

**Republic of Rwanda**

**The Project for  
Urban Mobility Improvement  
in Kigali  
Project Completion Report**

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**Japan International Cooperation Agency  
(JICA)**

**Nippon Koei Co., Ltd.  
ALMEC Corporation**

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## **Abbreviations**

Abbreviation	Official Name
AHP	Analytic Hierarchy Process
AT	Activity Team
ATPR	Association des transporteurs des l'ersonnes au Rwanda
BIA	Bugesera International Airport
BRT	Bus rapid transit
CCTV	Closed-circuit Television
CHOGM	Commonwealth Heads of Government Meeting
COMESA	Common Market for Eastern and Southern Africa
CoK	City of Kigali
COVID-19	CoronaVirus Disease 2019
CP	Counterpart
DBL	Dedicated Bus Lane
DEA	Data Envelopment Analysis
DTA	Dedicated Transport Authority
DX	Digital Transformation
EAC	East African Community
EIA	Environmental Impact Assessment
GPS	Global Positioning System
GTFS	General Transit Feed Specification
ICT	Information and Communication Technology
ITS	Intelligent Transport Systems
JET	JICA Expert Team
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
KTA	Kigali Transportation Authority
KTC	Kigali Transport Corporation
KIA	Kigali International Airport
LiDAR	Light Detection and Ranging
LOS	Level of Service
LRT	Light Rail Transit
M/M	Minutes of Meeting
MaaS	Mobility as a Service
MINALOC	Ministry of Local Government

MINICOM	Ministry of Commerce, Trade, Industry, Cooperatives and Tourism
MINICT	Ministry of ICT& Innovation
MININFRA	Ministry of Infrastructure
MP	Masterplan
MRT	Mass rapid Transit
NISR	National Institute of Statistics of Rwanda
NMT	Non-motorized traffic
OD	Origin & destination
PDM	Project Design Matrix
PPP	public-private partnership
PTPS	Public Transport Priority Systems
RBS	Bureau of Standards
RDB	Rwanda Development Board
REMA	Rwanda Environment Management Authority
RISA	Rwanda Information Society Authority
RMF	Rwanda Maintenance Fund
RNP	Rwanda National Police
RTA	Rwanda Transport Authority
RTB	Rwanda Transport Board
RTDA	Rwanda Transport Development Agency
RURA	Rwanda Utility and Regulatory Authority
RWF	Rwandan Franc
TOD	Transit oriented development
UAV	Unmanned Aerial Vehicle
UMD	Urban Mobility Department
UMIK	The Project for Urban Mobility Improvement in Kigali
VICS	Vehicle Information and Communication System
VMS	Variable Message Sign
WG	Working Group

## Chapter 1: Outline of UMIK Project

### 1.1 Basic Framework of the UMIK Project

#### 1.1.1 Overall Goal and Project Purpose

The overall goal and purpose of “the Project for Urban Mobility Improvement in Kigali (UMIK)” have been agreed in the Record of Discussions between the Government of Rwanda (GoR) and the Japan International Cooperation Agency (JICA) held on 17<sup>th</sup> December 2021.

Overall Goal:

“Transport mobility in Kigali is improved for sustainable urban development.”

Project Purpose:

“A mechanism to promote the use of public transport in Kigali is established through proper traffic management.”

#### 1.1.2 Outputs of the UMIK Project

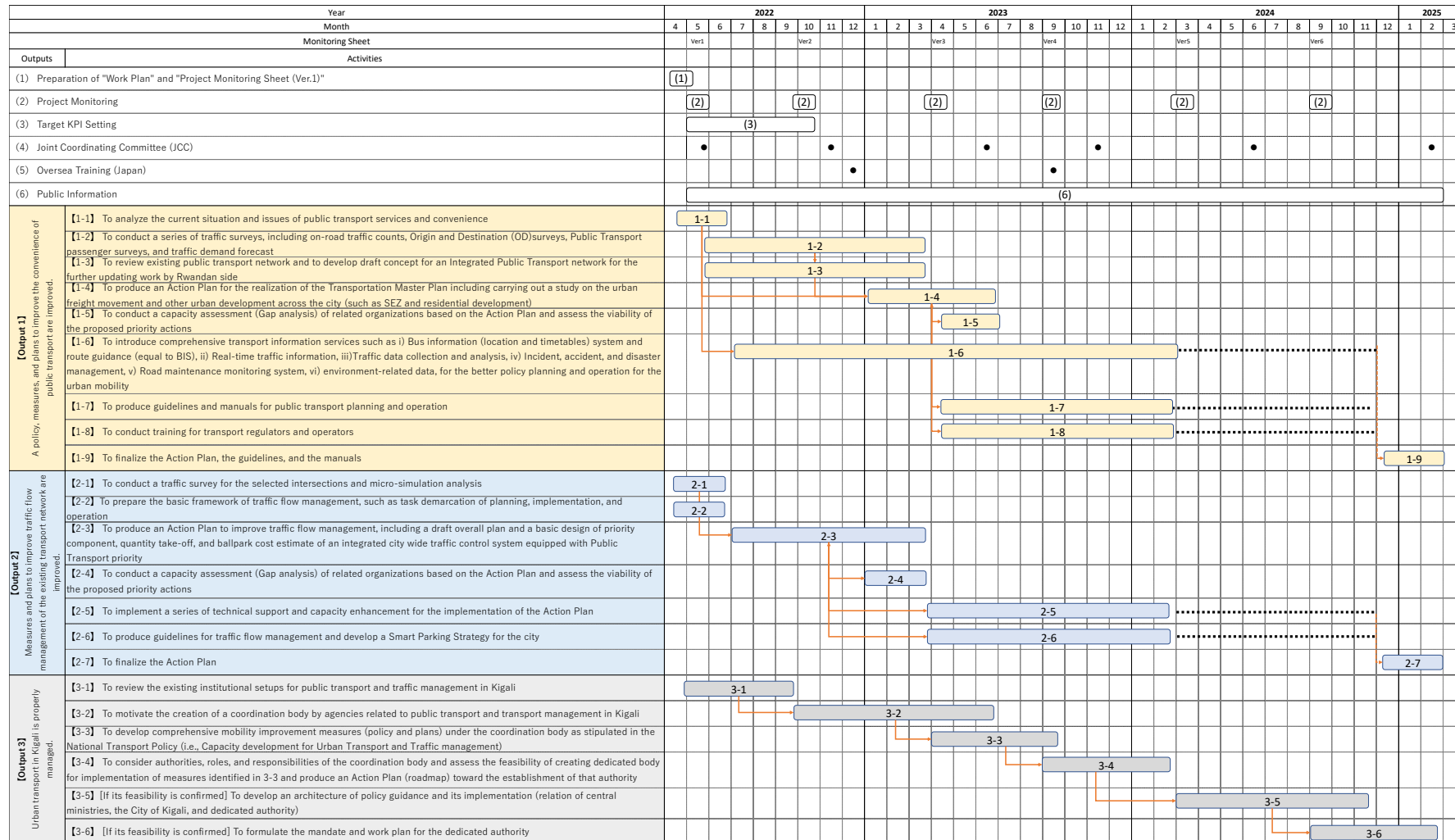
The outputs of the UMIK Project are shown below:

- Output1: The policy, measures, and plans to improve the convenience of public transport are improved.
- Output2: Measures and plans to improve traffic flow management of the existing transport network are improved.
- Output3: Urban transport in Kigali is properly managed.

#### 1.1.3 Overall Schedule

The entire schedule of the project is shown in Figure 1.1.1. The project period is a total of three years, from February 2022 to March 2025.

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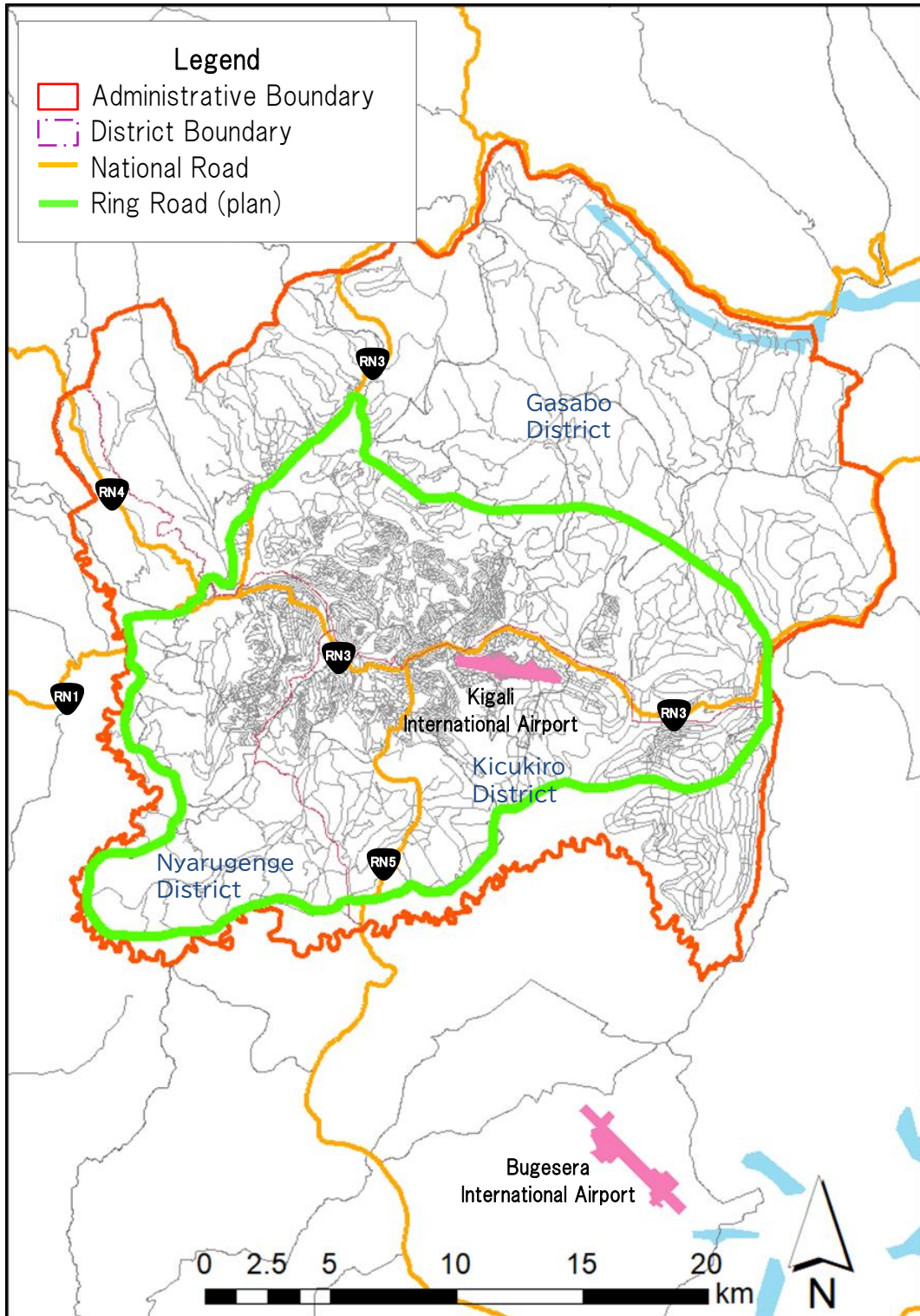


Source: JICA Expert Team

Figure 1.1.1: Work Schedule of the Project

### 1.1.4 Target Area

The targeted project area is Kigali City (Population: 1.17 million, Area: 731 km<sup>2</sup>). Figure 1.1.2 shows a map of the target area of the UMIK Project.



Source: JICA Expert Team

**Figure 1.1.2: Target Area of UMIK Project**

### 1.1.5 Basic Approaches

#### **(1) Approach 1: Capacity building and strengthening of counterpart (C/P) and related organizations in accordance with the progress of project activities**

Each activity of the project is carried out in three phases, such as finding the issues, formulation of the Action Plan, and implementation of the Action Plan. Based on these tasks and necessary skills of the C/P and related organizations, capacity building and strengthening of their ability are conducted in each phase by applying prompt methods such as study sessions, lectures, and seminars.

#### **(2) Approach 2: Coordination with local private companies and others in the implementation of priority project of the Action Plans**

The priority projects of the Action Plans, which is formulated in Output 1, are considered to utilize tools and technology of Rwandan private companies as much as possible, for example, information provision system and applications for smooth bus operation and traffic management. Their ideas and plans are grasped at the beginning of the project, and the C/P or the JICA Expert Team (JET) shall request them to cooperate and collaborate with the UMIK Project for utilizing their resources.

#### **(3) Approach 3: Coordination among relevant stakeholders in the preparation of traffic flow improvement measures and basic design of priority components**

The priority components of the Action Plans are expected to maximize the existing traffic capacity in Kigali by applying Information and Communication Technology (ICT) for traffic flow/demand management. In order to conduct an effective traffic flow management in Kigali, coordination among the City of Kigali (CoK), Rwanda National Police (RNP), and relevant stakeholders is essential. The Working Groups (WGs) under Activity 2 is responsible to complete the basic design of priority components and make consensus on the direction of priority components and role demarcation of traffic flow management.

#### **(4) Approach 4: Support for the establishment of an implementation system for urban mobility improvement by strengthening collaboration and capacities among related organizations through the Joint Coordination Committee (JCC) and Working Groups (WGs)**

##### **1) Improvement of core capacity to clarify the roles of related organizations**

The roles and responsibility of related organizations shall be clarified and strengthened through the project activities based on finding the issues and discussions with C/Ps on the implementation system for urban mobility improvement.

##### **2) Technical transfer on finding issues for the establishment of urban transportation management system**

The JICA Expert Team conduct the technical transfer to the C/Ps on how to organize finding the issues, which are classified according to the following points of view; 1) Organizational structures and human resources, 2) Laws and regulations, 3) Funding, and 4) Technology regarding public transportation and traffic management, for the establishment of urban transportation management system. After the technical transfer, JET and C/P jointly discuss the appropriate role demarcations of an architecture of policy guidance for urban transportation management in case that the organization system is developed.

### 3) Technical transfer on necessary actions for each organization

In addition to the above technical transfer, necessary actions along with a roadmap which is prepared in Output 3 is organized and discussed in the JCC and WGs. The technical transfer shall be based on the classified and summarized role demarcations of related organizations. JET supports the C/P to proceed the actions through the advice for necessary documents, information, and procedures.

### (5) Approach 5: Implementation system and plan to strengthen the ownership of C/P

In order to achieve the goal of the UMIK Project, the activities and abilities for urban mobility improvement need to be implemented continually and sustainably in the future after the completion of the Project. For the sustainable activities by the C/P, the project tasks to strengthen the ownership of C/P in the process of carrying out the activities. JET members input promptly and effectively for establishing the relationship with C/P and supporting them.

#### 1.1.6 Outline of Activities

The outputs and activities of the UMIK Project are shown in Table 1.1.1.

**Table 1.1.1: Outputs and Activities of the UMIK Project**

Output 1	Policy, measures, and plans to improve the convenience of public transport are developed.
<p><b>【Activities】</b></p> <p>1-1 To analyze the current situation and issues of public transport services and convenience.</p> <p>1-2 To conduct a series of traffic surveys, including on-road traffic counts, origin and destination (OD) surveys, public transport passenger surveys, and traffic demand forecast.</p> <p>1-3 To review existing public transport network and to develop draft concept for an integrated public transport network for further updating work by the Rwandan side.</p> <p>1-4 To produce an Action Plan for the realization of the Transportation Master Plan including carrying out a study on the urban freight movement and other urban development across the city (such as SEZ and residential development).</p> <p>1-5 To conduct a capacity assessment (gap analysis) of related organizations based on the Action Plan and assess the viability of the proposed priority actions.</p> <p>1-6 To introduce comprehensive transport information services such as i) Bus information (location and timetables) system and route guidance (equal to BIS), ii) Real-time traffic information, iii) Traffic data collection and analysis, iv) Incident, accident, and disaster management, v) Road maintenance monitoring system, and vi) Environment-related data, for the better policy planning and operation for the urban mobility.</p> <p>1-7 To produce guidelines and manuals for public transport planning and operation.</p> <p>1-8 To conduct training for transport regulators and operators.</p> <p>1-9 To finalize the Action Plan, the guidelines, and the manuals.</p>	
Output 2	Measures and plans to improve traffic flow management of the existing transport network are developed.
<p><b>【Activities】</b></p> <p>2-1 To conduct a traffic survey for the selected intersections and micro-simulation analysis;</p> <p>2-2 To prepare the basic framework of traffic flow management, such as task demarcation of planning, implementation, and operation;</p> <p>2-3 To produce an Action Plan to improve traffic flow management, including a draft overall plan and a basic design of priority component, quantity take-off, and ballpark cost estimate of an integrated city-wide traffic control system equipped with public transport priority;</p> <p>2-4 To conduct a capacity assessment (gap analysis) of related organizations based on the Action Plan and assess the viability of the proposed priority actions;</p> <p>2-5 To implement a series of technical support and capacity enhancement for the implementation of the Action Plan;</p> <p>2-6 To produce guidelines for traffic flow management and develop a Smart Parking Strategy for the city; and</p> <p>2-7 To finalize the Action Plan.</p>	

Output 3	Urban transport in Kigali is properly managed.
<p><b>【Activities】</b></p> <p>3-1 To review the existing institutional setups for public transport and traffic management in Kigali;</p> <p>3-2 To motivate the creation of a coordination body by agencies related to public transport and transport management in Kigali;</p> <p>3-3 To develop comprehensive mobility improvement measures (policy and plans) under the coordination body as stipulated in the National Transport Policy (i.e., Capacity development for urban transport and traffic management);</p> <p>3-4 To consider authorities, roles, and responsibilities of the coordination body and assess the feasibility of creating dedicated body for the implementation of measures identified in Activity 3-3 and produce an Action Plan (roadmap) toward the establishment of that authority;</p> <p>3-5 [If its feasibility is confirmed] To develop an architecture of policy guidance and its implementation (relation of central ministries, the City of Kigali, and dedicated authority); and</p> <p>3-6 [If its feasibility is confirmed] To formulate the mandate and work plan for the dedicated authority.</p>	

Source: JICA Expert Team

**(1) Activity 1-1: To analyze the current situation and issues of public transport services and convenience**

Activity 1-1 identifies the current situation and issues on public transport services and user convenience. The results of the analysis are shared and discussed with C/P in the WG1 and C/P reports the identified issues to the stakeholders in JCC meeting and verifies the necessary countermeasures. To find out the actual site situation and problems clearly, joint site visits are conducted with C/P and stakeholders as necessary.

**(2) Activity 1-2: To conduct a series of traffic surveys, including on-road traffic counts, origin and destination (OD) surveys, public transport passenger surveys, and traffic demand forecast**

In order to understand the current traffic situation in Kigali City, a series of traffic surveys including on-road traffic counts, origin and destination (OD) surveys, public transport passenger surveys are conducted. The survey locations for the traffic surveys are decided through discussions with C/P.

Based on the survey results, the future traffic demand is forecasted in three phases, such as 1) Short (2024), 2) Medium (2035), and 3) Long (2050), which enables to analyze the future traffic situations in Kigali.

**(3) Activity 1-3: To review the existing public transport network and to develop a draft concept for an integrated public transport network for further updating work by the Rwandan side**

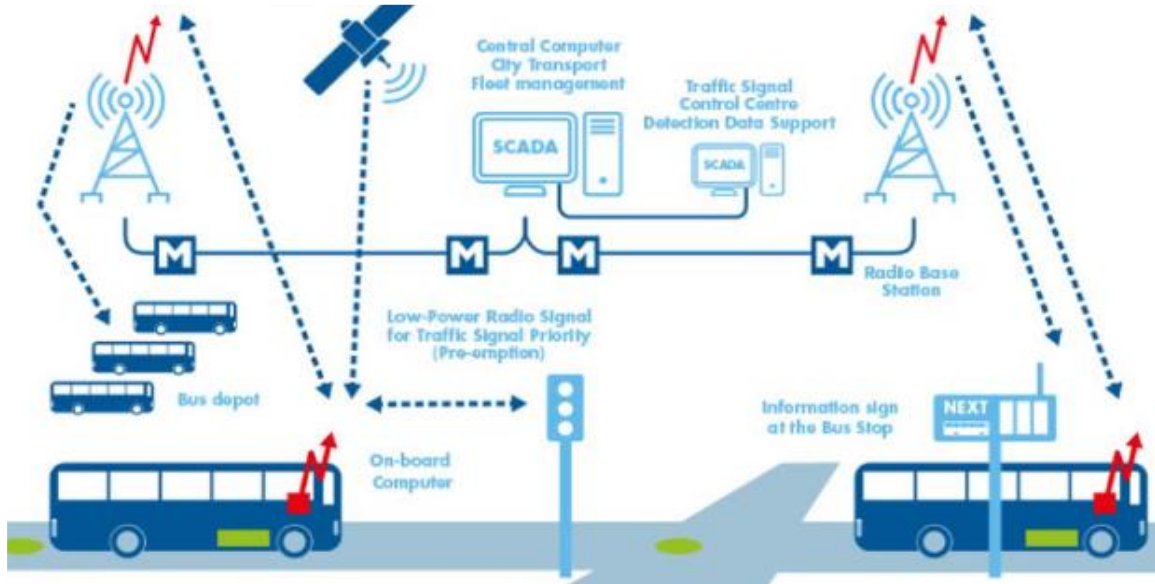
RURA is planning to conduct a feasibility study for the introduction of Intelligent Transport Management Systems (ITMS) such as bus operation management systems and development of data warehouse to improve public transport network. Source: MINICT

Figure 1.1.3 shows an image of an integrated public transport systems planned by RURA.

For further updating work by the Rwandan side regarding the integrated urban mobility, JET transfer the knowledges and technology to C/P to develop a draft concept for an integrated public transport network. The concrete concept plan consists of relationships between urbanization and public transportation, bus operations in service-blank areas for public transportations, diversity for bus users and policy of ITS/ICT utilization.

The goals for achieving the concept are set based on the results of traffic demand forecast in Activity 1-2.

MINICT and CoK are planning to shape an urban smart city platform through the concept plan “Smart Cities & Communities Command and Control Center (Smart C5)”, which is expected to realize data utilization across the sectors and improves management ability of each administrative service and user service. To accelerate the development, JET collaborate with them and share knowledge of data collection methods and related technology trends, etc.



Source: MINICT

**Figure 1.1.3: Image of an Integrated Public Transport Systems by ITS**

**(4) Activity 1-4: To produce an Action Plan for the realization of the Transportation Master Plan including carrying out a study on the urban freight movement and other urban development in Kigali (such as SEZ and residential development)**

**1) Policy of Action Plan**

An Action Plan is produced by target periods; 1) Change of the current operation (Short), facility improvement and system introduction (Medium), and 3) Facility construction and regulation improvement (Long) as shown in Section 3.2.6. The Action Plan is designed to include the urban freight regulations and urban development based on the transit-oriented development (TOD) concept focusing on the future traffic demand in Kigali City.

In the UMIK Project, some priority projects in the Action Plan are selected as priority actions (pilot projects). The other projects are clearly summarized for future implementation from the view of role demarcations and budget allocations with a roadmap for these processes.

**2) Priority Projects of the Action Plan**

The priority projects (pilot projects) of the Action Plan shall need to be objectively selected based on their accountability. JET proposes an analytic hierarchy process (AHP) method for selecting the implementation project. The method enables to evaluate and prioritize various projects objectively based on the evaluation items, which contributes to the policy goals such as project costs, travel time, cover ratio of public transportation, air pollution prevention, and gender diversity.

The priority projects (pilot projects) of the Action Plan are selected based on the total points calculated from the evaluation items weighted by C/P and academics.

### **3) Utilization of ICT**

Some ICTs are utilized for public transport sector in Kigali. These locational data of buses and moto taxis are collected by global positioning systems (GPSs) or Integrated Circuit (IC) card readers, and these data is provided to RURA. It is expected that the applications which utilize these data are expected to provide road users with road congestion information and travel time information, and the accumulation of user location information is also expected to improve the accuracy of information.

The utilization of ICT shall begin with quantitatively grasping the traffic situation in Kigali City. The collected data are utilized for formulating plans and provided to road users. The accuracy of these information is improved by collecting and accumulating continuously from the road users.

#### **(5) Activity 1-5: To conduct a capacity assessment (gap analysis) of related organizations based on the Action Plan and assess the viability of the proposed priority projects**

Human resources, skills, and equipment necessary for the sustainable implementation of priority projects shall be listed and organized. The list is used for managing the progress of the project.

As for public transportation, it is assumed to provide training and guidance for private business operators in this project. Information collection and analysis are conducted through field surveys and interviews such as driver's license training test centers and ICT-related facilities that can be used for training and guidance under the current circumstances.

#### **(6) Activity 1-6: To introduce comprehensive transport information services**

Information collection and provision for urban mobility improvement and policy recommendation and operation are introduced. Table 1.1.2 shows the candidate service. The pilot projects are selected in accordance with the quantitative evaluation such as budgets, schedules, expected outcomes, and time of effects to appear.

**Table 1.1.2: Transport Information Provision Services**

Sectors		Services
Public transportation	Information collecting for policy proposals	<ul style="list-style-type: none"> <li>• Monitoring and improvement of operation services using IC card usage history (Currently, since the buses on a regular route apply a flat fare system, OD data at bus stops are not collected, while the boarding bus stop can be collected)</li> <li>• Analysis of traffic demand based on mobile big data utilizing location information by mobile phone</li> </ul>
	Operation management	<ul style="list-style-type: none"> <li>• Operation management utilizing real-time location data such as delay management and vehicle dispatch management</li> </ul>
	Driver education	<ul style="list-style-type: none"> <li>• Monitoring and training of alert systems such as overspeed and sudden stop utilizing real-time location data</li> <li>• Mapping of near miss for driving accidents and provision of a feedback to bus drivers</li> </ul>
	Information provision to users	<ul style="list-style-type: none"> <li>• Development and open data of operation information in General Transit Feeding Specification (GTFS) format</li> <li>• Provision of real-time operating information through an application and an information display at bus stops</li> <li>• Development of an integrated guidance platform for various transportation services as Mobility as a Service (MaaS) systems</li> </ul>
Traffic management	Information collecting for policy proposals	<ul style="list-style-type: none"> <li>• Accumulation of location data of vehicles based on GPS information collected from mobile phones</li> <li>• Collection of detailed traffic volume and travel speed</li> <li>• Automatic collection of traffic volume at intersections by an advanced artificial intelligence (AI) technology such as video analysis</li> </ul>
	Accident and disaster management, road maintenance system	<ul style="list-style-type: none"> <li>• Multidimensional traffic accident analysis</li> <li>• Efficient road maintenance and management using Mobile Mapping System (MMS)</li> <li>• Development of digital maps necessary for automated driving vehicle</li> </ul>
	Information provision to road users	<ul style="list-style-type: none"> <li>• Information provision via variable message boards (VMS) and mobile applications for smartphones based on the collected traffic data</li> <li>• Expansion of GTFS, which provides bus information (bus service suspensions, detours) in the special case during events and disaster to users</li> </ul>
Data related to environment		<ul style="list-style-type: none"> <li>• Provision of weather information using closed-circuit television (CCTV) cameras</li> <li>• Provision of estimated Greenhouse Gases (GHG) emissions from traffic volume</li> </ul>

Source: JICA Expert Team

**(7) Activity 1-7: To produce guidelines and manuals for public transport planning and operation**

The guidelines and manuals for public transport planning and operation are produced jointly with JET and C/P in the process of the formulation of the Action Plan. Expected deliverables which are prepared in the UMIK Project are guidelines and manuals of bus driver techniques and bus operation management for the bus operators in Kigali. Capacity building programs for the preparation of these guidelines and manuals are produced.

**(8) Activity 1-8: To conduct training for transport regulators and operators**

Series of programmed trainings for transport regulators (CoK, RURA) and bus operators are shown in Table 1.1.3.

**Table 1.1.3: Contents of Capacity Building of the C/P**

Target	Objectives	Contents	
Administrative agency	RURA	Introduction of fare/subsidy system	Preparation of related manuals, discussion regarding a support of introduction based on the manuals and a trial of introduction
		Introduction of a concept regarding vehicle renewal and depreciation	
		Development of driver management system and monitoring system	
		Development of standards and monitoring systems for operational services including moto taxi	
		Technical assistance on utilization of operation information for supervisors	
	CoK	Planning of bus road network, support for planning public transportation improvement	Discussion and trial of the introduction
		Capacity building regarding transport planning	
Private Bus Operators	Support for developing bus terminals and facilities for bus stops	Implementation of pilot activities for developing bus terminals and facilities for bus stops, preparation of manuals for facility improvement through these activities	
	Capacity building regarding driving skills and treatments	Capacity building of drivers and mechanics, preparation of manuals for facility improvement	
	Technical assistance on vehicle management system		
	Capacity building regarding bus operation management	Preparation of related manuals, discussion regarding the support of introduction based on the manuals and a trial of introduction	
	Development of a plan of bus business management		
Technical assistance on utilization of bus operation information for operators	Guidance on options for utilizing the information and pilot activities for develop application, etc.		

Source: JICA Expert Team

**(9) Activity 1-9: To finalize the Action Plan, the guidelines, and the manuals**

JET and C/P summarize knowledges, experiences, and lessons learned accumulated on the process through the activities including implementation of priority projects of the Action Plan. It is reflected in the finalization of the Action Plan, the guidelines, and the manuals. The finalized documents are authorized by C/P and related organizations.

**(10) Activity 2-1: To conduct a traffic survey for the selected intersections and micro-simulation analysis**

The selected intersections are to be assessed and validated by micro simulation analysis which uses objective data such as traffic volume and geometrical information collected by the traffic surveys. The process for the selection of target intersections and the method of micro-simulation analysis are transferred to C/P in the project.

**(11) Activity 2-2: To prepare the basic framework of traffic flow management, such as task demarcation of planning, implementation, and operation**

CoK and RTDA have the responsibility of planning and installation of traffic signals. The maintenance of traffic signals is managed by CoK, on the other hand, RNP has responsibility on traffic control. The stakeholders of the traffic management have different tasks by the management phase and need to coordinate and collaborate.

The tasks and necessary capacities of traffic flow management at each management phase (planning, implementation, operation and maintenance) are clarified in this project and the basic framework of traffic flow management is developed.

**(12) Activity 2-3: To produce an Action Plan to improve traffic flow management, including a draft overall plan and a basic design of priority component, quantity take-off, and ballpark cost estimate of an integrated city-wide traffic control system equipped with public transport priority**

**1) Formulation of the Action Plan (Draft Overall Plan)**

The contents of the draft Action Plan to improve traffic flow management in Kigali are shown in Table 1.1.4, which is discussed with C/P and finalized in the project.

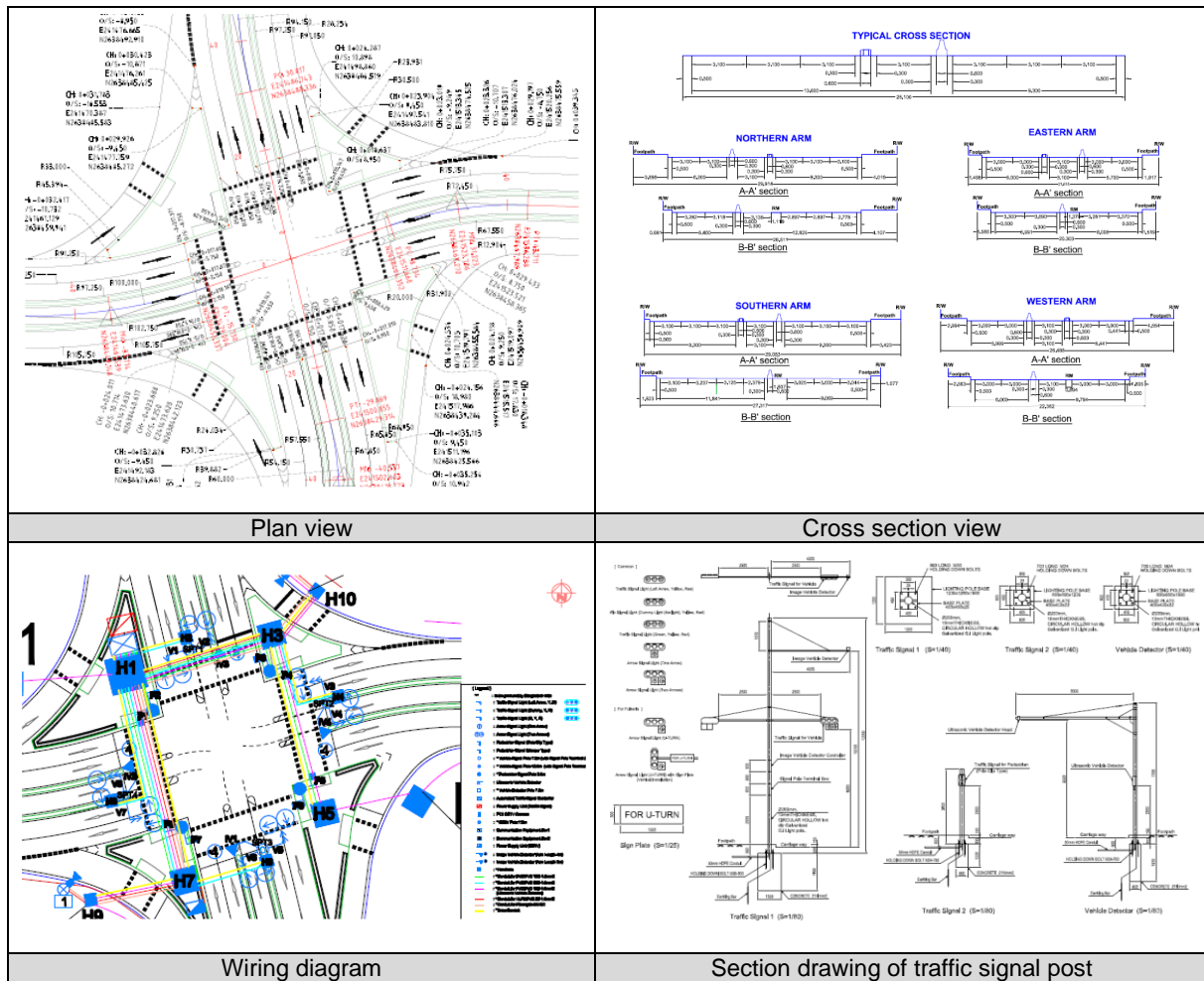
**Table 1.1.4: Draft Contents of the Draft Action Plan for Improving Traffic Flow Management**

Table of Action Plan	Detailed Contents
1. Overall Plan	<ul style="list-style-type: none"> <li>• A roadmap for improving traffic flow management</li> </ul>
Intersection Planning	<ul style="list-style-type: none"> <li>• Operation improvement at intersections to reduce the tasks of RNP</li> <li>• Traffic signal control for public transportation such as public transportation priority systems (PTPS)</li> <li>• Traffic segregation between cars and motorcycles/bicycles</li> </ul>
Traffic Signal Operation	<ul style="list-style-type: none"> <li>• Clarification of tasks for traffic signal operation</li> <li>• Development of a plan for operation and maintenance</li> <li>• Traffic regulation (PTPS, Information provision of alternative route, Traffic regulation for large vehicles, etc.)</li> <li>• Smart parking systems</li> </ul>
Traffic Management	<ul style="list-style-type: none"> <li>• Traffic Control: priority measures for public transportation, alternative route guidance, restrictions for large vehicles, etc.</li> <li>• Parking: Smart parking</li> </ul>
2. Priority Action Plan	<ul style="list-style-type: none"> <li>• Short-term implementation plans are selected from the above contents</li> </ul>
3. Priority Components	<ul style="list-style-type: none"> <li>• Signalized intersection improvement (Basic design, Quantity take-off, Ballpark cost estimate of project costs including maintenance and management)</li> </ul>

Source: JICA Expert Team

**2) Basic Design of Priority Components, Rough Cost Estimation, etc.**

Based on the results of the micro simulation and topographic survey, a basic design of priority components including rough cost estimation is carried out to improve signalized intersections.



Source: JICA Expert Team

Figure 1.1.4: Drawings of Basic Design of Priority Components

**(13) Activity 2-4: To conduct a capacity assessment (gap analysis) of related organizations based on the Action Plan and assess the viability of the proposed priority actions**

Human resources, skills, and equipment necessary for the sustainable implementation of priority projects of the Action Plans, which are selected in the Activities 2-3 are listed up and organized for the capacity assessment of related organizations. It is used for managing the projects progress.

For sustainability, not only the C/P but also private consultants and academics are involved and targeted for analysis of human resource development on the capacity assessment. The interview survey to key persons who belong to private company and institution are conducted for information collection and analysis. Candidates of priority projects of the Action Plan and organizations in charge are shown in Table 1.1.5.

**Table 1.1.5: Priority Projects of the Action Plan for Traffic Flow Management and Organizations in Charge**

Priority Action Measures	Contents
New Development of Signal Intersection Installed Advanced Traffic Signal System	CoK, RTDA, (RNP): Traffic volume/Intersection analysis, Intersection planning and design, Procurement, Construction RNP: Operation

Information Provision of Alternative Route	CoK: Road sign, Traffic information sign board/system
Public Transportation Priority Project	CoK, RURA: Dedicated bus lane (DBL) CoK, RNP: Public transportation priority system (PTPS)
Regulations of Large Vehicles	CoK, RNP: Traffic regulation, Road sign, Enforcement, Penalty

Source: JICA Expert Team

**(14) Activity 2-5: To implement a series of technical support and capacity enhancement for the implementation of the Action Plan**

To realize the Action Plan produced in Activity 2-3, effective pilot projects are selected from the priority projects of the Action Plan (as short-term project). Table 1.1.6 shows the candidate projects for pilot project.

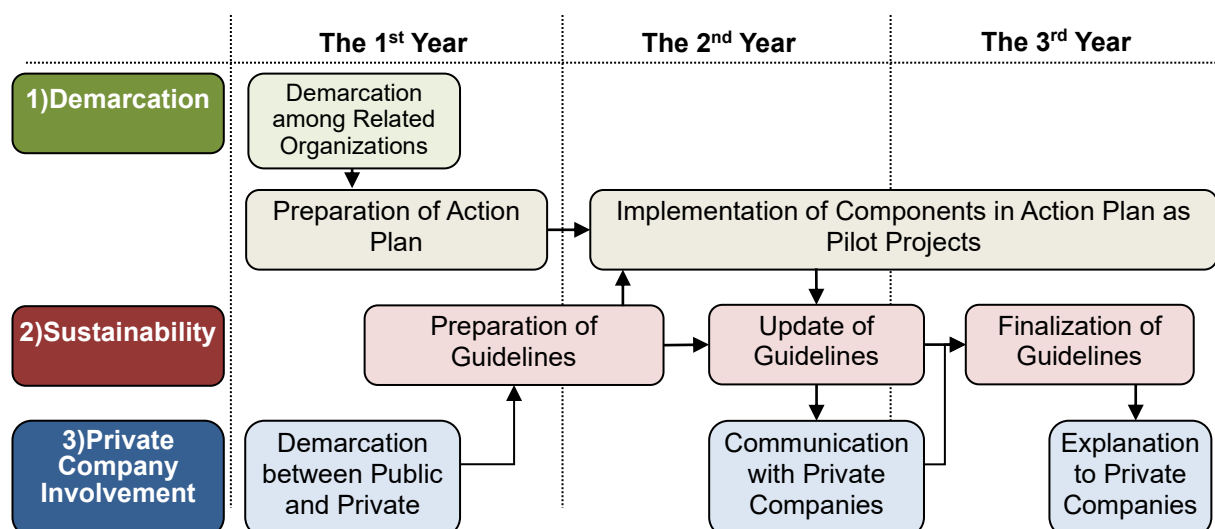
**Table 1.1.6: Candidates for Pilot Project (Tentative)**

Category	Pilot Project Measures (Draft)
Efficient use of existing roads	<ul style="list-style-type: none"> <li>• Display system on the road for traffic congestion and alternative road</li> <li>• Lectures for traffic engineering</li> <li>• Efficient information management linked with the road register system</li> <li>• Separation of mixed traffic</li> <li>• Installation of traffic signal and intersection improvement</li> </ul>
Change of modes	<ul style="list-style-type: none"> <li>• Bus information provision</li> <li>• Mobility management and road improvement for bicycles</li> </ul>
Suppression/adjustment of traffic demand	<ul style="list-style-type: none"> <li>• Traffic restrictions</li> <li>• Tightening of restriction against freight vehicles in CoK</li> <li>• High occupancy vehicle (HOV) lane</li> </ul>
Diversification of traffic demand	<ul style="list-style-type: none"> <li>• Traffic information provision</li> <li>• Recommendation for staggered working hours / flexitime</li> </ul>
Road safety education/training	<ul style="list-style-type: none"> <li>• Safety training using a drive recorder</li> <li>• Alerts and safety training for public transport and truck</li> </ul>
Improvement of road safety	<ul style="list-style-type: none"> <li>• Installation of safety facilities at the trunk road and street intersections</li> <li>• Pedestrian signals</li> <li>• Automatic road surface damage detection utilizing AI technology, etc.</li> </ul>

Source: JICA Expert Team

**(15) Activity 2-6: To produce guidelines for traffic flow management and develop a Smart Parking Strategy for the city**

The guidelines for traffic flow management are produced in accordance with the prompt steps for the improvement shown in Figure 1.1.5.



Source: JICA Expert Team

**Figure 1.1.5: Flow of Capacity Building for Traffic Flow Management**

### (16) Activity 2-7: To finalize the Action Plan

Based on a situation of limited number of staffs in the public sector in Rwanda, an efficient daily work and activities are a key factor for the sustainable traffic flow management, which is divided into three elements, i.e.: 1) Clear demarcation of roles, 2) Continuous operation systems, and 3) Involvement of private companies.

Regarding 1) Clear demarcation of roles, coordination among relevant organizations is discussed in WG2. C/P and JET determine which organization is responsible for traffic flow management through the activities.

Regarding 2) Continuous operation systems, guidelines including procedures for continuous implementation of plans and operation and management are produced and finalized, in case of replacement of the person in charge.

Regarding 3) Involvement of private companies, the produced guidelines are shared with private companies to provide information for better understanding of the project including the guidelines through a seminar for traffic flow management, which promote the project with their cooperation.

### (17) Activity 3-1: To review the existing institutional setups for public transport and traffic management in Kigali

Existing documents of laws and regulations for institutional setups, roads, public transportation and traffic management are reviewed. JET request C/P to collect the related documents and summarize institutional setups for public transport and traffic management in Kigali. The related laws and regulations are summarized first by JET and reviewed and updated in the meeting among related organizations.

