

7. TRANSPORT SECTOR PLAN

7.1 Road Development Plan

(1) Planning Concept

- The Study Area is divided into five (5) areas among which the urbanized area, urban area and suburban area are discussed in this section. The networks of CBD and the city center are presented in the Pre-Feasibility Study.
- The basic directions of road networks development are as follows:

Suburban Area

- To provide functional and effective linkages and connection of regional centers in the suburban area with the city center, by utilizing existing road networks.
- To improve linkage between regional centers and sub-centers.

Urban Area (Nairobi City)

- To divert and bypass through traffic from the city center by constructing bypasses and link roads.
- To orderly develop serviceable road networks in harmony with land development.

Urbanized Area

- To develop a hierarchical and functional road network by introducing radial and circumferential road system (R/C Network).
- To improve the present traffic congestion by construction of missing road links.

(2) Proposed Network in Suburban Area

Radial Trunk Roads Improvement

As the linkage of regional centers and the city centers, 14 road improvement projects are planned. The major works are road widening and rehabilitation.

Class	Section	Length (km)	No. of Lanes	Pavement Type & Condition	Improvement Measures
A2	Nairobi Border - Ruiru	5.2	4 (6)	Bitumen (Fair & Good)	Included in Eastern Bypass
A2	Ruiru - Juja	10.3	4	Bitumen (Fair)	Road Widening
A2	Juja - Thika	14.3	4	Bitumen (Fair & Good)	Road Widening
A3	Thika - NMA Border	34	2	Bitumen (Fair & Good)	Rehabilitation

Primary and Secondary Road Improvement

Six primary and secondary road projects connecting regional centers with sub-centers are planned. The measure adopted is the rehabilitation of existing poor pavement.

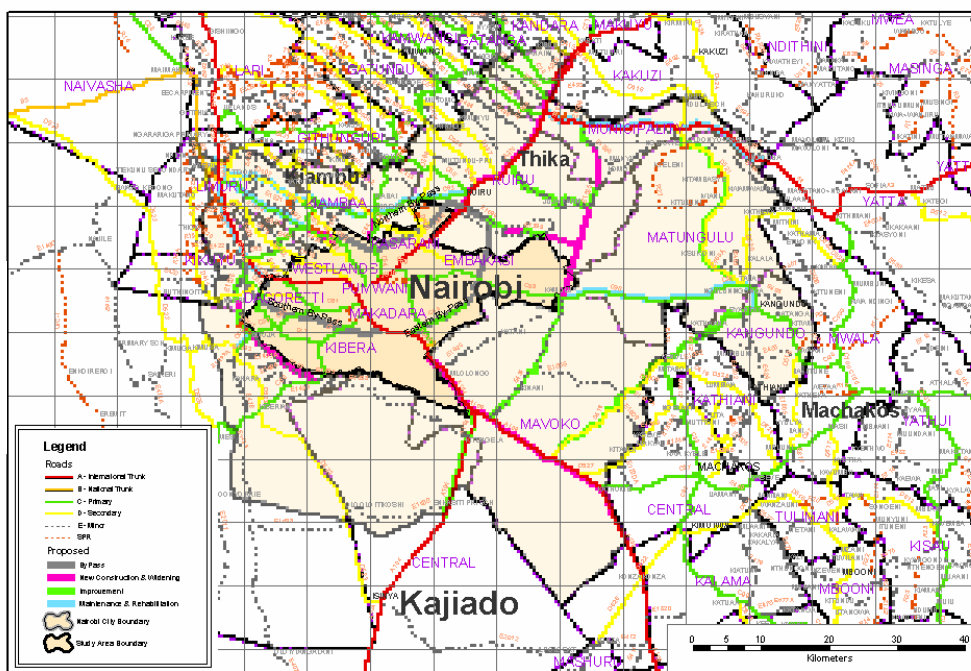
Class	Section	Length (km)	No. of Lanes	Pavement Type & Condition	Improvement Measures
D512	Tala -A3 Road	32.7	2	Gravel (Fair & Poor)	DBST
C63	Ruiru - Kiambu	15.7	2	Bitumen (Poor & Very Poor)	Rehabilitation
C63/D 407	Kiambu - Limuru	28.2	2	Bitumen (Good)	None

Minor Road Improvement

The pavement conditions of most minor roads which connect sub-centers with regional arterials are in poor of earth and gravel surface. The upgrading of pavement types and extension of linkages plan includes:

E1599 New Rd.	A2(Ruiru) -	18	2	Earth (Very Poor)	- DBST - New Road
E1535 New Rd	Gatunyaga - C98 (Ruai)	25.0	2	Gravel (Poor & Fair)	- DBST - New Road
E1535	A2(Ruiru) -	15.5	2	Gravel (Poor & Fair)	- DBST - Upgrading

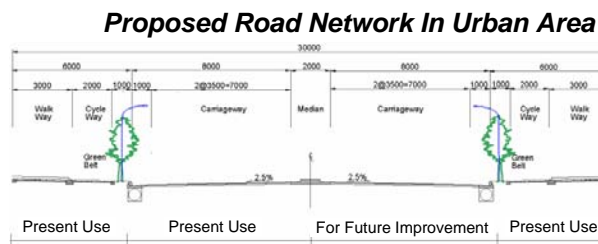
Road Network In Suburban Area In 2025



Standard Cross Section

Conceptional Road Cross Section

- The road design basically followed the requirements of Road Design Manual of MOTC 1987, Kenya with the following recommendations, among others.
- The existing spaces for road reserve areas will be fully utilized to avoid encroachment which may cause serious problems in future road improvement works by providing the following;
 - Walkway for NMT
 - Cycle way for para-transit
 - Green belt zone to improve urban environment



The stage road development will be applied wherever possible in order to save the unnecessary investment proposed for some road sections where traffic demand is not so great and traffic analysis warrants the acceptable level of service condition. Then, additional 2-lane road will be constructed when the traffic demand increases.

(3) Proposed Network Development in Urban Area (Nairobi City)

Bypass and Link Road Construction

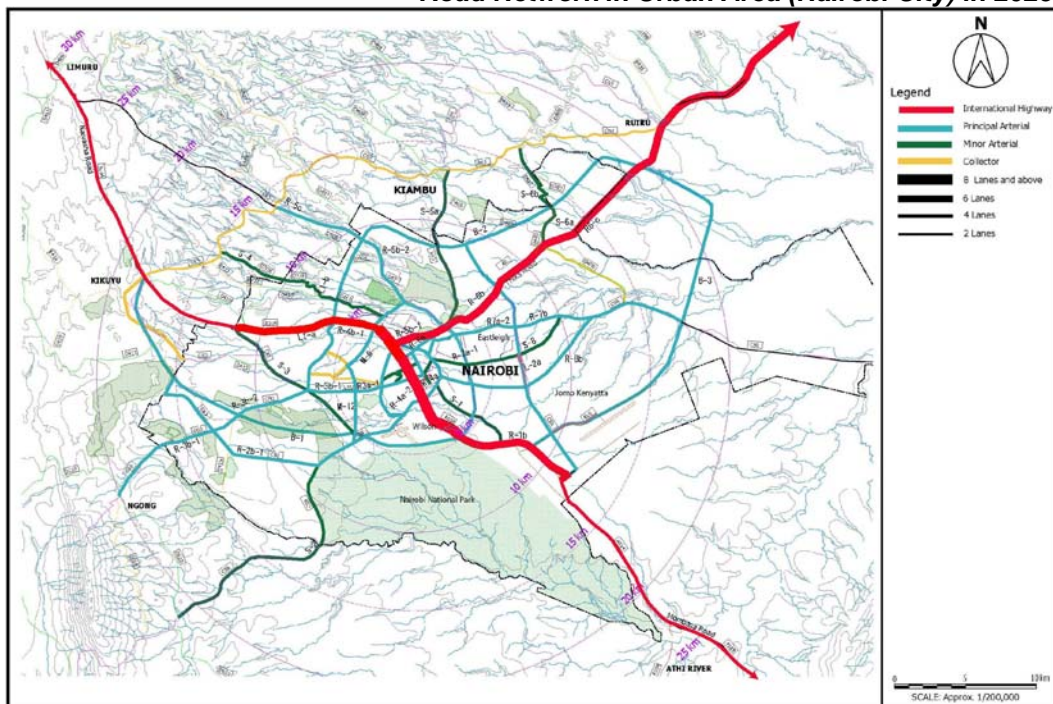
The through traffic passes through the CBD and the city centre which is one of the most serious causes of traffic congestion in the areas. This traffic shall be directed and re-routed to the outside fringe of densely developed areas by providing appropriate routes of bypasses and links.

- Bypass and Link roads
- Bypass Roads : 85.0 km
 - Link Roads : 24.4 km
 - Link Road Extension: 9.4km

Primary and Secondary Road Improvement

- In the urban area, rapid population increase is observed in the central area of Nairobi. The present concentrated urban structure generates large volume of person trip to/from the central area to work, school and other private activities. The formation of transport corridors to/from urban function area is in vital needs.
 - Proposed new radial roads: 10.91km
- Housing development by the private sector has evolved without apparent linkages to industrial and business area without any defined plan. The convenient and environmentally acceptable facilities are necessary to cope with those transport demand including improvement of secondary roads.
 - Secondary Roads (South-west): 40-9km
 - Secondary Roads (North – east): 24.4km
- In planning those road networks, special consideration are given to the following;
 - Distribution of urban function
 - Housing Development
 - Park and conservation areas

Road Network in Urban Area (Nairobi City) in 2025



(4) Road Network Improvement in the Urbanized Area

R/C Road Network Formation

Since the urban activities are concentrated in this area and co-exist with residential area, both the functionality and accessibility of transport means are the minimum requirement. To respond with those transport demand, the functional, effective and economical transport system of R/C Network composed of 8 Radial roads and 3 circumferential roads is planned in harmony with public transport system, including the followings:

Radial Arterial Road Improvement

- Radial Road inside C-3 : 21.9km
- Radial Road outside C-3 (South West) : 51.1km
- Radial Road outside C-3 (North East) : 54.2km

Circumferential Road Improvement

- C-1 and C-2 : 10.0km
- C-3 : 6.0km

Missing Road Link Construction

There still exit many missing links providing dead ends for road users. There are no community linkage and cohesion in areas separated mainly due to topographical reasons such as rivers, sharp slopes, etc.

The construction of those missing links is given the highest priority because those are major causes of traffic bottlenecks.

- Missing Links (Arterials) : 19.6km
- Missing Links (Collectors) : 8.1km
- Missing Links (Local Roads) : 5.1km

(5) Intersection Improvement

• Many intersections in the urbanized area of Nairobi city face serious congestion and traffic accidents. The intersection types are roundabouts for major crossings and conventional for minor; both with inadequate geometry and channelisation. Among these, 54 major intersections are selected by CCN as main causes of traffic bottlenecks and black spots and proposed for urgent improvement.

