JAPAN INTERNATIONAL COOPERATION AGENCY
THE UNITED REPUBLIC OF TANZANIA

# CAPACITY DEVELOPMENT PROJECT FOR THE IMPROVEMENT OF DAR ES SALAAM TRANSPORT (PHASE-2)

# PROJECT COMPLETION REPORT

# VOLUME 2: APPENDIX

**NOVEMBER 2017**


**JAPAN INTERNATIONAL COOPERATION AGENCY**

**INTERNATIONAL DEVELOPMENT CENTER OF JAPAN**
**ORIENTAL CONSULTANTS GLOBAL CO., LTD.**



| EI |
| --- |
| JR |
| 17-125 |

JAPAN INTERNATIONAL COOPERATION AGENCY
THE UNITED REPUBLIC OF TANZANIA

# CAPACITY DEVELOPMENT PROJECT FOR THE IMPROVEMENT OF DAR ES SALAAM TRANSPORT (PHASE-2)

# PROJECT COMPLETION REPORT

# VOLUME 2: APPENDIX

**NOVEMBER 2017**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

**INTERNATIONAL DEVELOPMENT CENTER OF JAPAN**
**ORIENTAL CONSULTANTS GLOBAL CO., LTD.**

**CAPACITY DEVELOPMENT PROJECT FOR THE IMPROVEMENT OF DAR ES SALAAM TRANSPORT (PHASE-2)**

**PROJECT COMPLETION REPORT**
**VOLUME2: APPENDIX**

## List of Appendices

Outputs for the Project Output 1: Enhancement of Coordination Mechanism

1 Draft Final Concept Note for the Dar es Salaam Urban Transport Authority (DUTA) (Revision 10.1)
2 Discussion Paper (Output 1, 1 Annex 1): Draft Act for the Urban Transport Authority (UTA)
3 Discussion Paper (Output1, Annex 2): Summary of DUTA Stakeholder Meetings

Outputs for the Project Output 2: PDCA through Pilot Project

1 Outline of Trial Measures and Short-term Projects
2 Discussion Paper (Output 2 Annex 1): Dar es Salaam Street Design Guide
3 Discussion Paper (Output 2 Annex 2): Management of Parking Services in Dar es Salaam
4 Discussion Paper (Output 2 Annex 3): Daladala and Bus Service Improvement (Ticketing System)
5 Discussion Paper (Output 2 Annex 4): PPP Bus Terminus/Bus Stop Improvement
6 Discussion Paper (Output 2 Annex 5): Daladala and Bus Service Improvement (Daladala Reform)

Outputs for the Project Output 3: Technical Training for Urban Transport Planning

1 Discussion Paper: Guideline for Urban Transportation Planning
2 Discussion Paper: Report on Cape Town Study Tour
3 Discussion Paper: Report on Jakarta Study Tour

| | | |
|---|---|---|
| 4 | Evaluation Report on Intensive Training Course 1 | (Soft copy only (CD-ROM)) |
| 5 | Evaluation Report on Intensive Training Course 2 | (Soft copy only (CD-ROM)) |
| 6 | Evaluation Report on Intensive Training Course 3 | (Soft copy only (CD-ROM)) |
| 7 | Evaluation Report on Intensive Training Course 4 | (Soft copy only (CD-ROM)) |
| 8 | Evaluation Report on Intensive Training Course 5 | (Soft copy only (CD-ROM)) |
| 9 | Evaluation Report on Intensive Training Course 6 | (Soft copy only (CD-ROM)) |
| 10 | Evaluation Report on Intensive Training Course 7 | (Soft copy only (CD-ROM)) |
| 11 | Evaluation Report on Intensive Training Course 8 | (Soft copy only (CD-ROM)) |
| 12 | Evaluation Report on Intensive Training Course 9 | (Soft copy only (CD-ROM)) |

# Outputs for the Project Output 1:

# Enhancement of Coordination Mechanism

# Draft Final Concept Note for the Dar es Salaam Urban Transport Authority (DUTA) (Revision 10.1)

Capacity Development Project for

the Improvement of Dar es Salaam

Urban Transport (Phase-2)

# Discussion Paper (Volume 1)

Draft Final Concept Note

for the Dar es Salaam Urban

Transport Authority (DUTA)

(Revision 10.1)

This paper has been prepared only for internal discussions amongst the designated stakeholders for this project. Discussions can explore ideas and concepts for policy development and need not be limited to current policies of the Government of Tanzania.

Secretariat for the Capacity Building Project

and

JICA Expert Team

## CONTENTS

# Revision Table

| Version/File Name | Main Author: | Date |
|---|---|---|
| Revised Concept Note V1.0 Dec 2015 | CUPID Expert through discussion with Secretariat members | 16 December 2015 |
| Revised V2.0 amended | CUPID Expert through discussion with Secretariat members | 27 January 2016 |
| Revision V 3.0 following in-principle support from PO-RALG | CUPID Expert through discussion with Secretariat members | 2 February 2016 |
| Revision 4 following stakeholder comments | CUPID Expert through discussion with Secretariat members | 8 February 2016 |
| Revision 5 following Task Group meeting at PO-RALG | CUPID Expert through discussion with Secretariat members | 24 March 2016 |
| Revision 6 Major Revision incorporating all comments | CUPID Expert and PO-RALG (Emmanuel Ndyamukama) | 6 April 2016 |
| Revision 7<br>Final amendments | CUPID Expert and PO-RALG (Emmanuel Ndyamukama) | 25 June 2016 |
| Revision 8<br>Final amendments | CUPID Expert and PO-RALG (Emmanuel Ndyamukama) | 8 July 2016 |
| Revision 8.1 (update schedules) | CUPID Expert | 23 September 2016 |
| Revision 9.0 | CUPID Expert through discussion with MOT panel | 13 October 2016 |
| Revision 9.1 | CUPID Expert through discussion with Secretariat members | 18 August 2017 |
| Revision 10.1 | CUPID Expert through discussion with MOT panel | 21 September 2017 |

## Definition of Terms

Board: Board of Directors (DUTA)

BRT: Bus Rapid Transit

DART: Dar es Salaam Rapid Transit Agency

DARCOBOA: Dar es Salaam Commuter Bus Owners Association

DCC: Dar es Salaam City Council

DSM-RS: Dar es Salaam Regional Secretary Office

DUTA: Dar es Salaam Urban Transport Authority

JICA: Japan International Cooperation Agency

LGA: Local Government Authority (Municipalities)

MOF (or MOFP): Ministry of Finance and Planning

MOLHHSD: Ministry of Lands Human and Housing Settlements Development

MOT: (Former) Ministry of Transport

MOW: (Former) Ministry of Works

MOWTC: Ministry of Works, Transport and Communication

NMT: Non-motorized transport

PO-RALG: President's Office, Regional and Local Government

PPP: Public Private Partnership

RCC: Regional Coordination Committee

RFB: Road Funds Board

RRB: Regional Road Board

SUMATRA: Surface and Marine Transport Regulatory Authority

SUTP: Strategic Urban Transport Policy

TANROADS: Tanzanian National Roads Agency

TARURA: Tanzanian rural and Urban Roads agency

TEMESA: Tanzanian Electrical, Mechanical and Services Agency

TPA: Tanzania Ports Authority

TRL: Tanzanian Rail Limited

The term 'executing agency' and 'implementing' agency or 'relevant' agency are interchangeable and carry the same meaning.

# Executive Summary

The Dar es Salaam Transport Authority (DUTA) was first proposed in the **2008 JICA Transport Master Plan** to provide the institutional framework for improved coordination of the transport sector. The **National Transport Policy (2003)** called for institutional reform, as a *"fundamental requirement"* to solve the *"lack of effective coordination of the various components of the transport system"* which has led to the deterioration and poor performance of the sector.

Presently multiple agencies (at least 8) have various responsibilities for transport but there is little or no coordination between them, and there is no coherent or unified urban transport policy. A disconnect between policy and implementation, fragmented decision-making, unclear responsibility and ad-hoc planning and funding underlines the need for institutional body such as DUTA to improve management of the transport sector.

There is a critical need for an institutional response to these problems, as Dar es Salaam faces severe urban transport and mobility challenges now and into the future, with rapidly increasing traffic congestion, which has a direct cost to the city well in excess of $200M per year. Inaction or inadequate response will have dire consequences for the future liveability, quality of life, health and sustainability of the city, as on present growth rates, population is expected to double in 10 years and motor vehicle ownership will double every 5 years.

To meet the challenge will require a considerable investment into the public transport network, selected road and infrastructure improvements, and a more effective institutional structure. Particularly a strategic, coordinated and integrated transport and land-use policy and planning policy is required, which is a key responsibility for the proposed DUTA.

The establishment of DUTA

DUTA is proposed as a high level strategic policymaking body, specifically and primarily to resolve coordination issues between urban transport/mobility and land-use.

It is proposed to function as an independent and autonomous authority with legal power established under its own special legislation for the purposes of **strategic policymaking and coordinated planning of urban transport in Dar es Salaam**. The supporting legislation will be generic so other cities can establish their own urban transport authority.

DUTA will act as an 'apex' umbrella organization; its key strength being its **inclusive and representative Board of Management structure** which involves all key stakeholders (being the leadership of the key implementing agencies) to ensure full coordination and cooperation.

The organisation will also include an Executive Level with specialised planning units to provide technical support to the Board (research & planning) and also oversight and monitoring of service delivery and performance.

These Executive Planning departments proposed as:

1. Policy & Planning, Land use and Environment and Development Coordination

2. Mass Transit and NMT
3. Roads, Traffic and Motor Vehicles
4. Finance and Administration

The scope of DUTA's responsibility and jurisdiction includes all modes of transport (public and private) with the management of roads and traffic, bus and rail networks, ferry services, land-use and town planning and funding for transport related infrastructure.

At the strategic planning and policymaking level, DUTA will be responsible for:

- The efficient and effective provision of urban transport and mobility solutions for Dar es Salaam;
- Coordination of urban transport infrastructure investment, harmonising transport and land-use development and ensuring the cost efficiency and effectiveness of these developments.
- Monitoring of service performance and outcomes and addressing failure in performance.

The key features of DUTA are:

- The purpose of DUTA is to develop a unified strategic urban transport policy (SUTP) and coordinate the planning and implementation
- DUTA has a strategic planning and policymaking role - it is not an implementing agency; the **tactical and operational responsibilities** for policy implementation are devolved to implementing agencies and transport operators who deliver services.
- DUTA is **fully responsible and accountable** by virtue of the participatory structure of the Board. This inclusiveness of all key stakeholders being represented is a key strength of DUTA. It should therefore be fully capable to address the transport and mobility challenges of the city, and avoid the possibility of 'blame shifting'.
- The ministerial chain of command between ministries and agencies is not affected with the introduction of DUTA. DUTA, as a strong and capable authority serves as a bridge between ministries for the purpose of unified policy, planning and coordination.