### (18) Activity 3-2: To motivate the creation of a coordination body by agencies related to public transport and traffic management in Kigali

As a coordination body by agencies related to public transport and traffic management in Kigali, the establishment of a dedicated authority, the Kigali Transport Authority (KTA), is stipulated in the

National Transport Policy. Current progress and necessary procedures of the authority are summarized in the project through the interview with MININFRA.

To initiate the creation of the authority, bottlenecks for the establishment are identified through the discussions among related organizations including MININFRA. Scooping between the authority and the JCC in the project is also discussed among them as the JCC takes a role of coordination among stakeholders for public transportation and traffic management.

**(19) Activity 3-3: To develop comprehensive mobility improvement measures (policy and plans) under the coordination body as stipulated in the National Transport Policy (i.e., Capacity development for urban transport and traffic management)**

Capacity building for developing comprehensive mobility improvement measures including policies and plans are carried out based on the activities to be implemented in the project such as future traffic demand forecasting, the proposed concept plan of public transportation network, and the basic plan of traffic flow management.

Candidate measures to improve the mobility in Kigali are summarized in above Table 1.1.5 and Table 1.1.6.

C/P prepare the first draft of urban mobility improvement measures and update it based on the advice by JET. The updated measures shall be considered among related organizations in the WG. These activities would take roles of enhancing the planning capability of the C/P.

**(20) Activity 3-4: To consider authorities, roles, and responsibilities of the coordination body and assess the feasibility of creating dedicated body for implementation of measures identified in Activity 3-3 and produce an Action Plan (roadmap) toward the establishment of that authority**

Based on the results of Activities 1-1 to 3-3, C/P and JET jointly summarize the roles (to be discussed in Activity 3-2), jurisdictions and responsibilities of the coordination mechanism referred as the Kigali Transport Authority (KTA) in Kigali Master Plan (2013). To motivate the establishment of KTA, current progress and necessary procedures of the authority are summarized in the project through the interview with CoK staffs, which are used for updating the procedures of establishment of that planned in Kigali Master Plan (2013). In addition, the key information such as budget allocation, laws, duration for approval, and other conditions are summarized to verify the feasibility.

**(21) Activity 3-5: [If its feasibility is confirmed] To develop an architecture of policy guidance and its implementation (relation of central ministries, the City of Kigali, and dedicated authority)**

Based on the results of Activity 3-4, the policy guidelines for KTA and demarcation of roles among related organizations are summarized jointly with the C/P. The demarcation and relationship among related organizations in addition to the procedures of coordination is simply shown in a diagram. C/P shall proactively execute these activities with support of the JET.

**(22) Activity 3-6: [If its feasibility is confirmed] To formulate the mandate and work plan for the dedicated authority**

Necessary human resources and skills are summarized to formulate the mandate and work plan for KTA according to the outputs of gap analysis, implementation plan of the roadmap, and the Action Plans in the project. The activities are conducted on the initiative of the C/P.

## 1.2 Implementation Structure

### 1.2.1 Implementation Organization

#### (1) Lead agency

- Ministry of Infrastructure (MININFRA)

#### (2) Collaborative agencies

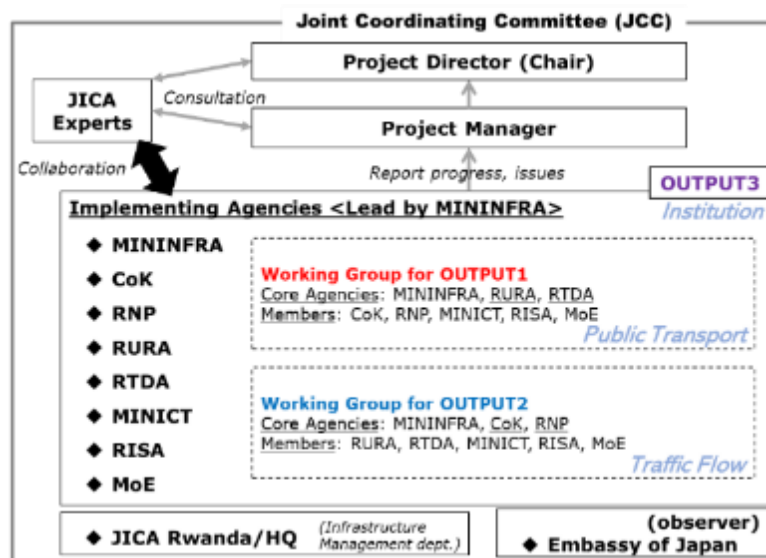
- City of Kigali (CoK)
- Rwanda National Police (RNP)
- Rwanda Utilities Regulatory Authority (RURA)
- Rwanda Transport Development Agency (RTDA)

#### (3) Other concerned agencies

- Ministry of ICT & Innovation (MINICT)
- Rwanda Information Society Authority (RISA)
- Ministry of Environment (MoE)
- Public transport operators

### 1.2.2 Implementation Structure

Figure 1.2.1 shows the implementation structure of the project. MININFRA takes the lead initiative as the implementing agency for managing and monitoring the entire progress of the project including WGs. The seven related agencies indicated in Figure 1.2.1 work and collaborate for conducting the activities of the project.



Source: JICA Expert Team

Figure 1.2.1: Implementation Structure of the Project

### **1.2.3 Project Organization (JCC, WGs, JET)**

#### **(1) Joint Coordination Committee (JCC)**

##### **1) Roles of JCC**

The committee provides an overall guidance in the implementation of the project and endorses the output of each activity for the project. The roles of the JCC are shown below.

- To oversee the activities of “The Project for Urban Mobility Improvement in Kigali” and to make the final decision-making body with regard to policy and overall project implementation issues.
- To provide guidance on setting policies and directions on project implementation.
- To approve the work plan and other plans which are prepared in the project.

##### **2) Composition**

Chairperson of the JCC is the Project Director of the project.

#### **(2) WGs**

##### **1) Roles of WG**

Each WG implements and manages each activity in the project under the coordination of MININFRA. The roles of the WGs are as presented below.

- To oversee the implementation progress of the project.
- To discuss and decide the necessary actions of each activity.
- To share the information/issues/problems of the activities.
- To report to the JCC about the progress of the project activities.

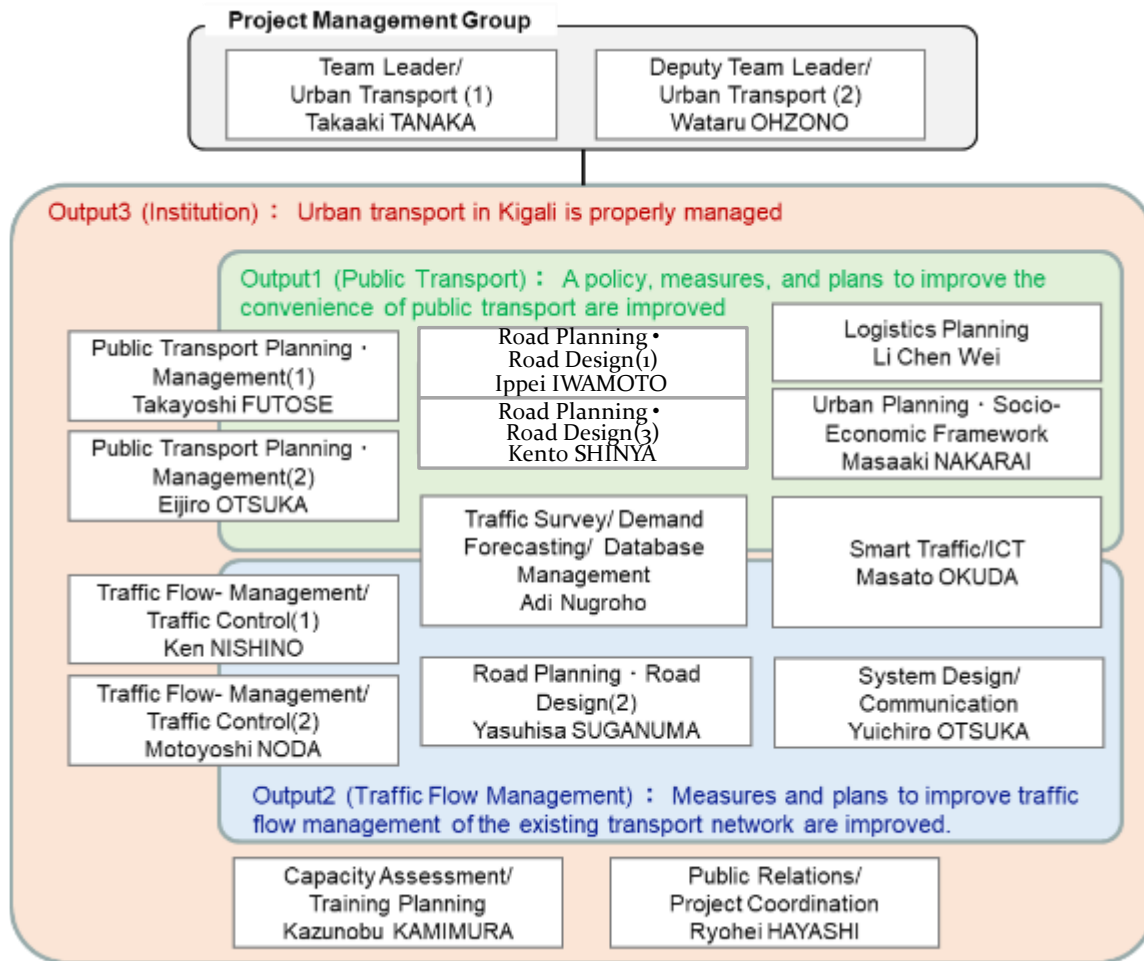
##### **2) Composition**

Chairperson of the WGs is the Project Manager of the project. Core members of each WG are as follows:

- WG1 (Public Transportation): RURA and RTDA
- WG2 (Traffic Flow Management): CoK and RNP
- WG3 (Institution): CoK

#### **(3) JICA Expert Team**

For the effective and successful implementation of the project, the following JICA experts are assigned.



Source: JICA Expert Team

**Figure 1.2.2: Composition of the JICA Expert Team**



## Chapter 2: Activities of UMIK Project

### 2.1 Activities (General)

#### 2.1.1 Work Plan and Monitoring Sheet Ver.1

The work plan of the Project for Urban Mobility Improvement in Kigali (UMIK) was prepared and submitted as part of the material of the first Joint Coordinating Committee (JCC) meeting held on 17 May 2022 and its minutes of meeting was signed. The Monitoring Sheet Ver.1 to describe the project progress was prepared and submitted at the second JCC meeting held on 29 November 2022.

#### 2.1.2 Technical Transfer

##### (1) Training Program Implementation

42 sessions have been completed (lectures and OJT).

**Table 2.1.1: Status of Training Program Implementation**

Completed Date	Title	Sub-title
15 July 2022	Orientation to Traffic Survey	Traffic Flow Survey Orientation
15 July 2022	Introduction of OD Survey	OD Survey
15 July 2022	Public Transportation Passenger Survey	Introduction
08 November 2022	Traffic Survey Data Management	Hands-on Session, Survey Data Management
12 April 2023	Traffic Demand Forecast	Introduction to Traffic Modelling
18 May 2023	Traffic Demand Forecast	Application of Traffic Modelling
23 June 2023	Traffic Demand Forecast	Creating Network from Scratch
12 August 2022 2 November 2022	Introduction of ITS for Transportation	Introduction of ITS of Japan and other countries
29 June 2023	Action Plan Preparation	Public Transport
15 September 2023	Action Plan Preparation	Traffic Management
3 May 2023	Action Plan Preparation	Traffic Management
24 May 2023	Action Plan Preparation	Traffic Management
22 March 2023	Introduction to Public Transport	Fare Policy
23 March 2023	Introduction to Public Transport	Proposed Concept of Public Transport Network
29 March 2023	Introduction to Public Transport	Collecting Information for Policy Recommendations
18 October 2022	Introduction to Traffic Flow Management	Functions of Road and Traffic Capacity
22 February 2023	Introduction to Traffic Flow Management	Roundabout Capacity Analysis
3 March 2023	Introduction to Traffic Flow Management	Traffic Signal Parameter Setting
24 May 2023	Introduction to Traffic Flow Management	Traffic Signal Parameter Setting
5 July 2023	Bus Operation and Management	Method of Creating Timetable Schedule and Diagram
5 July 2023	Bus Operation and Management	
24 March 2023	Bus Operation and Management	Fare Policy
13 December 2023	Bus Operation Plan	Operation of public transport under headway framework
28 November 2022	Aerial Based Topographical Survey	Methodology and Project Findings
20 October 2022	Introduction to Microsimulation Analysis	Introduction

24 October 2022	Introduction to Microsimulation Analysis	Hands-on Session Demonstration by CP
26 October 2022	Introduction to Microsimulation Analysis	Effect of traffic signal optimization
22 February 2023	Basics of Signal Phase Planning	
21 September 2023	GIS Training	Basic Skills of GIS
28 September 2023	GIS Training	Making layer data (object file & image file)
13 December 2023	GIS Training	Basic Skills of GIS
29 December 2023	GIS Training	Making layer data (object file & image file)
31 May 2023	Selection of a Pilot Project	Discussed in the 3 <sup>rd</sup> JCC
15 July 2022	Origin-destination Survey Implementation	Implementation and Operation Management
15 July 2022	Public Transportation Passenger Survey	Implementation and Operation Management
26 October 2022	Traffic Flow Survey at Intersections	Implementation and Management
14 November 2022	Intersection Improvement	Evaluation Geometric Improvement
22 February 2023	Intersection Improvement Planning and Design	Geometric Improvement and Signal System
21 July 2022	Intersection Improvement	Evaluation Geometric Improvement
11 November 2022	Survey at Intersections	Inspection of the Results
14 November 2022	Intersection Improvement Planning and Design	Geometric Improvement and Signal System

Source: JICA Expert Team

The following table is a summary of the attendance. The total number of attendances is 456. The number of students is the attendance of GIS training at the University of Rwanda.

**Table 2.1.2: Training Attendance Summary**

	Attendance
CoK	35
MININFRA	127
RTDA	40
RURA	22
RNP	60
RISA	1
Private company	109
Students	62
Total	456

Source: JICA Expert Team

## **(2) Knowledge Co-Creation (KCC) Program in Japan**

The Knowledge Co-Creation (KCC) Program in Japan was planned to be carried out twice in the project period: once at the management level and once at the practical working level. The implementation of the program was based on the "Guidelines for Training and Invitation Implementation in Consulting Contracts." The joint venture selected and requested the accepting organizations to utilize their experience and network. The contents of the program were customized based on the progress of each activity and the priority action projects. The participants from the CP reported the results of the program in the JCC and WG meetings.

The first KCC Program in Japan was held from 04 December (arrival in Japan) to 11 December (departure) in 2022, and nine people participated. (2 from MININFRA, 2 from RNP, 1 from CoK, 2 from RTDA, and 2 from RURA). The schedule and contents of the first KCC Program are shown in Table 2.1.3 and Table 2.1.4.

The purpose of the first KCC Program was to improve road traffic administration in Kigali City by learning about the actual situation of traffic management and public transportation in Japan from the policy-making perspective.

**Table 2.1.3: Itinerary for the 1st KCC Program**

Date	Duration	No.	Acceptance Partner	Program Title	Venue	
1	4th Dec (Sun)	-	-	-	(Arrival in Japan)	
2	5th Dec (Mon)	10:00~12:00	-	(Simple Briefing)	JICA Japan	
3	6th Dec (Tue)	10:00~12:00	2	Nippon Koei	Orientation Overview of the New Transportation System Mode	JICA Japan
		13:30~14:50	3	Shinjuku Highway Bus Terminal (Busta)	Tour and Explanation of Busta	Busta
		15:40~17:30	4	Metropolitan Police Department	Traffic Regulation by the Metropolitan Police Department	Nippon Koei (conference room)
4	7th Dec (Wed)	10:00~12:00	5	Yokohama	Road Administration of Yokohama	JICA Japan
		12:30~12:50	1	(Observation of Road and Transportation in Yokohama)	Test Ride of Articulated Bus	-
		13:15~13:30	1		Test Ride of Transit Bus	
		13:40~13:50	1		Test Ride of Cable Car	
		14:20~14:30	1		Test Ride of Water Bus	
		15:00~15:30	1		Observation of Road Construction in Yokohama	
5	8th Dec (Thu)	10:00~12:00	6	-	Chiba Prefectural Police Department Traffic Control Center	Chiba Prefectural Police Headquarters
		12:00~12:10	1	-	Test Ride of Chiba Urban Monorail	-
		14:30~16:30	7	VICS Center	Work of VICS --- central role in navigation	VICS Center
6	9th Dec (Fri)	13:00~14:45	8	Nippon Signal	Products of Traffic Signal System	Nippon Signal Kuki Office
		16:00~16:45	8	Nippon Signal	Factory Tour of Signal System	Wako Industries Urawa Office
		18:30~19:00	-	-	Evaluation Meeting / Closing Ceremony	JICA Japan
7	10th Dec (Sat)	15:00~19:00	1	-	Observation of Road Traffic and Understanding Japanese Cultures (Bus Tour)	(Departure from Japan) 4 people
8	11th Dec (Sun)	-	-	-	(Departure from Japan) 5 people	

Source: JICA Expert Team

**Table 2.1.4: Outline of the 1st KCC Program**

No.	Program Title	Style	Program and Objectives of Training	Lecturer / Affiliation	Duration (Hours)
1	Observing and Experiencing Various Means of Transportation	Tour	To familiarize with various transportation means including subway, bus, monorail, cable car, highway, and service area, and on civil engineering construction improvement (e.g., soil improvement)	Nippon Koei Co., Ltd.	-
2	Overview of the New Transportation	Lecture	To deepen understanding of an overview and comparison of transportation systems	Nippon Koei Co.,	2.0

No.	Program Title	Style	Program and Objectives of Training	Lecturer / Affiliation	Duration (Hours)
	System Mode		as a reference for introducing urban traffic systems in Rwanda	Ltd.	
3	Observation and Explanation of Busta	Lecture Tour	To train Rwandan officials on the current situation and operations of the bus business in Japan, with the aim to understand the facilities and operation status of the bus terminal, thereby facilitating the utilization of bus business management in their own countries.	Shinjuku Expressway Bus Terminal Co., Ltd.	2.0
4	Traffic Regulation by the Metropolitan Police Department	Lecture	To understand the concepts and methods of the police (the Metropolitan Police Department, which has jurisdiction over traffic management in large cities) towards traffic management as a reference for promoting urban traffic management in Kigali City	Metropolitan Police Department	2.0
5	Road Administration of Yokohama	Lecture	To deepen understanding of Yokohama City's overall road administration (planning, development, maintenance, etc.) and various initiatives for bus transportation as a reference for improving road and bus administration in Kigali City	Yokohama International Affairs Bureau Yokohama Road Bureau	2.0
6	Overview of Chiba Prefectural Police Department Traffic Control Center	Lecture Tour	To understand and deepen knowledge of the practical operation, mechanism, and utilization methods of the traffic control center, which is considered to be introduced in Kigali City	Chiba Prefectural Police	2.0
7	Work of VICS center in Navigation	Lecture	To introduce road traffic management that utilizes Japan's ITS and deepen understanding	VICS Center	2.0
8	Introducing Traffic Signal System Product and Factory Tour of Signal Systems	Lecture Tour	To understand and deepen the understanding of the practical operation, mechanism, and utilization methods of the signal control system, which is considered to be introduced in Kigali City	Nippon Signal Co., Ltd.	2.5

Source: JICA Expert Team

The second KCC Program in Japan was held from 08 October (arrival in Japan) to 21 October (departure) in 2023, and seven people participated. (1 from MININFRA, 1 from RNP, 2 from CoK, 1 from RTDA, 1 from “Association des transporteurs des Personnes au Rwanda (ATRP)” and 1 from Rwanda Transport Interlink Company (RITCO)). The schedule and contents of the second KCC Program are shown in Table 2.1.5 and Table 2.1.6.

The purpose of the second KCC Program was to improve road traffic administration in Kigali City by learning about the actual situation of traffic management and public transportation in Japan from the viewpoint of the implementation and the operation and maintenance of the projects. During the program, the participants attended lectures and visited case studies related to public transportation and traffic management in Japan. In the end, the participants prepared a final report, successfully completing the program.

**Table 2.1.5: Itinerary for the 2nd KCC Program**

Date	Duration	No.	Acceptance Partner	Program Title	Venue
1	8th Oct(Sun)	-	-	(Arrival to Japan)	(Arrival to Narita)
2	9th Oct(Mon)	-	-		(Narita→Haneda→Fukuoka→Kita-Kyusyu)
3	10th Oct(Tue)	09:40~11:30	JICA	JICA briefing	JICA

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Date	Duration	N o.	Acceptance Partner	Program Title	Venue	
					Kyusyu Center	
	13:48~14:30	1	-	BRT Limited Express1 Ride	-	
	14:45~15:45	1	-	Kita-Kyushu Monorail Ride	-	
4	11th Oct(Wed)	09:30~10:30	2	Nishi-Nippon Railroad Co., Ltd.	Introduction of Business Project	Nishitetsu Bus Training Center
		10:30~11:15	2		Providing information at bus stops, smart bus stops	
		11:15~12:00	2		Training Content	
		12:00~12:30	2			Nishi-Nippon Railroad Island city Office
		13:30~15:00	2		AI Demand Bus	
		15:00~15:30	2		Maintenance Site and Bus Facilities	
		15:30~16:00	2		Bus Operation Management and Safety	
		16:00~17:00	2			
5	12th Oct(Thu)	09:30~12:00	3	Kita-Kyushu City	Introduction of public transport plan of Kita-kyushu City region	JICA Kyusyu Center
		14:10~14:50	4	Kita-Kyushu Monorail Co., Ltd.	Overview of Monorail operation, maintenance factory	Kita-Kyushu Monorail Maintenance Factory
		14:50~15:20	4			
		15:20~15:40	4		Improving open space in front of the station, Collaborations to connect the services of trains and buses	JR Shimo-sone Station
		16:00~16:20	3			JR Kokura Station
		16:20~17:30	3			
6	13th Oct(Fri)	10:00~10:45	5	-	Jono housing complex	-
		14:00~15:30	5	-	Roadside Station, Bicycle Lane	-
7	14th Oct(Sat)	08:30~13:15	3	JICA	Hospitality Bus tour	Kita-Kyushu region
9	16th Oct(Mon)	09:30~11:30	6		Nagasaki City Project	Nagasaki City Hall
		13:35~14:00	6		Tram Trial Ride	-
		14:00~14:30	1		Glover Sky Road Trial Ride	-
10	17th Oct(Tue)	09:40~09:50	1	Nagasaki City	Inasayama Ropeway Trial Ride	-
		10:40~10:50	1		Slope Car Trial Ride	-
		11:00~11:30	6		Shared taxi Trial Ride	Kanehori District
		11:35~11:57	1	-		
		13:00~14:00	7	Nagasaki Prefectural Police	Nagasaki Traffic Control Center	Nagasaki Prefectural Police Department
		14:30~15:30	6	Nagasaki City	Road Improvement	Nishiyama line 7
		15:30~16:30	6			Konpira park
		11	18th Oct(Wed)	10:00~11:45	3	-
12	19th Oct(Thu)	10:00~11:30	8	Location Mind Inc.	ICT、MaaS	JICA Kyusyu Center
		13:00~14:30	8	Nippon Koei Co., Ltd		
13	20th Oct(Fri)	13:00~14:30	-	-	Training Report Presentation	JICA Kyusyu Center
		14:30~15:30	-	-	Evaluation Session	
		15:30~16:00	-	JICA	Closing Ceremony	
14	21st Oct(Sat)	-	-	-	-	(Return)

Source: JICA Expert Team

**Table 2.1.6: Outline of the 2nd KCC Program**

No.	Program Title	Style	Program and Objectives of Training
1	Observing and Experiencing Various Means of Transportation	Tour	To experience the convenience and comfort of articulated buses, monorails, trams, Shinkansen, shared taxis, inclined elevators, ropeways, and slope cars.
2	Introduction to Nishitetsu Bus Operations and Training Center	Lecture, Tour	To understand Nishitetsu Bus's initiatives in operation management and vehicle maintenance, and to learn about driver training at the Bus Training Center in Onojo.
3	Public Transport Plans and Policies in Kitakyushu City	Lecture, Tour	To learn about the planning and integration of various public transportation systems in Kitakyushu City, including monorails and BRT.
4	Inspection of Kita-kyushu Monorail Facilities	Lecture, Tour	To explore the operational methods and maintenance facilities of the Kita-kyushu Monorail system.
5	Nishi-Nippon Railroad Co., Ltd. Takeshita Automobile Office Visit	Lecture, Tour	To learn about bus operation management and maintenance, including vehicle inspection methods at the Takeshita Automobile Office.
6	AI Demand Bus "Noru-to" in Higashi-ku, Fukuoka	Tour	To experience and learn about the AI-based Demand Responsive Transport system in Fukuoka's Island-district.
7	Nagasaki City Public Transport Initiatives	Lecture	To understand Nagasaki City's unique approaches to road and public transportation in hilly terrain.
8	ICT and MaaS Sessions by LocationMind and Nippon Koei Co., Ltd.	Lecture	To gain insights into transportation measures using traffic data and big data analysis methods.

Source: JICA Expert Team

### 2.1.3 Progress Monitoring

The progress of the Project is monitored using a monitoring sheet. The monitoring is conducted jointly by JICA Expert Team (JET) and their counterpart, headed by the Ministry of Infrastructure (MININFRA). The monitoring sheet will be updated properly during the project period.

The JET shall consult with the Japan International Cooperation Agency (JICA) and finalize with their counterpart, especially when it is necessary to modify the project design matrix (PDM). The contents of the action plans were confirmed and agreed in the 4th JCC, and draft indicators in the PDM were set.

### 2.1.4 Target Key Performance Indicators (KPI)

As mentioned above, the draft indicators were set based on the confirmation and agreement on the contents of the action plan in the 4th JCC.

### 2.1.5 Joint Coordinating Committee(s) (JCCs)

The joint coordinating committee (JCC) meetings have been held as follows:

**Table 2.1.7: Status of Joint Coordination Meetings**

Name	Date
The First JCC	17 May 2022
The Second JCC	29 November 2022
The Third JCC	31 May 2023
The Fourth JCC	21 December 2023
The Fifth JCC	12 June 2024
The Sixth JCC	28 November 2024
The Seventh JCC	25 February 2025

Source: JICA Expert Team

The material and the minutes of each JCC meeting are attached in Annex of this report.

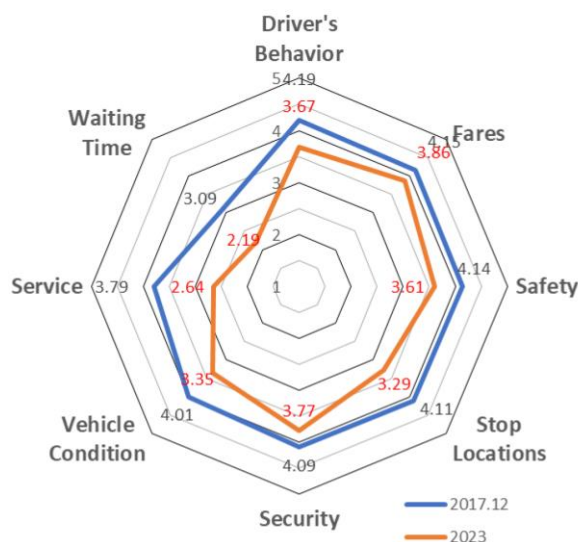
## 2.1.6 Monitoring of the Progress

The progress of the project is confirmed and grasped by regularly checking with the CP and using the Project Monitoring Sheet. In addition to reporting and confirming the progress of the project at JCC meetings, the minutes of the meetings are prepared.

## 2.2 Activity 1 (Improvement of Public Transport)

### 2.2.1 Activity 1-1: To analyze the current situation and issues of public transport services and convenience

According to a past study report, “Business Model for Public Transport Services in the City of Kigali (2020)”, various surveys and analyses were done to identify the current circumstances of the sector and challenging issues to improve operation and business management. Although the report was published in 2020, the baseline surveys were conducted in 2017. According to the result of the service level survey, it was revealed that most bus users have not expressed a negative opinion except for “long waiting times” at the bus stops and terminals. However, according to the passenger interviews conducted under Activity 1-2, the satisfaction scores have drastically decreased, again showing more concerns about the waiting time.



Source: Business Model for Public Transport Services in the City of Kigali (2020)

**Figure 2.2.1: Passenger's Satisfaction on Public Transport Service (As of 2017)**

The JICA Expert Team summarized the issues with the public transport service in Kigali as shown in Table 2.2.1. These were based on the field survey, an interview with the stakeholder, and discussions in the Working Group 1 (WG1) meeting.

**Table 2.2.1: Issues Related to the Public Transport in the City of Kigali (as of November 2022).**

Category	Issue	Contents										
Bus Fleet and Related Infrastructure	Lower fleet operation rate due to lack of maintenance	<ul style="list-style-type: none"> <li>According to the policy of CoK, the bus fleet has been replaced from minibuses (Toyota Coaster) to larger buses (e.g., Hyundai, Yutong). On the other hand, several vehicles can no longer operate due to difficulties in obtaining spare parts because of rising import costs.</li> </ul>										
	In-vehicle equipment	<ul style="list-style-type: none"> <li>City buses only accept payment by IC card, and all vehicles are equipped with IC card readers. Previously, only Tap &amp; GO had entered the market, but from August 2022, a new IC card (Safari Bus by Centrika Ltd.) has been introduced on some routes operated by one of the new operators.</li> <li>All vehicles are equipped with GPS in accordance with RURA regulations, but different operators have different types, including ones that cannot extract operational information. Furthermore, needs such as the use of location information for operation planning have been identified, but specific methods have not yet been considered.</li> </ul>										
	Terminal / stops	<ul style="list-style-type: none"> <li>Although infrastructure such as terminals and sheltered stops have been developed, guidance information such as bus routes, fares, and timetables are not provided.</li> </ul>										
Public Transport Planning	Participation of new bus operators	<ul style="list-style-type: none"> <li>For the bus operation in Kigali, the city boundary is divided into four zones, and the right to operate in each zone was assigned to three operators. In July 2022, new operators were allowed to operate by the government due to the lack of vehicles. There is a risk of competition among routes.</li> </ul> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Zone</th> <th>Bus operators: The underlined companies are new operators that started to operate in July 2022 (Number of Routes).</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>Kigali Bus Service (12), <u>Volcano</u> (6)</td> </tr> <tr> <td>II</td> <td>Royal Express (10), <u>Yahoo! Car</u> (2)</td> </tr> <tr> <td>III</td> <td>JARI Transport (18)</td> </tr> <tr> <td>IV</td> <td>JARI Transport (13), <u>Kivu Belt</u> (1)</td> </tr> </tbody> </table>	Zone	Bus operators: The underlined companies are new operators that started to operate in July 2022 (Number of Routes).	I	Kigali Bus Service (12), <u>Volcano</u> (6)	II	Royal Express (10), <u>Yahoo! Car</u> (2)	III	JARI Transport (18)	IV	JARI Transport (13), <u>Kivu Belt</u> (1)
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	II	Royal Express (10), <u>Yahoo! Car</u> (2)										
	III	JARI Transport (18)										
	IV	JARI Transport (13), <u>Kivu Belt</u> (1)										
	Competition with Moto-taxi (motorcycle taxis)	<ul style="list-style-type: none"> <li>The number of moto-taxis (motorcycle taxis) registered in Kigali is increasing rapidly, from 16,641 in 2018 to 25,000 in 2021. The congestion rates of buses are very high, with passengers being left unloaded at bus stops, causing a shift away from buses to motorcycle taxis.</li> <li>Moto-taxis are considered a safety issue, and the government is considering how to regulate them.</li> </ul>										
Non-coverage areas of bus services & lack of connectivity among city hubs	<ul style="list-style-type: none"> <li>There is a lack of information on the current route network, although it is conceivable that the requirements for route selection are unclear and may not cover areas with potential passenger demand.</li> </ul>											
Fare policy	<ul style="list-style-type: none"> <li>The fare rate (RWF 22/km) is set, but practically, the flat fare system is applied. The passengers must pay the fare for the entire journey, regardless of the distance traveled, which makes the fare system more expensive. As a result, users often pay different fares for different lines they use, even if the sections they use are the same.</li> <li>IC cards are only installed at one entrance, and the introduction of distance-based fares requires installation at both the entrance and exit.</li> <li>For IC cards, there are few places where they can be purchased and topped up, and there is a high risk of inducing non-paid riders in the future.</li> </ul>											
Discussion on subsidy	<ul style="list-style-type: none"> <li>Temporary subsidies for bus services as a measure against COVID-19 were provided, including the sharing of the difference in fare increases (from RWF 22/km to RWF 32/km) during COVID-19 through ride regulation, fuel tax exemption, and reduced interest on loans for business-related investments (from 35% to 5%, as of October 2021).</li> <li>In the medium to long term, subsidies are considered an option to sustain high-quality services, but the local government side is reluctant to implement them.</li> </ul>											

Bus Operation	Demand-Supply gap	<ul style="list-style-type: none"> <li>• The fleet congestion rate during peak hours is very high, and there is overloading at terminals and stops. As of October 2022, the travel demand is higher than before the COVID-19 pandemic, but there are insufficient vehicles in operation, and it is difficult to purchase new vehicles due to the financial status of the operators.</li> <li>• The buses are not operated according to schedule, and passengers do not know when the buses will depart or arrive at the bus stop. Although the operators acknowledge the necessity, they are concerned about the disruption to the schedule caused by traffic congestion and complaints from passengers and have not yet taken the step to introduce the scheduled operation.</li> </ul>
	Information provision for passengers	<ul style="list-style-type: none"> <li>• Guidance information for passengers is not provided by vehicles, at bus stops, or in other web media. The service is difficult to use for those who have never used it.</li> <li>• There is a lack of information for passengers on bus operations.</li> </ul>
	Driver training	<ul style="list-style-type: none"> <li>• There is no systematic training and education for drivers, with only a few days of training provided after they are newly hired and before they are assigned to work.</li> <li>• The need for driver training by operators is very high.</li> </ul>
	Safety	<ul style="list-style-type: none"> <li>• Buses often operate without lighting inside the vehicle at night.</li> </ul>

Source: JICA Expert Team

Similar to public transport, the issues related to freight traffic are also analyzed and summarized as shown in Table 2.2.2.

**Table 2.2.2: Issues Related to the Freight Traffic in the City of Kigali (as of June 2023)**

Issue	Contents
Limited Parking and Cargo Handling Area	<ul style="list-style-type: none"> <li>• Due to limited handling space, trucks have no choice but to park on the road. However, this reduces the capacity for vehicles and pedestrians, which results in traffic congestion as well.</li> </ul>
Expensive Transport Operation Cost	<ul style="list-style-type: none"> <li>• The majority of imports and exports are handled in Dar es Salaam, located 1,500 km from Kigali. Without a railway connection, truck transport costs will be reflected on the customer side. Therefore, an efficient transport approach that can reduce transport costs is desired.</li> </ul>
Safety Concerns	<ul style="list-style-type: none"> <li>• Freight traffic increases the risk of traffic safety in the city. On the other hand, roads outside of Kigali, such as RN1, only have two lanes, and vehicles have to wait after the truck or overtake from the opposite lane. This is a safety issue because if there are many overtaking vehicles, it may cause collisions.</li> </ul>
Air Pollutions	<ul style="list-style-type: none"> <li>• The vehicle conditions, including engine and fuel quality, cause serious air pollution to be emitted from the trucks. Particularly when driving on hilly roads, trucks need more power to run the engines and therefore produce more pollutants.</li> </ul>
Enforcement	<ul style="list-style-type: none"> <li>• Although there is a truck restriction, the time period and area are not clearly specified. Moreover, trucks can enter restricted areas based on permission. As a result, trucks are not given clear instructions, which induces them to drive into the town, but are unpenalized by the police.</li> </ul>

Source: JICA Expert Team

### **2.2.2 Activity 1-2: To conduct a series of traffic surveys, including on-road traffic counts, origin and destination (OD) surveys, public transport passenger surveys, and traffic demand forecast**

The traffic surveys were implemented in three periods: in May-June before the CHOGM event, in July-August, and in September-October 2022. The survey period in July-August were postponed because of school holidays until 23 September. All other surveys were restarted on 26 September. The survey was conducted based on the proper procedures of the JICA guideline, and JET and local engineers supervised the surveys.





Source: JICA Expert Team

Figure 2.2.3 Traffic Survey Activities

The technical transfer to the counterpart regarding the survey data processing and analysis was conducted on 4 November 2022 explaining the field data checking and processing for analysis.

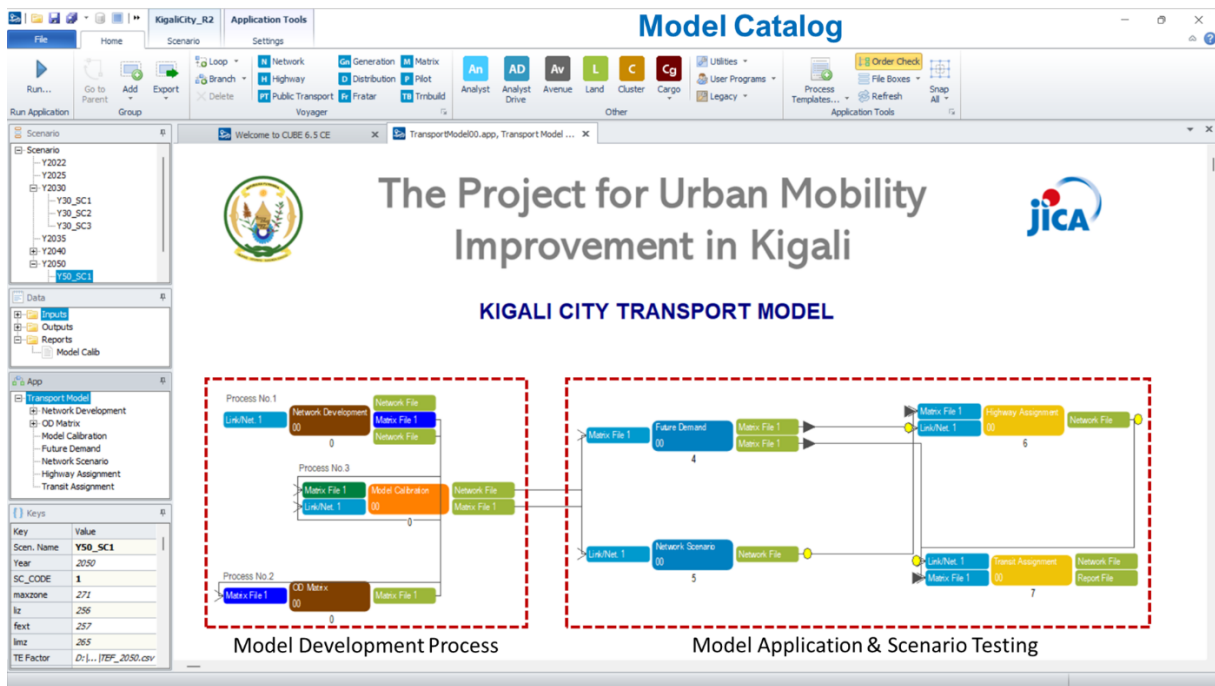
**Cross-Section Traffic Count Summary Report Process**

The Project for Urban Mobility Improvement in Kigali																	
Cross section traffic count						TOTAL											
Location No.	SI-03	Intersection Name	Kinamba			Direction Code	Total 3 Directions		Location No.	SI-03	Intersection Name	Kinamba		Direction Code	Total 2 Directions		
Date	12 April 2022	Coordinate	-1.908046, 29.999112			Direction from	Kacyiru		Date	12 April 2022	Coordinate	-1.908046, 29.999112		Direction from	Kacyiru		
Day	Tuesday	Direction to	Kinamba			Day	Tuesday		Direction to	Kinamba							
Time	1	2	3	4	5	6	7	TOTAL	1	2	3	4	5	6	7	TOTAL	
6:00-6:15	270	84	26	2	9	11	157	112	582	6	6	6	6	6	6	6	6
6:15-6:30	350	86	27	5	5	14	233	137	487	7	7	7	7	7	7	7	7
6:30-6:45	259	155	30	6	4	10	243	205	464	8	8	8	8	8	8	8	8
6:45-7:00	485	272	34	7	4	10	241	327	813	9	9	9	9	9	9	9	9
7:00-7:15	488	309	31	13	13	18	352	378	866	10	10	10	10	10	10	10	10
7:15-7:30	650	418	24	5	6	14	266	467	1117	11	11	11	11	11	11	11	11
7:30-7:45	641	420	25	7	50	16	254	518	1159	12	12	12	12	12	12	12	12
7:45-8:00	751	425	40	7	17	13	245	502	1258	13	13	13	13	13	13	13	13
8:00-8:15	673	392	35	7	10	17	214	364	1037	14	14	14	14	14	14	14	14
8:15-8:30	685	290	24	5	15	14	215	348	1033	15	15	15	15	15	15	15	15
8:30-8:45	845	268	33	4	14	28	190	347	1192	16	16	16	16	16	16	16	16
8:45-9:00	730	228	28	3	10	11	200	278	1008	17	17	17	17	17	17	17	17
9:00-9:15	635	255	25	6	10	11	170	308	933	18	18	18	18	18	18	18	18
9:15-9:30	765	259	29	3	16	15	138	322	1087	19	19	19	19	19	19	19	19
9:30-9:45	557	245	35	5	9	18	71	306	865	20	20	20	20	20	20	20	20
9:45-10:00	675	220	25	6	12	19	91	272	948	21	21	21	21	21	21	21	21
10:00-10:15	653	232	18	2	10	21	155	283	936	22	22	22	22	22	22	22	22
10:15-10:30	725	267	36	6	19	7	93	335	1060	23	23	23	23	23	23	23	23
10:30-10:45	496	219	23	9	18	14	82	277	773	24	24	24	24	24	24	24	24
10:45-11:00	576	197	27	2	17	13	94	256	833	25	25	25	25	25	25	25	25
11:00-11:15	615	247	29	4	17	15	87	312	927	26	26	26	26	26	26	26	26
11:15-11:30	609	248	35	2	11	15	118	311	920	27	27	27	27	27	27	27	27
11:30-11:45	840	249	24	4	22	14	158	313	1153	28	28	28	28	28	28	28	28
11:45-12:00	695	203	29	3	14	10	140	259	954	29	29	29	29	29	29	29	29
12:00-12:15	715	231	21	8	12	16	100	288	1003	30	30	30	30	30	30	30	30
12:15-12:30	745	238	30	1	22	24	115	315	1060	31	31	31	31	31	31	31	31
12:30-12:45	647	236	25	3	20	16	91	300	947	32	32	32	32	32	32	32	32
12:45-13:00	635	277	23	3	18	10	76	331	966	33	33	33	33	33	33	33	33
13:00-13:15	620	263	28	2	8	17	70	318	938	34	34	34	34	34	34	34	34
13:15-13:30	355	271	20	5	11	19	76	220	873	35	35	35	35	35	35	35	35
13:30-13:45	561	300	29	2	27	12	60	330	893	36	36	36	36	36	36	36	36
13:45-14:00	587	246	13	2	9	13	93	283	870	37	37	37	37	37	37	37	37
14:00-14:15	560	240	18	1	5	7	113	184	1074	38	38	38	38	38	38	38	38
Factor 16 hours to 24 hours																	
Total 16 Hrs	41304	16222	1617	261	887	722	8412	19709	61013								
Total 24 Hrs	46651	17561	1756	288	954	807	9361	21596	68685								
16-24 Factor	1.13	1.08	1.09	1.09	1.07	1.16	1.09	1.09	1.09								

Source: JICA Expert Team

Figure 2.2.4 Traffic Survey Data Processing Training

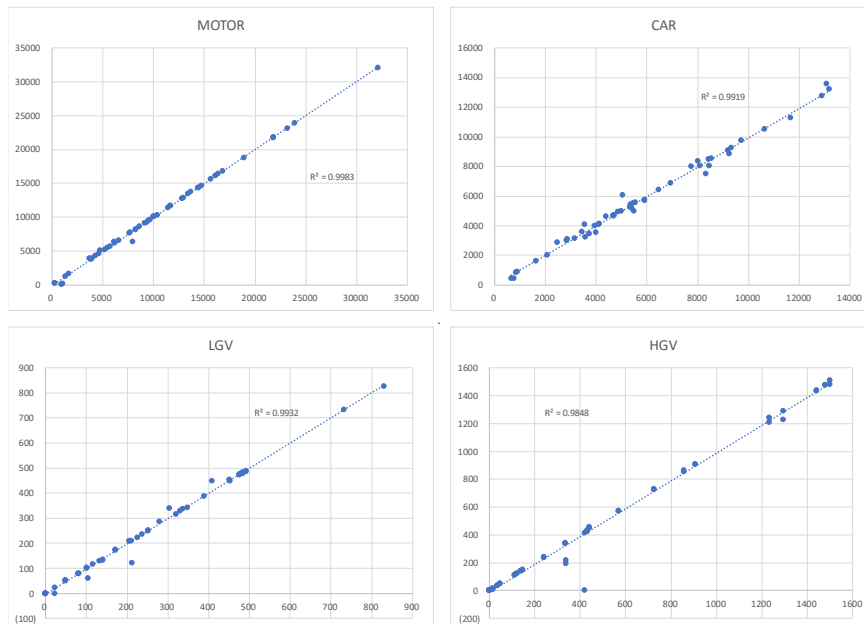
The preparation work for the traffic demand forecast includes data conversion from JICA STRADA software to CUBE software format, road network model update, population growth adjustment, and bus route network update. The traffic demand forecast workflow is shown in Figure 2.2.5. It consists of two parts: the model development process and the model application and scenario testing.



