4.2.3.1 According to the Maintenance Plan, the Manual on Traffic Signal Maintenance was prepared and its contents is as follows,

Table of Contents	
1.	Introduction
2.	Structure of the Manual
3.	Current Traffic Signals in Kampala
4.	Present Signal Maintenance System of KCCA
4.1	Process of Contractor Selection
4.2	Major Technical Specification of the Contract
4.3	Observation of Present Maintenance System
5.	Recommended Maintenance System
5.1	Background
5.2	Different Maintenance System
5.3	KCCA's Role in Maintenance System
5.4	Classification of Maintenance Activities
6.	Recommended Periodic Inspection
6.1	Periodic Inspection Work Items
6.2	Inspection Process
6.3	Daily Report
6.4	Inspection Criteria of the Equipment
7.	Required Maintenance Work
7.1	Maintenance Item
7.2	Implementation Procedure
7.3	Maintenance Process
7.4	Report
8.	Lantern Check & Cleaning
8.1	Cleaning Items



8.2	Implementation Method
9.	Maintenance Parts Inventory
9.1	Parts to be Maintained
9.2	Storage of Spare Parts
9.3	Method for Managing Maintenance Components
9.4	Report on Maintenance Parts Inventory
10.	Maintenance Tender Specification
10.1	Title
10.2	Object of the service
10.3	Contract Term
10.4	General Terms
10.5	Management of Maintenance Material
10.6	Instrument necessary for Implementation of Service
10.7	Implementation of Safety Measures
10.8	Document Submission and Reports
10.9	Payment Receiving Method
10.10	Others
10.11	Dispute
10.12	Contact:
11.	Appendices
	Appendix 1 Different Type of Check Sheet
	Appendix 2 Stock Management Sheet

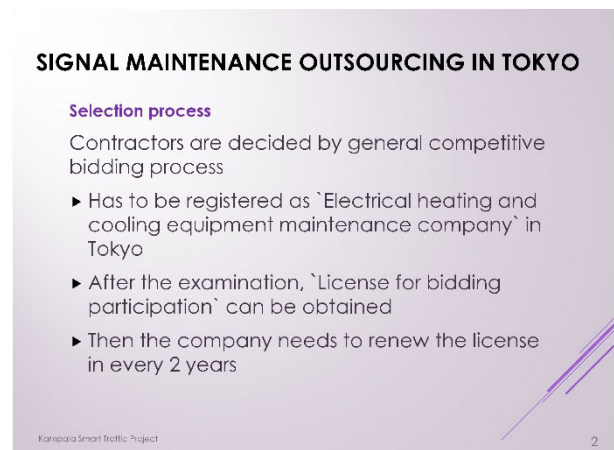
#### 4.2.4 Signal Maintenance Seminar

4.2.4.1 During the 1st Training in Japan in 2016, it was a seminar for the Outsourcing of Signal Maintenance on 8<sup>th</sup> August by Mr. Yokoi, the Expert.

4.2.4.2 In the seminar, the signal maintenance out-sourcing system was explained.



Photograph 4-2 A Scene of Seminar for the Outsourcing of Signal Maintenance



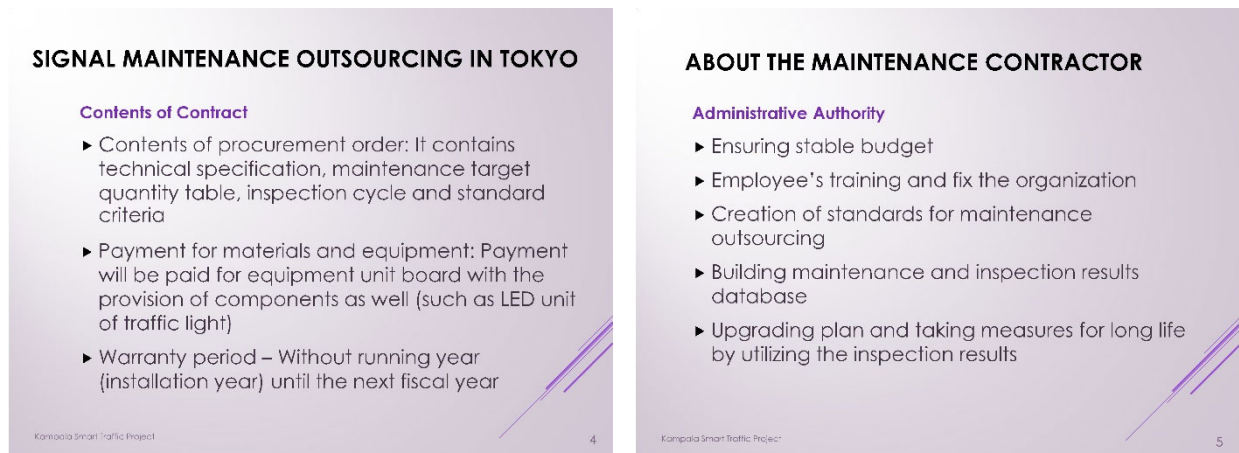


Figure 4-3 Some Presentation Slides for Outsourcing of Signal Maintenance Seminar

Table 4-2 List of Participants of Outsourcing of Signal Maintenance Seminar

Lecturer		KCCA	
Name	Position	Name	Position
Mr. Akira Yokoi	JICA Expert	Eng. Andrew Kitaka	Director, Directorate of Engineering and Technical Services
Eng. Pallab Debnath	JICA Expert	Dr. Steven Kasiima	Assistant Inspector General of Police, Director of Traffic and Road Safety, Uganda Police Force
		Mr. Martin Sekajja	Deputy Director, ICT, Office of the Executive Director
		Eng. Jacob Byamukama	Manager, Directorate of Engineering and Technical Services
		Eng. Beatrice Magumba	Transport and Traffic Engineering Specialist, Directorate of Engineering and Technical Services

#### 4.2.5 Signal Maintenance Technical Visit

4.2.5.1 During the 1<sup>st</sup> Training in Japan, 2016, it was a technical visit for the Signal Maintenance at Yotkaichi, Mie Prefecture guided by Mr. Furuichi, Shin-KOWA Corporation, the Japanese Signal Maintenance Contractor.



Photograph 4-3 A Scene of Technical Visit for Signal Maintenance

Table 4-3 List of Participants of Signal Maintenance Technical Visit

Lecturer		KCCA	
Name	Position	Name	Position
Mr. Mitsuaki Furuichii	President, Shin-KOWA Corporation	Eng. Andrew Kitaka	Director, Directorate of Engineering and Technical Services
		Dr. Steven Kasiima	Assistant Inspector General

			of Police, Director of Traffic and Road Safety, Uganda Police Force
		Mr. Martin Sekajja	Deputy Director, ICT, Office of the Executive Director
		Eng. Jacob Byamukama	Manager, Directorate of Engineering and Technical Services
		Eng. Beatrice Magumba	Transport and Traffic Engineering Specialist, Directorate of Engineering and Technical Services
		Mr.. Akira Yokoi	JICA Expert
		Eng. Pallab Debnath	JICA Expert

### 4.3 SIGNAL MAINTENANCE OPERATION TRAINING

#### 4.3.1 Need of Maintenance Operation Training

4.3.1.1 Since the beginning of the Project, KCCA appeals the problem of operation with the signal provided by past Japan's Grant Aid that the signal phase design is no longer adequate that needs to be reviewed and changed.



Photograph 4-4 An OJT Scene of Re-configuration of Signal Timing

4.3.1.2 Most recent signal controller can be configured by laptop computer which is not applicable to the controllers by the Grant. They are however still configured by manual that Expert demonstrated with the existing controller. The demonstration was held in Bakuli junction and give expiation on how to configure the controller.

4.3.1.3 It was observations on existing controllers by Mr, Sanpei, the Expert for Signal O&M as follows,

4.3.1.3.1 Basically, the controllers work properly with exception of the Clock Tower and Shoprite Junction that the backup system seems to be in problem. However, the controller is in workable condition as long as power supplies.

Table 4-4 Signal Equipment Working Status Check Result

		Controller	AVR	UPS	AGE
1	KitgumHouse	OK	OK	OK	OK
2	Nsambya	OK	none	none	none
3	ClockTower	OK	Nil	Nil	Nil
4	Shoplite	OK	OK	OK	NG
5	Kampala	OK	OK	OK	OK
6	Bakuli	OK	OK	OK	OK

4.3.1.3.2 According to the observation, the regular and routine maintenance works are taken place as required and programmed.

#### 4.3.2 Maintenance for Signal Control Experiment in Bakuli Junction

4.3.2.1 Traffic police often ignores the subordinate traffic in manual operation and more time is given to the main traffic, which is assumed to lower the efficiency of junctions. To improve current control

approach, the Experts needs to demonstrate how the existing signal phase designs are effective with comparison of various phase designs.

4.3.2.2 As explained, the objectives of the experiment are as follows,

4.3.2.2.1 To experience KCCA engineers/ technicians how to change the signal timing practically in field

4.3.2.2.2 To observe & demonstrate the traffic flow situation in several cases by changing the cycle time

a. Case 1 Optimum cycle time

b. Case 2 Long cycle time

c. Case 3 Short cycle time

4.3.2.3 Programme started from the traffic count in order to design the optimum signal design phase. The count was carried out with following methodology,

- Present traffic volume was captured by video at Bakuli from 7:00 ~ 9:00 1
- Count was completed in project office at 15 minutes' period
- Traffic volume of Albert Cook Direction was considered as peak direction and 7:30 ~ 7:45 is found to be the peak period.
- Direction wise peak hour traffic was derived based on the data.





4.3.2.4 The result of traffic count is as shown is Table 4-5.

Table 4-5 Traffic Count Result at Bakuli Junction

Name of Legs	Hoima Road (Kasubi)	Namirembe Road	Rubaga Rd	Albert Cook Rd.	Total Out
Hoima Road (Kasubi)	0	388	148	27	563
Namirembe Road	216	0	179	326	722
Rubaga Rd	138	215	0	12	365
Albert Cook Rd.	125	919	14	0	1,058
Total In	478	1,522	342	366	2,708

4.3.2.5 The existing signal phase design was compared with new designs based on the traffic count.

Table 4-6 Signal Patterns/Cycles for the Test

Phase	1	2	3	4	Total
Direction					
Present	86	31	39	26	182
Case 1 (Optimum)	49	21	49	21	140
Case 2 (Long)	70	30	70	30	200
Case 3 (Short)	35	15	35	15	100

4.3.2.6 Field Test was conducted on 26th April 2016. The day for the test had rainfall and continued during the test. The number of Boda boda traffic looked low because of the raining.



Photograph 4-5 A Scene of Field Test at Baluli Junction

4.3.2.7 Test Result is shown in Figure 4-4.

4.3.2.8 Surprisingly, the optimum design did not result in the largest traffic flow. The Expert analyzed the result and concluded as follows,

- Position for the vehicle to stop was varied that made inappropriate condition for the testing because optimum signal design only perform sufficiently under the condition that traffic flow regulated according to lane markings,
- As the cycle is longer, the queue length for right tuning movement (traffic) is also longer and larger creating some conflict with through traffic on the crossing direction which result in traffic capacity in the junction low.

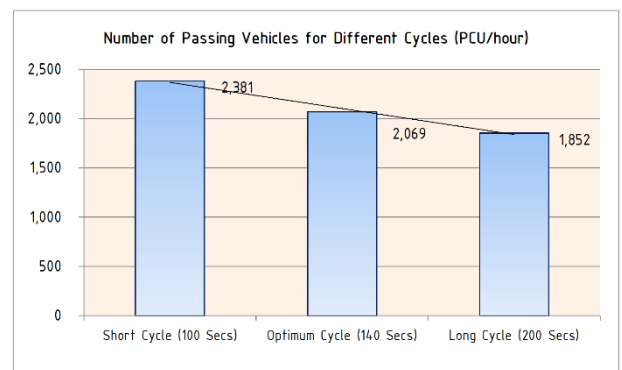


Figure 4-4 Traffic Volume by Signal Patterns/Cycles

4.3.2.9 This result suggested traffic discipline by drivers is very critical for the signal at junction to perform properly.

#### 4.4 SIGNAL MAINTENANCE RECORD FOR PILOT PROJECT

##### 4.4.1 Outsourcing

4.4.1.1 As discussed, it is considered practical for KCCA to outsource the maintenance works to private sector. Accordingly, the four (4) junctions piloted under the Project were out sourced to RE-POWER TECHNICAL SERVICES LTD as a result of the open tender for the maintenance contract.

4.4.1.1.1 RE-POWER TECHNICAL SERVICES LTD is a private company which was registered on March 17, 2005 to exploit the opportunities that existed in the growing Industrial and construction sector specializing mainly in the areas of Electrical & Electronics (Design, Supply, Installation, Training, Commissioning and Maintenance), Civil Works, Mechanical Works and Traffic Signalization Works.

4.4.1.1.2 RE-POWER is motivated to work for Japanese Signal Equipment/Control System as the company sent their technicians to Japan for the training by their cost.

4.4.1.2 The following is an example of the maintenance working sheets for the four junctions.

**RE-POWER TECHNICAL SERVICES LTD**  
Plot 4390/91, Namoto-Kyaggwe  
Namawe, along Kampala-Jinja Highway  
P.O. BOX 732, Kampala  
Uganda.  
Tel: +256 772-473489  
+256 706-219135  
Email: re\_potech@yahoo.com

**TRAFFIC SIGNAL PREVENTIVE MAINTENANCE FORM**  
Project name: KSI  
Junction name: KATI KATI  
Date: 5th 10/2021

No	Inspection item	Detail	Good/bad or measured value
1	Exterior	Check on the body, metal fittings and piping 1. There are no damage, deformation and rust 2. The fittings are tight 3. There are no posters and graffiti	Good / bad Good / bad Good / bad
2		Clean each part Remove dust and dirt	Good / bad
3		The printed circuit board is not deformed and the connectors are tight	Good / bad
4	Interior	Check on the terminal board and the cable 1. The terminal board and the terminals are tight 2. Cables are undamaged	Good / bad Good / bad
5		There are no fire damages, cracks and discoloration	Good / bad
6	Device door	Check on the fitting of the door and the device body 1. The water proof rubber sealant is undamaged 2. The door can be locked perfectly	Good / bad Good / bad
7	Input power	1. AC1-AC2 and AC1-E are AC100V±10V (AC2-E is 0V) 2. Record the measured value (between AC1-AC2)	100 V
8	Input power load current	Load current measurement 1. Measure 1 cycle and the maximum value 2. Record the measured value	0.8 A
9	Output power voltage measurement	Control circuit board voltage measurement Measure the voltage of each circuit board E.g. (check terminal of the G-G detection board) +3.3V (+0.3V) 1.5-1.7 V +5V (+0.3V) 4.5-4.7 V +12V (+1.0V) 11.5-12.5 V -12V (-1.0V) -11.5-12.5 V +120V (+1.0V) 115-125 V	Good / bad Good / bad Good / bad Good / bad Good / bad
10	Grounding resistance	Ground resistance measurement 1. Measurement shall be carried out through the three-electrode method as a rule; however, the two electrode system may be used depending on the location of installation 2. Record the measured value (100Ω or less)	Good / bad 99 Ω
11	Date and time	Check on the date and the time 1. The date and time match the standard time 2. Correct the time if there is any deviation from the standard time	Good / bad
12	Lighting instrument illumination status	Check on the illumination status of the lighting instrument The lighting instrument illustrates as indicated in the current ladder diagram	Good / bad
13	Monitor illumination status	Check on the illumination status of the monitor 1. Each malfunction indication lamp is not illuminating 2. There are no dead LEDs in the segment indication part and each lamp	Good / bad Good / bad
14	Time limit table	Check on the independent operation time limit, pattern switching time limit and protection time limit table and save each time table to an electronic media (Use console PC)	Good / bad

*Shirishile Kabanda*  
*WKS Malagala*  
09/10/2021

MAINTENANCE FORM

15	History	Check on the abnormality history	Check on the abnormality history and save it to an electronic media (Use console PC)	Good / bad
16	Remote operation	Check on the remote operation	1. The remote indication lamp illuminates as indicated in the current ladder diagram 2. Remote indication lamp of the controller part panel illuminates 3. Table control method The remote indication lamp operates accordingly when indicator: time is set for each stage based on the received signal control constant	Good / bad Good / bad Good / bad
17	Independent operation (multi stage) (Note)	Check on the independent operation	1. It switches to independent operation when the remote command signal is disconnected 2. Remote indication lamp of the controller part panel turns off and multi-stage indication lamp illuminates 3. Operation follows the independent operation time limit table and ladder diagram	Good / bad Good / bad Good / bad
18	Protection operation (Note)	Check on the protection operation	1. It switches to protection operation if independent operation time limit table is not set 2. Remote indication lamp of the controller part panel and multi-stage indication lamp turn off 3. Operation follows the protection operation time limit table and ladder diagram	Good / bad Good / bad Good / bad
19	Manual operation (Note)	Check on the manual operation	1. It switches to manual operation when the operation switch is changed "Manual" 2. Remote indication lamp of the controller part panel and multi-stage indication lamp turn off 3. It proceeds to the next stage one by one, every time the manual button is pressed	Good / bad Good / bad Good / bad
20	Flash operation (Note)	Check on the flash operation	1. It immediately switches to manual flash when the flash switch is changed "On" 2. Each direction operates with the designated indication colour 3. Normal indication begins from the first stage after the flash switch is switched "Off" and the initial all red time (5 seconds) is over	Good / bad Good / bad Good / bad
21	G-G detection (Note)	Check on the G-G detection operation	1. It forces green signals of heavy traffic flow to illuminate at the same time, detects errors and switches to erroneous flash 2. The G-G error indication lamp of the controller part panel illuminates 3. It recovers from erroneous flash when a recovery button is pressed	Good / bad Good / bad Good / bad

(Note): Pay enough attention to the traffic flow when inspecting

Company Engineer / Supervisor / Technician: Shirishile Kabanda  
Signature: [Signature]  
KCCA Supervisor: Mrs. Ngambi  
Signature: [Signature]

Figure 4-5 Signal Maintenance Working sheet

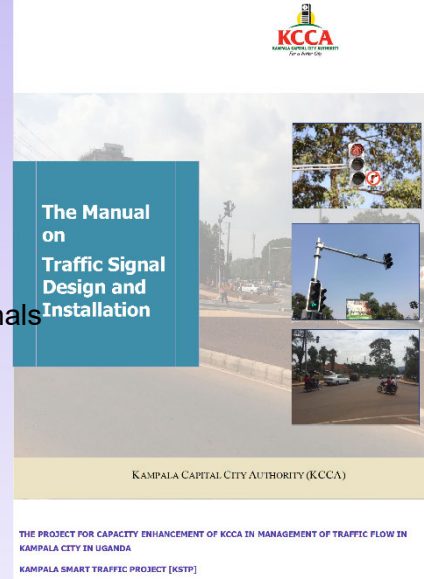
4.5 PREPARATION OF THE MANUAL ON TRAFFIC SIGNAL DESIGN AND INSTALLATION

4.5.1 Preparation Objective

4.5.1.1 The manual has covered the basic understandings required for planning and design of installing traffic lights at an at-grade junction. Project team expects this manual will be helpful to the relative engineers to carry on their daily professional activities. This manual is also required to be reviewed after several years as well as modified if necessary. Its contents is as follows,

Table of Contents	
Chapter 1	Role of Traffic Signal
1.1	Introduction
1.2	Objectives for Traffic Signals
1.3	Points to be considered
1.4	Interpretation of Traffic Lights
Chapter 2	Basic Understanding of Traffic Signal
2.1	Signal Phase & Stage

2.2	Signal Parameter
2.3	Lost Time
2.4	Delay Time due to Waiting for Green Light
2.5	Relation between Signal Parameter and Delay Time
2.6	Demand Flow Rate
2.7	Saturation Flow Rate
2.8	Capacity
2.9	Flow Ratio
2.10	Degree of Saturation
2.11	Traffic Control Method
2.12	Different Types of Traffic Signal
Chapter 3	Method of Signal Junction Design & Capacity Analysis
3.1	Traffic Data
3.2	How to Decide Signal Phases and Stages
3.3	Examples of Different Types of Stage Diagram
3.4	Capacity Analysis of a Signalized Junction
3.5	Example of Calculation of Traffic Capacity of a Signalized Junction
Chapter 4	Evaluating Performance of Signalized Junction
4.1	Delay Time Analysis of Traffic Signal
4.2	Queue Length at the Junction
4.3	Number of Stops before Crossing the Junction
4.4	Volume of Cleared Traffic
Chapter 5	Consideration for Traffic Signal Installation
5.1	Signal Light
5.2	Signal Pole
5.3	Wiring
5.4	Signal Controller
5.5	Push Button
5.6	Vehicle Detectors
Chapter 6	Various Devices and Materials of Traffic Signals
6.1	Pole
6.2	Wiring
6.3	Backup Power
Chapter 7	Process of Traffic Signal Installation
7.1	Traffic Signal Installation
7.2	Consultation before the Work
7.3	Preparation before the Work
7.4	The Work



## 5 ACTIVITIES RELATED TO [OUTPUT 4]: THE CAPACITY FOR RAISING CONSCIOUSNESS PROGRAMME CONCERNING OBSERVANCE OF TRAFFIC RULE IS ENHANCED

### 5.1 STUDY ON MANUAL TRAFFIC CONTROL

#### 5.1.1 Current Manual Traffic Control

5.1.1.1 Current manual traffic controlling has been investigated at Kitugum House Junction and Africana Roundabout by the Expert. The investigation was made at off-peak time as pm 2:30- 3:30

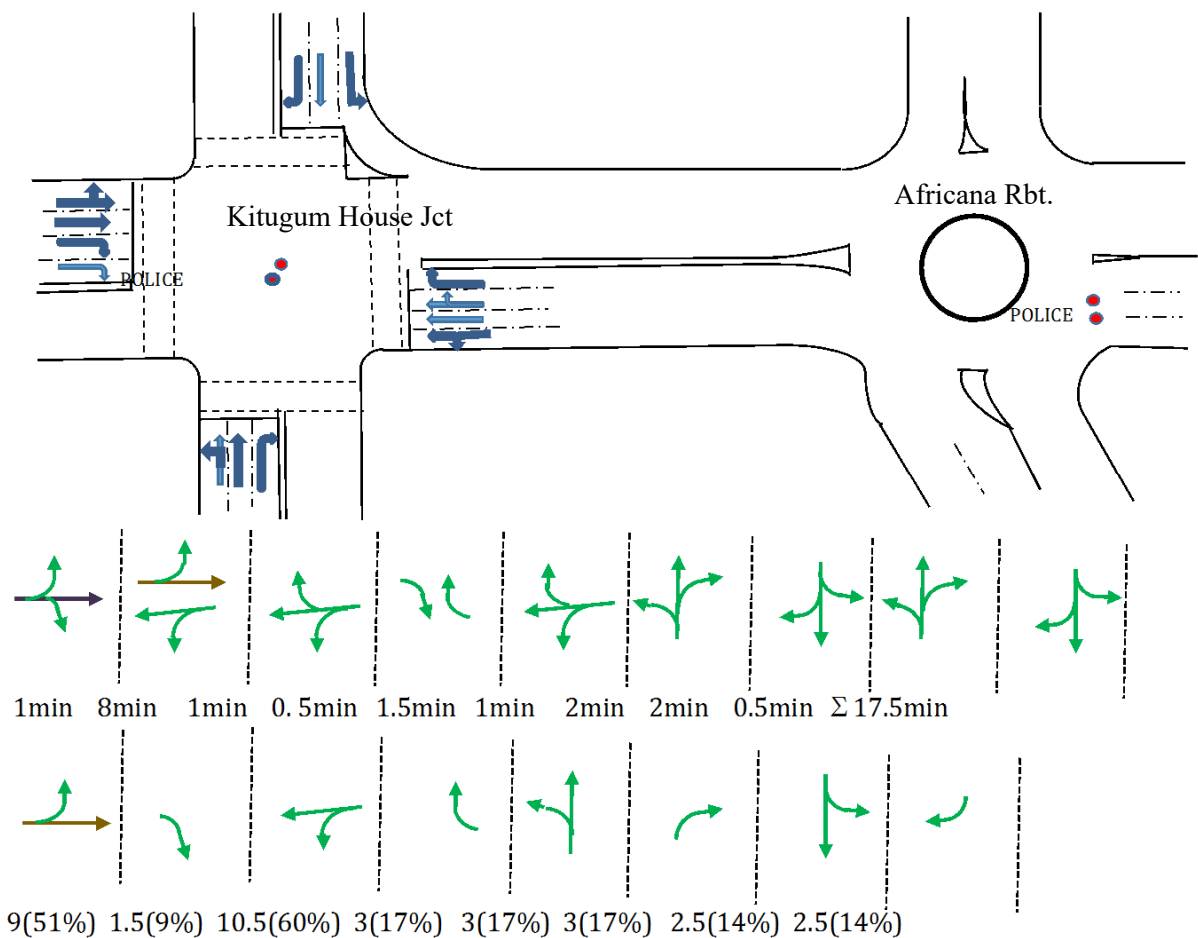


Figure 5-1 Schematic and Manual Control Situation at Kitugum House Junction

5.1.1.2 There had been 2 traffic policemen stationed at the Kitugum House Junction and the adjacent the Africana roundabout.

5.1.1.3 The Expert made the following observations on the current control,

5.1.1.3.1 At the junction, the traffic policemen were conducting traffic control as shown in the diagrams above and at the roundabout the traffic policemen were stopping vehicles that were coming from

- out of town whenever they were too many and causing congestion.
- 5.1.1.3.2 Since the cycle was 17minutes, this proportionally made the length of the waiting lanes too long. This spread to the roundabout thus causing a gridlock situation.
- 5.1.1.3.3 Focusing on the road area where there is traffic, Gridlock is a phenomenon where traffic from different directions hinders movement of vehicles. When this happens, there is a fast-spreading chain reaction where the road network traffic capacity rapidly falls. Time for reducing the traffic congestion becomes longer, and the time for passing through the traffic becomes unpredictable
- 5.1.1.3.4 Pedestrians and bodaboda riders continue stopped for crossing movement by Police unless they find the gap in the traffic flow that the Police allow.
- 5.1.1.4 Challenges arising out of the current situation.
- 5.1.1.4.1 There is a split between the direct effects of the possible controllable traffic volumes since its non-dependent on the cycle length. But generally, there is a tendency of excessive dependence of cycle length on traffic control. (Due to their convenience, manual traffic control in Tokyo was also principally banned because it would cause a lot of traffic jam.)
- 5.1.1.4.2 The Kitgum House Junction and the Africana Roundabout are not necessarily linked to work together.
- 5.1.1.4.3 When the Africana Roundabout exceeds the capacity, the roundabout gets closed out and this affects the Kitgum House Junction leading to reduced efficiency.
- 5.1.1.4.4 Since the roundabout is made for the right turn, when right turn traffic exceeds half of the roundabout, it interferes with each other's course thus causing a gridlock.
- 5.1.1.4.5 When it is manual traffic control by Police, the Police is difficult to view all the traffic, and due to different variations of manual control time, there is a big fluctuation in congestion/traffic conditions.
- 5.1.1.5 Proposed Traffic Control Method using Traffic Signals.
- a. Re-set traffic signal display times. (In reference to Traffic volume data, traffic control conditions)
  - b. Traffic Police should control traffic with respect to the traffic signals.
  - c. At the Roundabout, traffic control should be done in the following manner;
  - d. When traffic in the Jinja road direction is flowing, intersecting traffic into the roundabout should be stopped.

- e. When traffic flowing across the Jinja road direction is flowing, the respective traffic at the roundabout should be allowed to flow too. When the roundabout seems to be getting congested, traffic at the junctions should be stopped.

### 5.1.2 Principles of Manual Traffic Control

- a. During traffic control, a leader should be chosen and all commands should be made basing on the leader.
- b. As much as possible, the leader should be in position to see the whole junction.
- c. As a general rule, at least 1 traffic control officer should be at each stop line from where they follow the leader's instruction on when to stop and release vehicles and pedestrians.
- d. For better clarity, a baton should be used during traffic control.
- e. Horn/Whistles should be uniformly sounded in the following ways.

Long sound + Short sound (Beeeeeeep + Beep)                      Used only when switching signals

Repeated short sounds (Beep Beep Beep)                      When guiding, warning

- f. When vehicles and pedestrians who ignore traffic signals are found out, use a horn/whistle to give them warnings.

### 5.1.3 Optimization of Manual Traffic Control

5.1.3.1 Manual traffic control is common practice not only at un-signalized junction but also at signalized junction in Kampala and an excessive longer split tends to be given on a major traffic. In other word, there was no standard (fixed) sequence in controlling. When long split is given on a directional traffic which brings long queuing on other directional traffic which needs another longer split for the queue to be removed. This circumstance results in lowering capacity of junction.

5.1.3.2 Demonstration experiment programme of traffic control was planned and its objective of the programme is for traffic police and KCCA to understand how the regulated traffic control effect over traffic capacity and traffic safety and check the effectivity

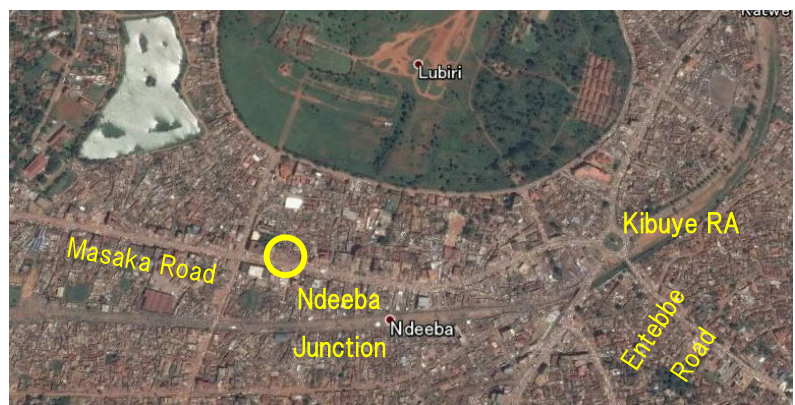


Figure 5-2 Location of Neeba Junction

of Hand Signal Control in Uganda through implementation of Japanese methods.