**DUTA to control funding for transport-related areas**

To be effective DUTA must have control over funding and financial resources. Through its unified policy and coordination, and dedicated investment fund, investments will be more effective. DUTA can also manage financial /price instruments (such as fees, levies and charges) to raise revenue and to influence demand behaviour (e.g. parking fees/ congestion charging, cross subsidy etc.).

However, it is recommended that a transition period apply for DUTA to build capacity before it takes over full responsibility of managing resources.

**Ease of implementation**

Implementing the DUTA concept as proposed here, requires very little organizational change, and creates no 'losers' in regard to absorbing agency functions or responsibilities. It is expected that it will

gain general support as none of the present institutions are replaced or displaced, and the inclusion of the present institutions in will improve their effectiveness.

The DUTA Concept Paper

This document is the result of extensive consultations with stakeholders and describes the concept in detail, outlining DUTA objectives, role and functions, management structure, exercise of power, required resources and how the establishment of DUTA will align to existing institutions. A strategy for the implementation of DUTA is also outlined.

# Frequently asked questions:

**Why not improve coordination by combining all agencies under one single super Authority? Such an authority could then implement its own policies.**

This option has been extensively discussed on the basis of a previous concept paper but rejected by key stakeholders of the Joint Consultative Committee in 2015.

From a conceptual viewpoint, such an organisation will be accountable only to itself; and being responsible for implementation, it may tend to forgive its own mistakes and 'water down' policy to make life easier. It is for this reason that strategic policymaking and implementation should be separated. A large organisation is also likely to be more bureaucratic; to be large but weak.

Furthermore, as there are stakeholders still outside the organisation that need to be coordinated with, coordination may not be improved. Furthermore, managing such large and disruptive organisational change will be difficult and time consuming.

**Why not develop an UTA at national level?**

This was also rejected by stakeholders as a UTA is basically a local function; however, the legislation establishing DUTA can be common, so other large cities can follow suit.

**Why does DUTA need to control funding?**

Stakeholders were of the consensus that a DUTA without the means of controlling resources and funds for transport related purposes would be weak and ineffective. However, a transition period should apply as DUTA build capacity to manage the task.

**Why incorporate Land use with Transport under DUTA?**

Transport influences land use and in turn, land use influences transport; so DUTA's role is to coordinate urban transport with the city's land use plans. DUTA takes no responsibility for land use planning from existing planning agencies that manage this task.

**Does the formation of DUTA require major legislative changes; and what changes are required to the legislation governing the other organizations?**

DUTA requires its own legislation supporting its establishment. As its role is at the level of strategic policymaking and planning there is little if any, impact on the functions of the implementing agencies. Some of the coordinating and consultative functions of DAR-RS will be transferred to DUTA. The coordinating role of the Regional Commissioner (RC) will in fact be enhanced if the recommendation is followed to make the RC the chairman of DUTA.

**Can we learn from other cities' experience in developing urban transport authorities?**

Cities develop UTAs for their own reasons; sometimes to integrate or market public transport as a single entity; or introduce common ticketing; and often to manage transport in a more integrated way. But "***one size does not fit all"*** *and* this is a clear lesson to observe. **Appendix C** contains some key examples.

An excellent summary of world city experience in establishing transport authorities is contained in a World Bank publication titled: ***Institutional Labyrinth - designing a way out for improving urban transport services: lessons from current practice*** (available at*:*

<*siteresources.worldbank.org/.../Institutional-Labyrinth.pdf*.>).

**Can DUTA be placed under DCC?**

While the DCC has a coordinating role amongst the LGA's, placing DUTA under the DCC is not recommended as does not fit with its intended role as the 'apex' authority **managing strategic policymaking and coordinated planning.**

Such a proposal confuses role of strategic and tactical functions and the DCC may not have the necessary jurisdiction to effectively host such a high level 'umbrella' organisation, which may result in DUTA being a nothing more than a coordinating committee.

**Will the role of DUTA duplicate the functions of SUMATRA?**

The role of SUMATRA under its legislated function are not altered in any way.

The SUMATRA organization while being an autonomous Authority, has a regulatory role not to be confused with the strategic policy-making and oversight role of DUTA, which is a Strategic Policy, Planning and Coordinating Authority. See Section 4.2.3

**What powers will DUTA have over ministries and implementing agencies? Their mandates and their powers?**

DUTA has no power over ministries nor does it replace their role in developing their relevant policy and strategy; however, both the sector ministries and the implementing agencies are Board Members of DUTA and will actively contribute to the harmonization of policy and coordination of policies into a ***unified strategic urban transport policy*** for Dar es Salaam. See Section 4.

# 1. The Present Situation of Transport and Mobility in Dar es Salaam

Dar es Salaam faces an unprecedented challenge in managing the impacts of population growth and specifically the rapid increase in the number of vehicles plying the streets.

## 1.1. Population growth

The population of the city increased from 2.5 million (in 2002) to 4.3 million (in 2012) representing an annual growth rate of 5.6% (JICA). If this continues as a straight-line projection the population in 2020 (in 5 years' time) will be **6.7 million** and in ten years (2025) is estimated to reach **8.8 million**; double the population figure of 2012.

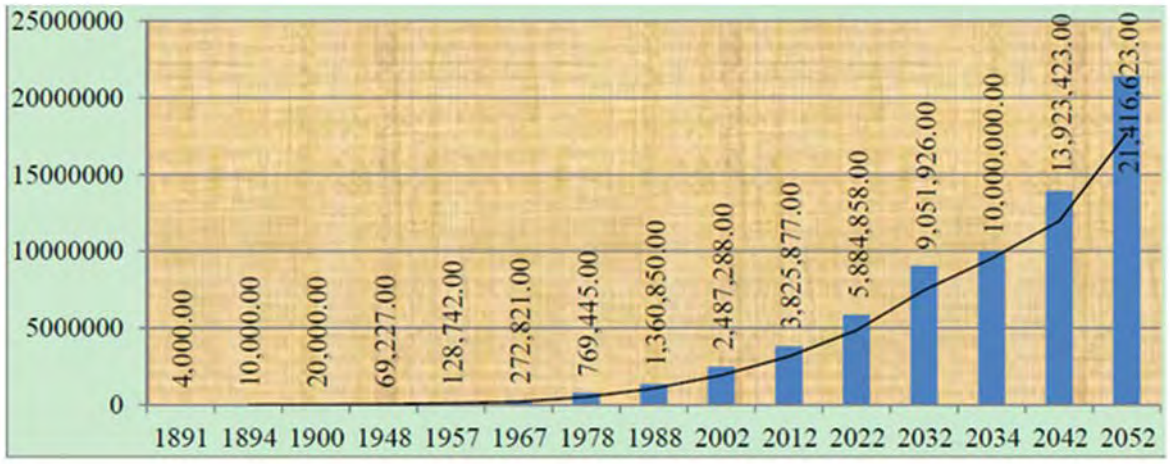



**Figure 1-1: Trends of Population Growth for Dar es Salaam City (1891-2052)**

Source: Kuinsi, Robert B. 2013 Journal of Sustainable Development[1]

## 1.2. Motor vehicle growth

The number of vehicles in the city has increased from **80** thousand (in 2007) to **200** thousand vehicles (in 2014); with annual growth of **14%.** Projected as a straight line, the number of vehicles in the city will double **every 5 years** (439 thousand in 2020 and **846** thousand 2025)

These figures are sobering and alarming, considering that chronic and severe traffic congestion already cause daily hardships in the lives of the people.

## 1.3. Financial and economic costs of increasing traffic congestion

The economic cost due to lost productivity is well understood but the direct financial cost to the city is in the billions of shillings per year. Just take the cost of traffic congestion to daladala in additional fuel cost (25.55bn); the loss of earning for daladala stuck in traffic (265bn); and loss of productive time for workers (120.4bn), and you reach a staggering total of **Tshs 411 billion each year**[2] (over US$200M). The city also bears a heavy environmental cost of toxic air pollution; traffic noise and land

[1] http://www.ccsenet.org/journal/index.php/jsd/article/viewFile/24345/15400

[2] Dickson Ng`hily. THE GUARDIAN 31 Dec 2013 quoting a study by Ntwale and Samweli

encroachment for parking and road widening. Displacement of walking and cycling areas are the inevitable negative side effects as cars increasingly dominate the city and its environs.

In the light of poor road infrastructure and poor condition of storm water drains, the government faces insurmountable budgetary challenges if these trends are not addressed. 'Do-nothing' is not an option and simply building more roads[3] is not tenable as the city will fast run out of space.

## 1.4. Institutional Weaknesses

The present institutions that manage transport infrastructure and deliver services in Dar es Salaam are spread across multiple agencies with little or no coordination between them. This was confirmed by the 2008 JICA study which where stakeholders identified problems such as:

- No coherent and unified urban transport policy and a tendency to implement project specific solutions under different agencies with little coordination.
- A serious disconnect between policy and implementation, with an ad-hoc process for planning, funding and implementation
- A fragmented decision making process; no coordination between vertical levels and horizontal departments and failure to deliver on set policy objectives
- Gaps in planning with unclear responsibility, and overlaps in responsibility.
- Confusing and multiple lines of authority and overlaps due to a complex organisational arrangement.

While the establishment of DART around the BRT initiatives there are improvements to be seen, however, a complex organisational arrangement still exists with confusing and multiple lines of authority and overlaps (see Figure 1-2).