Source: JICA Expert Team

**Figure 2.2.5 Sample of Traffic Demand Forecast Workflow**

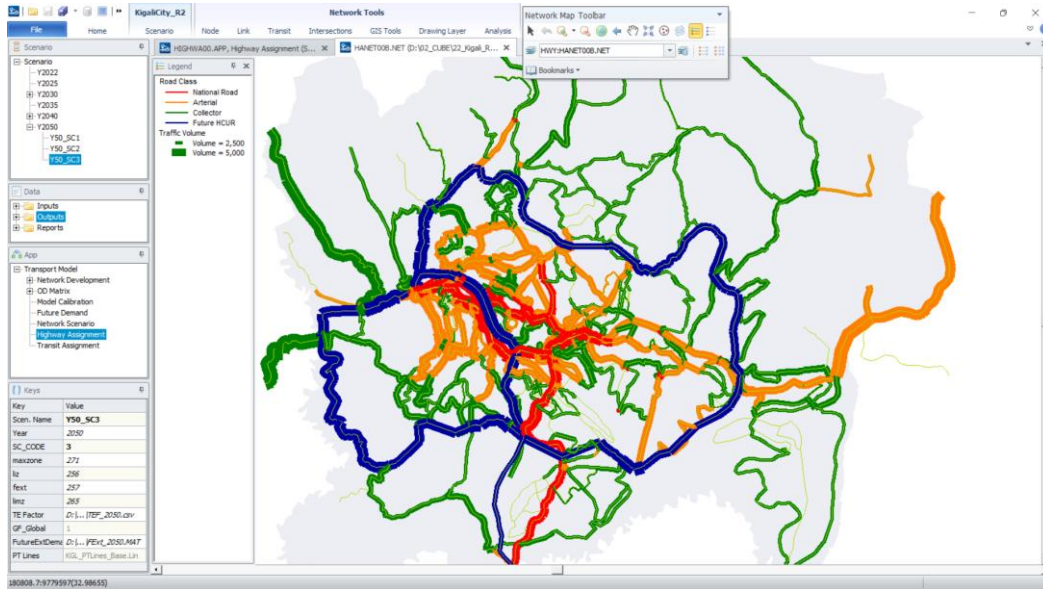
Traffic model calibration is part of the model development process which compares the model result with the traffic survey data.



Source: JICA Expert Team

**Figure 2.2.6 Traffic Model Calibration Result**

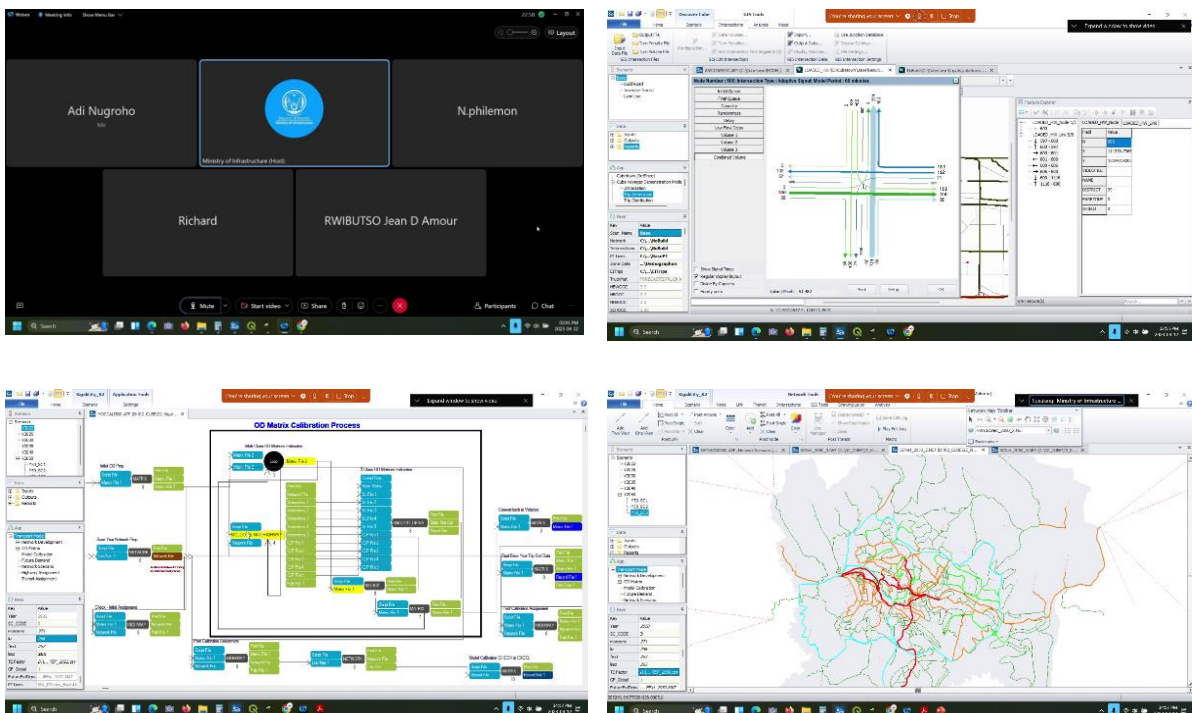
The model application and scenario testing process consist of future year OD matrices preparation, scenario network preparation, and the assignment for highway and public transport. In this part of the workflow, various scenario analysis can be developed, tested, and compared for further analysis.



Source: JICA Expert Team

**Figure 2.2.7 Traffic Demand Forecast Result for Year 2050**

The technical transfer to the counterpart regarding the traffic demand forecast was conducted via online training on 12 April 2023 and 18 May 2023 explaining the basic understanding of the software and traffic model development process.



Source: JICA Expert Team

**Figure 2.2.8 Traffic Demand Forecast Training**

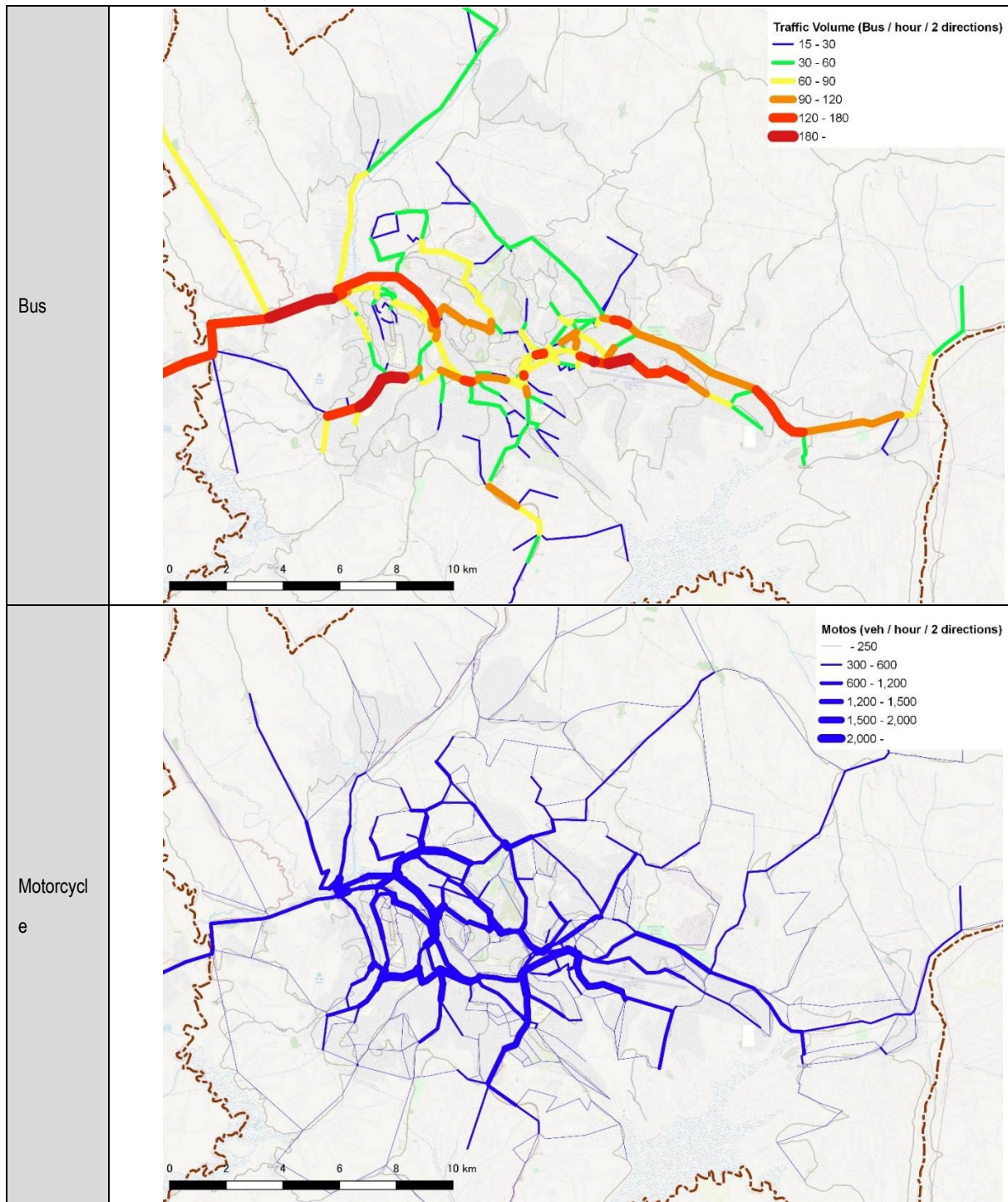
### **2.2.3 Activity 1-3: To review the existing public transport network and to develop a draft concept for an Integrated Public Transport Network for further updating work by the Rwandan Side**

Throughout this activity, a draft concept of the “Integrated Public Transport Network” will be prepared together with the counterpart members. The concept should be consistent with the existing plans, such as the Kigali Urban Transport Masterplan 2050. In this part, the draft development concept plan that was established by the JET is highlighted.

#### **(1) Review on the Public Transport Network in Kigali**

Present issues in the public transport sector, based on the analysis in the “Business Model for Public Transport Services in the City of Kigali (2020),” which was prepared by the Business Model for Public Transport Services in the City of Kigali and updated by the JET, are as follows:

- **Route Coverage:** According to the rough estimation, 77.4% of the citizens live in the 1,000-m catchment area, with the extension to the populated zones in the suburbs. Due to the insufficient service provision, the in-vehicle congestion during peak hours is very high, and overloading at terminals and stops can be seen.
- **Inter and Intra-modal Connectivity at Terminals/Major Stops:** With the route coverage, the handling capacity of bus terminals (called bus parks or taxi parks) and major bus stops must also be considered for the route planning.
- **Sectional Passenger Demand:** The traffic volume per peak hour by road segment was roughly assessed in Activity 1-2. Reflecting the urban and road structure of Kigali City, passenger transport demand is high in the east-west corridors.
- **Passenger’s Satisfaction with the Bus Service:** According to the passenger interview survey in Activity 1-1, Moto-taxi users show a negative attitude towards buses in terms of fare, drivers’ behavior, vehicle comfort, and on-board safety and security. While the safety issue of moto-taxi has been considered problematic, current Moto-users may be concerned about the safety and security of the bus service.
- **Potential Issues of ICT Utilization:** Although the government has made efforts to develop ICT infrastructure and promote digital literacy among its citizens, there are still several challenges that need to be addressed (see Activity 1-6).



Source: JICA Expert Team

**Figure 2.2.9 Peak Hour Traffic Volume by Traffic Assignment**

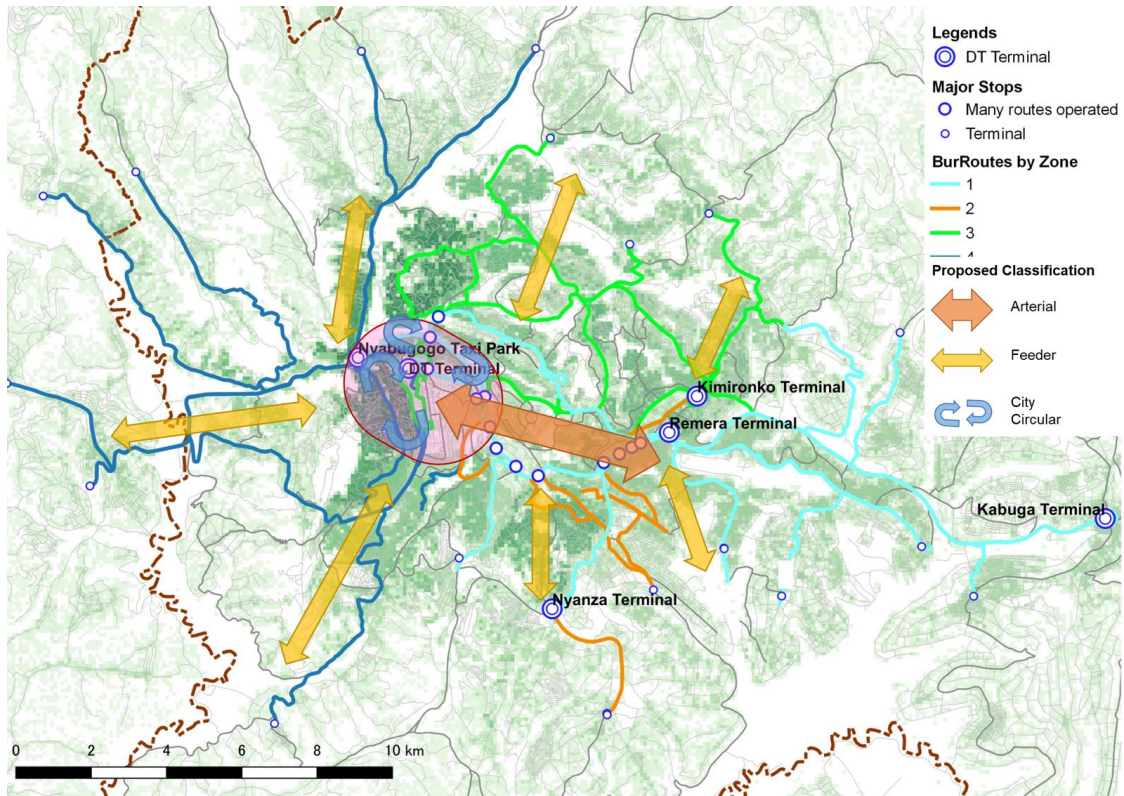
## (2) Draft Concept for an Integrated Public Transport Network

To achieve a safe and reliable public bus system that meets the requirements of the citizens, the abovementioned issues and problems should be addressed. Based on the categories proposed as the key strategies in the Kigali Master Plan, the JET has identified additional actions that can be undertaken by the government, to improve the public transport service. Table 2.2.4 summarizes the on-going actions and further proposals for the bus service in Kigali City by related category.

**Table 2.2.4: Current and Proposed Actions for the Bus Service**

Category	Sub-Category	Current Action by the Government	Proposed Actions
Institutional Framework	Policy Making for Bus Industry Reform	Fare policy to introduce distance-based system is under discussion.	<ul style="list-style-type: none"> <li>• Bus fare and subsidy policy</li> <li>• Strengthening of operation/management of buses including cost/revenue control</li> </ul>
	Institutional Development as Operating Body	Establishing Kigali Transport Authority (KTA) as the public transport management sector	<ul style="list-style-type: none"> <li>• Institutionalization including role-sharing between KTA and bus companies/operators</li> <li>• Technical support for bus companies/operators</li> <li>• Preparation of bus operation rules, regulations and their enforcement</li> </ul>
Arterial and Feeder Public Transport Development	Bus Route Restructuring (Arterial / Feeder)	Inviting new bus operators to mitigate insufficient bus fleets	<ul style="list-style-type: none"> <li>• Route Planning with hierarchical classification (Trunk, Arterial, Feeder, etc.)</li> <li>• Preparation of bus operation rules, regulations and these enforcement</li> <li>• Introducing scheduled operations to provide stable service and manage the working conditions of drivers</li> </ul>
	Bus Fleet Renewal/Maintenance	Procurement of new buses by the government is ongoing	<ul style="list-style-type: none"> <li>• Need for a system for the sustainable renewal of vehicles</li> <li>• Establishment of a maintenance system</li> <li>• Consideration of Energy Management System using EV buses</li> </ul>
	Bus Corridor Traffic Management	DBL project on the selected corridor is on-going.	<ul style="list-style-type: none"> <li>• Micro traffic management at bus stops and specific areas</li> <li>• Consideration for bus priority measures</li> </ul>
Intermodal Facility Development	Bus Stop Improvement	“Smart Bus Shelter” projects on the selected corridor are on-going.	<ul style="list-style-type: none"> <li>• Need for technical design guidelines for bus stops, including bus terminal and access facilities</li> </ul>
	Bus Terminal Improvement	In some bus terminals, upgrade project is ongoing (ex. Nyabugogo Bus Terminal by the World Bank).	<ul style="list-style-type: none"> <li>• Improvement of bus depots and turn-around facilities</li> <li>• Establishing an implementation framework to promote transit-oriented development (TOD) around terminals</li> </ul>
Introducing ITS	Information Provision	As part of the “Smart Bus Shelter”, information provision is ongoing.	<ul style="list-style-type: none"> <li>• Expansion of ITS for public transport operators and passengers</li> </ul>
	Operation Management	RURA is planning to introduce ITMS.	<ul style="list-style-type: none"> <li>• Expansion of ITS for government</li> </ul>
Promoting NMT and Walking		Bicycle use is promoted.	<ul style="list-style-type: none"> <li>• Strategic promotion of NMT</li> <li>• Developing missing link to expand the public transport catchment area in urban blocks</li> </ul>

Source: JICA Expert Team



Source: JICA Expert Team

**Figure 2.2.10 Concept of Public Transport Network in Kigali**

In the Kigali City Master Plan, transit-oriented development (hereafter “TOD”) in Nyabugogo and Kimironko is planned as a catalytic project. To promote the TOD projects efficiently, establishing an implementation framework is necessary in the short term, including the urban redevelopment scheme with the “Property Right Exchange System”.



Source: Kigali City Master Plan 2050

**Figure 2.2.11 Conceptual Plan of TOD Projects in Kigali City Master Plan**

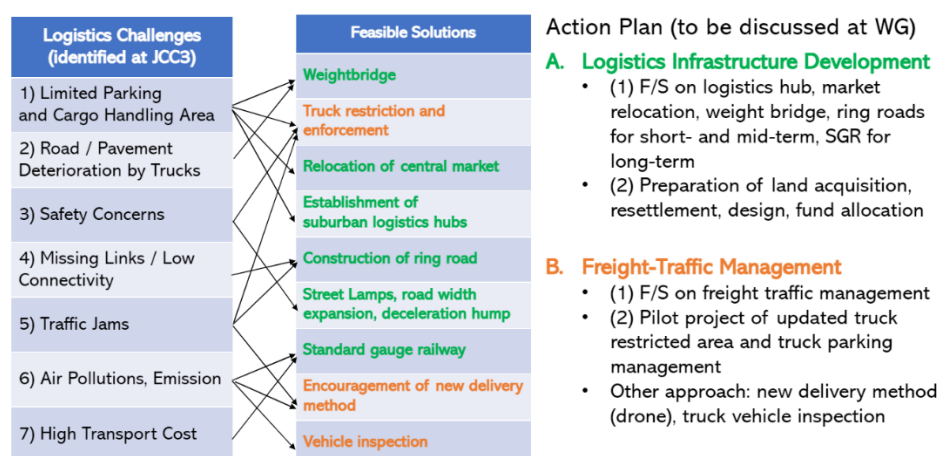
The Kigali City Master Plan also proposed projects related to the logistics sector. The table below summarizes the progress as of May 2024.

**Table 2.2.5: Progress of the Freight Related Projects**

Project	Progress
Standard Gauge Railways (SGR)	Standard Gauge Railways along the Central and Northern Corridors have not progressed since MOF and MININFRA are still mobilizing the funds, but the Rwandan government has coordinated with the Kenyan side to establish a dry port at Naivasha, Kenya in 2024 to improve the connectivity to Mombasa. Currently, trucks cross the border from Gatuna on Rwanda's northern border to Kenya through Uganda, with a plan to using inland water transport via Lake Victoria, which according to RTDA is highly feasible but still under consideration as the cost of water transport is considered high.
Kigali Ring Road	The Kigali Ring Road has been proposed, but MOF and MININFRA are still looking for funding. The logistics hub, operated by DP World, started the operation in 2019, and mainly transport containers by truck. The future connectivity and positioning of SGR to the Kigali Ring Road require further discussion.
Weighbridge	Portable weighbridges are used to avoid truck's damage to the pavement due to overloads. Locations of fixed weighbridge installation have been selected and prepared in Nyagatare in the north and Kirehe in the south, but have not yet been installed.
Relocation of Kigali Market	Progress has not been observed because of land acquisition and resettlement issues.

Source: Kigali City Master Plan 2050

They are expected to have some impact on urban transport, including public transport, and coordination and synergies should be considered. Reviewing the proposed projects and the challenges, the JET proposed action plans to reclassify the proposed projects to resolve the challenges more efficiently.



Source: Worked by JET

**Figure 2.2.12 Challenges, Solution and Proposed Action Plan for Freight Transport**

#### **2.2.4 Activity 1-4: To produce an Action Plan for the realization of the transportation master plan including carrying out a study on the urban freight movement and other urban development across the city (such as SEZ and residential development)**

The proposed actions to improve public transport in Activity 1-3 are partially related. In light of the long-term master plan scenario, the actions are further packaged as short-term strategic programs that the government must lead to maximize its synergies.

In general, for the smooth implementation of other actions, institutional development must be prioritized. Restructuring bus routes in all zones, which are operated by multiple operators, is especially challenging without central management.

To establish the new mobility department, recruiting, staffing, and capacity development will be key challenges. Currently, government authorities in Kigali are facing a staff shortage, and capacity development remains insufficient. Such minor issues and decision-making are handled and resolved by a limited number of executives. The current organizations are not capable of managing all the proposed actions. Therefore, the institutional framework must be discussed, prepared at an early stage, and partially supported under the UMIK Project.

Figure 2.2.13 presents a detailed roadmap for activities in the six fields. This chart was developed to visualize the relationship between the proposed actions and the impacts of delays, based on the opinions and feedback from the members of Working Group 1.

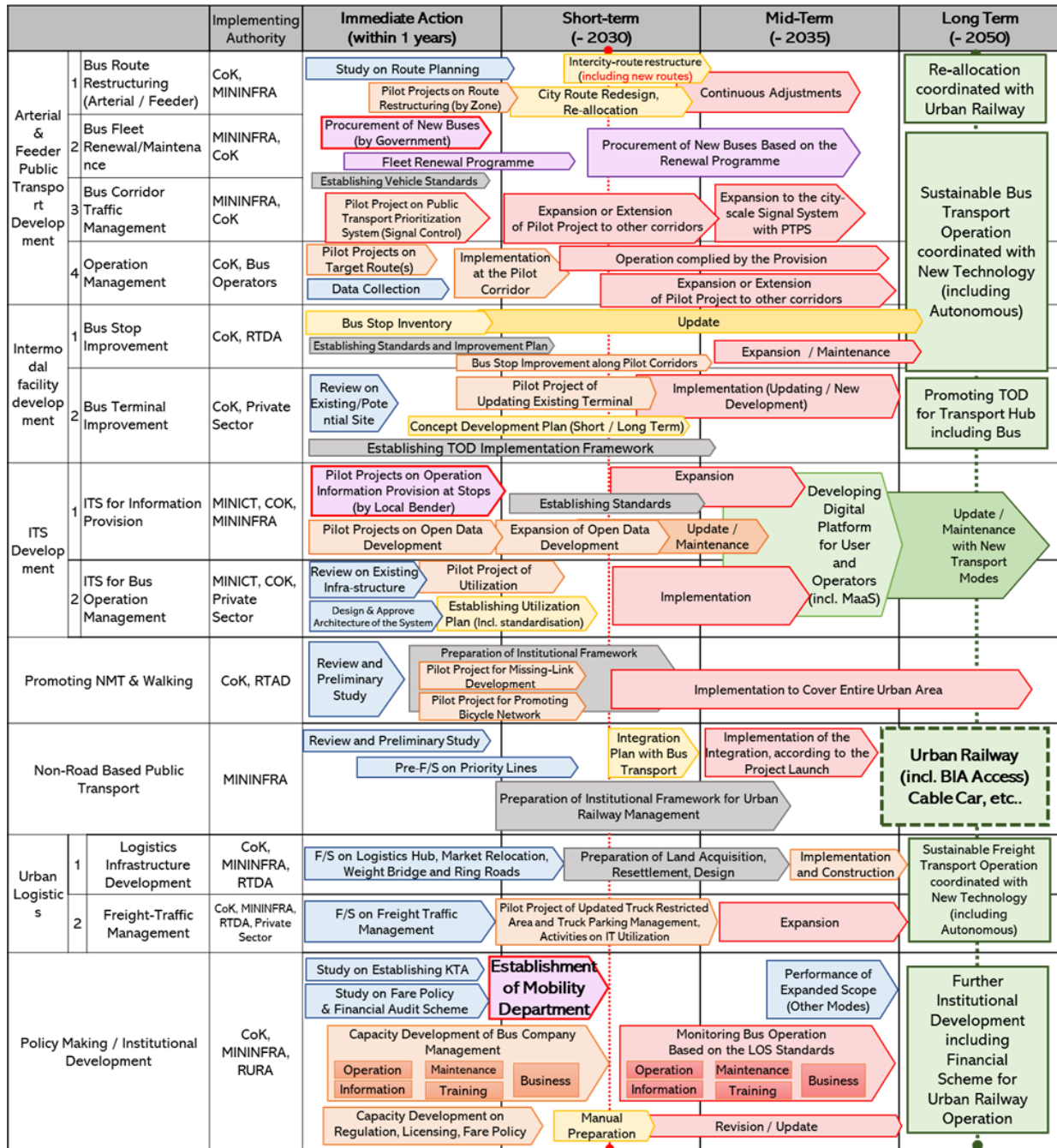
The importance of actions related to policymaking and institutional development is particularly significant, as they are closely related to the overall progress. Until the establishment of the new mobility department, pilot projects shall be implemented to validate the impacts and benefits of these actions, while also strengthening the capacity of relevant entities, including private operators, for operation.

As part of the immediate actions, the JET is implementing the pilot projects as follows:

- Scheduled Bus Operation and Practices
- Open Data Development and General Transit Feed Specification (GTFS) (Completed for bus routes operated by Royal Express in Zone II, and to be expanded to other operators)
- Terminal Improvement

In the long-term, up to 2050, mass transit, including urban railways, could serve as the backbone of Kigali's transit system. The population of the city is projected to reach three million by 2050, according to the Master Plan. To accommodate future passenger travel demand, the preparatory work, which includes mode selection, transit network planning, institutional framework development, and financial scheme, must be conducted at an early stage.

In the logistics sector, several additional actions have been proposed alongside the proposed projects in the Transport Master Plan. As a short-term measure, utilization of information technology (IT) to improve loading efficiency, cargo handling productivity, and optimize freight vehicles has been proposed as an initiative and is expected to be promoted in Rwanda, which aims to position itself as an IT-driven country. As a long-term measure, shifting freight transport from road to rail is necessary to reduce traffic congestion and greenhouse gas emissions.



Source: JICA Expert Team

Figure 2.2.13: Roadmap for Implementing Proposed Actions

## 2.2.5 Activity 1-5: To conduct capacity assessment (gap analysis) of related organizations based on the Action Plan and assess the viability of the proposed priority actions

### (1) Arterial and Feeder Public Transport Development

Key actions for improving arterial and feeder public transport include immediate capacity development for route network planning, pilot projects for route restructuring, and enhanced coordination with operators. Short-term plans involve redesigning and reallocating city and intercity routes while addressing bus park operations. Medium-term efforts focus on continuous adjustments to accommodate

uncertainties. Identified gaps include inadequate data collection and feedback mechanisms, insufficient coordination among stakeholders, and challenges in fare policy planning to adapt to new network structures.

Fleet renewal programs face immediate challenges such as aligning vehicle standards with environmental targets, improving maintenance techniques, and ensuring financial sustainability. Short-term priorities include procuring new buses. Operational management requires improved data collection and analysis, along with immediate coordination for pilot projects on target routes.

## **(2) Intermodal Facility Development**

Immediate actions for bus stop improvements include updating inventories, establishing local service standards, and integrating enhancements with ongoing infrastructure projects. For bus terminals, efforts focus on site reviews, developing transit-oriented development (TOD) frameworks, and upgrading existing terminals. Identified gaps include limited capacity for database management, technical standards development, and stakeholders coordination.

## **(3) ITS Development**

Intelligent Transport Systems (ITS) for information provision require immediate pilot projects for operational information at stops and open-data development. Medium-term priorities include developing digital platforms for Mobility-as-a-Service (MaaS) and ensuring data privacy for users and operators. ITS for bus operation management involves immediate reviews of existing infrastructure and pilot utilization projects. Challenges include capacity development for data utilization, enforcement of technical standards, and fostering collaboration between public authorities and private providers.

## **(4) Promoting Non-motorized Transport and Walking**

Immediate actions for non-motorized transport (NMT) include conducting preliminary studies, establishing an institutional framework, and implementing pilot projects to close missing links in the NMT network. Medium-term plans involve scaling up NMT infrastructure across urban areas. Key challenges include addressing legal constraints, securing budget allocations, and tackling traffic safety issues in mixed-use environments. Clear policies and design guidelines are necessary for effective implementation.

## **(5) Non-road-based Public Transport**

The development of urban rail systems requires immediate capacity building for planning and conducting preliminary feasibility studies. Short-term actions include establishing institutional frameworks and integrating rail with bus transport systems. Medium-term goals focus on ensuring financial sustainability, enhancing stakeholder coordination, and managing land acquisition and resettlement processes.

## **(6) Urban Logistics**

Urban logistics initiatives prioritize on immediate feasibility studies for logistics hubs, market relocations, and freight management systems. Short-term goals involve project development, funding mobilization, and addressing environmental and resettlement issues. Medium-term priorities focus on implementing logistics infrastructure and management schemes through public-private partnerships (PPPs). Key challenges include capacity building in logistics planning, enhancing coordination among stakeholders, and ensuring private sector involvement in operational improvements.

## **(7) Policy Making / Institutional Development**

Immediate actions in policy development include establishing the City of Kigali Mobility Department, fare policy studies, and capacity development programs for bus company management and regulation.

Short-term goals focus on developing frameworks to monitor bus operations based on Level of Service (LOS) standards. Key challenges include recruitment difficulties, limited capacity-building programs, and addressing public and operator concerns regarding policy changes.

**Table 2.2.6: Summary of Gap Analysis (Public Transport)**

Actions		Action Term	Challenges (Gaps):
id	Description		
1	Study on Route Planning and Bus Route Restructuring (Arterial / Feeder)	Immediate	<ul style="list-style-type: none"> <li>-Capacity development in route network planning</li> <li>-Coordination with public transport operators sharing the arterial / feeder corridors</li> <li>-Fare policy planning towards the proposed network, which require passengers to make more transfers (Action 7-2)</li> </ul>
2	Pilot Project on Route Restructuring (by Zone) and Bus Route Restructuring (Arterial / Feeder)	Immediate	<ul style="list-style-type: none"> <li>-Coordination with public transport operators sharing arterial / feeder corridors</li> <li>-Data collection and feedback on actual implementation</li> </ul>
3	City Route Redesign, Reallocation, and Bus Route Restructuring (Arterial / Feeder)	Short	<ul style="list-style-type: none"> <li>-Coordination with public transport operators sharing arterial / feeder corridors</li> <li>-Data collection and continuous feedback</li> </ul>
4	Intercity Route Redesign, Reallocation, and Bus Route Restructuring (Arterial / Feeder)	Short	<ul style="list-style-type: none"> <li>-Management of departures and arrivals at bus parks (Action 2- 2)</li> <li>-Reallocation of bus park</li> </ul>
5	Continuous Adjustment	Medium	<ul style="list-style-type: none"> <li>-Coordination with public transport operators and other relevant agencies, considering various uncertainties</li> </ul>
6	Establishing Vehicle Standards	Immediate	<ul style="list-style-type: none"> <li>-Compliance with national environmental targets</li> <li>-Conformity with the Electric Infrastructure Investment Plan</li> </ul>
7	Fleet Renewal Program	Immediate	<ul style="list-style-type: none"> <li>-Review of the financial sustainability of the procurement plan</li> <li>-Consideration of spare parts availability</li> <li>-Provision of a maintenance scheme to maximize fleet lifespan</li> <li>-Enhancement of vehicle maintenance techniques</li> </ul>
8	Procurement of New Buses Based on the Renewal Program	Short	<ul style="list-style-type: none"> <li>-Review of the financial sustainability of the procurement plan</li> <li>-Consideration of spare parts availability</li> </ul>

			<ul style="list-style-type: none"> <li>-Implementation of a maintenance scheme to maximize fleet lifespan</li> <li>-Enhancement of vehicle maintenance techniques</li> </ul>
9	Pilot Project on Public Transport Prioritization System (Signal Control) - Implementation and Expansion	Immediate	<ul style="list-style-type: none"> <li>-Management of the signal system</li> <li>-Data collection and continuous feedback</li> </ul>
10	Data Collection for Operation Planning and Management	Immediate	<ul style="list-style-type: none"> <li>-Collecting necessary information for operation management</li> <li>-Capacity development in information analysis</li> </ul>
11	Pilot Projects on Target Route(s)	Immediate	<ul style="list-style-type: none"> <li>-Coordination with public transport operators sharing the arterial / feeder corridors</li> <li>-Data collection and feedback for actual implementation</li> </ul>
12	Implementation at the Pilot Corridor and Expansion (Including the Restructuring of the Operation Plan)	Immediate	<ul style="list-style-type: none"> <li>-Coordination with public transport operators sharing the arterial / feeder corridors</li> <li>-Data collection and feedback for the actual implementation</li> </ul>
13	Bus Stop Inventory Update	Immediate	<ul style="list-style-type: none"> <li>-Preparation of feasible data specification</li> <li>-Management of the database</li> </ul>
14	Establishing Standards and Improvement Plan	Immediate	<ul style="list-style-type: none"> <li>-Reference for developing local Level of Service (LOS) standards</li> <li>-Enforcement of compliance with established LOS standards</li> </ul>
15	Bus Stop Improvement Along Pilot Corridors and Expansion	Immediate	<ul style="list-style-type: none"> <li>-Coordination with ongoing infrastructure projects</li> <li>-Technology integration</li> <li>-Data collection and continuous feedback</li> </ul>
16	Review on Existing/Potential Site	Immediate	<ul style="list-style-type: none"> <li>-Coordination with owners of potential sites</li> <li>-Capacity development in transport hub planning</li> </ul>
17	Establishing TOD Implementation Framework	Immediate	<ul style="list-style-type: none"> <li>-Capacity development in TOD framework formulation</li> </ul>
18	Pilot Project for Updating Existing Terminal	Immediate	<ul style="list-style-type: none"> <li>-Coordination with owners of the sites</li> <li>-Coordination and guidance for public transport operators</li> <li>-Consideration of traffic safety issues</li> </ul>
19	Concept Development Plan (Short- / Long-term)	Immediate	<ul style="list-style-type: none"> <li>-Coordination with owners of the sites</li> </ul>

			-Development of technical standards for bus terminal sites
20	Implementation (Updating / New Development)		-Coordination with owners of the sites -Budget allocation between public and private bodies
21	Pilot Projects on Operation Information Provision at Stops (by Local IT Vendor)	Immediate	-Discussion on the necessary information for public transport users
22	Pilot Projects on Open Data Development	Immediate	-Preparation of feasible data specification -Database management strategies
23	Establishing Standards	Short	-Reference for developing technical standards -Enforcement of information provision in the specified format
24	Developing a Digital Platform for Users (including MaaS)	Medium	-Maintenance of the digital platform -Management of private information for users and public transport operators
25	Review of Existing Infrastructure	Immediate	-Discussion on the necessary information for public transport operation management
26	Design and Approval of System Architecture	Immediate	-Assessment of the technical and financial feasibility for local IT vendors to provide information -Coordination between public authorities and private IT vendors to collect the necessary information
27	Pilot Project on Utilization	Immediate	-Capacity development on utilizing the collected information to improve operation management
28	Establishing a Utilization Plan (including standardization)	Immediate	-Capacity development on utilizing the collected information to improve operation management
29	Implementation of ITS Utilization	Short	-Capacity development on utilizing the collected information to improve operation management
30	Developing a Digital Platform for Operators	Medium	-Maintain the digital platform -Manage private information of users and public transport operators
31	Review and Preliminary Study	Immediate	-Reference for establishing walkability indicators
32	Preparation of Institutional Framework	Immediate	-Responsibility sharing to ensure walkability and a suitable environment for NMT

33	Pilot Project for Missing-link Development - Expansion	Immediate	<ul style="list-style-type: none"> <li>-Review of existing legal constraints for implementing missing link development</li> <li>-Budget allocation between public and private bodies</li> </ul>
34	Pilot Project for Promoting NMT Network	Immediate	<ul style="list-style-type: none"> <li>-Ensuring traffic safety amid the coexistence of motorized transport and NMT</li> <li>-Discussion on the position of bicycle under the traffic law</li> </ul>
35	Review and Preliminary Study	Immediate	<ul style="list-style-type: none"> <li>-Capacity development in urban railway planning</li> </ul>
36	Pre-feasibility Study on Priority Lines	Immediate	<ul style="list-style-type: none"> <li>-Capacity development in urban railway planning</li> <li>-Capacity development in environmental and social considerations regarding the urban railway project</li> </ul>
37	Preparation of Institutional Framework for Urban Railway Management	Short	<ul style="list-style-type: none"> <li>-Challenges in establishing the legal framework and management bodies for the urban railway</li> <li>-Role-sharing between existing authorities</li> </ul>
38	Integration Plan with Bus Transport	Short	<ul style="list-style-type: none"> <li>-Capacity development in route planning (to be conducted in Action 1-1)</li> </ul>
39	Implementation of Integration According to Project Launch	Medium	<ul style="list-style-type: none"> <li>-Coordination with relevant stakeholders, including residents affected by land acquisition or resettlement</li> <li>-Capacity development in sustainable financial planning, including the procurement plan</li> </ul>
40	Feasibility Study on Logistics Hub, Market Relocation, Weighbridge, and Ring Roads	Immediate	<ul style="list-style-type: none"> <li>-Capacity development in urban logistic planning and management</li> <li>-Role-sharing between public authorities and the private sector</li> <li>-Exploring and formulating an appropriate PPP scheme or public corporation for sustainable operation</li> </ul>
41	Preparation of Logistics Project Development (includes determining executing agencies, funding mobilization, environmental assessment, land acquisition, involuntary resettlement, risk analysis, civil work design, etc.)	Short	<ul style="list-style-type: none"> <li>-Mobilization of funding from the national budget, international donors, or the private sector</li> <li>-Coordination with relevant stakeholders, including residents affected by land acquisition or involuntary resettlement</li> </ul>

42	Implementation and Construction	Medium	-Discussion of the management scheme, including the PPP or public corporation models
43	Feasibility Study on Freight Traffic Management	Immediate	-Capacity development in urban logistics planning and management
44	Pilot Project of Truck Parking Management and Activities on ICT Utilization for the Logistics Sector	Short	-Strategies to support private sector initiatives for operational improvements
45	Study on Establishing a CoK Mobility Department	Immediate	-Streamlining the recruitment of personnel -Establishing the organizational structure
46	Study on Fare Policy and Financial Audit Scheme	Immediate	-Coordination with bus operators -Immediate action in response to citizens' feedback or complaints
47	Capacity Development of Bus Company Management	Immediate	-Establishing an appropriate program for efficient capacity development
48	Capacity Development on Regulation, Licensing, and Fare Policy	Immediate	-Establishing an appropriate program for efficient capacity development
49	Manual Preparation	Short	-Establishing an appropriate program for efficient capacity development
50	Monitoring Bus Operations Based on LOS Standards	Short	-Establishing a strict framework to monitor and enforce LOS standards

Source: JICA Expert Team

## 2.2.6 Activity 1-6: To introduce comprehensive transport information services

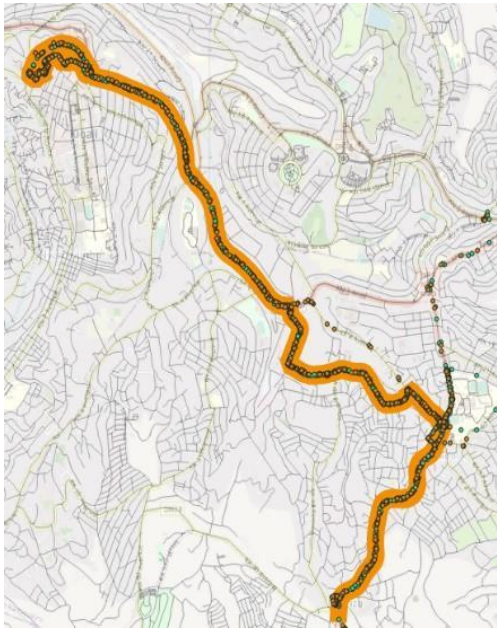
As described in Subsection 2.2.1 of this chapter, “lack of information to bus users” is one of the present issues in the public transport sector. The information collection and utilization measures of public transport, which are effective and feasible in the city of Kigali, are summarized with ongoing activities and progress.