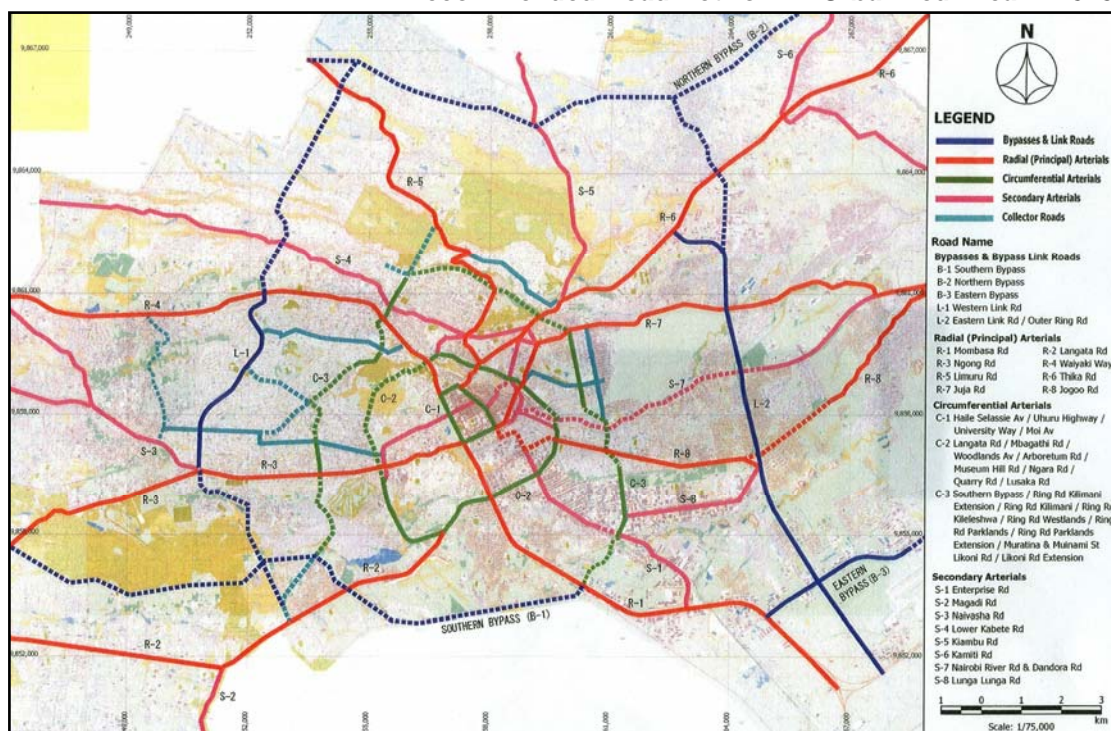
• Based on the field survey and traffic demand analysis, improvement measures are established. Taking into consideration the result of Westlands Roundabout Improvement conducted as the Pilot Project Experiment under the Study, measures are established involving the followings:

- Traffic signal installation at roundabouts : 28
- Traffic signal installation at conventional intersection : 16
- Intersection geometry improvement : 10

• The implementation cycles of traffic signal installation are designed with three (3) stages in accordance with traffic congestion degree.

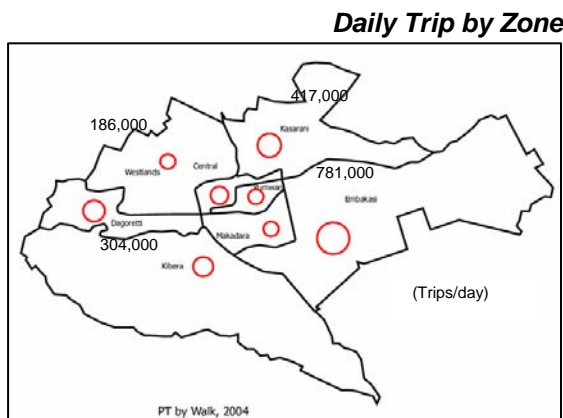
- Short Term : 23 intersection
- Medium Term : 16 intersection
- Long Term : 5 intersection

Recommended Road Network In Urbanized Area In 2025

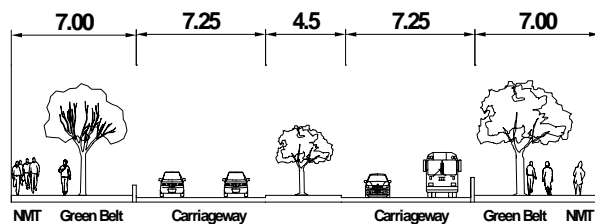


(6) Non-Motorized Transport

- Characteristics of NMT transport in the NMA are analyzed with nature of Person Trip Survey, Traffic Count Survey and others.
- Out of 4.82 million person trip per day in 2004 in Nairobi City, 2.32 million trips or 48.2% are either walk or use bicycles. Thus, the importance of NMT means is emphasized by the fact that almost half of total trips within the city depend on walk and more than 20,000 people use Daily Trips by Zone bicycles for their trips every day.



- The following design principles for NMT improvement are established.
 - Special consideration on urban poor and Physically Challenged People (PCP) in NMT corridor planning
 - Provision of NMT facilities with urban landscaping wherever applicable.
 - Segregation of NMT facilities from vehicular traffic for safety particularly at intersections.



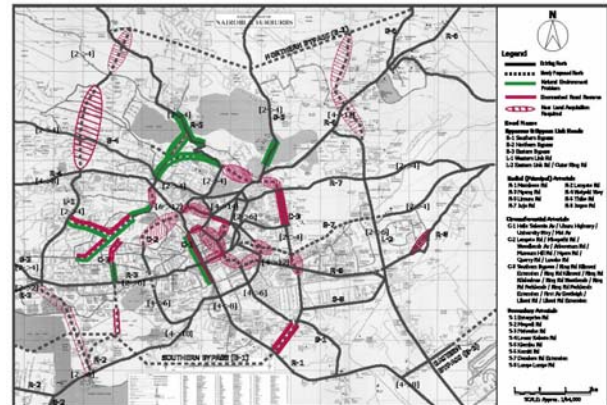
The following design considerations on the Physically Challenged People (PCP) in NMT corridor planning are established:

- A minimum of 2m wide walkway for two wheel chairs to pass each other;
- A minimum of 2m wide flat area on ramp;
- Kerb with maximum height of 15cm;
- Flat asphalt concrete (AC) pavement on walk way for PCP ; and
- Maximum vertical slope of 5% and max. traverse slope of 1%

(7) Problem Areas for RoW Acquisition

The Master Plan includes the formulation of R/C road network system utilizing existing road spaces at the maximum extent. However, the availability of spaces is limited and therefore acquisition of new road right of way (ROW) is inevitable. Anticipated major problem areas are identified in the figure.

Problematic Areas



(8) Staging Plan

The priority of each planned road project is primarily assessed from the view points of five (5) aspects.

- Planning Aspect: Compatibility with the National Development Plan
- Technical Aspect: Urgency in terms of degree and scale of problems.
- Environmental Aspect: Impacts on affected people and nature
- Economic Aspects: Cost-effectiveness
- Financial Aspect: Available fund

Staging Plan of Road Improvement

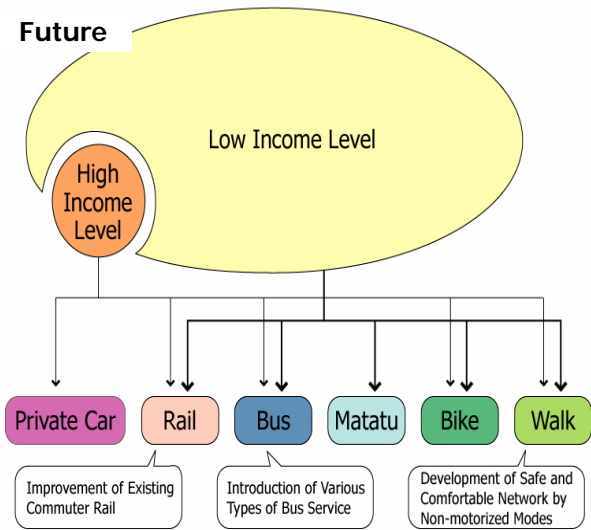
	Short Term (2006-2010)	Medium Tem (2011-2015)	Long Term (2016-2025)
1. Bypass and Link Roads	-	-	- Bypass Roads - Link Roads - Link Roads Extension
2. Missing Links	- Missing Links (Arterials)	- Missing Link (Collector) - Missing Link (Local)	-
3. Radial Roads	- Radial Roads Within C-3	- Radial Roads outside C-3 (North & West)	Radial Roads outside C-3 (South & East)
4. Circumferential Arterial Roads	-	Circumferential Arterial Roads C3	Circumferential Arterial Roads C1 & C2
5. Secondary Arterial Roads	-	-	Secondary Arterial Roads (South-West) Secondary Arterial Roads (North - East)
6. Intersection Improvement	Intersection Improvement (Stage 1)	Intersection Improvement (Stage 2)	Intersection Improvement (Stage 3)
7. Non-Motorized Transport (NMT)	NMT (North & East)	NMT (South & West, Part-I)	NMT (South & West, Part-II)
8. Uhuru Highway	- Expressway will be proposed after 2025		
9. Traffic Circulation	Traffic Circulation (Stage 1)	Traffic Circulation (Stage 2)	-

7.2 Public Transport Plan

1. Planning Concept

- Considering the traffic problems in Nairobi and to cope with the future increase of traffic demand, it is necessary to improve the current public transport system composed of bus, matatu and railway. The basic concept of public transport plan is: From the current limited modal choice to developing the urban transport environment with a wide variety of modal choice to the Nairobi Metropolitan citizens.

Preparation of Various Modes

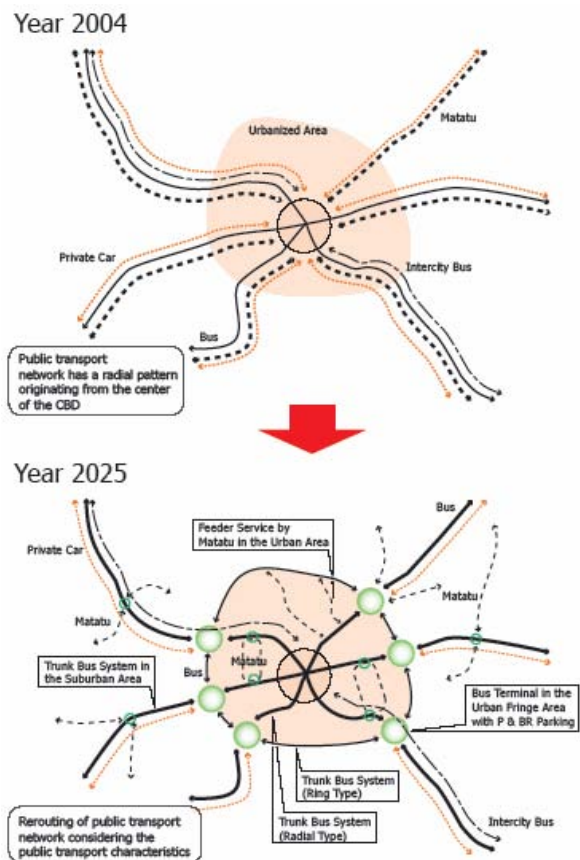


- To cope with the expected future demand, the basic concept of future public transport system is to achieve a convenient transport system composed of the bus as the trunk public transport system and matatus as the feeder, which are currently serving 85% of total public transport demand. Based on this concept and other measures such as development of convenient mode interchange areas with park-and-bus-ride parking spaces, the public transport system shall be established to enhance the urban environment.
- With these ideas, the basic planning directions for the public transport plan in Nairobi metropolitan area is worked out as follows:
 - Restructuring of public transport network,
 - Improvement of existing commuter rail,
 - Strengthening of mode interchange areas/points,
 - Improvement of public transport system in suburban towns, and
 - Introduction of stage development considering the increase of public transport demand, capability of investment and planning reality.