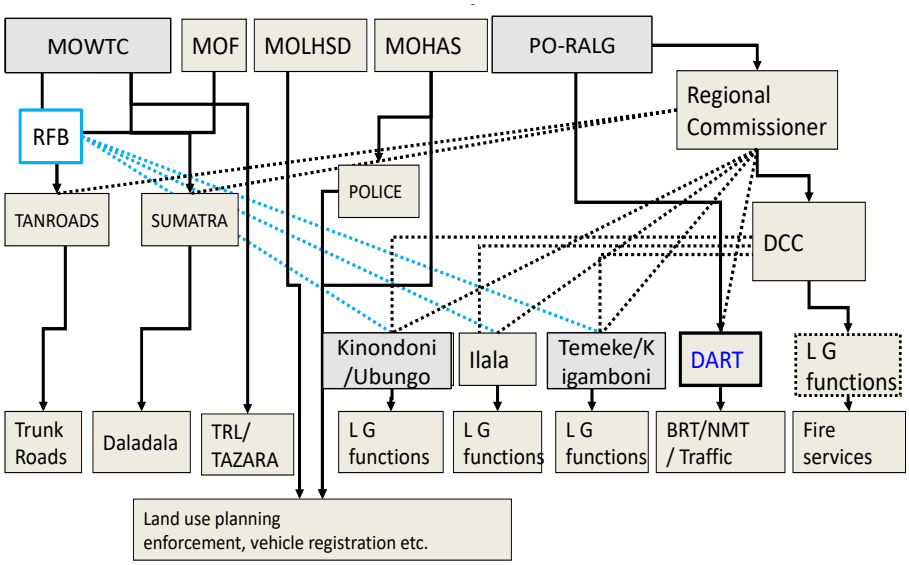



**Figure 1-2: Existing organisational layout**

A multiplicity of stakeholders are involved in managing transport with at least eight agencies carrying some responsibility related to transport, among them being:

[3] Building more roads is also proven to increase traffic, as they attract more cars.

1. **Ministry of Works, Transport and Communication** (MOWTC) for transport policy and planning
2. **Tanzania National Roads Agency** (TANROADS) for trunk roads in the city
3. **DART** agency implementing and managing the BRT also with a wider road management role
4. **Six separate LGAs** being DCC and the five local government municipalities (LGAs) for local and community roads, parking, construction and maintenance works
5. **Traffic Police Department** for traffic control and enforcement
6. **Tanzania Electrical, Mechanical and Electronics Services Agency** (TEMESA*)* to maintain traffic signals although TANROADS installs traffic signalling equipment
7. **The Surface and Marine Transport Regulatory Authority** (SUMATRA) to regulate transport providers and manage transport licensing and permissions
8. **TEMESA** managing the passenger ferry at Kivukoni.

Note that in 2017 a new agency, the Tanzanian Rural and Urban Roads Agency has been established to improve the management of Tamisemi roads.

For Dar es Salaam to face its transport and development challenges requires a more holistic and integrated approach, which encompasses the multiple sectors and the various sub-systems that contribute to land-use, transport and mobility.

## 1.5. Institutional framework and management strategies to address traffic congestion

A key strategy is to manage traffic demand through a **developing public transport** and at the same time implement limitations and **restrictions on private motor vehicles**. In parallel a considerable investment into mass transit projects and selected road and intersection improvements will also be required.

However, the most critical and fundamental requirement is the institutional framework, being the organisation **and capacity of government institutions** to respond and be able to make the difficult yet essential decisions and finance major investments in transport infrastructure. to face these future challenges.

The **establishment of DUTA** provides a structured response at strategic policymaking and planning level, as it will develop a unified transport and land-use policy to guide planning and prioritize infrastructure investment. DUTA will coordinate all players and ensure cooperation toward good management and effective action.

## 1.6. Progress in Establishing DUTA

The progress on DUTA establishment has been slow with 7 years elapsed since its detailed recommendation in the JICA Transport Master Plan. During this time various proposals have been examined to determine the most optimum structure and design of DUTA; and its relationship and interaction with existing agencies and governance structures.

In late 2014 the former PMO-RALG proposed a concept note for DUTA which was circulated to stakeholders for comment. At the stakeholder meeting of 21st August 2015 this Concept Note was discussed, with members and stakeholder raising some objections and concerns.

The results of the meeting were:

1. Rejection of the idea to develop an Urban Transport Authority at a national level for the reason that an urban transport authority is essentially a local issue. There was an agreement to focus on establishing a Dar es Salaam Urban Transport Authority (DUTA), with a generic legislation to enable other cities to develop their own authority. Placing a Ministerial Advisory Board member on the DUTA Board member was considered appropriate to link national policies to local governance.
2. Rejection of the concept of DUTA as a large all-encompassing 'super-authority' that develops policy and implements its own programs, due to likely weaknesses in coordination, accountability and bureaucracy, and that functions of existing agencies were being duplicated. There was also a concern over the disruptive organisational upheaval during the change process.
3. Opposition to the proposal that DUTA will absorb the existing agencies or duplicate the role of existing agencies.

Notwithstanding the comments, there was a strong preference for DUTA as a coordinating Authority, equipped with strong powers including financial capacity to manage its task.

The following DUTA Concept addresses the identified problems, satisfies the concerns and comments of stakeholders and develops a DUTA that comprehensively meets the challenges of urban transport in Dar es Salaam.

# 2. The Concept of DUTA

Many cities are adopting the approach of a Transport Authority as an umbrella organisation to overcome the problems of poor coordination and execution. However, experience has shown that each city must adapt the concepts to suit their own particular conditions, mindful of the cultural, political and governance structure, the social and economic (and spatial) characteristics of the city and the human resource skills available. There is no "one size fits all" solution. Consequently, the preparation of a DUTA concept in Dar es Salaam has involved diverse a range of stakeholder inputs.

## 2.1. Background

The Dar es Salaam Transport Policy and Systems Development Master Plan (JICA 2008) first proposed the establishment of the Dar es Salaam Urban Transport (DUTA) to act as an **intermediate and coordinating authority** between the national and local institutions and agencies responsible for the management development and regulation of city transport and land-use planning.

An Urban Transport Authority was also recommended by the National Transport Policy (2003) which states:

> 4.2.1 A fundamental requirement for an effective transport system is an institutional framework, which will ensure provision of effective, reliable and integrated transport services. One of the main factors that has led to the deterioration and poor performance of the sector is lack of effective coordination of the various components of the transport system.

## 2.2. Legal Basis of DUTA

DUTA is proposed as an independent and autonomous authority **with legal power established under its own special legislation** for the purposes of **strategic policymaking and coordinated planning**. The responsibilities of implementation and operation remains with the various executing and operational agencies.

## 2.3. The Role and functions of DUTA

### 2.3.1. DUTA Mission

DUTA's mission, its vision and its core values, are set out as follows:

**Mission:**

*To provide strategic policy, planning and oversight of the implementation of integrated transport policy, to guide, coordinate and exercise executive control and management for urban transport in Dar es Salaam.*

**Vision:**

*To develop an urban transport network in Dar es Salaam that **safeguards quality of life** and the environment and provides its citizens with accessible and safe transport that respects passengers and pedestrians alike, is reliable and efficient at affordable costs, and which support government strategies for socio-economic development and poverty reduction.*

**Core Values:**

*DUTA will continually review and improve governance practices to ensure:*

- *Integrity – in upholding ethical and professional behaviour*
- *Transparency – conducting our affairs in an open and honest manner*
- *Accountability - having clear roles and responsibilities with all participants answerable for their decisions and performance*
- *Stewardship - ensuring our resources are utilised to deliver the best outcomes for all of our stakeholders.*

### 2.3.2. Scope, Jurisdiction and Power of DUTA

DUTA is fully responsible for **efficient and effective provision of urban transport** for the city of Dar es Salaam, its scope being:

- All urban transportation infrastructure and mobility
- Private and public transport modes
- Pedestrian and non-motorized transport
- Urban development policies and land-use planning.

DUTA is not just another layer of bureaucracy in the management of transport. It will be the 'apex' body for urban transport policy and will carry full responsibility for urban development and transport and mobility issues in the greater Dar es Salaam area.

Through its fully inclusive structure, representing key stakeholders, being the sector ministries and heads of key implementing agencies as members of the Board of Directors, DUTA can develop and coordinate policy. Each Board member may represent their respective sector policies and interests toward a unified and coordinated strategic policy to guide implementation agencies in their tactical and operational policies.

This representative and participatory nature of DUTA is its key strength. Non-key stakeholders can be represented on advisory committees[4].

Oversight of DUTA is by the DUTA Board, with the Chairman being a Presidential Appointee.

### 2.3.3. The Overall Functions of DUTA

DUTA will have the overall functions of:

- A Strategic Policy, Planning and Coordinating Authority
- Investment Funding and Financial Management
- A Contracting Authority
- Liaison, Communications and Stakeholder management
- Network management
- Research, Oversight and Performance Measurement

While DUTA carries the 'ultimate responsibility' for transport outcomes ~~(service levels and coverage)~~ this does not imply that it carries out the tasks itself; as implementation remains the responsibility of the various implementing agencies, and who are accountable for performance and service outcomes.

DUTA will operate at a Tier 1: Strategic level, being the strategic planning of general and broad-based aims and direction to achieve set goals and transport outcomes.

The implementing agencies will operate at Tier 2: Tactical level being guided by the strategic policy and works on making things happen in a practical sense, and in the most effective and efficient way. It manages the detailed service characteristics including service levels.

The service providers will operate at Tier 3: Operational level being the delivery of the product or services following the tactical policies, regulations and standards.

Specific function are described in Table 2-1 as follows:

**Table 2-1: Description of functions in the delivery of transport**

| Tier | Function |
|---|---|
| **Tier 1 Strategic Policy & planning** (DUTA functions) | Develop vision and appropriate policy with long range planning and analysis<br>Plan and prioritize long range infrastructure investments<br>Secure funding and finance<br>Contract out specific service delivery where required |

[4] Non-key stakeholders being agencies/other parties (such as TPA, TRL etc. and donors or industry associations) that have a relationship with urban transport, or be affected by it, shall be nominated to advisory committees to provide input and advice to the DUTA Board - this makes the Board more manageable and also avoids excluding relevant constituencies or related bodies.

| | |
|---|---|
| | Agree on standards and regulatory guidelines<br>Monitor performance and outcomes<br>Plan overall transport network to ensure service coverage & service levels<br>Assign implementation to the implementing agencies |
| **Tier 2 Tactical** (implementing and regulatory agencies) | Short range tactical planning in line with guidelines set in the strategic policy<br>Develop public transport services (tactical planning of network, routes and passenger facilities) and engage with service providers.<br>Construct and maintain public facilities and infrastructure<br>Develop service integration e.g. fare collection systems<br>Manage commercial regulation (contract/licenses/permits) managing level of service and supply<br>In cases where DUTA agrees, to contract out service delivery<br>Manage safety regulation and enforcement<br>Setting fare policy and devising business models<br>Monitor and evaluate performance<br>Community consultation and feedback and public information |
| **Tier 3 Operational** (Rail, bus, taxi, ferry operators) | Construction and maintenance of public facilities and infrastructure where contracted to do so.<br>Provision of contracted or licensed service for provision of public transport<br>Care and maintenance of facilities used in the provision of public transport (vehicles, depots and terminals) where contracted to do so.<br>Managing day to day operational requirements, monitoring performance<br>Following safety regulations and maintain public service delivery standards<br>Customer management (feedback and help lines), public information |

## 2.4. Specific Functions of DUTA

The detail of DUTA functions is described more fully as follows:

### 2.4.1. Develop Strategic Transport and Land-use Plan for Dar es Salaam (SUTP)

The SUTP is the platform upon which decisions are made, priority projects established and investment programs developed. It is a 'live' document adaptable to changing circumstances. Performance benchmarks are measurable and reportable. As transport and land-use are interdependent, DUTA will work closely with parties that develop and approve the urban development and land-use plan, ensuring that transport is fully integrated with land use planning.