**Table 2.2.7: Effective and Feasible Provision of Information on Public Transport Sector in Kigali City**

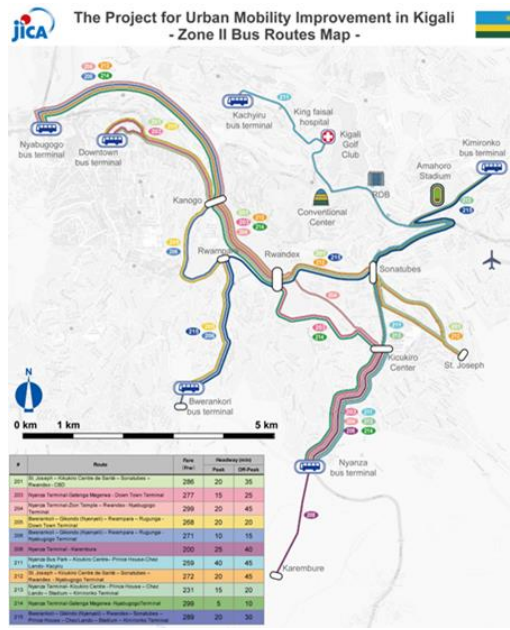
Category	Service	Remarks	Progress
Information collection for policy implications	Utilizing IC card tap records	Currently, passengers tap the IC card reader only once (at boarding). If the 2-tap rule (by distance-based fare) is introduced, origin-destination information will be available.	Request AC Group to provide the snapshot data for one day.
	Mobile big data	A Call Detailed Record is utilized for traffic demand forecasting.	-

	GIS database	For route planning, bus route information should be compiled in a database for analysis.	Based on the city of Kigali database, the project team has been updated.
	Sensor on the doors	To count the number of boarding and alighting passengers	Brief consolation was conducted upon the request by the counterpart
Operation Management	Utilizing real-time location information	Delay management and dispatch management	Some bus operators provided GPS log data. Some analysis had been conducted and shared with the operators.
	GPS data	GPS data is useful for creating operation planning (operation schedule and timetable).	The project team and the bus operators will examine the possibility of utilizing this technology during the pilot project.
Driver Training	Alert for passengers	A record of alerts (over-speeding, sudden brakes and stops) will be collected from GPS and utilized for training.	
	Mapping of “Hiyari-Hatto (near miss)” experiences by bus drivers	The high-risk spots reported by each operator are stored in a database and shared with all stakeholders (government, operators, and passengers).	-
Information Provision	General Transit Feed Specification (GTFS) Development	Specification of the public transport route information, which will be published in Google Maps.	The introduction of GTFS has started for Royal Express as a pilot project. JALI was also considering introducing it, but it was not implemented due to a change of the bus operator in February 2024.
	Bus map	To provide basic information to citizens	The project team provided the draft bus map.
	Providing real-time information	Provision via mobile application or info-board at bus stops	Cooperation with the Smart Bus Shelter Development Project by AC Group is planned.
	Development of MaaS	An integrated platform for various transport services.	-

Source: JICA Expert Team



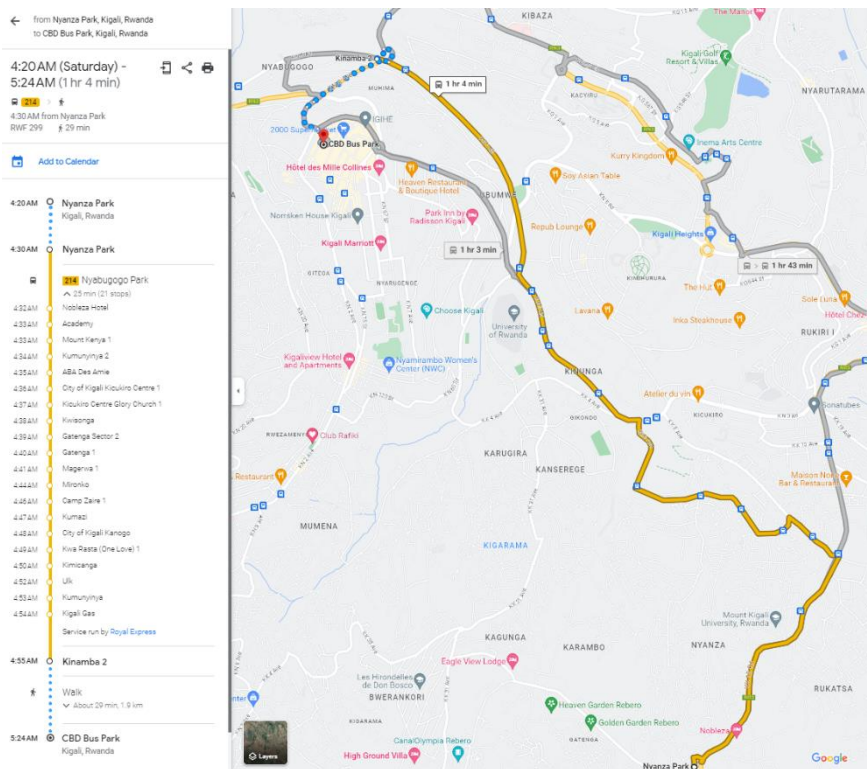
GPS Positioning on the Map  
Obtained from a Bus Operator



Bus Routes Map  
Drafted by the JICA Expert Team

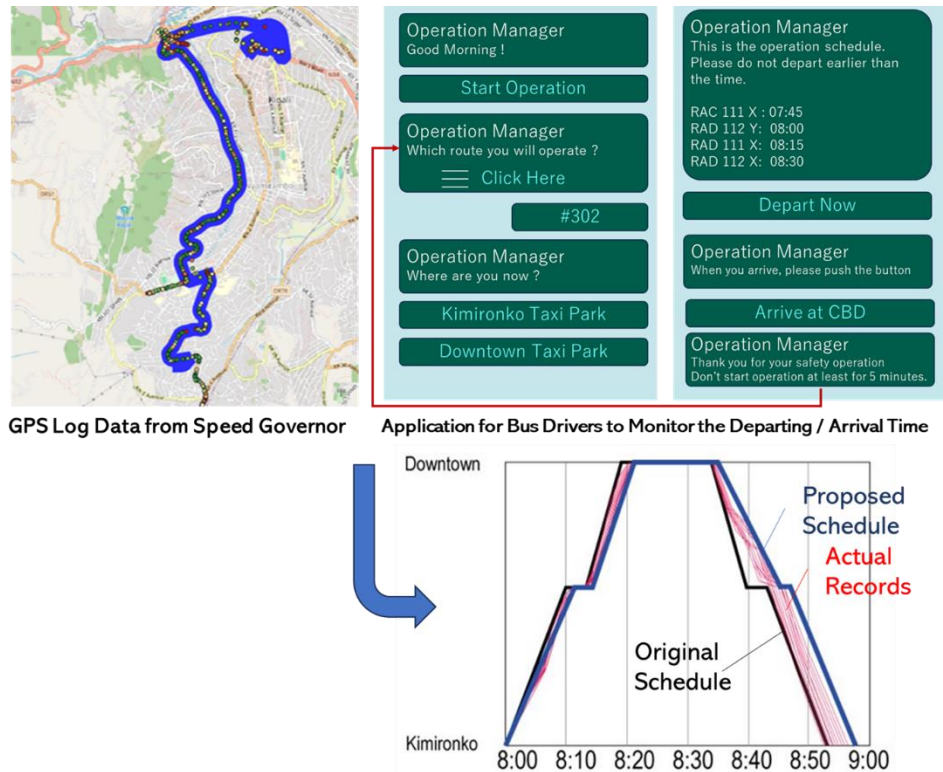
Source: JICA Expert Team

Figure 2.2.14: Draft Bus Route Map



Source: JICA Expert Team

Figure 2.2.15: Trial GTFS Prepared by the JICA Expert Team



GPS Log Data from Speed Governor Application for Bus Drivers to Monitor the Departing / Arrival Time

Source: Worked by JICA Expert Team

**Figure 2.2.16: Proposed Monitoring System of Scheduled Operation Utilizing the GPS Log**

**2.2.7 Activity 1-7: To produce guidelines and manuals for public transport planning and operation**

Through Activities 1-4, which involve the formulation of the Action Plan, guidelines and manuals for the future planning and operation of public traffic will be developed in collaboration with the counterpart (CP). The materials used for lectures and training (see Section 2.2.1) can be utilized for the guidelines and manuals for planning bodies and bus operators. The contents of the training manual are listed in the table.

**Table 2.2.8: Contents of the Training Manual**

No	Items	Contents
1	Introduction	Basic principles Seven items that must be followed Five rules for safe driving Conditions necessary for joining a bus operator
2	Preparedness as a Bus Driver	The social role of bus industry Social impact of bus-related accidents

		Preparedness for safe operations
3	Customer Service and Hospitality	Wearing a proper uniform Factors that influence first impression Announcement (greetings) inside the bus
4	Correspondence to Elderly, Disabled, and Wheelchair Users	Requesting other passengers to offer seats to disabled individuals, pregnant women, and the elderly Managing wheelchair passengers
5	Driving Posture	Appropriate driving posture Proper handling of the steering wheel
6	Visibility and Blind Spots	Understanding the blind spots unique to large vehicles and using mirrors effectively to maximize visibility from the drivers' seat
7	Steering Wheel Handling and Sense of Vehicle	Understanding vehicle characteristics unique to large vehicles (Inner-wheel difference, overhang, length, height)
8	Safe Driving Practices	Key considerations when starting from bus stop, arriving at a bus stop, and turning at an intersection.
9	Defensive and Predictive Driving	Necessity of hazard prediction while driving Understanding the behavior of pedestrians, two wheeled vehicles and weather conditions
10	Daily Bus Inspection	The purpose of maintenance is to reduce breakdowns and ensure safe operation Methods for conducting daily inspection

Source: JICA Expert Team

### 5 Rules for Safe Driving

1. Observe safe speeds.
2. Slow down before a curve.
3. Always make sure you are safe at intersections.
4. Stop for the safety of pedestrians crossing the street.
5. Never drink alcohol 8 hours before work and during operation.





Source: JICA Expert Team

**Figure 2.2.17: Example of the Contents of Driver's Training Manual**

### 2.2.8 Activity 1-8: To conduct training for transport regulators and operators

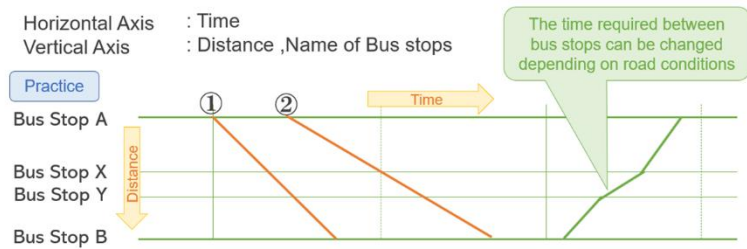
As shown in Table 2.1.1, training activities have been conducted by the JET. Training on public transport-related topics has been targeted for all bus operators in CoK in accordance with CP requests.

#### Operation Plan (Diagram and Timetable)

*Structure of Diagram*



Horizontal Axis : Time  
Vertical Axis : Distance, Name of Bus stops

**Practice**



A) Which has the shorter travel time between bus stops A and B, ① or ②?  
B) Which is the shortest distance between each bus stop?

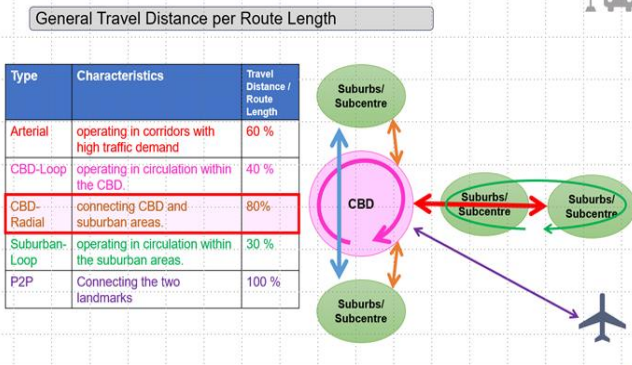
A) ①  
B) Between Bus Stop X and Y

Source: Prepared by the JICA Expert Team

**Figure 2.2.18: Training and Lectures on the Operation Plan for Bus Operators**

3. Calculation of Average Travel Distance per Pax.



Source: Prepared by the JICA Expert Team

**Figure 2.2.19: Training on the Introduction of the Distance-based Fare System for Bus Regulators**

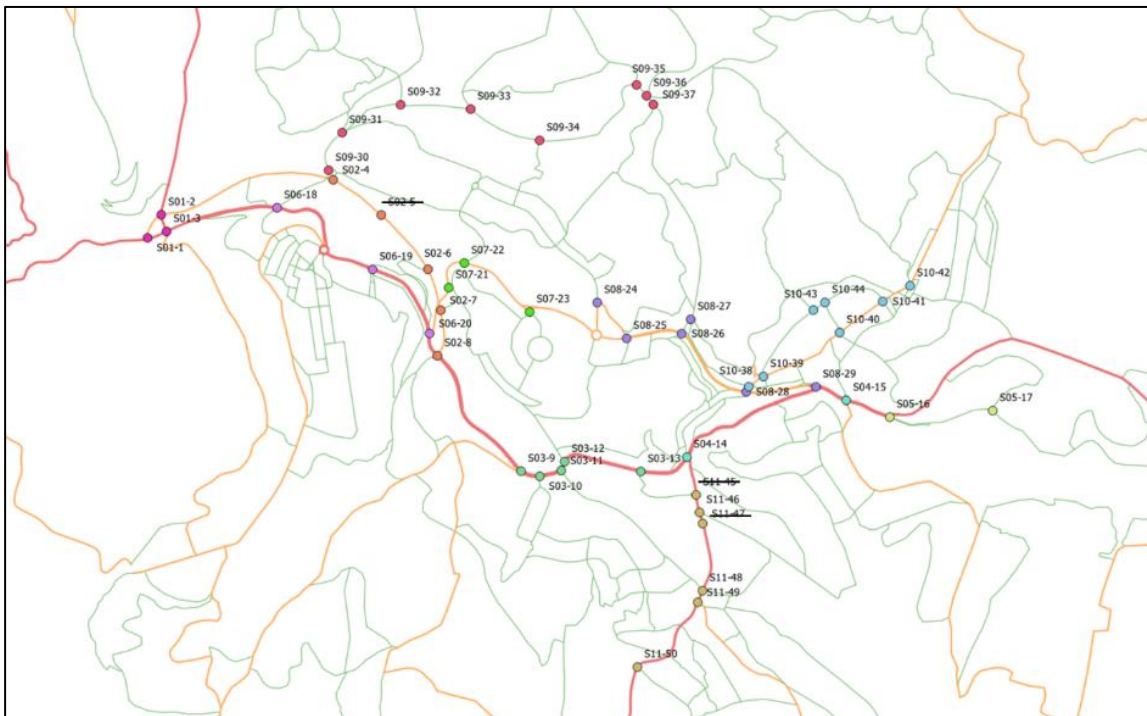
## 2.3 Activity 2 (Improvement of Traffic Flow)

### 2.3.1 Activity 2-1: To conduct a traffic survey for selected intersections and micro-simulation analysis

#### (1) Intersection Traffic Count Survey and Queue Length Survey

Intersection traffic count and queue length surveys at 50 intersections agreed upon in the 1st JCC meeting and additional intersection traffic count surveys requested by the CP (traffic surveys at 17 locations and topographic surveys at 24 locations) were conducted. Based on local road conditions (due to change from intersections to non-intersections by the installation of median strips, etc.), four locations were excluded/integrated from the survey locations. Finally, traffic surveys were conducted at 63 locations in this project.

Series of intersection traffic count surveys were conducted for each 3-hour period at morning peak, evening peak and off-peak. The survey location map is shown below. The specific analysis results (prepared in English) are shown in the appendix.



Source: JICA Expert Team

**Figure 2.3.1: Location of Intersection Traffic Count and Queue Length Surveys**



Source: JICA Expert Team

**Figure 2.3.2: Location of Intersection Traffic Count Surveys and Queue Length Surveys (Additional 17 Locations)**



Training on Traffic Survey for Investigators



Situation of the Intersection Traffic Count Survey



Measuring of Queue Length Using Smartphone Apps

Source: JICA Expert Team

**Figure 2.3.3: Situation of Traffic Surveys**

## (2) Conducting Micro Simulation Analysis

A micro-simulation analysis was conducted following the traffic survey activity. The simulation evaluated the capacity of each intersection for current and future traffic flow. In addition, the capacity of each modified intersection was estimated and checked in light of future traffic volume and traffic signal phasing and by reflecting the newly proposed design of the intersection improvement. The micro-simulation based on the draft final report of the basic design was submitted in May 2023 and completed in June 2023.

### 2.3.2 Activity 2-2: To prepare the basic framework of traffic flow management, such as task demarcation of planning, implementation, and operation

Currently, there is no organization or department that specifically manages traffic flow management in Rwanda or Kigali City; therefore, related organizations such as CoK, Rwanda National Police (RNP), and Rwanda Transport Development Agency (RTDA) are working cooperatively to plan, implement, and operate measures for traffic flow management.

The JICA Expert Team has identified the details of traffic flow management and summarized the current status and proposed plans for the management entity of each item (proposals are based on cases in other countries and the actual situation of traffic flow management in Rwanda) as shown in Table 2.3.1. It is considered that road management is the main task of the CoK and traffic management (especially for emergency traffic control) is the main task of the RNP. The WG finalized the proposal through exchanges of opinions as below:

- Road management mainly by CoK
  - Accumulation/analysis of traffic information for Road Planning by CoK
  - Accident analysis and improvement plan by both CoK and RNP
- Traffic management, especially for emergency traffic control by RNP
  - Emergency traffic control at the site by RNP
  - Remote signal operation to coordinate with the site by RNP
  - Traffic information provision by CoK
  - Adjustment of signal parameters by CoK

**Table 2.3.1: Draft Task Demarcation (No.1: Road Management)**

Category	Item	Management Entity	
		Current Status	Proposed
1.Road Management	1.1 Road Planning		
	Traffic survey	CoK/RTDA	CoK/RTDA
	Accumulation of traffic information		CoK
	Analysis of traffic survey output and accumulated traffic information	CoK/RTDA	CoK/RTDA
	Traffic plan demand scattered reduction of congestion detour plan	CoK/RTDA	CoK/RTDA
	1.2 New Road Construction/Improvement and Expansion of Existing Road		
	Accident analysis and improvement plan		RNP/CoK/RTDA
	Construction plan · Road occupancy	CoK/RTDA	CoK

Category	Item	Management Entity	
		Current Status	Proposed
	Construction supervision · Detour road · Road regulations	RNP/COK/RTDA	RNP/COK
	Installation supervision of road ancillary facilities: installation of pedestrian crossings, sidewalks, bicycle paths, road signs, fences, and street lights	COK/RTDA	COK/RTDA
	Evaluation of post-construction	Not Clear	COK/RTDA
	1.3 Road Maintenance		
	Road patrol, cleaning, and weeding	COK/RTDA	COK/RTDA
	Making and management of road asset register	Not Clear	COK/RTDA
	Road condition survey		COK/RTDA
	Information acquisition on weather/disaster (real-time)		COK/RNP
	Exhaust gas and noise survey (regular)		COK/RTDA
	1.4 Repair		
	Repair of deteriorated/damaged parts of roads and road-related facilities	COK	COK/RTDA
	Wind- and flood-damaged reinforcement, slope surface reinforcement		COK/RTDA
	1.5 Installation of Control Center and Signal System		
	Installation and maintenance of the control center		COK/RNP
	Installation and maintenance of the signaling system	COK	COK

Note: Red: Control center-related activity, Blue: Site activity

Source: JICA Expert Team

**Table 2.3.2: Draft Task Demarcation (No.2: Traffic Management)**

Category	Item	Management Entity	
		Current Status	Proposed
2. Traffic Management	2.1 Management and Operation of the Traffic Management Center		
	Control Center: Depends on demarcation of task as follows:		COK/RNP
	Signal System: Remote manual signal control and temporary parameter adjustment from the control center	RNP	RNP
	2.2 Collection and Accumulation of Traffic Information		
	Collection and accumulation of traffic information such as probe data and intersection traffic		COK
	Monitoring of traffic information such as probe data and intersection traffic		COK/RNP
	2.3 Early Detection of Abnormal Traffic Situations and Prompt Initial Action		
	Receive information through call center or site patrol (Control Center).	RNP	RNP
	Detection or obtainment of abnormal traffic situation by CCTV (Control Center)	RNP	COK/RNP
	Direction to site patrol (Control Center)	RNP	RNP
	Report the site situation and restrict traffic by site patrol (Site).	RNP	RNP
	2.4 Elimination of Traffic Obstacles		

Category	Item	Management Entity	
		Current Status	Proposed
	Receive the report of the site situation and restrict traffic from site patrol (Control Center)	RNP	RNP
	Contact related organizations to eliminate obstacle factors: tow truck, ambulance (on-site/Control Center) (site/Control Center)	RNP	RNP
	2.5 Wide-area Traffic Control Activities		
	One-way traffic, intrusion control, and large vehicle control due to regulation	COK/RTDA	COK/RTDA
	Early start of traffic control and detour guidance at major intersections in congested areas (local)	RNP	RNP
	2.6 Promoting Decentralization of Locally Concentrated Vehicles		
	Process the probe data, calculate the congestion level, and provide congestion information (Automatic)		COK
	Provide construction information (including construction schedules and regulation information)		COK
	Provide accident and regulation information		RNP
	2.7 Site Activity for Hazard Prevention/Congestion Prevention Based on the Site Situation		
	Use a hand signal if necessary (site)	RNP	RNP
	Prohibit or restrict the passage of vehicles if necessary (site)	RNP	RNP
	2.8 Collection and Analysis of Accident Information		
	Building an accident database		RNP
	Factor analysis based on accident data and road/intersection shape (regular: once a year)		RNP/COK
	2.9 Adjustment of Signal Parameters		
	Analyzing traffic information (regular: once a year)		COK
	Adjustment of signal parameters according to analysis of traffic information (regular: once a year)		COK

Note: Red: Control Center-related Activity, Blue: Site Activity

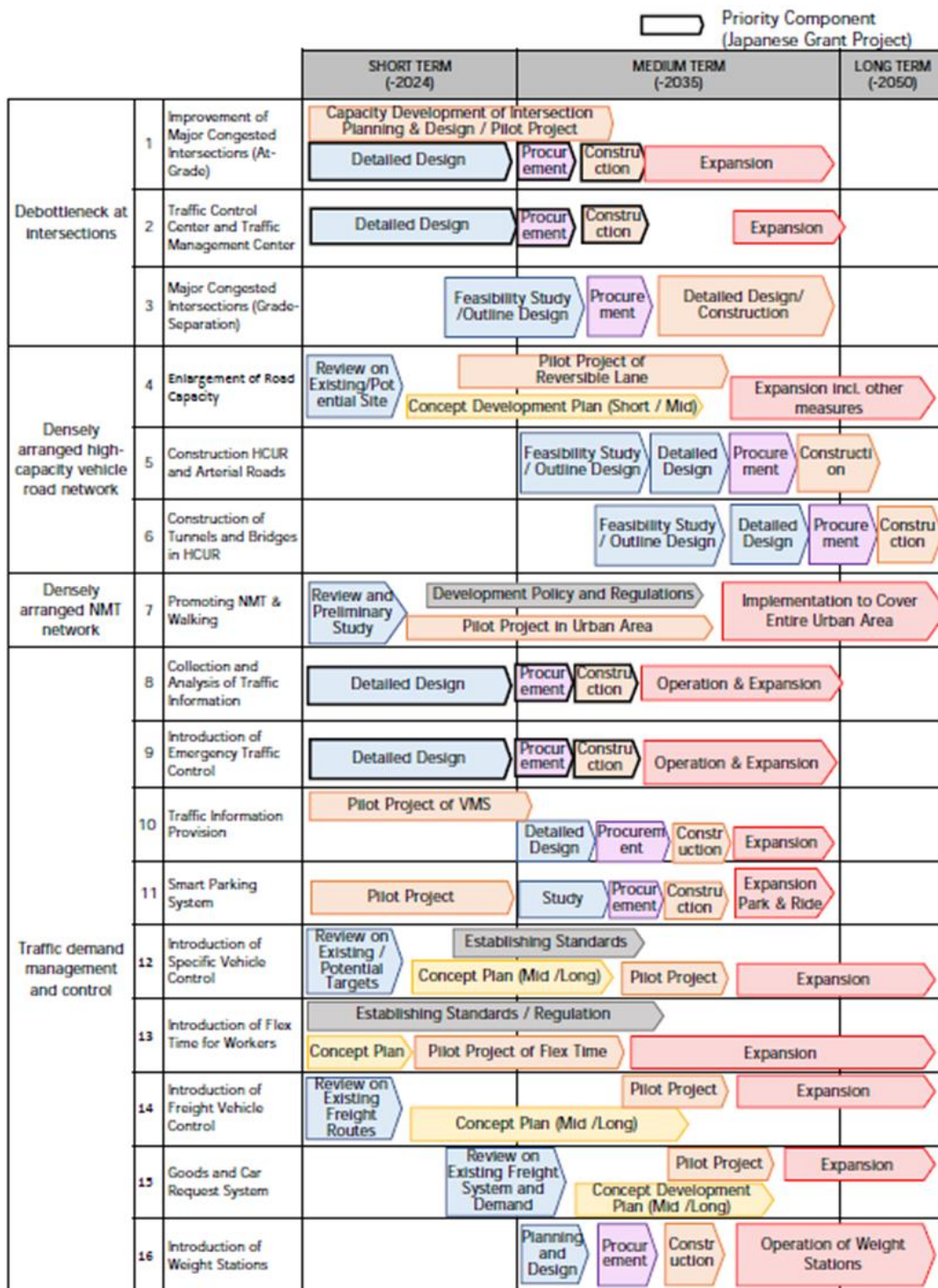
Source: JICA Expert Team

### 2.3.3 Activity 2-3: To produce an Action Plan to improve traffic flow management, including a draft overall plan and basic design of priority components, quantity take-off, and ballpark cost estimate of an integrated citywide traffic control system equipped with public transport priority.

#### (1) Action Plan

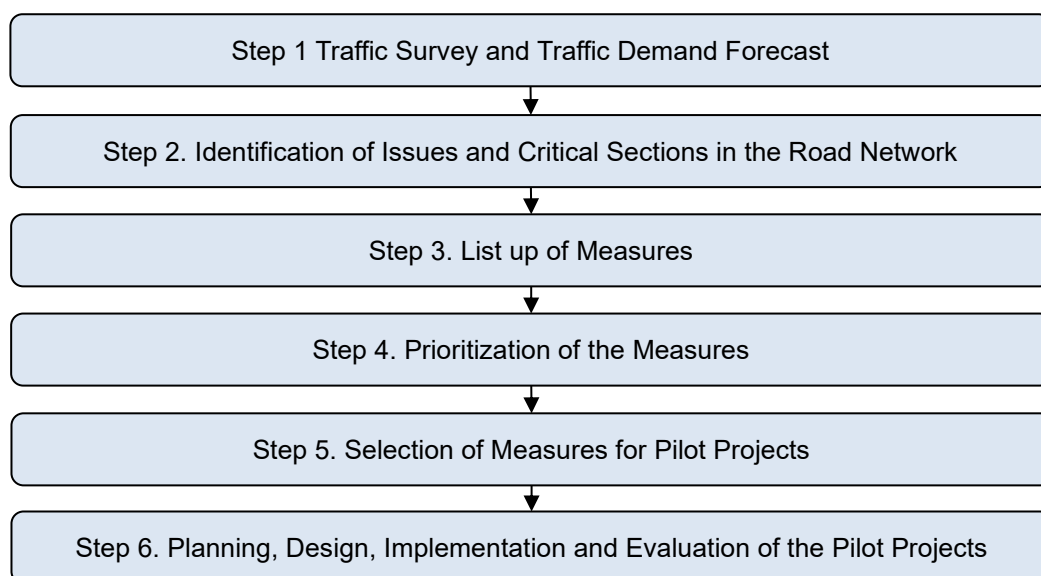
##### 1) Action Plan

Discussion for the draft “Action Plan for traffic flow management” were made in WG2 meetings and the Action Plan was submitted to the 4<sup>th</sup> JCC. The action plan is shown in Figure 2.3.5.



Source: JICA Expert Team

Figure 2.3.4: Action Plan for AT2



Source: JICA Expert Team

**Figure 2.3.5: Action Plan for Traffic Flow Management**

Some measures in the action plan that have been implemented in the Project are shown in Table 2.3.3.

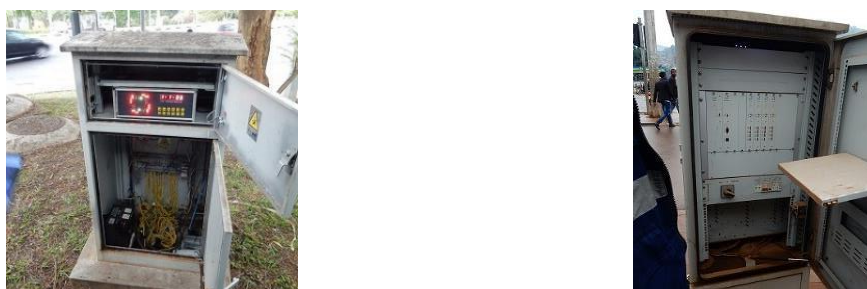
**Table 2.3.3: Provisional Measures**

Measures	Outline
1. Improvement of Major Congested Intersections (At-Grade)	<ul style="list-style-type: none"> <li>Basic design of the traffic signal control system has been prepared as a priority component,</li> <li>Intersection improvement has been implemented as pilot projects</li> </ul>
2. Traffic Control Center and Traffic Management Center	<ul style="list-style-type: none"> <li>Basic design of the traffic signal control system has been prepared as a priority component,</li> </ul>
8. Collection and Analysis of traffic Information	<ul style="list-style-type: none"> <li>Collected information through the traffic event management system in a pilot project is analyzed.</li> </ul>
9. Introduction of Emergency Traffic Control	<ul style="list-style-type: none"> <li>Traffic event management system has been introduced as a pilot project.</li> </ul>
11. Smart Parking System	<ul style="list-style-type: none"> <li>Smart parking system is studied in a smart parking management strategy and guideline.</li> </ul>
13. Introduction of Flex Time for Workers	<ul style="list-style-type: none"> <li>A concept note for staggered working hour is prepared.</li> </ul>

Source: JICA Expert Team

## 2) Technical Transfer (Improvement of Signal Junctions)

There are 17 signalized intersections in Kigali, and all are made in China. The CoK can set the traffic signal parameters for the traffic signals at these intersections. The traffic signal parameters for all existing intersections in Kigali have fixed cycle controls and do not have a function for real-time control based on the actual traffic demand.



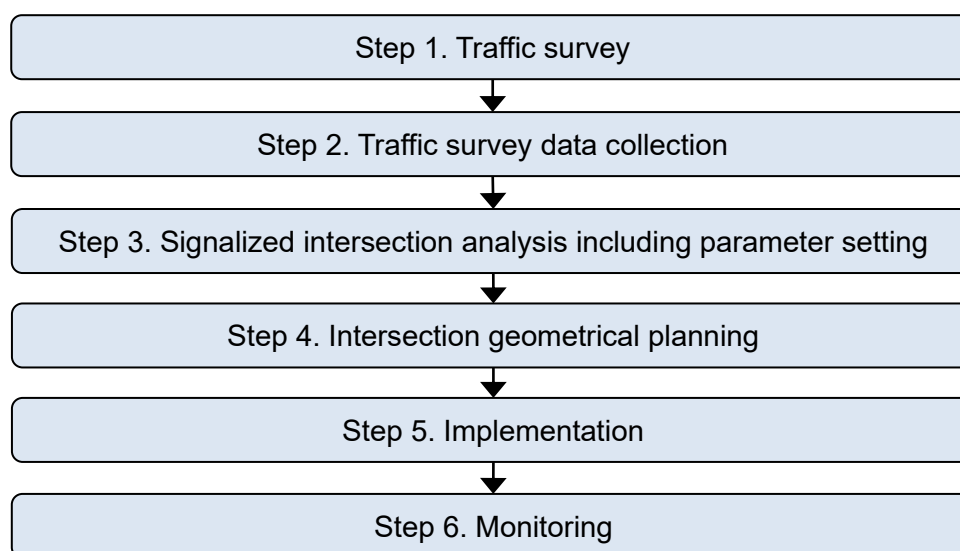
A control box for traffic signals which was introduced before 2018

A control box for traffic signals which was introduced after 2019

Source: JICA Expert Team

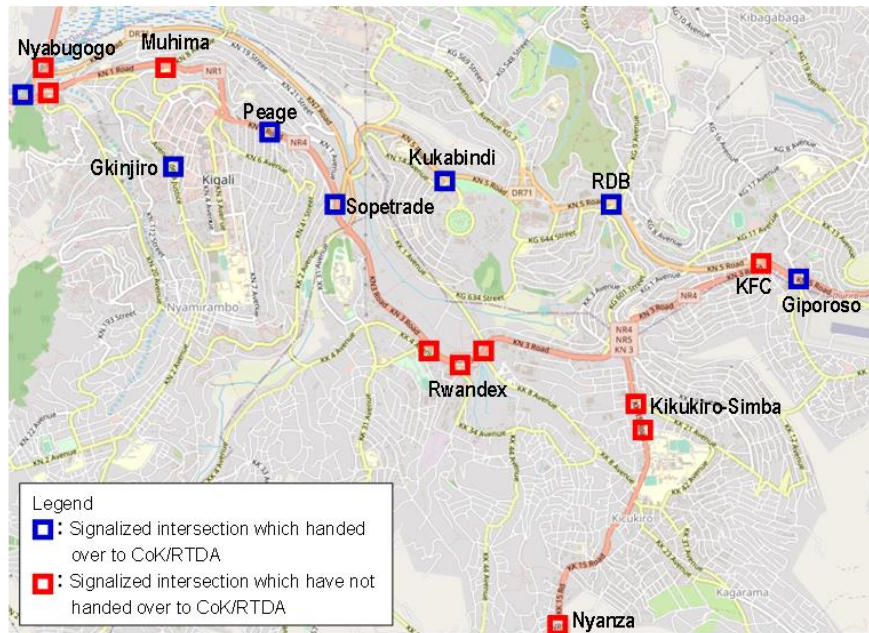
**Figure 2.3.6: Photos of Traffic Signal Control Box**

The CoK and JET have been improving the Gakinjiro intersection, which has traffic signals, as one of the activities of the technical support in the UMIK Project. The workflow of this activity is shown in Figure 2.3.7. The CoK studied the appropriate signal parameter of the Gakinjiro intersection based on traffic survey results supported by the JICA Expert Team in May 2023. The signal parameter was updated, and the operation of traffic signals with the updated signal parameter started from 3 June 2023 as the first pilot project. The CoK studied the improvement of Peage intersection based on traffic survey results and an update of the signal parameter, and its operation was started from 15 June 2023 as the second pilot project. This pilot project was evaluated by comparing the queue length before and after implementation as shown below. The study of the appropriate traffic signal parameter of the Sopetrade Intersection as the third pilot project was conducted.



Source: JICA Expert Team

**Figure 2.3.7: Workflow for the Gakinjiro Intersection Improvement Activity**



Source: JICA Expert Team

**Figure 2.3.8: Location Map of Signal Intersections in Kigali (As of Year 2023)**

The JICA Expert Team got a request from MININFRA and reviewed the improvement plan at the Nyarutarama intersection, RDB intersection, and roads around Kacyiru bus park, which were prepared by a local contractor. The outputs of these reviews are shown in Appendix 3.

### 3) Technical Transfer (Improvement of Pedestrian Crossing)

There is an intersection where the signal push button on the school side is broken, and it does not change even if it is pushed by the pedestrian; it might be a simple mechanical malfunction. This problem encourages the students to ignore the traffic signal, and poses a risk to traffic safety and traffic congestion.

Through Activity 2, CoK requested JET’s advice on improving this pedestrian crossing. The JET prepared the following possible measures and discussed them with the CoK throughout Activity 2-3.

**Table 2.3.4: Improvement Plans of Pedestrian Signal Operation**

Item	Improvement Plans
Road Improvement	The existing humps should be removed to ensure traffic efficiency.
Repair of a Push Button	The broken push button encourages people to ignore the traffic signal. So, it should be repaired. If it takes time, it is better to modify the button to circulate its phases without pushing as the next best measure.
Signal Phase Adjustment	The signal phase should be adjusted to ensure the pedestrian green time (from 12s to 15s) and reduce the waiting time for pedestrians (from 67s to 45s).
Others	<ul style="list-style-type: none"> <li>· Not only at this location, but there is no signal phase of all-reds. The all-reds phase should be considered to prevent collisions when the signal indication change.</li> <li>· The push button with indication to let pedestrians know the waiting status should be procured in the future.</li> <li>· Educational campaign to make people understand the importance of following the traffic signal should be conducted in the future.</li> </ul>

Source: JICA Expert Team

#### **4) Upcoming Traffic Control Center**

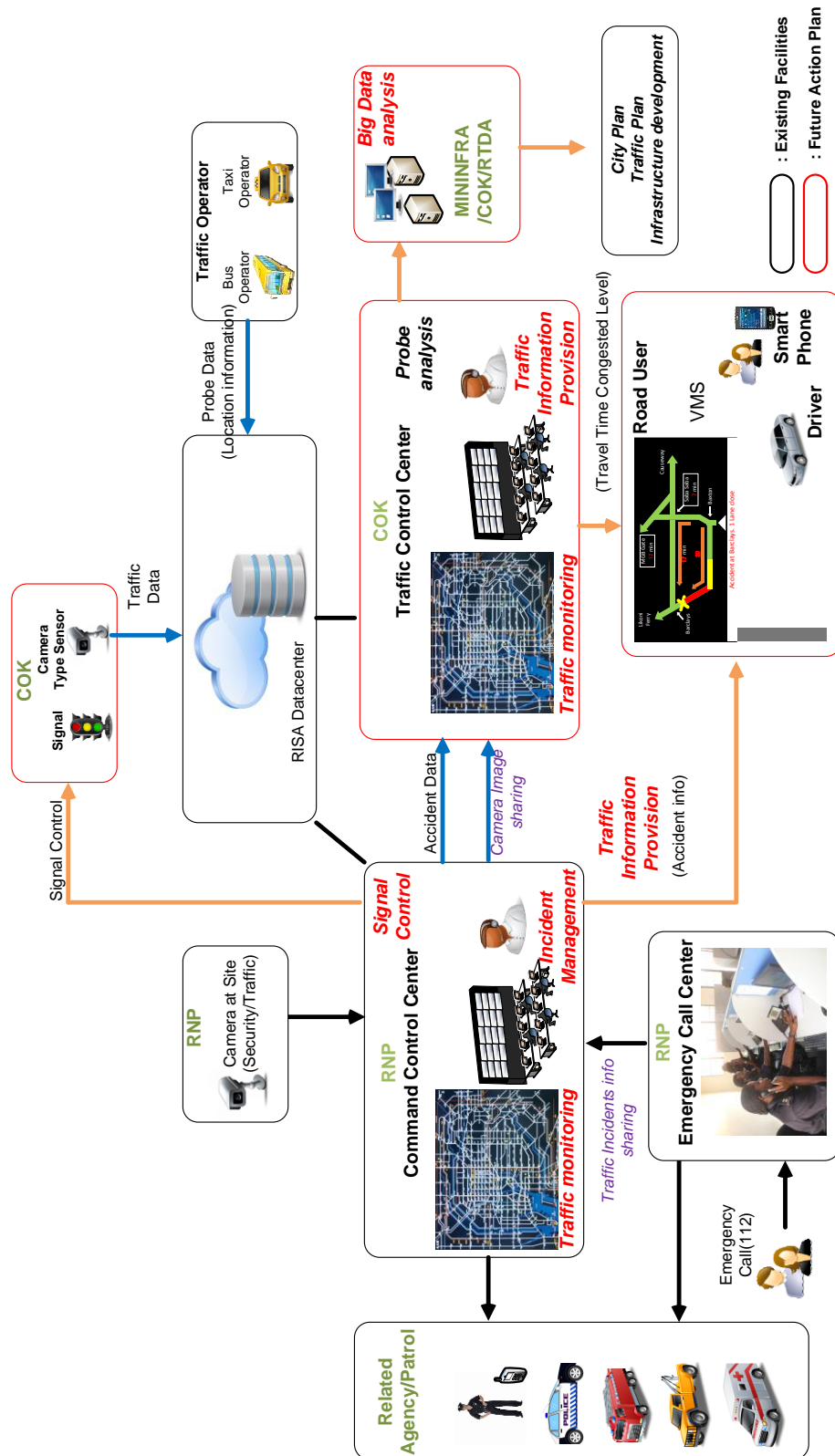
A project for the construction of a traffic control center, including signalized intersections, will be implemented with Japanese official development assistance. This project will be the core project in the short- and medium-term measures of the Action Plan to be developed under Activity 2.