2. Restructuring of Bus/Matatu System

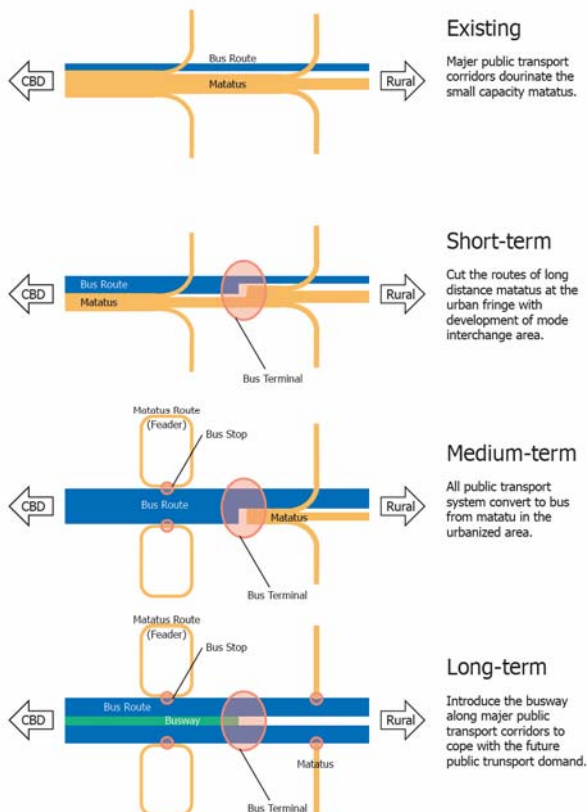
- The future public transport demand will increase to 2.9 million trips in 2025 from 1.7 million trips in 2004, but the increase of future car demand will be more drastic. And, the infrastructure development, such as widening of trunk roads, development of missing links and construction of new roads, say, a bypass, will not completely cope with the future traffic demand, especially in the urbanized area. Therefore, it is necessary to restructure the bus/matatu transport which is the road public transport operating together with other vehicles such as private cars, into an efficient, safe and comfortable public transport system.
- The basic concept, as mentioned in the planning directions, is that the trunk public transport system is composed of bus/matatu and commuter rail. At the same time, the public transport modes along the major transport corridors convert to bus which may contribute to more efficient transport system, and matatu plays a role of feeder for the improvement of convenient public transport.
- The concept as described above is schematically drawn in the figure below.

Rerouting of Public Transport Network

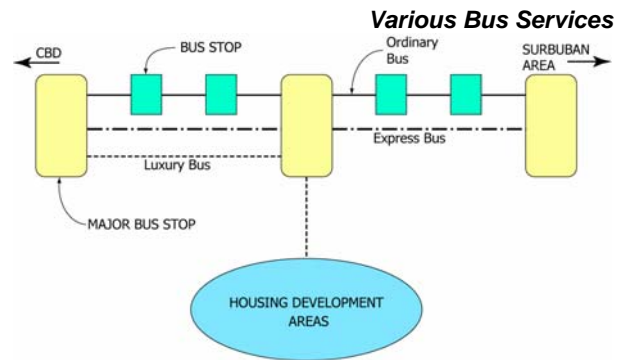


- Considering the long history of matatu system, the change of public transport demand, investment possibility and project reality, it is necessary to introduce a staging plan for the future bus/matatu transport plan.
- Outline of the staging plan along typical major public transport corridor is:
 - Short term
Cut the long distance matatu routes at the urban fringe and develop the transfer terminal at this point together with park-and-bus-ride parking spaces, and introduce the bus routes in the urbanized area side.
At the same time, the improvement / development of bus stop/terminal, regulation of loading/unloading rules and distribution of bus/matatu route map are prepared to increase the convenience of bus operation circumstances.
 - Medium term
All of public transport routes along the major roads in the urbanized area convert to bus routes.
New types of bus services and bus priority/exclusive lane are introduced.
 - Long term
Development of an efficient, safe and convenient public transport system, such as development of bus way, is the target for the year 2025.

Conceptual Staging Plan of Bus/Matatu System



- It is necessary to implement various bus priority measures such as bus priority/exclusive lane, express bus and park-and-bus-ride system for the preparation of various bus services to the public transport users.
- One of the effective measures of bus service is to introduce various kinds of operations along major transport corridors, as shown in the figure below.



- It is also necessary to restructure the existing public transport fleet and type as shown in the figure below.

Bus/matatu Fleet Size and Type of Bus

	Capacity (person/bus)	- 100 -	- 60	25 - 40	20 -
Existing	Bus		BUS TRACK	Metro Shuttle	
	Matatu			Big Matatu	Small Matatu
Future	Bus	New Type Busway (Articulated)	Bus along Major Road	Shuttle in the CBD	
	Matatu				Feeder of Bus

3. Taxi and Other Feeder Public Transport System

Currently, taxis are operated in Nairobi city and other major towns. Taxi is one of the supplemental public transport systems of bus and matatu. It is recommended to introduce the taxi meter for the convenience of taxi users.

Non-motorized public transport systems such as boda boda are recommended for the short-term.

4. Rail Transport

- Kenya Railway forms not only the backbone of the country but also of the major transport corridors in the Nairobi Metropolitan Area as one of the important urban transport systems, i.e. the commuter rail carrying passengers to/from suburban areas. However, the number of daily passengers is only 22,000, or the share of merely 1.5% of current total public transport demand. This is attributed to the small number of train frequency owing to the lack of commuter coaches.
- Therefore, the improvement of commuter train, which is one of the important urban transport systems in Nairobi Metropolitan Area, is planned to contribute to the solution of urban traffic problems.

Basic Considerations

- Based on the assessment of current railway facilities and expected future transport demand, the basic considerations of the improvement of commuter rail are as follows:
 - Implement the improvement plan by the minimum investment, because modern electric commuter train systems need big amount of cost, based on using the existing single track,
 - Examine the extension to Athi River station to cope with the expected increase of public transport demand in the southern metropolitan area,
 - Target approximately 150,000 daily passengers, which is 5% of future public transport demand in Nairobi Metropolitan Area,

- Maximize the number of train frequency by the introduction of new/used-hand commuter coaches,
- Improve/develop the station facilities for increase of the passenger boarding/ alighting convenience and for protection from fare cheating passengers, and
- Improve the telecommunication and signal facilities using the existing system.

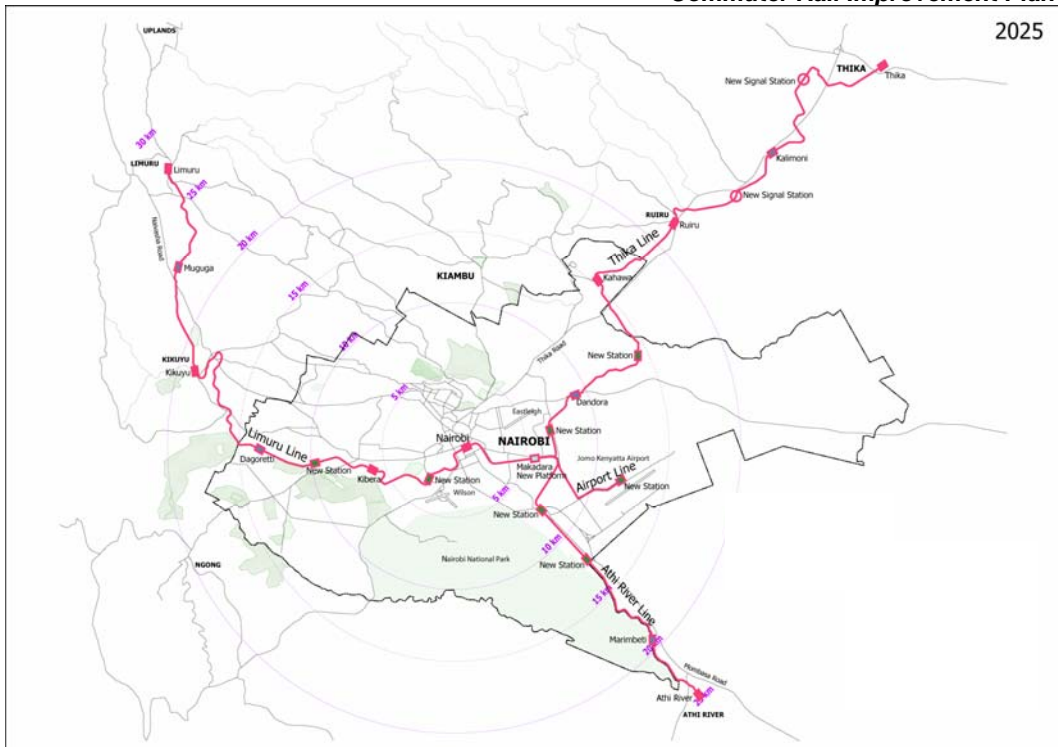
Improvement Plan of Commuter Rail

- Taking into account the abovementioned considerations and after careful study, the outline of the improvement plan of commuter rail is drawn up as follows:

Economic and Financial Viability

- Based on the results of economic and financial viability, the following findings are arrived at:
 - If all project cost is taken into account in the financial analysis, the project is not financially viable.
 - In case of fare increasing from 15 ksh / passenger to 20 ksh /passenger, the project is still not financially viable.
 - If the Kenya Railway will subsidize the construction cost of new stations, new platforms, signals and telecommunications and private firms only take care of the rolling stock expenses in the cash flow in the concession to a private firm, the project is financially viable both with and without increase in fare level.

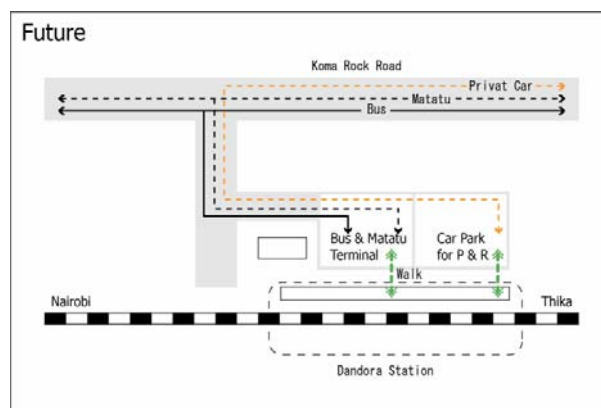
Commuter Rail Improvement Plan



5. Development of Mode Interchange Area

- Designing convenient public transport modes aims to minimize urban traffic congestion and largely contribute to improvement of the urban environment.
- Measures to provide a more convenient public transport are the introduction of suitable modes of transport and the smooth transfer between modes at mode interchange area, such as bus/matatu terminal/stop and railway station. The most serious disadvantage of public transport, especially mass public transport, is the need to transfer from one mode to another. Therefore, transfer between modes at mode interchange area is the key factor to ensure success of a public transport system.
- Mode interchange areas such as bus terminals and bus stops are the place where many people are generated and attracted. Therefore, mode interchange area has a great potential for commercial activities. Use of the mode interchange areas not only for commercial activities but also as public space is the trend in many countries. Branches of local government offices, galleries and libraries attached to the railway station are popular in Japan. This type of development may contribute not only to increase public transport users but also to energize district/community activities. This means that the mode interchange areas become the core of the community activities.
- Considering the current and future mode of transport, the mode interchange areas in Nairobi metropolitan area are classified into two types of bus/matatu stops, four types of bus/matatu terminals and three types of railway stations.

Conceptual Plan of Dandora Railway Station



6. Public Transport Plan for the Suburban Towns

- The planning directions for the public transport plan, which is mainly focused on the mode interchange area, in the suburban towns are as follows:
 - To increase the convenience of public transport use and to minimize the generated traffic from towns to Nairobi CBD, and
 - To vitalize the suburban activities by the development of mode interchange area.
- The selected towns are Thika, Limuru, Ngong, Athi River and Kangundo.

7. Staging Plan

- Based on the above discussions, the outline of staging for the public transport plan is established in the table below.