### 2.4.2. Plan transport and mobility solutions

Through its planning departments DUTA will study the functioning of the transport system, identify bottlenecks and problems, and produce concrete solutions for its improvement. Within the Board it is capable of resolving political and jurisdictional issues.

DUTA will concern itself with planning overall level of services (relating to public transport) and manage strategic network planning to ensure mobility needs are met. Similarly, policies relating to public safety, road safety, equity, non-discrimination and poverty reduction are also within DUTA policymaking responsibilities.

### 2.4.3. Plan and prioritize infrastructure investment and secure funding

DUTA will plan and prioritize infrastructure investments and urban development plans, develop investment plans and budgets, with funding proposals to secure funds. These plans will be developed in accordance with the SUTP.

### 2.4.4. Control and mobilise funding for transport investments

For DUTA to be effective and be able to implement its policies, requires it to have control over funding and financial resources, either through approval of disbursements or funding being channeled through DUTA.

### 2.4.5. Power to approve all transport infrastructure and investments in Dar es Salaam

DUTA will have powers of veto over land use developments and land-use permissions in cases where the social interest is not served in respect of maintaining transport, mobility and access, and where such proposals and development do not comply with, or are not aligned with the SUTP. It will approve all transport and related urban projects carried out by LGAs and agencies.

### 2.4.6. Delegate implementation, monitor progress and measure performance

DUTA will coordinate between agencies where multiple agencies are concerned. DUTA's policies will be the guide for all implementing agencies in the development of their planning and tactical policies to manage implementation and daily operations. DUTA will ensure all implemented projects are funded and suitably resourced. By virtue of its full responsibility, DUTA can hold agencies accountable for performance, work with them to resolve issues, and take over or reassign responsibilities as required to achieve its aims and objectives. DUTA can work with agencies to resolve problems.

### 2.4.7. Realign responsibilities, activities and tasks

Where there are gaps in responsibility DUTA can realign responsibilities, or establish or recommend new agencies if required. In cases of unresolved performance issues, DUTA can pass a motion to reassign **the implementation task, or take over the implementing function** itself.

### 2.4.8. Enter into contracts and develop contracting mechanisms

DUTA will be responsible for developing the overall business model for the delivery of public transport, to ensure sustainability. In this regard, it may approve business plans, licensing and contracting arrangements as well as developing business opportunities for the private sector. DUTA will have the power to enter into contracting arrangements (PPP's) for the supply of transport infrastructure, or the provision of transport services. It may also delegate such responsibilities to the responsible implementing agencies.

## 2.5. Financial management

During consultations with stakeholders it was widely agreed that for DUTA to be effective and be able to implement its policies, it will need to have control over funding and financial resources. Centralising the funding through DUTA is the most appropriate measure to achieve this.

DUTA may receive government budget support for its administrative upkeep but also has the authority to raise its own funds for this purpose. Donor support for the ongoing annual running costs of DUTA should be avoided as these funding source may be unreliable.

Where agencies collect their own revenue to support their own operations, such mechanisms can be maintained, although DUTA has the authority to vary such revenue collection levies and taxes in accordance with its agreed policies in alignment to the SUTP.

Furthermore:

1. Funding and investments will have maximum effect when coordinated by DUTA under a unified policy instead of the ad-hoc planning of projects.
2. As urban governance will be improved under DUTA, Tanzania will prove a more capable development partner and this will encourage donor support for development projects. Both JICA and WB indicate support DUTA establishment for this reason.
3. DUTA will be able to establish an investment fund, to finance projects.
4. DUTA can manage financial /price instruments (such as fees, levies and charges) to raise revenue and to influence demand behaviour (e.g. parking fees/ congestion charging, cross subsidy etc.).

### 2.5.1. The power to apply for and secure funds

**DUTA has the power make funding applications and to secure its own financial resources** based on its priority projects and to support its policy implementation. It will be **authorized to make funding decisions**, administer government budgets, borrow funds, liaise with donor agencies and raise its own revenue to support its internal funding needs as well as funding projects carried out by implementing agencies. At its inception the government may need to support the operational costs of DUTA.

Under such arrangements Implementing Agencies will cease to make independent funding applications for transport related works. Note that exceptions can be made for LGA works not under DUTA scope, but it is suggested where any such project has impact on transport matters that LGA's need to obtain approval or 'no-objection' letter from DUTA.

The functions of the Regional Road Board which presently manages the Road Fund in Dar es Salaam and chaired by the Regional Commissioner will be transferred to DUTA. DUTA will make application for funds from the RFB.

### 2.5.2. Power to levy charges, duties and taxes

DUTA will have the power to implement and enforce policies on the various duties and taxes levied on motor vehicle imports; car registration and road use (tolls) and parking fees, aimed at managing the

growth and use of motor vehicles in the city and will work in harmony with the TRA and SUMATRA to develop suitable policies.

### 2.5.3. Transitional arrangements for funding responsibilities

At the time of DUTA inauguration existing budgets will be in place and assigned, so a transition process is recommended to introduce these changes smoothly. Financial powers to DUTA can be assigned over time, as DUTA builds its capacity for the task and establishes its presence in the policymaking arena.

During this transition and capacity building phase, DUTA will be granted the power to approve all infrastructure investments relating to transport and mobility. This will allow DUTA to begin to exercise its governance responsibilities in the short term.

DUTA will have in its legislated mandate the ability to develop the functions of an investment/ infrastructure bank to raise and manage funds to support investments in infrastructure.

# 3. Management of DUTA

## 3.1. DUTA structure

### 3.1.1. Organization

DUTA will comprise a Board of Directors, and an executive structure with planning departments. The strength and efficiency of DUTA lies the involvement of all key stakeholders as members of the Board of Directors (being the implementing agencies) which will help to ensure full coordination and cooperation.

The planning departments within the executive arm of DUTA will provide research and planning support and technical expertise for the DUTA Board, and also provide oversight and monitoring of performance and outcomes. Without this expertise DUTA would simply be a coordinating body. It is expected that DUTA, as an efficient and streamlined organisation will require no more than 40 staff. The suggested organizational structure of DUTA is shown in **Figure 3-1**.

### 3.1.2. DUTA will be transparent and accountable

DUTA will be fully transparent in its functions and all deliberations and decisions of the Board will be conducted in an open and democratic manner. All reporting will be open and there will be public disclosure of performance.

### 3.1.3. DUTA must be an efficient and effective body

DUTA must be a lean, highly capable and efficient organisation to be effective and reduce unnecessary bureaucracy and duplication. Highly skilled and well remunerated staff need to be employed in the planning departments.

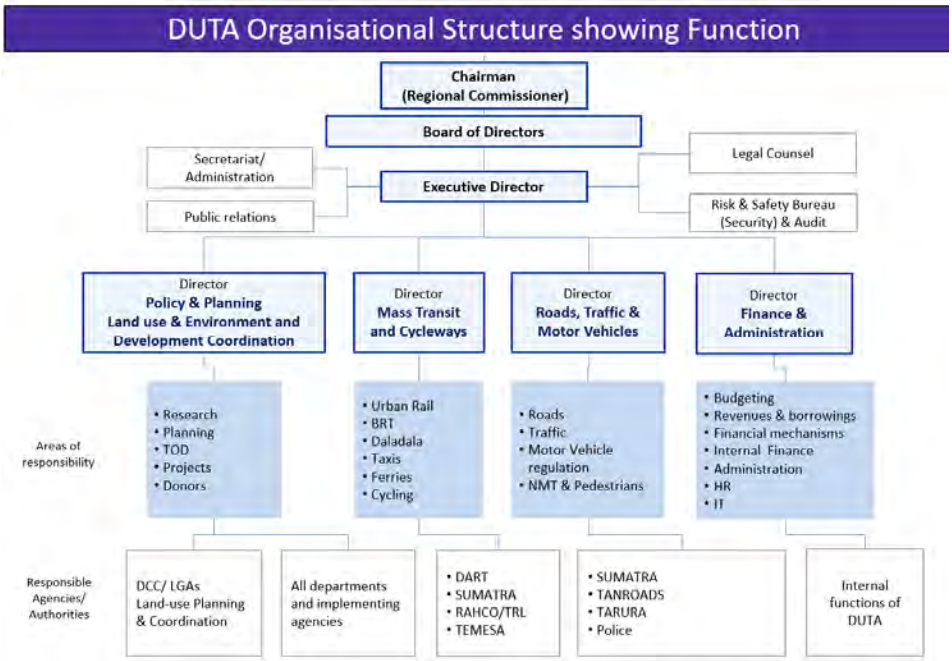



**Figure 3-1: DUTA Organisation Chart**

## 3.2. The Board of Directors

### 3.2.1. Chairmanship of the Board

The Chairman of the DUTA Board is to be selected from board members; however, it is recommended that the Regional Commissioner be appointed as Chairman of DUTA Board, because:

- It is a position requiring a strong candidate to provide a high level of leadership, yet be close enough to local issues.
- The Regional Commissioner presently carries out a coordinating and oversight function so the chairmanship of DUTA is an extension of this role;
- Many of the DAR-RS functions in the area of urban transport coordination will be taken over by DUTA, so it is a natural progression for the RC to be the chair of DUTA.

### 3.2.2. Nomination of board members and secretariat

The positions of Board members are technical and not political positions. All members of the Board will have full input into the development of policy. Generally, this would include the level of Permanent Secretaries from ministries, as well as key decision makers such as CEOs and directors. Board membership is not available to heads of operating entities (such as bus operators), although such representatives, including representatives from industry associations and donor partners may be invited to form or support non-voting Standing Committees or Technical Steering Committees.

The Executive Director position for DUTA is advertised with final approval for appointment by the President.