5.1.3.3 Ndeeba junction has been selected for the programme with the following reasons,

- a. 2-lane 4-leg typical junction: easy starting point of the experiment,
- b. Congestion during peak hours: traffic control is required,
- c. Distance from adjacent large junction: lesser traffic complications, and;
- d. No traffic signals: applicable for traffic manual control

5.1.3.4 The programme was carried out according to the flow below,

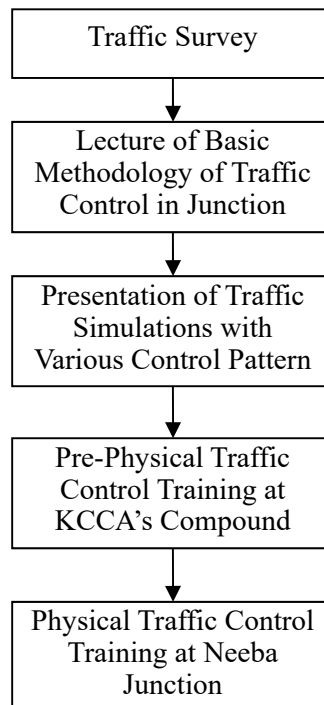


Figure 5-3 Experiment Programme Flow

5.1.3.5 Traffic survey was carried out in morning and evening peak hours and their results were as shown in Figure 5-4

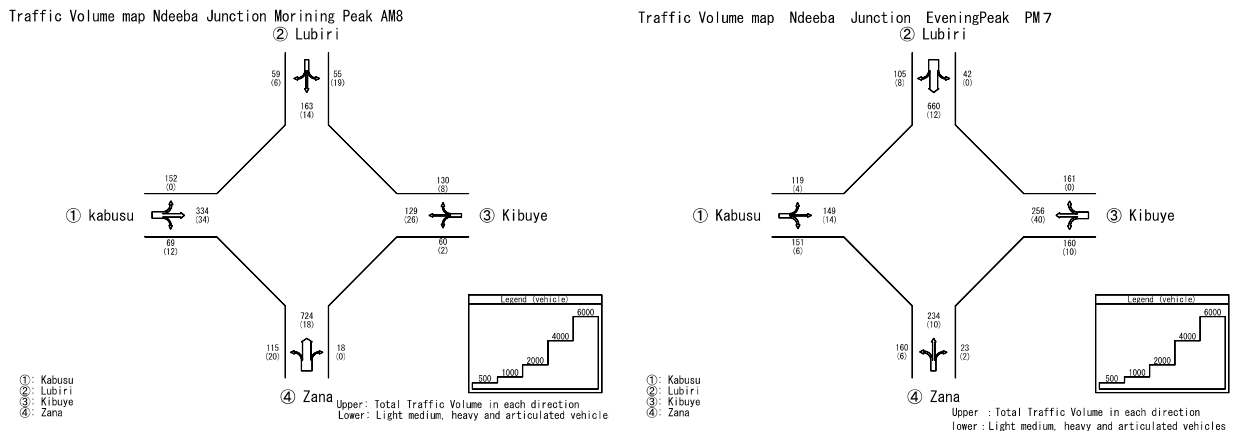


Figure 5-4 Traffic survey results

5.1.3.6 Traffic movements from the survey result were re-produced by Vissim, the simulation software. They are the ones according to the present manual control method and the another one with theoretical control.



Present Manual Control



Theoretical Control

Figure 5-5 Traffic Simulations

5.1.3.7 In Japan, the video for Manual Traffic Control has been prepared by Tokyo Metropolitan Traffic Police in order to train the police officers. The video demonstrates the standardized gestures by the officer with indicative traffic movements including go-ahead and stop for through traffic as well as go-ahead for right turn traffic. So as to seek applicability of this standard, the Uganda version was prepared by the Expert Team. In Japanese approach, there is a fixed splits and cycle in controlling.



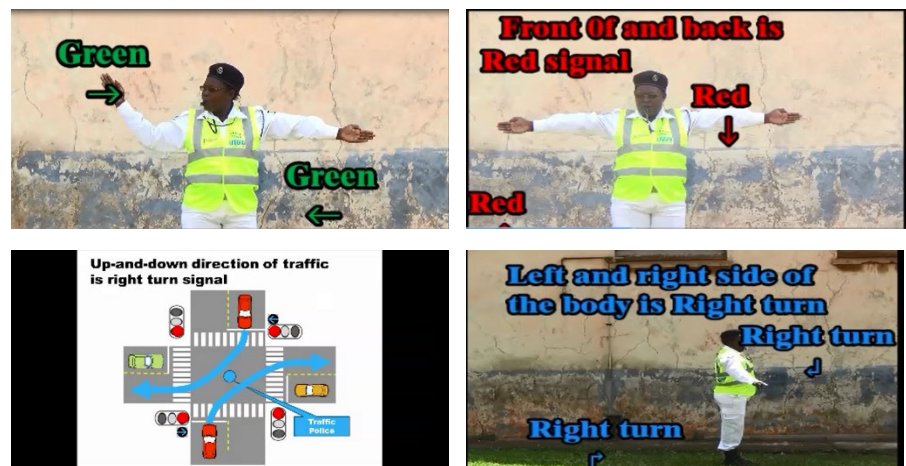


Figure 5-6 Manual Traffic Control Training Video Uganda Version

5.1.3.8 To understand optimum traffic control, traffic volumes by three cases were physically counted at Ndeeba junction from 28th September to 2nd October 2015 including,

- a. Traditional Manual Traffic Control
- b. No Traffic Control
- c. Manual Control with fixed splits and cycle (Japanese Approach).

5.1.3.9 After the counting, those traffic volumes were compared as shown in Figure 5-7.

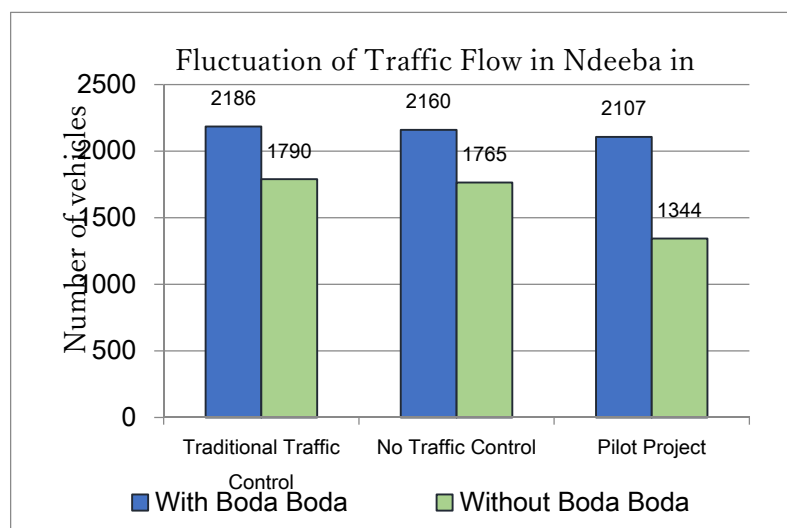


Figure 5-7 Traffics by Different Cases in the Experiment Programme

5.1.3.10 On contrary to expectation, traffic by the traditional control was largest and the one with Japanese approach was smallest among them. The analysis was made to the results and the following conclusions were obtained.

- a. The Traffic Police who was responsible for signal instruction was getting tired soon due to

good number of movements in 1 cycle.

- b. As the whole process is controlled by movement of physical gesture, it seemed application of Japanese approach is not easy.
- c. The drivers also took a little more time to start the vehicles once the signal turned into Green. Due to longer start up loss time the traffic flow was less than expectation.

5.1.3.10.1 As a result, the loss time between signal phase change was increased which eventually affect the capacity. In some cycles, more than 10 seconds of loss time was also observed.

5.1.3.11 From the execution of the programme, the following lessons are obtained.

- As the standard of manual control may differ from Japan to Uganda, intensive research is needed to be carried out and Ugandan standard of manual control should be prepared.
- Traffic knowledge of the drivers regarding the manual control should be enhanced to make the manual control effective.
- Proper Traffic Signal (mechanical) should be installed in those junctions where the traffic flow demand is very high.
- Proper enforcement should be ensured to insist the users following the traffic rules.
- Together with Traffic Signal, geometrically the intersection should be improved and proper signs and markings should be installed to guide the drivers.

## 5.2 KAMPALA CAPITAL CITY ROAD SAFETY STRATEGY 2021-2030

### 5.2.1 Background

5.2.1.1 Since 2011, KCCA has prioritized road infrastructure and implemented projects and programs geared towards improving transport and mobility in the City.

5.2.1.2 However, the increasing road crashes can undermine the gains being made by these efforts.

5.2.1.3 This strategy is therefore, part of KCCA's efforts to ensure a road network that is safe for its residents and visitors as well as achieve UN Sustainable Development Goals 3 and 11 that respectively state; by 2020, halve the number of global deaths and injuries from road traffic accidents by 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport,



with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

5.2.1.4 In line with the country's commitment to the second United Nations Decade of Action for Road Safety 2021-2030 and with support from the Bloomberg Philanthropies Initiative for Global Road Safety (BIGRS), the Kampala City Road Safety Strategy 2021 – 2030 presents a vision to achieve a Kampala Road and street network that is forgiving to users and where all people are safe from crashes as they use the roads.

## **5.2.2 BIGRS Overview**

5.2.2.1 The Bloomberg Philanthropies Initiative for Global Road Safety is a 12-year, \$259 million project that aims to reduce traffic deaths and injuries in low- and middle-income countries. Initiative partners representing the world's leading road safety organizations coordinate with in-country governmental and non-governmental stakeholder to implement road safety activities, focusing on four primary risk factors: speeding, impaired driving, helmet use, and seatbelt use. As a partner in the initiative, International Association of Chiefs of Police (IACP)'s primary role is to work alongside in-country law enforcement agencies to implement evidence-based interventions that have been proven to reduce road traffic fatalities and injuries.

## **5.2.3 Strategic Objectives**

5.2.3.1 The following Strategic Objectives have been identified by KCCA, in order to achieve the goal of reducing road crashed, fatalities and injuries in Kampala city by 50% by the year 2030. The strategies outlined will be achieved through goals and activities presented in a series of Road Safety Implementation Plans, published every two years over the course of the Road Safety Strategy period (2021-2030).

## **5.2.4 Improve Road Safety Management**

5.2.4.1 In Kampala, the leadership and coordination of road safety management will be done through a centralized City road safety steering committee comprising of representatives of key players in road safety such as;

- a. Kampala Capital City Authority
- b. Ministry of Works and Transport
- c. Uganda National Roads Authority
- d. Ministry of Health
- e. Uganda Police Force – Traffic

- f. Ministry of Education and Sports
- g. Uganda institution of Professional Engineers  
(Engineers professional body)
- h. viii. Uganda Association for Consulting Engineers (Consultants body)
- i. ix. Media

5.2.4.2 Despite centralized management, the responsibility will be shared among key stakeholders responsible for implementing road safety activities and monitoring results. If effective, Kampala will set the precedence for road safety management, in a way that can be adopted by other Ugandan cities.

### **5.2.5 Influence Behavioral Change for Safer Road Use**

5.2.5.1 To create comprehensive and inclusive programs, including mass media communication coordinated with enforcement, to improve road user behavior.

- Ensure that correct information on road safety is widely communicated to the road users to promote compliance.
- Develop key messages, target audiences and communication channels based on data and aligned with best practices.
- Each year, ensure that a communication is included on the agendas of key stakeholders.
- Participate in regulation of public transport within the City to ensure orderliness and safety of road users

### **5.2.6 Create More & Safer Infrastructure and Promote Sustainable Transportation for All**

5.2.6.1 City streets should be safe for all road users, and designed to mitigate mistakes made by road users, which are inevitable. Non-motorized transport (NMT) infrastructure will be implemented throughout the city, guided by the policy statements in the Ministry of Works and Transport NMT Policy, 2012.

5.2.6.2 The following goals will also contribute to creating safer infrastructure and sustainable transport:

- Reduce exposure to crash risks through construction of separated facilities for the different categories of road users
- Reduce road traffic injuries through construction of forgiving roads.
- Ensure through enforcement, the adherence to regulations in place for the use of facilities

for vulnerable road users such as pedestrian crossings and walkways.

- Increase motorists' awareness of vulnerable road users and pedestrian / cyclist awareness of vehicles through continued engagement and mass media sensitization.
- Control vehicle speed through regular enforcement and communication / sensitization, based on the available data.
- Expansion of the non-motorized traffic (NMT) network i.e. connected walkways and cycling tracks to different parts of the City to promote active transport.
- Enhance transport efficiency in the City by expanding the road network and upgrading traffic junctions for smooth traffic flow.
- Improve air quality in the City through implementation of scheduled eco-bus transit services.

### **5.2.7 Set and Enforce Safer Speed Limits Appropriate for Specific Roads**

5.2.7.1 To implement globally recommended and acceptable speed limits on the City's road network and further enforce these limits.

- Negotiate for city zoning and then set speed limits by zones.
- Install traffic-calming measures in target locations to reduce crash frequency for example speed humps, road narrowing and rumble strips.
- Strengthen capacity for speed management through enforcement. Provision of speed monitoring equipment like speed detectors both stationary and mobile as well as training for Police deployed within the city.
- Put in place a system to review and adjust speed limits on various roads basing on nature of users.

### **5.2.8 Support Traffic Police on Traffic Management**

5.2.8.1 To encourage use of deterrence principles and technology to protect road users, reduce crashes and offences through implementation of best practice traffic law enforcement.

- Have a five years speed management implementation plan in place.
- Have phased operational plans on all the other risk factors in place.
- Have traffic police capacity building trainings plan and a training curriculum with strategic road policing enforcement areas included; and have continuous road policing capacity building trainings and road side coaching practice.

- Constitute a team of trainers within the force with capacity to transfer knowledge to peers and to enforce road safety related regulations.

## **5.2.9 Encourage The Use of Safe Vehicles**

5.2.9.1 To push for use of the latest technology to ensure safety of both the vehicle occupants and other road users.

- Ensure, through partnership with the traffic enforcement team, that the cars on the road are installed with functioning vehicle safety equipment.
- Advocate for the enforcement of the law banning importation of cars manufactured more than fifteen years before purchase.
- Increase the public's awareness of the advantages of safe vehicles, through mass communication.
- Advocate for policy amendment on mandatory vehicle inspections

## **5.2.10 Improve Post-Crash Response Measures**

5.2.10.1 Fast and efficient emergency medical help, diagnosis and care for road crash victims.

- Ensure, through mass media communication and sensitization, first responders / crash witnesses and bystanders are aware of the basis of first aid / how to call for help.
- Continued sensitization and training of key personnel in road safety as well as the public in first aid required in the event of a crash.
- Ensure establishment and operationalization of a functional emergency response unit/call centre.
- Mapping the post-crash response centres, creating awareness of these centres through media publications
- Creating awareness of the lack of proper post-crash care.

5.2.10.2 Kampala road and street network that is forgiving to users and where all people are safe from crashes as they use the roads; to reduce the number of road deaths and traffic crash injuries as well as traffic crashes by 50% by the year 2030. If implemented effectively, it will also yield

1. Fulfill KCCA's mission to deliver quality services to the City and vision to be a vibrant, attractive and sustainable City. Road Safety is a fundamental human right and one of the utmost measures of quality service the City administration can render its residents.

2. Residents of the City especially the vulnerable groups like the elderly, people with disabilities, children and cyclists will have an improved quality of life because the threat on their safety as they use the roads will be reduced.
3. Improve compliance with evidence-based laws and thus, reducing the risk of death or injury to all users of the road network including visitors.
4. Reduce burden of road traffic crashes on the country's economy.
5. Improve road infrastructure through the different interventions.
6. Promote active travel i.e. the use of non-motorized transport through walking and cycling.

### **5.2.11 Cost Implication**

5.2.11.1 As guided by the global plan for the decade of action of road safety 2011 – 2020, institutions are tasked to work to ensure that funding is sufficient for road safety activities to be implemented.

5.2.11.2 The Government of Uganda commits to funding Road Safety Initiatives by allocating a portion of the road Development budget to implementing Road Safety initiatives. Below are some of the commitments;

- Utilizing and allocating 10% of infrastructure investments for road safety
- Encouraging road authorities to commit a minimum of 10% of road budgets to dedicated safer road infrastructure programs.

5.2.11.3 KCCA in the financial year 2019/20 was tasked to commit 16% of the Uganda Road Fund budget (Budget for maintenance of city roads) towards Road Safety. Some of the interventions implemented like road furniture & marking, street lighting maintenance,

5.2.11.4 facilities for NMT users, speed humps, traffic lights maintenance, paving walkways and road safety elements for temporary works among others.

5.2.11.5 Other un ventured avenues of funding like working with other stakeholders to fund initiatives, writing proposals for grant aids and costing for road safety initiatives through advocacy and integration within project deliverables will be encouraged by the strategy and explored in the respective implementation plans.

### 5.3 INTERVIEW SURVEY ON TRAFFIC SAFETY AWARENESS

#### 5.3.1 Objective of the Survey

5.3.1.1 The main actors of Road Safety are the road users such as drivers and pedestrians. This chapter describes the safety awareness interview survey conducted with the road users to assess their road safety awareness.

#### 5.3.2 Outline of the Survey

5.3.2.1 The survey was conducted with Face-to-Face interview approach for the groups below,

1. Car Drivers (interviewed at shopping malls)
2. Taxi Drivers (interviewed at taxi stands)
3. Boda-boda Drivers (interviewed at boda-pools)
4. Pedestrians (interviewed at roadsides)



Photograph 5-1 A Scene of Road Safety Awareness Interview

5.3.2.2 The interview locations were randomly selected among the divisions in the city. The accuracy is less than  $\pm 10\%$  error with 95% confidence level for mode-wise analysis.

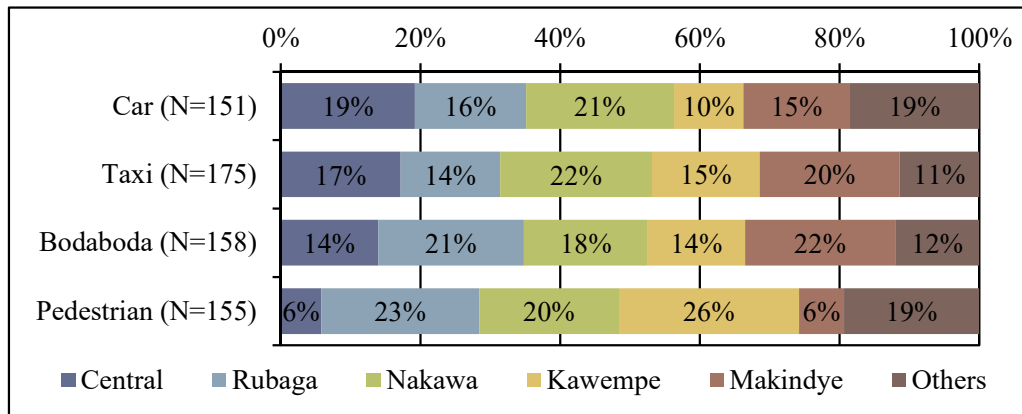


Figure 5-8 Interviewed Locations (Divisions)

#### 5.3.3 Attributes of Interviewees

5.3.3.1 Attributes of the Interviewees by pedestrian and driver are as follows.

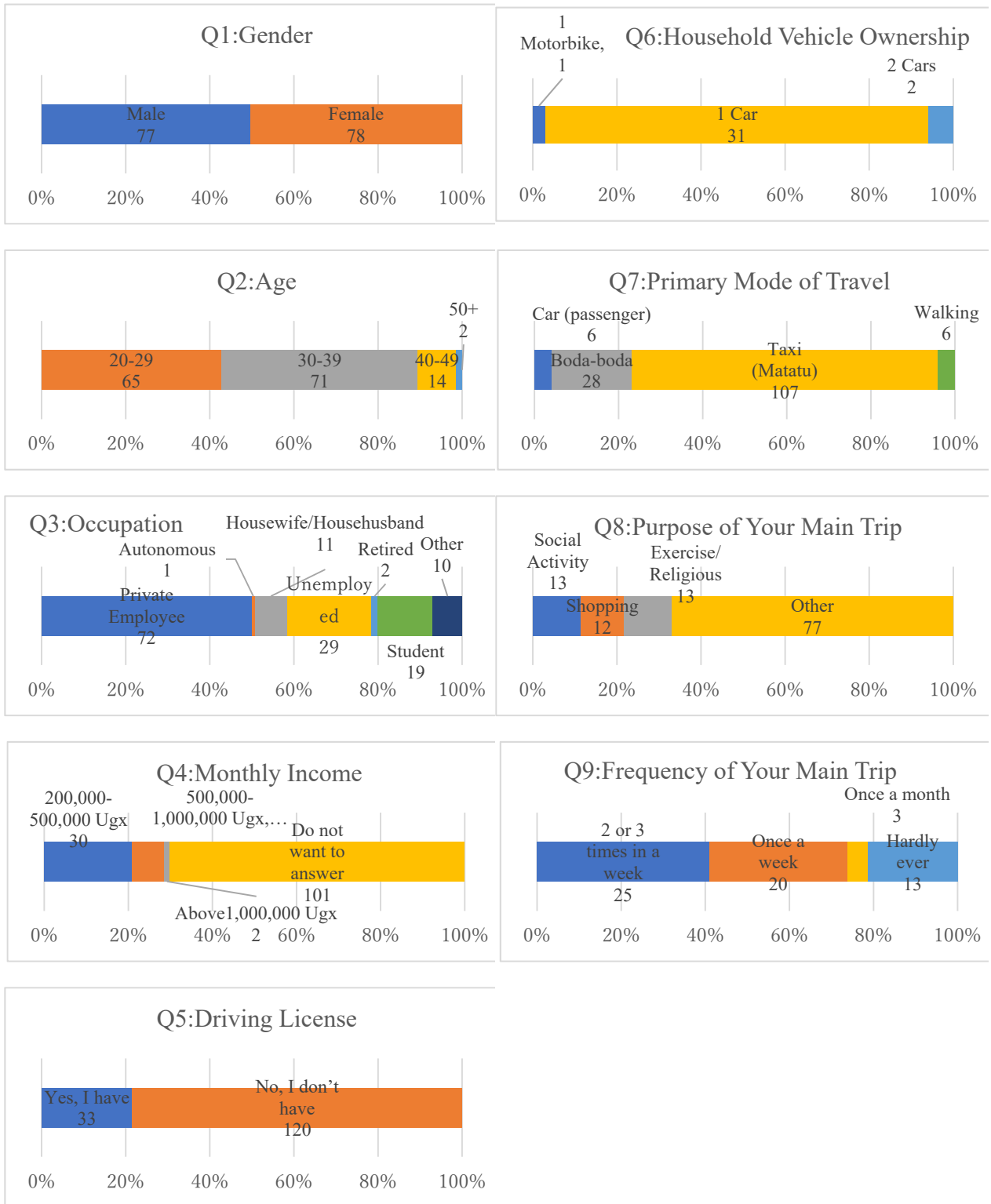


Figure 5-9 Attributes of Interviewees (Pedestrian)

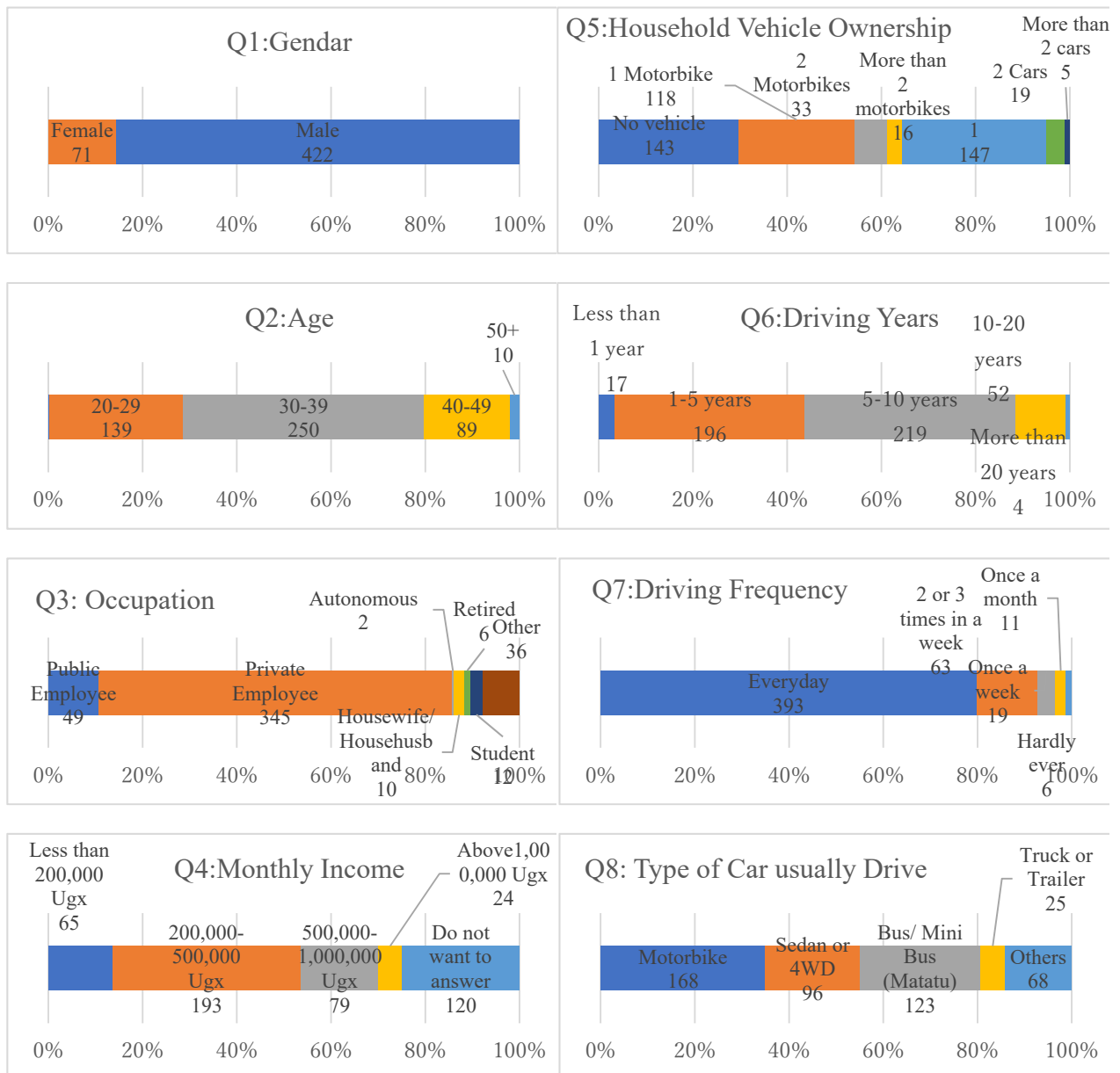


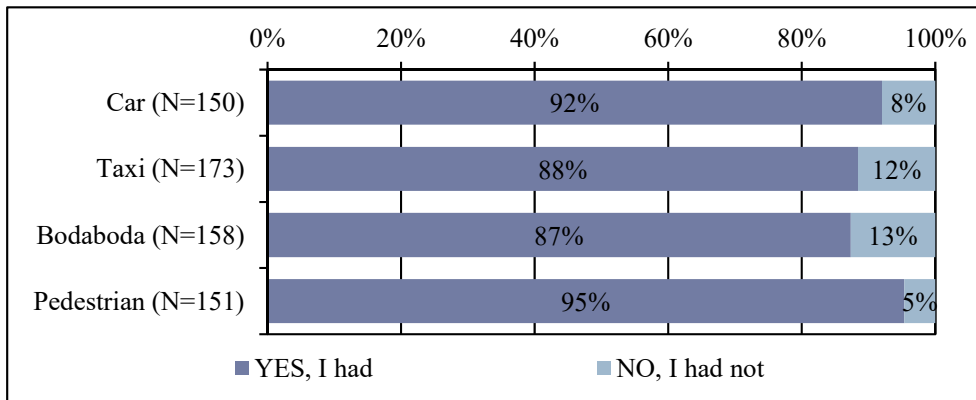
Figure 5-10 Attributes of Interviewees (Driver)

5.3.3.2 The majority of road users, consisting of drivers and pedestrians, are under the age of 40, representing the national population structure which the younger generation makes up the majority of the population. The average income seems to be mostly below 500,000 UGX, which estimated an annual income of 6,000,000 UGX. It is the same cost as a used passenger car that can be purchased in Kampala.

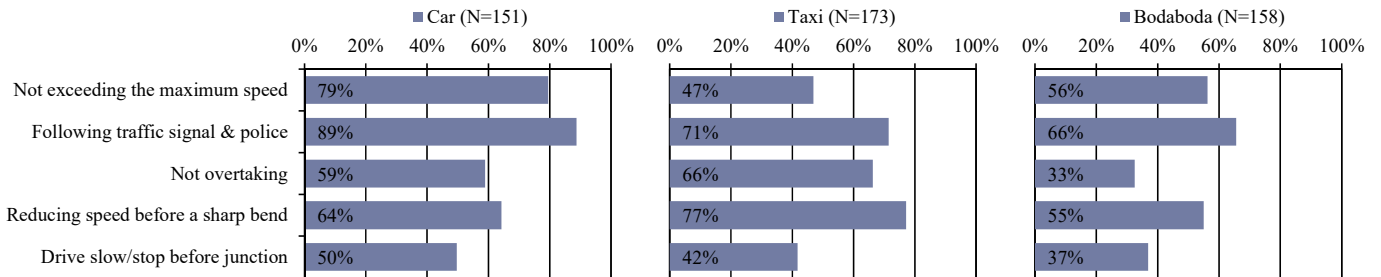
5.3.3.3 The majority of driving years are 10 years or less, and motorcycles account for about one quarter of all drivers for type of vehicle in driving.