Public Transport Staging Plan

Items		Short-term	Medium-term	Long-term
Planning Directions		<ul style="list-style-type: none"> • Restructuring of bus/matatu route network • Maximum use of existing PT system such as commuter rail with minimum cost • Improvement of mode interchange area/point, especially existing bus terminal/stop 	<ul style="list-style-type: none"> • Development of new bus service such as express bus and luxury bus to improve the PT system • Development of new mode interchange areas to cope with the planned PT system 	<ul style="list-style-type: none"> • Development of new bus system such as busway to improve PT system • Development of new mode interchange areas to cope with the planned PT system
Model/ Others	Bus	<ul style="list-style-type: none"> • Introduce the bus to major PT corridors with corridor management/improvement 	<ul style="list-style-type: none"> • Bus plays as the main PT system along major PT corridors • Introduce the various types of bus service such as luxury bus • Introduce the bus priority/exclusive lanes along the major PT corridors 	<ul style="list-style-type: none"> • Bus plays as the main PT system along major PT corridors • Introduce the busway/system along the major PT corridors
	Matatu	<ul style="list-style-type: none"> • Matatu with long route length cut at the suburban mode interchange area/point 	<ul style="list-style-type: none"> • Matatu plays as the feeder PT system of bus transport 	
	Taxi & Others (Tuk tuk & Boda boda)	<ul style="list-style-type: none"> • Install the taxi meters to all taxis • Improve the NMT PT system as a feeder system of bus/matatu in the suburban towns 		
	Commuter Train	<ul style="list-style-type: none"> • Partially improve the railway track • Improve the station facilities • Introduce the new commuter coaches 	<ul style="list-style-type: none"> • Extend to Athi River • Improve the station facilities • Introduce the new commuter coaches 	<ul style="list-style-type: none"> • Develop the double track at the station • Introduce the new commuter coaches
	Mode Interchange Area	<ul style="list-style-type: none"> • Strengthen the transfer facilities such as bus terminal/stop between bus and matatu 	<ul style="list-style-type: none"> • Develop the mode interchange area with park-and-bus-ride facilities • Improve Nairobi Railway Station as a main mode interchange area in Nairobi 	<ul style="list-style-type: none"> • Develop the mode interchange area along bus corridors and commuter rail with park-and-bus-ride and park –and-ride facilities.

7.3 Traffic Management Plan

1. Basic Consideration

- The following measures on traffic management are examined in view of activating the city’s activities by the optimum use of limited urban space with the aim of decreasing traffic congestion.

Examination of parking policies and countermeasures

- Urban activities are deteriorating because many road spaces are used as parking slots. Therefore, parking countermeasures and policies are one of the most urgent issues in the CBD in Nairobi.

Traffic demand management in CBD

- Car traffic volume is increasing drastically because there is no alternative mode of transport at present. Therefore, it is necessary to reduce car traffic volume for the creation of safe, comfortable and vigorous urban environment.

Traffic safety education and traffic enforcement

- It is necessary to introduce traffic safety education not only to citizens and drivers but also to children, and to strictly enforce traffic regulations by traffic police to decrease traffic accidents.

2. Parking Facility in CBD

- Nairobi is not only the capital city of Kenya but also the business/commercial center in the Eastern African Region. The functions of Nairobi metropolitan area as a central business district (CBD), however, are undermined by the inefficient use of road space, such as illegal on-street parking because of the drastic increase of cars, the lack of convenient public transport system and the low parking fees in CBD.
- Therefore, based on the current parking situation, it is necessary to recommend adequate parking countermeasures to cope with the future parking demand

Current Situation of Parking Supply and Demand

- From field observations, it is found that the demand for on-street parking is high for the following reasons:
 - On-street parking is generally cheaper because the charge is neither time-based nor space-based, therefore one can park anywhere and at anytime with the same parking ticket (one flat rate of Ksh70 is

charged throughout the day).

- Some of the off-street parking areas especially basement parking, are mainly reserved for the building tenants.

- It is clear that the current parking demand exceeds the capacity. This trend is expected to continue into the future.

Countermeasures

- Development of multi-story car parking

This would maximize the use of off-street parking and ease the demand on on-sheet parking. In the development of multi-story (2-story) parking buildings, some basic factors which include; environmental and social issues, expected capacity, effective use and location of the facilities need to be considered.

- Parking guide system

Adequate parking guide system is to maximize the parking space utilization and to minimize the traffic congestion caused by the cars that are looking for vacant parking space in the busy CBD. The parking guide system is an electronic panel that gives information on the parking situation and is usually installed at the entrance of CBD.



Source: www.tcsint.com

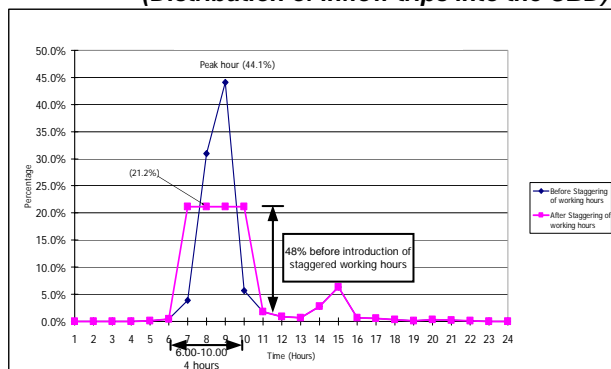
3. Traffic Demand Management

One of the effective countermeasures to improve the traffic conditions in Nairobi CBD is the parking policies and measures. It is recommended that the fundamental measures to alleviate the traffic problems should introduce comprehensive countermeasures,

i.e. the combination of various traffic demand management to Nairobi CBD. Based on the typical measures of traffic demand management implemented in various cities in the world, the following are the applicable measures to the Nairobi CBD considering the traffic characteristics and behavior of the study area.

- Parking policies and measures (as described in previous section)
- Staggering of working hours
The attracted trips to CBD by car from 7:00 to 9:00 (2 hours) are 75% of total daily trips. This shows high concentration in the morning peak to the CBD and causes serious traffic jams in and around the CBD. Introduction of staggered working hours into the CBD from 6:00 to 10:00 will drastically decrease the incoming peak traffic into the CBD by 43% or 2 hours (7:00 – 9:00) worth of traffic theoretically. A successful program of staggering of working hours depends on the cooperation of a wide range of business and other activities and preparation of various modes such as convenient public transport system.

Introduction of Staggering of Working Hours (Distribution of inflow trips into the CBD)



- Improvement of public transport
The improvement of public transport system, described in Chapter 7.2, is the basis of the traffic demand management.
- Park and ride and bus ride
For 'park and ride' to be effective, it is necessary to have secure and convenient parking space close to public transport stations/terminals/stops. Parking payment can be integrated with public transport fares. Many successful 'park and ride' schemes are associated with rail transit.

4. Traffic Safety Education and Traffic Enforcement

- It is necessary to introduce the traffic safety education and traffic enforcement thoroughly against the increasing traffic accidents even after strict matatu regulations in Nairobi metropolitan area.
 - Introduction of system for traffic accident data and analysis
Currently, traffic accident data are collected manually and individually by traffic police. This is not enough to conduct the traffic engineering analysis for formulating countermeasures to reduce traffic accidents. Therefore, it is necessary to introduce a system for integrating such processes as building a database on accidents, analyzing causes of accidents using analytical programs and examining suitable countermeasures in a unified way. The system gives priorities to identifying appropriate measures against locations of high traffic accidents.
 - Implementation of periodical traffic safety campaign
The constant periodical implementation of traffic safety campaigns on a national, local and district level will have a greater impact to the public.
 - Coordination of driving manner education program done by various companies/ organizations for drivers including public transport
 - Traffic safety education for the schoolchildren
The introduction of the traffic safety education to the school curriculum is important to prepare a new generation with higher safety manner.
 - Strengthening the traffic enforcement by the traffic police

Traffic safety education material for children

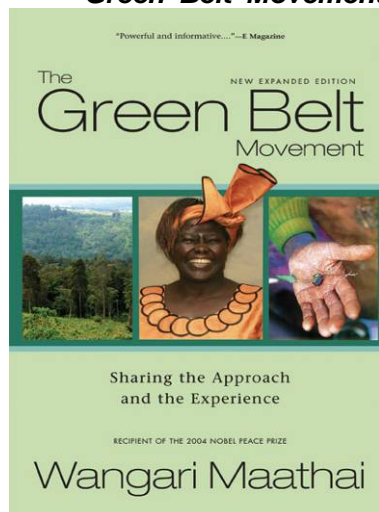


8. ENVIRONMENT AND SOCIAL CONSIDERATIONS

(1) EIA Legislation of Kenya

- In Kenya, Environmental Management and Coordination Act (EMCA), 1999 was made effective on 14th January 2000. NEMA (National Environmental Management Authority) was created to oversee the EIA procedure of development projects at the same time as EMCA was created.
- EMCA established rules for the protection of the natural environment and the socio-cultural and historical heritages. It contains "Project Report", which is an obligation of project proponent for EIA license. Sensitive project intervention requires further EIA study.
- Based on the legislative arrangement, all major roads and roads in scenic, wooded or mountainous areas and wetlands are subject to EIA study and any road project that should take place involving the existing road, the project proponent should take the legislative procedure of EIA.

Green Belt Movement



Courtesy: Lantern Books, www.gbmna.org/pressroom.

There is no pollution standard explicitly stated in EMCA and also no specific requirement for resettlement.

- EMCA of 1999 provides for strategic environmental impact assessment, (SEA), which is a procedure to study alternatives on development intervention well in advance of project planning stage.

- It is an obligation of SEA that consultation and public participation are necessary and "at least three public meetings with the affected parties and communities to explain the project and its effects and to receive their oral or written comments" are required for application of EIA license.

(2) Environment and Social Consideration of JICA

- Under the new JICA guidelines on the Environmental and Social Consideration, two essential conditions are:
 - Opening of related information to the public; and
 - Public consultation with local stakeholders.
- JICA's new guidelines provide that the environmental impact assessment of ODA project is subject to EIA regulations of the country in which the project takes place.
- SEA is a systematic and comprehensive process to assess environmental impacts of policies, plans and programs as project interventions and that these features of the project would have to incorporate into the environmental concerns for which it would become a tool for higher level decision-making.
- The scope of SEA is generally broader than that of project-level EIA in terms of both geographic extent of possible impact and options to be considered on social environment both on structural and non-structural measures. SEA gives at least equal weight to environmental and social objectives as given to economic objectives in formulating any policy, plan or programme.
- Essential features of SEA process are:
 - The basic principle of SEA is to ensure meaningful participation of a wide range of stakeholders on the regard for basic human rights and the democratic system of good governance.
 - To make all the information related to the proposed project open to the public;
 - To cultivate social consensus on the

project through a series of meetings; and

- A wide range of stakeholders should be encouraged to participate in order to ensure transparency and accountability of the decision-making on the project.

Based on the above, taking into account of both Kenya's EIA procedure and JICA's Guidelines on the Environment and Social Considerations, an IEE and series of stakeholder meetings had been held in late 2004 and early 2005.

(3) Initial Environmental Examination (IEE)

- Objectives of the "Initial Environmental Examination(IEE)" at the Master Plan stage are:
 - to investigate the present conditions of the proposed road areas;
 - To identify and anticipate positive and negative impacts likely to be caused by the implementation of proposed projects; and
 - To propose mitigation measures and monitoring plan for further study and measures as necessary.
- The IEE study covered the following areas of project components within the framework of the Project:
 - Road Improvement
 - Missing Links
 - Bypass Construction Projects
 - Intersection Improvement
 - Non-motorised Transportation (NMT)
 - Bus and Matatu Route Development
 - Railway Rehabilitation
- Result of IEE - Overall
 - It is predictable that the Project would greatly improve efficiency of the flow of good and workforce as a result of project implementation;
 - Psycho-physical comfortableness of the public transport users and pedestrians would be greatly improved; and

Kibera Slum Near Southern Bypass



- Traffic congestion would become severe during the construction period.

- Road Improvement

- Some of the routes subject to the study on the road improvement are occupied by local residents running small kiosks.
- In some places, there are slum areas developed on the road reserve.
- Since there is no provision of resettlement action plans provided in EIA of Kenya, whether it is for permanent or temporary establishment, a formulation of explicit resettlement action plan is essential.
- Instead of excluding the kiosk owners as project-affected people (PAP), integrating them as a part of the Project's beneficiary should be elaborated during the detailed study period.