Representation on the Board as a full Board Member may include:

1. Chairman of the Board

2. MOF&P
3. PO-RALG*
4. Member MAB PO-RALG
5. MOWTC*
6. VPO- Ministry of State Environment
7. RFB
8. DART CEO*
9. RAHCO
10. TAZARA
11. DSM-RS*
12. TANROADS*
13. TARURA
14. MOLHHSD
15. Local Government Administrations (Municipalities)
16. Zonal Traffic Police*
17. The Executive Director of DUTA

*These 7 Board members will comprise the Executive Committee or this can be varied according to DUTA decision.

### 3.2.3. Executive Committee

As the DUTA Board will meet regularly at set intervals (30-60 days as deemed appropriate or necessary), DUTA can elect an Executive Committee to conduct any business and act on behalf of the DUTA Board during intermediate periods to the extent the authority vested in it by the Board.

### 3.2.4. Standing Committees and Technical Committees

The Board of Directors can form standing committees or ad-hoc technical advisory committees to examine specific issues or represent stakeholder viewpoints or provide specialised technical advice where needed. Committee members attend Board meeting only by special invitation where required and do not have voting rights. Remuneration of Committee members (if any) is at the discretion of the Board of Directors.

Standing Committees have a continued existence, with members replaced from time to time to constitute a group of persons, which through their representations or associations (or by virtue of their specific skills) can advise and contribute to the work of DUTA. Representatives could include transport experts,

non-key stakeholders such as representatives from academic institutions, industry associations or donor agencies.

Technical advisory or representative committees can be formed as ad-hoc or special committees for specific, once-only tasks as designated by the Board of Directors. Members appointed to such committees could comprise technical experts and industry representatives.

### 3.2.5. Code of Conduct and attendance

The Board of Directors within the first 6 months of establishment will vote on a Code of Conduct. A draft Code of Conduct is attached as ***Appendix A***.

All Board members are mandated to attend officially scheduled Board Meetings. Absence shall be properly explained to the Chair, apologies properly tendered and actions taken by the absent member to mitigate their absence by nominating an ad-hoc replacement member on a case by case basis. Such a replacement member shall inform the absent member of meeting proceedings but shall not be entitled to vote.

### 3.2.6. Removal and replacement of members

Board Members shall retain their membership only for the period they hold office in their respective organisations. Retirement/ transfer to non-eligible positions shall be handled with propriety, and ensuring current work of the Board is properly handed over with due process and all responsibilities are fulfilled. The Chairman can request ongoing attendance for a retiring member for a set period as circumstances require, ensuring smooth transfer to a new Member.

## 3.3. The Executive Arm

### 3.3.1. Appointment of Executive Director

The Executive Director of DUTA shall be appointed through a merit-based recruitment process managed by PO-RALG approved by the Minister for a term of (5) years or shorter period as may be specified and eligible for reappointment.

He/she will have responsibility for the day to day management of DUTA's functions and control financial expenditure as approved by the Board of Directors and under the scope of the DUTA Establishment Act. He/ She will ensure proper management of the Authority's funds, property and business, and for the management of the organisation, its personnel, control and discipline of the employees and performance of sub-contracted parties.

### 3.3.2. Executive departments of DUTA

DUTA shall establish a number of departments which will act as its executive arm. Each of these executive departments will be headed by a Director who shall be appointed through a merit-based recruitment process managed by the Executive Director and approved by the Board to ensure skills and competence in their respective positions.

Each director will be responsible for their specific portfolio in planning, control and oversight of their assigned implementing departments.

The departments are:

1. Policy & Planning, Land use and Environment and Development Coordination
2. Mass Transit and NMT
3. Roads, Traffic and Motor Vehicles
4. Finance and Administration

## 3.4. The Planning Departments

The planning departments will develop into a 'centre of excellence' to conduct research and planning and provide technical support to the DUTA Board. They will also monitor performance and evaluate outcomes. The specific functions of these departments are outlined below.

### 3.4.1. Policy & Planning, Land use and Environment and Development Coordination

Tasks of this department include research and planning, developing projects and interacting with Donors. It includes a specific responsibility for developing the Dar es Salaam land use and city development plan in conjunction with the MOLHHSD, with an overriding responsibility to ensure full integration of transport policy and land use planning and development policy.

Environmental oversight and protection (mitigation of environment destruction) is an important and key part of this portfolio.

### 3.4.2. Mass Transit and NMT

Includes Dar commuter trains, DART BRT, Buses, daladala, Taxis, ferries, walking and cycling is including the planning and design of related infrastructure, service integration (physical treatments as well as integrated ticketing) public information and standards of service delivery and passenger safety.

Developing the overall public transport networks is a main part of this portfolio, to provide strategic planning for area coverage, level of service and network integration. Affordability, funding and cross subsidy issues are key factors that need attention. Developing the business models for transport providers is also included in this portfolio, including establishing PPP arrangements. Overall strategic decisions for transport operations is within the scope of this planning department, however the implementing agencies are the counterpart for private sector transport operators.

Walking and cycling is included in this portfolio as cycling will become an increasingly available option as roads become more congested, but it requires safe infrastructure. Cycling is environmentally-friendly, low cost and highly efficient (cycling can carry passenger volumes equal to mass transit). They should be more than a token 'environmental' measure as they will increasingly be relied on for efficient cross city travel, especially from local communities where mass transit is not easily reached.

### 3.4.3. Roads, Traffic and Motor Vehicles

Responsibility of this department includes the oversight of roads and traffic management within Dar es Salaam to ensure proper traffic management strategy, road safety and physical guidance systems including signage, for all road users including cyclists and pedestrians.

It is also responsible for road safety and awareness including public information and education etc. working with the relevant executing agencies.

Motor vehicle policy relates to strategic policymaking on regulatory matters such as import controls, ownership, roadworthiness inspection policy and any matter relating to registration fees/ taxes/ charges on motor vehicles including strategic parking policy. This planning unit will liaise closely with SUMATRA on these policies.

### 3.4.4. Finance and Administration

This department is responsible for the internal management of finance and administration including:

- Financial mechanisms, revenues & borrowings
- Budgeting
- Internal Finance and Administrative functions
- Human Resources and Information Technology.

## 3.5. Staffing and Human Resources

The organisation of DUTA shall be lean and efficient. The executive arm of DUTA shall be expected to perform with a high standard of technical competence with each department capable of doing the necessary research and planning to develop policy guidance in their area of responsibility.

To secure staff of a high calibre, DUTA needs to be able to employ staff on commercial salary scales, not bound by restrictive established government procedures or limits of government pay scales. All staff need to be competent professionals capable of executing their work to a high standard. This will be critical to develop DUTA's standing as it evolves into an effective authority.

Some planning departments will require staff to conduct monitoring and inspection to ensure service delivery is meeting the required standards. **Table 3-1** shows indicative staffing for DUTA.

**Table 3-1 DUTA Staffing**

| | |
|---|---|
| **Executive Director** | **1** |
| Secretariat | 2 |
| Public Relations | 2 |
| Legal Counsel | Outsourced |
| Security & Audit | 2 |
| **Policy & Planning Land use & Development Coordination** | |
| Director | 1 |
| Staffing strength | 4 |
| **Mass Transit** | |
| Director | 1 |
| Staffing strength | 6 |
| **Roads, Traffic & Motor Vehicles** | |
| Director | 1 |
| Staffing strength | 10 |
| **Finance & Administration** | |
| Director | 1 |
| Staffing strength | 6 |
| **TOTAL** | **37** |

# 4. Regulatory Impact Assessment

## 4.1. Key Impacts

During stakeholder discussions, there were concerns raised on the duplications and conflicts caused by DUTA on the functions and responsibilities of existing authorities and agencies. These concerns were targeted to the proposal of DUTA as a 'super- authority' that absorbed existing agencies, and developed

and implemented its own policies. However, as this proposal of a 'super-authority' was rejected, the concerns have been allayed.

The most fundamental change instigated by the establishment of DUTA as it is now proposed, is the improved coordination of policymaking and planning of urban transport, with a focus specifically on Dar es Salaam. It fully addresses the call for institutional reform in the National Transport Policy (2003) for *"fundamental requirement"* to solve the *"lack of effective coordination of the various components of the transport system"* which has led to the deterioration and poor performance of the sector.

DUTA's prime responsibility is to harness coordination and cooperation toward a single unified Strategic Urban Transport Policy (SUTP) and it does this with minimal disruption to the existing structures of present intuitions. However over time, DUTA itself with consensus of the representative Board can realign responsibilities as it sees fit.

**DUTA is a strategic policy & planning authority -** not an implementing agency and in no respect, does it replace implementing agencies or duplicate their functions. Tactical planning and implementation is through nominated implementation agencies, such as Police, DSM TANROADS, DART, DCC/ LGA's, and any new agencies DUTA may recommend establishing. SUMATRA as the regulator retains its role in managing transport regulations over service providers.

In terms of its regulatory impact:

1. DUTA has no power over ministries and does not interfere with the 'chain of command' or the hierarchal structure between ministries and implementing agencies. Each agency will continue to report according to the established line of authority as they do now - (see Box below).

2. What will change under DUTA is that strategic policymaking and financial resources will be directed through DUTA, however, all relevant ministries and their agencies are represented on the DUTA Board. The purpose is to ensure that policies and strategies are **harmonized, integrated and coordinated** and that **sufficient and appropriate financial resources** are assigned. A two-way flow of information will exist between ministries and DUTA.

3. Where any responsibility previously managed by an agency or authority, and where this responsibility has been transferred to DUTA, this agency or authority will be a member of the DUTA Board. Neither is there any competition between and sector ministry, implementing agency and DUTA. Agencies in fact do not 'lose' power or influence; in fact, their status is enhanced through DUTA Board membership.

4. Any strategic policymaking functions held by organizations relating to transport, either for their own functions or for functions performed by an agency under their control, shall be vested into DUTA upon its establishment (for example the Ministry Advisory Board setting policy for DART) or if they retain a legislated responsibility for this they will coordinate and liaise closely with DUTA.

5. **The separation of strategic planning and policy from tactical and operational functions** creates clear accountability for performance and avoids the tendency for 'blame-shifting'.
6. **DUTA is not a regulator in the sense that it manages regulations**. But it could be regarded as a regulator in the sense of controlling policy implementation and monitoring performance and outcomes.

7. A key responsibility of DUTA is to **encourage and foster sustainable business models** based on commercially-oriented and business-like incentives, such as PPP arrangements and concessions where risk is properly assigned and appropriate incentives for performance are in place.