5.3.3.4 Travel means for the pedestrian were mainly Taxi that was considered the traffic mode for the low-income population.

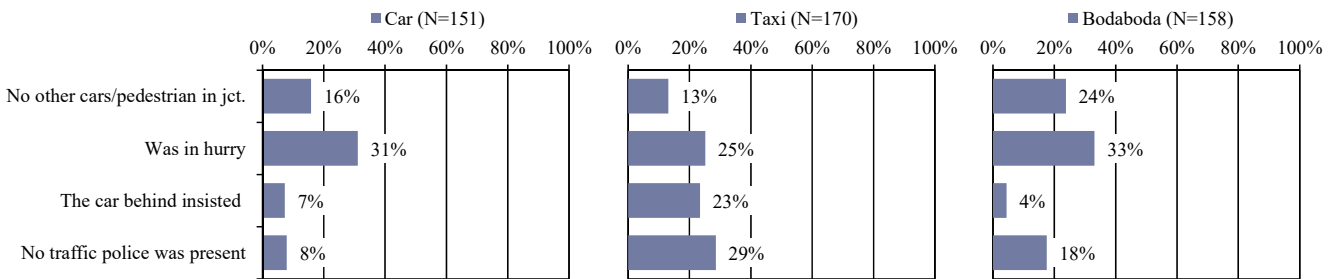
5.3.3.5 Did you have traffic safety education or classes in your school?



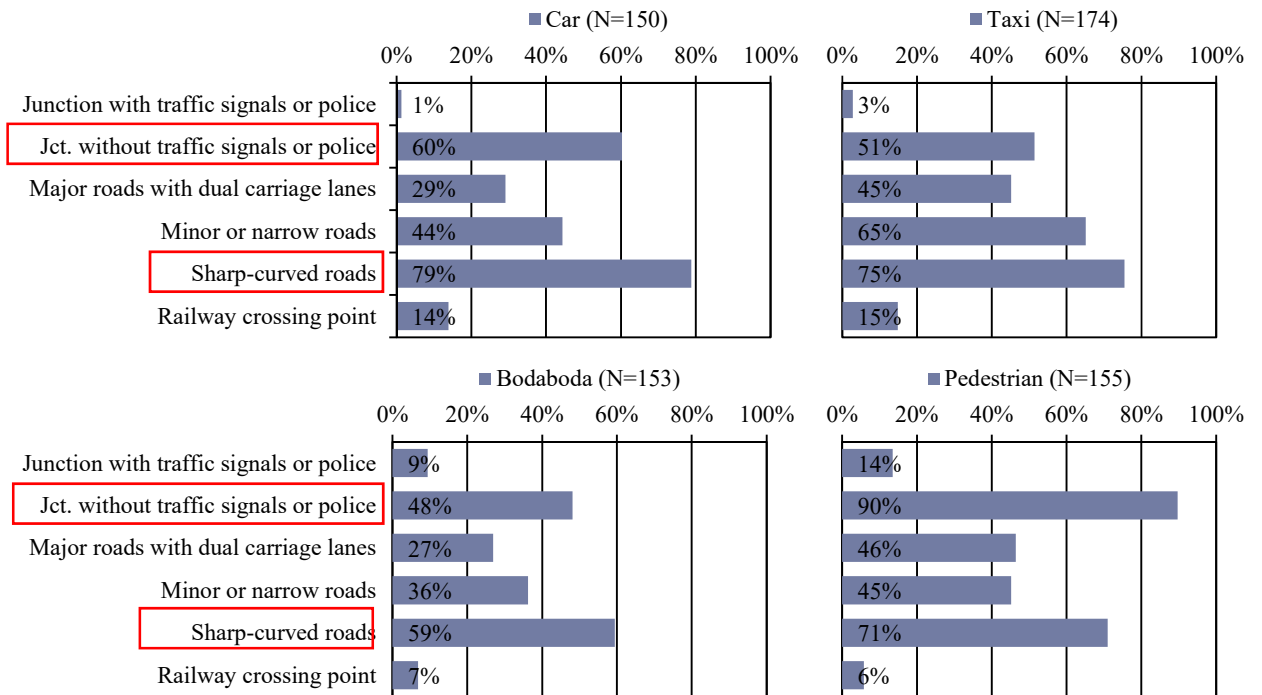
5.3.3.6 What do you usually do for traffic safety?



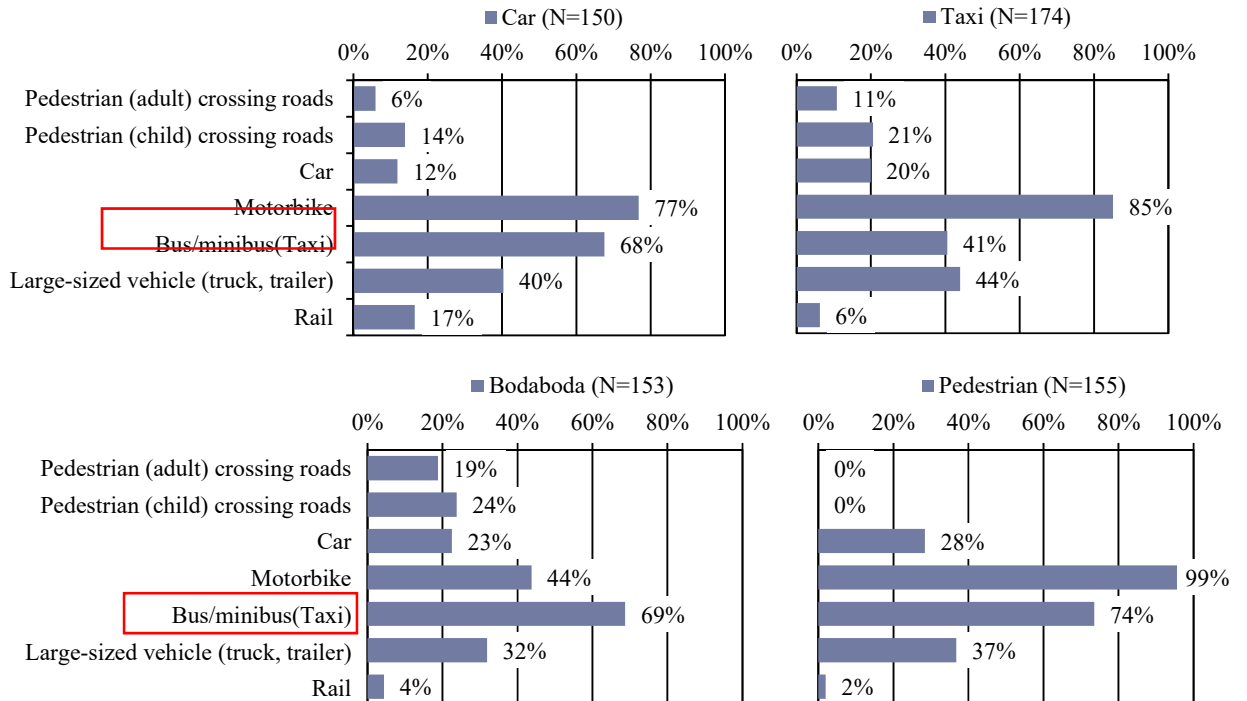
5.3.3.7 What is likely reason of ignoring the traffic signals?



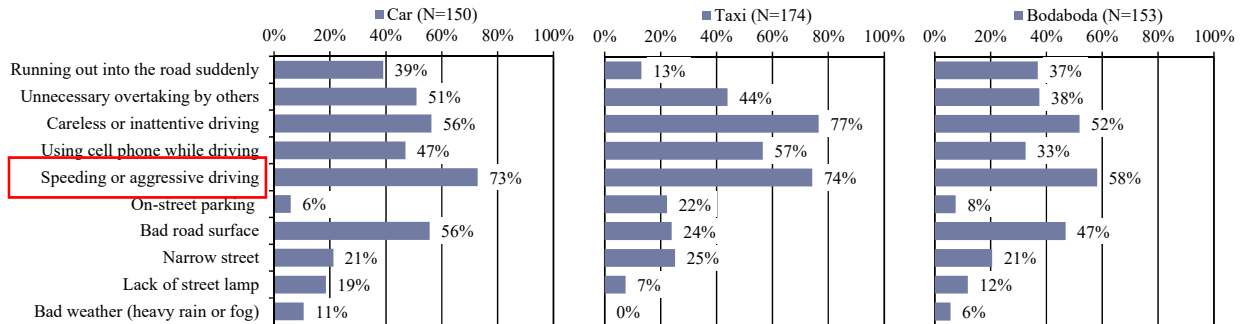
5.3.3.8 Where is the most likely to have traffic accidents?



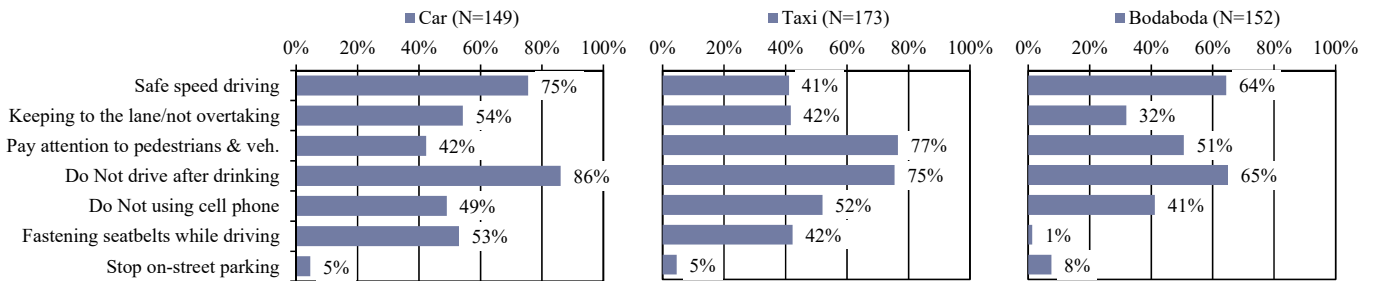
5.3.3.9 Who are the causes of traffic accidents?



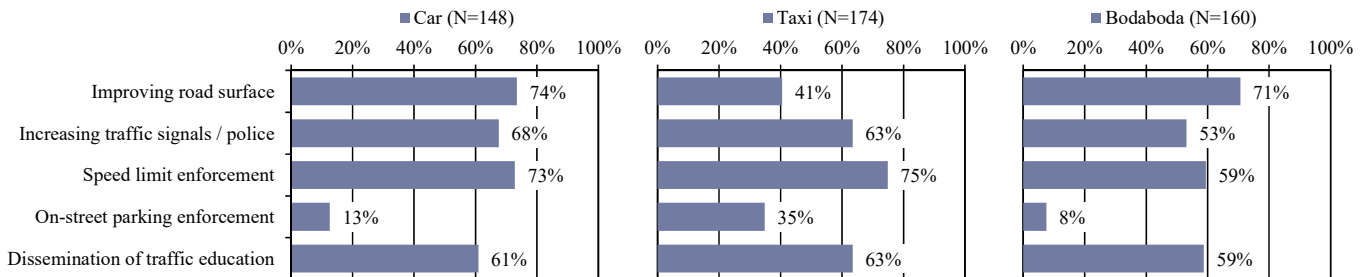
5.3.3.10 What is the major problem to cause traffic accidents while driving?



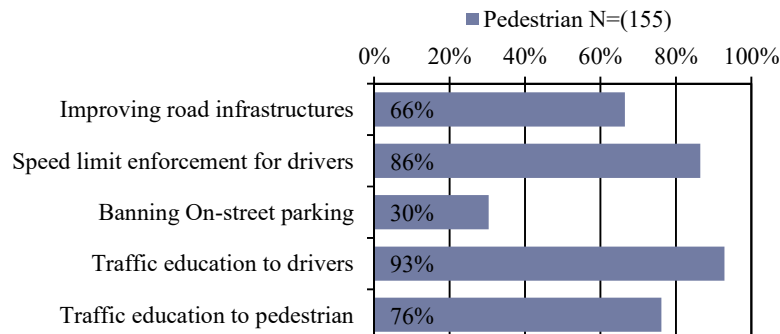
5.3.3.11 What is an important behavior to avoid traffic accidents while driving?



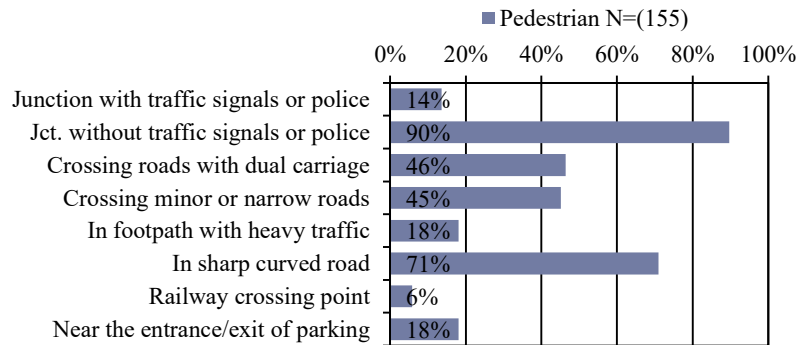
5.3.3.12 What is an important environment for safety traffic?



5.3.3.13 What measures can be taken to improve on traffic safety?



5.3.3.14 Do you understand any of the following traffic rules?



5.3.4 Analysis on Results

5.3.4.1 Both drivers and pedestrians have the same understanding of the traffic rules and regulations, the spots where traffic accidents occur, and the problem contributing to the accident. The most frequent points of traffic accidents (so-called "black spots") are at the sharp curves followed by unsignalized junctions according to the survey. The accident records by the Traffic Police, however, do not include information on the exact accident positions, so the number of accidents at the sharp curves cannot be confirmed. On the other hand, the black spots listed by the Traffic Police are mainly on the junctions. Hence, the perceptions of users and the traffic regulator differ.

5.3.4.2 Over speeding and aggressive driving are also addressed as the causes of traffic accidents, and these points are commonly understood by drivers of all types of vehicles, however, as for the problem means, Boda-Boda cites Taxi, while drivers of other types of vehicles and pedestrians cite Boda-Boda.

5.3.4.3 As for measures to improve traffic safety, in addition to enforcement, more signalized junctions, as well as the improvement of road makings and pavement conditions, were identified, and poor traffic management road infrastructure was also recognized as an issue. Road marking, including zebra making on the pedestrian crossing, is being replaced by road studs in some road improvement projects, and sufficient visibility of the pedestrian crossing points is a future Road Safety issue.

5.3.4.4 Boda-Boda problem needs to be handed in conjunction with the improvement of public transportation as the boda-boda is an essential transport means for the public. It is therefore impractical to implement traffic management such as the boda-boda free zone KCCA plans and it concludes with the strengthening of enforcement on boda-boda's aggressive traffic that could be a quick solution.

5.3.4.5 It is therefore advisable in more focusing on the pedestrian and other drivers than these of the Boda-boda for the Road Safety sensitization activities although the Boda-boda drivers shall continuously

be involved in it.

5.3.4.6 From the engineering perspective, giving the information for the spots where the accidents may occur due to the inappropriate junction and/or road geometries will be effective to achieve the objective.

## 5.4 ROAD SAFETY CAMPAIGN

### 5.4.1 Objective

5.4.1.1 The primary objective of the Road Safety Campaign is to prevent traffic accidents by spreading and disseminating the idea of traffic safety widely among the public, encouraging them to observe traffic rules and practice proper traffic manners, and promoting efforts by the public themselves to improve the road safety environment.



Photograph 5-2 Opening of Road Safety Campaign led by ED

5.4.1.2 In order to implement the campaign, it is necessary that the public in Kampala correctly understand and recognize the severe situation of traffic accidents, in which many people are still killed or suffer physical and mental injuries due to the accidents.

5.4.1.3 The primary objective is therefore to contribute to the prevention of traffic accidents by ensuring that each public observes traffic rules and practices good manners with a sense of "Consideration and Consideration for Others".

5.4.1.4 Over time, KCCA has implemented several signalization programmes with various funds, which is expected to continue. Improving traffic control infrastructure will encourage wider economic impacts. However, it is worth noting that benefits of the infrastructure improvement will not be realized in the absence of discipline and road safety awareness by the road users.

5.4.1.5 Secondary, the campaign is to guide on how to use the traffic control infrastructure, properly.

5.4.1.6 Furthermore, it is important to share the potential road safety risks at junction along the city road network with the road traffic relevant authorities (KCCA, MoWT and Traffic Police). Therefore, the campaign includes the black spots information with an aim to decrease road traffic crashes.

### 5.4.2 Campaign Approach

5.4.2.1 Recently, the social media platforms have now become a great way to keep the public informed and listen to their views. It is therefore appropriate to hold a digital campaign such as the use of social media and television services instead of physical events in the field.

5.4.2.2 KCCA's Twitter, for example, would play the videos on road safety, provide guidance to the use of

traffic control infrastructure, highlight Kampala's black spots and introduce the upcoming traffic control centre to be constructed under Japan's Grant. At the same time, KCCA will be asking for feedbacks on these from the public.

5.4.2.3 For guidance regarding traffic control infrastructures, it will show how to use the recently applied push-button for pedestrian crossing traffic. KCCA has introduced new green time system on the traffic control that pedestrian needs to demand the green time for crossing by pushing the button otherwise no green time appears. In other words, the traffic light continues to serve green times for vehicle traffics unless there is a demand for pedestrian crossing traffic, aiming at eliminating unnecessary green time for pedestrian and improve traffic flow.

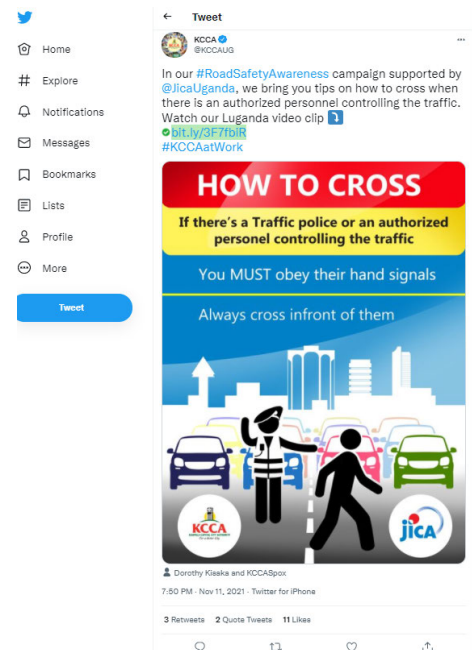


Figure 5-11 Road safety Campaign on Twitter

5.4.2.4 Black spot information will sensitize the public on the safety risk of the city road network. The information gives an idea of areas where they are and the road crashes are likely to occur.

### 5.4.3 Preparation

#### 5.4.3.1 Consultations with Stake Holders

5.4.3.1.1 Participatory approach has been adopted to prioritize the activities. In this respect, meetings in KCCA, consultations with other government agencies, NGOs, Academies and private companies have been conducted.

5.4.3.2 Series of meetings have taken place to determine the campaign programs since January 2017.

#### 5.4.3.3 Internal Meetings within KCCA

- Meeting in KCCA Central Division (2017.01.27): Meeting in KCCA Central Division (2017.05.30):
- Meeting with other KCCA Divisions (2017.01.30):
- Meeting with Communication Specialist of Executive Director of KCCA (2017.06.12):

5.4.3.3.1 KCCA plans to sensitize road safety through electronic billboards, TV and radio stations. According to the new regulations, paper posters are restricted because they clog drainage pipes

and cause environmental problems.

5.4.3.3.2 KCCA made an agreement with private advertisement company called Vision Group. According to the agreement, 15 secs messages will be aired at Bukedde TV, Urban TV, Bukedde FM and Xfm radio stations.

5.4.3.3.3 KCCA will also send short messages through special group messaging system for mobile phones.

1. Meeting with the Ministry of Works and Transport (MOWT) (2017.01.25)
2. Meeting with Uganda Police Force (2017.06.01)
3. Meeting with the Related NGOs:

5.4.3.4 Reach A Hand Uganda

5.4.3.5 Reach A Hand Uganda (RAHU) is an organization that focuses on youth empowerment programs with an emphasis on Family Planning & Sexual Reproductive Health and Rights (SRHR), Livelihoods and Skills Development, Behaviour Change Communication (BCC), and HIV/AIDS awareness and prevention through the design of innovative, creative and effective communication strategies, campaigns and community interventions.

5.4.3.5.1 Objectives of the road safety activities shall be as the following; Creating collective responsibility and building community involvement to raise the road safety awareness; Sensitizing public and raise their consciousness; Developing cost effective schemes; Changing the behaviours of drivers.

5.4.3.5.2 RAHU is able to use its expertise in creating awareness campaigns to make an extensive and vigorous awareness campaign in schools about road safety. This can be done by consultation of the young people who are the primary target of the campaign to get what appeals to them.

5.4.3.5.3 Posters with information and statistics about road safety shall be designed and printed to be used in talking to the pupils and students about road safety. They shall be designed in a young and colourful way that will attract the pupils to always read and remember them.

5.4.3.5.4 In order to have the schools motivated to pass on road safety information to their pupils and students, there shall be competitions organized ranging from essay, quiz, art and debate. Winners of these shall be rewarded with different incentives.

5.4.3.5.5 Online media shall be utilized to reach out to other road users that may not be able to benefit from the in school campaigns. This can be done by creating social media posters to be shared on Instagram, Facebook and Instagram under a hashtag that will be developed for the campaign.

5.4.3.5.6 Through the use of Uganda's cultural icons and musical project, a road safety theme song can

be created that will be aired on different media channels.

5.4.3.5.7 Some of the Ugandan cultural icons can be chosen as road safety ambassadors and they can be once in a while record short informative messages about road safety and share them on their social media platforms.

5.4.3.5.8 Radio adverts and drama series can be used to pass on awareness messages. These can also have segments of feedback and questions from the listeners.

5.4.3.6 In addition, the following NGO's were consulted,

- Commonwealth Peoples' Association of Uganda (CPAUG),
- Uganda Road Sector Support Initiative (URSSI),
- Civil Society Coalition on Transport in Uganda (CISCOT),
- Hope for Victims of Traffic Accidents (HOVITA),
- Parental Roles in Values Empowerment (PROVE)

5.4.3.7 Meeting with Nakasero Primary School

5.4.3.7.1 Nakasero Primary School is one of the biggest KCCA schools in Kampala. The issues discussed with the Head Teacher, Charles L. Ssendendo are summarized as the following:

5.4.3.7.2 Nakasero Primary School (NPS) has approximately 2300 students in primary school sections. School starts at 7 AM and finishes at 5 PM. Kindergarten section, P1 (208 students) and P2 (300 students) are from 9 AM to 13 AM, but they prefer taking their children from school at 5 PM because they work.

5.4.3.7.3 There 2-3 routes for students to go back home. However, they mostly walk down to the city center to take the minibus taxis to go back home. It is nearly 1.3 km from school and takes nearly 16 minutes to walk.

5.4.3.7.4 Last year 3 children died by road crashes. This year there was no death but 4 children had severe injuries.

5.4.3.7.5 Taxi is the cheapest way for students which costs around 1000-2000 UGX. Boda boda is more dangerous and yet it costs around 5000 UGX.

5.4.3.7.6 On the other hand, Ministry of Works and Transport and KCCA has a School Travel Plan by changing the route of the taxis and passing in front of the schools.

5.4.3.7.7 It is essential to educate not only students, but also parents and teachers together. Teaching road

signs to the students will be a good option. Children have good memories. They may even warn their parents, if they see any actions against road safety rules.

5.4.3.7.8 It will be effective to establish Road Safety clubs in school and choose Road Safety Ambassadors from each class or from their school commuting routes. Giving them prestige will raise their consciousness.

5.4.3.7.9 Competitions, such as essay writing could be other options to raise the awareness of students.

#### 5.4.4 Campaign Contents

5.4.4.1 As a result of the preparation activities, it was concluded that the campaign needs the icons and visual content enabling to attract the public.

5.4.4.2 Unlike the conventional campaign approach, it was considered effective to widely disseminate messages through social media that feature strong messaging, without focusing on the particular target of the campaign.

#### 5.4.5 Animations

5.4.5.1 As mentioned above, visual content with a strong message was needed for the campaign. Therefore, it was decided to create an animation on the theme of traffic safety.

5.4.5.1.1 Due to the constrain of budget, it was decided to invite the public to the competition and give cash prizes to the best ones. This would be more cost-friendly than the usual approach of ordering with professional creators. Conventionally, such contents have been prepared by the campaign organizers themselves or by subcontracting them to professional creators. However, by involving an unspecified player through an open call, the contents do not tend to be only from the perspective of the organizers and it would be more free and unique content. It was that expectation and it would be more viewer-friendly.

5.4.5.1.2 A video contest for the road safety awareness in Kampala was implemented. It would be cash prizes to the first two winners. Poster designed to publicize the contest until first selection date of April 1st, 2018.

5.4.5.1.3 Submission of the final draft was planned on May 1st 2018 and the awarding announcement date was expected on June 1st 2018.

5.4.5.1.4 Although there were 40 interests in the advertisement of the

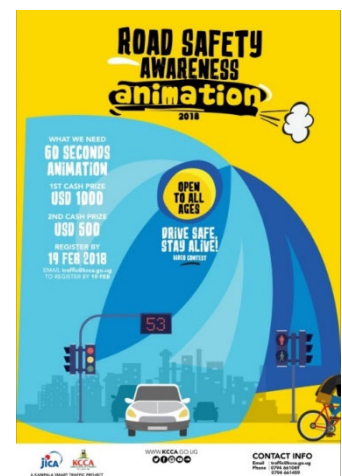


Figure 5-12 Contest Call Poster

Contes, there were 25 submissions, eventually.

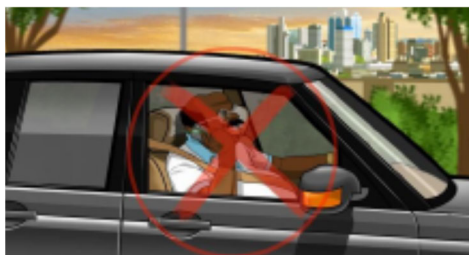
5.4.5.2 The project held the meeting for evaluation of the submissions on 2nd July 2018 inviting stakeholders such as Traffic Police, National Road Safety Authority (Ministry of Works and Transport) and JICA Uganda office in addition to the KCCA Engineers involved in the Project.

5.4.5.2.1 For the evaluation, the criteria have been prepared with weightings on the aspects as follows,

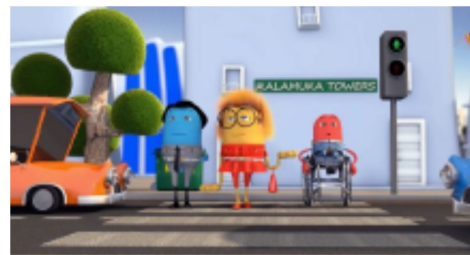
Table 5-1 Evaluation Criteria

N	Aspects	Criteria	W	Scale and Point					
				>5	3	3-4	2	<2	1
1	Message	Nos of message presented	6	>5	3	3-4	2	<2	1
2	Story	Story is well undegradable and considered nature of Kampala	3	Good	3	Fair	2	Poor	1
3	Illustration	Characters/ localized scenario of Kampala is understood. Design sense is good.	3	Good	3	Fair	2	Poor	1
4	Graphics quality	Quality of video is better than the available animations.	3	Good	3	Fair		Poor	1
5	Sound Quality	Quality of sound is clear enough for listening	2	Good	3	Faor		Poor	1

5.4.5.2.2 As a result of the evaluation, the Best Evaluated and the Runner-up Animation were decided.



Best Evaluated Animation



Runner-up Animation

Figure 5-13 Awarded Animations



Photograph 5-3 Scenes of Award Ceremony

5.4.5.3 In the past, most of the traffic safety videos used grotesque images such as accident scenes to stir up fear in the viewers or were educational content targeted at school pupils. However, the awarded animations were enjoyable for viewers regardless the age, comical yet with a strong message and

they were satisfactory enough to fulfil the contest's objectives.

5.4.5.4 Hence, this contest was concluded successful as was a sort of the public participations to the campaign activities.

5.4.5.5 In addition to Road Safety Awareness animation, the Project has prepared the animation tutting on “How to cross the road”. This animation was in line with the educational approach.

5.4.5.5.1 The junctions improved by the pilot project includes the "Recall Function" for traffic control. In this "recall function", the pedestrian crossing demand by pedestrians pushing a push button, is transmitted to the traffic control system and if there is no demand, the green time for pedestrian crossing is skipped. This eliminates wasted green time and gives more green time to vehicle traffic, thus achieving rational traffic control.

5.4.5.5.2 This pedestrian crossing control, “Recall” was new so that the control should be described to the public.

5.4.5.5.3 The purpose of video is to publish the new system and make the effective by proper understanding on how the signal system works”.



Figure 5-14 Animation on “How to Cross Road”

5.4.5.6 The Campaign further prepared the video describing the MODEARO system. The purpose of the video was to describe the new traffic control system in the city and also publicize KCCA's proactive approach on improving traffic management.



Figure 5-15 Animation on MODERATO System

## 5.4.6 Videos

5.4.6.1 The project created a "Black Spot File" with the message, "Protect yourself from traffic accidents".

5.4.6.1.1 Police has shared the Black-spot list covering the country. From the list, the project prepared the Black Spot Files including 32 junctions in Kampala. The Junctions included in the file were selected without bias from the four Divisions in the city and also included traffic safety bottlenecks as considered by KCCA.

5.4.6.1.2 The project created a "Black Spot File" with the message, "Protect yourself from traffic accidents".

5.4.6.1.3 Police have shared the Black-spot list covering the country. From the list, the project prepared the Black Spot Files including 32 junctions in Kampala. The Junctions included in the file were selected without bias from the four Divisions in the city and also included traffic safety bottlenecks as considered by KCCA.