- Missing Links

- Kiosks and Jua Kali Project's garage operators are occupying some of the road reserves subject to missing link construction works and that they are subject to relocation.
- Missing Links No.1, No.3, No.7 and No.16 are the most heavily occupied missing links.
- There are more kiosks and vendors moving into the road reserves. Thus individual road construction project is in need of explicit resettlement action plan.

Kiosks Occupying Missing Link No.7



- Bypass Construction Projects

- Northern Bypass will go through heavily developed area of tea estates as well as other large scale agricultural operations.
- Eastern Bypass will go through former cattle ranch areas while road reserves are generally clear of significant impacts on natural and social environment.

- Southern Bypass is subject to full EIA through the study on the habitat of rare species of Cactus and the extent of the area subject to clearing forest within the Ngong Road Forest should be carried out.

Road Reserve for Southern Bypass



- Intersection Improvement
 - Signalization of intersections in the city of Nairobi is clear of significant impact on natural and social environment.
 - Some of the existing cultural landscape of roundabouts subject to replacement with modern roundabout system in and around the CBD of Nairobi city would be lost.
 - Use of signalized introductions or modern roundabout system would be in need of discipline and unfamiliarity of the traffic rule would increase traffic congestion during the initial period.

Roundabouts on Uhuru Highway



- Non-motorised Transportation (NMT)
 - Provision of traffic facilities for NMT should greatly improve safety of the pedestrians, and users of non-motorised mode of transportation.
 - Mental and physical comfortableness of the pedestrians, and non-motorised users of mode of transportation would be greatly improved.

Non-motorised Transportation



- Bus and Matatu Route Development
 - There will be an introduction of the increase of noise, vibration and air pollution to the area where new routes are developed.
 - Buses and matatus should be well maintained and that they should be subject to strict regulations on CO₂ discharge.

Bus Contributing to Air Pollution



- Railway Rehabilitation
 - Railway rehabilitation works would increase efficiency of mass transit for commuters as a number of trains are operated and more stations are constructed for safe ride of trains.
 - Encroachment to the railway reserve should be cleared for the safety of the train operation as well as for the local residents.

Encroachment to Railway Reserve in Kibera Slum



(4) Stakeholder Meeting

- JICA guidelines provide that it is mandatory to hold at least three stakeholder meetings.
- Advertisements of the public notice for SEA on three national news papers are made in order to encourage participation of the citizens of Nairobi. A series of stakeholder meetings have been held during the Master Plan Study period to exchange views on its components.

Stakeholder Meetings

No.	Date	No. of Participants and Theme
1	11/Nov/2004	Participants: 81 persons Theme: Problem Identification on Urban Transport in the Nairobi Metropolitan Area
2	03/Feb/2005	Participants: 88 persons Theme: Master Plan Scenarios
3	03/Mar/2005	Participants: 61 persons Theme: Recommended Master Plan and Implementation Priority

Participants are ranging from those working for central and local government, semi-governmental organizations, public transportation companies, local residential organizations, educational institutions, NGOs and private individuals.

- First Stakeholder Meeting
 - JICA's Role of Environmental Impact Assessment and SEA;
 - Observation of Transport Problems: Outline of JICA Study; and
 - Pilot Project: Intersection Improvement at the Westlands.

Presentation



- Second Stakeholder Meeting
 - Result of Traffic Analysis;
 - Progress of IEE Study;
 - Master Plan Scenario;
 - Road Network and NMT;
 - Public Transport and Traffic Management; and
 - Funding Urban Transport Development;
- Third Stakeholder Meeting
 - Recommended Master Plan;
 - Overall Implementation Programme;
 - High Priority Projects; and
 - Result of IEE

Stakeholders' Opinion

- Three stakeholder meetings have been well accepted by the participants and the following is noted:
 - First Stakeholder Meeting
 - i. Participants appreciated the meeting as an appropriate tool of project design;
 - ii. Land use planning of Nairobi was not appropriately implemented as planned in the 70s; and
 - iii. Explicit EIA study for the entire road construction projects should be implemented.
 - Second Stakeholder Meeting
 - i. The area in the eastern part of Nairobi is to be taken care of in the Study;
 - ii. Provision of NMT facilities are to be given equal importance;
 - iii. Principles of land use plan adopted in the Study follow the planning concepts of Nairobi Metropolitan Region prepared by MOLH.
 - Third Stakeholder Meeting
 - i. The traffic congestion is not only a matter of road and transportation problems but also a matter of the lack of an explicit land use plan;
 - ii. Road network shall be in an appropriate hierarchy;
 - iii. NMT facilities shall be adequately provided for the mobility of physically-challenged;
 - iv. It is important that urban development, land use plan and public transport are considered together.

9. INSTITUTIONAL PLAN

(1) Issues on Transport Institution

- Responsibilities of the transport sector in the NMA are fragmented among the central government ministries and departments, and CCN, other local councils. The central government agencies concerned and their functions are:

MORPW

Ministry of Road and Public Works (MORPW) is responsible for development and maintenance of the classified roads.

MOLG

Ministry of Local Government is responsible for administering and supporting the Local Authorities (LAs).

MOT

Ministry of Transport is responsible for Transport Sector administration.

MOLH

Ministry of Land and Housing is responsible for administering and supporting the Local Authorities.

KRB

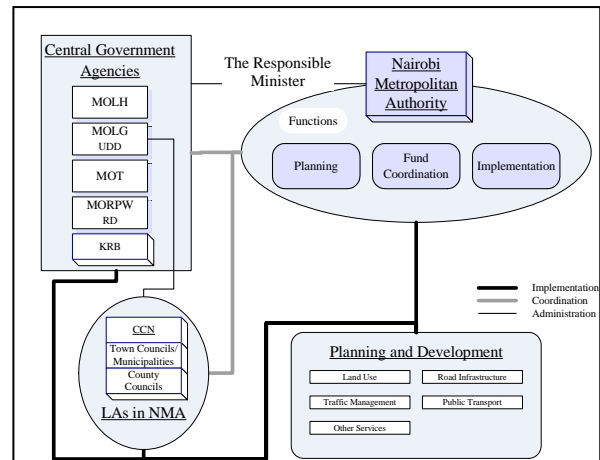
Kenya Roads Board is responsible for road maintenance fund management.

- Major road-based public transport services of bus and matatu are provided by private operators and are virtually under the laissez-faire (non-interference) principle.
- Traffic management measures are almost independently conducted by various organizations.
- Coordinated effort among the sub-sectors of the transport sector including roads, traffic management, transport administration, and public transport is rarely observed.
- Linkage between land use planning and transport sector planning including infrastructure development/ improvement, traffic management and public transport service provision is weak.

(2) Kenyan Effort

- Establishment of a new organisation, tentatively called the Nairobi Metropolitan Authority under the national cabinet, which shall take responsibility of coordinating comprehensive development planning and plan implementation for NMA.
- The Authority is intended to be an autonomous state corporation being established by the presidential order. It may retain own fund procurement capability other than government support. It might have an allocation function of the funds derived from the central government agencies for the plan implementation.

Functional Relation of Nairobi Metropolitan Authority (tentative name)



- Reform activities of the road sector in Kenya initiated by the GOK leadership in 1992 is underway while further contemplations are required to reach a conclusion for the advancement of the reform.

(3) Recommendation for Institutional Development

- It is important for the intended Authority to provide the strategic development plan for NMA including the comprehensive transport plan coordinated with the land use plan.
- The Authority is recommended to retain a certain degree of discretion capacity regarding fund allocation to the local authorities for implementation of the plan. This is an important instrument to assure plan implementation which could serve as a guiding tool for the private sector to follow intended land use.
- Performance of Road Department (RD) of MORWP may be improved through adopting more performance-oriented management by using key performance indicators supported by enhanced Information Communication and Technology (ICT) application.
- For the KRB, expansion of their road fund management function other than RMLF is desirable for maximizing its fund management capability in the sector. The coverage may include road development funds while it requires legislative change.

10. FINANCING PLAN

(1) Current Fund Flow

- Road development funds are mainly procured by MORPW while majority of funds for maintenance are administered by KRB. The funds consist of Road Maintenance Levy Fund (RMLF) levied on fuel sales, which occupies dominant portion of the entire funds, and Cess levied on transactions of local products and services,
- MOLG is overseeing Local Authority Transfer Fund (LATF) which is allocated from the central government to LAs from income tax revenue mainly for physical development including maintenance and rehabilitation in line with its decentralization program. LATF is mainly utilized for road maintenance activities. UDD under MOLG is procuring road and other development funds including foreign official assistances for LAs in case a required fund is too big to be procured by particular LAs.
- While RMLF and LATF are utilized for road maintenance activities, major road development works have been procured substantially from foreign official assistance of donor countries and international organizations.
- LAs have limited own fund resources, which are not enough to cover major capital investment schemes including roads development.
- KWS and FD under MOENR are executing limited roles to develop and to maintain the roads which are under their jurisdiction.

(2) Possible Fund Allocation

Possible Fund for Master Plan (Unit: Million Ksh)

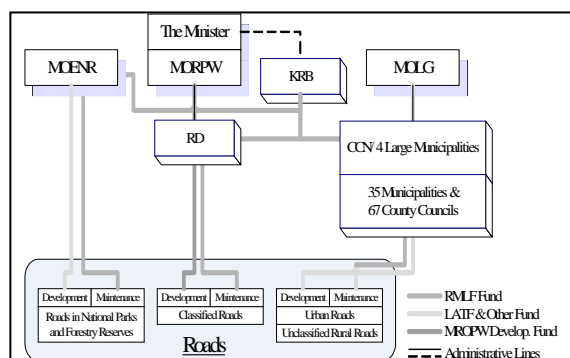
	Total	Short term (06-10)	Medium term (11-15)	Long term (16-25)
Cost for Road Development	34,795	6,356	9,142	19,297

- An indicator for future financing capability of the Kenyan economy to the sector possible fund allocation to the roads sector in the NMA by the GOK based on the past performance was analyzed. The projected amounts may be enough to cover the fund requirement for the Master Plan implementation on the roads sector.

(3) Possible Measures to Expand Funding

- The private sector participation in the form of Public Private Partnership (PPP) is a main alternative financing measure for implementation of schemes in the Transport

Current Fund



Sector. Road concessions for development and maintenance, and concessions for development, operation and maintenance of public transport facilities are prospective varieties.

- The concessions for public transport facilities have potential engagement with commercial activities which may expand opportunities of the private sector participation by enlarging eligible candidates for particular activities.
- Increase in levying rate of RMLF is a reasonable consideration for national level fund-base expansion, as the rate has not been raised since its establishment in 1999 although the fuel prices have been raised substantially with the general economic inflation of the country.
- Other major possibilities to expand national level fund base are the utilization of TLB's license fee and the road safety levy motor vehicle imports. TLB's license fee which is currently remitted directly to the Treasury for general fund, is reasonable to be tied to the expenditure of specified purposes relating to traffic management. Also tying up road safety levy with road safety initiatives would be justified.
- Increase in effectiveness of collecting Cess and/or other taxes and charges under LAs' authority may have prospective opportunities for the local level expansion considering the current level of levying coverage.
- Increase in foreign development partner's contribution is duly expectable fund expansion in current circumstances for the new administration selected by the election in December 2002 with its Investment Program for the Economic Recovery Strategy for Wealth and Employment Creation.

11. MASTER PLAN EVALUATION

(1) Evaluation Method

- Alternative 3 was selected as the Transport Master Plan for future development of the transport system in the Nairobi Metropolitan Area. Based on the Master Plan selected, and staging of the sectorial development plans, the established Master Plan is to be evaluated from various aspects.