**Analogy on DUTA relationship to sector ministries**

If each government ministry is viewed as a stand-alone 'silo' or building; each with its own mandates, objectives and delegated powers, DUTA will act as a 'mid-level' bridge connecting them without affecting their individual function or structural integrity. This concept is illustrated in here.

Another analogy is that DUTA can also be compared to a military 'war–room' where defense forces (i.e. army, air force and navy) jointly develop a battle plan or war strategy, but retain their own chain of command and autonomy.

**DUTA acts as a bridge between silos (Petronas Towers Kuala Lumpur Malaysia)**

## 4.2. Which ministry should be responsible for DUTA?

DUTA has a wide range of function covering transport and mobility, land use planning, transport investment, and local governance with an essential coordinating and oversight role. So its functions are not easily compartmentalized into a single ministry.

On one hand, because DUTA is a transport authority planning transport and its investments in Dar es Salaam, and is a key instrument to implement the National Transport Policy, it would seem appropriate to place it under the MOWTC. On the other hand, given that the coordination of urban transport is a key instrument of the PO-RALG and the PO-RALG has a prime responsibility for local and regional government, it is reasonable and justifiable to argue that ownership of DUTA should rest with the PO-RALG.

To evaluate the options and develop a recommendation, requires a closer look at actual DUTA functions to see how they align with the respective instruments of each Ministry. The functions of DUTA are listed in the table below, with each function a aligned to ministerial responsibilities and their respective instruments.

**Table 4-1 Alignment of DUTA functions to sectoral responsibilities**

| Function of DUTA | Alignment to the respective ministry |
|---|---|
| **Develop Strategic Transport and Land-use Plan for Dar es Salaam (SUTP)**<br>The SUTP is the platform upon which decisions are made, priority projects established and investment programs developed. It is a 'live' document adaptable to changing circumstances. Performance benchmarks are measurable and reportable. | DUTA is a key institution to implement the urban transport policies for Dar es Salaam that are in the National Transport Policy developed by the MOT. This however is a high-level guidance as the local SUTP policy is crafted at a very local level, therefore the PO-RALG is the more applicable ministry for this function. |
| **Plan Transport and Mobility solutions**<br>At the local level DUTA will identify demand, bottlenecks, and options to produce concrete solutions for improve transport and mobility. | Guided by the SUTP, local conditions will inform the transport and mobility solutions which is in the span of governance exercised by LGA's and DSM Tanroads and TARURA. Coordinating these activities is a function of the PO-RALG. SUMATRA, a DUTA Board |

| | |
|---|---|
| **Customer service delivery and sustainability is its driving aim.** | member is the MOT's arm to regulate transport at local level so service delivery and performance standards are upheld. |
| **Plan and prioritize infrastructure investment, and secure funding**<br>DUTA will plan and prioritise infrastructure investments and urban development plans, develop investment plans and budgets, with funding proposals to secure funds. These plans will be developed in accordance with the SUTP. | Based on the plans and solutions developed above, investment plans are developed with the LGA's which is within the scope of local government responsibilities. PO-RALG is the key ministry overseeing this area.<br>TANROADS DSM, representing the MOT is a DUTA Board member. |
| **Control and mobilize funding for transport investments**<br>For DUTA to be effective and be able to implement its policies, requires it to have control over funding and financial resources, either through approval of disbursements or funding being channelled through DUTA. | Ultimately, as DUTA develops capacity, the present funding streams can be channelled through DUTA. This has no implications on the issue of ministerial responsibility.<br>However, DUTA will have the ability to develop its own sources of funds such as from increases in parking charges or implementing a congestion charge. This requires greater local coordination which is more relevant to PO-RALG responsibilities. |
| **Approve all transport infrastructure and investments in Dar es Salaam**<br>DUTA will have powers of veto over land use developments and land-use permissions in cases where the social interest is not served in respect of maintaining transport, mobility and access, and where such proposals and development do not comply with, or are not aligned with the SUTP. It will approve all transport and related urban projects carried out by LGAs and agencies. | Ad-hoc project planning is a major detrimental factor in the city's performance and future sustainability. A very important function of DUTA is to develop a cohesive and efficient plan, and it has the power over LGA's to approve any design or development affecting transport and mobility. Here once again, the PO-RALG is the ministry with the instruments to support this important DUTA function. |
| **Delegate implementation, monitor progress and measure performance**<br>DUTA will ensure all implemented projects are funded and suitably resourced. By virtue of its full responsibility, DUTA can hold agencies accountable for performance, work with them to resolve issues, and take over or reassign responsibilities as required to achieve its aims and objectives | This function is closely aligned with the implementing agencies, largely represented by LGA's DART and regional players, all under the scope of the PO-RALG. |
| **Realign responsibilities, activities and tasks**<br>Where there are gaps in responsibility DUTA can realign responsibilities, or establish or recommend new agencies if required | This is an issue within the domain of local responsibilities under the span of PO-RALG management. |

Based on the assessment above, both the MOWTC and the PO-RALG are relevant sponsors for DUTA; MOWTC under its responsibility over transport, and the PO-RALG within its functions of local coordination.

If the MOWTC is taking responsibility for establishment of DUTA with the support of the PO-RALG it can delegate the on-going functions of DUTA oversight to PO-RALG.

## 4.3. DUTA functions relative to other agencies

### 4.3.1. Impact of DUTA on present functions of DAR-RS

The Regional Commissioner presently acts in the position of chair of the **Regional Road Board (RRB)** and also convenes the **Regional Consultative Committee (RCC)** being the consultation mechanism for the city mayors and directors.

As DUTA will take over the majority of functions of the RRB this board should be dissolved. The RCC, as it consists of members who may not be on the DUTA Board, can be reassigned as a Standing Committee under DUTA (and still be chaired by the RC as Board member) to offer advice and advice and consultation.

### 4.3.2. SUMATRA role and function in relation to DUTA

**The legal status and powers of SUMATRA**

SUMATRA is the national transport regulator, established under the *SUMATRA ACT 2001*.

In respect to urban transport in Dar es Salaam, SUMATRA has the power to decide on the supply of goods and services, make rules and regulations, grant or renew licenses, regulate services for effective competition and in the public interest, collect levies and charges for regulated services, hold consultations and review applications, and conducts inquiry into any complaints or grievances it receives related to the supply and regulation of transport in Dar es Salaam.

**The relationship of SUMATRA to DUTA**

SUMATRA will be a full Board Member to DUTA, with its regulatory powers over transport fully preserved, and DUTA does not replace any of its legislated functions. Its input into strategic policy planning and development of a unified transport policy will in fact strengthen its role.

The SUMATRA organization while being an autonomous Authority, has a regulatory role, not to be confused with the strategic policy-making and oversight role of DUTA.

### 4.3.3. DART role and function in relation to DUTA

**The legal status of DART**

In 2006, the DART Agency was established under the former PMO-RALG as a semi-autonomous Executive Agency, primarily charged with the establishment, implementation and operation of the BRT under principles of commercial business management. It has a Chief Executive (appointed under due process by the Minister) who is responsible for the day to day operations of the Agency. DART operates under the strategic direction of the Permanent Secretary who presides over a Ministerial Advisory Board (MAB).

The MAB advises the Minister on the strategic business framework and objectives of the DART Agency; approval of the Chief Executive's plans, budgets, priorities, annual performance targets and annual reports and accounts, and will evaluate DART’s performance.

DART is to operate as a commercial business; able to generate income from its own operations and be self-financing (charging for services provided under its authority), but it is also able to receive financial support as decided by Parliament or borrow funds for the purposes of its functions.

Its semi-autonomous status implies that it is not subject to direct political pressure or influence other than by the strategic policy formally set by the Permanent Secretary and the Ministerial Advisory Board. DART also contracts concessionaires to deliver services, being fare collection (and station management), bus operations and management of a trust fund for revenue.

**Oversight of DART**

Figure 4-2 shows the present structure of institutional oversight relative to DART. It shows that DART has multiple linkages to institutions (TANROADS, SUMATRA, PO-RALG & DCC) which may cause problems if the policies of these entities are not properly aligned or coordinated.

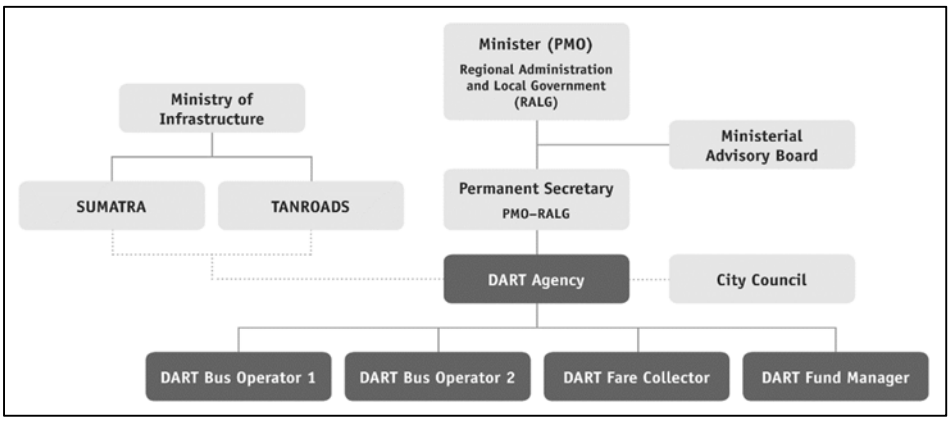



**Figure 4-2: DART Institutional set up (proposed under DART planning)**

*Source: Dar es Salaam Rapid Transit Investors Document April 2008*

Each one of these oversight bodies will become members of the DUTA Board so that the oversight and strategic planning role over the DART Agency will pass to DUTA. DART will be an implementing agency under DUTA, thereby improving unity of command.

**The wider responsibilities of DART**

DART under its Establishment Order also carries wider powers and responsibilities to ensure orderly traffic flow on urban streets and roads of Dar es Salaam.

This function normally belongs to a roads and traffic agency and has most likely been allocated to DART as there is presently no dedicated agency[5] in Dar es Salaam managing the roads and traffic function and to help DART manage traffic issues to support the BRT.

However, the DART Agency being a type of 'de-facto' roads and traffic agency is somewhat misleading as its responsibilities do not include urban road maintenance which appears to be left under the management of TANROADS and municipalities. The Establishment Order Act stipulates that DART must provide 120 km of walkways and bikeways for non-motorized transport (NMT), which indicates

[5] *The TANROADS agency looks after national trunk roads that intersect the city and they also repair traffic lights, but do not have a traffic planning or management role. Also the municipalities manage local road issues to an extent.*

a construction role. The clause that 'intersections be redesigned and rebuilt by 2008' implies that it does have a responsibility for roads (but perhaps only in relation to traffic management). The inclusion of 'maintenance of structures' implies DART is responsible for stations and signaling, but it is not clear who is responsible for the maintenance of the busway.