5.4.6.1.4 In creating this video, the expert and KCCA took into consideration on how to give the danger point locations to the viewers. In the past, education in Uganda was limited in terms of time allocation in the geography class, such as map reading and many of the older people, therefore are not familiar with maps, therefore, it was considered a challenge in providing the location of junctions by maps. For this reason, the subjected junctions were photographed from a viewpoint that included nearby landmarks to make their location clear.

5.4.6.1.5 In order to give a message of the risk of accidents at junctions, it was supposed to be effective to include images of actual accidents, but since it is difficult to obtain such images, it interviewed

users about the risk and danger at junctions and they were inserted in the interview scenes.



Figure 5-16 Kampala Black Spot Files

### 5.4.7 Goods

5.4.7.1 To remind the public about the campaign, the Project prepared the T-shirts and Safety Vest and they were provided the stake holders and traffic wardens.





Figure 5-17 Road Safety Campaign Goods

### 5.4.8 Publicity

5.4.8.1 A new traffic safety page has been added to the KCCA website, <https://www.kcca.go.ug/road-safety>, where the videos created for the campaign can continue to be viewed.

5.4.8.2 The traffic safety page has a message from the ED at the top, followed by "Traffic Safety Videos" and "Black Spots" at the bottom, to access the contents on each theme.

<p>KCCA Road Safety Page Top</p>	<p>Road Safety Animations</p>	<p>Black Spot Files</p>

Figure 5-18 KCCA Road Safety Page

## 5.4.9 Feedbacks

5.4.9.1 Through collaboration with KCCA's Public and Corporate Affairs section, the information was shared widely via KCCA's social media channels of Facebook and Twitter. Upon sharing of the information, the general public was allowed to share comments and opinions on the road safety. (See appendix attached for comments) These opinions constitute valuable feedback that both KCCA and JICA can utilise to understand public perceptions on road safety within Kampala. Below is a summary of the opinions.

### 5.4.9.2 Summary of Opinions

#### 5.4.9.2.1 Causes of poor road safety

##### **Motorcycle Taxi (Boda-Boda) and Road safety**

*There is general consensus is that Boda-bodas are the leading group of road users that bring about poor road safety in Kampala. Many comments suggest that issues involving motorcyclists occur because of the following; lack of patience while on the road, over speeding; dangerous manoeuvres while on the road, failure to follow traffic signs and traffic signals and not respecting other road users especially pedestrians by for example riding on walkways.*

##### **Errant Motorists**

*Another opinion here points to motor taxi drivers, government owned vehicles and a few private vehicles that drive recklessly by speeding or simply have no respect for other road users and end up causing accidents.*

##### **Role of traffic Police**

*A recurrent theme points to the fact that many already signalised junctions have been hijacked by the traffic police who issue contradicting instructions to what is displayed on the signal head. This creates confusion for the different road users creating an accident hazard.*

##### **Poor state of roads in Kampala**

*Users also commented that it is inconsistent for JICA/KCCA prioritise road safety when the current state of some roads in Kampala is bad. Many roads are riddled with potholes. This causes motorists to encroach on pedestrian spaces in a bid to 'dodge' the potholes.*

##### **Poor road usage by pedestrians and foot traffic.**

*Pedestrian traffic was also faulted for causing poor road safety. An example was a user who opined that some pedestrians don't know when to cross the and others choose to cross at wrong spots like junctions even while zebra crossings have been put in place. Others do not utilise the pedestrian push buttons in place.*

#### 5.4.9.3 Recommendations by the public on improving road safety

- ✓ *More sensitization to pedestrians on the usage of traffic infrastructure like the push button*
- ✓ *Regulation of the Boda-Boda industry within Kampala.*
- ✓ *Putting in place more zebra crossings.*
- ✓ *Re-painting of faded Road Markings and Zebra Crossings to increase on visibility.*
- ✓ *Supporting zebra crossings with speed humps to compel motorists to reduce speed*
- ✓ *Removal of road-side vendors from pedestrian walkways in order to create space for pedestrians to use the roads safely*
- ✓ *Adapting the smart traffic control systems that can communicate and count traffic loads*
- ✓ *Improving on the efficiency of the installed traffic lights*
- ✓ *Stricter regulation of driving schools by checking competencies of vehicles and condition of vehicles to improve on the quality and skills of graduates*
- ✓ *Providing more inclusive road spaces for bicycles*
- ✓ *KCCA enacting the trade and transport ordinances so that the city gets rid of vendors who crowd walkways leaving pedestrians with no safe place to pass*
- ✓ *Involving the elected political leaders and representatives in the road safety campaign.*
- ✓ *Adopting a cleaner city free of motor vehicle emissions*
- ✓ *Improving on the state of roads by patching potholes and rehabilitating debilitated roads*

## **6 ACTIVITIES RELATED TO [OUTPUT 5]: THE CAPACITY FOR TRAFFIC FLOW MANAGEMENT MAINLY ON JUNCTIONS IS ENHANCED; PILOT PROJECT REPORT 1**

### **6.1 PILOT PROJECT (SIGNAL SYSTEM INSTALLATION)**

#### **6.1.1 Project Objective**

6.1.1.1 In order to respond to rapid growth of road traffic demand, KCCA is utilizing funds from the World Bank to carry out an intersection and road improvement project (KIIDP2). Particularly for junction improvement, KCCA adopts the demand-driven traffic signals instead of the conventional constant cycle type of traffic signals in KIIDP2.

6.1.1.2 KCCA plans on networking all traffic signals and have them controlled from one Central Traffic Control Centre. In view of this trend, an Urban Transport Management Plan (UTMP) by the KSTP has been formed for the medium and long terms. 200 junctions have been proposed for signalization and consensus has been got from KCCA that among those, 50 junctions will be under the Central Traffic Control Centre.

6.1.1.3 Also, as a control approach in this traffic management plan, and taking into account the variation in the complex Kampala Road Network and the irregular traffic demand, it is possible to have Area Traffic Control (ATC) and we thus are proposing Japan's MODERATO, a traffic control system that can flexibly adopt to variations in traffic demand.

6.1.1.4 The superiority of this proposal to KCCA is the MODERATO functions and it requires one to understand the validity of its application to Kampala. KCCA has a very positive opinion about its introduction but there is some concerns about its operations. Therefore, the programme shall conduct a pilot project of the MODERATO system to check out its effectiveness and any other operational issues. Especially in addition to the direct support from JICA Experts on MODERATO pilot operation, the programme shall also take advantage of the remote support by the controller manufacturer through the internet.

**6.1.1.5 This chapter mainly describes the signal system installation and its impact on the traffics.**

#### **6.1.2 Project Outline**

6.1.2.1 Pilot junction selection criteria

6.1.2.1.1 Pilot junction selection criteria area for the project was as follows:

- Covering more than one route.






- Area with high traffic demand, including intersections with remarkable congestion.
- Intersections with minimum geometric design improvement.
- Intersections with no existing improvement projects as well as no duplication of other plans.
- Routes with fully equipped communication infrastructure (optical fibre)

6.1.2.1.2 The above criteria were fulfilled by 4 junctions namely; 1. Wampewo 2. Naguru, 3. KatiKati and 4. Game, Jinja Road.



Figure 6-1 Pilot Project Junctions

### 6.1.3 Signal Equipment Installed

				
Traffic Light Vehicles	Traffic Light Pedestrians	Traffic Signal Controller	Ultrasonic Traffic Detector	Image processing Traffic Detector

### 6.1.4 Project Diary

6.1.4.1 Civil works of junction improvement has been started from May 2017 and continued up to January 2018. Installation of electrical wires and other equipment have been started from November 2017 and simultaneously continued with civil works.

6.1.4.2 Major junction improvement works were taken place at junction 1 where the road width of Upper Kololo Road has been expanded for quite a long distance up to the intersecting point with Archer road. Major changes by geometrical improvement are shown in Figure 6-2.



**Junction 1 Wampeo**



**Junction 2 Naguru**



Junction 3 Katikati



Junction 4 Game (Jinja Road)

Figure 6-2 Geometrical Improvement of the Junctions (source: Google Earth Image)

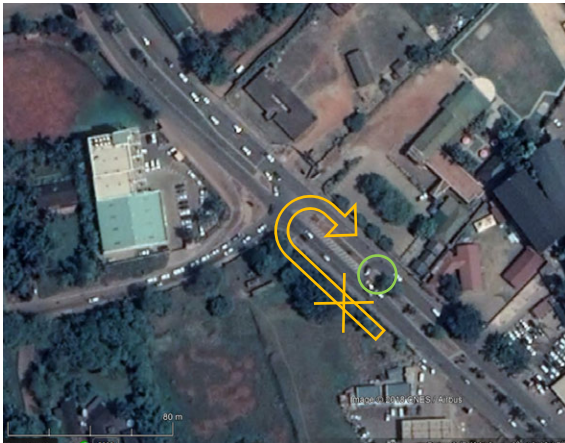
6.1.4.3 Some new traffic regulations are also in effect in order to achieve better and smooth traffic flow at the junctions.



Right turn from both direction of Upper Kololo is banned



U-turn from both direction of Lugogo Bypass is banned



U-turn at the junction is banned as a U-turn lane is installed before the junction (green circle)

Figure 6-3 Regulation in effect as Signals are in Operation

6.1.4.4 Connections of signal lights are checked by JICA team at the end of January 2017 and connection errors are fixed by the sub-contractor(RE-POWER) . Signal timings are preinstalled by the supplier (Nippon Signal) at the signal controllers. However, before operation KSTP team had intense discussion with KCC engineers and revised the signal timings for off peak and midnight. Prior to signal operation newspaper advertisements and social media campaigns were placed and people were aware of the forthcoming traffic control.



Photograph 6-1 Modifying of the Signal Timings Using Control Panel

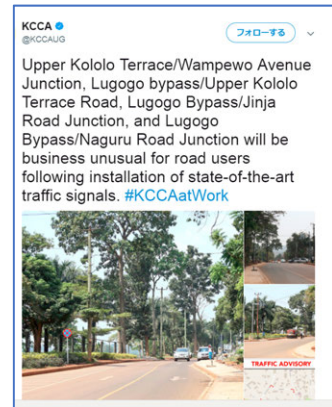
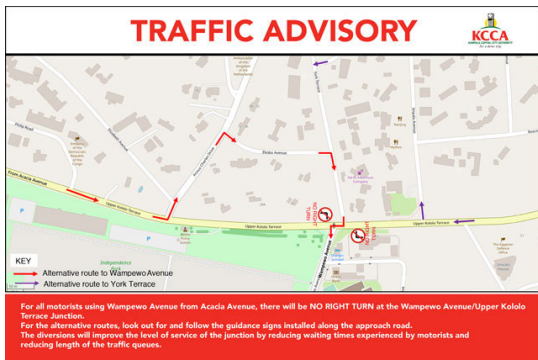


Figure 6-4 Social Media Campaign by KCCA for Traffic Advisory

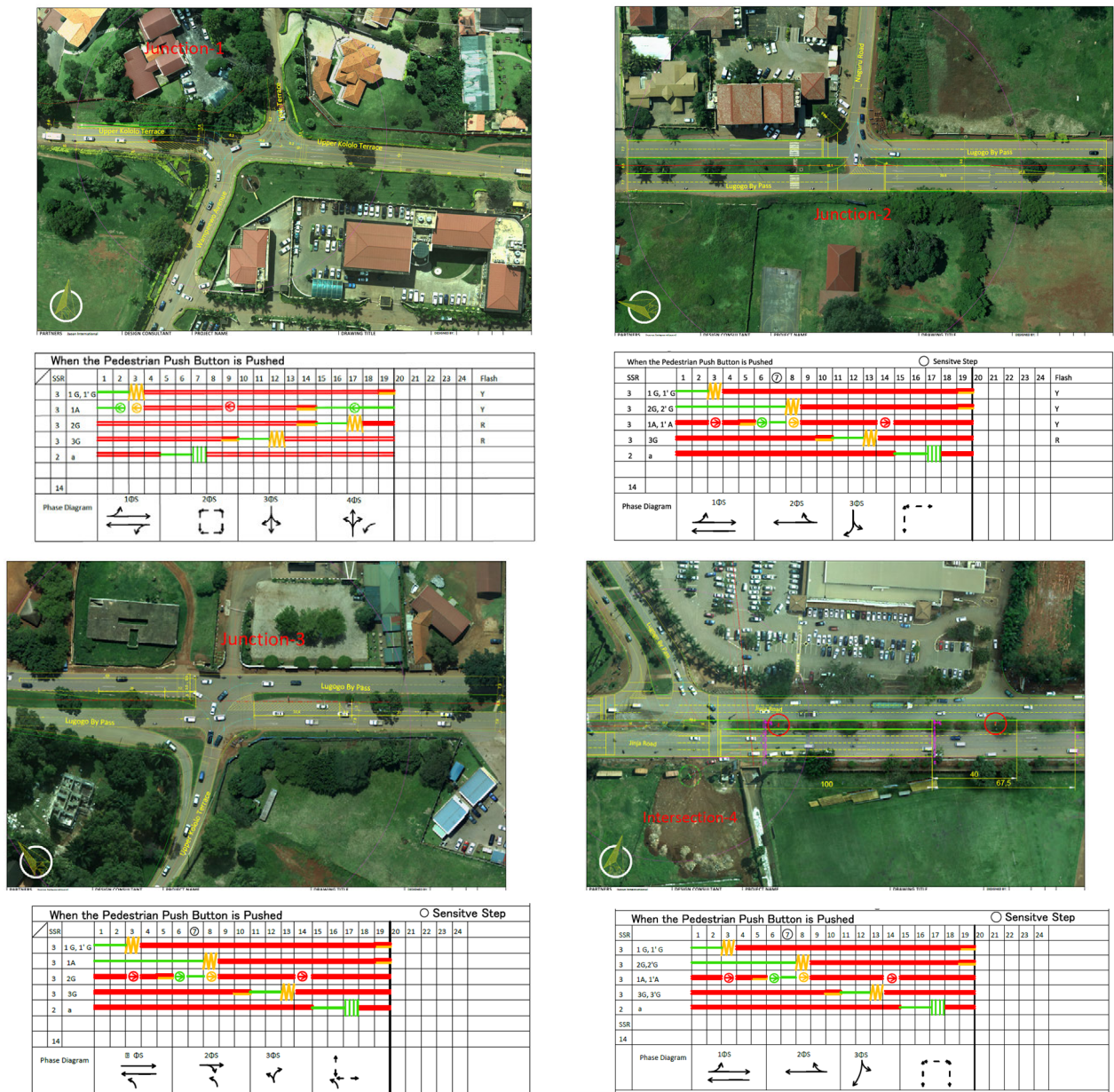


Figure 6-5 Final Junction Layout and Stage Diagram

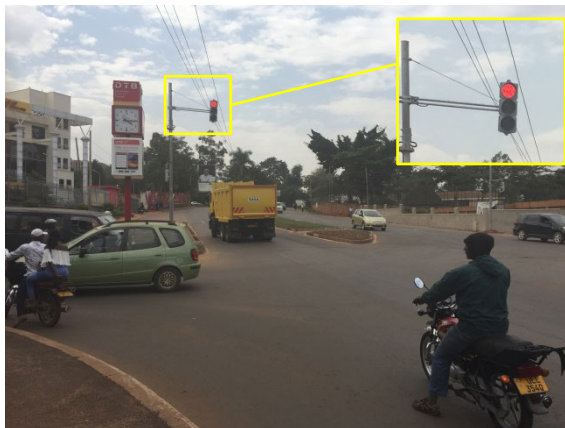
6.1.4.5 Traffic lights of 3 junctions at Wampeo, Katikati and Game (Jinja Road) were switched on 2nd February, 2017 and the vehicles are controlled by the lights only. Even in the peak hour when the junctions are congested due to heavy traffic the police are not interfering and the users are getting used to be regulated by the lights.



Jct 1: View from Wampeo Avenue



Jct 1: View from Upper Kololo (Acacia)



Jct 3: View from Lugogo Bypass (Game)



Jct 4: View from Jinja Road (Nakawa)

Figure 6-6 Installed Traffic Lights in Operation

**6.1.5 Monitoring of Pilot Project (Signalization Impact)**

6.1.5.1 Traffic volume after the signalization was compared with one with before the signalization.

Table 6-1 Traffic Volume before and after Signalization  
 Number of Vehicle (PCU/hour)

	AM Peak			PM Peak		
	2016	2019	% Change	2016	2019	% Change
Jct1	1,901	2,590	27%	2,068	2,374	13%
Jct2	2,348	3,197	27%	2,817	2,934	4%
Jct3	2,777	2,768	0%	2,589	2,876	10%
Jct4	5,764	6,046	5%	4,393	5,054	13%
	12,790	14,601	12%	11,867	13,238	10%

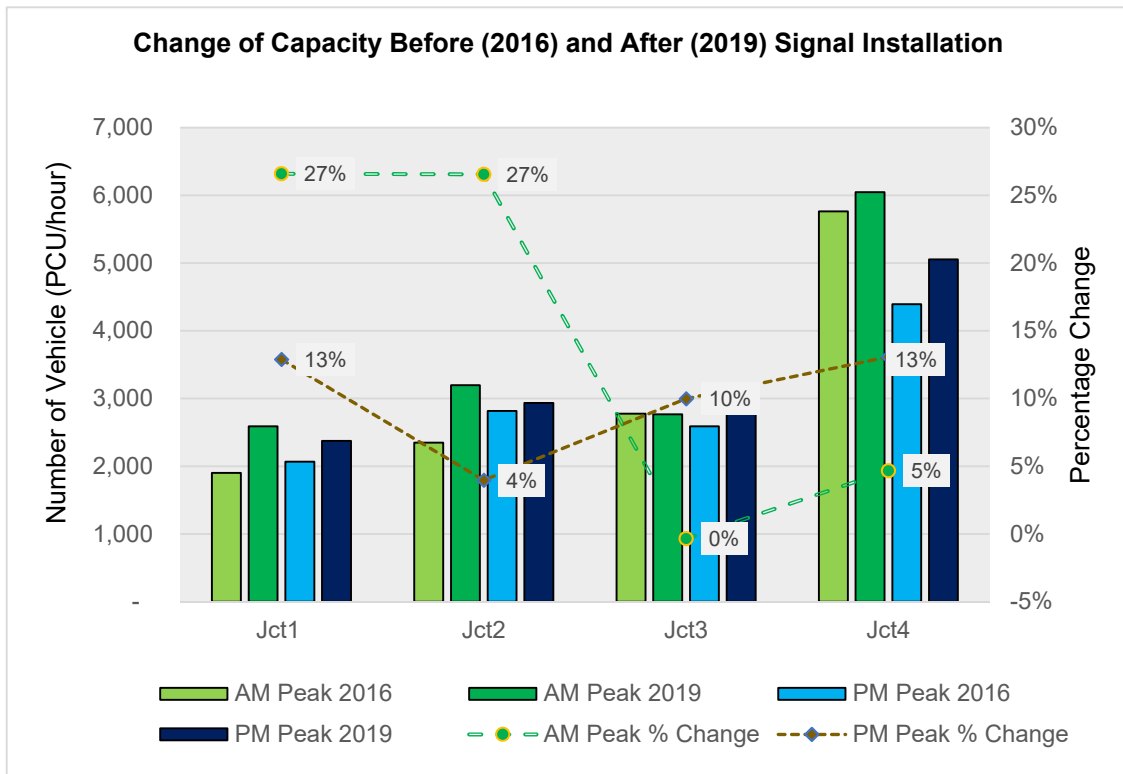
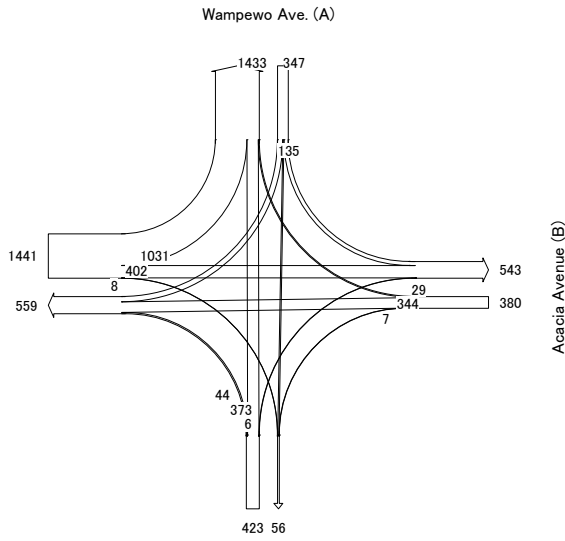


Figure 6-7 Traffic Volumes before and after Signalization

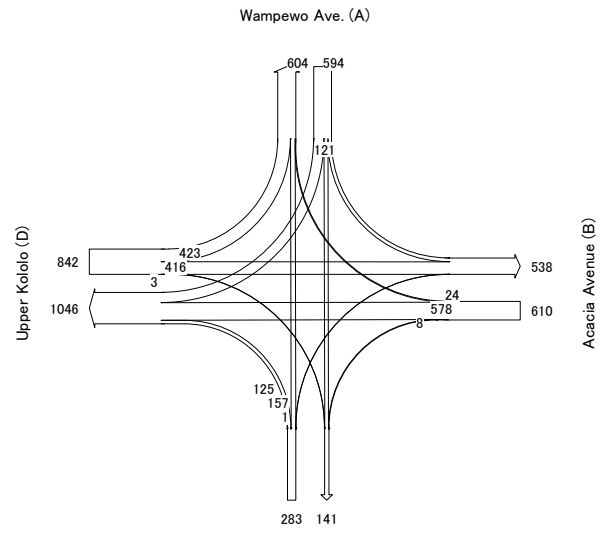
**6.1.5.2 Improvement of 10% traffic capacity has been observed by a comparison between at June 2016 (before signalization) and at June 2019 (after signalization).**

**6.1.5.3 Most improved junction was the junction No.1 by 27% at AM peak and 13% at PM peak.**

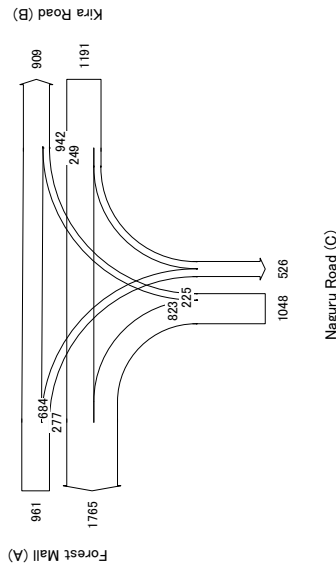
**June 2019, Traffic Flows by Directions**



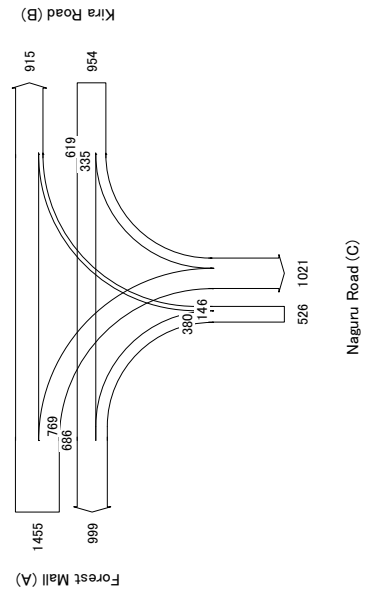
**Junction 1: AM Peak**



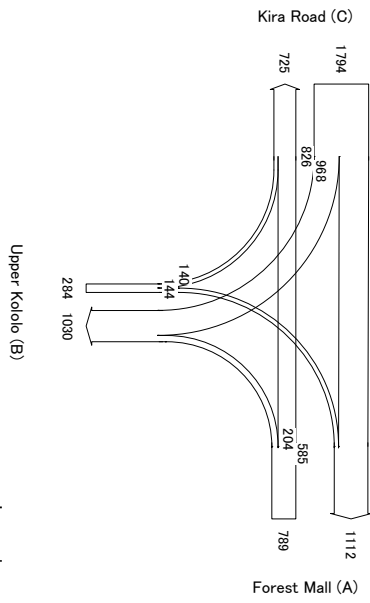
**Junction 1: PM Peak**



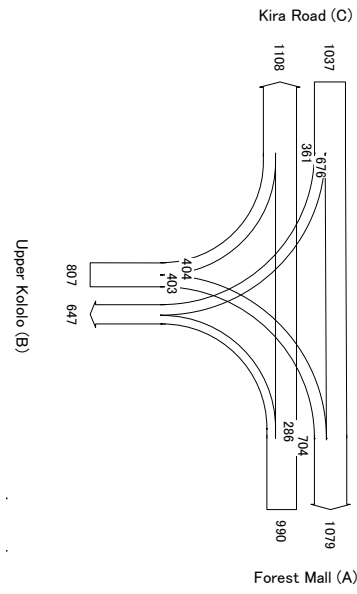
**Junction 2: AM Peak**



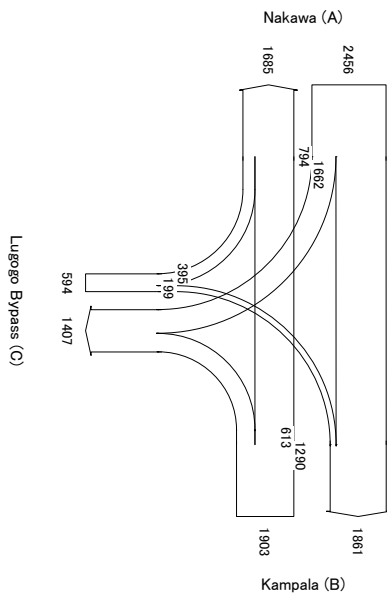
**Junction 2: PM Peak**



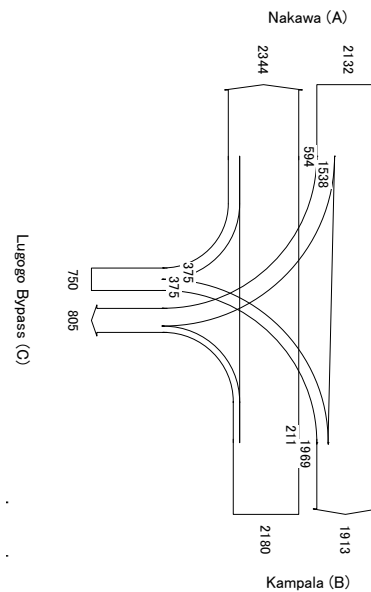
**Junction 3: AM Peak**



**Junction 3: PM Peak**



**Junction 4: AM Peak**



**Junction 4: PM Peak**

Figure 6-8 Traffic Turning Movements before and after Signalization

## **7 ACTIVITIES RELATED TO [OUTPUT 6]: SKILL OF TRAFFIC CONTROL USING “MODERATO SYSTEM” IS BUILT ON KCCA; PILOT PROJRCT REPORT 2**

### **7.1 MODERATO SYSTEM**

#### **7.1.1 Background**

7.1.1.1 In order to support smooth management of Kampala traffic the Urban Traffic Management Plan (UTMP) is prepared by KSTP. In this report, as one of the possible solutions to manage this fluctuated traffic demand caused by time, weather and incident, adaptive signal control is recommended. Adaptive signal control generates traffic signal parameters in accordance with actual traffic situation and it is able to cope with sudden incident rather than responsive control based on the pre-timed signal plan. To address the uncertain traffic flow situation of Kampala Area Traffic Control using MODERATO technology is also recommended in UTMP.

7.1.1.2 Out of 200 long-listed junctions, real time adaptive type signals should be installed in around 50 junctions. In addition, it was also recommended that a central traffic control centre is also necessary to coordinate all 200 traffic signals smoothly.


7.1.1.3 However, the establishment of the centre is a big challenge for KCCA because KCCA has no skill for how to operate. Moreover, the establishment of the Centre is a huge investment that requires careful considerations with various viewpoints in selection of the system. The Central Control Centre would be a very useful tool in traffic controlling, yet it shall be with appropriate operation and maintenance set-up which need some time to take place.

7.1.1.4 The JICA Expert team and KCCA came up with an idea of the Pilot Project containing signaling number of junctions and set up small scale traffic control system in order to study its operation by KCCA. Besides, the pilot project is designed in line with Immediate Action Plan (IAP) as pointed out in the UTMP.

7.1.1.5 In consideration of whole situation it is planned to carry out the pilot project in 2 phases. In first phase, junctions will be signalized and the effectivity of signalizing the junctions will be studied. After that in second phase the adaptive control system using MODERATO will be installed in these junctions and effectivity of introducing this kind of system in Kampala will be studied. It must be mentioned that this type of system will be the first in East Africa region.

#### **7.1.2 Objective**

7.1.2.1 The objectives of installing MODERATO system are:

-  To improve the junction capacity reducing loss time where traffic volume is less

- ✚ To improve overall traffic flow of the area

7.1.2.2 In order to introduce a brand-new system, it is necessary to study the probable challenges and figure out the possible solutions. In this pilot project it is also aimed to focus on the capacity enhancement of KCCA in order to handle traffic control system. In addition, it is necessary to experience the operation and maintenance for the system by the KCCA staffs. Therefore, some additional objectives of introducing MODERATO system are:

- ✚ Technical verification under the Uganda's traffic characteristics for MODERATO type ATC system
- ✚ Verification and identifying the challenges for materials considering the users, infrastructure, weather condition etc.
- ✚ Examination of human resources and capacities for practical operation & maintenance of ATC by setting up mini central traffic control centre

### 7.1.3 System Concept

7.1.3.1 The signal phases are changed in certain interval based on the real time traffic volume which are counted by the detectors. The server using for MODERATO traffic control system is set up at KCCA from where the junctions are operated and managed. The signal controller of target junctions are connected through fiber cable network with MODERATO server.

7.1.3.2 The server of KCCA is connected in such a way so that the process can be supervised from Japan using Virtual Private Network (VPN) and in case any adjustment or intervention is required for the system also can be done. The overall concept of controlling the junctions using MODERATO under the pilot project is described in Figure 7-1.