Investment Cost

- The total investment costs for the M/P projects are KSh 43.4 billion during 20 years from 2006 to 2025, of which those required in the short-term period (2006-10) are about KSh 8.0 billion, in medium-term period (2011-2015) are about 10.8 billion and are in long-term term period (2016-2025) about 24.7 billion, taking into account the Government financial affordability.

Investment Plan (KSH Million)

	Total Cost	Short Term (2006-10)	Med. Term (2011-15)	Long Term (2016-25)
Road Development	34,795	6,356	9,142	19,297
Public Transport	8,100	1,100	1,600	5,400
Traffic Management	350	300	50	0
Traffic Institution	200	200	0	0
Total	43,445	7,956	10,792	24,697

Evaluation Factors

- The Master Plan was evaluated through the following factors:
 - Improvement of traffic efficiency
 - Average travel speed
 - Average V/C
 - Improvement of system efficiency
 - Total PCU-Km
 - Total PCU-Hour
 - Economic viability
 - Net Present Value (NPV)
 - B/C Ratio
 - Economic Internal Rate of Return (EIRR)
 - Environmental impacts in terms of:
 - Air pollution of HC, CO and NOx
 - Special Consideration
 - Use of NMT
 - Traffic Security/Safety Management
 - Traffic Demand Management

(2) Traffic Efficiency

- The traffic system performance of the M/P was assessed based on traffic parameters between the two cases of "Without Master Plan" and "with Master Plan".
- The Master Plan will improve the travel speed in the Study Area as well as in the city centre. Average travel speed in the Study Area will be increased by about 6 to 20 % by the Master Plan while that in City Centre will increase by about 22 to 27 %.
- The Master Plan will contribute to decrease traffic congestion in the Study Area as well as in the City Centre. Average congestion degree (W/C) in the Study Area will decrease by about 7 to 17 % by the Master Plan while that in the city centre will decrease by about 11 to 16 %.

Traffic Efficiency Indicators

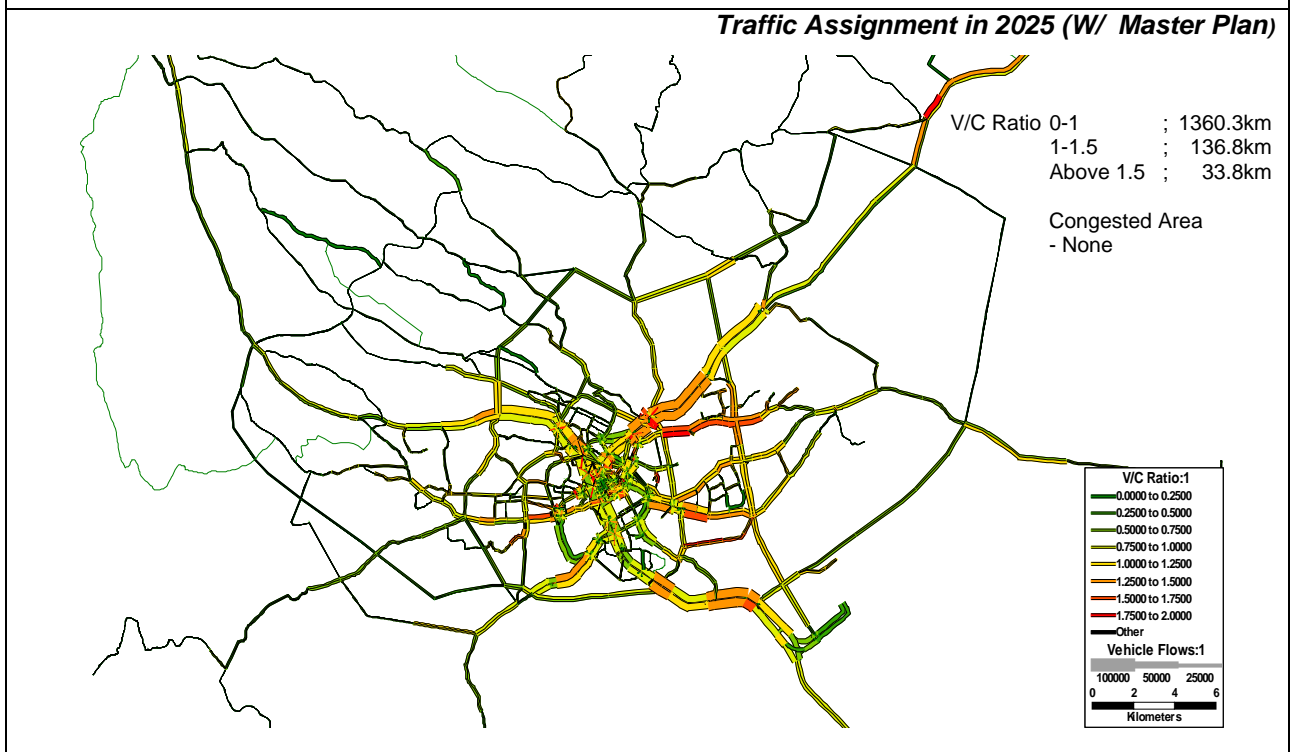
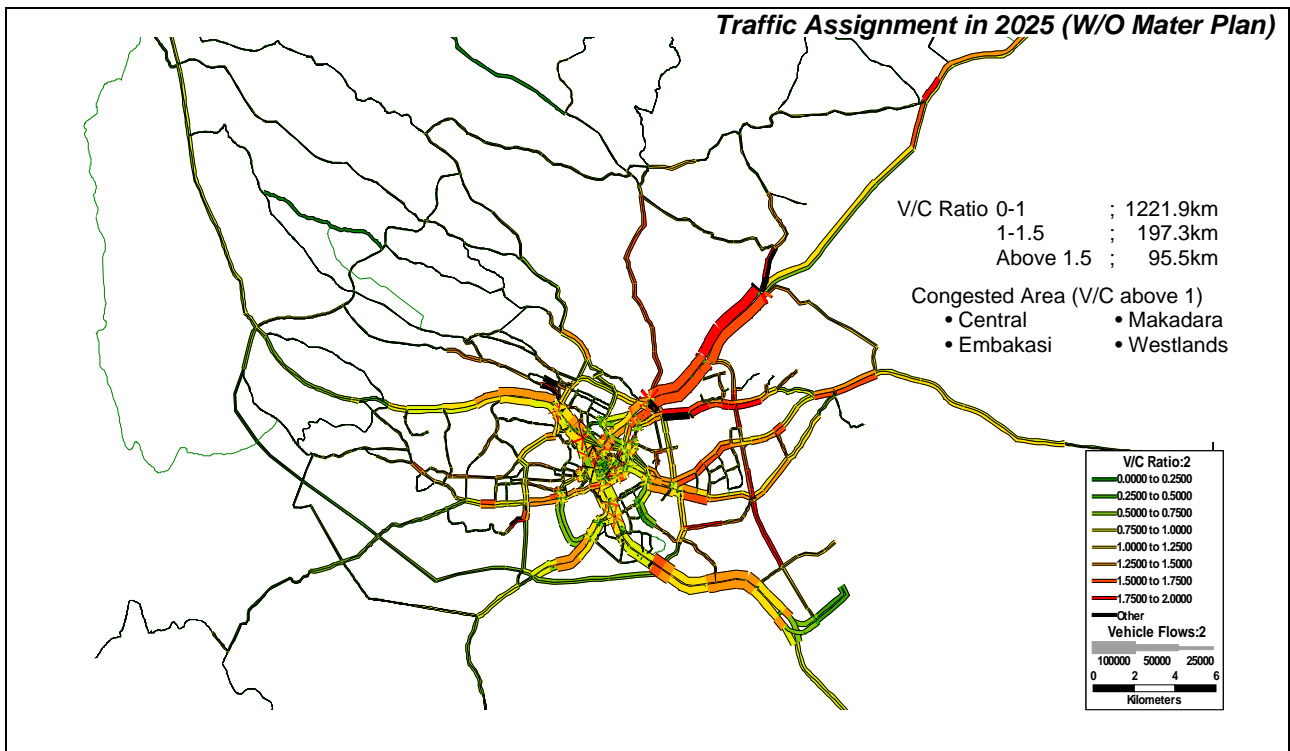
		2004 (Base Year)	2010	2025
Study Area				
Ave.Travel Speed (km/h)	W/O MP(A)	34.1	33.10	31.20
	W/ MP(B)	34.1	37.76	37.40
	B/A	1.00	1.14	1.20
Average V/C Ratio	W/O MP(A)	0.501	0.685	0.889
	W/ MP(B)	0.501	0.639	0.741
	B/A	1.00	0.93	0.83
City Center				
Ave.Travel Speed (km/h)	W/O MP(A)	31.0	28.0	25.1
	W/ MP(B)	31.0	34.4	31.8
	B/A	1.00	1.23	1.27
Average V/C Ratio	W/O MP(A)	0.809	0.854	0.950
	W/ MP(B)	0.809	0.751	0.850
	B/A	1.00	0.88	0.89

System Efficiency Indicators

		2004 (Base Year)	2010	2025
Study Area				
PCU-Km ('000)	W/O MP(A)	10,960	14,995	23,523
	W/ MP(B)	10,960	14,452	22,390
	B/A	1.00	0.96	0.95
PCU-Hour ('000)	W/O MP(A)	322	515	753
	W/ MP(B)	322	383	598
	B/A	1.00	0.74	0.79
City Center				
PCU-Km ('000)	W/O MP(A)	1,167	1,402	1,823
	W/ MP(B)	1,167	1,293	1,758
	B/A	1.00	0.92	0.96
PCU-Hour ('000)	W/O MP(A)	38	53	73
	W/ MP(B)	38	38	55
	B/A	1.00	0.72	0.75

(3) System Efficiency

- The Master Plan will contribute to decrease the vehicle-km in the Study Area as well as in the City Centre. The transport system efficiency can be measured in PCU-kilometers and PCU-hours. The PCU-km in the study Area will decrease by about 4 to 5 % by the Master Plan while that in City Centre will decrease by about 21 to 26 %.
- The Master Plan will greatly contribute to decrease travel hour in the Study Area as well as in the City Centre. The PCU-hour in the study Area will decrease by about 8 to 4 % by the Master Plan while that in City Centre will drastically decrease by about 24 to 29 %.



(4) Economic Evaluation

- Using the unit vehicle operating cost (VOC) and traffic assignment results, the vehicle operating cost is expected to provide huge savings by implementing the Master Plan projects.

Benefit Estimated (Ksh'000)

Year		Running Cost	Fixed Cost	Travel Time Cost	Total Traffic Cost
2010	W/O M/P	28,296	3,602	18,272	50,171
	W/ MP	27,685	3,377	17,273	48,252
	Benefit	610	225	1,083	1,919
2020	W/O M/P	34,386	4,287	21,910	60,553
	W/ MP	33,211	3,299	16,663	53,173
	Benefit	1,175	958	5,247	7,380
2030	W/O M/P	47,160	5,793	32,121	85,074
	W/ MP	44,768	4,766	24,258	73,793
	Benefit	2,392	1,027	7,862	11,281

Economic Cost (MKsh)

		Financial Cost	Economic Cost
1	Road Improvement	34,795	29,228
2	Public Transport Improvement	8,100	6,804
3	Traffic Circulation and Management	350	294
4	Traffic Institution	200	168
	Total	43,445	39,852

- The benefit – cost analysis of the Master Plan during project life span of 30 years is shown below. The results of the economic analysis show that a Net Present Value (NPV) of Ksh 18,350 million and B/C of 2.34 using a discount date of 12.0 % which is designated by the Ministry of Planning and National Development in Kenya. The Economic Internal Rate of Return (EIRR) is compiled at 39.4%.