The duplicity of agencies managing a single area of responsibility (roads and traffic) is inefficient and does not promote clear responsibility and accountability. In practice DART has not been able to devote any resources or attention to the wider control of traffic beyond issues that directly affect the construction and implementation of the BRT.

Thus, DART is a good example of an agency where the strategic policy oversight will change under DUTA. Given that all the parties involved in its present oversight will be members of the DUTA Board, they will coordinate through DUTA and DUTA Board will be responsible for Strategic Policy direction to DART.

Regarding DART's role in roads and traffic, this should be assigned to a newly established dedicated separate Roads and Traffic Agency. The *DART* Agency *Establishment Order*, 2007 may need to be amended accordingly at the same time.

### 4.3.4. Role of the Traffic Police relative to DUTA and the proposed Roads and Traffic Agency

Presently the Traffic Police carry out the main task of traffic management, maintaining order and enforcement - however their task is an unenviable one, due to the lack of proper formal traffic planning and management. This creates a situation where police are often blamed for not managing traffic problems, when in fact they are the 'back-stop'; managing the effects of chronic traffic planning and management failures of the city.

According to the **Road Traffic Act 1973** the role of the Traffic Police is mainly identified as enforcement and regulation of the traffic code, as well as maintaining records of offences, road accident data, to close thoroughfares as necessary, and maintain orderly traffic flow. They also have the power to remove vehicles from the roads if unfit for service or non-compliant with regulations.

The function of traffic planning and management (beyond 'in-situ' enforcement) is not mentioned although the Traffic Police manage this responsibility by default due to the lack of a proper agency in Dar es Salaam to carry out the task.

Under DUTA, a separate Roads and Traffic Agency should be established with the purposes of planning traffic (roads and intersections), managing traffic signalling, and planning and implementing a road safety programme. Proper collection and analysis of road accident data (in cooperation with the Traffic Police) will also be a focus of the Agency. The management of trucks (axle weights and measures) may also fall under the auspices of the Roads and Traffic Agency, as it is a key factor in road maintenance.

The Traffic Police will be a full member of the DUTA Board, able to contribute fully to strategic policy development and be responsible for its functions, supported by the Board. The task of the Traffic Police should be made easier, supported by proper planning, and the cooperation of related agencies represented on the DUTA Board.

### 4.3.5. Strengthening the relationship between land use and transport planning

Land use and transport are inter-dependent; as transport influences city development (land-use) and land-use in turn influences how transport functions (efficiently or inefficiently). So it becomes obvious that transport and land–use must be planned conjointly and in harmony to avoid dysfunctional transport outcomes.

To manage this, it could be suggested that Dar es Salaam requires a **Development Authority** type of organisation, strengthening the control of land-use policy and enforcing its regulations. Such a Development Authority would work closely the transport planning DUTA.

However, rather than establishing a separate Development Authority it is recommended to **develop within DUTA a planning unit with a strong land-use and development function**, working closely with MOLHHSD and LGA's who presently manage city wide urban planning.

The reasons for DUTA and the MOLHHSD to work closely is that:

1) Both organizations work with the same data

2) Both transport and land-use plans are highly interdependent and need to be fully aligned and integrated and

3) A single institution managing this task is far more efficient than having multiple parties involved.

Such a function within DUTA is not to compete with, or replace the work of MOLHHSD but coordinate and support it, injecting a transport component into the planning (an element which is somewhat lacking in the present Urban Planning Act 2007).

**Legal basis for a DUTA role in urban planning**

Urban planning matters, guidelines and responsibilities are currently vested in the **Urban Planning Act, 2007**, but there is no sole assignment of responsibilities, as the Act applies to any entity involved in urban planning, stating that "*every city council, municipal council, town council, and township authority, shall each become a planning authority in respect to its area of jurisdiction.*"

While it is generally accepted that the MOLHHSD is the body charged with developing the major land use and urban development plans for the city, the Act does not assign it the exclusive urban planning function and therefore does not preclude the involvement of, and a liaison and planning coordination with DUTA. In practice, the MOLHHSD is a DUTA Board member so it inherently will be working in close harmony with DUTA transport and mobility planning.

### 4.3.6. No change of functions for LGAs

The Local Government Authorities (LGA's) are governed by THE LOCAL GOVERNMENT (URBAN AUTHORITIES) ACT, 1982.

DUTA does not impose any conflict to the functions outlined for the LGA's in this Act, however there are some outdated clauses in view of current role of SUMATRA. These are outlined in Table 4-1 below.

**Table 4-1 Clauses in LGA (Urban Authorities) Act pertaining to transport**

| Clause | Content outlining function of LGA | Issues |
|---|---|---|
| Section 55(n) | "To regulate the use and conduct of public vehicles plying for hire and their fares, to regulate the routes and parking places to be used for such vehicles to appropriate particular routes, roads, streets and parking places to specified classes of traffic and where necessary provide for the identification of all licences vehicles" | Functions of vehicle regulation, fare setting, route assignments and vehicle ID are now the functions of SUMATRA (remaining so under DUTA). Power over road use, parking assignment and permissions is likely to remain under the LGA. |
| Section 59(h) | "with the approval of the Ministers to provide any form of transport service". | Any service provided by LGA is now under permission of SUMATRA. This clause allows the LGA to be a public transport operator should it wish to do so. DUTA will not change this. |
| Section 59(l) | "To appropriate particular routes, roads and streets to the use of public vehicles employed in the transport services undertaken and conducted by the authority to the exclusion of such routes roads and streets by other public vehicles plying for passenger hire; save always however that no such appropriation shall substantially affect to its detriment traffic proceeding to and from places outside the limits of the area of the authority." | This clause effectively allows the LGA's public transport operation monopoly rights over certain routes (with conditions).<br><br>Such powers are presently nullified by the regulatory powers of SUMATRA, and shall not change with the establishment of DUTA. |

### 4.3.7. Establishing an independent Roads and Traffic Agency

During PO-RALG task group consultation the establishment of a dedicated urban roads agency was discussed. However, this is not a role to be incorporated into DUTA, as DUTA is not an implementing agency. Subsequently, TARURA has been established to take over the management of local roads.

However, there still lacks a dedicated agency for the management of road safety and traffic in Dar es Salaam, and may require DUTA to establish such new body, or assign the task to an existing agency.

# 5. Implementation of DUTA

## 5.1. Phased introduction of DUTA

The path from an in-principal agreement to the formal establishment of a new Authority is a substantial change management process, so it is recommended to implement DUTA as a phased approach – using an inclusive and participatory approach and executing it in manageable steps.

Three phases are foreseen in the process of establishing the DUTA, being:

**Preparatory Phase 1:**

This is a preparation phase, establishing a Steering Committee focused on preparation, coordinating present players and establishing liaison. Active coordination on current short-term measures identified by the CUPID project can also be a means to create momentum. To catalyze action, some 'seed-funding' in the DUTA launch budget can 'kick-start' some projects to create a highly visible demonstration of DUTA at work.

This phase is a concrete step but does not yet alter the present structure and responsibilities. This Phase can be implemented prior to DUTA legislation being finalised.

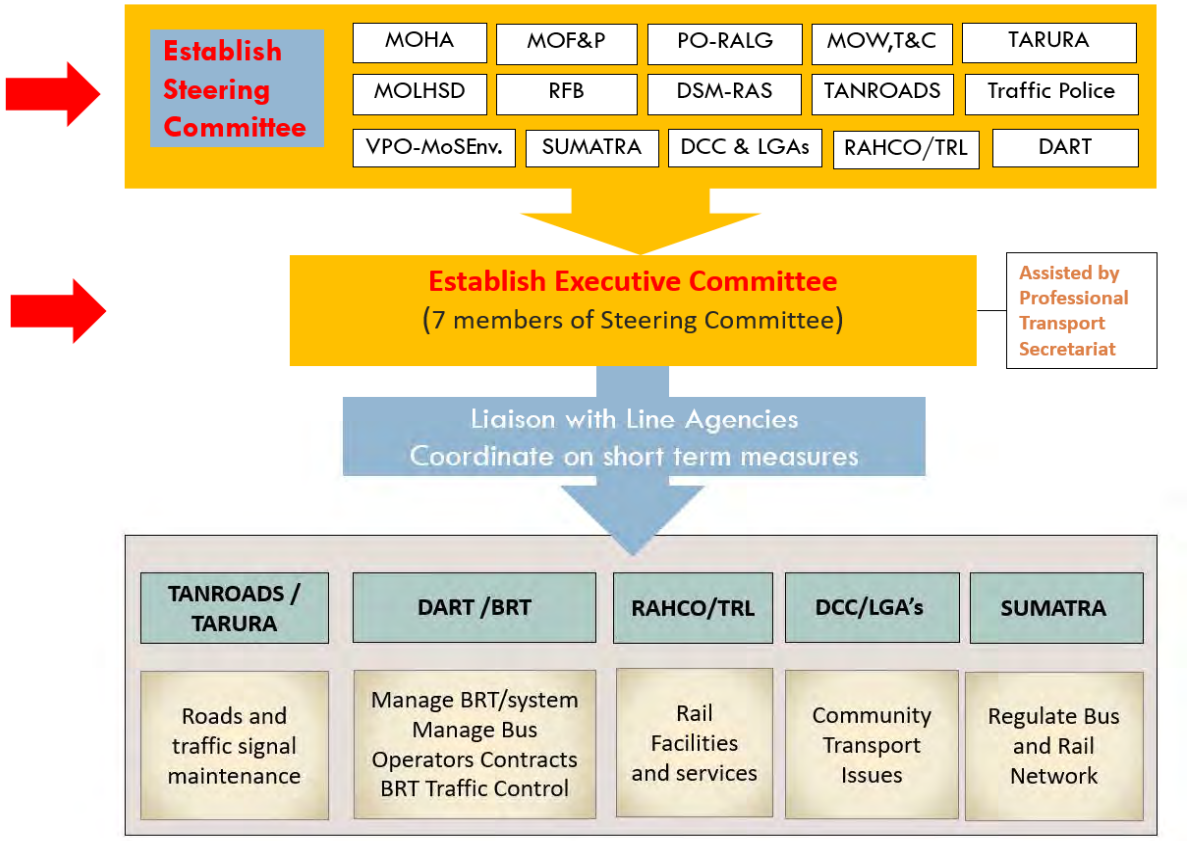



**Figure 5-1: Preparatory Phase 1**

**Establishment Phase 2:**

This phase becomes into play when DUTA establishment legislation is passed, and the Steering Committee is transformed into the Board of Directors. In this phase DUTA will also establish its Planning Divisions that will manage the consolidation phase involving the line agencies in their respective areas.