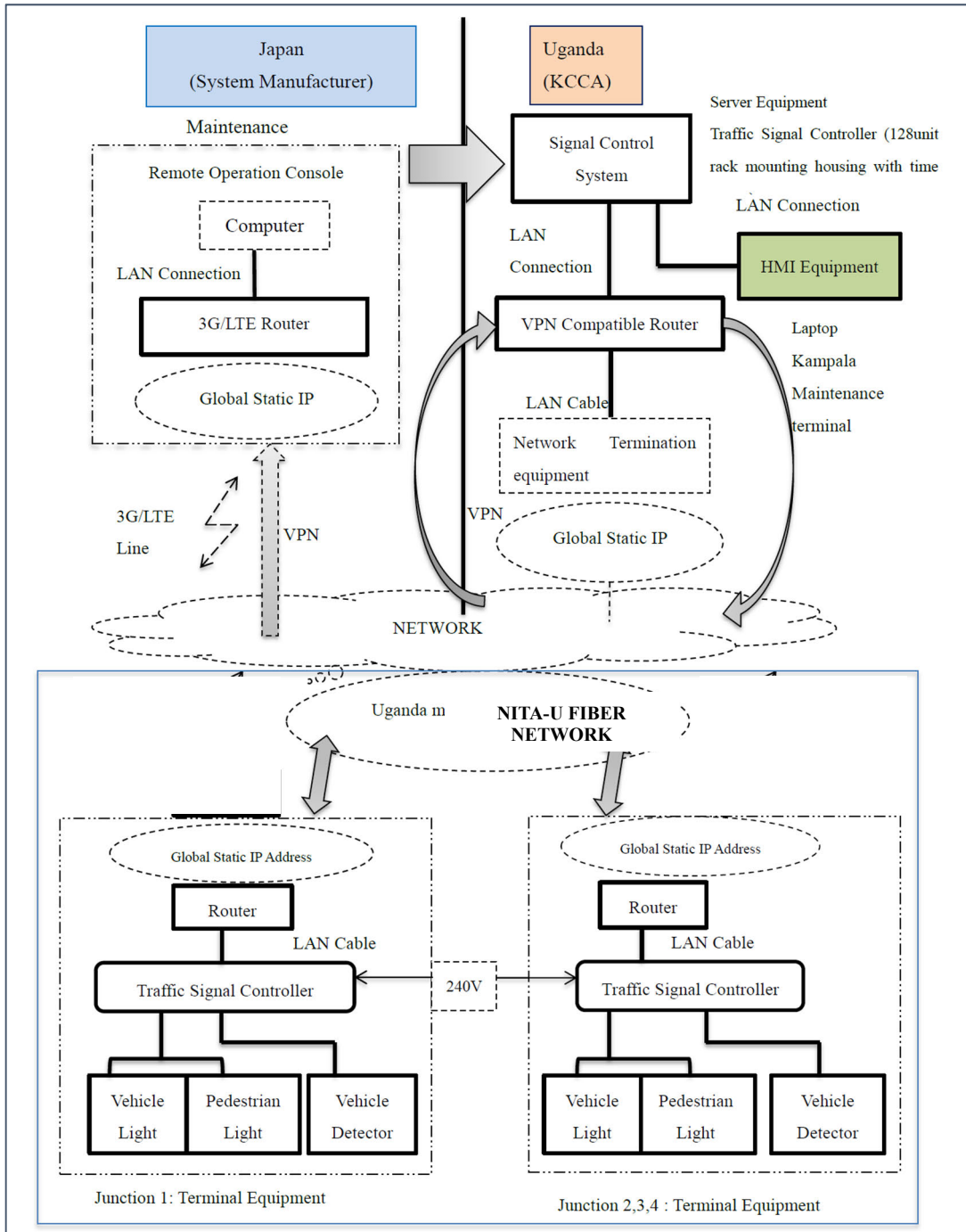


Figure 7-1 System Concept of Operation using MODERATO System

#### 7.1.4 MODERATO Control Principal

7.1.4.1 The area to be controlled is divided into the several sub-areas. To give optimum system control, the sub-areas are combined or separated depending on traffic demand.

7.1.4.2 The system control are organized by the two (2) sub controls.

7.1.4.2.1 Macro Control: The system automatically calculates cycles and splits at the critical junctions in

the sub-area I in real time that controls the traffic flows in the area.

7.1.4.2.2 Micro Control: Fine-tune (adjustment) the cycles and splits according to the traffic demands at each junction

7.1.4.3 Junctions with large traffic loads and fluctuations are designated as the Critical Junction (CJ) where automatic cycle and split calculation take place.

7.1.4.4 The other junction is the non-critical junction (NCJ) of which control is depend on its CJ's control in the sub-area

7.1.4.5 The sub-area setting shall be the smallest unit for macro-control, and should be designed in order to be too large.

7.1.4.6 Detecting of traffic demands on right-turning flow is always challenge, the flow is therefore not subject for split calculation (Macro)

7.1.4.7 Optimization of right-turning flow shall be based on gap detection (Micro).

### 7.1.5 Signal Control Design

7.1.5.1 As CJs, the cycles and splits are automatically estimated by calculating the load factor based on traffic volume and queue length

$$\text{Cycle } C = (a1 \cdot L + a2) / (1 - a3 \cdot \rho)$$

L: Loss time

$\rho$ : Junction Load Factor ( $\rho = \sum \rho_i$ )

a1, a2, a3: Factors

$$\text{Split } \rho_i = \text{Max}(\rho_{i1}, \rho_{i2})$$

$$g_i = \rho_i / \sum \rho_i$$

$\rho_i$ : Load factor on leg I at phase i

$\rho_i$ : Load factor at phase i

$g_i$ : split at phase i

### 7.1.6 Sub-area Design

7.1.6.1 Sub-area and the critical junctions were designed as shown in Figure 7-2.

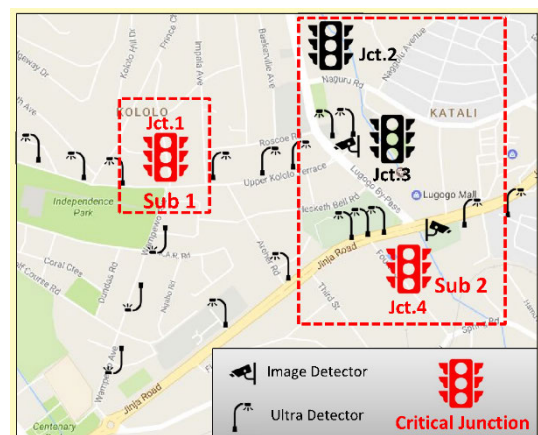


Figure 7-2 Original Sub-area

### 7.1.7 Microsimulation Model

7.1.7.1 1 hour traffic simulation has been prepared using microsimulation software VISSIM on how the situation can be improved after installation of traffic signals. The simulation is prepared for 3

different cases:

1. No signal (present),
2. Traffic signal fixed timing
3. Traffic signal controlled by MODERATO

7.1.7.2 The result shows the delay time can be reduced by 35% and average travel speed can be increased by 47% in the network compared to present if MODERATO type traffic control system can be introduced.

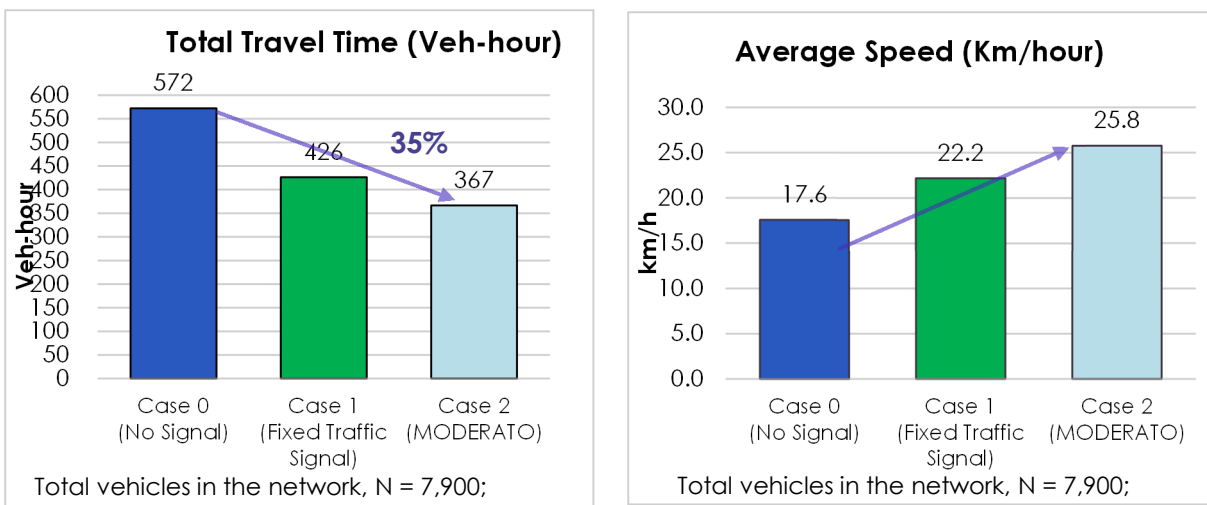


Figure 7-3 Result of Different cases using Micro Simulation

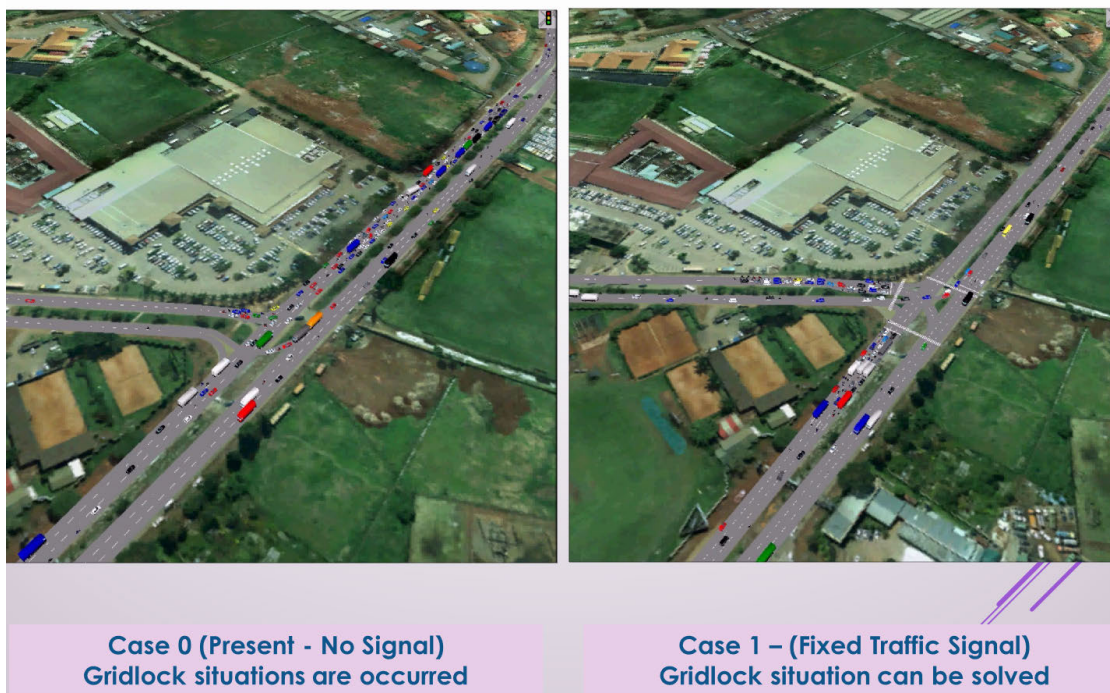


Figure 7-4 Image of Micro Simulation using VISSIM

## 7.2 MONITORING

### 7.2.1 Communication Challenge

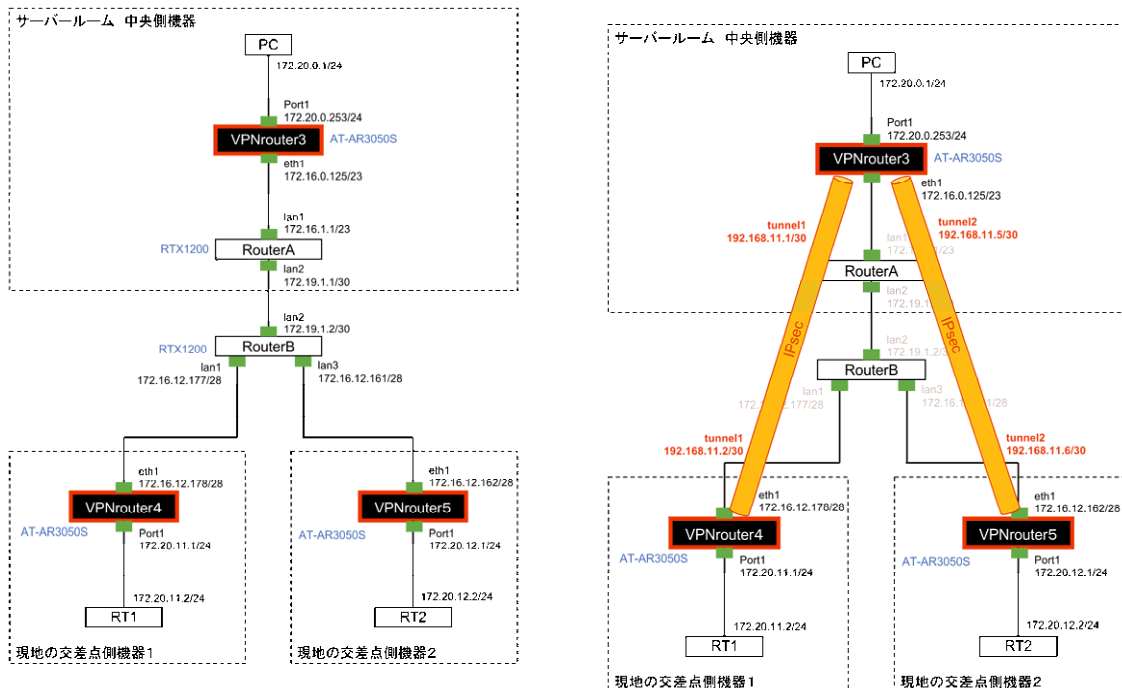
7.2.1.1 Challenge in communications between junctions and centre was encountered that the tunneling protocol could not be re-activated after power cut. Because of the problem, the central control signals cannot be transmitted to the site controller that results in stand-alone operation.

7.2.1.2 Investigations have been made by Nippon Signal, the manufacture of signal devices and Moderato and Dr. Kikuchi, the Communication Expert. Nippon and Dr. Kikuchi built the virtual networks in Japan and reproduced the situation of repeats powering on/off at the network.

7.2.1.3 It was found that the communication interruption due to the assumed switching timing to the UPS did not cause a problem because the length of the instantaneous power that the router could endure was short.

7.2.1.4 As a result, they concluded there was no problem on tunnel protocol set-out and other local external problem was considered. However, they improved tunneling design by IPsec.

7.2.1.5 Tunneling by IPsec uses symbolic names instead of inorganic numbers. Tunneling by IPsec improves readability and is expected to reduce problems during configuration and troubleshooting. In the case of IPsec tunneling, tunneling is rebuilt in about 3 minutes after power recovery from a power failure.



Tunneling by l2tp (Original)

Tunneling by IPsec (Improvement)

Figure 7-5 Improvement of Tunneling Set-out

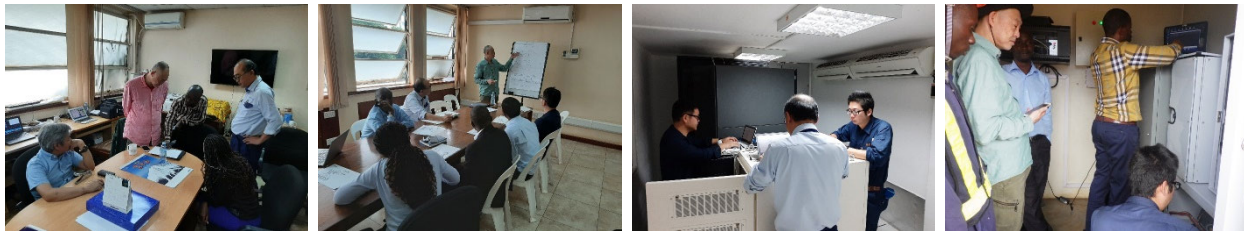
7.2.1.6 A site investigation was conducted by Nippon, the Expert team and KCCA in early December 2019.

Table 7-1 Work Programme at Site

Date	Work Time	Work Details	Responsibility
2-6 Dec,	9:00~17:00	1. Router set-out work • Write the configuration file to the VPN router for signal controller connection in the signal control system and check the communication • Writing of configuration file to VPN router for HMI device connection in signal control system and communication confirmation 2. Router test • Clear VPN router power on signal control system side 3. HMI screen display change (sub area division, sensor name change) 4. Change of signal control constant • Sub area division, sub area combination setting, important intersection change, split value, important intersection parameter change, fixed step change 5. Change of signal control system program	Nippon Signal: Mr. Onozato Mr. Hayashi Mr. Takahashi

Table 7-2 Work Programme in KCCA Control Room

Date	Work Time	Work Details	Responsibility
2-6 Dec,	9:00~17:00	1. Router set-out work • Write configuration file to VPN router for HMI device and check communication 2. Router test • Clear VPN router power on signal control system side	Nippon Signal Mr. Onozato Mr. Hayashi Mr. Takahashi KCCA Mr. Tom Kizito



Photograph 7-1 Working Scenes

7.2.1.7 In addition, the firmware for the router was updated with the latest version.

## 7.2.2 Improvement of the design (January 2020)

### 7.2.2.1 Review on Sub-area

7.2.2.1.1 The original design was for No.1 as a single sub-area and No.2, 3, & 4 in the same sub-area, but No.4 was made independent as a result of the review. This is because the cycle of No.4 was too long for No.2 & 3, so we separated it and linked it with the cycle of No.1. The maximum cycle time of No.4 was originally 180 seconds, but the cycle time of No.4 developed over 220 seconds by following the offset to maintain the control system.

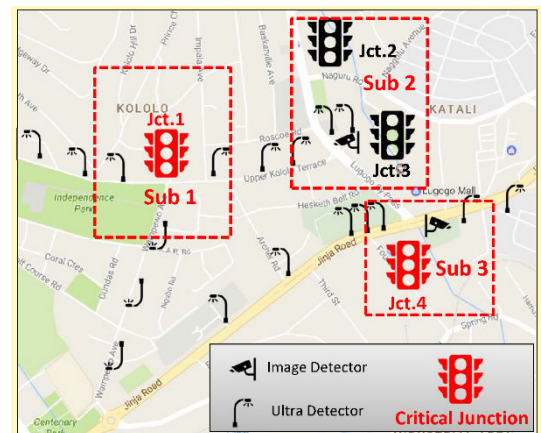


Figure 7-6 Improved Sub-area

### 7.2.2.2 Review on Split on No.2 &3

7.2.2.2.1 These junctions, which are NCJ, was set up as a pattern based on cycle values, but since the split pattern based on cycle values could not respond to traffic conditions, they were therefore changed to a split selection method based on the traffic volume ratio of the designated detectors.

### 7.2.2.3 Saturation Traffic Flow Rate Parameter Change

7.2.2.3.1 At No. 4, the traffic congestion on the upstream side of the East-West direction was light, while the downstream side was heavily congested. Because of the wider lane width of the upstream direction, the saturation traffic flow rate for the split calculation was set smaller than that for the downstream direction, and priority was given to the upstream direction.

## 7.2.3 Travel Time Survey and Traffic Queue Length

7.2.3.1 A travel time survey of the network including the pilot junction was conducted in May 2020. The objective of the survey was to confirm the MODERATO control impact by comparing of the non-signalized, the pre-fixed signal control and the MODERATO control.

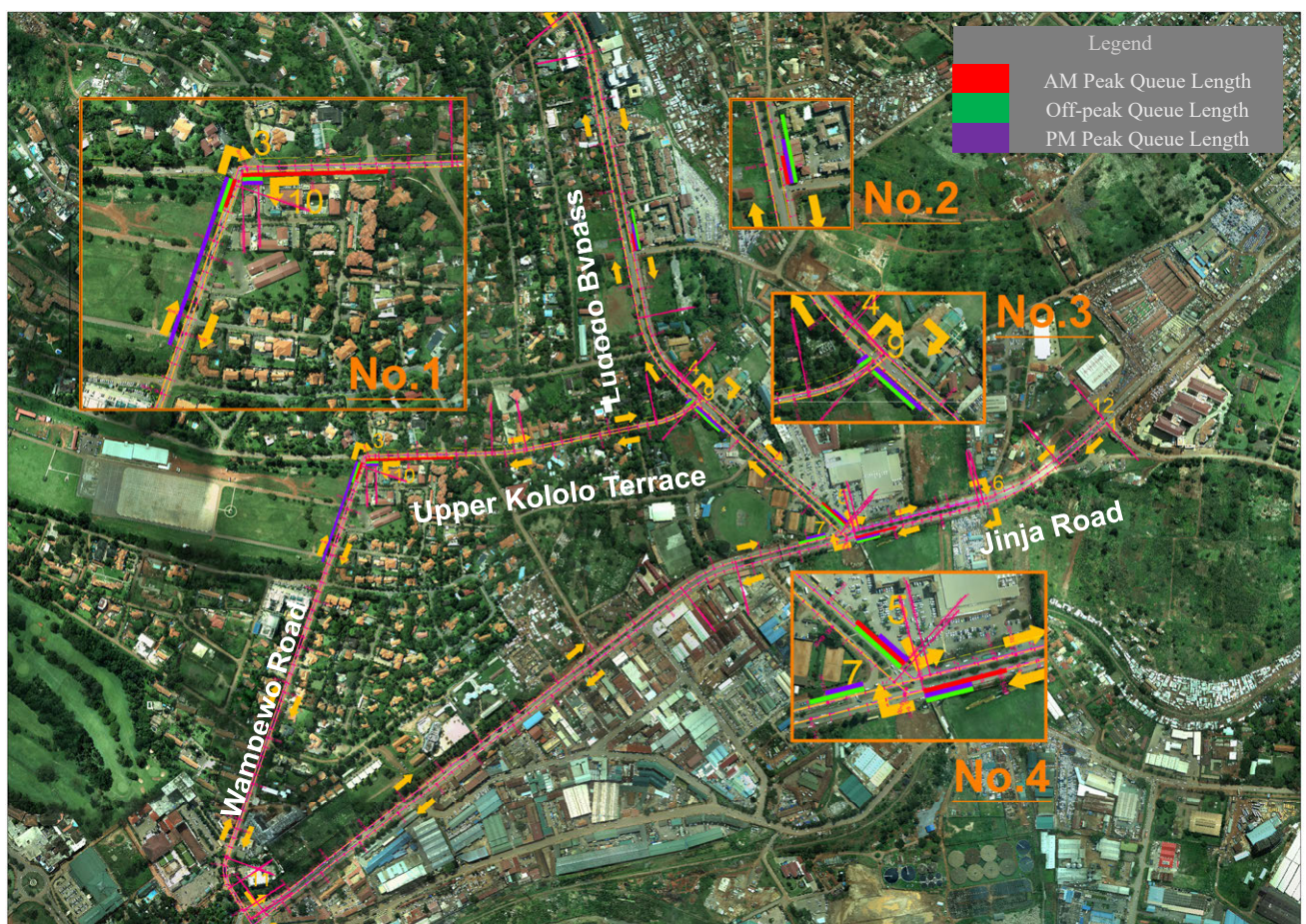


Figure 7-7 Travel Time and Queues Length Survey Results

Table 7-3 The Travel Time Survey Results (Km/hr)

	2020 (MODERATO)	2019 (Stand-alone)	2016 (Un-signalized)
AM Peak	19.37	20.20	13.20
Off Peak	19.14	20.47	29.00
PM Peak	15.51	17.39	16.42
Peak Average	17.44	18.79	14.81

7.2.3.2 The speed is close to 60km/h in all the surveyed time periods except at the intersection, and it is judged that there is no shortage of capacity in the single road section of the surveyed network.

7.2.3.3 As shown in Figure 7-7 and Table 7-3, the congestion at the junctions were also observed during the off-peak hours. (The off-peak travel time is almost the same as the morning peak). This can be interpreted to the presence of unnecessary pedestrian-demand in a single cycle, which resulted in a reduction of junction traffic capacity.

7.2.3.4 The purpose of the pedestrian-demand is to protect the vulnerable and to ensure the efficient operation of signalized junctions. Originally, pedestrian-only indications are activated by the operation of a push button when there is pedestrian traffic, and are omitted when there is no pedestrian traffic (the recall function of the controller). At present, the pedestrian demand time is activated even when there is no pedestrian traffic, because the push button is not installed.

7.2.3.5 Also, during the off-peak period, when the difference between the primary traffic and the secondary traffic is less, the split to the primary traffic is less, so the impact of the pedestrian demand phase is considered to be greater, resulting in the occurrence of congestion.

7.2.3.6 The reduction in speed during the peak time at the Junction 1 is significant and causes congestion. This is thought to be due to the geometric problem of the junction as does not have a right-turn lane.

7.2.3.7 In this survey, the advantage of the MODERATO Control was not fully confirmed. This may be due to the fact that the number of target junctions was only 4, which was not enough to confirm the effect of the Area Traffic Control, and the time loss impact by pedestrian-demand phase was significant. Further, the increase in traffic volume over year may have also affected the confirmation of the effect.

### 7.3 PREPARATION OF MANUAL FOR TRAFFIC CONTROL USING CENTRAL CONTROL SYSTEM

#### 7.3.1 Preparation Objective

7.3.1.1 The main objective of preparation the manual was to describe the control operation method. The manual started with an explanation of the system configuration including the global view of the central control system, and then continued to explain the local control functions and the central control functions.

7.3.1.2 The MODERATO control is a macro control and aims to optimize the traffic flow in a sub-area. The

global view of the control system is that of this macro control with control that reflects the information of each junction in a certain range of parameter variation. Therefore, the manual is structured with an explanation of the types of micro control and their effects.

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Overview of Traffic Control using Central Control System

Control Devices at Junction

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Vehicle Detectors & Push Button

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Image Processing Vehicle Detector

Controller of Detector

Push Button

Signal Controller Device

Special Day Function

Coordinated Signal Operation Function

Time Correction Function

Recall Function

Gap Responsive Function

Stage Pattern Change Function

Pedestrian Responsive Function

Senior Citizen Road Crossing Assistance Function

Interlocking Function

Time Sharing Interlocking Function

High Speed Responsive Function

Dilemma Function

Bus Responsive Function

Automatic Calculation Function

FAST Function

Profile Controller Function

Accumulation of Controller Execution History Function

Control Devices at Central Control Centre

Central Server and Human Machine Interface (HMI) Device

Components of Central Server

Signal Control Block

Traffic Information Accumulation Block

System Management Block

Network Monitoring Block

Signal Control Subordinate Block

Large Screen

Components of HMI Device

Main Window

Unit Failure Report Window

Individual Display Window

Traffic Control System MODERATO

Overview

Basic Principle of MODERATO

Area Traffic Control

The Role of Signal Control Devices at the Centre and at the Junction

<ul style="list-style-type: none"><li>Planning for MODERATO<ul style="list-style-type: none"><li>Formation of Sub-area</li><li>Control Method of the Critical Junction</li><li>Consideration of Right Turn Responsive Detector</li></ul></li><li>Automatic Cycle Length Calculation</li><li>Automatic Split Calculation</li></ul> <p>Traffic Condition Monitoring using HMI Device</p> <ul style="list-style-type: none"><li>Basic Monitoring Items<ul style="list-style-type: none"><li>Traffic Condition Query</li><li>Signal Controller Query</li></ul></li><li>Regular Monitoring Items</li><li>Extraction of problems and countermeasures<ul style="list-style-type: none"><li>From Traffic Condition Query</li><li>From Signal Control Status Query</li></ul></li><li>Process of Details Settings Change</li></ul> <p>Optional Items of Central Control System</p> <ul style="list-style-type: none"><li>Public Transportation Priority System (PTPS)</li><li>Variable Message Signboard (VMS)</li><li>Parking Information</li><li>Congestion Information Sharing in Radio/TV</li></ul>
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### 7.3.2 Preparation of Video Manual

7.3.2.1 Area traffic control by MODERATO is considered to be applicable in other major cities. In order to let more engineers/traffic regulator know about MODERATO, video explaining the main function of Moderato control have been prepared in addition to the hard copy manual.



Figure 7-8 Scenes of Video Manual

## 8 CONCLUSIONS AND RECOMMENDATIONS

### 8.1 CONCLUSIONS

#### Activities Related To [Output 1]: The Urban Traffic Management Policy By Kcca Is Strengthened;

Through this activity, KCCA has successfully prepared the UTMP and IAP, in which medium- and long-term junction improvement plans have been proposed. From the IAP, a pilot project of ATC by MODERATO was implemented, and MODERATO control have been selected for the road improvement project by other funds, and the work has already been completed. In addition, the junction improvement project using MODERATO control is scheduled to be implemented under Japan's grants.

As a result of the activity, the stream-line of traffic management in Kampala City has been established.

#### Activities Related To [Output 2]: The Capacity For Junction Improvement Design Enhanced;

Through this activity, KCCA has successfully prepared the Manual on Planning and Design of At-Grade Junctions. The Manual has been used in the aforementioned Japan's Grant project.

#### Activities Related To [Output 3]: The Capacity For Installation And Maintenance Of Signals At Junction Is Enhanced;

Through the activity, KCCA has successfully prepared the manuals for signal installation and maintenance. As for maintenance and management, outsourcing is becoming standardized. KCCA has also reminded many private sectors to realize and motivate business opportunities in this field. As the number of signalized junctions increases in the future, the need for operation and maintenance and management will undoubtedly increase, and it is believed that the experience and knowledge gained through this activity will be used to ensure proper operation and maintenance.