The traffic control center is a new infrastructure for the Government of Rwanda. During the discussion in WG2, the configuration and operation of typical traffic control centers in other countries have been introduced, and a proposal for a traffic control center for Kigali City has been presented, which has been discussed with relevant organizations (CoK, RNP, RTDA, MININFRA, MINICT, RISA, etc.).

Each organization has expressed various opinions as to whether the current road manager (CoK) and traffic manager (RNP) should work in the same control room or whether they should work in different control rooms. It is necessary to foster a common understanding among the organizations as to what specific tasks the road manager and the traffic manager should have.

According to the conclusion of Activity 2-2 on task demarcation, the Traffic Control Center (TCC) shall be installed at RNP, and the Traffic Management Center (TMC) shall be installed at COK.

The location of the TCC was discussed in RNP and concluded at Muhima, Division of Traffic and Road Safety.



Source: JICA Expert Team

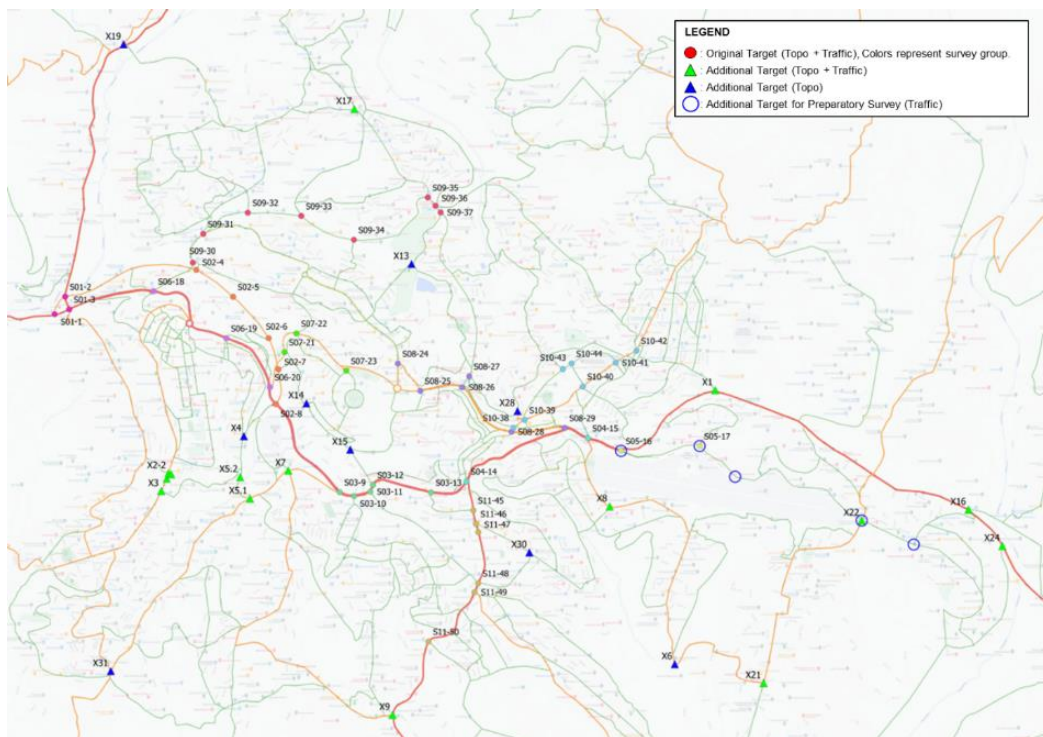
**Figure 2.3.9: Traffic Control System Configuration in Case of Separate Operation by CoK and RNP**

## (2) Basic Design of the Priority Component, Quantity Take-off, and Ballpark Cost Estimate of an Integrated Citywide Traffic Control System Equipped with Public Transport Priority

The signal intersection improvements (advanced signal intersection and signal control system) were identified as a short-term priority project in the Data Collection Survey (2019) and as a priority component in the pilot project in the Detailed Planning Survey (2021) due to the strong request from the CP for early implementation. The basic design was prepared in this project.

### 1) Topographic Survey

The Laser Imaging Detection and Ranging (LiDAR) survey and aerial photography by an unmanned aerial vehicle (UAV) were conducted as topographic surveys. The survey covered 74 intersections, including 50 intersections initially targeted and an additional 24 intersections requested by CoK. Figure 2.3.10 shows the locations of the intersections surveyed.



Source: JICA Expert Team

Figure 2.3.10: Location Map of Surveys



Source: JICA Expert Team

Figure 2.3.11: Photos of Topographic Survey

## 2) Traffic Analysis

Traffic volume surveys were conducted at intersections in order to obtain the peak hour traffic volume by direction, which is a design condition for the basic design. The traffic volume survey was conducted at 65 intersections, excluding the nine intersections with apparently low traffic volumes from the 74 intersections.

To evaluate the current degree of congestion, the flow ratio has been calculated based on the obtained traffic volumes (2022). In addition, since traffic improvements are to be implemented as a Japanese Grant Aid Project, which shall be evaluated three years after completion (in 2026-2027), the flow ratio was calculated with the traffic volume in 2030.

## 3) Signal Systems

In WG2, the JET explained the signal control methodology and application conditions of the advanced signal system to promote understanding. Also, the JET considered the target signalized intersections in terms of site conditions, road shape, and safety, in conjunction with the analysis results of the traffic count survey.

The implementation location of the control center, system server(s), and necessary functional requirements are deeply related to the "Basic Framework for Traffic Flow Management" described in Section 2.3.2. Therefore, these were decided after a mutual agreement involving CoK, RNP, and other related organizations.



Source: JICA Expert Team

**Figure 2.3.12: Site Investigation with CoK Officers**

Key points for system design and system configuration are shown below:

### a) System Design key point

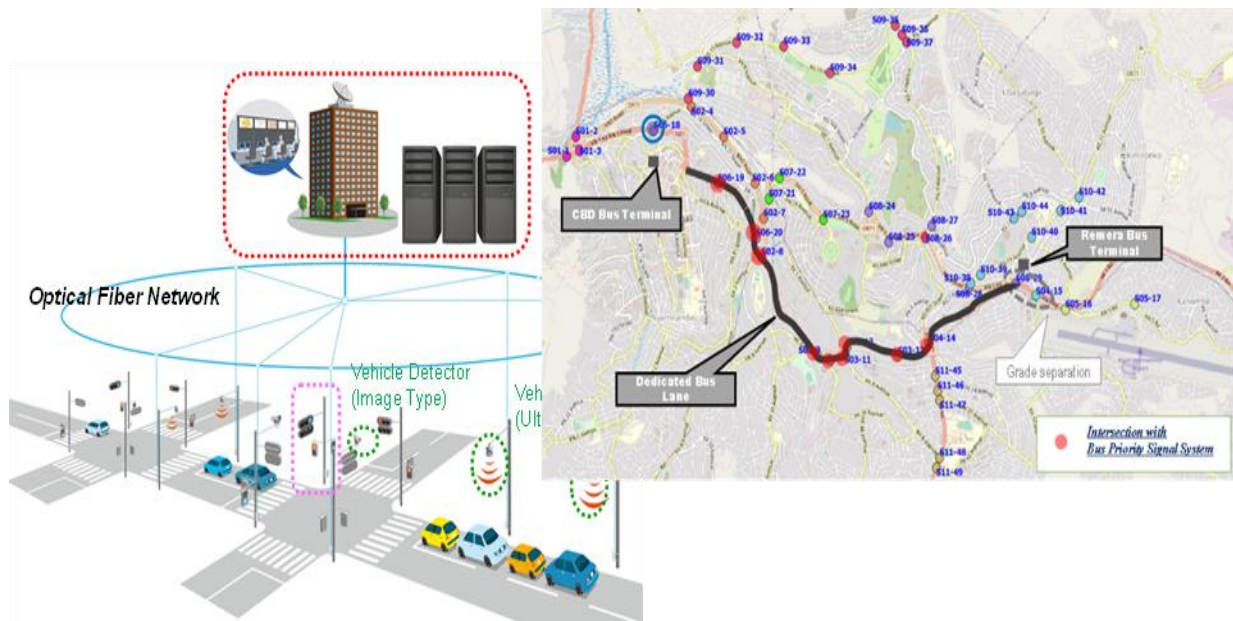
- Adoption of the Japanese Signal System, MODERATE

Minimizing the waiting time by optimizing the traffic signal parameter based on the real-time traffic data collected by the vehicle detectors and controlled by the Control Center Area Control/Coordinated Control

- Bus Priority Signaling System

In line with the Dedicated Bus Lane (DBL) project, proceeded by COK.

When a bus is detected, the traffic signal system can extend the green light for the bus, or shorten the red light for other traffic, allowing the bus to pass through the intersection more quickly.

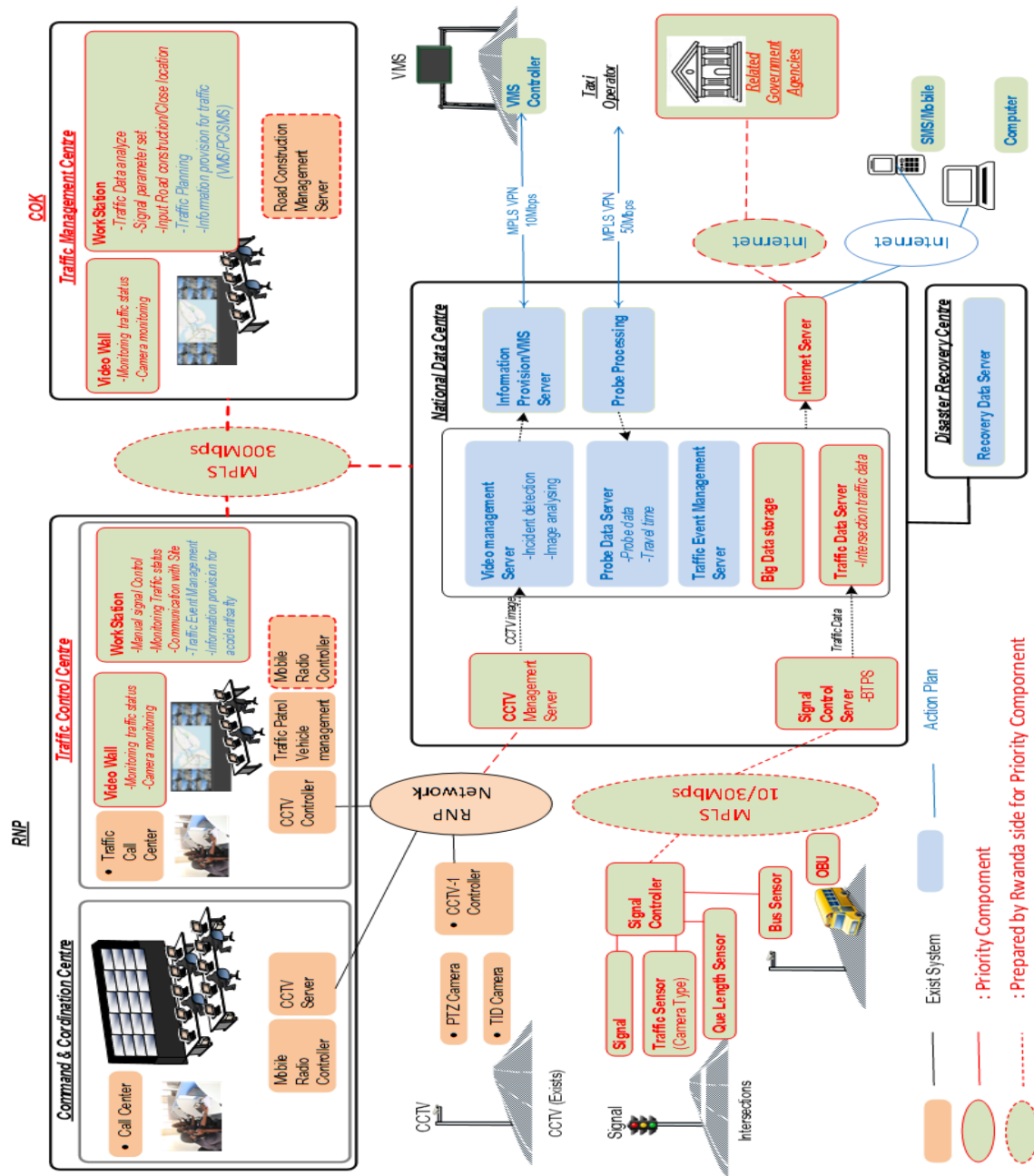


Source: JICA Expert Team

**Figure 2.3.13: Key Point of the System**

b) System Configuration Key Points

- Traffic Control Center (TCC) at RNP (Muhima, Traffic and Road Safety)
- Traffic Management Centre (TMC) at COK
- Using KTRN optical fiber for communication
- Monitoring cameras collected and shared by RNP and Traffic at Center.
- Data collection and accumulation at the National Data Center
- Data provision to related government agency



Source: JICA Expert Team

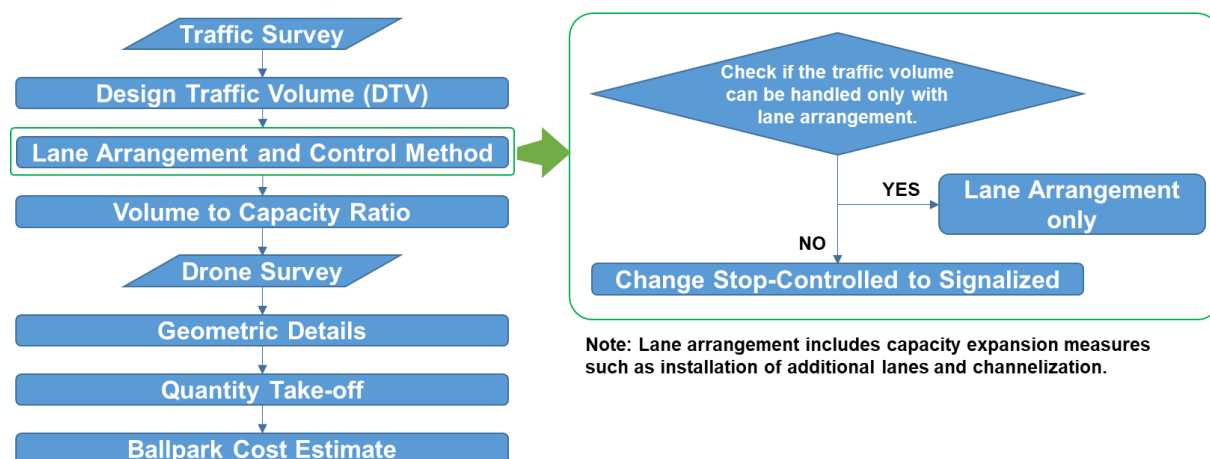
Figure 2.3.14: System Configuration (Plan)

#### 4) Prioritization of Intersections to be Improved and Basic Design

Based on the results of the field survey and traffic analysis, the basic design was carried out. The signal intersection improvements are short-term priority projects and will be implemented as a Japanese Grant Aid Project, which shall be evaluated three years after its completion in 2026-2027. Thus, the lane number was determined based on the traffic volume in 2030, three years after

the completion of the project. In addition, the intersections located on the pilot route of the DBL, which is planned in parallel, were designed taking bus priority operation into account.

The basic design was conducted as shown in the work flow in Figure 2.3.15. That is, if the current situation is an intersection with stop control, the flow is to consider installing an additional lane based on the design traffic volume obtained from the traffic study, and if that does not satisfy the design traffic volume, then signalization is considered.



Source: JICA Expert Team

**Figure 2.3.15:Workflow of Basic Design**

With regard to the targets for intersection improvement, the following three items were evaluated for overall scoring:

a) Urgency

The ratio of traffic volume to traffic capacity (VCR) of the existing intersection was used as a parameter to evaluate the degree of the supply-demand gap. The VCR was calculated for each inflow, and the worst VCR value obtained at the most congested inflow was taken as representing the value of the intersection. The VCR value above 1 indicates that traffic demand exceeds the traffic capacity of the intersection during peak hours, resulting in congestion. Intersections with far higher VCR values and intersections where demand exceeds supply even at present (2022) or in the near future were assessed as urgent.

b) Effectiveness

The daily traffic volume at each intersection was used as a parameter to express the degree of effectiveness of the intersection improvement. The daily traffic volume was defined as the total traffic volume entering the intersection. The higher this volume was, the higher the effectiveness was assessed.

c) Others

The degree of need for intersection improvements from aspects other than 1) and 2), such as the number of pedestrians and cyclists, the ease of coordinated signal control, and whether the route is on the pilot route of DBL.

The results of the priority evaluation of the target intersections and the list of proposed improvements are presented in Table 2.3.5. As a result of the priority evaluation, the subject intersections were categorized into groups 1 to 5 in terms of improvement priority. The proposed improvements include VCRs after intersection improvements, including control methods

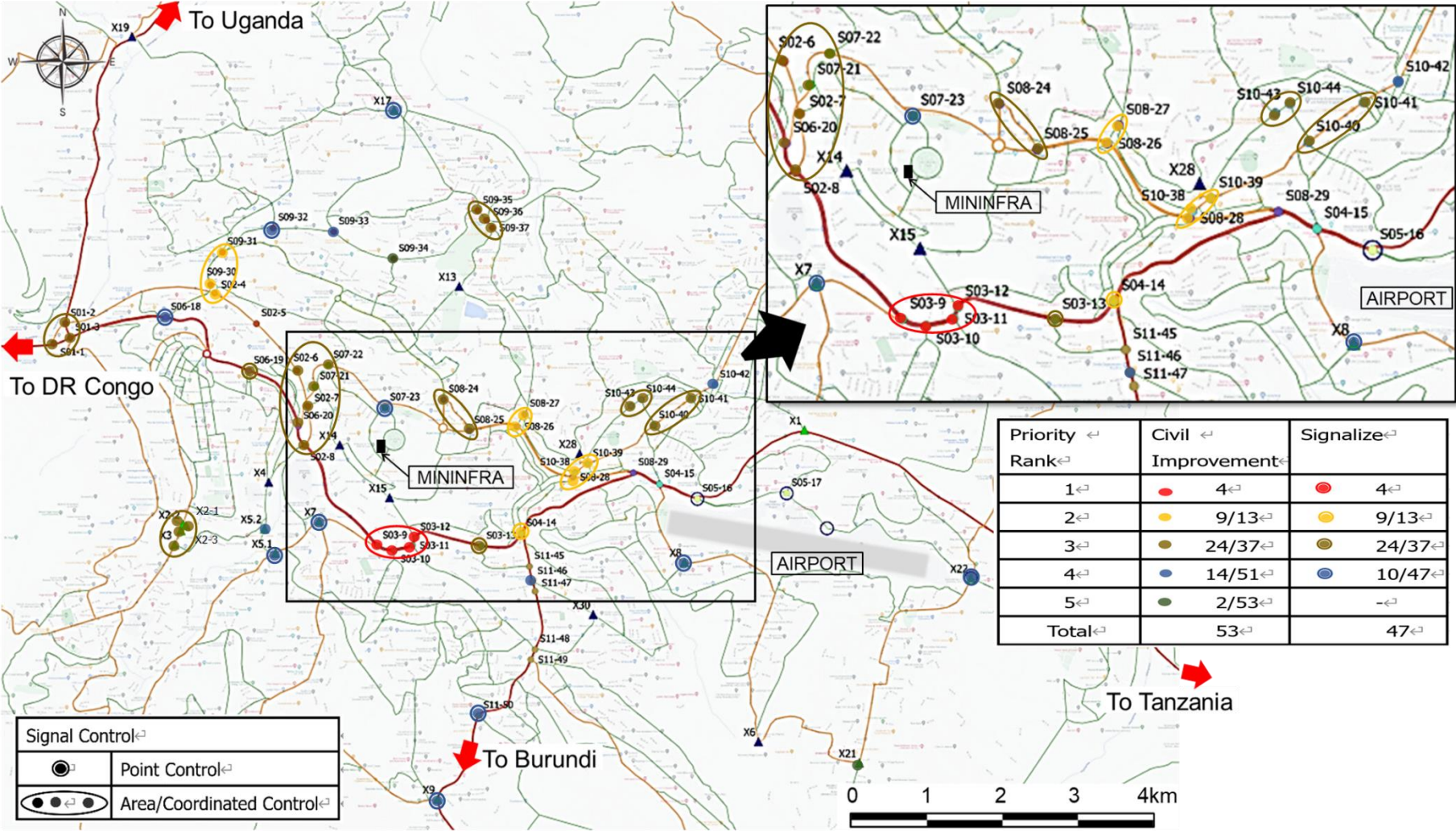
(signalized intersections (SIG), stop-controlled intersections (UNS), and roundabouts (RAB)), and geometric improvements (e.g., installation of additional lanes). Seven of the 45 intersections can cope with traffic volume in the immediate future (2025) by being upgraded as at-grade intersections, which is the scope of this study; however, congestion is expected to occur in the medium term (2030), thus further consideration should be given to upgrading, including grade-separation, for these intersections.

Figure 2.3.16 shows the locations of the intersections (priority components) by priority. Grouped in order of priority from Group 1 to Group 5, improvement plans were developed for 53 intersections, excluding intersections that had already been improved or for which future improvements were specifically planned in another project, 47 of which were planned as signalized intersections.

Table 2.3.5: Evaluation of Priorities of Intersections

IS No.	Name of IS	Current Condition	Current Control Type	Evaluation										Improvement Plan					Remarks				
				Emergency			Effectiveness			Sub Total Score (C)+(A)+(B)	Other Consideration			Total Score (G) (C)+(D)+(E)+(F)	Total Score with Grouping (H)	Priority Result					Proposed Geometry		
				Worst Value of VCR			Rating <sup>1</sup> (High 3 - Low 1)	Traffic Volume <sup>2</sup> (Total Entry per Day)	Rating <sup>3</sup> (High 3 - Low 1)		Volume of NMT <sup>4</sup>	Necessity for Coordinated Control <sup>5</sup>	Necessity for Bus Priority <sup>6</sup>			1 10.0 -	2 10.0 - 8.6	3 8.5 - 6.1		4 6.0 - 3.1	5 - 3.0	VCR	
				2022	2025	2030	(A)	2022	(B)	(D)	(E)	(F)						2025		2030			
S01-1	Nyabugogo - Ruyenzi	SIG	1.18			3	78,429	2	2	2	9	8.3	3						SIG	Area Control	OK	OK	
S01-2	Nyabugogo - Gatsata	SIG				1	111,416	3	4	2	2	8							SIG	Area Control	OK	OK	
S01-3	Nyabugogo - Kimisagara	SIG				1	128,601	3	4	2	2	8							SIG	Area Control	OK	OK	
S02-4	Kinamba	UNS	1.21			3	100,390	3	6		2	8							SIG	Coordinated Control	OK	OK	
S09-30	Kinamba-BK	UNS	1.65			3	101,353	3	6	2	2	10	2						SIG	Coordinated Control	OK	OK	
S09-31	Gisozi	UNS	6.12			3	174,250	3	6	1	2	9							SIG	Coordinated Control	OK	OK	
S02-6	Kwa Rasta1	UNS			1.41	2	76,992	2	4	1	2	6							SIG	Area Control	OK	OK	
S02-7	Kwa Rasta2	UNS				2	91,612	2	4	1	2	7							SIG	Area Control	OK	OK	
S06-20	Sopetrade	SIG	1.42			3	131,822	3	6	1	2	11							SIG	Area Control	OK	OK	
S07-21	Medhill	UNS	9.22			3	133,776	3	6	2	2	8							SIG	Area Control	OK	OK	
S07-22	Kimicanga	UNS	1.25			3	128,981	3	6	1	2	9							SIG	Area Control	OK	OK	
S02-8	Kanogo	RAB			1.02	2	150,105	3	5		2	9							SIG	Area Control	OK	OK	
S03-9	Rwandex -SP	SIG	1.19			3	121,211	3	6		2	10							SIG	Coordinated Control	OK	OK	
S03-10	Rwandex - Gitwaza	SIG				1	123,795	3	4	1	2	9							SIG	Coordinated Control	OK	OK	
S03-11	Rwandex - Magerwa	SIG	1.12			3	139,956	3	6	1	2	11							SIG	Coordinated Control	OK	NG	Grade separation shall be considered in future.
S03-12	Rwandex - Gikondo	UNS	12.71			3	110,441	3	6		2	10							SIG	Coordinated Control	OK	NG	Grade separation shall be considered in future.
S03-13	Tiz Zanzi Market	UNS	4.98			3	99,756	2	5	1	2	8	8.0	3					SIG	Point Control	OK	OK	
S04-14	Sonabale	RAB			1.08	2	129,913	3	5	2	2	9	9.0	2					SIG	Point Control	OK	OK	
S05-17	Kanombe/Airport Entrance	RAB				1	66,351	2	3	3	0	5							RAB	Point Control	OK	OK	No intervention is required.
S06-18	Muhama	SIG		1.10		2	116,404	3	5	1	2	6	6.0	4					SIG	Point Control	OK	OK	
S06-19	Peage - RSSB	SIG	1.37			3	78,143	2	5		2	8	8.0	3					SIG	Point Control	OK	OK	
S07-23	Kukabindi	SIG	2.11			2	26,204	1	3	1	2	4	4.0	4					SIG	Point Control	OK	OK	
S08-24	University of Kigali	RAB	1.01			2	118,350	3	5	1	2	8	8.5	3					SIG	Coordinated Control	OK	OK	
S08-25	Convention Center East	RAB	1.00	1.11		3	108,547	3	6	1	2	9							SIG	Coordinated Control	OK	NG	Grade separation shall be considered in future.
S08-26	RDB	SIG	1.31			3	138,148	3	6	2	2	10							SIG	Coordinated Control	OK	NG	Grade separation shall be considered in future.
S08-27	RDB To Nyamirambo	UNS	1.23			3	62,010	2	5	1	2	8	9.0	2					SIG	Coordinated Control	OK	OK	
S08-28	Chez Lando	RAB			1.13	2	140,023	3	5	2	2	9							SIG	Coordinated Control	OK	OK	
S10-38	Gisiments - Chez Lando	UNS	1.67			2	90,698	2	4	2	2	8	8.7	2					SIG	Coordinated Control	OK	OK	
S10-39	Gisiments - Airtel	UNS	3.33			2	103,543	3	5	2	2	9							SIG	Coordinated Control	OK	OK	
S09-32	Gukinjiro	UNS	6.16			3	93,755	2	5	1	2	6	6.0	4					SIG	Point Control	OK	OK	
S09-33	Kumavaze - Vision City	UNS				1	72,515	2	3	1	2	4	4.0	4					UNS	Point Control	OK	OK	
S09-34	TVI	UNS				1	51,466	2	3	3	0	5							UNS	Point Control	OK	OK	
S09-35	Mukabaga -Kanyaruzarama - Airtel	UNS		2.63		2	87,343	2	4	2	2	8							SIG	Coordinated Control	OK	OK	
S09-36	Hotel Viba Portofino Kigali	UNS	3.33			3	97,340	2	5	1	2	8	7.3	3					SIG	Coordinated Control	OK	OK	Careful consideration is needed for signalization due to steep gradient.
S09-37	White House APT	UNS	1.01			2	60,689	2	4	1	2	6							SIG	Coordinated Control	OK	OK	
S10-40	Kimironko - Kwarwahama	UNS	1.68			2	48,396	1	3	2	2	7	7.5	3					SIG	Coordinated Control	OK	OK	
S10-41	Kimironko - Simba	UNS	1.66			3	42,406	1	4	2	2	8							SIG	Coordinated Control	OK	OK	
S10-42	Kimironko - BPR	UNS				1	74,406	2	3	2	2	5	5.0	4					UNS	Point Control	OK	OK	
S10-43	Remera Control Technique	UNS	1.53			3	4,907	1	4	1	2	7	6.5	3					SIG	Coordinated Control	OK	NG	Grade separation shall be considered in future.
S10-44	Remera - RED	UNS	5.26			2	4,907	1	3	1	2	6							SIG	Coordinated Control	OK	NG	Grade separation shall be considered in future.
S11-46	Kicukiro - Simba	UNS				1	68,565	2	3	1	2	4	4.0	4					UNS	Point Control	OK	OK	Signalized in other project
S11-50	Kicukiro - DMC	UNS			2.13	2	35,726	1	3	1	2	4	4.0	4					SIG	Point Control	OK	OK	
X2-1	Biryogo JCT	UNS	1.85			2	52,191	2	4	2	2	8							SIG	Area Control	OK	OK	
X2-2	Biryogo JCT	UNS	1.34			3	52,191	2	5	2	2	9							SIG	Area Control	OK	OK	
X2-3	Biryogo JCT	UNS				1	41,846	1	2	2	2	6	8.0	3					SIG	Area Control	OK	OK	
X3	Nyamirambo JCT	UNS	2.47			3	78,765	2	5	2	2	9							SIG	Area Control	OK	OK	
X5.1	Gikondo-Nyamirambo JCT	UNS	1.30			2	63,693	2	4	1	2	5	5.0	4					SIG	Area Control	OK	OK	
X5.2	Gikondo-Nyamirambo JCT	UNS			1.67	2	66,335	2	4	1	2	4	4.0	4					UNS	Point Control	OK	OK	
X7	Gikondo SGM	UNS	1.17			2	75,480	2	4	1	2	5	5.0	4					SIG	Area Control	OK	OK	
X8	Kubera-Kicukiro JCT	UNS	2.29			2	32,301	1	3	1	2	4	4.0	4					SIG	Area Control	OK	OK	
X9	Nyama main car park IS	UNS	2.29			3	58,629	2	5	1	2	6	6.0	4					SIG	Area Control	OK	OK	Signalized in other project
X17	Kagugu-Umweyo Estate	UNS			1.58	2	31,010	1	3	1	2	4	4.0	4					SIG	Area Control	OK	OK	
X21	Rubizi-Busanza-Kanombe barracks IS	UNS				1	251	1	2	1	2	3	3.0	5					UNS	Point Control	OK	OK	
X22	Kanombe M.H-International Airport IS	UNS	2.82			2	58,595	2	4	1	2	5	5.0	4					SIG	Area Control	OK	OK	
Number of Intersections in Each Rank										4	9	24	14	3									
Accumulated Number										4	13	37	51	54									
Accumulated Number (Signalized)										4	13	37	47	47									

Source: JICA Expert Team



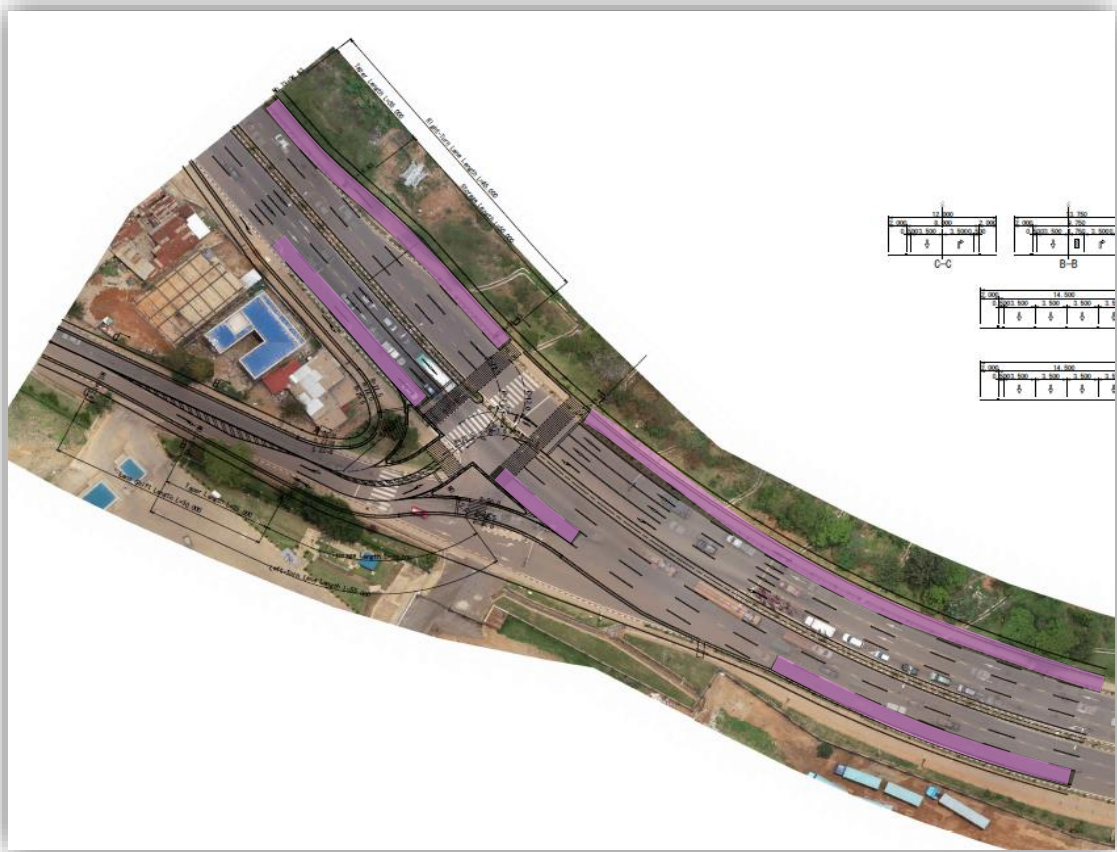
Source: JICA Expert Team

Figure 2.3.16: Priority Location Map of Target Intersections

Figure 2.3.17 shows an example of the draft basic design drawing prepared for No. 03-9.

The signal system drawings were prepared by using the geometric improvement drawings as a base for the location of traffic signals, vehicle detectors, and other facilities.

The report and drawings were submitted to WG members in May 2023.



Source: JICA Expert Team

**Figure 2.3.17: Draft Basic Design Report and Drawings (Ex. S03-9)**

### 2.3.4 Activity 2-4: To conduct a capacity assessment (Gap analysis) of related organizations based on the Action Plan and assess the viability of the proposed priority actions

#### (1) Debottlenecking at Intersections

Efforts to address congestion at intersections focus on both at-grade and grade-separated solutions. Immediate actions include capacity development for intersection planning and design, as well as feasibility studies and detailed designs. Medium-term priorities encompass procurement, construction, and expansion of intersection improvements. Key challenges include securing budgets for infrastructure development, identifying bottlenecks in the road network, and enhancing operational and maintenance management for traffic control centers. Grade-separated intersections present additional difficulties in advanced design capabilities and strategic planning.

#### (2) Densely Arranged High-capacity Vehicle Road Network

The development of high-capacity vehicle road networks involves addressing bottlenecks and improving arterial road designs. Immediate actions focus on identifying potential sites and formulating concept development plans. Medium-term priorities include implementing pilot projects, expanding road capacity, and constructing high-standard highways, tunnels, and bridges. Key challenges include inadequate capacity for road improvement planning, high-standard highway design, and the construction of tunnels and bridges. Long-term projects, such as tunnels and bridges, require significant expertise and financial sustainability to overcome technical and resource constraints.

#### (3) Densely Arranged Non-motorized Transport (NMT) Network

The establishment of an NMT network aims to enhance walkability and cycling infrastructure. Immediate actions include data collection and preliminary studies to establish walkability indicators. Medium-term initiatives focus on formulating development policies, implementing pilot projects, and scaling up NMT infrastructure across urban areas. Key challenges include legal constraints, budget allocation for public-private partnerships, and ensuring traffic safety in mixed-use environments. Establishing institutional frameworks and design guidelines is essential for the successful NMT integration into the broader urban mobility network.

#### (4) Traffic Demand Management and Control

Traffic demand management focuses on improving data collection, traffic control systems, and parking solutions. Immediate priorities include detailed designs for traffic monitoring systems, such as cameras and sensors, and conducting pilot projects for emergency traffic management. Medium-term goals involve expanding data collection systems, implementing variable message signs (VMS), and developing smart parking systems. Key challenges include operational and maintenance management, budget constraints, and capacity development for private operators in parking and freight logistics. Robust planning and stakeholder collaboration are also essential for freight vehicle control systems, weigh stations, and staggered working strategies.

**Table 2.3.6: Summary of Gap Analysis (Traffic Management)**

Category		Sub-category		Description	Initial Action	Challenges (Gaps):
id	Description	id	Description		Period	
1	Debottleneck at Intersections	1	Improvement of Major Congested Intersections (At-grade)	Capacity Development for Intersection Planning and Design / Pilot Project	Short	- Budget constraints for infrastructure
				Detailed Design	Short	
				Procurement	Medium	

						development.
				Construction	Medium	
				Expansion	Medium	- Capacity development for identifying bottlenecks in the road network.
		2	Traffic Control Center and Traffic Management Center	Detailed Design	Short	
				Procurement	Medium	- Budget constraints for infrastructure development.
				Construction	Medium	
				Operation and Expansion	Medium	- Capacity development for for operations and maintenance management
		3	Major Congested Intersections (Grade-separation)	Feasibility Study / Outline Design	Short	- Capacity development for planning grade-separated intersection improvement.
				Procurement	Medium	- Budget constraints for infrastructure development.
				Detailed Design / Construction	Medium	- Capacity development for designing grade-separated intersection improvement.
2	Densely Arranged High-capacity Vehicle Road Network	4	Enlargement of Road Capacity	Review on Existing / Potential Site	Short	- Capacity development for identifying bottlenecks in the road network.
				Concept Development Plan (Short / Medium)	Medium	- Capacity development for planning of road improvement.
				Pilot Project	Medium	
				Expansion, including other measures	Medium	
		5	Construction of HCUR and Arterial Roads	Feasibility Study / Outline Design	Medium	- Capacity development for identifying bottlenecks in the road network.
				Detailed Design	Medium	- Capacity development for designing high-standard highways.
				Procurement	Medium	- Budget constraints for infrastructure development.
				Construction	Medium	
		6	Construction of Tunnels and Bridges in HCUR	Feasibility Study / Outline Design	Medium	- Capacity development for identifying bottlenecks in the road network.
				Detailed Design	Medium	- Capacity development for designing tunnels and bridges.
				Procurement	Medium	- Budget constraints for infrastructure development.
				Construction	Long	- Capacity development for constructing tunnels and bridges.
3	Densely Arranged NMT Network	7	Promoting NMT and Walking	Review and Preliminary Study	Short	- Collecting necessary information, such as inventory. - Capacity development for study and planning.
				Development Policy and Regulations	Medium	- Capacity development for creating development

						policies and design guidelines.
				Pilot Project in Urban Area	Medium	
				Implementation to Cover the Entire Urban Area	Medium	- Budget constraints for infrastructure development.
4	Traffic Demand Management and Control	8	Collection and Analysis of Traffic Information	Detailed Design on Collection of Camera and Traffic Data	Short	- Capacity development for creating development policies and design guidelines.
				Procurement	Medium	
				Construction	Medium	
				Operation and Expansion	Medium	- Capacity development for management of operation and maintenance.
				Detailed Design	Medium	- Capacity development for creating development policies and design guidelines.
				Procurement	Medium	
				Construction	Medium	
				Expansion	Medium	- Budget constraints for infrastructure development.
		9	Introduction of Emergency Traffic Control	Pilot Project of EMS	Short	- Capacity development for operation management.
				Detailed Design	Medium	- Capacity development for strategy development.'
				Procurement	Medium	
				Construction	Medium	
				Expansion	Medium	- Budget for infrastructure development.
		10	Traffic Information Provision	Pilot Project of VMS *	Short	- Capacity development for strategy development.
				Detailed Design	Medium	
				Procurement	Medium	- Capacity development for VMS operation for private operators.
				Construction	Medium	
				Expansion	Medium	- Budget for infrastructure development.
		11	Smart Parking System	<del>Pilot Project *</del>	<del>Short</del>	
				Study	Medium	- Capacity development for study and strategy development.
				Procurement	Medium	- Capacity development for parking operation for private operators. - Capacity development and system development for parking information management and provision.
				Construction	Medium	
				Expansion Park and Ride	Medium	
		12	Introduction of Specific	Review on Existing / Potential Targets	Short	- Capacity development for study and analysis.

			Vehicle Control	Establishing Standards	Short	
				Concept Plan (Medium /Long)	Short	
				Pilot Project	Medium	
				Expansion	Medium	
		13	Introduction of Staggered Working	Concept Plan	Short	
				Establishing Standards / Regulation	Short	
				Pilot Project for Staggered Working	Short	
				Expansion	Medium	
		14	Introduction of Freight Vehicle Control	Review on Existing Freight Routes	Short	- Capacity development for study and analysis.
				Concept Plan (Mid /Long)	Short	
				Pilot Project	Medium	
				Expansion	Medium	
		15	Goods and Car Request System	Review of Existing Freight System and Demand	Short	- Capacity development for study and analysis.
				Concept Development Plan (Medium /Long)	Medium	
				Pilot Project	Medium	
				Expansion	Medium	
		16	Introduction of Weight Stations	Planning and Design	Medium	- Capacity development for study and analysis.
				Procurement	Medium	- Budget for procurement.
				Construction	Medium	
				Operation of Weight Stations	Medium	- Capacity development for the operation and management of weigh stations.

Source: JICA Expert Team

### 2.3.5 Activity 2-5: To implement a series of technical support and capacity enhancement for the implementation of the Action Plan

Four pilot projects—basic design of intersections, intersection traffic flow improvement, establishment of a traffic event management system, and study on staggered working hours—have been implemented to improve traffic flow in Kigali, as listed in the Action Plan. The details of these activities are shown in Section 2.6.4.

**Table 2.3.7: List of the Pilot Project for Output 2**

Pilot Project	Outline
Basic Design of Intersections	Selection of priority target intersections and preparation of basic designs, including traffic control system.
Intersection Traffic Flow Improvement	Improvement of traffic flow at five intersections through signal parameter updates and small-scale physical improvements.
Traffic Event Management System	Establishment of a Traffic Event Management System centered on the Traffic Control Center (TCC), aimed at improving traffic management capabilities.
Staggered Working Hour	Study on the availability and effectiveness of introducing staggered working hours in Kigali to mitigate peak-hour traffic demand concentration.