Economic Parameters

Net Present Value	Ksh 18,350 million
B/C	2.34
EIRR	39.4%

- Notes: 1) Applied Project life is 30 years
2) Applied Discount rate is 12.0%

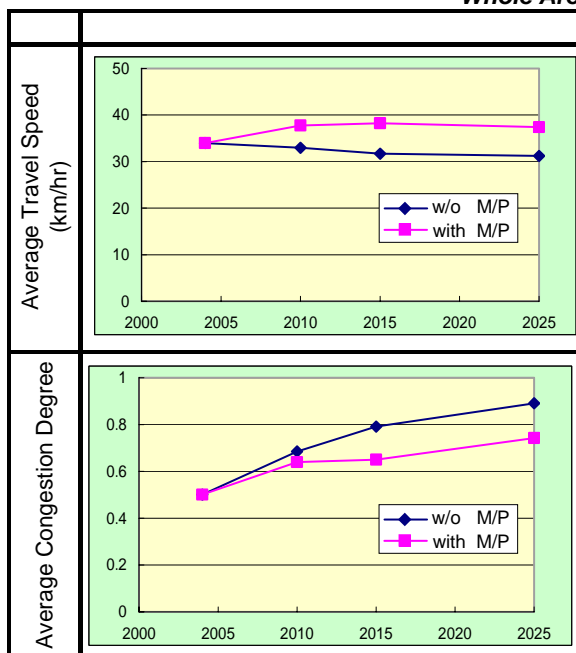
(5) Environmental Impact Assessment

- The environmental and social impact assessment was already carried out. Among the various environmental impacts, air pollution is taken into account in the 'Do Nothing' and 'Master Plan' cases. The air pollution components of HC, CO and NOx are expected to decrease by implementing the M/P projects.

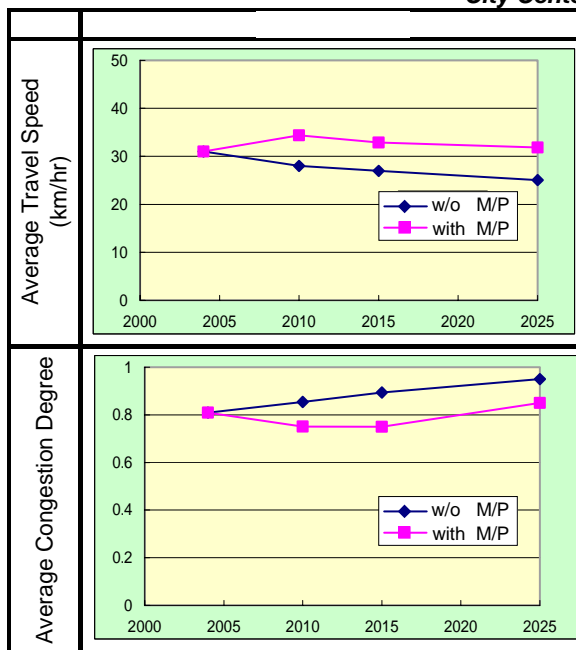
Air Pollution with and without Master Plan

		W/O Master Plan	W/ Mater Plan	Reduction Amount
2010	HC	3,809	3,671	138
	CO	31,489	30,350	1,139
	NOx	3,719	3,584	135
2025	HC	5,975	5,687	288
	CO	49,399	47,020	2,379
	NOx	5,834	5,553	281

Whole Area



City Center



(6) Effects of Transport Master Plan

- It is expected that the Master Plan will have favourable impacts from view of economic viability, traffic function, system efficiency, and environmental impact.
- The following special achievements are emphasized aside from improvement of traffic conditions.
 - Widespread use of NMT for pedestrians
 - Promotion of Bus/Matatu system for transport poor.
 - Discouragement of private car use.
 - Minimum or ban of on-street parking in CBD
 - Improvement of traffic safety level
 - Advancement of motorist behaviour
 - Reinstalation of Nairobi City as the transport hub in East African Region
 - Raise of urban landscape to the international level

Effects of Transport Master Plan

	Urban Development Policy	Target Indicators	SHORT TERM (2006-2010)	MEDIUM TERM (2011-2015)	LONG TERM (2016-2025)
Traffic / Efficiency	<ul style="list-style-type: none"> • International Level of Improvement 	<ul style="list-style-type: none"> • Level of Service (LOS) • Mobility • Congestion 	<ul style="list-style-type: none"> • LOS Level D • Travel Speed 38km/hr • V/C=0.64 	<ul style="list-style-type: none"> • LOS Level D • Travel speed 38 km/hr • V/C=0.65 	<ul style="list-style-type: none"> • LOS Level D • Travel speed 37 km/hr • V/C=0.74
System Efficiency	<ul style="list-style-type: none"> • Hierarchy Road Network System 	<ul style="list-style-type: none"> • Accessibility 	<ul style="list-style-type: none"> • Increase of accessibility by construction of Radial Road inside C-3 and missing link 	<ul style="list-style-type: none"> • Increase of accessibility by improvement of Radial Roads in north-east and C-3 Road. 	<ul style="list-style-type: none"> • Strengthen accessibility by construction of Radial Roads outside C-3, C1 and C-2, etc.
	<ul style="list-style-type: none"> • Promotion of Bus Transport 	<ul style="list-style-type: none"> • Modal Share 	<ul style="list-style-type: none"> • Share of bus passenger from 10 % in 2004 to 23 % in 2010. 	<ul style="list-style-type: none"> • Share of bus passenger to 36 % in 2015. 	<ul style="list-style-type: none"> • Share of bus passenger to achieve at level of 50 % in 2025.
	<ul style="list-style-type: none"> • Upgrading of Rail Transport 	<ul style="list-style-type: none"> • No. of Passengers 	<ul style="list-style-type: none"> • Increase from 24,300 in 2004 to 51,900 in 2010. 	<ul style="list-style-type: none"> • Increase to 85,800 in 2015. 	<ul style="list-style-type: none"> • Increase to 140,000 in 2025.
	<ul style="list-style-type: none"> • System Performance 	<ul style="list-style-type: none"> • PCU-km • PCU-hr 	<ul style="list-style-type: none"> • 0.96 times • 0.74 times 	<ul style="list-style-type: none"> • 0.96 times • 0.79 times 	<ul style="list-style-type: none"> • 0.95 times • 0.79 times
Economic Viability	<ul style="list-style-type: none"> • Economic Viability 	<ul style="list-style-type: none"> • Vehicle Operating Cost 	<ul style="list-style-type: none"> • Reduction of VOC (0.96) 	<ul style="list-style-type: none"> • Reduction of VOC (0.88) 	<ul style="list-style-type: none"> • Reduction of VOC (0.86)
Social / Natural Environmental Aspect	<ul style="list-style-type: none"> • Use of Non-Motorized Transport 	<ul style="list-style-type: none"> • NMT Length 	<ul style="list-style-type: none"> • NMT length is expanded to 23.8 km. 	<ul style="list-style-type: none"> • Expanded to 42.0 km 	<ul style="list-style-type: none"> • NMT length of 59.8 km.
	<ul style="list-style-type: none"> • Traffic Security / Safety Management 	<ul style="list-style-type: none"> • No of Accident • No. of Street Light 	<ul style="list-style-type: none"> • Traffic safety and security by control of on street parking and strengthening of traffic enforcement 	<ul style="list-style-type: none"> • Traffic safety and security by improvement of Radial Roads in north-east and C-3 	<ul style="list-style-type: none"> • Traffic safety and security by construction of bypasses, radial roads and C-1 and C-2, etc
	<ul style="list-style-type: none"> • Traffic Demand Management (TDM) 	<ul style="list-style-type: none"> • Traffic Congestion in CBD / City Centre 	<ul style="list-style-type: none"> • Enforcement and education of TDM policy. 	<ul style="list-style-type: none"> • Same as the Short Term 	<ul style="list-style-type: none"> • Implementation of TDM policy
	<ul style="list-style-type: none"> • Environmental Considerations 	<ul style="list-style-type: none"> • HC, CO, NOx 	<ul style="list-style-type: none"> • Reduction of about 4 % of outputs of HC, CO, NOx. 	<ul style="list-style-type: none"> • Reduction of about 4 % of outputs of HC, CO, NOx. 	<ul style="list-style-type: none"> • Reduction of about 5 % of outputs of HC, CO, NOx.
		<ul style="list-style-type: none"> • Community Cohesion 	<ul style="list-style-type: none"> • Contribute improvement of nationhood community / cohesion. 	<ul style="list-style-type: none"> • Same as Short Term 	<ul style="list-style-type: none"> • Same as Short Term
	<ul style="list-style-type: none"> • City Landscape 	<ul style="list-style-type: none"> • Contribute sound city landscape by pedestrian walk and landscape. 	<ul style="list-style-type: none"> • Same as Short Term 	<ul style="list-style-type: none"> • Same as Short Term 	

12. OVERALL IMPLEMENTATION PLAN

The Overall Implementation Plan of the Transport Master Plan is established considering time framework, project implementation capacity, expected available budget among others.

• Time Framework

- Short Term ; 2006 – 2010
- Medium Term ; 2011 – 2015
- Long Term ; 2016 – 2025

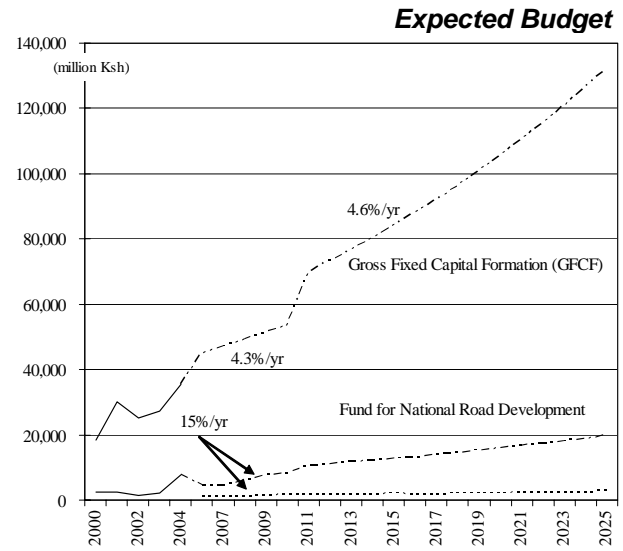
• Project Implementation Capacity

The Master Plan covers various transport projects of road transport (road, NMT and signalization), public transport (bus, matatu and railway), traffic management (engineering, enforcement and education) and institution. The administrative and technical capacity of concerned agencies for the implementation of the Master Plan projects should be developed with efficient deployment of the governmental human resources with the assistance of professionals.

The establishment of an umbrella agency such as the Metropolitan Nairobi Transport Authority is recommended for the sake of realizing the integrated coordination of the Plan among concerned agencies.

Expected Budget

The budget for each planning period of the Master Plan is estimated based on the past record and the assumption that the national economic growth will be realized at the projected rates.



Cost and Fund (BKsh)

	Short Term	Medium Term	Long Term
Cost	7.9	10.8	24.7
Fund	6.2	9.2	22.9

Uhuru Highway Project-Special Reference

The national transport policy of Kenya emphasizes the level of transport infrastructures to be world - class in terms of facilities, services, operation and urban scenery.

Uhuru Highway is now playing the role as the major arterial and local road in the local network and as the international corridor in the East African region.

The improvement plan of this major artery is being discussed to be implemented under the government/private scheme with several ideas.