#### Activities Related To [Output 4]: The Capacity For Raising Consciousness Programme Concerning Observance Of Traffic Rule Is Enhanced;

Through this activity, KCCA has conducted a survey on road users' awareness of traffic safety to understand the public's awareness of the problems in this field. In addition, through the traffic safety campaign, KCCA was able to raise awareness of traffic safety among the public and get a lot of feedback for future activities. In addition, the campaign took a different approach by fully utilizing social media and adopting a contest system to create campaign materials.

#### Activities Related To [Output 5]: The Capacity For Traffic Flow Management Mainly On Junctions Is Enhanced; Pilot Project Report 1;

#### Activities Related To [Output 6]: Skill Of Traffic Control Using "Moderato System" Is Built On Kcca; Pilot Project Report 2;

KCCA has successfully implemented ATC control through these activities and has experienced the problems during the system commissioning. The experience can be used when further development of ATC network is implemented. In the ATC control, KCCA engineers has operated the HMI in the project office, prepared statistical data and report, and adjusted the control parameters.

**As a result of the above activities, the project purpose "The capacity of traffic flow management on the roads in Kampala City by KCCA is enhanced " has successfully been achieved.**

## **8.2 RECOMMENDATION**

The project encompasses both hard and soft activities of traffic management and KCCA has improved its management capacity in each of these areas. There is no doubt that this capacity will be put to good use in the upcoming road development. As the volume of traffic will continue to increase and more skills will be required for traffic flow management, it is hoped that the knowledge gained from this activity will be independently developed to improve the quality of road traffic.

In this project, MODERATO, a Japanese traffic control system, was introduced and mobilized to Africa for the first time. In commissioning the system, it took time to provide stable communication, and therefore, the project period had to be extended. In addition, the installation locations of the terminal equipment that is consisted MODERATO system are different from those in Japan, and there are many restrictions, and it was necessary to take into account the environment of the region, such as natural disasters, against rat measure and vandalism. Those were lessons for the Japanese side.

In addition, MODERATO does not allow users to change the signal pattern program as freely as SCOOT, and the customization of the software is necessary to make the system accommodate the situation and needs in developing countries where the situation is constantly changing.

The digital campaign was conducted for traffic safety, and the event was broadened without setting a specific target. The message conveyed by the Project was "Understand traffic infrastructure function and use them properly" and "Protect yourself from danger". The visual materials created through the Project will continue to be available on the KCCA website, and KCCA is expected to update and improve them in the future.

In the future, demand control and more severe traffic regulation will be necessary, and it is also hoped that KCCA will be able to solve these problems in cooperation with the Police and other stakeholders.

## APPENDIX

### APPENDIX-1 LIST OF MEMBERS

KCCA		JICA EXPERT	
ENG. ANDREW KITAKA	PROJECT DIRECTOR	ENG. TETSURO IZAWA	TEAM LEADER
ENG. JUSTUS AKANKWASA	PROJECT DIRECTOR	ENG. YOSHIHISA ASADA	DEPUTY TEAM LEADER
ENG. JACOB BYAMUKAMA	PROJECT MANAGER	DR. YUTAKA KIKUCHI	COMMUNICATION SPECIALIST
ENG. JOEL WASSWA	PROJECT COORDINATOR	ENG. KUNIIHIKO TACHIBANA	COMMUNICATION SPECIALIST
MR. MARTIN SSEKAJJA	C/P	DR. HIROHISA KAWAGUCHI	URAN ROAD NETWORK PLANNER
MR. ADAM SSENGOOBA	C/P	ENG. KIMINORI MATSUMOTO	JUNCTION DESIGN ENGINEER
ENG. FORTUNATE BIIRA	C/P	MR. AKIRA YOKOI	TRAFFIC LIGHT SYSTEM PLANNER
MS. BEATRICE MAGUMBA	C/P	ENG. YOSHIYUKI ARITA	TRAFFIC LIGHT SYSTEM PLANNER
MR. TOM KIZITO	C/P	ENG. AKIHIRO SANPEI	TRAFFIC LIGHT OPERATION ENGINEER
		ENG. OSAMU SHIRAI	TRAFFIC LIGHT OPERATION ENGINEER
		ENG. TAKAFUMI KAWACHI	TRAFFIC SURVEY ENGINEER
		ENG. YUYA OTSUBO	TRAFFIC SURVEY ENGINEER
		MR. TUGRUL YETISGIN	TRAFFIC SURVEY ENGINEER
		ENG. PALLAB DEBNATH	TRAINING PLANNING & MONITORING
		MS. MIHOKO OGASAWARA	DATABASE ENGINEER/PUBLIC RELATION
		MS. MITSUE UMIGUCHI	DATABASE ENGINEER/PUBLIC RELATION

## APPENDIX-2 MINUTES OF JCC MEETING

### MINUTES OF JOINT COORDINATION COMMITTEE MEETING HELD ON THURSDAY 14<sup>TH</sup> MAY 2015 AT IMPERIAL ROYALE HOTEL MONGOLIA ROOM AT 10:30AM

**ATTENDANCE-SEE ATTACHED**

#### AGENDA:

1. ARRIVAL/BREAKFAST/SIGNING IN
2. INTRODUCTIONS
3. OPENING REMARKS BY EXECUTIVE DIRECTOR, KCCA
4. REMARKS BY JICA REPRESENTATIVE
5. PRESENTATION OF THE PROJECT BY CONSULTANTS (MR. IZAWA)
6. A.O.B/QUESTION AND ANSWERS
7. CLOSING REMARKS BY ENG. KITAKA ANDREW
8. LUNCH

No.	Discussion	Action/Resp Officer
<b>1.0</b>	<b><u>Arrival/Breakfast/Signing in</u></b>	
	Eng. Byamukama Jacob called the meeting to order after everyone had had their breakfast..	
<b>2.0</b>	<b><u>Introductions</u></b>	
	There was self-introduction from all members. Jacob informed the meeting that the ED was still finishing up with another meeting and would join us anytime. He thus requested the Director of Engineering and Technical Services of KCCA, Mr. Kitaka Andrew, to officially open the meeting and then invite the JICA Representative for his remarks.	
<b>3.0</b>	<b><u>Opening Remarks by Director of Engineering Department at KCCA</u></b>	
	Mr. Kitaka Andrew noted that KCCA is currently having technical cooperation projects with JICA and this project is aimed at mainly improving traffic management in Kampala through capacity building of staff in KCCA and also improving our cooperation with other national organizations like UNRA and also Police. He said that the project begun this year and would run for 3years and KCCA would like to make the best out of the project and make sure that the heavy investment put into infrastructure is well managed. He then invited the JICA Representative, Mr.	

No.	Discussion	Action/Resp Officer
	Kawabe to give his remarks.	
<b>4.0</b>	<b><u>Remarks by JICA Representative</u></b>	
	<p>Mr. Ryoichi Kawabe welcomed everyone to the first Joint Coordination Committee meeting for the Project for Capacity Enhancement of KCCA in Management of the traffic flow in Kampala. He reiterated what Eng. Kitaka has mentioned that the project would last 3 years aimed at enhancing KCCA manpower in traffic management. He expressed his sincere thanks to the host of the meeting KCCA for the excellent support to this project and for their continuous effort to make Kampala a better city. He also thanked everyone for agreeing to participate in this project.</p> <p>He informed the meeting that JICA's is willing to contribute towards reduction of Kampala city congestion, which goes a long way in contributing to Uganda's economic development. As such JICA is willing to support the Uganda government in projects like;</p> <ul style="list-style-type: none"> <li>• The Kampala Flyover Project at a cost of \$180m.</li> <li>• The project for the completion of the Queen's way substation at a cost of \$18m whose construction will commence in July 2015.</li> <li>• Kampala transmission system upgrade, which would most probably begin this summer (July or August).</li> </ul> <p>This project thus aimed at helping Kampala become a world standard capital. He concluded by promising that JICA will continue to support towards KCCA and thanked everyone for the harmonious relationship they have accorded JICA for this project.</p>	
<b>5.0</b>	<b><u>Presentation of the Project by Consultants (Mr. Izawa)</u></b>	
	<p>Mr. Izawa gave his presentation on the outline and aims of the project. He later welcomed questions from members in the meeting.</p> <p>The presentation was halted with the arrival of the KCCA executive director. Apologies were made for her late arrival, but she had been involved in another meeting elsewhere. Mr. Kitaka informed the ED that a presentation on the project was being made and he requested Mr. Izawa to continue with his presentation.</p>	
<b>6.0</b>	<b><u>A.O.B/ Questions and Answers.</u></b>	

No.	Discussion	Action/Resp Officer
	<p>Mr. Kitaka thanked Mr. Izawa for the informative presentation. He added that JICA is in the country to give soft skills in management of the technologies KCCA is investing in. He noted that Kampala would soon have more junctions than before i.e. from 9 to 60.</p> <p>He then invited questions from members in the meeting.</p> <ul style="list-style-type: none"> <li>• Mr. Olobo from UNRA asked to questions. <ul style="list-style-type: none"> <li>○ He asked whether the consultant is considering Demand-Driven signals instead of fixed time signals because some junctions have overwhelming demands at different times of the day.</li> <li>○ He also asked whether the consultant is planning on having primary and secondary signal heads?</li> </ul> </li> <li>• One of the town clerks asked if there would be improvement on areas around Kampala because as they develop, they too would definitely have an effect on the Kampala traffic.</li> <li>• Mr. Wambesyo Israel from UPF asked for how some un-signalized junctions are being catered for because they have a lot of traffic flowing into the signalized junctions.</li> </ul>	
6.1	<p><b><u>Answers</u></b></p> <ul style="list-style-type: none"> <li>• To Mr. Olobo: <ul style="list-style-type: none"> <li>○ The demand-driven signals (detective signals) would be use during the KIIDP2 project. But we have to first understand how these signals work before we can start using them. All this training would be done during the course of the project and hands-on will be in japan for some of the trainees.</li> <li>○ Mr. Izawa said that the primary and secondary signalization is used in Japan, and would be considered to be check its effectiveness in Kampala.</li> </ul> </li> <li>• Target areas: <ul style="list-style-type: none"> <li>○ This project focuses on the KCCA but our overall target would be beyond KCCA area since it also forms part of the road network.</li> </ul> </li> <li>• To Mr. Wambesyo (Traffic Police): <ul style="list-style-type: none"> <li>○ The un-signalized junctions would be signalized and Mr. Izawa requested the traffic police to have some faith in the signalization. He explained that the current Kitgum junction signals are not doing</li> </ul> </li> </ul>	

No.	Discussion	Action/Resp Officer
	<p>their job well because they are surrounded by un-signalized junctions.</p> <p>Mr. Wambesyo reiterated that Traffic Police had agreed with the JICA team to have a ground experience on what happens during peak hours.</p> <p>Mr. Kitaka responded that the project scope includes involvement of traffic Police so many visits would be made. He added that KCCA is also in the process of acquiring more sophisticated traffic controllers that are both fixed time and demand driven, on top having a traffic control center.</p> <p>Mr. Kitaka then invited the ED to give a few remarks.</p>	
<b>7.0</b>	<b><u>Remarks by the KCCA Executive Director, Mrs. Semakula J. Musisi</u></b>	
	<p>The ED started by greeting everyone. She expressed her joy at being part of the meeting and said she is excited about the project. She said that, however, her main reason for coming was to thank the JICA technical team that is providing the technical knowledge.</p> <ul style="list-style-type: none"> <li>• To mitigate congestion in Kampala, KCCA started by remaking roads (improving the driving surface, getting rid of potholes), then widening of some roads. Under the KIIDP2 Project, some junctions would be widened and signalized. She said that under KIIDP2, 32 junctions would be signalized and the BRT project would see 30 more.</li> <li>• She said the that plan to put in place a manual is a very good idea because it not only helps the current team, but all other teams that will do similar works later on.</li> <li>• She said the KCCA would avail themselves for capacity building and any local component that would be needed.</li> <li>• She hoped that at the end of the project with all or most goals achieved, KCCA would be very appreciative to the JICA technical team, especially since at the end of this project the effects would be around for a very long time.</li> <li>• She thanked all stakeholders i.e. UNRA, Traffic Police, World Bank, MOWT, the KCCA team and the JICA technical team.</li> <li>• She promised that KCCA would continue supporting the JICA team, sensitization of the masses through social media would continue as has been happening since the public is very expectant of the results of this project.</li> <li>• She concluded her remarks by thanking everyone for their contribution</li> </ul>	

No.	Discussion	Action/Resp Officer
	<p>towards this project.</p> <p>Mr. Kitaka requested everyone present to publicize this project and to take interest in it. He delivered apologies from MOWT who could not send any representative as they were preparing for a conference. He emphasized that all partners are very necessary in order to achieve the objectives of the project.</p> <p>He then invited Mr. Kawabe to give a few remarks to the ED.</p>	
<b>7.1</b>	<b><u>Remarks from JICA Representative, Mr. Kawabe</u></b>	
	<p>Mr. Kawabe thanked Eng. Kitaka for offering him a chance to give remarks yet again. He thanked the ED for accepting to attend the JCC meeting.</p> <p>He commended her for her efforts in wanting to mitigate the congestion in Kampala and pointed out that as the World bank would be providing the hardware support, JICA would be providing software support. He hoped that with the upcoming projects of the flyover and BRT, congestion would be done away with in Kampala.</p> <p>He then ended his remarks by thanking everyone for being attending.</p>	
<b>8.0</b>	<b><u>Closing Remarks by Eng. Kitaka Andrew</u></b>	
	<ul style="list-style-type: none"> <li>• Eng. Kitaka thanked everyone for participating in the first JCC meeting.</li> <li>• He said he would not repeat what previous speakers had said.</li> <li>• He also said that KCCA would support this project.</li> <li>• Unlike other projects where a lot of hardware is involved, this project would be more of technical knowledge transfer.</li> <li>• He stressed that with the development of the Urban Traffic Management guidelines, their approval from the Ministry of Works and transport, KCCA would take the lead on how to manage traffic in the country.</li> <li>• He also noted that with the upcoming projects like the BRT, Flyover, World bank KIIDP2, Kampala will slowly but surely be moving from a low technology city to a moderately high technology city. All this requires building of human capacity in all these projects. Therefore, there is need for a unifying standard so that the country can move in a more organized manner.</li> <li>• All these would be coming to Kampala within the next 5years and Eng. Kitaka requested members to prepare well for all these projects. He reiterated that we need to train as many engineers as possible, and also preempt capacity in the private sector because all other developed cities have the private sector involved in the development.</li> </ul>	

No.	Discussion	Action/Resp Officer
	<ul style="list-style-type: none"><li>• He closed the first JCC meeting and invited everyone to take keen interest in the technical meetings that would be help from time to time. He invited everyone for lunch.</li></ul>	

## ACRONYMS

Acronym	Definition
KCCA	Kampala City Council Authority
MoWT	Ministry of Work and Transport
ED	Executive Director
UNRA	Uganda National Roads Authority
JCC	Joint Coordination Committee
JICA	Japanese International Cooperation Agency

Meeting Attendance List				
No.	Name	Title/Organization	Tel	Email
1	Ms. Biira Fortunate	Transport Planning & Traffic Management officer, KCCA	0794 661 049	<a href="mailto:fbira@kcca.go.ug">fbira@kcca.go.ug</a>
2	Mr. Mwesigwa Leonard	Transport Planning & Traffic Management officer, KCCA	0794 661 037	<a href="mailto:lmwesigwa@kcca.go.ug">lmwesigwa@kcca.go.ug</a>
3	Mr. Ssenyimba Andrew	Electrical & Asst. Traffic Engineer, JICA	0757 117 722	<a href="mailto:andethso2002@yahoo.co.uk">andethso2002@yahoo.co.uk</a>
4	Mr. Ssenigooba Adam	Officer, KCCA	0794 661 031	<a href="mailto:assengooba@kcca.go.ug">assengooba@kcca.go.ug</a>
5	Mr. Wambesyo Israel	Traffic Police Officer, UPF	0712 458 279	<a href="mailto:wambesyoisrael@yahoo.com">wambesyoisrael@yahoo.com</a>
6	Mr. Hiroshi Kawaguchi	Urban Road Planning, JICA	0791 632 591	<a href="mailto:kawaguchih@oriconsul.com">kawaguchih@oriconsul.com</a>
7	Ms. Busingye Alice	Acting Town Clerk Nakawa Division, KCCA	0794 661 413	<a href="mailto:abusingye@kcca.go.ug">abusingye@kcca.go.ug</a>
8	Mr. Byamukama Jacob	Manager Transport & traffic Management, KCCA	0794 660 980	<a href="mailto:jbyamukama@kcca.go.ug">jbyamukama@kcca.go.ug</a>
9	Mr. Wasswa Joel	Support team, Transport & traffic Management, KCCA	0794 660 989	<a href="mailto:jwasswa@kcca.go.ug">jwasswa@kcca.go.ug</a>
10	Mr. Kitaka Andrew	Director, Engineering & Technical Services, KCCA	0794 660 979	<a href="mailto:akitaka@kcca.go.ug">akitaka@kcca.go.ug</a>
11	Mr. Olobo Benjamin	Technical Manager, UNRA	0777 011 546	<a href="mailto:benjamin.olobo@unra.go.ug">benjamin.olobo@unra.go.ug</a>
12	Mr. Muhwezi Davis	Transport Planner, UNRA	0773 543 509	<a href="mailto:davis.muhwezi@unra.go.ug">davis.muhwezi@unra.go.ug</a>
13	Mr. Ajalu J Stephen	Urban Specialist, World Bank	0776 669 380	<a href="mailto:sajalu@worldbank.org">sajalu@worldbank.org</a>
14	Mr. Tibihika Theo	Town Clerk, KCCA	0794 660 036	<a href="mailto:ttibihika@kcca.go.ug">ttibihika@kcca.go.ug</a>
15	Mr. Komakech Henry	Roads Officer, KCCA	0794 660 982	<a href="mailto:hkomakech@kcca.go.ug">hkomakech@kcca.go.ug</a>
16	Mrs. Semakula J. Musisi	Executive Director, KCCA	Nil	
17	Mr. Tetsuro Izawa	Project Team Leader, JICA		<a href="mailto:izawa-te@ej-hds.co.jp">izawa-te@ej-hds.co.jp</a>
18	Mr. Ryoichi Kawabe	JICA Representative	0774 650 621	
19	Ms. Kyoshabire Florence	Acting Town Clerk Central Division, KCCA	0794 661 392	<a href="mailto:fkyoshabire@kcca.go.ug">fkyoshabire@kcca.go.ug</a>
20	Mr. Robert Katungi	Acting Town Clerk, KCCA	0794 661 247	<a href="mailto:rkatungi@kcca.go.ug">rkatungi@kcca.go.ug</a>
21	Mr. Kiligwajjo Abasi	Electrical Officer, KCCA	0794 660 996	<a href="mailto:akirigwajjo@kcca.go.ug">akirigwajjo@kcca.go.ug</a>
22	Mr. Bwire Ernest	Traffic Technician, KCCA	0794 661 024	<a href="mailto:ebwire@kcca.go.ug">ebwire@kcca.go.ug</a>
23	Mr. Ssekatawa Edward	Technician, KCCA	0794 661 005	<a href="mailto:essekatawa@kcca.go.ug">essekatawa@kcca.go.ug</a>
24	Mr. Kaweesa Patrick	Supritendant of Roads, KCCA	0794 660 986	<a href="mailto:pkaweesa@kcca.go.ug">pkaweesa@kcca.go.ug</a>
25	Mr. Lwanga Y	KCCA		
26	Mr. Matsumoto	Intersection Design, JICA		

## MINUTES OF JOINT COORDINATION COMMITTEE MEETING HELD ON TUESDAY 12<sup>TH</sup> APRIL 2016 AT GRAND IMPERIAL HOTEL SHELINA ROOM AT 02:00PM

**ATTENDANCE-SEE ATTACHED**

### AGENDA:

1. ARRIVAL/LUNCH/SIGNING IN
2. INTRODUCTIONS
3. OPENING REMARKS BY EXECUTIVE DIRECTOR, KCCA
4. REMARKS BY JICA REPRESENTATIVE
5. PRESENTATION OF THE PROJECT BY CONSULTANTS (MR. IZAWA, MR. PALLAB)
6. BREAK
7. A.O.B/QUESTION AND ANSWERS
8. CLOSING REMARKS BY ENG. KITAKA ANDREW

No.	Discussion	Action/Resp. Officer
<b>1.0</b>	<b><u>Arrival/Breakfast/Signing in</u></b>	
	Eng. Byamukama Jacob called the meeting to order after everyone had had their breakfast.	
<b>2.0</b>	<b><u>Introductions</u></b>	
	There was self-introduction from all members.	
<b>3.0</b>	<b><u>Opening Remarks by the Executive Director (E.D) of KCCA</u></b>	
	<ul style="list-style-type: none"> <li>• The E.D begun by greeting everyone and introduced herself by name.</li> <li>• She welcomed everyone to the meeting and also recognized the JICA chief representative to Uganda, the Director Traffic from Uganda Police, officials from development partners, KCCA staff.</li> <li>• She acknowledged the support the Japanese government has rendered to Uganda particularly in Kampala regarding the reduction of the traffic congestion problem.</li> <li>• She pointed out that there is a lot of health, economic and social problems associated with traffic congestion.</li> <li>• She added that a lot of valued time is lost in traffic jam. It also causes a lot of climatic problems due to the bad gases emitted from the cars. Thus, she welcomed any effort or support from anyone who wants to work with KCCA in mitigating the traffic congestion problem in Kampala city.</li> <li>• She also expressed her happiness at the presence of all the partners who are helping in the solving the problem.</li> <li>• She noted that Kampala currently has only 9 signalised junctions, which are still few but thanked the Japanese government for providing them to the city.</li> <li>• She added that following up with the donation, the Japanese government also provided technical support after identifying the need to provide capacity enhancement to KCCA engineers. This included Japanese experts</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<p>coming to Uganda to train Ugandan engineers and also the Ugandan engineers flying to Japan to have more exposure.</p> <ul style="list-style-type: none"> <li>• She also pointed out that KCCA would soon start on the Kampala flyover project, also funded by JICA, which will greatly address the traffic congestion problem in the city.</li> <li>• She added that KCCA is currently implementing the World Bank funded KIDDP2 Project. This includes the signalization of over 30 junctions so we will soon be seeing more traffic junctions in Kampala. Under the same project, a Central traffic Control Centre is being designed so that all traffic lights are synchronized to provide better control of the traffic within the city.</li> <li>• She also pointed out that KCCA hopes that Japan will provide more support to equip the traffic control centre when its in place, and also training the manpower to run the centre.</li> <li>• She noted that KCCA needs to train staff to manage all junctions because without such capacity, KCCA will not be able to manage all traffic lights and all the technology that comes with it.</li> <li>• She said that she hopes that this progress will help improve the quality of life of people in Kampala with the improved traffic flow and management.</li> <li>• She added that as KCCA, we have had some intervention we have put in place, like expanding the road network (filling potholes, regular maintenance of the roads, and upgrading many others to paved roads in the last 5years).</li> <li>• She noted that KCCA has also tried to improve public transport; they have recently awarded contracts to bus service providers for routes in Kampala, worked with Rift Valley railways to restart the passenger train services between Namanve and Kampala. The trains have increased daily user capacity up to 1,000 passengers of recent. She added that in fact KCCA is under pressure to provide additional train coaches since the public has appreciated the train service and many have stopped using their private cars to come to the city. She said that, hopefully, the train service would be extended to Nalukolongo and Luzira in due course.</li> <li>• She said that KCCA has recruited 30 traffic wardens to help in traffic management hand-in-hand with Uganda Traffic Police, and expect to recruit another 200 if funds allow.</li> <li>• She added that KCCA is also beginning to work with schools to reduce the number of vehicles coming into the city to bring children; KCCA is encouraging mass transport vehicles for schools.</li> <li>• She also said that KCCA is also considering other modes like Non-Motorised Transport (NMT) for certain parts of the city. Walkways and bicycle lanes are also being established in places where space allows.</li> <li>• She also added that a feasibility study for cables was done and the report is ready. She noted that such a project is rather ambitious but a possible venture since it has succeeded elsewhere.</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<ul style="list-style-type: none"> <li>• She reiterated the objectives of this project as: <ul style="list-style-type: none"> <li>❖ To strengthen the capacity of KCCA staff in transport management policy,</li> <li>❖ To improve the capacity of KCCA staff in junction management (esp. designs),</li> <li>❖ Enhance the capacity of KCCA in maintaining traffic signals something which has already started with the support of JICA,</li> <li>❖ To increase capacity to raise awareness concerning observance of traffic rules and regulations (already ongoing and are already working together with Uganda Police),</li> <li>❖ To enhance capacity in traffic flow management mainly at junctions which will involve having a pilot project with the help of JICA experts.</li> </ul> </li> <li>• She pointed out that the World Bank under KIDDP2 has provided funds for the construction of the traffic control centre but it needs equipment and manpower to run it. She thus said that one of the reasons for the JCC meeting was to appreciate support from JICA (and government of Japan) and other development partners, but again to express the need for additional support to enable the successful completion of the ongoing projects in order to make Kampala a benchmark city among all developing cities especially in managing traffic flow.</li> <li>• She appreciated the JICA support, the JICA expert team at KCCA and thanked everyone for the great interest showed by attending the JCC meeting.</li> <li>• She promised that KCCA would continue communicating with everyone on the progress and called for continued participation and advice from all partners.</li> <li>• She also added that she is looking forward to the day she will be able to drive to work in 15min (at any time of the day) like she does very early in the morning or very late at night.</li> <li>• She finished by thanking everyone for listening to her.</li> </ul>	
<b>4.0</b>	<b>Remarks by JICA Representative</b>	
	<ul style="list-style-type: none"> <li>• Mr. Kawabe welcomed everyone to the Joint Coordination Committee and introduced Mr. Kawahara, the Chief JICA representative in the JCC meeting.</li> <li>• Mr. Kawahara started by greeting everyone and expressed the honor he had at being in Kampala for the JCC meeting.</li> <li>• He said that as mentioned in the first JCC meeting, JICA is very dedicated to infrastructural development in Uganda and that they intend to continue supporting a number of transport infrastructural projects as well as technical cooperation like the on-going program.</li> <li>• He added that the current project by JICA experts is very important to KCCA to clearly understand the UTMP and to coordinate with other agencies and officials as well as stakeholders, some of who were in the meeting.</li> <li>• He assured the meeting of JICA's continued support, with a major</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<p>announcement coming up in the TICAD 6 meeting to be held in Nairobi in August.</p> <ul style="list-style-type: none"> <li>• He ended his speech by thanking everyone for coming to the JCC meeting.</li> </ul>	
<b>5.1</b>	<b><u>Presentation by JICA Expert. (Mr. Izawa Tetsuro)</u></b>	
	<p>Mr. Izawa made a presentation on the project background, goals, and expected output: in summary, the project progress since the previous JCC meeting. <i>See Appendix: 1</i></p>	
<b>5.2</b>	<b><u>Presentation by JICA Expert (Mr. Pallab Debnath)</u></b>	
	<p>Mr. Pallab made a presentation on the Urban Traffic Management Plan (UTMP). <i>See Appendix: 2</i></p>	
<b>6.0</b>	<b><u>Break</u></b>	
	<p>There was a short break taken after the presentations</p>	
<b>7.0</b>	<b><u>Question and Answer Session.</u></b>	
	<p>Eng. Kitaka Andrew, Director Engineer and Transport Services at KCCA invited anyone who had questions to present them. He requested anyone who wanted to ask a question to first introduce themselves before asking.</p> <ol style="list-style-type: none"> <li>1. Henry Komakech (KCCA engineer Kawempe Division): <ul style="list-style-type: none"> <li>- He asked for what means the experts had to bring the cost of the central control centre down since UGX 4 billion seemed like a very high figure.</li> <li>- What (other) measures are being worked on to improve on the drivers' behavior in Kampala?</li> </ul> </li> <li>2. Dr. Kasiima (Director Traffic, Uganda Police Force) <ul style="list-style-type: none"> <li>- He sought for clarification on whether the policy being formulated (as mentioned in the presentation) is for government or KCCA, because there is already an existing one for government, although not yet approved by cabinet.</li> <li>- He also wanted to get a figure of the number of vehicles and bodabodas in Kampala since the graph from the presentation had only indicated percentages.</li> <li>- He noted to the JICA experts that despite the fact that the presentation had considered traffic congestion for morning and evening peaks, it has no formula since congestion is persistent throughout the day on some days and almost non-existent on others.</li> <li>- He pointed out that capacity building seems to be putting almost all emphasis on KCCA staff yet traffic police manages the control centre in many other jurisdictions. He requested for a joint effort between Police and KCCA.</li> </ul> </li> </ol>	

No.	Discussion	Action/Resp. Officer
	<ul style="list-style-type: none"> <li>- He added that the project is 1/3 way and yet nothing tangible has been observed.</li> <li>- Many people are not aware of the existence of many of such projects so he requested more sensitization of the public on such projects.</li> </ul> <p>3. Mwesigwa Sam (Wakiso Dept. Engineering)</p> <ul style="list-style-type: none"> <li>- What are the alternative routes (outside KCCA jurisdiction) that can be taken by road users to avoid congested areas? This could help in decongesting the city instead of investing a lot in traffic signals.</li> </ul> <p>4. Patrick Muleme (Design Engineer, UNRA)</p> <ul style="list-style-type: none"> <li>- What is the extent of the study done by JICA experts? Shouldn't the study be expanded beyond KCCA borders?</li> <li>- Shouldn't the assumptions made have considered on going and yet-to-begin projects since some projects may not start on schedule, which might affect the results based on project assumptions. (realistic assumptions)</li> <li>- We need to analyse all the available systems (MODERATO, SCAT, SCOOT) before choosing on a particular one to adopt in Kampala.</li> </ul> <p>5. Lawrence Pario (Manager Bridges and Structures, UNRA)</p> <ul style="list-style-type: none"> <li>- Grid separated interchanges are going to be introduced to Kampala, has the project put into consideration the impact of some of these mega projects?</li> </ul> <p>Mr. Izawa first attended to the questions from the first 5 people;</p> <ol style="list-style-type: none"> <li>1. Regarding the cost, he pointed out that though seeming very expensive, this figure was still a preliminary one, and the figure may change according to the final design from the experts.</li> <li>2. Regarding Dr. Kasiima's questions;             <ul style="list-style-type: none"> <li>- Regarding road users, he said it was still a big challenge. One of the approaches is to sensitize ALL roads with cooperation from enforcement authorities. The necessary enforcement would be discussed with police at a later stage.</li> <li>- Road Transport Policy. Mr. Izawa noted that the policy being formulated is for KCCA.</li> <li>- Cars in KCCA area. He pointed out that that's a very difficult figure to come to since car registration in Uganda is not done by region but by registration order. He added that the figure that was presented was derived from an approximation using traffic count data.</li> <li>- Traffic Congestion. He pointed out that though it's true that congestion doesn't happen during peak hours only, there is always a fluctuation. The unpredictability of the traffic situation in Kampala is one of the reasons an Area Traffic Control (ATC) system is being recommended.</li> <li>- Target parties for capacity enhancement. During formulation of the technical assistance program, 3 parties were identified;                 <ul style="list-style-type: none"> <li>o KCCA, the Road Management Body,</li> <li>o Police the Road Regulation Body, and</li> </ul> </li> </ul> </li> </ol>	