Source: JICA Expert Team

### 2.3.6 Activity 2-6: To produce guidelines for traffic flow management and develop a smart parking strategy for the city

Traffic congestion in Kigali has worsened due to the increasing number of vehicles. Intersection improvements, such as the introduction of a traffic signal system as a priority component of this project and intersection grade separation projects, have been implemented. Parking demand has risen sharply alongside the increasing of number of vehicles. However, the development of parking facilities has not kept pace with this demand. Streets in the Central Business District (CBD) are frequently used as parking spaces, leading to issues such as deterioration of urban environment, disruptions to working conditions, and reduced traffic safety. To ensure smoother traffic flow in the CBD, a parking management strategy and guideline, including a smart parking strategy, is being prepared. The JET and CP has compiled a list of existing parking facilities, conducted a current parking demand survey, estimated future parking demand, and studied potential schemes and regulations for parking management. Data collection on existing parking facilities has been carried out. The table of contents for the Guideline on Parking Management in the CBD is shown provided below.

**Table 2.3.8: Draft Table of Contents of the Guideline on Parking Management in the CBD**

1. Introduction
1.1. Background
1.2. Objectives of the Guideline
1.3. Target Area of the Guideline
2. Related Plans
2.1. Kigali Master Plan 2050
2.2. National Transport Policy and Strategy for Rwanda (2021)
2.3. Summary
3. Roles and Outcomes of Parking Management
3.1. Efficient Land Use
3.2. Traffic Flow Regulation
3.3. Safety and Security Improvement
3.4. Environmental Sustainability

3.5. Economic Development Support

4. Car Parking Demand

- 4.1. Zoning and Types of Parking
- 4.2. Current Parking Demand
- 4.3. Future Parking Demand

5. Key Challenges

- 5.1. Insufficient Number of Parking Slots
- 5.2. Conflict Between Vehicles and Pedestrians
- 5.3. Coordination with Wholesale Activities
- 5.4. Preservation and Development of the Historical Commercial District
- 5.5. Regulations and Enforcement

6. Policies for Parking Management in the CBD Kigali

- 6.1. Securing Parking Spaces Across the CBD in Coordination with Each Zone
- 6.2. Provision of Parking Spaces for Various Purpose and Target in Each Area (Short/Long/Freight)
- 6.3. Collaboration Between Public Transport and Parking
- 6.4. Provision of a Minimum Number of Parking Spaces with Consideration for the Urban Environment
- 6.5. Instructions of the Government

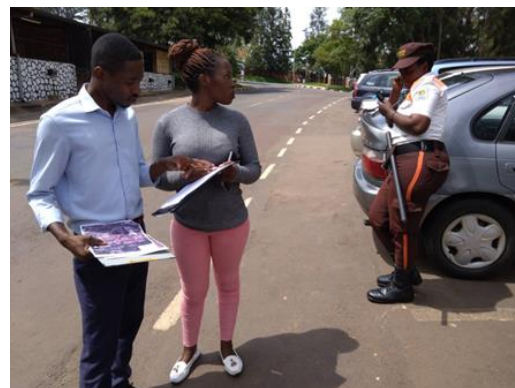
7. Implementation Guideline

- 7.1. Implementation Flow
- 7.2. Establishment of Regulations
- 7.3. Zoning Plan
- 7.4. Preparation and Parking Management Policy for Different Zones
- 7.5. Parking Facilities Inventory
- 7.6. Assessment of Demand and Supply Balance
- 7.7. Development of Parking Facilities
- 7.8. Operation Plan of Parking Facilities, Including Smart Parking

Source: JICA Expert Team



Parked Cars on the Sidewalk



Parking Facility Survey

Source: JICA Expert Team

**Figure 2.3.18: Parking Situation in the CBD**

## **2.4 Activity 3 (Institutional Setup)**

### **2.4.1 Activity 3-1: To review the existing institutional setups for public transport and traffic management in Kigali**

#### **(1) Rwandan Constitution 2003 (rev. 2015)**

Article 34: Right to private ownership of land grants the right to private ownership of land and other rights related to land.

#### **(2) Land Law**

ORGANIC LAW N° 08/2005 OF 14/07/2005 DETERMINING THE USE AND MANAGEMENT OF LAND IN RWANDA

Article 3 of the law stipulates that the state has the right to expropriation due to public interest, settlement, and general land management through procedures provided by the law and prior to appropriate compensation.

#### **(3) Law Governing Road in Rwanda**

LAW N°55/2011 OF 14/12/2011 GOVERNING ROADS IN RWANDA

Article 1 states the purpose of the law: "This law regulates the road network in Rwanda and determines its reserves, classification, and management." Article 3 Classification defines the road classification. All public roads are classified into: National Roads; Districts and city of Kigali Roads in urban areas (Class 1); Districts and city of Kigali Roads in other urban areas (Class 2); and Specific roads. Article 6 defines that all management and maintenance of the national roads are under the jurisdiction of the RTDA. Article 8 states that district roads and city of Kigali roads are under the jurisdiction of the districts and city of Kigali, respectively. Maintenance works are funded by the RMF, and development is funded by the government. Article 15 and 16 define the width of the roads.

#### **(4) Land Use Planning Law**

LAW N°24/2012 OF 15/06/2012 RELATING TO THE PLANNING OF LAND USE AND DEVELOPMENT IN RWANDA

The law governs the planning of land use and development in Rwanda. Article 5 states that: A presidential order shall determine the land use and development master plan in Rwanda to guide the enforcement of land use planning at the national level. It mandates all districts to prepare a specific master plan based on the district development plan.

#### **(5) Law Governing Urban Planning**

**LAW N°10/2012 OF 02/05/2012 GOVERNING URBAN PLANNING AND BUILDING IN RWANDA**

It is a law applicable to urban areas: cities, municipalities, and agglomerations with a population of 10,000 or more and an area of at least twenty square kilometers, as well as other areas such as economic zones or any other densely occupied areas. The law defines the master plan, local plan, local land development, specific land development plans, and land subdivision plans. It also states the rules on construction, rehabilitation, and demolition activities. Article 56 states the power of the government, city of Kigali, and district to create land reserves for the purposes of land development in the public. This law is the legal basis for permits such as building permits, occupancy permits, and demolition permits.

## **(6) Expropriation**

### **LAW N° 32/2015 OF 11/06/2015 RELATING TO EXPROPRIATION IN THE PUBLIC INTEREST**

Article One: This law determines the procedures relating to expropriation in the public interest. The law gives the government the power to order expropriation for the public's interest. Article 5 gives the list of activities. Among the 22 types of projects of public nature, roads and railway lines are listed first in the list. The districts, the city of Kigali, and the central government are the entities that determine expropriation.

## **(7) EIA**

### **ANNEX I TO MINISTERIAL ORDER N° 001/2018 OF 25/04/2018 DETERMINING THE LIST OF WORKS, ACTIVITIES AND PROJECTS SUBJECT TO AN ENVIRONMENTAL IMPACT ASSESSMENT**

The Rwanda Environment Management Authority (REMA) has prepared the EIA Guidelines for Road Construction. Section 3.3.2 Basic EIA Considerations for Road Development Projects set the environmental impact assessment (EIA) requirements for roads based on the sizes (width and length) of new construction, rehabilitation, and upgrading. Section 3.3.3 defines the road categories. The five categories of road projects are: a) New construction; b) Reconstruction and/or upgrading; c) Improvements; d) Rehabilitation; and e) Maintenance.

### **Rwanda Development Board (RDB) Roles in EIA<sup>[1]</sup>**

The Department of Investment and Division of Investment Promotion of the RDB coordinates the EIA process, and issues the environmental clearance certificates for the project, and validates the EIA project studies. Article 67 stipulates the Environmental Organic Law N°04/2005 of 08/04/2005 which clarifies the different steps to access the EIA certificate. [2]

### **EIA Procedure in Rwanda**

The EIA process in Rwanda includes five steps: (1) project application and registration; (2) screening, scoping, and terms of reference; (3) EIA study and report; (4) submission of an EIA report; and (5) decision-making.

Screening enables the categorization of projects according to their impact level, as follows:

Category 1 (Impact Level 1): A full EIA is not required. RDB advises on the appropriate environmental management measures (plan). The exercise may take 14 days from the day the project brief is received (days may be less or more depending on the nature of the project);

Category 2 (Impact Level 2): The proposed projects under this category are screened to determine whether a full EIA is needed. In this connection, RDB provides the developer with a clear indication of the additional information required. Once this information is received, RDB will determine whether a full EIA of the project is needed.

Category 3 (Impact Level 3): A full EIA is required.

In the guidelines prepared by REMA, the EIA requirements are defined as follows:<sup>[3]</sup>

A detailed EIA study is required if the road project considered in its entirety meets any of the following criteria:

- a) In the case of a new construction (new alignment):

- All main highways and national roads; and
  - All roads longer than 5 km and, the road reserve is > 15 m.
- b) In the case of rehabilitation, upgrading, or other improvement:
- Upgrading of roads to provide 4 or more lanes (continuous section of 10 km or more);
  - The road reserve is > 15 m, and the length of the road project is > 30 km; and
  - The road reserve is < 15 m, and the length of the road project is > 60 km.
- c) For all types of road projects:
- The road project or temporary infrastructure affects partly or completely more than 100 households;
  - The road project or temporary infrastructure crosses a river with a distance of 300 m (or less) inside the flood plain;
  - The road project or temporary infrastructure is located along an existing river bank with a distance of 30 m (or less) and a total length of more than 100 m;
  - The road project or temporary infrastructure is located 10 km from or within national parks, conservation areas, or forest reserves; and
  - The road project crosses a sensitive area.

Also, for non-major-impact projects, an initial environmental examination is required<sup>[4]</sup>:

For a project that is unlikely to:

- involve setting up temporary infrastructure within the existing road reserve;
- require any resettlement (within or outside of the road reserve);
- affect any sensitive area, e.g., a habitat of rare or threatened species;
- require a new borrow pit or other facilities (e.g., site camps); and
- create any important induced development.

Other institutions involved in the EIA processes are summarized as follows:

**Table 2.4.1: Key Institutions in EIA for Road Development Projects in Rwanda**

Institution/ Agency	Key Interests and Responsibilities
1 Ministry of Infrastructures (MININFRA)	Formulating policies, laws, and standards for road development in the country. Is also responsible for national roads, highways, bridges, and overseeing local road development.
2 Road Maintenance Fund (Font d'Entretien Routier (FER))	Mobilizing, financing, and technical resources for regular maintenance of highways and other national roads ensuring that road infrastructure is maintained to the required standards through proper procurement. The Rwanda Transport Board (RTB) oversees the implementation of the transport policy, including the management of roads, initiating public investment in transport services like licensing public transport service providers, rail, water, and air transport.
4 Ministry of Natural Resources (MINIRENA)	Formulating policies, laws, and standards for land administration and land use planning, environmental protection, and natural resource utilization. In roads development, a major responsibility is to determine compensation and provide land for resettlement of displaced people.
5 Ministry of Local Government (MINALOC)	National policies and laws on decentralization and local governance – supervising local government authorities which are responsible for district,

Institution/ Agency	Key Interests and Responsibilities
	local, and community roads.
6 Rwanda Environmental Management Authority (REMA)	National authority responsible for environmental regulations and standards setting and overseeing the implementation of the EIA guidelines. REMA will also be responsible for mobilizing, educating, and sensitizing stakeholders to follow or participate in the implementation of the EIA guidelines.
7 Ministry of Commerce, Trade, Industry, Cooperatives and Tourism (MINICOM)	Policies and laws relating to licensing of commercial and industrial activities, including premises.
8 City Council of Kigali	Responsible for the design and implementation of all urban infrastructures in the city, including inter-district roads. Providing and enforcing guidelines for construction work within Kigali City.
9 District Local Governments	Districts are responsible for the planning and execution of road construction and maintenance within their district.
10 Rwanda Bureau of Standards (RBS)	Imposition of regulations and standards on public utilities associated with housing/building, i.e., water, electricity, and telecommunications. This includes quality-of-service provision, including tariff setting.
11 National Land Centre (NLC)	Land registration and land use planning throughout the country. Compensation and resettlement will depend on legal ownership.
12 Electrogaz	National agency responsible for the provision of water and electricity utilities. In road development, Electrogaz' major stake in roads.

Source: REMA, Sector Specific EIA Guidelines for Road Construction Project

## **(8) PPP Laws**

The Law on Investment Promotion and Facilitation (LAW N° 06/2015 OF 28/03/2015 RELATING TO INVESTMENT PROMOTION AND FACILITATION)

The Law on Investment Promotion and Facilitation was enacted in March 2015, to promote and facilitate investment in Rwanda.[5] In the law, a foreign investor is defined as: a) a natural person who is not a citizen of Rwanda or of a member State of the East African Community (EAC) or the Common Market for Eastern and Southern Africa (COMESA); b) a business company or a partnership not registered in Rwanda or a member state of the East African Community, or COMESA; and c) a business company or a partnership registered in Rwanda whose foreign capital from countries other than the East African Community (EAC) or COMESA member states is at least fifty-one percent (51%) of the invested capital.

Foreign investors' rights--protection of investor's capital and assets are clearly stated and protected, as well as intellectual property rights.

PPP Law: LAW N° 14/2016 OF 02/05/2016 GOVERNING PUBLIC PRIVATE PARTNERSHIPS (PPP)

The PPP law was officially published at the end of May 2016. The conventional procurement process was designed only for the private sector; with the PPP Law, the government is a partner in investment projects and can receive value for money, unlike under the conventional procurement framework.

Article 6 of the law states the roles of public institutions in PPP. The Steering Committee is composed of: the Minister in-charge of Finance Economic Planning; the Minister in-charge of Infrastructure; the Chief Executive Office of the Rwanda Development Board; and the Head of the Contracting Authority, depending on the PPP project under study. The Steering Committee has the responsibility to approve and oversee the PPP projects. The responsibility of the contracting authority is stated in Article 9. The contracting authority identifies the PPP project and conducts feasibility studies. During implementation, the contracting authority needs to provide the Steering Committee with monthly and annual progress reports on the implementation.

## **(9) Speed Governor**

PRESIDENTIAL ORDER N° 25/01 OF 25/02/2015 MODIFYING AND COMPLEMENTING PRESIDENTIAL DECREE N° 85/01 OF 02/09/2002

## REGULATING GENERAL TRAFFIC POLICE AND ROAD TRAFFIC AS MODIFIED AND COMPLEMENTED TO DATE

Articles 29 and 30 of the order limit the speed of a public or good transport vehicle to sixty kilometers per hour (60 km/h). All public or goods transport vehicles must be equipped with speed governors, and a qualified agent may stop any public or goods transport vehicles for the verification of the installation and proper functioning of a speed governor.

### **(10) Motorcycle Public Transport Service**

#### REGULATION No 008/TRANS/RT/RURA/2018 OF 21/12/2018 GOVERNING MOTORCYCLE PUBLIC TRANSPORT SERVICES IN RWANDA

This is a regulation by RURA to govern moto-taxis in Rwanda. Chapter II defines licensing application, issuance, and renewal requirements.

### **(11) Public Transport Bus Services**

#### REGULATIONS N° 010/R/TL-TPT/TRANS/RURA/2021 OF 14/12/2021 GOVERNING PUBLIC TRANSPORT BUS SERVICES

This is a regulation by RURA on public bus services. The regulation has 1) a licensing regime for public transport; 2) fare, fees, promotion, and advertisement; 3) luggage transportation; and 4) enforcement powers and administration sanctions. Article 14 states that when a zone is fully serviced, the license is not issued. Article 44 gives a right to an authorized staff member of RURA if accompanied by a police officer to stop a public transport bus. A sanction will be imposed on public bus transport operators for illegal operations. The table of license fees and fines is attached. Also, a simple description of standard vehicle conditions is stated at the end of the regulation.

### **(12) Moto Taxi Fare**

#### BOARD DECISION N° 03/BD/RD-TRP/2021 OF 27TH SEPTEMBER, 2021 REVIEWING THE FARE FOR MOTORCYCLE PUBLIC TRANSPORT SERVICES IN RWANDA

The Board decided the tariffs of the moto taxis as follows:

- The fare for one-time travel within 2 km is RWF 300.
- The kilometer rate applicable to distance traveled after 2 km but not beyond 40 km is RWF 107.
- The kilometer rate applicable to distance traveled beyond 40 km is RWF 187.

### **(13) City of Kigali, Organizational Restructuring**

#### LAW N° 22/2019 OF 29/07/2019 GOVERNING THE CITY OF KIGALI

“LAW N° 22/2019 OF 29/07/2019 GOVERNING THE CITY OF KIGALI” has changed the organization structure of the City of Kigali. The three urban districts, namely Gasabo, Kikukiro, and Nyarugege, lost their autonomy. An appointed District Executive Administrator manages the urban districts. The policy on decentralization, namely, the National Decentralization Policy (revised), was reversed in 2012.

In Article 27 of the Law in 2019, it is specified that infrastructure development projects in the district plans need to be consistent with the city’s master plan, and they are to be implemented with the city’s budget and plan. This guarantees the consistency of plans and projects between the city of Kigali and

the urban districts. The centralization policy makes city management and decision-making more efficient, as consistencies of district roads are guaranteed.

#### **(14) The Modalities of Facilitating Persons with Disabilities**

MINISTERIAL ORDER N°02/cab.M/09 OF 27/7/2009 DETERMINING THE MODALITIES OF FACILITATING PERSONS WITH DISABILITIES ON NECESSARY TRAVELS WITHIN THE COUNTRY

Article 5 makes it a requirement that the owners of buses reserve seats and secure entrance doors for persons with disabilities. The program shall be prepared by the state.

Article 6 states that all bus stops or public transport vehicles must be developed in such a way that they facilitate persons with disabilities to easily board vehicles.

<sup>[1]</sup> Environmental and Social Impact Assessment (ESIA) for the Upgrading Project of Ngoma-Nyanza Road, Rwanda Transport Development Agency (RTDA), p.21

<sup>[2]</sup> Environmental and Social Impact Assessment (ESIA) for the Upgrading Project of Ngoma-Nyanza Road, Rwanda Transport Development Agency (RTDA), p.21

<sup>[3]</sup> Sector Guidelines for Environmental Impact Assessment (EIA) For Roads Development Projects in Rwanda, REMA. p.16

<sup>[4]</sup> Ibid. p.20.

<sup>[5]</sup> Chapter One, Article 1: Purpose of this Law

#### **(15) Land and Waterways Transport in Rwanda**

##### **Law No. 042/2023 of 02/08/2023 governs land and waterways transport in Rwanda**

Chapter I: General Provisions This chapter establishes the purpose, interpretation, and scope of the law. It lays the foundational framework for the governance of land and waterways transport, setting the stage for detailed regulations in subsequent chapters.

Chapter II: Roads This chapter details the classification and naming of roads, encompassing national, district, local, and specific roads. It also covers the construction, management, width specifications, road reserves, and preservation procedures for roads, emphasizing the importance of infrastructure quality, safety, and maintenance.

Chapter III: Public Transport on Public Roads Focused on public transport on roads, this chapter addresses the safety of people and goods, vehicle insurance, professional certification, and compliance with alcohol limits. It covers the categorization of vehicles for passenger and goods transport, load control, vehicle stations, and regulations for the operation of passenger and goods transport services, highlighting the commitment to safety, efficiency, and regulatory compliance in public road transport.

Chapter IV: Railway This chapter outlines the components, categories, construction, maintenance, development, and safety of railways. It includes provisions for railway staff training, licensing, public rail transport, and maintenance and repair of trains. The chapter emphasizes the importance of safe, efficient, and well-maintained railway systems for public and goods transport.

Chapter V: Transport on Waterways Covering waterways transport, this chapter details the determination, categorization, and management of waterways, including vessel registration, transfer, de-registration, navigation, and safety. It also outlines public transport on waterways, focusing on the safety of passengers and goods, vessel insurance, compliance with load and alcohol limits, and incident management, reflecting the law's comprehensive approach to regulating waterway transport.

#### **2.4.2 Activity 3-2: To motivate the creation of a coordination body by agencies related to public transport and transport management in Kigali**

One brainstorming session was conducted on November 1, 2022. The JET explained the contents of the Kigali Master Plan 2013 and 2050 (2020) and the National Transport Policy 2021, as well as the significance of the technical cooperation to the participants.

The City of Kigali (CoK) decided to establish an Urban Mobility Department and started to recruit 16 staff members. The establishment of the Public Transport Department was officially decided on 22nd February 2024, and it is responsible for bus operation management and DBL (Dedicated Bus Lane)-related activities. It was originally planned to have 16 staff members, but currently only 10 are assigned to the department.

The draft agreement for establishment of Urban Mobility Department includes the following contents:

##### **(1) Purpose and Mandate:**

- Plan the establishment of the Kigali Transport Authority (KTA).
- Coordinate and resolve cross-agency activities related to public transport and traffic management in Kigali, as outlined in the National Transport Policy and Strategy (2021).
- Manage interim urban mobility improvement initiatives until the KTA becomes fully operational.

##### **(2) Multi-agency Membership:**

- Includes representatives from key sectors such as the Ministry of Infrastructure, City of Kigali, Rwanda National Police, Rwanda Transport Development Agency, and other regulatory and planning bodies.
- Ensures integrated decision-making and holistic planning for Kigali's transport needs.

##### **(3) Operational Structure:**

- Regular quarterly meetings to track progress and address emerging challenges.
- Formation of specialized sub-sector committees to address urgent priorities, such as public transport, traffic management, and transport funding.
- A designated chairperson and secretariat to facilitate day-to-day coordination and maintain comprehensive records.

##### **(4) Strategic Contributions:**

- Development of Urban Transport Fund mechanisms to ensure sustainable financial support for mobility projects.
- Drafting transport planning guidelines for Kigali, tailored to its status as the capital and aligning with district and national transport master plans.

This agreement underscores the government's commitment to institutionalizing collaboration and streamlining efforts in the transport sector. It sets a precedent for coordinated governance while laying the groundwork for establishing the Kigali Transport Authority.

### **2.4.3 Activity 3-3: To develop comprehensive mobility improvement measures (policy and plans) under the coordination body as stipulated in the National Transport Policy (i.e., capacity development for urban transport and traffic management);**

In the official letter dated April 25, 2023, JET recommended establishing committees within a coordination body, initially envisioning the submission of an organizational chart along with the functions of KTA. As a reference to the proposed organization chart, the City of Kigali has drafted an Urban Mobility Department within the City of Kigali.

The draft Inter-agency Agreement was prepared for signing by the ministries and the city, with MININFRA serving as the chair. It proposed quarterly meetings with possible agenda items for discussion. With the draft, the CP side decided to include MINECOFIN and RDA to resolve issues related to importing auto parts and other economic and financial matters.

At the meeting on June 8, it was confirmed that the discussion items regarding comprehensive urban mobility policies and plans were included in Activity 3-3, and it was further confirmed that the activities would be planned under the CP's initiative.

On December 4, 2023, JET was further notified that its domain would be extended to the national level, evolving into the Rwanda Transport Authority (RTA). As the contents of the action plans were being considered, comprehensive mobility improvement measures were discussed with the members of the CP.

Following the summary of measures:

#### **(1) Urban Transport Measures**

Enhancing urban transport systems is paramount for addressing inefficiency and limited accessibility in Rwanda's cities. Current gaps, such as disconnected bus routes and inadequate infrastructure, hinder the ability to provide timely and reliable services. To resolve these issues, key measures have been identified, including the optimization of bus routes and schedules to improve coverage and reduce travel time. Additionally, infrastructure improvements, such as modernized bus stops and terminals, will enhance user comfort and convenience. To support sustainable urban mobility, priority will be given to integrating non-motorized transport options and environmentally friendly alternatives, such as electric buses and bike-sharing programs, fostering a multimodal and inclusive transport system.

#### **(2) Traffic Management Enhancements**

Efficient traffic management is vital for reducing congestion and improving mobility across urban areas. However, challenges such as bottlenecks at intersections, limited traffic data collection, and poorly managed parking systems have hindered the progress. To address these obstacles, the implementation of adaptive traffic control systems and real-time monitoring technologies will be pursued to streamline vehicle flow. Data-driven insights will enable proactive decision-making and targeted interventions. Furthermore, regulated parking zones supported by digital payment systems will alleviate on-street parking congestion, while designated loading areas will facilitate the efficient movement of goods and services, contributing to a more organized and functional urban transport environment.

#### **(3) Organizational Development**

Effective organizational structures are critical for the successful implementation of urban mobility initiatives. The proposed establishment of a Public Transport Department (PTD) and an Infrastructure Department will provide focused leadership and oversight in key areas, ensuring cohesive planning, regulation, and execution of transport strategies. Additionally, recruiting skilled personnel and implementing targeted capacity-building programs will enhance institutional capabilities, equipping the workforce to address emerging challenges and leverage innovative solutions. By fostering

interdepartmental collaboration, the government aims to deliver high-quality, sustainable transport services to the public.

#### **(4) Technology Integration**

To modernize urban transport, integrating advanced technologies will play a central role in improving system efficiency and service quality. Hardware solutions, such as GIS tools and real-time passenger information systems, will enable precise planning and improve user experiences. Software solutions, including data analytics tools and fleet management systems, will optimize operations and facilitate informed decision-making. These technologies will empower transport operators and planners to anticipate and address issues proactively, fostering a seamless, responsive urban transport network that aligns with national development objectives.

#### **(5) Implementation Phases**

A phased implementation approach will ensure the systematic and sustainable development of urban mobility systems. In the short term (Years 1-2), immediate priorities include upgrading critical infrastructure and addressing operational inefficiencies. By the mid-term (Years 3-5), the focus will shift to expanding public transport networks and integrating sustainable transport options, laying the groundwork for long-term benefits. In the long term (Year 5+), the government envisions a fully integrated and resilient urban mobility system that supports economic growth, reduces environmental impact, and enhances the citizens' quality of life. This structured approach will allow for adaptability and continuous improvement throughout the implementation process.

##### **2.4.4 Activity 3-4: To consider authorities, roles, and responsibilities of the coordination body and assess the feasibility of creating a dedicated body for implementation of measures identified in 3-3 and produce an action plan (roadmap) toward the establishment of that authority**

On December 1, 2022, a brainstorming session was conducted to discuss the issues that should be addressed in the coordinating body and to review meeting dates and schedules.

Using a questionnaire format, respondents were asked which department is currently responsible for the functions outlined in the 2013 Kigali Master Plan and which department should ideally be responsible. They were also asked to prioritize the implementation in the short, medium, and long term, and to indicate the frequency of discussions in the coordinating body and which existing government agencies or organizations should participate in those discussions. While there was only one response, the results are presented below.

**Table 2.4.2: Results of the Opinion Survey on Prioritization of Coordination in the Coordinating Body and the Establishment Roadmap of KTA**

Primary Role	Sub-category	Current Situation		Ideal Situation		Actions to be Taken by	Action Period	Coordination Meeting
		Inter-city between Province Bus/Rail Service in Kigali	Intra-city Bus Service (General)	Inter-city between Province Bus/Rail Service in Kigali	Intra-city Bus Service (General)	Leading public entity. Identify department /divisions	Short (by 2024) Mid (by 2035) Long (by 2050)	If necessary, when? Identify stakeholders to be invited. TWICE A YEAR
Planning	Strategic transport & urban development planning	RURA	RURA	RTDA/RURA	KTA/COK	KTA	Establish the body in Medium term	MININFRA, RURA, RTDA,COK, RNP, PSF
	Planning route networks and development services	RURA	RURA	RTDA/RURA	KTA/COK	KTA	Review of existing route (short term)	MININFRA, RURA, RTDA, COK, RNP, PTO, PSF
	Strategic service planning bus/railway integration	RURA	RURA	RTDA/RURA	KTA/COK	RTDA/ KTA		MININFRA, RURA, RTDA,COK, RNP
	Planning Public Transport Infrastructure Development	RURA	RURA	RTDA	KTA/COK	KTA		MININFRA, RURA, RTDA,COK, RNP, DP
Regulation	License and permit approval	RURA	RURA	RURA	KTA/COK+RURA	RURA		MININFRA, RURA, RTDA,COK, RNP
	Administrative & Technical Standards Minimum Service Standards and Guidelines	RURA	RURA	RTDA	KTA/COK	KTA		MININFRA, RURA, RTDA,COK, RNP, PTO
	Fare policy	RURA	RURA	RURA	RURA	RURA	Review and confirm fare levels (short term)	MININFRA, RURA, RTDA,COK, RNP, PTO
Finance	Financial Arrangement for Business Operation (facilitate loan, subsidy)	RURA	RURA	RTDA	KTA/COK+RTDA			MININFRA, RURA, RTDA,COK, RNP,PSF
Fare/marketing	Development of the Fare-Collection System (ticketing system)	RURA	RURA	RURA	KTA/COK+RURA			MININFRA, RURA, RTDA,COK, RNP, PTO
	Marketing/Promoting Public Transportation Services	RURA	RURA	RTDA/ RURA	KTA/COK+RURA			
Infrastructure Development	Financial planning, budgeting and procurement	RTDA	COK	RTDA	COK	KTA/COK and RTDA PT department	Mid term acquisition of all bus terminals and parks	Consultations to be held quarterly / MININFRA, RURA, RTDA, COK, RNP, PTO
	Infrastructure Development (construction)	RTDA/ DISTRICTS	COK	RTDA	COK	KTA/COK and RTDA PT department	Development of needed infra	Consultations to be held quarterly / MININFRA, RURA, RTDA, COK, RNP, PTO
	Construction Supervision & Technical Inspection	RTDA/ DISTRICT	COK	RTDA	COK	KTA/COK and RTDA PT department		MININFRA, RURA, RTDA, COK, RNP, PTO
Asset Management	Land	DISTRICTS	COK	DISTRICTS	COK	KTA/COK and RTDA PT department	Planning land reserve acquisition	Consultations to be held quarterly/ / MININFRA, RURA, RTDA, COK, RNP, PTO
	Base Infrastructure	RTDA/ DISTRICTS	COK	DISTRICTS	COK	KTA/COK and RTDA PT department		MININFRA, RURA, RTDA, COK, RNP, PTO
	Upper Infrastructure (bus terminal, bus station)	RTDA/ DISTRICTS/ PTO	COK	RTDA	COK	KTA/COK and RTDA PT department	CoK and RTDA to acquire all the assets for PT and give the management to private entities under performance contracts	Consultations to be held quarterly/ / MININFRA, RURA, RTDA, COK, RNP, PTO
	Fleets and equipment	PTO	COK	RTDA/PTOs	COK/ PTOs	KTA/COK and RTDA PT department	Short term Review the fleet acquisition and ownership to promote	Consultations to be held quarterly / MININFRA, RURA, RTDA, COK, RNP, PTO

Source: JICA Expert Team

In Activity 3-2, an inter-agency agreement was reached, prompting a request from CP to consider the organizational structure of KTA. A draft report on "Organizational Structure and Functions" was prepared and submitted on June 5<sup>th</sup>, 2023. Based on this draft, a thorough examination of the organizational structure was conducted, including personnel allocation and budget considerations.

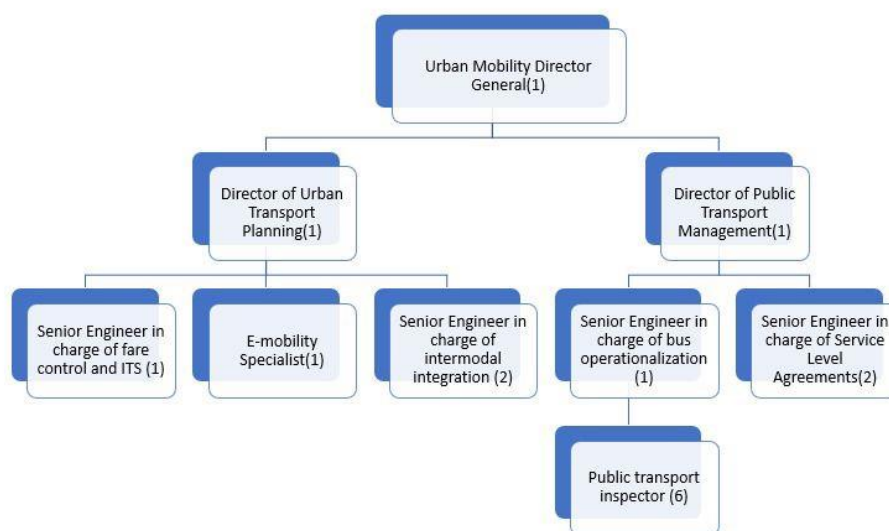
Although the action plan for establishment has not yet commenced, during the WG3 meeting on June 7<sup>th</sup>, it was confirmed that the ongoing TMC project could serve as the foundation for the Data Analysis Division within the Planning and Development Department of KTA.

On December 5, 2023, it was confirmed that the Urban Mobility Department would be established in CoK with an expected staff of 16, primarily transportation and urban planners.

Following the CP's initiative, an extensive outline for the Rwanda Transport Authority (RTA) was developed, marking a significant transition from a department within CoK to the national-level organization. A phased transition plan was prepared to transfer and integrate the functions of CoK, RTDA, and RURA into RTA.

On February 22, 2024, the Urban Mobility Department was officially established. Despite its modest size, the department serves as an incubator for integrating all public transport activities in Rwanda.

## CoK Urban Mobility Department (16)



Source: JICA Expert Team

**Figure 2.4.1: Organization Chart of CoK Urban Mobility Department**

Activity 3-4 centers on evaluating the feasibility and readiness of the Public Transport Department (PTD) within the City of Kigali to transition into the proposed Kigali Transport Authority (KTA). The aim is to assess existing capabilities, identify gaps, and establish the foundational roles and responsibilities necessary for this transformation. A pivotal element of this initiative is the Kigali Transport Corporation (KTC), which will serve as the asset management entity for public transport service delivery. The activity outlines the clear distinctions between KTC's operational role and KTA's oversight and regulatory responsibilities, ensuring a well-coordinated urban transport management.

A detailed roadmap will guide the establishment of KTA, emphasizing on a phased approach to strengthen PTD's capacity, integrate KTC's operational structure, and facilitate smooth transition. This structured plan will also clarify inter-agency relationships and coordination mechanisms, involving key stakeholders such as the Rwanda Transport Development Agency (RTDA) and Rwanda National Police

(RNP) to ensure effective collaboration. These efforts aim to develop an efficient, integrated, and sustainable transport framework for Kigali.

A roadmap for two years and longer is summarized as follows:

### **(1) Short-term Actions (0–12 Months)**

The initial phase of establishing the Kigali Transport Authority (KTA) focuses on laying the groundwork through capacity-building measures and strategic coordination. During this period, the Public Transport Department (PTD) will undergo a detailed gap analysis to identify its current capabilities and areas requiring enhancement. Based on these findings, PTD's expanded roles will be defined, emphasizing its transitional responsibilities in Intelligent Transport Systems (ITS) integration, multimodal transport management, and service-level oversight. To ensure a structured transformation, a comprehensive transitional framework will be developed, outlining a roadmap for PTD's evolution into KTA.

Simultaneously, coordination mechanisms with the Kigali Transport Corporation (KTC) will be established to foster alignment between policy and operational delivery. This includes forming a joint working group to oversee the transition, creating standardized reporting protocols for seamless communication, and aligning operational priorities to ensure cohesive public transport services. To support effective regulation and service delivery, guidelines for Service-level Agreements (SLAs) will be drafted, setting benchmarks for operational standards. Additionally, pilot corridors for ITS deployment will be identified, and an implementation roadmap will be crafted to guide ITS integration into Kigali's transport system.

### **(2) Mid-term Actions (12–24 Months)**

Building upon the foundation set in the initial phase, the mid-term period will focus on piloting KTA's core functions in collaboration with KTC. During this phase, ITS-based service monitoring systems will be deployed to enhance operational transparency and efficiency. Intermodal integration pilots will be launched, combining bus services with non-motorized transport (NMT) options and emerging e-mobility solutions to demonstrate the potential for seamless multimodal urban transport. In tandem, mechanisms for enforcing SLAs will be tested, ensuring that public transport operators adhere to defined quality and performance standards. Capacity-building programs will also be conducted to equip staff and stakeholders with the skills necessary to manage and sustain these initiatives.

The outcomes of these pilot projects will provide critical insights for refining operational frameworks. Lessons learned will inform updates to SLA guidelines, ITS deployment strategies, and intermodal transport policies. This iterative approach ensures that the KTA framework remains adaptive and responsive to the practical challenges of urban transport management. By the end of this phase, KTA will have a stronger operational foundation, paving the way for its full establishment as a transport authority.

### **(3) Long-term Actions (24+ Months)**

In the final phase, the focus will shift toward institutionalizing KTA as a fully functional authority with a formal governance structure. Legal and administrative approvals will be secured to establish KTA's legitimacy. An organizational blueprint outlining the authority's roles, responsibilities, and hierarchical structure will be finalized. Additionally, leadership and staff recruitment will prioritize expertise in urban transport management, ITS, and multimodal integration. Governance protocols will also be introduced to ensure accountability, transparency, and stakeholder engagement.

As KTA assumes its role, the functions, personnel, and resources of the PTD will be seamlessly transitioned to the new authority. A structured transition plan will guide this process, with clear milestones to monitor progress and address challenges. Finally, KTA will formalize its regulatory oversight of KTC by drafting and enforcing comprehensive SLAs, establishing data-sharing protocols,

and conducting regular audits and inspections. This long-term phase will culminate in the realization of KTA as a robust and sustainable transport authority, capable of driving Kigali's urban mobility system into the future.

#### **2.4.5 Activity 3-5: [If its feasibility is confirmed] To develop an architecture of policy guidance and its implementation (relation of central ministries, the city of Kigali, and dedicated authority)**

The components of the policy architecture are as follows:

##### **(1) Policy Guidance Framework**

The policy framework focuses on identifying and aligning key policies, including the National Transport Policy Statement (NTPS 2021), the Kigali Master Plan, and the City of Kigali's local regulations. The primary objective is to ensure that national goals, such as multimodal integration and sustainable urban mobility, are effectively embedded into Kigali's transport system. As the lead policy body, the KTA will bridge national-level policies with local implementation and integrate operational feedback from transport stakeholders to continuously refine policies and strategies.

##### **(2) Coordination Mechanisms**

Effective coordination is emphasized to unify efforts across various stakeholders. The central ministries will oversee national-level alignment, while the City of Kigali will integrate transport goals within local planning frameworks. The KTA will function as the intermediary, ensuring operational compatibility and policy coherence across different levels of governance. Structured communication protocols and working groups will support joint efforts and collaborative decision-making.

##### **(3) Institutional Relationships**

Formalizing relationships among key stakeholders through Memoranda of Understanding (MoUs) is essential for achieving a well-coordinated transport system. These agreements will outline roles and responsibilities between KTA, KTC, CoK, and other relevant agencies, ensure accountability and smooth collaboration, and strengthen institutional ties to streamline transport operations and eliminate redundancy.

##### **(4) Master Plan Revision Oversight**

The Kigali Master Plan will undergo revisions to reflect updated transport priorities, including sustainable land use, multimodal hubs, and green transport initiatives. The KTA, in collaboration with the CoK and central ministries, will play a central role in ensuring these revisions are aligned with both national and local transport objectives, fostering a more integrated and efficient transport network.

##### **(5) Strategic Enhancements to Coordination Mechanisms**

To strengthen collaborations among stakeholders, new mechanisms, such as policy directives and administrative orders, will be introduced. Capacity-building initiatives for integrated planning and shared data platforms will further enhance inter-agency coordination, supporting the cohesive implementation of transport policies.

##### **(6) Policy Implementation Pathway**

The implementation pathway is divided into three phases to ensure a systematic approach. In the short-term (pilot phase), the focus will be on revising the Kigali Master Plan and piloting the implementation of ITS. The mid-term (transition phase) will emphasize the formalization of the Urban Mobility Master Plan, the establishment of multimodal transport hubs, and the development of advanced traffic control

systems. In the long-term (operational phase), transport solutions will be scaled citywide, embedding sustainability and adaptability into the transport system.

### **(7) Establishing a Governance and Policy Framework for Urban Transport Management**

This component outlines the need for well-defined roles and coordination mechanisms among stakeholders, including central ministries, CoK, KTA, and KTC. It ensures that each entity's mandate align with the revised master plan, enabling efficient policy implementation and oversight.

### **(8) Defining Roles and Coordination Mechanisms Among Key Stakeholders**

The roles of central ministries, CoK, KTA, and KTC are clearly defined to ensure that all stakeholders contribute effectively. Central ministries will provide oversight and policy direction, CoK will handle local regulatory alignment, KTA will manage transport planning and supervision, and KTC will focus on service delivery and operational feedback.

### **(9) Guiding the Revision of the Kigali Master Plan**

The Kigali Master Plan will be updated to integrate transport objectives, including sustainable mobility, ITS deployment, and multimodal infrastructure. KTA will oversee the integration of these priorities into urban development strategies, ensuring alignment with broader national goals.

### **(10) Providing Actionable Pathways for Policy Implementation**

KTA's role in regulatory oversight and KTC's focus on implementing strategies will serve as the foundation for effective policy execution. Collaborative platforms and feedback mechanisms will support the ongoing refinement of transport initiatives, ensuring responsiveness to emerging challenges.

### **(11) Gap Identification and Implementing Solutions**

Key gaps, such as coordination challenges, misaligned roles, and inefficient communication, are identified. Proposed solutions include enhancing stakeholder engagement, establishing joint governance committees, and improving data-sharing protocols to address these issues effectively.

### **(12) Limited Interagency Communication**

Fragmented communication between CoK, KTA, and national agencies hinders coordination. The report recommends establishing improved frameworks, such as structured interagency meetings, reporting tools, and dashboards, to enhance collaboration and data-driven decision-making.

### **(13) Stakeholder Roles**

Each stakeholder's role is clearly defined, from national oversight by central ministries to operational alignment by KTC. CoK will lead master plan revisions, while KTA will oversee policy integration and regulation. Clear role definitions aim to minimize overlaps and ensure accountability.

### **(14) Institutional Relationships and Regular Interagency Forums**

The report recommends holding quarterly interagency meetings to review progress, address challenges, and align priorities. Regular forums will provide a platform for continuous dialogue, enabling adaptive planning and effective collaboration among stakeholders.

### **(15) Policy Implementation and Long-term Sustainability**

Short-term Actions (0–12 Months):

The short-term focus is on revising the Kigali Master Plan to incorporate transport priorities such as multimodal integration, ITS deployment, and sustainable mobility solutions. Pilot projects, including ITS-based traffic management and data-driven planning initiatives, will be launched to test and refine strategies. Foundational agreements, such as Memoranda of Understanding (MoUs) between KTA, KTC, and other stakeholders, will formalize roles and lay the groundwork for collaborative efforts.

**Mid-term Actions (12–24 Months):**

In the mid-term, the emphasis shifts to formalizing the Urban Mobility Master Plan, integrating lessons from the revised Kigali Master Plan and pilot initiatives. Key projects, such as developing multimodal hubs and implementing advanced traffic control systems, will enhance connectivity and reduce congestion. Regulatory and operational frameworks for KTA will also be finalized, equipping the authority with the legal and administrative tools necessary to oversee Kigali’s transport ecosystem effectively.