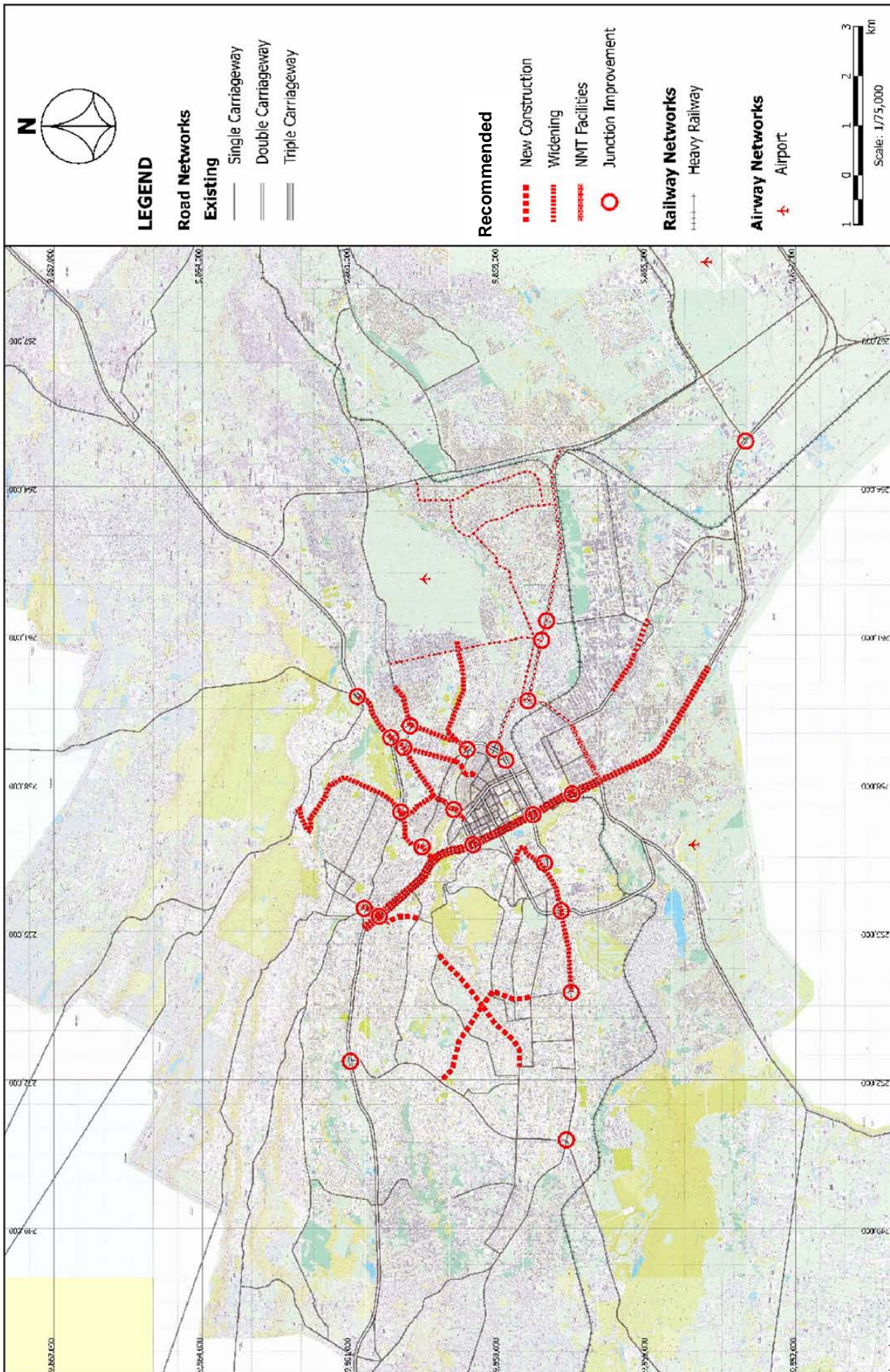
As a reference, the following points are recommended:

- To segregate local traffic from through traffic to offer the international level of functionality.
- To construct 8 lanes carriageway for future installation of public transport or expressway.
- To construct frontage roads for local services.
- To provide NWT and bicycle path for commercial purpose and greenbelt for urban scenery.

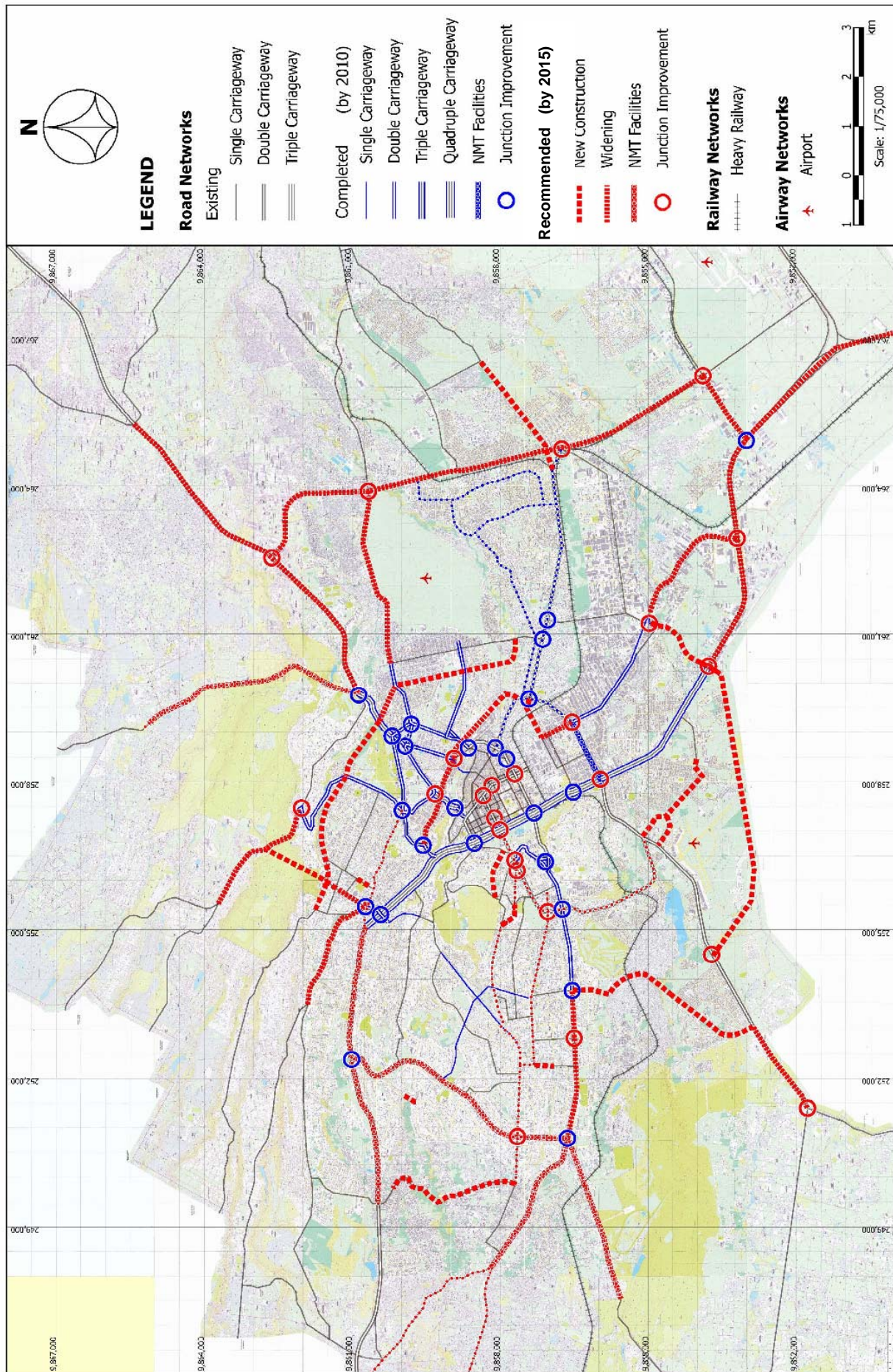
An Example of Uhuru Highway Improvement



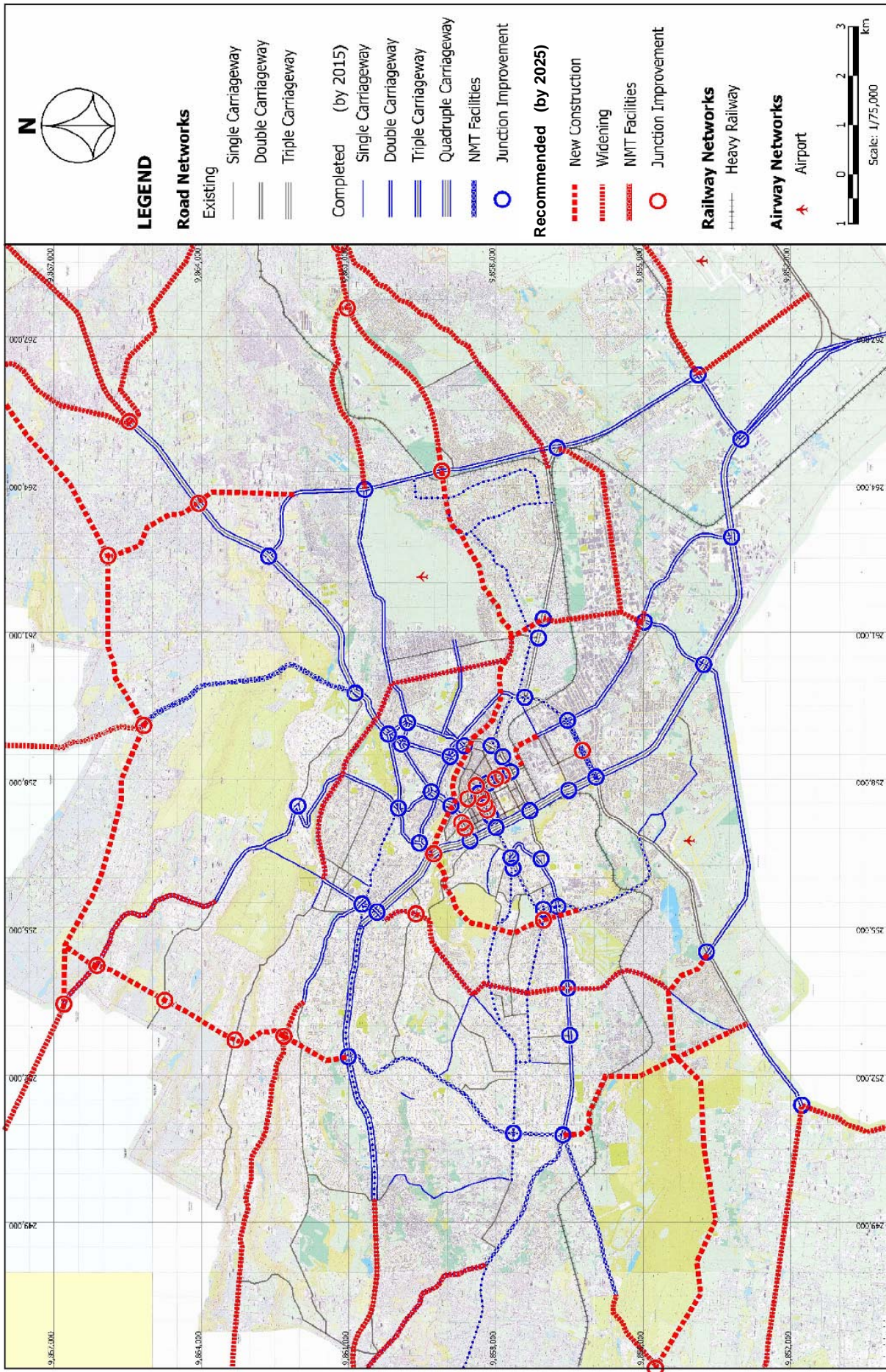
Stage 1: Typical Cross Section for Widening w/ Frontage Road



RECOMMENDED TRANSPORT NETWORKS IN SHORT TERM (~ 2010)



RECOMMENDED TRANSPORT NETWORKS IN MEDIUM TERM (~ 2015)



RECOMMENDED TRANSPORT NETWORKS IN LONG TERM (~ 2025)