No.	Discussion	Action/Resp. Officer
	<ul style="list-style-type: none"> <li>○ Road users.</li> <li>- Achievement so far. Mr. Izawa pointed out that, soon, tangible results will be available the first being the UTMP.</li> <li>- Road safety campaign. A road safety campaign will be carried out after discussions with the various district leaders.</li> </ul> <p>3. Alternative routes. We are aware of the issue but the project focuses mainly on the KCCA area jurisdiction.</p> <p>4. To Eng. Patrick Muleme.</p> <ul style="list-style-type: none"> <li>- Covered area. This question had a similar answer to that of question 3.</li> <li>- Regarding studies. Mr. Izawa noted that other projects like the BRT were considered although it never came to fruition. He added that many scenarios are looked at but since the project is for capacity enhancement of KCCA staff, all they can do is to train these staff in all different scenarios for implementation later. He however noted that the experts are working with KCCA to use more realistic scenarios by looking at the KCCA master plan.</li> <li>- MODERATO. He said that no final decision had been made on the use of MODERATO but it was just a recommendation. He added that Area traffic Control system was very necessary for Kampala, and that MODERATO was one of the systems that can address that.</li> </ul> <ul style="list-style-type: none"> <li>● Jacob Byamukama, Manager Roads and Traffic at KCCA added more to the point of number of vehicles in Kampala that was asked by Dr. Kasiima. He said a survey was done in 2015, with an inner and outer cordon, to count vehicles coming in and going out of Kampala but that the report was not yet out.</li> <li>● He promised to share the report with the different stakeholders when it comes out, since figures from URA couldn't be counted on as cars are decommissioned quite often yet URA has no records of such.</li> <li>● Eng. Kitaka added that the survey would be repeated on a regular basis since the travel patterns of the vehicles coming into Kampala are not static especially with the development of projects like the Southern Bypass, the Entebbe Expressway etc. Thus traffic counts will be done every two years.</li> <li>● He requested Mr. Izawa to address the question asked earlier on separated grids.</li> <li>● He added that the modeling process was still ongoing to ascertain the different solution to the different junctions i.e. grid separation, tunnels, signals etc.</li> </ul> <p>More questions were then asked.</p> <p>1. Godfrey Kisekka, Townclerk KCCA.</p> <ul style="list-style-type: none"> <li>- Instead of focusing on KCCA, can't we focus more on the entire Uganda especially in trying to divert traffic away from Kampala by creating alternative routes, especially putting great consideration to water transport?</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<ul style="list-style-type: none"> <li>- He expressed his concern about having tunnels since the workmanship in the country is still very poor as this would lead to collapse of many buildings.</li> <li>- He also pointed out indisciplined drivers especially those that drive government vehicles and simply get away with it. He also requested for clarification from police on who has right-of-way apart from obvious cases like ambulances.</li> <li>- Can't government take ownership of all road reserves since individuals usually don't want to let go of their land?</li> </ul> <p>2. Patrick Muleme, UNRA.  If we are deriving interventions based on travel speed alone, aren't we missing other aspects like delay that also affect the performance of the network.</p> <p>3. Eng. Nabbose Betty. Urban Roads in-charge at MoWT.</p> <ul style="list-style-type: none"> <li>- She first thanked KCCA for having such a visionary project in Kampala. She however asked stakeholder not to look at Kampala only but at Uganda as a whole.</li> <li>- Due to indiscipline of the drivers, as we consider the first 200 junctions, the remaining junctions might face congestion issues. We thus need to look at ways of having all 500 junctions monitored at a go in a central place.</li> <li>- She requested stakeholders like URA to consider fining indisciplined drivers as a source of revenue to the country. She requested for an integrated system that can automatically bill a car driver without having to take them to court since they can easily get away with the offence.</li> </ul> <p>4. Okuk Bright (Supervisor, KCCA)</p> <ul style="list-style-type: none"> <li>- Have alternative routes been considered other than signalization with the aim of decongesting the city?</li> <li>- What is in plan to decongest the city with regards to hotels, offices etc.?</li> </ul> <p>5. <i>(Did not identify himself)</i></p> <ul style="list-style-type: none"> <li>- KCCA should work on proper handling of road users especially bodabodas who just use any space they have.</li> <li>- He requested for plans beyond the KCCA jurisdiction as this project can only address problems with the KCCA mandated area.</li> </ul> <p>6. Rwakabale Geoffrey Kawempe Division Town Clerk, KCCA</p> <ul style="list-style-type: none"> <li>- He requested authorities to consider the fact that not all drivers with driving licences understand or even appreciate the traffic rules since the licences are very easy to get. More stringent regulations should be placed when once is acquiring a driver's permit, on top of periodical driving tests.</li> <li>- He asked for implementation of comprehensive program in all schools to teach children traffic rules and the Highway Code.</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<ul style="list-style-type: none"> <li>• Dr. Kasiima interjected and pointed out that many questions were targeted towards the Traffic Police yet members were supposed to ask questions related to the presentations.</li> </ul> <p>7. S. Ajalu, World Bank</p> <ul style="list-style-type: none"> <li>- He also pointed out that the questions being asked were not focused on the presentations made by JICA experts. He thus asked for clarification from KCCA when a meeting for such traffic questions would be held.</li> <li>- He asked whether the JICA experts had considered the fact the traffic fluctuates at different times.</li> <li>- He asked the responsible parties to consider other options other than junctions as the possible bottlenecks to the traffic flow in the city.</li> <li>- He wanted clarification on whether capacity would be in place even without the traffic control centre.</li> </ul> <ul style="list-style-type: none"> <li>• Mr. Izawa was called upon to answer the questions. <ul style="list-style-type: none"> <li>- Alternative Transport mode. He said that water transport was a good idea but it was not the JICA experts' mandate to implement.</li> <li>- It is difficult to measure the junction delay, however, estimates can be made.</li> <li>- Traffic Control Centre. He pointed out that the experts too have the same idea of setting up a central control centre. He, however, noted that the challenge would be a budget for it.</li> <li>- Road Safety (Driving Licences). He pointed out that in Japan, driving licences are reviewed every 5 years and good drivers are rewarded with licences of 10 years. Seminars are also held to equip drivers with better skills.</li> <li>- The experts will also have talks with MoWT in regards to the road safety policy to have copies availed to schools for road safety education.</li> <li>- Road conditions. He pointed out the junctions are not the only bottlenecks but also the condition of the roads. He requested KIIDP2 consults to provide road works information so that the experts could plan accordingly.</li> </ul> </li> </ul> <ul style="list-style-type: none"> <li>• Eng. Kitaka pointed out that although the problem is bigger than Kampala, KCCA can only work within Kampala boundaries since that's where their mandate ends. He however requested members from other jurisdictions to come on board so that KCCA can synchronise its work with them.</li> <li>• He added that the laws calls for compensation of individual landowner so government cannot just take over such land. However, some owners willingly give away part of their land in exchange for improved roads and a</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<p>higher value of their remaining land.</p> <ul style="list-style-type: none"> <li>• He also reiterated the need for another forum where traffic discipline would be addressed with police.</li> <li>• Two more questions were allowed before the meeting would be closed.</li> </ul> <p>1. UNRA official.</p> <ul style="list-style-type: none"> <li>- He requested for focus on proper management of the traffic signals since that would come in handy. He proposed a smart real time information exchange system (website or application), if its part of the project Terms of Reference (TOR). This would help drivers know the alternative routes that can be used to avoid congested places.</li> <li>• Dr. Kasiima interjected and said that drivers simply have no alternative routes to use and thus end up crowding a certain route since it's their only gateway out of the city. He called for immediate action before the situation becomes a crisis.</li> <li>• He also clarified that Traffic Police has no mandate on the driving school and that it's KCCA that licences them even when they don't have operational grounds.</li> <li>• Jacob Byamukama invited Eng. Kitaka to officially close the meeting.</li> </ul>	
<b>8.0</b>	<b><u>Closing Remarks by Eng. Kitaka Andrew</u></b>	
	<ul style="list-style-type: none"> <li>• He thanked everyone for attending the meeting and for the ideas brought forward by everyone.</li> <li>• He thanked JICA for the assistance given to Kampala in particular and Uganda in general and thanked Mr. Kawahara for making the journey all the way from Tokyo to Kampala, and expressed his hope that all requests to JICA will be looked into favourably.</li> <li>• He announced another JCC meeting in 1 year's time and invited everyone to be back for the same.</li> <li>• He then closed the JCC meeting.</li> </ul>	

## ACRONYMS

Acronym	Definition
KCCA	Kampala City Council Authority
UTMP	Urban Transport Management Plan
MoWT	Ministry of Work and Transport
ED	Executive Director
UNRA	Uganda National Roads Authority
JCC	Joint Coordination Committee
JICA	Japanese International Cooperation Agency
ATC	Area Traffic Control
AfDB	African Development Bank

Meeting Attendance List				
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47	Mr. Asada	Dep. Team Leader, JICA Expert team		

**MINUTES OF THE 3<sup>RD</sup> JCC MEETING OF THE PROJECT FOR CAPACITY ENHANCEMENT OF KCCA IN  
MANAGEMENT OF TRAFFIC FLOW IN KAMPALA CITY, HELD ON WEDNESDAY 14<sup>TH</sup> DECEMBER 2016 AT  
HOTEL AFRICANA RWIIZI HALL AT 1:00 P.M.**

**ATTENDANCE-SEE ATTACHED**

**AGENDA:**

1. OPENING REMARKS BY DEPUTY EXECUTIVE DIRECTOR, KCCA
2. REMARKS BY CHIEF REPRESENTATIVE JICA
3. JCC OBJECTIVE BY TL, EXPERT TEAM
4. BRIEF REPORT OF TRAINING IN JAPAN BY DDRM, KCCA
5. PILOT PROJECT BY URNP, EXPERT TEAM
6. UPDATE OF PROJECT DESIGN MATRIX (PDM) AND WAY FORWARD BY TL
  - HEALTH BREAK
7. Q& A
- 8. CLOSING REMARKS BY DED**

No.	Discussion	Action/Resp Officer
<b><u>1.0</u></b>	<b><u>Opening Remarks by DED, Eng. Kitaka Andrew</u></b>	
	<p>He started by welcoming everyone to the 3<sup>rd</sup> JCC meeting and expressed his gratitude on behalf of KCCA for the help rendered to KCCA by the Japanese government. He followed this up with the project background. He noted that some progress had been registered due to this project and that this progress can be sped up to address the increasing traffic congestion problem. He outlined the objectives of the project as;</p> <ol style="list-style-type: none"> <li>1. Strengthening of KCCA's Urban traffic Management Policy</li> <li>2. Enhancement of KCCA's capacity on junction improvement design</li> <li>3. Enhancement of KCCA capacity for installation and maintenance of traffic signals at junctions</li> <li>4. Enhancement of KCCA's capacity on raising awareness concerning observance of traffic rules and regulations.</li> <li>5. Enhancement of capacity for traffic flow management at junctions</li> </ol> <p>He also pointed out that due to many other upcoming projects within and around the city at around the same time, traffic flow will have to be affected and thus coordination in planning and design are needed when implementing these projects to ensure minimum inconvenience to the public.</p> <p>He also added that with the expected increase in traffic signals in the city, there is need to enhance capacity of both KCCA and the private sector in maintenance of these signals, and thus there is a need for a central control for all these signals.</p> <p>He then invited the JICA Chief Representative Mr. Yutaka Fukasi to give his remarks</p>	
<b><u>2.0</u></b>	<b><u>Remarks by JICA Chief Representative Mr. Yutaka Fukasi</u></b>	

No.	Discussion	Action/Resp Officer
	<p>He started by welcoming everyone to the 3<sup>rd</sup> JCC meeting. He said it was a great opportunity for him to be in Kampala especially given the opportunities that the city has to offer. He also mentioned the good weather, young and vibrant people and the Kampala's proximity to lake Victoria as motivations to working hard to make sure he makes a contribution to Kampala's development in the next 3years he will be in office. He appreciated the KCCA leadership for having managed this project since its commencement in 2015.He added that Kampala and Tokyo have a lot in common especially with the transport sector and he hopes the Tokyo experience can be used to develop Kampala to world class standards.</p> <p>He added that he hopes that if the ATC is successful, it will be used to improve the traffic congestion situation in the city. As JICA, he said that they are looking forward to further working with KCCA in the area of traffic management. He thus said that it's important to participate in the sessions and meetings that will be held for the remaining part of the project.</p> <p>He reiterated JICA's commitment to supporting the socio-economic development of Kampala. He added that Japan is already working with the Ugandan government to ensure adequate electricity supply to Kampala to support the city's economic activities with projects like;</p> <ul style="list-style-type: none"> <li>- The improvement of Queensway substation, which will be finished in February 2017. The government of Japan contributed ¥ 2.5 billion (\$25 million) towards the project.</li> <li>- The Kampala Metropolitan Systems Improvement project whose procurement has commenced. JICA is contributing a loan of ¥ 13.659billion (\$130million).</li> </ul> <p>He added that JICA believes that if Kampala's economic potential is exploited, it will significantly contribute to Uganda's attainment of middle-income status by 2020. He concluded by encouraging KCCA management to strengthen their planning process especially around this time when a number of key projects are being proposed. E.g having a comprehensive development master plan for the city in place. This will help KCCA have planned and coordinated development leading to KCCA's vision of a vibrant, Attractive and Sustainable City.</p> <p>He closed by wishing everyone a Merry Christmas and Happy new year.</p>	
<b>3.0</b>	<b><u>Presentation of the Report by the JICA Expert Team Leader</u></b>	
	<p>Mr. Izawa made a presentation on the brief of the JCC meeting. <i>See Appendix 1</i></p> <p>He pointed out that the main objective of the 3<sup>rd</sup> JCC meeting was to request for more time for the project to be completed fully.</p>	
<b>4.0</b>	<b><u>Presentation of the KCCA Mandate by Ag. Director DETS, KCCA</u></b>	
	<p>Mr. Jacob Byamukama presented on the KCCA mandate with a bias on roads. <i>See Appendix 2</i></p> <p>He then made a presentation on the Technical training trip to Japan in August. <i>See</i></p>	

No.	Discussion	Action/Resp Officer
	<i>Appendix 3</i>	
<b>5.0</b>	<b><u>Presentation by Mr. Kawaguchi on the Pilot Project using ATC</u></b>	
	<i>See Appendix 4</i>	
<b>6.0</b>	<b><u>Presentation by the JICA Expert Team Leader</u></b>	
	Mr. Izawa made a presentation on the Update of the Project Design Matrix (PDM) and way forward. <i>See Appendix 5</i>	
<b>7.0</b>	<b><u>Q&amp;A.</u></b>	
	<ol style="list-style-type: none"> <li>1. Mr. Izawa asked for the opinion of the members regarding the extension period for the Kampala Smart traffic Project <ul style="list-style-type: none"> <li>- <b>No objection was raised</b></li> </ul> </li>   <li>2. Dr. Mwesige Godfrey (Private Consultant): <ul style="list-style-type: none"> <li>- Assumption 3 omitting some traffic data in the simulation (e.g. Archer road), can we also include this assumption on the physical traffic flow by (maybe) refusing some turns? What would be the impact of this traffic data, using MODERATO? <b>Traffic signal specialist recommended that no traffic signal was needed at Archer road. This would however be considered in the future</b></li> <li>- Can we coordinate junction 4 with the Nakawa junction, since it has a spill back effect due to its proximity? <b>Nakawa junction is not within the scope of the pilot project but it definitely needs to be considered for coordination.</b></li> <li>- What is was the threshold of the traffic volumes per hour used and was the future traffic volume increase considered? <b>Simulation was based on the prevailing traffic conditions at the time and the future traffic volumes were not considered. But future works and projects, like BRT, will have to consider both current and future traffic volumes.</b></li> </ul> </li>   <li>3. Eng. Kitaka Andrew; He requested JICA to consider the fact that since there is a plan for a TCC, proper plans need to be done to consider the different technologies available in the future. <b>Mr. Izawa answered that even though current technologies don't enable effective communications, there will be a solution to that in the future.</b></li>   <li>4. Mr. Byaruhanga Edward, UNRA Transport Planning Engineer: <ul style="list-style-type: none"> <li>- Disadvantages of MODERATO. Kampala has load-shedding problem which</li> </ul> </li> </ol>	

No.	Discussion	Action/Resp Officer
	<p>has to be put into consideration.</p> <p><b>Only being applied in Japan currently. Soon to be used in Cambodia. But it's the same reason why it's being tested in Uganda too since parameters can be adjusted. With a UPS, these lights will continue working even during load shedding. Japan too has backup but the cost has to be considered too. Mr. Izawa added that after several tests with Eng. Magala (MoWT), generators were observed to be the best backup option.</b></p> <ul style="list-style-type: none"> <li>- What plans are in place for pedestrian safety? <b>System mainly considers cars but pedestrians are also considered. They are given appropriate times enough for crossing.</b></li> </ul> <p>5. Norman Musinga (Senior Superintendent of Traffic Police for KMA).</p> <ul style="list-style-type: none"> <li>- Kampala was planned poorly, narrow roads, too many auxiliary roads; How does KCCA intend to solve this problem? <b>Kampala road network is very complicated and its one of the main reasons KCCA is preparing an Urban Master Plan to consider mass transport means.</b></li> <li>- What's the plan for pedestrians who always block roads when crossing? <b>MODERATO system will consider them too. The junction geometry and pedestrian time will have to be considered. They will also be educated on the basics of junction crossing and enforcement from police will also be required.</b></li> <li>- Roundabouts surround the few available signalized junctions. Are traffic lights going to be installed at every junction, and will they be coordinated so as to ease police work? <b>As a short-term solution, police help will be needed to control drivers who violate the traffic signals.</b></li> </ul> <p>6. Henry Komakech;</p> <ul style="list-style-type: none"> <li>- Consideration needs to be given to the assumptions used in the project, as the traffic volumes will change especially after road improvements on particular roads. <b>This is a pilot project that is testing different parameters so most of the traffic volume patterns will have to be considered when the permanent traffic signals are being installed. Mr. Izawa added that one of the advantages of the MODERATO system is that it adapts to the different traffic conditions, and that the ATC system will be able to handle all these situations.</b></li> </ul>	
<b>8.0</b>	<b>Closing Remarks by Eng. Kitaka Andrew</b>	
	<p>He thanked the presenters for the lively presentations given and all participants in the meeting. He noted that MODERATO was approved for the pilot project since no objection had been given to it.</p> <p>He said that the pilot project that was to be conducted was not going to be the answer to all traffic problems in Kampala but just attempting to answer a few</p>	

No.	Discussion	Action/Resp Officer
	<p>issues KCCA is having with traffic.                      He noted that another project for dualling of more roads was undergoing, and the government of Uganda was funding many more road construction projects in the country.</p> <p>He added that more buses were being introduced by KCCA as they look to reducing the number of matatus, which cause a lot of congestion, in the city.                      He asked that what was going to happen next after the pilot project is completed since it only considered 4 junctions. He added that other than Kololo, there are many other junctions that are worse off that needed such interventions/improvements, with the support of the development partners. This would enable KCCA and the country at large to get the full benefit of the MODERATO system.</p> <p>He noted that the workshop had been very successful and it came at this time of the project because MODERATO needed to be approved.                      He noted that KCCA needed MoWT to be on board during the preparation of the traffic control guidelines.                      He finished by saying that he hopes all stakeholders will adhere to all the improvements going on in the city as the country looks to achieving middle-income status by 2020.                      He thanked everyone for attending the meeting and wished them a good evening, Merry Christmas and a Happy New Year.</p>	

## ACRONYMS

Acronym	Definition
KCCA	Kampala Capital City Authority
DED	Deputy Executive Director
ATC	Area Traffic Control
DDRM	
URNP	
PDM	Project Design Matrix
KMA	Kampala Metropolitan Area
JICA	Japanese International Cooperation Agency
MoWT	Ministry of Works and Transport.
UNRA	Uganda National Roads Authority

Meeting Attendance List				
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**MINUTES OF THE 4<sup>TH</sup> JCC MEETING OF THE PROJECT FOR CAPACITY ENHANCEMENT OF KCCA IN  
MANAGEMENT OF TRAFFIC FLOW IN KAMPALA CITY, HELD ON WEDNESDAY 7<sup>TH</sup> JUNE 2017 AT HOTEL  
AFRICANA RWIIZI HALL AT 1:00 P.M.**

**ATTENDANCE-SEE ATTACHED**

**AGENDA:**

1. OPENING REMARKS BY DIRECTOR DETS, KCCA
2. REMARKS BY CHIEF REPRESENTATIVE JICA
3. PROJECT PROGRESS BY TESTURO IZAWA, JICA EXPERT TEAM
4. MANUAL INTRODUCTION BY PALLAB DEBNATH, JICA EXPERT TEAM
5. ROAD SAFETY CAMPAIGN BY YETISGIN TUGRUL, JICA EXPERT TEAM
6. TEA BREAK
7. Q&A
- 8. CLOSING REMARKS BY DIRECTOR DETS, KCCA**

No.	Discussion	Action/Resp Officer
<b>1.0</b>	<b><u>Opening Remarks by Director DETS, KCCA, Eng. Kitaka Andrew</u></b>	
	<p>He started by welcoming everyone to the 4<sup>th</sup> JCC meeting viz. the director of traffic police, UPF, the town clerks, KCCA, Oriental Consultants, UNRA representatives, and MoWT representatives. He noted that the ongoing technical cooperation project was being implemented by Oriental Consultants of Japan and it has been in place since 2014. He noted that it was originally meant to run for 3 years but that a one-year extension had been granted, all being funded by the government of Japan.</p> <p>He noted that the main objective of the project is to improve traffic flow in Kampala as traffic congestion is one of Kampala's biggest problems and that more projects in that regard would be coming up.</p> <p>He noted that under this project, several KCCA personnel have been trained from</p>	

No.	Discussion	Action/Resp Officer
	<p>both in and out of the country, design guidelines relating to junction design are being prepared as well as standards of traffic control. He added that under the project, KCCA was in the process of implementing a pilot project at 4 junctions (Jinja road-Lugogo Bypass, Upper Kololo-Wampewo Junction, Naguru road - Lugogo bypass and KatiKati junction) within the city and that the civil works had commenced. The intention of the pilot project was to try out a new method of traffic control, which would be implemented city-wide if successful. He added that another bigger project for improving traffic flow within the city was being formulated and that many more junctions within the city would be improved and also construct a traffic control center.</p> <p>He added that KCCA was still counting on JICA in the improvement of traffic flow within Kampala. He thanked JICA for the friendly gesture to the people of Kampala and hoped that the friendship would continue to grow, especially given the already existing funding for the New Nile Bridge and Kampala Flyover projects.</p> <p>He added that the 4<sup>th</sup> JCC was to review the project progress as indicated on the agenda. He wished everyone a good afternoon and encouraged all to participate in the discussion. He then invited the JICA representative to give his remarks.</p>	
<b>2.0</b>	<b><u>Remarks by JICA Chief Representative Mr. Yoshino</u></b>	
	<p>He started by welcoming everyone to the 4<sup>th</sup> JCC meeting of the Kampala Smart Traffic Project. He noted his awareness of KCCA's cooperation with the JICA Expert Team and for that he thanked KCCA for the cooperation.</p> <p>He specifically appreciated all parties that are supporting the project to ensure its executed on time. He noted that a JICA team is already working on a survey for the upcoming project that will follow the Kampala Smart Traffic Project. He added that JICA is committed to support KCCA in their fight to improve traffic flow in the city, putting in mind the environment of the city.</p> <p>He thanked everyone for their kind attention.</p>	
<b>3.0</b>	<b><u>Presentation from the JICA Expert Team Leader</u></b>	
	<p>Mr. Izawa made a presentation on the brief of the JCC meeting and the technical assistance project purpose.</p> <p><i>See Appendix 1</i></p>	
<b>4.0</b>	<b><u>Presentation of Technical Manuals by Pallab Debnath</u></b>	
	<p>Mr. Pallab Debnath presented the contents of the technical manuals prepared by the JICA Expert Team.</p>	

No.	Discussion	Action/Resp Officer
	<p><i>See Appendix 2</i></p> <p>Mr. Izawa noted that at the beginning of the project, the initial plan for approval of the manuals was to be done by the government of Uganda and thus reminded the officials from MoWT and UNRA to pick DVD copies of the draft manuals for perusal and comments upon which the final copies would be produced for approval</p>	
<b>5.0</b>	<b><u>Presentation about the Traffic Safety Campaign by Mr. Yetisgin Tugrul</u></b>	
	<i>See Appendix 3</i>	
<b>6.0</b>	<b><u>Questions &amp; Answers.</u></b>	
	<ol style="list-style-type: none"> <li>1. Agnes Biribonwa: Communication Specialist with KIIDP Project.  She expressed her excitement with the Kampala Smart Traffic Project since it has a community outreach component (road safety campaign) and expressed her readiness to work with the team in-charge.</li> <li>2. MoWT Engineer:  He wanted to know whether the traffic signals had been programmed to follow the traffic flow patterns of the city since these vary with the different times of the day.  <b>Mr. Izawa answered that all that information would be out into the final copy of the manuals being prepared by the JICA Expert Team. He also added that the traffic signals will have detectors that will help in knowing the traffic flow patterns which information will help in future designs and control patterns.</b>  <b>Eng. Kitaka also added that the traffic signals being installed are dynamic ones, which automatically adjust the green times according to the demand at any particular time.</b></li> <li>3. Dr. Steven Kasiima, Director Traffic, UPF  He requested road and junction designers to consider improving the approach and exit roads to and from the junctions since this is where the congestion arises. Number of lanes should be uniform.  <b>Eng. Kitaka noted that it's not the intention of KCCA to have narrow roads but expansion of some of the roads was being carried out under the KIIDP project.</b></li> <li>4. Patrick Muleme, UNRA  - He didn't see any section in the manuals for someone to assess the</li> </ol>	

No.	Discussion	Action/Resp Officer
	<p>necessity of signals at some junctions.</p> <p><b>Mr. Izawa noted that the criteria would be included in the manuals.</b></p> <ul style="list-style-type: none"> <li>- He requested for a section in the manuals to provide for a review of signal settings, as adjustments maybe be needed from time to time.</li> <li>- He said that road users need a longer period of sensitization, as the one indicated in the plan was short-lived. He also advised that video clips might have a bigger impact to road users as compared to talk shows.</li> <li>- He also noted that as UNRA, they are also planning on installing signals along all their corridors. He thus noted that a central control would be very welcome for the better operation of all signals. <b>Eng. Byamukama noted that this would be a very good idea and it would indeed be great to have a central control for all signals.</b></li> </ul> <p>5. Eng. Byamukama Jacob, KCCA</p> <p>He requested UNRA to especially consider expanding Entebbe road as the 4 lane stretch suddenly terminates into 2 thus causing a lot of unnecessary congestion.</p> <p><b>Patrick Muleme answered him by saying that it was the shortage of finances that forced UNRA to terminate the 4-lane stretch instead of going all the way to Entebbe. The expansion was thus done for the most critical section of Entebbe road. He also added that any further expansion would be done only when the expressway was functional to avoid congestion problems.</b></p> <p>6. MoWT Engineer</p> <p>He advised that the current project was limited to within KCCA jurisdiction and thus there was need to expand to areas out of the KCCA jurisdiction in order to comprehensively solve the whole problem.</p> <p><b>Eng. Kitaka noted that there is a greater Kampala multi-modal master plan being worked on and that would involve all areas outside KCCA jurisdiction viz. Mukono, Mpigi, Wakiso and Kiira. He added that sometimes the scope of many of the projects is dictated by the available budget.</b></p> <p>7. Engineer from MoWT</p> <p>He noted that the roundabouts in the Kampala should be removed and replaced with grid-separated junctions like the one at Bwaise to reduce on the congestion problem. <b>Mr. Patrick Muleme answered that part of the</b></p>	