**Long-term Actions (24+ Months):**

The long-term strategy focuses on embedding the Urban Mobility Master Plan into Kigali’s broader development strategy to ensure transport planning aligns fully with sustainable urban growth goals. Scaled citywide solutions, including ITS systems, multimodal infrastructure, and green transport initiatives, will be deployed. Governance structures will be formalized to ensure sustained collaboration between KTA, KTC, CoK, and national agencies. Regular updates and feedback mechanism will ensure that Kigali’s transport policies and systems remain adaptive, scalable, and sustainable over time.

**2.4.6 Activity 3-6 [If its feasibility is confirmed] To formulate the mandate and work plan for the dedicated Authority**

**(1) Mandate**

A draft mandate is as follows:

**Proposed Outline**

**Chapter I: General Provisions**

Article 1: Purpose and Objectives of the Kigali Transport Authority (KTA)

Article 2: Vision, Mission, and Core Values

Article 3: Alignment with National and Regional Transport Goals

**Chapter II: Organizational Structure and Governance**

Article 4: Governing Board

Article 5: Advisory Committees and Stakeholder Engagement

Article 6: Executive Leadership and Functional Divisions

**Chapter III: Mandates and Core Functions**

Article 7: Strategic Planning and Policy Development

Article 8: Regulatory Oversight within the City of Kigali (CoK)

Article 9: Intelligent Transport Systems (ITS)

Article 10: Sustainability and Climate Action

Article 11: Customer Advocacy and Policy Input

Article 12: Coordination of Multimodal Transport

Article 13: Data and Policy Monitoring

Article 14: Safety and Compliance

#### Chapter IV: Collaboration with KTC and Other Stakeholders

Article 15: Clear Division of Roles with KTC

Article 16: Coordination Mechanisms for Shared Objectives

Article 17: Joint Oversight of Service-Level Agreements

#### Chapter V: Monitoring, Evaluation, and Reporting

Article 18: Performance Indicators and Annual Reviews

Article 19: Passenger Feedback Mechanisms

Article 20: Publication of Reports and Transparency Measures

#### Chapter VI: Integration of RURA Functions within the CoK Area

Article 21: Licensing, Tariffs, and Safety Standards

Article 22: Transition of Regulatory Powers and Roles

Article 23: Coordination Framework with RURA

#### Chapter VII: Implementation and Transition Plan

Article 24: Phased Integration of Public Transport Department (PTD) Functions into KTA

Article 25: Capacity Building and Training Programs

Article 26: Continuous Improvement and Adaptation

#### Chapter VIII: Final Provisions

Article 27: Legal Framework for KTA Establishment

Article 28: Glossary of Terms and Acronyms

Article 29: Key Stakeholder Roles and Responsibilities

## **(2) Work Plan**

A work plan for KTA is as follows:

The work plan spans 24 months and prioritizes the integration of existing systems, emphasizing operational efficiency, and fostering stakeholder collaboration.

Phase 1: Strengthening Core Capabilities of PTD

Timeline: 0–6 Months

Key Actions:

1. Integration of E-ticketing Systems:

- Enhance data analytics and reporting features in existing e-ticketing systems to improve decision-making.
- Establish protocols for data sharing between operators and stakeholders.

2. Capacity Building:

- Train staff in Intelligent Transport Systems (ITS) and data management to support evidence-based planning and service monitoring.
- Recruit specialists in transport policy, technology, and sustainability.

3. Policy Framework Development:

- Develop foundational policies for public transport management, service standards, and ITS utilization.

Outputs:

- Integrated e-ticketing system with enhanced analytics and reporting.
- Trained personnel equipped for operational and strategic tasks.
- Approved foundational policies for KTA operations.

Phase 2: Formalizing KTA Governance and Operations

Timeline: 6–18 Months

Key Actions:

1. Establish KTA Organizational Structure:

- Create specialized units for operations, data analysis, policy enforcement, and stakeholder engagement.

Appoint key leadership and operational roles within KTA.

2. Pilot Integrated ITS Solutions:

- Implement pilot projects using ITS to monitor service reliability, traffic flow, and passenger demand.

Evaluate the effectiveness of ITS integration for citywide scaling.

3. Stakeholder Engagement and Coordination:

- Develop communication frameworks with Kigali Transport Corporation (KTC) for joint service improvement.
- Establish formal agreements with the City of Kigali (CoK) and other stakeholders to define roles and responsibilities.

Outputs:

- Fully staffed and operational KTA organizational structure.

- Results from ITS pilot projects to guide citywide implementation.
- Formalized stakeholder agreements and communication protocols.

### Phase 3: Full Implementation and Operationalization of KTA

Timeline: 18–24 Months

#### Key Actions:

1. Citywide Deployment of ITS and Data Systems:
  - Expand ITS for real-time traffic monitoring, multimodal integration, and service optimization.
  - Launch comprehensive reporting systems to track operational KPIs and generate actionable insights.
2. Sustainability and Infrastructure Improvements:
  - Scale green mobility initiatives, such as electric buses and enhanced pedestrian pathways.
  - Upgrade key transport hubs to support multimodal connectivity.
3. Performance Monitoring and Policy Refinement:
  - Implement data-driven monitoring systems to evaluate service standards and compliance.
  - Use findings to refine policies and ensure continuous improvement.

#### Outputs:

- Citywide ITS deployment supporting integrated urban mobility.
- Enhanced infrastructure for sustainable transport options.
- Regular performance reports guiding strategic improvements.

#### Monitoring and Evaluation

##### Review Timeline:

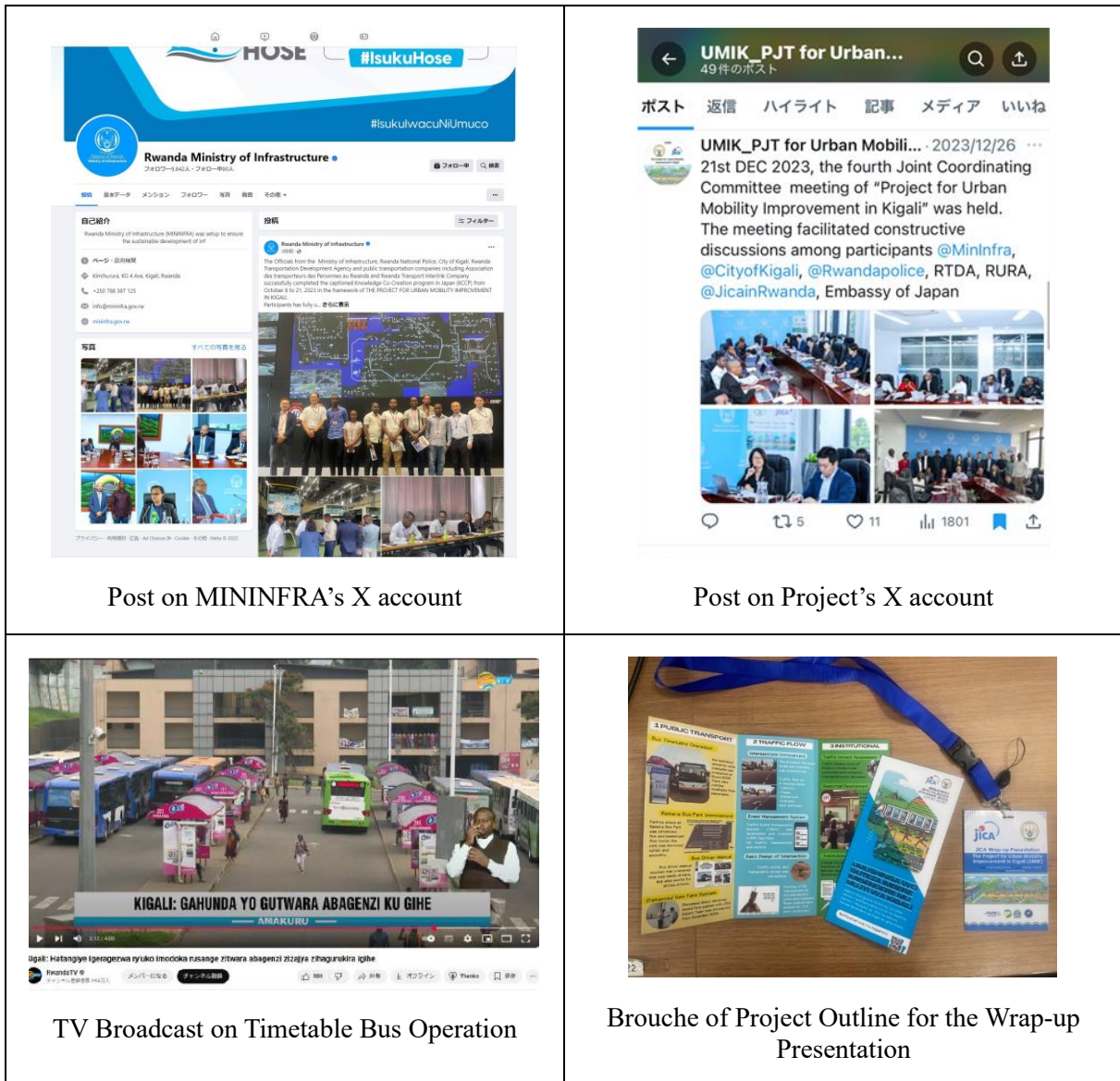
- Quarterly reviews to assess progress in each phase.
- Annual evaluations post-operationalization to track the impact of KTA's implementation.

## 2.5 Public Relation Activity

The purpose of the public relation activity is to enhance public awareness among citizens and stakeholders about its progress and outcomes, as well as to publicize the implementation of the Priority Actions (Pilot Projects) in the Action Plans. To facilitate this, a project Twitter account (referred to as “X”) has been established as part of an overall project publicity campaign since X is the most popular for Rwandan people as a social media. This platform was used to inform about activities related to technology transfer, such as joint field surveys in Kigali, on-site lectures, and training programs in Japan.

Through collaboration with the division of public relations of MININFRA, COK, University of Rwanda and the JICA Rwanda office, the dissemination of information about UMIK's initiatives to a wider audience has been achieved. For instance, the article on the 4<sup>th</sup> JCC attracted over 1,800 views on platform X.

During the implementation of the pilot project, public dissemination to citizens and bus users was collaboratively conducted through TV and social media.



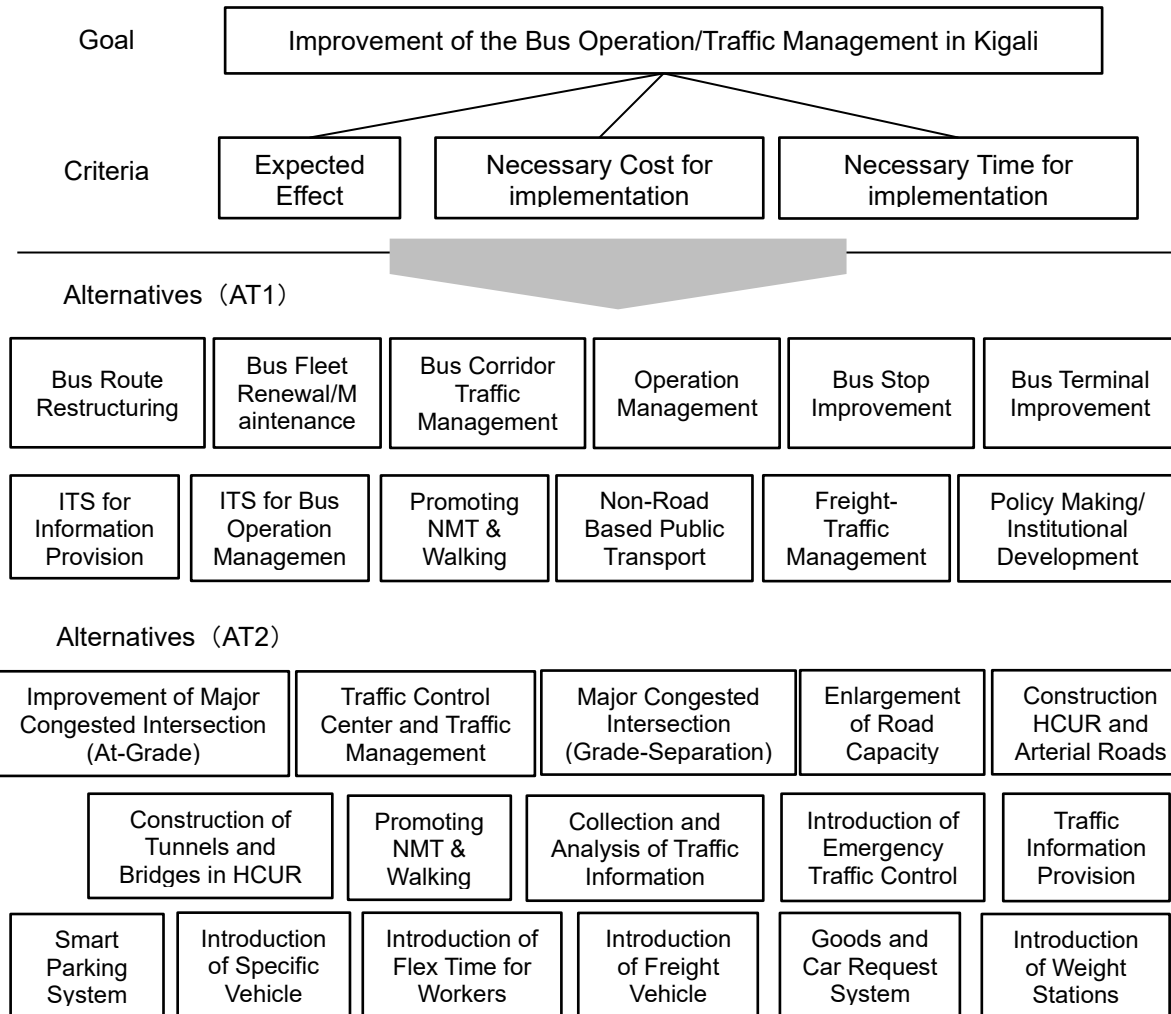
Source: JICA Expert Team

**Figure 2.5.1: PR Activities collaborated with CP**

## 2.6 Pilot Projects

### 2.6.1 Selection of the Project

Based on discussions within the WGs during the formulation of the Action Plan, the importance of alternatives (proposed measures in the Action Plan) was assessed using the Analytic Hierarchy Process (AHP) to determine the implementation contents and classifications for pilot projects. The top three measures were selected based on these evaluations. The results of AHP for Activities 1 and 2 are shown in the table below.



\*The importance of each alternative is calculated using binary comparison by each evaluation criteria.

Source: JICA Expert Team

**Figure 2.6.1: Procedures of AHP (AT1 and AT2)**

**Table 2.6.1: Importance of each alternative for AT1 and AT2**

Activity 1		Activity 2	
Alternative	Importance	Alternative	Importance
Bus Route Restructuring	0.043	Improvement of Major Congested Intersection (At-Grade)	0.080
Bus Fleet Renewal/Maintenance	0.062	Traffic Control Center and Traffic Management Center	0.080
Bus Corridor Traffic Management	0.040	Major Congested Intersection (Grade-Separation)	0.062
Operation Management	0.181	Enlargement of Road Capacity	0.071
Bus Stop Improvement	0.039	Construction HCUR and Arterial Roads	0.074
Bus Terminal Improvement	0.066	Construction of Tunnels and Bridges in HCUR	0.066
ITS for Information Provision	0.210	Promoting NMT & Walking	0.065
ITS for Bus Operation Management	0.146	Collection and Analysis of Traffic Information	0.081
Promoting NMT & Walking	0.052	Introduction of Emergency Traffic Control	0.043
Non-Road Based Public Transport	0.052	Traffic Information Provision	0.072
Freight-Traffic Management	0.045	Smart Parking System	0.056
Policy Making/Institutional Development	0.062	Introduction of Specific Vehicle Control	0.047
		Introduction of Flex Time for Workers	0.085
		Introduction of Freight Vehicle Control	0.040
		Goods and Car Request System	0.040
		Introduction of Weight Stations	0.037

Source: JICA Expert Team

Accordingly, specific pilot projects (see Section 2.6.2) were selected with the CPs within the WG. Regarding Activity 1, the “ITS-based traffic control (smart bus stop)” was initially planned for implementation in cooperation with the AC group. However, due to ongoing preparations and delays within the AC group, the “bus terminal improvement” was brought forward as an alternative candidate.

Regardless of the importance of alternatives, projects related to Activities 1 and 3, which were requested by the CPs, were selected as pilot projects for Activity 3.

### **2.6.2 The list of pilot projects**

The list of pilot projects under the UMIK project is shown in Table 2.6.2. From clause 2.6.3 to 2.6.5, the outline and output for each pilot project are shown. The evaluation report for each pilot project including detailed contents of pilot project, result, and assessment is shown in the Annex.

**Table 2.6.2: List of Pilot Projects**

No.	Name of Pilot Project	Task No.	Work Task	
AT1	1-1	Open Data Development, GTFS	1-1-1	Creating a website to display bus route information
			1-1-2	GTFS introduction experiment for pilot operators
			1-1-3	Training for operators
			1-1-4	Formulation of the framework for creating and updating GTFS
			1-1-5	Evaluation
1-2	Bus Operation using Timetable	1-2-1	Formulation of an operation plan	
		1-2-2	Coordination with operators	
		1-2-3	Operator training	
		1-2-4	Implementation	
		1-2-5	Evaluation	
1-3	Bus Driver Training Manual	1-3-1	Review of the drafted manual	
		1-3-2	Finalization of the manual	
		1-3-3	Printing of the manual	
		1-3-4	Training using the manual	
		1-3-5	Evaluation	
1-4	Improvement of Bus Terminal	1-4-1	Selection of target bus terminals	
		1-4-2	Collection of baseline data	
		1-4-3	Formulation and discussion of the concept plan	
		1-4-4	Implementation	
		1-4-5	Evaluation	
1-5	Distance Based Fare System	1-5-1	Lectures and training	
		1-5-2	Selection of pilot routes and fare setting	
		1-5-3	Addition and confirmation of fare payment systems	
		1-5-4	Implementation	
		1-5-5	Evaluation	
AT2	2-1	Basic Design of Intersection	2-1-1	Traffic survey
			2-2-2	Topographic survey
			2-2-3	Data Setting and basic design of intersections
2-2	Intersection Traffic Flow Improvement	2-2-4	Ballpark cost estimate	
		2-2-5	Reporting	
		2-2-1	Review of improvement plans	
2-3	Traffic Event Management System (TEMS)	2-2-2	Design and joint field survey	
		2-2-3	Selection of subcontractors for facility improvement work	
		2-2-4	Implementation and supervision of facility improvement work	
			2-2-5	Completion of the improvement work
			2-2-6	Evaluation
			2-2-1	Agreement on the basic plan
			2-2-2	Preparation of specifications
			2-2-3	Selection and ordering
			2-2-4	Procurement (basic design)

			2-2-5 2-2-6 2-2-7 2-2-8	Procurement (production of system trial version) Procurement (system development) Introduction and testing Operation and evaluation
	2-4	Staggered Working Hour	2-3-1 2-3-2 2-3-3 2-3-4	Preparation and discussion of the plan Implementation of feasibility studies Judgment of feasibility Preparation for implementation (regulation, discussion, coordination)
AT3	3-1	Traffic Impact Assessment (TIA) of Amahoro Stadium	3-1-1 3-1-2 3-1-3 3-1-4 3-1-5	Implementation of BK Arena OD survey and analysis of survey results Implementation of traffic analysis Proposal of traffic measures for events Verification of the effectiveness of proposed measures Explanation in a workshop
	3-2	GIS Database with Data Sharing System	3-2-1 3-2-2 3-2-3 3-2-4 3-2-5 3-2-6	Preparation and discussion of the plan Survey of GIS data management and confirmation of sharing permissions Procurement of data servers Preparation and implementation of the site (Geo-Portal) Site publication and maintenance instruction Implementation of Geo-Portal utilization workshops

Source: JICA Expert Team

### 2.6.3 Pilot Projects of Activity 1

#### (1) 1-1 Open Data Development, GTFS

Project Name	Open Data Development, GTFS
<b>Counterparts</b>	<b>MININFRA, CoK, Bus Operators (Royal Express, JALI Transport), AC Group</b>
<p>1. Current Issues, Project Rationale</p> <ul style="list-style-type: none"> <li>· Bus routes are fixed, and all buses install Speed Governor, making it easy to obtain data for bus operations.</li> <li>· While Rwanda is aiming to become an ITS-oriented country, little information on bus service and operation has been disseminated. The introduction of GTFS is a step toward the goal of open data on bus operations.</li> </ul>	
<p>2. Project Outline</p> <ul style="list-style-type: none"> <li>· GTFS can be introduced by analyzing bus routes and frequencies based on the data obtained by Speed Governor and the bus stop location information data from CoK. By introducing GTFS, it will make it possible to search for bus routes, frequency of bus service, and routes using buses on Google Maps.</li> </ul>	
<p>3. Project Effects</p> <ul style="list-style-type: none"> <li>· It is hoped that dissemination of bus information and the use of public transportation will increase in Kigali.</li> </ul>	
<p>4. Achievement and Way forward</p> <p>(1) Achievement</p> <ul style="list-style-type: none"> <li>· Sample GTFS is reflected in the city and the development assist tool was provided</li> <li>· Bus users can access information about bus operation (route, frequency, stop location, etc.)</li> <li>· Rwanda side get the knowledge of GTFS development through the technical transfer.</li> </ul> <p>(2) Way forward</p> <ul style="list-style-type: none"> <li>· Necessity of information provision to users shall be shared among every stakeholder to successfully conduct all planned activities.</li> <li>· The Urban Mobility Department of the CoK is recommended to conduct appropriate information provision to reach the active and potential users of the public transport service.</li> </ul>	

Source: JICA Expert Team

## (2) 1-2 Bus Operation using Timetable

Project Name	Bus Operation using Timetable
Counterparts	MININFRA, Bus Operators (Royal Express, Yahoo Car), ATPR, CoK
<p>1. Current Issues, Project Rationale</p> <ul style="list-style-type: none"> <li>· Bus operator in Kigali does not have any operation plan, so that the number of vehicles used on each route changed daily.</li> <li>· Basically, the buses do not depart before 80% of the capacity is boarded at the starting point, so passengers do not know when the buses will depart or when they will arrive.</li> <li>· In the policy stipulated by CoK in December 2023 mentions that bus should operate every 10 minutes during peak hours on major bus routes, and although a timetable has been developed at MININFRA, this has not yet been realized.</li> <li>· Bus operators do not know how to establish a timetable or how to manage the operation of their buses, so they are not able to operate at every 10 minutes frequency.</li> </ul>	
<p>2. Project Outline</p> <ul style="list-style-type: none"> <li>· Timetable will be formulated at the starting point to operate at regular intervals in specific route, Line 203.</li> <li>· The main goal is to ensure that the service is operated as instructed by handing the driver a work schedule showing their job.</li> </ul>	
<p>3. Project Effects</p> <ul style="list-style-type: none"> <li>· It is possible to operate bus in accordance with the policy such as every 10 minutes operation in major route that Kigali is aiming for.</li> <li>· It will improve convenience for users and promote conversion to public transportation.</li> <li>· It will be easier to disseminate bus operation information.</li> <li>· In the future, buses will be able to operate according to demand on a route-by-route basis, simplifying operation management. In addition, it will be possible to correct long working hours, which is a local issue.</li> </ul>	
<p>4. Achievement and Way forward</p> <p>(1) Achievement</p> <ul style="list-style-type: none"> <li>· Bus operation using timetable was done for 2 weeks.</li> <li>· This result can be utilized for other bus routes.</li> <li>· Rwanda side obtained an image of operations using a timetable.</li> </ul> <p>(2) Way forward</p> <ul style="list-style-type: none"> <li>· It is necessary to formulate an operation plan that meets the demand based on the actual situation, rather than an operation plan based on the number of vehicles. Since the operation is not used to operate by using timetable, it is important to provide prior training to drivers and supervisors.</li> </ul>	

Source: JICA Expert Team

### (3) 1-3 Bus Driver Training Manual

<b>Project Name</b>	<b>Bus Driver Training Manual</b>
<b>Counterparts</b>	<b>MININFRA, ATPR, Bus Operators</b>
<p>1. Current Issues, Project Rationale</p> <ul style="list-style-type: none"> <li>· The Rwandan Government has decided to purchase 300 new buses in Kigali to operate in sufficient number of buses in Kigali. This means that requires the hiring of a large number of new drivers, and it is thought that the number of drivers who lack experience in driving large vehicles such as buses and trucks will increase.</li> <li>· In addition, although there is training institution, ATPR, drivers required for obtaining a bus driver license, however there is no training manual. Therefore, the project aims to improve service by providing regular education and training on safety driving and passenger hospitality not only to new drivers but also to current drivers through the training manual.</li> </ul>	
<p>2. Project Outline</p> <ul style="list-style-type: none"> <li>· Through interviews and meetings with bus operators and ATPR, a training manual with necessary and feasible content will be developed locally, based on the education provided by Japanese bus operators and manuals developed for other overseas projects.</li> <li>· Based on the manual, education and training for local bus drivers will be conducted by Rwandan side.</li> </ul>	
<p>3. Project Effects</p> <ul style="list-style-type: none"> <li>· It is expected that safety driving and improved customer service will permeate among drivers, therefore to improve the image of public transportation, people in Kigali will change their mind to use public transportation instead of using private car.</li> <li>· Level of service for bus operation will be ensured in Kigali.</li> </ul>	
<p>4. Achievement and Way forward</p> <p>(1) Achievement</p> <ul style="list-style-type: none"> <li>· Bus driver manual was prepared.</li> <li>· This manual is utilized for the bus driver training at ATPR.</li> </ul> <p>(2) Way forward</p> <ul style="list-style-type: none"> <li>· It is expected that this manual will be actively used not only by new drivers, but also by experienced drivers. Also, this manual will be used as a basis for periodic revisions to make the training more relevant to the actual situation.</li> </ul>	

Source: JICA Expert Team

**(4) 1-4 Improvement of Bus Terminal**

<b>Project Name</b>	<b>Improvement of Bus Terminal</b>
<b>Counterparts</b>	<b>MININFRA, Bus Operators, JALI Real Estate</b>
<p>1. Current Issues, Project Rationale</p> <p>In some bus terminals, flow of buses and pedestrians, and bus waiting spaces are not separated, making a dangerous situation due to congestion.</p>	
<p>2. Project Outline</p> <ul style="list-style-type: none"> <li>· Of the bus terminals in Kigali, Remera Bus Park is a candidate that is considered feasible.</li> <li>· Rather than making major improvements to the terminal, this would be accomplished by ensuring bus flow lines of buses and pedestrians and bus waiting areas, by minor improvement such as road surface markings and installing traffic cones.</li> <li>· Furthermore, since bus stops currently have no information at all, install bus stops that display destinations and other information.</li> </ul>	
<p>3. Project Effects</p> <ul style="list-style-type: none"> <li>· Ensure user safety</li> <li>· Improving bus mobility</li> <li>· Enhancement of the function as a traffic node</li> </ul>	
<p>4. Achievement and Way forward</p> <p>(1) Achievement</p> <ul style="list-style-type: none"> <li>· Optimization of parking space and improvement of bus and passenger flow inside of bus park could be achieved.</li> <li>· Positive comments from bus users against the PP were confirmed.</li> </ul> <p>(2) Way forward</p> <ul style="list-style-type: none"> <li>· Capacity development for engineers is essential to facilitate more effective discussions and decision-making.</li> <li>· CoK needs to urgently develop a plan for the development of a bus terminal for the entire city of Kigali, including the development of a dedicated intercity bus terminal on the outskirts of the city.</li> </ul>	

Source: JICA Expert Team

**(5) 1-5 Distance Based Fare System**

<b>Project Name</b>	<b>Distance Based Fare System</b>
<b>Counterparts</b>	<b>RURA, MININFRA</b>
<p>1. Current Issues, Project Rationale</p> <ul style="list-style-type: none"> <li>· Buses in Kigali City have a fixed fare for each route, and the fare is the same no matter which section of the bus you ride between them.</li> <li>· This creates an imbalance whereby different bus lines charge different fares even for the same section of the trip.</li> <li>· As a result, MININFRA and RURA asked JET for the training for fare setting method in order to introduce distance set a fare that is easy to use even for short distances and to promote the shift of use from motos to buses.</li> </ul>	
<p>2. Project Outline</p> <ul style="list-style-type: none"> <li>· Propose fare setting method calculated based on fully distributed cost.</li> <li>· MININFRA and JET will work together to examine the issues and evaluation of the pilot project which is to be conducted by Kigali side.</li> </ul>	
<p>3. Project Effects</p> <ul style="list-style-type: none"> <li>· This method will be a basis idea for bus service throughout Kigali.</li> <li>· It is expected to increase the number of people using the short section, which in turn will promote the use of buses and increase revenues for the operators.</li> <li>· A shift in use to public transportation will be promoted.</li> </ul>	
<p>4. Achievement and Way forward</p> <p>(1) Achievement</p> <ul style="list-style-type: none"> <li>· Technical transfer from JET was done.</li> <li>· Distance-based fare system was introduced from December 2024 by Rwanda side.</li> </ul> <p>(2) Way forward</p> <ul style="list-style-type: none"> <li>· More active and systematic information provision is required.</li> <li>· Setting Fares based on a Certain Calculation Basis is required.</li> <li>· Certain Numbers of Validators is necessary for fare payment smoothly.</li> </ul>	

Source: JICA Expert Team

## 2.6.4 Pilot Projects of Activity 2

### (1) 2-1 Basic Design of Intersection

Project Name	Basic Design of Intersection
Counterparts	COK, MININFRA
<p>1. Current Issues, Project Rationale</p> <ul style="list-style-type: none"> <li>The signal intersection improvements (advanced signal intersection and signal control system) were identified as a short-term priority project in the Data Collection Survey (2019) and as a priority component in the pilot project in the Detailed Planning Survey (2021) due to the strong request from the CP for early implementation. The basic design was prepared in this project.</li> </ul>	
<p>2. Project Outline</p> <p>(1) Topographic Survey</p> <p>The Laser Imaging Detection and Ranging (LiDAR) survey and aerial photography by an unmanned aerial vehicle (UAV) were conducted as topographic surveys. The survey covered 74 intersections, including 50 intersections initially targeted and an additional 24 intersections requested by CoK.</p> <p>(2) Traffic Analysis</p> <p>Traffic volume surveys were conducted at intersections in order to obtain the peak hour traffic volume by direction, which is a design condition for the basic design. The traffic volume survey was conducted at 65 intersections, excluding the nine intersections with apparently low traffic volumes from the 74 intersections to be surveyed.</p> <p>In order to evaluate the current degree of congestion, the flow ratio has been calculated based on the obtained traffic volumes (2022). In addition, since traffic improvements are to be implemented as a Japanese Grant Aid Project, which shall be evaluated three years after completion (in 2026-2027), the flow ratio was calculated with the traffic volume in 2030.</p> <p>(3) Signal Systems</p> <p>In WG2, the JET explained the signal control methodology and application conditions of the advanced signal system to promote understanding. Also, the JET considered the target signalized intersections in terms of site conditions, road shape, and safety, in conjunction with the analysis results of the traffic count survey.</p> <p>The implementation location of the control center, system server(s), and necessary functional requirements are deeply related to the "Basic Framework for Traffic Flow Management" described in Section 2.3.2. Therefore, these were decided after a mutual agreement involving CoK, RNP, and other related organizations.</p> <p>(4) Prioritization of Intersections to be Improved and Basic Design</p> <p>Based on the results of the field survey and traffic analysis, the basic design was carried out. The signal intersection improvements are short-term priority projects and will be implemented as a Japanese Grant Aid Project, which shall be evaluated three years after its completion in 2026-2027. Thus, the lane number was determined based on the traffic volume in 2030, three years after the completion of the project. In addition, the intersections located on the pilot route of the DBL, which is planned in parallel, were designed taking bus priority operation into account.</p>	

3. Project Effects

- Priority evaluation was conducted for 54 major intersections in Kigali City, excluding intersections that were under consideration for improvement by other projects, and the target intersections were classified into Group 1 to Group 5 with the priority for improvement. The proposed improvements include VCRs for the intersection improvements, including the control method (signalized intersection (SIG), stop-controlled intersection (UNS), roundabout (RAB)), and geometric improvements (additional lanes, etc.).
- The geometric improvement design and the signal system design were conducted for these intersections, and the methods and results were shared with the CP through lectures in the WG.

4. Achievement and Way forward

(1) Achievement

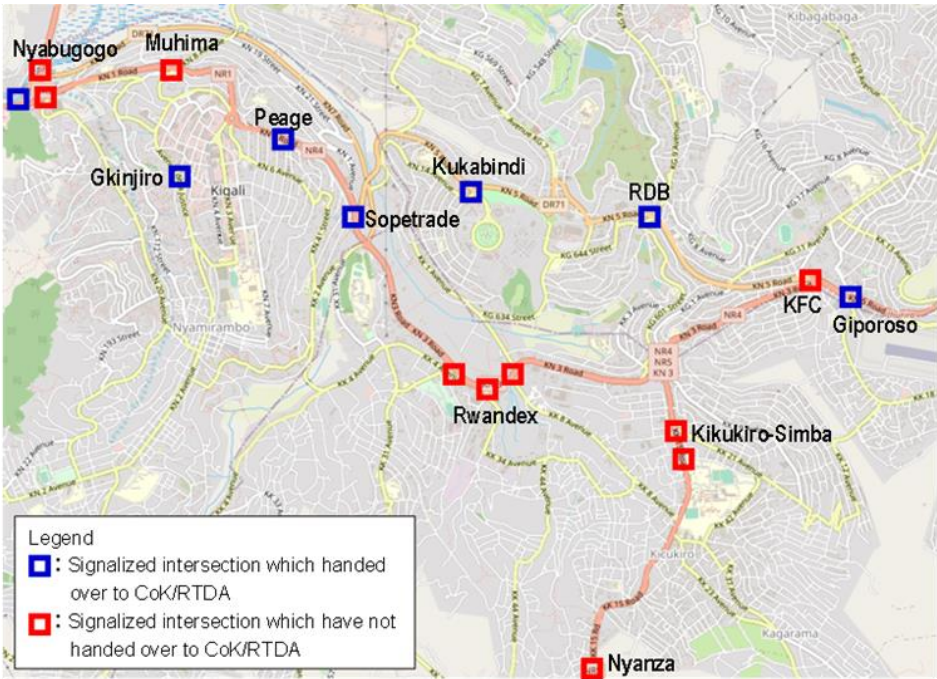
- Drawings of 53 intersections for civil and electric work were prepared, and other outputs/results were shared with Rwanda side.
- These outputs were utilized for JICA grand aid project.

(2) Way forward

- Priority Location Map for intersection improvement can be utilized for expansion of signal intersection in the future

Source: JICA Expert Team

(2) 2-2 Intersection traffic flow improvement

Project Name	Intersection traffic flow improvement						
Counterparts	CoK						
<p>1. Existing condition, issues and background</p> <ul style="list-style-type: none"> <li>Traffic congestion mainly occurs at intersections in Kigali; thus, traffic management at intersections is a critical issue. There are around 17 signalized intersections in Kigali, and CoK oversees the operation and maintenance of the traffic signals. The persons in charge of the operation and maintenance of the traffic signals in CoK requested technical support on traffic signal parameter setting and intersection improvement at signalized intersections.</li> </ul>  <p><b>Figure: Location Map of Intersections in Kigali</b></p>							
<p>2. Project Outline</p> <ul style="list-style-type: none"> <li>Of the 17 signalized intersections, CoK is able to handle 7. 4 intersections were selected for improvement as part of a pilot project. Technical training sessions for setting signalized intersection parameters were conducted, and CoK officers subsequently set new signal parameters for the intersections. JET members prepared intersection facility improvement plans, which were finalized through discussions and site visits with CoK, MININFRA, and RNP.</li> </ul> <p>Table: List of Intersections for the Pilot Project</p> <table border="1" data-bbox="263 1753 1407 2004"> <thead> <tr> <th>Intersection</th> <th>Improvement Items</th> </tr> </thead> <tbody> <tr> <td>Gakinjiro</td> <td> <ul style="list-style-type: none"> <li>➤ Signal parameter improvement (implemented as demonstration and technical transfer of parameter setting)</li> <li>➤ Improvement of pavement marking for traffic safety</li> </ul> </td> </tr> <tr> <td>Peage</td> <td> <ul style="list-style-type: none"> <li>➤ Signal parameter improvement</li> </ul> </td> </tr> </tbody> </table>		Intersection	Improvement Items	Gakinjiro	<ul style="list-style-type: none"> <li>➤ Signal parameter improvement (implemented as demonstration and technical transfer of parameter setting)</li> <li>➤ Improvement of pavement marking for traffic safety</li> </ul>	Peage	<ul style="list-style-type: none"> <li>➤ Signal parameter improvement</li> </ul>
Intersection	Improvement Items						
Gakinjiro	<ul style="list-style-type: none"> <li>➤ Signal parameter improvement (implemented as demonstration and technical transfer of parameter setting)</li> <li>➤ Improvement of pavement marking for traffic safety</li> </ul>						
Peage	<ul style="list-style-type: none"> <li>➤ Signal parameter improvement</li> </ul>						

Sopetrade	➤ Signal parameter improvement
RDB	➤ Minor intersection geometrical structure improvement

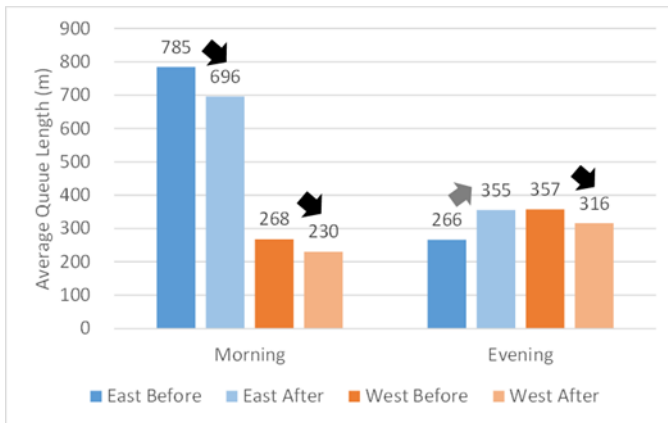
### 3. Project Effects

#### (1) Gakinjira

This pilot project was implemented as a demonstration and technical transfer for signal parameter setting; therefore, an evaluation of effectiveness was not conducted.

#### -Peage

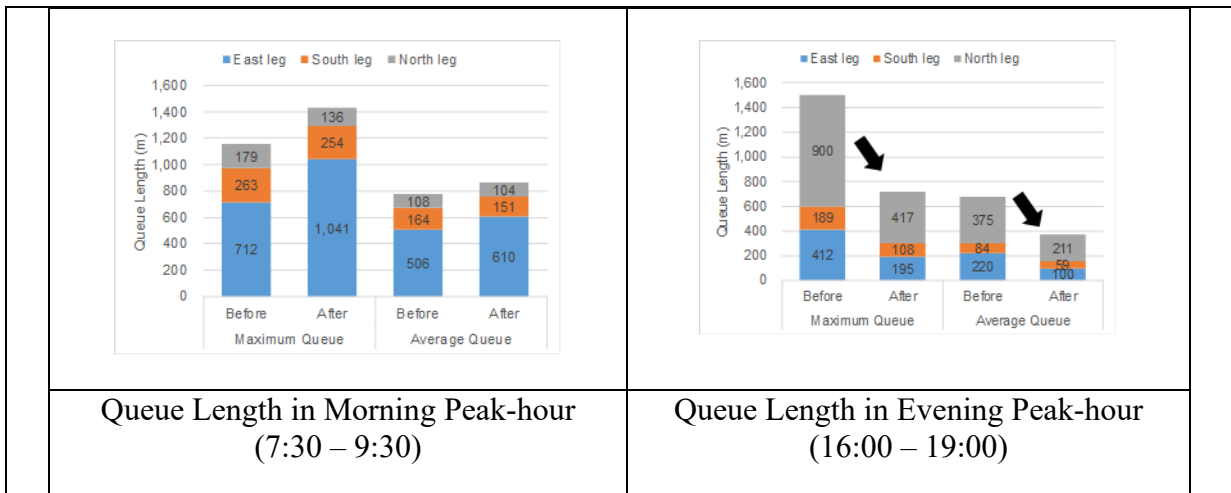
Queue length surveys were conducted both before and after the signal parameter improvements to evaluate their effectiveness. The results of these surveys are shown in the figure below. The vehicle queue on the west approach was shortened during both the morning and evening peak hours, while the queue on the east approach was shortened during the morning peak hour. Thus, the effectiveness of the parameter improvements was confirmed.



**Figure: Vehicle Queue Length Survey Results at Peage Intersection**

#### -Sopetrade

Queue length surveys were conducted both before and after the signal parameter improvements to evaluate their effectiveness. The results of these surveys are shown in the figure below. The vehicle queue during the morning peak hour was not shortened due to the impact of vehicle queues from the Peage intersection. However, the vehicle queue during the evening peak hour was reduced by half. Thus, the effectiveness of the parameter improvements was confirmed.



**Figure: Vehicle Queue Length Survey Results at Sopetrade Intersection**

4. Achievement and Way forward

(1) Achievement

- Traffic flow at all target junctions was improved. (but not drastically changed)
- The know-how for small scale improvement was transferred to CP through the PP.

(2) Way forward

- The basic theory of intersection planning has been acquired. However, understanding traffic signal parameters requires extensive experience through monitoring and evaluation. Therefore, CoK and related organizations should continue updating traffic signal parameters at these pilot intersections and other intersections.
- It is necessary to have an understanding of the details of the improvement works, especially at meetings bringing together CoK engineers, Rwanda National Police officers, and utility operators.