No.	Discussion	Action/Resp Officer
	<p><b>works on the on-going northern bypass improvement was to create grid separation, and those that will remain will be signalized.</b></p> <p>8. Eng. Lawrence Mugenyi.</p> <p>He noted that nothing had been talked about the non-motorised traffic especially when it comes to safety. <b>Mr. Izawa noted that KCCA was working on an NMT corridor. Eng Byamukama Jacob added that the NMT corridor would be on Luwum street. He requested Mr. Pallab to expound on what the manuals say about the NMT to which Mr. Pallab replied that NMT hadn't been considered in the manuals but would be included in the final copy.</b></p> <p>9. Morris.</p> <p>He noted that enforcement had not been talked about when it came to discussing road user safety.</p> <p><b>Mr. Izawa added that the current project was not focused on enforcement but rather education. Dr. Steven Kasiima also added that Uganda Traffic Police needs complementary help from other stakeholders like KCCA if the traffic congestion problem was to be solved. He encouraged stakeholders to educate road users prior to enforcement.</b></p> <p>10. Wakiso District Engineer.</p> <ul style="list-style-type: none"> <li>- He asked KCCA whether they considered the traffic impact assessments before approving any new installations within the city. <b>Eng. Kitaka noted that this was a serious issue and KCCA was going to follow it up seriously.</b></li> <li>- He wondered what happened to KCCA's plan of having satellite/peripheral taxi terminals instead of having all traffic flowing into the city. <b>Eng. Kitaka noted that KCCA had plans of decongesting the city center by setting up peripheral terminal and had reached the level of signing MoUs. This was however, hampered by the taxi industry operations since they have different leadership groups and are not forthcoming in having only one leader. He added that the same applied to the bodaboda group. He however noted that plans were in place to have the bodaboda riders wear colored jackets to reflect their areas of operations.</b></li> <li>- He noted that the different players in traffic management are not coordinating and thus end up causing congestion instead. <b>Mr. Izawa noted that discussion with MoWT, KCCA and UNRA will be commenced to address the issue of management.</b></li> </ul>	

No.	Discussion	Action/Resp Officer
	<p>- He also added that bodaboda riders need to be regionally regulated to avoid having all of them using the city center. <b>Eng. Kitaka noted that plans were in place to have the bodaboda riders wear colored jackets to reflect their areas of operations.</b></p> <p>11. Eng. Irene, KCCA</p> <p>She noted that enforcement should consider putting deterrents in place to complement enforcement. <b>Eng. Jacob noted that the temporary deterrents were providing good results and thus more would be considered where necessary.</b></p>	
<b>7.0</b>	<b><u>Closing Remarks by Eng. Kitaka Andrew</u></b>	
	<p>He thanked the presenters for the lively presentations given and all participants in the meeting. He noted that the meeting had been productive and hoped that it was informative enough for, especially, the JICA team in knowing the needs of the city. He encouraged everyone to gain more interest in the issues of Kampala and also spare time to attend such meetings. He once again thanked everyone for attending and closed the meeting.</p>	

## ACRONYMS

Acronym	Definition
KCCA	Kampala Capital City Authority
KIIDP	Kampala Institutional Infrastructure Development Project.
ATC	Area Traffic Control
DETS	Directorate of Engineering and Technical Services
UPF	Uganda Police Force
PDM	Project Design Matrix
KMA	Kampala Metropolitan Area
JICA	Japanese International Cooperation Agency
MoWT	Ministry of Works and Transport.
UNRA	Uganda National Roads Authority
NMT	Non-Motorized Transport
SGR	Standard Gauge Railway

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**MINUTES OF THE 5<sup>TH</sup> JCC MEETING OF THE PROJECT FOR CAPACITY ENHANCEMENT OF KCCA IN MANAGEMENT OF TRAFFIC FLOW IN KAMPALA CITY HELD ON WEDNESDAY 30<sup>TH</sup> MAY 2018 AT HOTEL AFRICANA ORANGE HALL AT 02:00 P.M.**

**ATTENDANCE-SEE ATTACHED**

**AGENDA:**

1. OPENING REMARKS BY KCCA;
2. REMARKS BY JICA
3. PRESENTATIONS BY JICA AND KCCA
4. QUESTION & ANSWER SESSION.
5. CLOSING REMARKS BY UGANDA POLICE FORCE

No.	Discussion	Action/Resp. Officer
<b>1.0</b>	<b>Opening Remarks by Eng. Kitaka Andrew, KCCA</b>	
	<ul style="list-style-type: none"> <li>- Mr. Izawa welcomed everyone to the meeting and requested for self-introductions from all attendants.</li> <li>- Eng. Kitaka started by apologizing for being late to the meeting.</li> <li>- He then welcomed everyone to the 5<sup>th</sup> JCC meeting.</li> <li>- He noted that KCCA is very grateful to JICA for funding the technical cooperation project that's tackling traffic congestion, a key challenge in Kampala.</li> <li>- He added that the Japanese government has continuously funded projects aimed at reducing traffic congestion in Kampala city, including 9 of the current signalized junctions in the city.</li> <li>- He noted that the soon-to-start Kampala flyover project, also funded by JICA, would also come in very handy in solving the traffic congestion problem in the downtown area of Kampala.</li> <li>- He added that KCCA is currently implementing the KIDDP2 project, a world bank funded project, which includes the signalization of over 30 junctions and the design of a Traffic Control Center (TCC). Under this same project, KCCA expects further funding from JICA for the construction, equipping and training of staff to work in the TCC.</li> <li>- He added that Kampala would, in about 2years, have about 60 signalized</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<p>junctions and thus the need for the technical cooperation project.</p> <ul style="list-style-type: none"> <li>- He noted that one of the greatest achievements of this project, which started in February 2015, is the signalization of 4 junctions under a pilot.</li> <li>- This will be followed by installation of the MODERATO system to pave way for the testing of its operation including the rest of the junctions.</li> <li>- He noted that KCCA staff were training in signal phasing using the Bakuli junction lights and many other external trainings in Japan have been conducted.</li> <li>- He added that a road safety campaign competition was also conducted and the target was addressing the challenges faced by road users in the city. The results would soon be announced by the JICA Expert Team.</li> <li>- He expressed hope that after the end of the technical cooperation project, a bigger project would soon start. In this new project, JICA has committed a grant of \$26m and this was for the establishment of a traffic control center, which would be the first of its kind in sub-Saharan Africa.</li> <li>- He noted that the design of the traffic control center was funded under the world bank and JICA would be funding the design review and implementation parts.</li> <li>- He ended by thanking all partners that have participated in the technical cooperation project and hoped that the KCCA team involved with the project has all the necessary skills to run the TCC.</li> </ul>	
<b>2.0</b>	<b><u>Remarks by Mr. Tanaka from JICA, Tokyo</u></b>	
	<ul style="list-style-type: none"> <li>- He stated by welcoming everyone to the JCC meeting.</li> <li>- He said that the traffic improvement program is one of the biggest projects in JICA and has a long history.</li> <li>- He expressed delight at being part of the project.</li> <li>- He added that the technical cooperation project was at first aimed at building capacity in signal maintenance and management but after a request from the Ugandan side, the project was extended to include traffic management.</li> <li>- He added that JICA is now preparing for the upcoming project which involves the improvement of 30 junctions in the city using the MODERATO system.</li> <li>- He noted that JICA is also involved in other projects such as the Kampala Flyover project.</li> <li>- He finished by noting that he believes that such technical cooperation project by JICA would help the economy of Uganda and also enhance the friendship of JICA and the people of Uganda.</li> </ul>	
<b>3.0</b>	<b><u>Presentation of Project Progress by Mr. Izawa, JICA Expert Team</u></b>	
	<i>Refer to annex 1</i>	
<b>4.0</b>	<b><u>Presentation of Manual Introduction by Mr. Pallab, JICA Expert Team</u></b>	
	<i>Refer to annex 2</i>	

No.	Discussion	Action/Resp. Officer
<b>5.0</b>	<b><u>Presentation of KSTP Pilot Project by Mr. Pallab, JICA Expert Team</u></b>	
	<i>Refer to annex 3</i>	
<b>6.0</b>	<b><u>Presentation of the Training Program in Japan by Mr. Wasswa Joel, KCCA</u></b>	
	<i>Refer to annex 4</i>	
<b>7.0</b>	<b><u>Presentation of the Road Safety Animation Contest by Mr. Pallab Debnath, KCCA</u></b>	
	<i>Refer to annex 5</i>	
<b>8.0</b>	<b><u>Question &amp; Answer session</u></b>	
	<ol style="list-style-type: none"> <li>1. Eng. Mukiibi Joseph Kiwanuka, MoWT. Comment on goals and purpose presentation by Mr. Izawa. Consider installing some signals in other places of the country so that people can acquaint themselves with the operation of these lights. Eng. Jacob also added that KCCA can share manuals with other jurisdictions in addition to having workshops to share such information. World Bank is also working on expanding into more municipalities with 26 already chosen.</li> <li>2. Anita, KCCA. Appreciated the traffic safety contest since it was targeting the younger generations more people.</li> <li>3. Eng. Kitaka. Comment on public sensitization. <ul style="list-style-type: none"> <li>- A video on the usage of signalized junctions by pedestrians and motorists too.</li> <li>- Most junctions are susceptible to power blackouts and yet the backups also have very small capacities (about 4hrs). He suggested that UMEME is involved more in such meetings so that they might probably consider giving dedicated power lines to the signalized junctions.</li> </ul> </li> <li>4. Mr. Tanaka, JICA: He was very impressed with the creativity of Ugandans when it came to the traffic safety contest. He suggested that if possible, some could also be broadcast in Japan media. He wondered whether Uganda has a system of enabling such creativity in making movies.</li> <li>5. Fortunate to Mr. Mukiibi, MoWT commissioner urban roads. A request to MoWT to participate in the review of the manuals prepared by the JICA team. The commissioner accepted that they received the manuals and are still studying them. Feedback would soon be brought to KCCA.</li> <li>6. Mr. Ssenyimba to Dr. Kasiima, UPF. <ul style="list-style-type: none"> <li>- Why are police still not working hand-in-hand with KCCA to improve traffic flow? New officers have been recruited and the operation of all traffic officers will improve with time.</li> <li>- What plan does police have to improve the Driving License system?</li> <li>- Government, in collaboration with the government of South Korea, is planning on establishing an automated testing center for all drivers. A bill is coming to parliament to have a point system for the whole country.</li> </ul> </li> </ol>	

No.	Discussion	Action/Resp. Officer
	7. A brief of the training in Japan by Fortunate. <ul style="list-style-type: none"> <li>- There was a training with the human-machine interface</li> <li>- Training for operating traffic controllers</li> <li>- Controller and pole cabling training from Nippon signals.</li> <li>- Training in detection and MODERATO operation.</li> </ul>	
<b>9.0</b>	<b>Closing Remarks by Dr. Kasiima, UPF</b>	
	<ul style="list-style-type: none"> <li>- He thanked everyone for sparing their time to come for the JCC meeting.</li> <li>- He thanked JICA for supporting Uganda especially in trying to improve the traffic flow in the city, UMEME etc.</li> <li>- He requested for the signalization of all roundabouts in the city so as to improve traffic flow and reduction of accidents (both serious and minor) in the city.</li> <li>- On behalf of the team that went to japan for training, he thanked JICA for funding the training since it was very fruitful.</li> <li>- He thanked the government of japan/JICA for funding the traffic safety campaign since it would help the younger generation in understanding traffic safety.</li> <li>- He added that UPF traffic also carries out road safety education especially in schools located on the highways.</li> </ul>	

## ACRONYMS

Acronym	Definition
JICA	Japan International Cooperation Agency.
UPF	Uganda Police Force
MoWT	Ministry of Works and Transport
KCCA	Kampala Capital City Authority
F/O	Flyover
JCC	Joint Coordination Committee
AC	Assistant Commissioner
UR	Urban Roads
SE	Senior Engineer

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**MINUTES OF THE 6<sup>TH</sup> JOINT COORDINATION COMMITTEE MEETING FOR THE PROJECT FOR CAPACITY ENHANCEMENT OF KCCA IN MANAGEMENT OF TRAFFIC FLOW IN KAMPALA CITY UGANDA, HELD ON WEDNESDAY 26<sup>TH</sup> SEPTEMBER 2018 AT KCCA CITYHALL, DETS DIRECTOR'S OFFICE AT 08:30 A.M.**

**ATTENDANCE-SEE ATTACHED**

**AGENDA:**

1. OPENING REMARKS BY KCCA;
2. REMARKS BY JICA
3. PRESENTATIONS BY CONSULTANT
4. QUESTION & ANSWER SESSION.
5. CLOSING REMARKS BY JICA

No.	Discussion	Action/Resp. Officer
<b>1.0</b>	<b><u>Introduction Remarks by Eng. Kitaka</u></b>	
	<ul style="list-style-type: none"> <li>- Eng. Kitaka started by welcoming everyone to the meeting and requested for self-introductions.</li> <li>- Technical program since 2015 and has been very beneficial to KCCA in terms of technical training and some infrastructural improvements.</li> <li>- KCCA staff have worked well with JICA consultants and he prayed that more activities would be held together for more technology transfer.</li> <li>- He noted that the project is almost coming to the end but there are still some pending issues, like the installations of the MODERATO system and monitoring of its performance. He also expressed his hope that the project would usher in bigger projects for the betterment of the city especially traffic jam which brings about economic losses and a lot of air pollution.</li> <li>- He then requested the JICA representative to give brief remarks</li> </ul>	
<b>2.0</b>	<b><u>JICA Chief Representative Remarks</u></b>	
	<ul style="list-style-type: none"> <li>- Mr. Fukase, Representative JICA UG said that JICA is glad to be supporting KCCA in the alleviation of traffic jam in the city and he expressed his hope that the JICA support would help in the solving the traffic problem in Kampala city</li> </ul>	
<b>3.0</b>	<b><u>Presentation from Mr. Izawa</u></b>	
	<ul style="list-style-type: none"> <li>- Mr. Izawa gave a presentation on the project progress. <i>See Annex 1&amp;2</i></li> <li>- Mr. Izawa requested Ms. Fortunate Biira to give an update on the pilot project.</li> <li>- Ms. Fortunate noted that all civil works and signalization was done, pending</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<p>the MODERATO system installation. Procurement of the communication system by the contractor is going on and hopefully the process will be done by December 2018. The detector poles were already installed and only detector installation is pending. This is keeping the contractor on site which needs to be fast tracked.</p> <ul style="list-style-type: none"> <li>- <b>Mr. Izawa requested for a 1year extension to the technical cooperation project to December 2019 to enable installation and monitoring of performance of the MODERATO system.</b></li> <li>- <b>Eng. Kitaka expressed support to the extension as requested by Mr. Izawa and requested that Nippon Signal is urged to carry out the MODERATO system installation early enough so that KCCA and the Consultant can have more monitoring time.</b></li> </ul>	
<b>4.0</b>	<b>Questions &amp; Answers</b>	
	<ul style="list-style-type: none"> <li>- Eng. Kitaka: Can the Nippon Signal equipment work with both fiber and microwave communication? <b>Mr. Izawa answered in the affirmative. The equipment can work with both but will require a media converter to enable proper communication. In the future, the microwave devices will be removed and replaced with fiber during the Grant Aid Project.</b></li> <li>- Mr. Fukase: What is the technical difficulty in changing the communication system from microwave to fiber? <b>Mr. Izawa answered that there is no technical challenge in switching between these two modes of communication.</b></li> <li>- Muhame Ivan: How far is KCCA with the adoption of the manuals prepared by the consultant? Who is covering the broadcasting charges of the traffic safety animations? <b>Mr. Izawa noted that the draft manuals are ready and were shared with World Bank KIIDP team for comment. He also added that discussions are on-going with KCCA to determine the cost implication of running the traffic safety (animation) campaign on TV. Mr. Izawa also added that this would be finished as soon as possible so that the campaign is run on TV.</b></li> <li>- Mr. Saito: How will the MODERATO system be transported? <b>Mr. Izawa noted that transportation will be by sea. Mr. Saito expressed concern regarding the transportation by sea since it takes a very long time especially due to storms at sea. Eng. Kitaka also requested for confirmation with Nippon Signal regarding the time it takes to ship MODERATO. Mr. Izawa noted that JICA is also taking the possible delay very seriously and thus all will be done to ensure there are no delays in shipping.</b></li> </ul>	
<b>5.0</b>	<b>Closing Remarks by JICA</b>	
	<ul style="list-style-type: none"> <li>- Mr. Fukase thanked the team for the project update and then stressed the importance of the project to both JICA and KCCA.</li> <li>- He humbly requested KCCA not to overlap JICA technical cooperation projects with other non-JICA projects so that there is harmony in the work being done.</li> <li>- He thanked everyone for coming for the meeting.</li> </ul>	

## ACRONYMS

Acronym	Definition
JICA	Japan International Cooperation Agency.
KCCA	Kampala Capital City Authority
JCC	Joint Coordination Committee

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9	Mr. Ssenyimba Andrew	Electrical Engineer, JICA Expert Team	0794 661459	<a href="mailto:andethso2002@yahoo.co.uk">andethso2002@yahoo.co.uk</a>

**MINUTES OF THE 7<sup>TH</sup> JOINT COORDINATION COMMITTEE MEETING FOR THE PROJECT FOR CAPACITY ENHANCEMENT OF KCCA IN MANAGEMENT OF TRAFFIC FLOW IN KAMPALA CITY UGANDA, HELD ON THURSDAY 20<sup>TH</sup> JANUARY 2022 AT HOTEL AFRICANA, KAMPALA AT 2:00 P.M.**

**ATTENDANCE-SEE ATTACHED**

**AGENDA:**

1. OPENING REMARKS BY DETS KCCA;
2. PRESENTATION 1 ON THE RESULTS OF THE BY CONSULTANT MR. IZAWA/EXPERT TEAM
3. PRESENTATION 2 ON THE WAY FORWARD ENG. JACOB BYAMUKAMA
4. QUESTION & ANSWER SESSION NO.1
5. PRESENTATION 3 ON THE KAMPALA DIGITAL ROAD SAFETY AWARENESS
6. QUESTION & ANSWER SESSION NO.2
- 7. CLOSING REMARKS BY JICA CHIEF REPRESENTATIVE**

No.	Discussion	Action/Resp. Officer
<b>1.0</b>	<b>Introduction Remarks by Eng. Justus Akankwasa</b>	
	<ul style="list-style-type: none"> <li>- Conveyed apologies from the Executive Director who was unable to attend meeting due to other engagements.</li> <li>- Welcomed everyone to the meeting and thanked all members present for making time to attend the JCC.</li> <li>- Thanked JICA for their commitment to the Technical Assistance Program since its inception in 2015 and noted that this meeting was the last JCC marking the end of the Technical Assistance Program.</li> <li>- Noted that the technical assistance program has been very beneficial to KCCA in terms of technical training and infrastructural improvement.</li> <li>- Noted that KCCA staff have worked well with the JICA consultant and he requested that more activities would be held together for more technology transfer.</li> <li>- He requested JICA to consider extending the technical assistance program so that JICA and KCCA can achieve more together.</li> <li>- Thanked JICA for the projects that have been done so far and expressed his hope that this cooperation would usher in even bigger projects for the betterment of the city especially in terms of reducing traffic jam, which brings about economic losses and a lot of air pollution.</li> <li>- He then invited the JICA Expert representative to make his presentation</li> </ul>	
<b>2.0</b>	<b>Presentation from Mr. Izawa</b>	

No.	Discussion	Action/Resp. Officer
	<ul style="list-style-type: none"> <li>- Thanked KCCA for working with JICA.</li> <li>- Informed meeting that JICA had taken up the challenge of solving the traffic situation in Kampala because they possess skills of managing traffic in urban areas like Tokyo and the same skills can be applied here in Kampala.</li> <li>- Mr. Izawa gave a presentation on the project progress and on plans.</li> </ul> <p><b>See Annex 1 for detailed presentation</b></p> <ul style="list-style-type: none"> <li>- Informed the meeting that the objective of the 7<sup>th</sup> JCC was to present the achievements of the Technical Assistance Program and discuss how KCCA can develop the skills gained through the project activities for future traffic control and road transport management in the capital city of Kampala.</li> <li>- Noted that the project had Six Major Outputs. <b>(These are detailed in the presentation of Annex 1)</b></li> <li>- Informed meeting that the UTMP MP1 Phase 1 proposes improvements to 109 junctions</li> <li>- 27 of the 109 are going to be done under the JICA Grant Aid Project that is expected to start in March 2022 and will include the construction of the traffic control centre at City Hall.</li> <li>- MP2 is its utilization Plan</li> <li>- MP3 is the Peak Demand Movement Plan. It involves; <ul style="list-style-type: none"> <li>• Road Pricing</li> <li>• Time Management</li> <li>• Park and Ride</li> <li>• NMT corridor</li> </ul> </li> <li>- MP4 is the Enforcement Strengthening Plan</li> <li>- MP5 is the Public Involvement and Awareness plan which included items like the road safety Campaign</li> <li>- Informed members about the JICA Pilot Project where 4 junctions were signalized in 2018 to carry out the Area Traffic Control.</li> <li>- Showed that the traffic speeds improved significantly in this area, after signalization and that there was even more improvement after installation of the MODETATO system.</li> <li>- Analysis of the Travel Survey Results showed that the system had been effective in improving travel speed but that the effect would be more apparent if the Area Traffic Control is expanded to cover other areas.</li> </ul> <p><b>(See presentation attached for details)</b></p> <ul style="list-style-type: none"> <li>- Informed the meeting that the project had also produced 4 manuals and presented them to KCCA. These are; <ul style="list-style-type: none"> <li>➤ Traffic Signal maintenance</li> <li>➤ Planning and Designing of at Grade Junctions</li> <li>➤ Traffic Signal Design and Installation</li> <li>➤ Management of the Traffic Control Centre.</li> </ul> </li> <li>- Proceeded to play the MODERATO technical video.</li> <li>- Reminded KCCA of the need to regulate Boda-Bodas because they are the major culprits when it comes to not utilizing traffic signals properly.</li> <li>- Underscored the need to work together with Uganda Traffic Police to ensure respect for traffic signals.</li> </ul>	KCCA
<b>3.0</b>	<b><u>Presentation By Eng. Jacob Byamukama</u></b>	
	<ul style="list-style-type: none"> <li>- Thanked members present for their attendance.</li> <li>- Informed the meeting that the partnership between KCCA and JICA had achieved a lot over the past 7 years of the Technical assistance program.</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<ul style="list-style-type: none"> <li>- Spoke about the genesis of the project where KCCA got pilot training and was able to check the efficacy of using traffic signals to control traffic vis a vis using hand signals. The exercise demonstrated the need for signalization of junctions and acted as a proof of concept for the project.</li> <li>- The Second phase involved using fixed timing for the traffic on the JICA Pilot signals and was implemented and later configured for demand control using MODERATO.</li> <li>- Informed meeting that so far KCCA has been able to signalize more than 40 junctions. 16 Junctions were signalized in 2021 year under KIIDP2.</li> <li>- Another 27 are going to be signalized under the JICA Grant Aid within the next 3 years and it was agreed that in places old signals already existed, the signals will be transferred to other places as required.</li> <li>- Reiterated the need to develop the capacity to manage and maintain the signals especially since they have increased in number.</li> <li>- Informed the meeting that KCCA was promoting public transport and therefore the signals should be flexible enough to manage the Bus Rapid Transport as is the case in Japan.</li> <li>- Informed the meeting that with support from JICA, KCCA can adopt an Intelligent Transport System and should consider aspects like road pricing and utilizing traffic information to strengthen collections from aspects like street parking.</li> <li>- Underscored the need for support by the IGP during enforcement of traffic regulations. Informed meeting that KCCA had an MOU with Police in place which allows for access to the camera surveillance network for better traffic management.</li> <li>- Informed the meeting that there was still need for red-light enforcement and for improvement.</li> <li>- Underscored the need for greater public involvement. For example, the need to educate Boda-Bodas on road usage in order to bring about sanity in the city.</li> <li>- Spoke about the need to integrate the existing Traffic Control Systems like the RMS from UK and MODERATO from JAPAN in order to optimize control impacts.</li> <li>- Reiterated that KCCA still needed more support from Japan in the management of Traffic and requested JICA to continue the support.</li> </ul>	JICA
<b>4.0</b>	<b>Questions &amp; Answer Session No.1</b>	
	<p>Dr. Emmanuel Serunjoji (Mayor Kawempe):</p> <ul style="list-style-type: none"> <li>- Isn't this project inconsistent with the city's plan to have a less polluted city and how are the Environmental aspects going to be incorporated? <b>Mr. Izawa responded by explaining that the project aims at reducing traffic congestion which is one of the major causes of air pollution because vehicles pollute less when they are moving than when they stationary for long periods like during traffic jams.</b></li> <li>- Will this project not merely exacerbate traffic in suburbs like Kutaano? <b>Eng. Jacob informed the meeting that Kutaano and many other junctions have been earmarked for improvement/signalization under the Upcoming AfDB Project.</b></li> </ul> <p>Ssande Kenneth Kasenene(MoWT):</p> <ul style="list-style-type: none"> <li>- How will the Signals installed cater for intervening variables like Traffic Police, Boda-Boda cyclists and Matatus and how can the models be improved to</li> </ul>	

No.	Discussion	Action/Resp. Officer
	<p>cater for those? <b>Mr. Izawa noted that JICA is willing to work with KCCA and the political leadership to find a win-win situation to all these. He called for the opinions and support from all stakeholders in handling such intervening variables. Sensitization is key here according to Izawa</b></p> <ul style="list-style-type: none"> <li>- <b>Mayor Serunjoji remarked that the issue of Boda-Bodas and Matatus could be managed if the city leaders are given time and chance to do the work. There needs to be political will from central government.</b></li> </ul> <p>Eng. Hasan Nyende:</p> <ul style="list-style-type: none"> <li>- Before the project closes, can all the signals have vehicle detectors installed? <b>Mr. Izawa responded that all signals have had vehicle detectors installed. 27 detectors have been installed so far.</b></li> </ul> <p>Joseph Ssekandi (Engineer KCCA):</p> <ul style="list-style-type: none"> <li>- Has the Project put into consideration that the concentration of economic activities is increasing in the city every day and therefore increasing on traffic volumes? <b>Mr. Izawa responded in the affirmative and noted that all these are taken into account during the design stage.</b></li> </ul> <p>Yamamoto San:</p> <ul style="list-style-type: none"> <li>- What is the status of the authorization of the Manuals that were prepared by the JICA Consultant? What is the plan by KCCA for maintenance of the traffic infrastructure, case in point the incident where lightening hit a signal and KCCA could not repair it for a long time because of not having spare parts in stock? Does KCCA have plans to recruit and train staff in the utilization and management of these systems? <b>Jacob responded that KCCA is in the process of checking whether the manuals are fit for purpose. MoWT is also in the process of updating the urban design manuals which will soon be authorised soon per each edition.</b></li> <li>- <b>On the maintenance of the equipment and infrastructure, Jacob responded that KCCA responded had learnt from the experience and that there is need to do proper documentation about the condition of all infrastructure. A Framework contract for the maintenance of traffic signal equipment is now in place.</b></li> <li>- <b>On the recruitment of staff to handle the TCC, Eng. Akankwasa guided that The Directorate of Engineering submitted the needs requirement to Management and that Public Service Commission is looking into the staffing structure and will provide the requisite staff.</b></li> </ul>	
<b>5.0</b>	<b><u>Presentation 3 On The Kampala Digital Road Safety Awareness</u></b>	
	<ul style="list-style-type: none"> <li>- Thanked Members present for their attendance.</li> <li>- Informed meeting that KCCA in partnership with JICA had launched the Digital Road Safety Campaign in October 2021.</li> <li>- Informed meeting that KCCA plans of improving the safety capacity of Kampala roads and to implement Road safety education in schools</li> <li>- Informed meeting that JICA had produced videos and infographics on social media and was able to get feedback.</li> </ul> <p><b>See full presentation attached for details.</b></p>	
<b>6.0</b>	<b><u>Questions &amp; Answer Session No.2</u></b>	
	<p>Ssande Kenneth Kasenene:</p> <ul style="list-style-type: none"> <li>- Are there any plans to implement safe school zones? <b>Eng. Justus replied telling the meeting that there are measures in place to make schools safe by KCCA for example; there's a contract for painting Zebra crossings which</b></li> </ul>	

No.	Discussion	Action/Resp. Officer
	<p><b>is coming out soon. KCCA also intends to start using the road marking machine for road marking for creating zebra crossings and safe school zones.</b></p> <p>Joseph Ssekandi:</p> <ul style="list-style-type: none"> <li>- How can we instill sense into the ‘Wanaichi’ (local person) about road safety? How can we carry out a mindset change to make the public more conscious about road safety? <b>Eng. Justus responded that this can be done through continuous sensitization of the public.</b></li> <li>-</li> </ul> <p>Mpungu Hanifa (Deputy Mayor Central):</p> <ul style="list-style-type: none"> <li>- Underscored the need to involve political leaders and pledged support the project? Asked whether there is a fair and consistent enforcement mechanism for the traffic laws in place. <b>Eng. Justus Responded on the need for more dialogue with the police about this issue.</b></li> </ul> <p>Eng. Andrew Serungoji:</p> <ul style="list-style-type: none"> <li>- How do we bring a component of enforcement to Boda-Bodas? <b>Eng. Justus replied by underscoring the need for empowering police in this regard.</b></li> <li>-</li> </ul>	
<b>7.0</b>	<b><u>Closing Remarks by Chief Representative JICA, Uchiyama San</u></b>	
	<ul style="list-style-type: none"> <li>- Thanked everyone for attending the meeting.</li> <li>- Reminded the meeting of JICA’s commitment to the improvement the living conditions within Kampala through ongoing projects like the Kampala Flyover Project, the Greater Kampala Urban Masterplan Project and the upcoming Grant Aid Project.</li> <li>- Remarked that he hopes that the recommendations discussed would be implemented in order for Kampala to become safe for all road users.</li> <li>- Expressed his happiness about the commitment of KCCA to creating safer road spaces.</li> <li>- Said that he hoped that the Grant Aid Project would be implemented successfully and that MODERATO would improve on the efficiency of traffic flow.</li> <li>- Made the following requests to KCCA <ul style="list-style-type: none"> <li>o KCCA to Build Capacity of staff in the management of traffic</li> <li>o KCCA to carry out more sensitization about the importance of Road Safety.</li> <li>o KCCA to carry out proper maintenance of traffic equipment and infrastructure.</li> </ul> </li> </ul> <p>Meeting Closed at 4:15pm</p>	KCCA

## ACRONYMS

Acronym	Definition
JICA	Japan International Cooperation Agency.
KCCA	Kampala Capital City Authority
JCC	Joint Coordination Committee
UTMP	Urban Traffic Management Policy
AfDB	African Development Bank

## MEETING ATTENDANCE LIST

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