Source: JICA Expert Team

**(3) 2-3 Traffic Event Management System (TEMS)**

Project Name	Traffic Event Management System (TEMS)
Counterparts	Rwanda National Police (RNP)
<p>1. Current Issues, Project Rationale</p> <ul style="list-style-type: none"> <li>· When Call Center in TCC received Traffic Event information, Call Center Operator provide the information to site Traffic police and relating agencies and Record in Note. And as Traffic Control Center (TCC) started the operation recently, coordination between Call Center and Traffic Control Center has not being well.</li> <li>· The Rwanda National Police (RNP) responds to various incidents ranging from traffic accidents, fire outbreaks, noise complaints, domestic disturbances, theft, vandalism, and road blockages,etc. However, the current manual dispatch system faces challenges such as difficulty in identifying incident locations and lack of digital information transmission, leading to delays in response time.</li> <li>· Also, Japanese grant aid project will be implemented to build signal control system and traffic monitoring system which will be controlled at the existing TCC (Traffic Control Centre) in Muhima Traffic Police. But Traffic control operation at TCC has recently started and is not able to grasp traffic information and respond to traffic events promptly. Thus, the enhancement of Traffic control capability at TCC is urgently required.</li> </ul>	
<p>2. Project Outline</p> <ul style="list-style-type: none"> <li>· While we are considering building an Incident Dispatch Management Platform (IDMP) that can handle comprehensive incidents, we will first build an IDMP that specializes in traffic events. Then, we will connect RNP's TCC and IDMP and build an Traffic Event Management System (TEMS) that manages traffic events centered on TCC, aiming to improve traffic management capabilities.</li> </ul> <p>(1) Functional overview of TEMS</p> <ul style="list-style-type: none"> <li>• Collect information from voices and information data with mobile phones from Citizen.</li> <li>• Collect detailed reports from the police officers at site.</li> <li>• Information collected through applications of mobile phone and computer will be digitized and automated as much as possible.</li> <li>• Instruction from TCC to dispatch traffic police officers and provide instructions and information to related departments.</li> <li>• Provide information to citizens and police officers</li> <li>• In addition to emergency events such as accidents, we also manage and provide schedules for traffic restrictions due to construction and large-scale planed events.</li> </ul>	

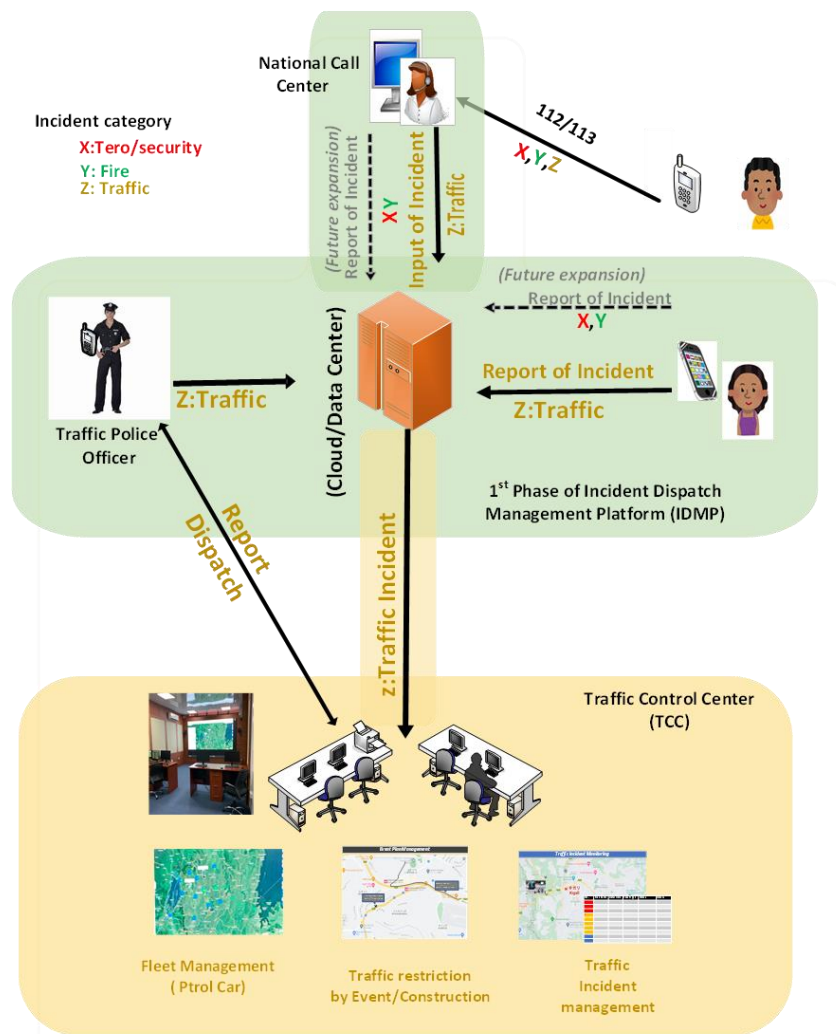


Figure: System Configuration of TEMS

### 3. Project Effects

TEMS is expected to have the following effects:

- Accurate understanding of traffic event information and speedy emergency response through Call Center
- Prompt and accurate communication of instructions and information to related departments and organizations through digital communication.
- By accumulating event information, it can be used for traffic accident analysis, etc.
- Improvement of traffic management ability centered on RNP's TCC
- Since the basic platform for the future comprehensive IDMP will be constructed, it will be easy to expand of a comprehensive event management system by Ruanda side's budget.

#### 4. Achievement and Way forward

##### (1) Achievement

- Traffic Event Management System (TEMS) was installed in RNP facilities and utilized for traffic management and control.
- Police officer had technical transfer for using TEMS.

##### (2) Way forward

- As operations become more active and various site officers come into contact with various situations, it is expected that the need to improve the User Interface will arise, so RNP needs to collect usage information and continue to improve it.
- RNP should expand the system for Incident Dispatch Management System (IDMS) based on the basic platform which developed for TEMS as pilot project of UMIK.
- Taking advantage of the introduction of TEMS, it is expected that further discussions on the digitalization of traffic control, centered on TCC, will progress, led by the CCC Commissioner, who also participated in the JCC and Traffic police staffs involved in TEMS introduction.

Source: JICA Expert Team

**(4) 2-4 Staggered Working Hour**

<b>Project Name</b>	<b>Staggered Working Hour</b>
<b>Counterparts</b>	<b>MININFRA, COK, RTDA, RURA</b>

1. Current Issues, Project Rationale

- Road traffic congestion has worsened in Kigali with rapid urbanization and economic growth. With this growth come challenges, notably in transportation and road traffic congestion, resulting in longer commuting times for workers. The business hour of the government officers were from 7:00 AM to 5:00 PM until December 2022 and they were changed to 9:00 AM to 5:00 PM after January 2023. It is thought that this change in working hours also affects to worsening traffic congestion by concentrating traffic demand during morning and evening peak hour. To address these challenges, the introduction of a staggered working system presents a solution.

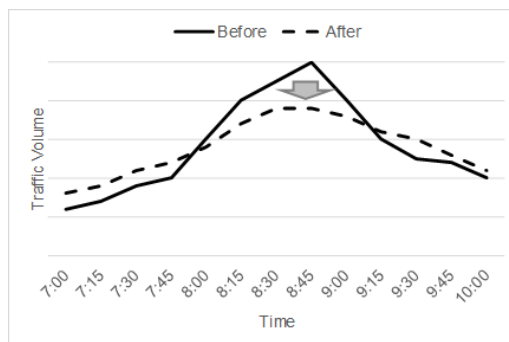


**Figure: Photos of Traffic Situation**

2. Project Outline

(1) Objective

Staggered working is one of Traffic Demand Management (TDM) measure. TDM is the application of strategies and policies to increase the efficiency of transportation systems, that reduce travel demand, or to redistribute this demand in space or in time. Staggered working helps mitigate the concentration of traffic demand by offering alternative working shifts to employees. This not only aids in the mitigation of traffic congestion but also enhances the working environment for employees and others.



**Figure: Image of Distribution of Traffic Demand**

-Assessment Survey Result

A questionnaire survey to assess possibility of introducing staggered working was conducted in February 2024, with 29 government officers from MININFRA, CoK, RTDA and RURA

responding. Findings from the survey are shown in below.

- The same working hours affect the concentration of traffic demand during the morning and evening peak hours.
- Commuting by bus takes longer than other modes of transportation. Some respondents tend to use motorcycles to shorten their travel time in the morning, which may contribute to traffic congestion.
- The majority of respondents may have the option to choose their working hours and may prefer to introduce a staggered working system.

-Activity

Introduction of staggered working hour need coordination with related organizations and take time. However, this measure shall effect to mitigate traffic congestion and improve work environment and also the majority of respondents in the assessment survey prefer to introduce this measure. Thus, the project team create a concept note to propose staggered working hour to decision makers.

3. Project Effects

- This pilot project is just creating a concept note and may not implement actual pilot project activity. Examples staggered working in other countries are collected in the concept note and traffic demand in peak hour is reduced 10 to 20% in other countries. Traffic demand models for both of a normal situation and an introducing staggered working will be created to evaluate effectiveness of staggered working hour in Kigali.

4. Achievement and Way forward

- A concept note of introduction of staggered working hours in Kigali was prepared.

Source: JICA Expert Team



survey was carried out with support from the University of Rwanda. The results of this survey were used to analyze traffic conditions during events.

- Traffic simulation utilizing OD survey and related data which were collected by UMIK project were conducted for analyzing the traffic situation in case of the big event in Amahoro Stadium. Proposed interventions based on the analysis results were discussed with Kigali City staff in charge and refined.

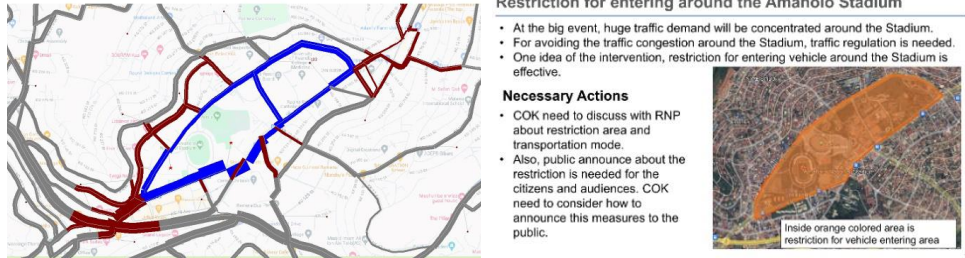


Figure: Traffic Analysis and Proposed Intervention

#### 4. Achievement and Way forward

##### (1) Achievement

- Final Report has been submitted to CoK in April 2024, and these results were reported in the WG and JCC. CoK tried to arrange the workshop for discussion, but it was not realized due to some internal reasons such as the election of president, etc.

##### (2) Way forward

- CoK should discuss the output of analysis and proposed interventions internally and will utilize them for future traffic management and planning.

Source: JICA Expert Team

**(2) 3-2 GIS Database with Data Sharing System**

<b>Project Name</b>	<b>GIS Database with Data Sharing System</b>
<b>Counterparts</b>	<b>MININFRA</b>
<p>1. Current Issues, Project Rationale</p> <ul style="list-style-type: none"> <li>Each organization such as the MININFRA and related implementing agencies has ongoing urban transport related projects, smooth project status sharing is essential to implement multi-sectoral projects like TOD (Transit Oriented Project) projects. On the other hand, GIS data which is produced by the organizations is managed by the project base, it is not shared among the related organizations. During this pilot project, JET develop GIS database and Geo Portal (website) in the MININFRA to share the current project status and the urban transport related GIS data.</li> </ul>	
<p>2. Project Outline</p> <ul style="list-style-type: none"> <li>Grasping current status of Geo-portals and GIS data that each organization owns and maintains.</li> <li>Development of the GIS data server in the MININFRA</li> <li>Development (Update) of the Geo-portal(website) to share the GIS data under the MININFRA's website</li> <li>Lecture to engineering staff and non-engineering staff to touch the Geo-portal</li> </ul>	
<p>3. Project Effects</p> <ul style="list-style-type: none"> <li>This system assists to share the projects status among urban transport related organizations. Since multi-sectoral projects such as TOD or public transport development/improvement projects include road improvement or signal installation are planned/ongoing in Kigali, this system can be utilized to share the status. In addition, GIS users can access easily GIS data which each organization has through this single window website.</li> </ul>	
<p>4. Achievement and Way forward</p> <p>(1) Achievement</p> <ul style="list-style-type: none"> <li>Database system (Geo Portal) was developed and introduced in the MININFRA.</li> <li>Technical transfer for maintenance of the system was conducted.</li> </ul> <p>(2) Way forward</p> <ul style="list-style-type: none"> <li>Collaboration with the Department of Urbanization or others that ensure the QGIS users are recommended for periodical update of the GeoPortal.</li> <li>The Rwanda Infrastructure GeoPoratal is operated under the MININFRA's website and it is managed by the IT team of the organization. Therefore, frequent communication with the IT team to make them well understand is required.</li> </ul>	

Source: JICA Expert Team

## Chapter 3: Project Evaluation

### 3.1 Objectives of the Project Evaluation

The objectives of the project evaluation are as follows:

- (1) Confirm the progress of project activities, the achievement level of outputs, the expected achievement of project goals, and the implementation process in accordance with the current Project Design Matrix (PDM) and Plan of Operation (PO).
- (2) Evaluate the project based on relevance, consistency, effectiveness, efficiency, impact, and sustainability, following the Japan International Cooperation Agency (JICA) Project Evaluation Guidelines (Second Edition) and the JICA Project Evaluation Handbook Version (Version 2).
- (3) Organize issues identified from the evaluation results toward achieving the project purpose and extract lessons learned and recommendations for project activities.

### 3.2 Evaluation Method

#### 3.2.1 Evaluation Framework

The evaluation of this project was conducted based on the JICA Project Evaluation Guidelines (Second Edition) and the JICA Project Evaluation Handbook (Version 2). The project's performance was evaluated based on the current PDM.

#### 3.2.2 Evaluation Procedures

- i. Collect data and information regarding the three project outputs through document review, stakeholder interviews, and questionnaires. The project outputs are: (i) Policies, measures, and plans to improve the convenience of public transport are developed, (ii) Measures and plans to improve traffic flow management of the existing transport network are developed, and (iii) Urban transport in Kigali is properly managed.
- ii. Evaluate the outputs, the achievement level of the project purpose, and the expected achievement of the overall goal based on the evaluation indicators in the PDM.
- iii. Review the project implementation process.
- iv. Assess the project using six evaluation criteria: relevance, consistency, effectiveness, efficiency, impact, and sustainability.
- v. Extract post-project recommendations and lessons learned during project implementation.

**Table 3.2.1: Definition of Six Evaluation Criteria**

1) Relevance	<ul style="list-style-type: none"> <li>• Evaluates the legitimacy and necessity of cooperation projects by assessing whether the project's desired effects (project purpose and overall goal) meet the needs of beneficiaries.</li> <li>• Determines whether the project provides an appropriate solution to identified problems and issues.</li> <li>• Considers whether adequate attention is given to vulnerable groups and whether fairness is ensured.</li> </ul>
2) Consistency	<ul style="list-style-type: none"> <li>• Assess whether the intended effects of the project align with the policies of Rwanda and Japan.</li> </ul>

	<ul style="list-style-type: none"> <li>Examines synergies and complementarities with JICA and other related projects.</li> </ul>
3) Effectiveness	<ul style="list-style-type: none"> <li>Reviews the achievement of outputs and project goals and considers the logical relationship between them.</li> </ul>
4) Efficiency	<ul style="list-style-type: none"> <li>Analyzes the relationship between outputs and inputs/activities in terms of timing, quality, and quantity.</li> <li>Ensures that resources are or will be used efficiently, with a focus on project costs and effectiveness.</li> </ul>
5) Impact	<ul style="list-style-type: none"> <li>Examines the longer-term, indirect, and ripple effects brought by project implementation. Includes an assessment of unexpected positive and negative impacts.</li> </ul>
6) Sustainability	<ul style="list-style-type: none"> <li>Evaluates projects from political, institutional, organizational, financial, and technical aspects by considering the extent to which outcomes are sustained or expanded after the project ends.</li> <li>Assess the perspective that the project effects have continued after completion of the project.</li> </ul>

Source: JICA Expert Team

### 3.3 Achievements of the Project

#### 3.3.1 Outputs

The achievements and details of the project activities for each output are described in Chapter 2. Based on the content of each activity, the degree of achievement for each output was evaluated as follows.

##### (1) Output 1 (Public Transport)

Output 1	Policies, measures, and plans to improve the convenience of public transport are developed.
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**Table 3.3.1: Achievement of the Evaluation Indicators for Output 1**

Indicator/Outcome		Achievement
1.1	The Action Plan for Public Transportation is prepared.	The Action Plan for Public Transport has been prepared.
1.2	A report on the gap analysis for public transportation is prepared.	The result of gap analysis was prepared and shared with the counterparts (CPs).
1.3	Comprehensive transport information services are introduced.	The GTFS dataset was compiled through the pilot project.
1.4	Two manuals and one guideline are produced.	The Bus Manual, GTFS Manual, and Guidelines and manuals for public transport planning and operation were prepared.
1.5	Forty people are trained by using the produced manuals and guidelines to improve public transportation.	Training at ATPR using the Bus Drivers Manual (200 bus drivers per year will be trained.)

Source: JICA Expert Team

During the project period, major changes occurred in bus operation within the City of Kigali (CoK). Initially, three bus companies operated buses across four areas. However, the operation situation changed since other bus companies entered the market in July 2022, followed by the restructuring of bus operators and routes in February 2024. In addition, the fare system transitioned in December 2024 from a flat rate system to a distance-based system toward the end of the project. In response to these changes, each indicator/outcome was prepared or achieved through the activities of Output 1, and technology transfer was carried out.

## (2) Output 2 (Traffic Flow Management)

Output 2	Measures and plans to improve traffic flow management of the existing transport network are developed.
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**Table 3.3.2: Achievement of the Evaluation Indicators for Output 2**

Indicator/Outcome		Achievement
2.1	The Action Plan for the Traffic Management Strategy is prepared.	The Action Plan for Traffic Flow Management has been prepared.
2.2	A report on the gap analysis for traffic management is prepared.	The result of the gap analysis was prepared and shared with the CPs.
2.3	Comprehensive transport information services are introduced.	Traffic Event Management System (TEMS) has been installed and utilized by the CP (RNP) through the pilot project.
2.4	One guideline is produced.	Parking Management Guideline was prepared.

Source: JICA Expert Team

Each indicator/outcome was prepared or achieved through the activities of Output 2, and technology transfer was carried out.

## (3) Output 3 (Institutional Setup)

Output 3	Urban transport in Kigali is properly managed.
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**Table 3.3.3: Achievement of the Evaluation Indicators for Output 3**

Indicator/Outcome		Achievement
3.1	A coordination body with agencies related to public transport and traffic management regularly holds meetings.	The Urban Mobility Department (UMD) has been established in the CoK; and regular meetings have been conducted.
3.2	Comprehensive mobility improvement measures under the coordination body are prepared.	The mandates of UMD were prepared.
3.3	The Action Plan for institutionalizing public transport and traffic management is prepared.	(Ongoing as of January 2025. To be updated in the PCR) The Action Plan (Roadmap) for UMD toward the Kigali/Rwanda Transport Authority was prepared.
3.4	[If its feasibility is confirmed for creating another body for implementation] Measures for the implementation body are prepared.	The Urban Mobility Department (UMD) was established in the CoK.

Source: JICA Expert Team

Each indicator/outcome was prepared or achieved through the activities of Output 3, and technology transfer was carried out. Indicator 3.4 was fulfilled because the Urban Mobility Department (UMD) was officially established in the CoK in February 2024. The related documents for establishing the UMD were prepared by the CP side using the outputs from this project.

### 3.3.2 Project Purpose

The purpose of this project is: “A mechanism to promote the use of public transport in Kigali is established through proper traffic management”. The following achievements correspond to the indicators shown in PDM, which should be achieved at the completion of the project.

Project Purpose	A mechanism to promote the use of public transport in Kigali is established through proper traffic management.
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**Table 3.3.4: Achievement of the Evaluation Indicators for Project Purpose**

Indicator/Outcome		Achievement
1)	The convenience of bus is improved at priority action sites (data should be disaggregated by different categories of bus users).	Achieved. - Introduction of GTFS - Timetable operation and practice - Bus terminal improvement in Remera.
2)	Traffic flow is improved at priority action sites.	Achieved. - Small-scale intersection improvements and traffic signal cycle improvements at several sites.
3)	Some of the projects proposed in the Action Plans are authorized by the relevant government agencies.	Achieved. - Pilot projects selected from Action Plans.
4)	Efforts to establish a permanent/official coordination body are undertaken.	Achieved. - The UMD was established in the CoK.
5)	Effort to establish a dedicated authority for implementation is initiated (if applicable).	Achieved. - The UMD was established in the CoK.

Source: JICA Expert Team

Each indicator/outcome was achieved in this project, mainly through pilot projects. Each evaluation result is described in Chapter 2.

### 3.4 Expected Achievement of Overall Goal of the Project

The overall goal of this project is “Transport mobility in Kigali is improved for sustainable urban development.”

Through this project, the CPs were able to grasp key points related to improving public transport operations, managing traffic flow, and establishing responsible organizations for urban transport management. In addition, knowledge of appropriate urban transport management practices was gained through these project activities.

Various pilot projects were conducted in collaboration with the CPs and the JICA Expert Team, facilitating technical transfer related to each output. To assess the achievement of the overall goal, the objectively verifiable indicators were set as follows.

1)	Twenty-eight projects proposed in the Action Plans are implemented by public transport and traffic management agencies.
2)	Around 80% of the population conveys with public transportation (reflecting a shift in the structure of traffic modality)
3)	The number of people using buses increases (data should be disaggregated by different categories of bus users) in the main corridors.
4)	The number of traffic accidents decreases.

The CP side gained experience and knowledge through this project, which is expected to make great progress toward achieving the overall goal. However, coordination capacity remains a major challenge because of the limited number of staff in each organization. Despite this, the contribution of this project towards achieving the overall goal is relatively high.

### 3.5 Result of the Evaluation

The evaluation results regarding the six evaluation criteria are shown below.

**Table 3.5.1: Evaluation Results Regarding the Six Evaluation Criteria**

1) Relevance	The relevance of the project is evaluated as high for the following reasons:
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	<ol style="list-style-type: none"> <li>1. Consistent with the Rwandan government policies, including the Kigali Master Plan 2050 and NST1 and NST2.</li> <li>2. Consistent with national and beneficiary needs, particularly the improvement of public transport and traffic management).</li> <li>3. Leverages Japan's technical expertise in the field of public transport.</li> </ol>
2) Consistency	<p>The consistency of the project is evaluated as high for the following reasons:</p> <ol style="list-style-type: none"> <li>1. Aligned with the JICA grant aid project (Introduction of Traffic Control System).</li> <li>2. Complements other donors' project (WB, AfDB, and KOICA).</li> <li>3. Consistent with the Japanese government's official development assistance (ODA) policy.</li> </ol>
3) Effectiveness	<p>Considering the current level of achievement of the project purpose, the effectiveness of the project is evaluated as relatively high.</p>
4) Efficiency	<p>Based on the appropriateness of inputs and the degree of achievement of outputs, the efficiency of the project is evaluated as fair.</p>
5) Impact	<p>The impact of the project is evaluated as high for the following reasons: Through the implementation of the project, the following impacts were confirmed.</p> <ol style="list-style-type: none"> <li>1. The Urban Mobility Department (UMD) was established and officially launched within the project period.</li> <li>2. Action Plans for each output were prepared.</li> <li>3. Evaluation results for pilot projects indicate relatively positive outcomes.</li> </ol>
6) Sustainability	<p>While uncertainties remain in policy and institutional aspects, the sustainability of the project is evaluated as relatively high.</p>

Source: JICA Expert Team

### **3.5.1 Relevance**

#### **(1) Consistent with Rwandan Government Policy**

The CoK has developed the Kigali Master Plan 2050, and the Rwandan government will publish the NST-2. The improvement of public transport and traffic flow management is included in both documents and will continue to be a priority. Additionally, the establishment of transport-related authorities has been achieved through the creation of Urban Transport Department in the CoK, which is responsible for managing urban transport.

The Action Plans, which are based on the Kigali Master Plan 2050, were prepared, and several pilot projects based on these plans were conducted through this undertaking. Therefore, the project's relevance is evaluated as high.

#### **(2) Consistent with National and Beneficiary Needs**

Traffic conditions in the CoK are worsening, necessitating urgent measures to mitigate traffic congestion. In addition, the operation situation regarding bus transport system is undergoing changes, including multiple operators serving the same routes and the distance-based fare system being introduced.

This project activities, including technical transfer and pilot project, were implemented in a timely and flexible manner, based on the needs of the Rwandan side as described above. Therefore, outcomes of the project related relevance are evaluated high.

#### **(3) Advantages of Japan's Technical Knowledge in Public Transport**

Japan's expertise in technology for public transport operations was introduced as pilot programs, such as timetable-based operations and bus terminal improvements. Especially, the bus timetable system was introduced based on the changing bus operation in the CoK.

### 3.5.2 Consistency

#### (1) Relationship with JICA Grant Aid Project

The basic design for the introduction of a traffic control system was conducted in this project, and the results were utilized by the Rwandan side. Consequently, the Japanese grant aid project for introducing the traffic control system was approved and is set to commence soon.

#### (2) Relationship with Other Donors' Project

This project was implemented in collaboration with various donors, including the World Bank. For example, the World Bank is planning the Nyabugogo Bus Terminal Improvement Project, the Asian Development Bank (ADB) is planning the Major Intersection Improvement Project, while KOICA is working on the Bus Terminal Improvement Project. Throughout this initiative, technical knowledge transfer was carried out, and activities were closely related with these donor-supported programs. Therefore, it is expected that the results of this project will be utilized in collaboration of these efforts.

#### (3) Consistent with the Japanese Government's Official Development Assistance Policy

The Country Assistance Policy for Rwanda (2017), prepared by the Ministry of Foreign Affairs, lists Economic Infrastructure Development (including transportation, trade facilitation, and electricity) as one of the priority areas. Based on this policy, the business deployment plan emphasizes cooperation for improvement of urban transport in the CoK. This project is in line with Japan's development assistance policy, as it supports the development of economic infrastructure and provides technical cooperation to improve urban transport in the capital city of Kigali.

### 3.5.3 Effectiveness

The achievements against indicators for the project purpose are shown in Clause 3.3.2. The following aspects/insight were obtained from each achievement:

#### (1) Improved bus convenience at priority action sites (data should be disaggregated by different categories of bus users).

As part of the project, three pilot projects focused on improving public transport was conducted. These initiatives were assessed as achievements, and the following effects were confirmed.

Pilot Project Name	Achievement
Open Data Development, GTFS	<ul style="list-style-type: none"> <li>- Two bus operators have introduced GTFS.</li> <li>- Technical transfer for GTFS introduction has been done for all bus operators.</li> <li>- It is necessary to expand the introduction of GTFS to other bus operators.</li> </ul>
Bus Timetable Operation	<ul style="list-style-type: none"> <li>- The effect of the punctuality of bus operation was confirmed through the pilot project.</li> <li>- Both positive and negative feedbacks were gathered from the bus users, bus drivers, and bus operators.</li> </ul>
Bus Terminal Improvement	<ul style="list-style-type: none"> <li>- A better layout plan was discussed and agreed upon with the CPs and the JICA Expert Team.</li> <li>- Bus and passenger movement in the terminal appears smoother compared with before improvement. However, it was confirmed that there was some misconduct by intercity buses during the pilot project.</li> <li>- It is necessary to give guidance to bus operators to ensure safety and convenience in the bus terminal.</li> </ul>

- i. The traffic flow has improved at priority action sites.

Some effects on smoother traffic were confirmed through the pilot project on intersection traffic flow improvement. Although there was no significant impact on mitigating traffic congestion due to the small scale of the pilot project, a positive effect was confirmed at all target intersections. The detailed results are shown in Chapter 2. In addition, the Traffic Event Management System (TEMS) was installed in the RNP as part of the Project. The positive effect of traffic flow control by the traffic police using TEMS was confirmed in the pilot project.

**(2) Some of the projects proposed in the Action Plans have been authorized by the relevant government agencies.**

The Action Plan was formulated as part of the project activities for Outputs 1 and 2. A total of 28 projects with implementation schedules were proposed based on the Kigali Master Plan 2050. These Action Plans were discussed and agreed upon with the CPs and the JICA Expert Team in this project, and some of the proposed projects were implemented as pilot projects.

**(3) An effort to establish a permanent and official coordination body.**

The idea of a traffic-related authority was proposed in the Transport Master Plan 2018 for the CoK and the Kigali Master Plan 2050. Some technical transfers and recommendations were given by the JICA Expert Team to the Rwanda side in this project regarding the coordination body, based on the above master plans. The Rwandan government and the CoK established the Urban Mobility Department (UMD), which was officially launched in February 2024, based on the technical transfer from this project. This is a significant achievement of the project.

**(4) An effort to establish a dedicated authority for implementation has been initiated (if applicable).**

The UMD serves as the dedicated authority for urban transportation in the City of Kigali, and several activities have been implemented, particularly in the public transport sector. The technical transfer by the JICA Expert Team was conducted for UMD engineers as part of this project.

As shown in Clause 3.3, almost all the indicators for each output were achieved through the project activities. Based on the above achievements, the effectiveness of the project is evaluated as relatively high.

### **3.5.4 Efficiency**

All outputs were achieved as planned, and the inputs from the Rwandan and Japanese sides were implemented appropriately. The project was conducted as planned. The man-months of the JICA experts were increased, but these inputs were added as additional activities related to assisting with the pilot project implementation. However, some activities experienced delays, particularly those pilot project related, due to the following reasons:

**(1) Traffic Survey**

The timing of traffic surveys was delayed due to the CHOGM event, which was held at the end of June 2022 in the CoK. During this event, restrictions for traffic control, such as road closure, were imposed. Therefore, traffic surveys were conducted in two timings—before and after CHOGM—to account for changes in traffic flow during the event. Due to this reason, the traffic demand forecast was also delayed.

**(2) First Training in Japan**

Originally, the first training in Japan was scheduled to last two weeks. However, due to a decision made by the Rwandan government, the duration was shrunk to one week. The issue was that this

decision was informed to JICA only one week before the training. Therefore, some schedules of the training had to be canceled.

### **(3) Pilot Project**

Some of the pilot projects required approval from related organizations in Rwanda. Additional procedures and coordination were needed to proceed with the pilot projects. For example, the implementation schedule had to be changed due to the restructuring of bus operations in July 2024 for the pilot project of the public transport improvement. The implementation schedule for the pilot project of traffic flow management also had to be modified or canceled due to a decision by CPs. However, some pilot projects, such as the introduction of GTFS, bus driver manuals, and the Traffic Impact Assessment, were implemented as scheduled.

Based on the above, the efficiency of the project is evaluated as fair.

#### **3.5.5 Impact**

The following outcomes were achieved in this project. These results are expected to have a positive impact on the Rwandan side.

1. The Urban Mobility Department was established and officially launched within the project period.
2. An Action Plan for each output was prepared.
3. The evaluation results of pilot projects were relatively positive.

#### **3.5.6 Sustainability**

Although there are uncertainties in the policy and institutional aspects because NST2 is still under discussion as of January 2025, urban transport management measures, including public transport, traffic flow management, and coordination with transport-related departments, are being continuously considered by the Rwandan side.

The sustainability of the project is evaluated as relatively high.

### **3.6 Conclusion**

All project objectives and outputs have been achieved or are expected to be achieved. As a result of examining this project from the viewpoint of six criteria (relevance, consistency, effectiveness, efficiency, impact, and sustainability), although some issues and uncertainties remain, the results for each criterion are positive. This project is considered to have made a significant contribution to improving the capacity of public transport, traffic flow management, and institutional management in Rwanda through its activities related to the planning and implementation of the project.

## Chapter 4: Recommendation and Lessons Learned

The overall goal of the Project for Urban Mobility Improvement in Kigali (UMIK) is to improve transport mobility for sustainable urban development. As summarized in Chapter 3, while some progress has been made during the course of the project, achieving the overall goal is a long-term objective that requires continuous efforts from the implementing agencies even after the project's completion. This chapter presents insights, findings, and lessons learned from the project for future activities to be implemented by the implementing agencies.

### 4.1 Lessons Learned

#### 4.1.1 Implementation Aspect

Despite challenges such as personnel changes, the restructuring of government organizations, and the coronavirus 2019 (COVID-19) pandemic, UMIK activities were implemented according to its initial scope. This success is attributed to the strong relationship between the counterparts and the JICA Expert Team, as well as the functioning of the Joint Coordination Committee (JCC). Insights and findings for possible future technical cooperation activities are suggested below in view of the implementation aspect:

- (i) In a multi-year project such as a technical cooperation project, personnel changes and organizational restructuring on the counterpart side are inevitable. To ensure the continuity of the project, it is effective to set up a single-window and consistent focal point, such as the JCC of UMIK.
- (ii) Young, working-level counterpart staff engaged in individual activities such as working groups (WGs) are likely to be transferred due to periodic human resources (HR) rotation. Providing manuals and technology transfer materials as deliverables will help ensure a smooth transition of knowledge to new staff members.
- (iii) The progress of each UMIK activity has been implemented as scheduled. This achievement was made possible by the timely and effective decision-making at the JCC and the management-level of each counterpart. However, some delays in documentation process were experienced, likely due to the limited number of officers.
- (iv) Rwandan officers involved in UMIK are generally highly intellectually curious and actively engage in various technical transfer programs and discussions. Furthermore, their strong proficiency in English fosters a collaborative environment facilitating the work of foreign experts dispatched from donor countries.

#### 4.1.2 Technical Aspect

The findings and insights from a technical perspective are summarized below:

- (i) **Proactive and flexible approach to introducing new policies and measures:** For example, while the implementation of the Bus Rapid Transit (BRT) system was a policy determined in the Master Plan 2020, land acquisition constraints made it challenging to proceed. Consequently, the plan was adjusted to adopt Dedicated Bus Lanes (DBL) as a feasible alternative. Similarly, for the pilot project on intersection improvements under UMIK, the WGs and JCC approved the application of substandard narrow lane widths. In other countries, such decisions often face delays or are suspended. Additionally, even within typically conservative

police organizations, permissions for app development under UMIK and its operation on police data servers under strict security were approved without delay. Such timely and prompt decision-making, along with a progressive attitude, will positively contribute to the smooth execution of development projects.

- (ii) **Strong sense of ownership among CPs:** UMIK activities included discussions on the necessity of distance-based fare system of bus services. The methodologies, effects, and fare-setting processes were transferred as part of the technical support. As a result, in December 2024, city buses in Kigali transitioned from a flat fare system to a distance-based fare system. Moreover, while the creation of a dedicated urban mobility organization was proposed as part of UMIK activities, the new Urban Mobility Department (UMD) was established in the City of Kigali in February 2024. These proactive adoption and dynamic implementation of policies learned through the UMIK Project serve as a strong driving engine for achieving future development goals.

## **4.2 Recommendation**

### **4.2.1 Continuing Necessary Development Projects and Planning**

The population of Kigali City is expected to continue growing, reaching an estimated 3.5 million by 2050. Achieving the overall goal of the UMIK Project still requires both hard and soft infrastructure development in the transport sector, which remains insufficient. Therefore, continuous project planning and implementation are essential, based on a strategic comprehensive policy.

The Transport Plan outlined in the Kigali Master Plan 2050, established in 2020, proposed a Bus Rapid Transit (BRT) system as the backbone transport network for the city. However, Kigali's hilly terrain, limited road space, and existing roadside developments present significant challenges for land acquisition and road widening to accommodate exclusive lanes of BRT. Consequently, the development of the BRT system has shifted toward implementing Dedicated Bus Lanes (DBL) as a practical alternative.

Through the Activity 1 of UMIK, several discussions were held regarding the development of mass transit facility, such as the corridor between BIA and Sonatubes (a node with DBL). In December 2024, the Rwanda Transport Development Agency (RTDA) decided to conduct a feasibility study for a mass transit system.

Considering the future population of Kigali, mass transit development will be necessary. The Bugesera New Airport is scheduled to open in 2027, necessitating a review and decision whether to proceed with the BRT or another mass transit mode. This decision should be part of a comprehensive strategy for sustainable urban development. While RTDA is already planning to conduct a feasibility study for a possible mass transit system, there is an urgent need to update the Transport Plan of Kigali Master Plan 2050 to improve urban transport or to formulate a mass transit development plan.

In establishing these plans, it is essential to develop a comprehensive strategy that includes the Bugesera Region, where development potential is expected to increase due to the new airport, as well as satellite cities where residents commute to Kigali.

### **4.2.2 Improving the Efficiency of Urban Mobility Activities**

Due to Rwanda's historical background, government administrative activities are implemented by a limited number of senior officers and younger staff. The staff of City of Kigali and other concerned government agencies and private organizations in charge for the transport sector are quite busy. In response, donor agencies have provided active assistance, including human resource development.

It is essential to streamline administrative operations through the utilization of information technology (IT) and data technologies, which aligns with Rwanda's national policies, such as the National Strategic Transformation 1 (NST1), the Smart City Master Plan, and the Irembo System. In the urban transport sector, promoting digitalization and efficiency through IT and data technologies is vital for achieving the provision of better administrative services.

In UMIK Activity 1, the General Transit Feed Specification (GTFS) data for buses and operational manuals were developed. Activity 2 included proposing an automated traffic signal control system as part of traffic management systems and a digitalized information system to record traffic events and accidents. It is strongly expected that these initiatives will sustain efficiency improvements even after UMIK's activities.

#### **4.2.3 Implementing Measures That Can Be Conducted Even with a Small Budget**

To address the population growth of the city, extensive infrastructure development must continue. However, government budgets remain limited, even though donor agencies continue to provide active financial support.

Despite budget constraints, many feasible measures can still be implemented. During the UMIK Project, technical transfers through lectures (attended by 495 people) and ten pilot projects demonstrated low-cost measures, such as lane markings at bus terminal, traffic signal adjustments, and small-scale civil engineering works at intersections. The effects of these pilot projects were confirmed and summarized in Section 3.5.3. These proven measures should continue even after the UMIK Project, ensuring their implementation within the government's limited budget.

#### **4.2.4 Continuous Use of UMIK Deliverables**

As mentioned above, technology transfer has been carried out through UMIK activities to support infrastructure development, even within a limited government budget. Manuals and guidelines have been prepared to facilitate this process. In addition, for mid-term and long-term development policies, action plans for implementation of public transportation and traffic management were formulated in collaboration with counterparts. It is expected that these UMIK deliverables will continue to be utilized for further development and for training new personnel.

#### **4.2.5 Formation of Urban Mobility Organizations for Sustainable Development**

Multiple agencies, including the Ministry of Infrastructure, RTDA, City of Kigali, RURA, and the Rwanda National Police, are involved in urban transport sector. However, a lack of coordination and insufficient information sharing between these organizations often results in misaligned planning. For instance, there may be no integration between RTDA's cable car plan and CoK's DBL routes, particularly regarding each station layout and transit convenience of citizen.

Through UMIK activities, a new organization, Urban Mobility Department, was established in the City of Kigali in February 2024 with 19 staff members. Additionally, there were concrete discussions on upgrading this new department to the Kigali Transport Agency (KTA) or Rwanda Transport Agency (RTA) and on forming another authority, Kigali Transportation Corporation (KTC), to regulate bus transport under Activity 3. The establishment of these new organizations is challenging but remains a work in progress. To ensure its sustainable functioning, strong and continuous support from international donors such as the Japan International Cooperation Agency (JICA), may still be needed.

Lastly, it should be noted that during the 6<sup>th</sup> JCC meeting held in November 2024, appreciation and gratitude were expressed to JICA for the UMIK activities over the past three years, along with a strong request for continued support, such as UMIK 2.

Specifically, while some overlap exists with the aforementioned recommendations and lessons learned, the following areas could benefit from support from donors and experienced professional experts:

- ✓ Monitoring the implementation progress of the UMIK Action Plan as well as collaboratively developing its implementation plans and measures for de-bottlenecking.
- ✓ Providing support for long-term planning, including updating the Transport Master Plan and examining the implementation of the proposed mass transit mode, which should encompass Bugesera area as well as Kigali's satellite cities. For this planning, the macro traffic demand model developed through UMIK activities can be utilized.
- ✓ Further improving bus services and development policies that the Rwandan government is introducing through UMIK Project activities, such as distance-based fares, scheduled timetables, and the utilization of GTFS data.
- ✓ Conducting additional pilot projects and technology transfers to achieve traffic improvement measures within the limited government budget. This may include the expanded use of data collected through the traffic control center to be established under JICA's grant aid project, as well as data gathered through UMIK activities and their pilot projects.
- ✓ Monitoring the activities of KTA and KTC, finding challenges, and collaboratively developing measures for de-bottlenecking issues. In the context of the aforementioned long-term planning, the coordination capabilities of KTA are expected to play a key role.

## ANNEX

1. Materials of the Joint Coordinating Committee (the 1<sup>st</sup> - the 7<sup>th</sup> JCC)
2. Minutes of the Joint Coordinating Committee (the 1<sup>st</sup> - the 7<sup>th</sup> JCC)
3. Materials and Record of the Wrap-up Presentation
4. Deliverables
5. Other Deliverables related to Technology Transfer
6. Evaluation Report of Pilot Projects

**Table 1: A List of Deliverables**

No.	Deliverables
4-1	A Draft Concept for an Integrated Public Transport Network on Activity 1-3
4-2	Concept Proposal for Comprehensive Public Transport Information Services (Activity 1-6)
4-3	Overall Plan for Traffic Flow Improvement (Activity 2-3) and Documents Related to the Basic Design of Priority Components (Drawings and Cost Estimates)
4-4	[Output 1] Action Plan for the realization of the masterplan
4-5	[Output 1] Evaluation report of priority action(s) on activity 1.5
4-6	[Output 1] Guidelines and manuals for public transport planning and operation
4-7	[Output 2] Action Plan to improve traffic flow management including a basic design of the signal control systems
4-8	[Output 2] Guidelines and manuals for traffic flow management
4-9	[Output 2] Evaluation report of priority action(s) on activity 2.5
4-10	[Output 3] Action Plan (roadmap) toward the establishment of the dedicated authority

**Table 2: A List of Other Deliverables**

No.	Deliverables related to Technology Transfer
AT1	
5-1	Traffic Survey Introduction
5-2	Traffic Survey and Demand Forecast
5-3	Drone Survey
5-4	GTFIS Manual

5-5	Creating Timetable
5-6	Timetable_Line 203_Pilot Project_Operator Explanation
5-7	Timetable_TrialOperationManagementAssistTool
5-8	Bus Operation Management and Bus Operation Plan
5-9	Driver's Education and Training_ATPR
5-10	Labor Management in Japan
5-11	Fare Policy
5-12	How to Utilize the Speed Governor's Log Data
AT2	
5-13	Function of Roads and Capacity
5-14	Roundabout Analysis
5-15	Parking Guideline
5-16	Concept Note of Staggered Working
AT3	
5-17	Kigali Urban Logistics
5-18	GIS workshop
5-19	Establishment of PTD KTC KTA
5-20	Draft Business Plan KTC