In this Phase 2:

- DUTA is legislated into a formal entity
- Steering Committee becomes Board of Directors
- Executive and administrative function of DUTA is established
- Research and planning units within DUTA are developed

- Internal budget & administration is developed
- Possible reassignment of responsibilities between agencies is evaluated including planning of additional agencies as required
- Strategic policy for each agency within the overall strategic policy is developed complete with budget plans.

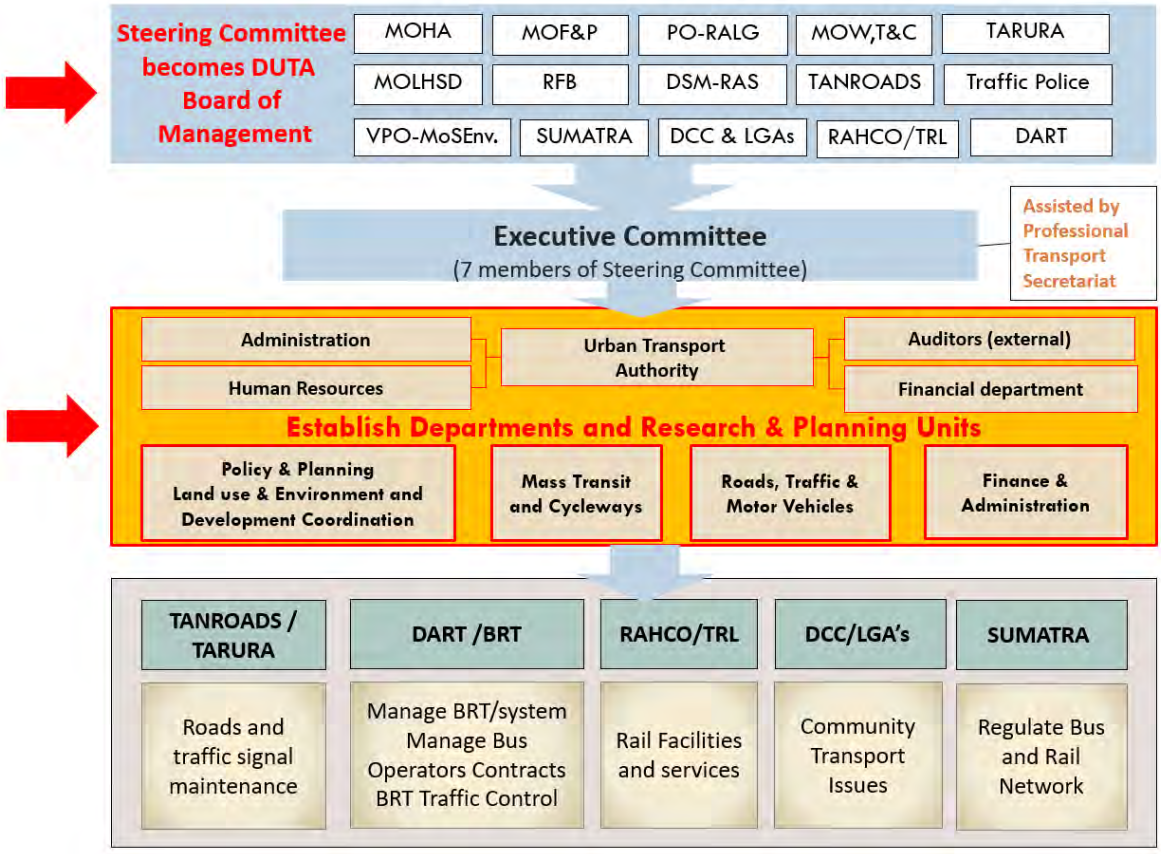



**Figure 5-2: Establishment Phase 2**

**Consolidation Phase 3:**

This phase will fully develop the Authority and all attached structures, including:

- Finalize the reassignment of responsibilities amongst the agencies to bring all functions under its scope and authority.
- Develop integrated planning functions according to modal / functional responsibilities
- Finalize agencies.
- Fully reassign responsibilities to agencies.

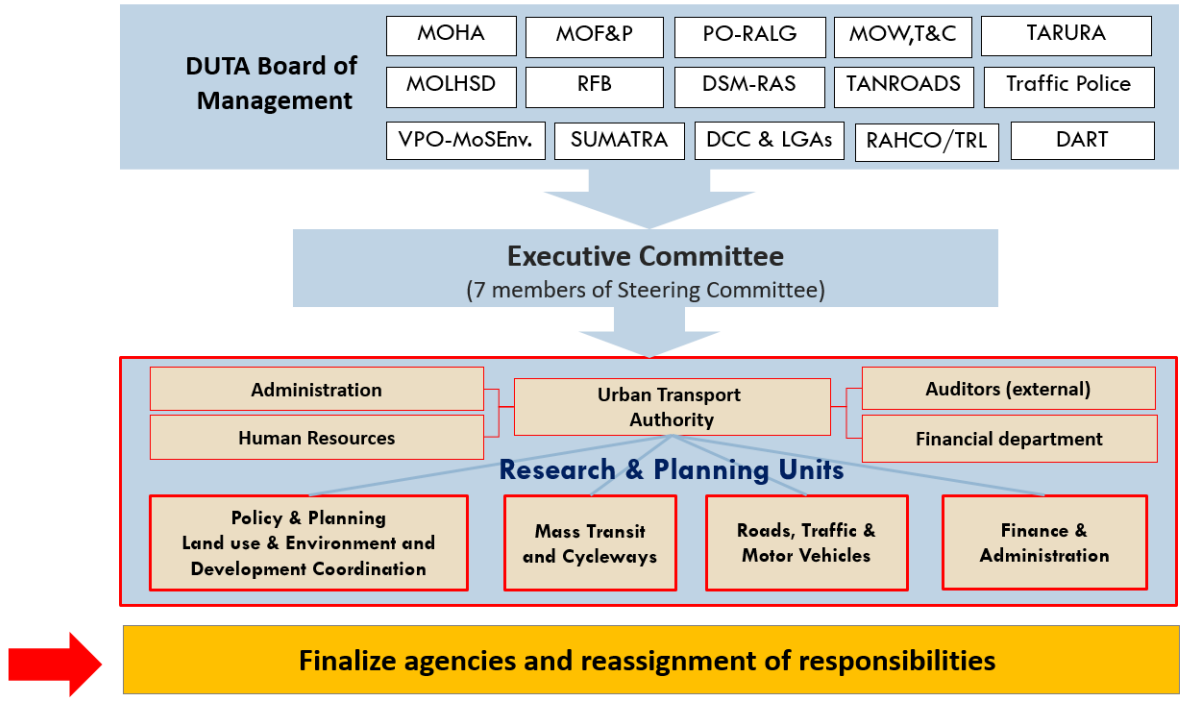



**Figure 5-3: Consolidation Phase 3**

## 5.2. Roadmap to Legislation

This is the final section on the roadmap to getting DUTA legislated. The progress and estimated timeframe to completion is shown below.

| | | |
|---|---|---|
| 1. | Finalize draft Concept Note (by Jan 2016) – Reviewed by PO-RALG | Completed |
| 2. | Consensus on Concept Note by Secretariat members (Feb 2016) | Completed |
| 3. | Approval on Concept Note by Management of PO-RALG (Apr 2016) | Completed |
| 4. | Finalize Concept Note with feedback of all stakeholders (June 2016) | Completed |
| 5. | Approval on Finalized Concept Note by PS of PO-RALG (November 2016)<br>(Referred to interagency meeting to decide which ministry to be responsible to establish DUTA) | Not completed |
| 6. | Resolution on responsibilities; MOWTC seeks final comments on DUTA Concept Note. | September 2017 |
| 7. | Concept Note Agreement (September 2017) | September 2017 |
| 8. | Draft Establishment Bill written | October 2017 |
| 9. | Present Concept Note and draft Bill to Inter-ministerial PS Meeting | October 2017 |
| 10. | Submit draft Bill to Cabinet (or National Assembly??) | November 2017 |
| 11. | Official Opening of DUTA | February 2018 |

### 5.3. The evolution and strengthening of DUTA

World experience in setting up urban transport authorities shows that they need time to evolve and mature. DUTA's actions and visibility in the early years are critical in establishing an effective and respected role.

To this end we raise the following requirements:

- The chairmanship of DUTA Board be a respected person, held in high esteem, and capable of helping the organisation develop collaboratively with the stakeholders.
- The ability for the Board to work as a team, develop a good vision and sound supporting policy will be critical.
- Engage in high visibility actions, such a broad and pro-active consultation for a vision/policy direction and a well-enunciated plan of action. Also to act as proponent and sponsor of some major project initiatives to create momentum and demonstrate action.
- Create publicity and communications to harness public support, engendering cooperation and support for the implementation of 'on-ground' actions.
- Work actively with implementing agencies to resolve issues of conflict and disharmony where they occur. This should not be difficult as these agencies are all represented at the DUTA Board.
- Ensure all policies are clearly 'objectives-based' and transparent (open to public scrutiny) and ensure formal reporting of performance and outcomes.
- Budget for consultants' assistance to build capacity in the numerous skills areas that need to be developed.

## 6. DUTA Budget Preparation

The budget for the establishment of DUTA will comprise of three elements:

- Set up costs
- Annual budget
- Seed funding for short term projects to 'kick-off' progress

Typically, DUTA as an ongoing function will develop budgets and secure funding to support its policy & planning. Appendix B show a draft budget with estimated costs of establishment and operation over 5 years.

Summarized as follows:

- Establishment costs and training over first 5 years are estimated at US$ 2.1M with a further US$ 2.5M for 'seed funding' expended over Yr 1&. This seed funding is to provide some 'kick-off' funds for DUTA to commence some early priority projects.
- Annual operating costs are estimated at US$1.545 m per year.
- So, the all–inclusive budget estimates for Yr 1-5 are US$15.3 (less US$3.0M from JICA to update Transport Master Plan) = US$12.3M
- This expenditure (including establishment cost and seed funding) is assigned by year as follows:
    - Year 1: US$ 3.895M

- Year 2: US$ 3.515M
- Year 3: US$ 1.665M
- Year 4: US$ 1.615M
- Year 5: US$ 1.615M

# 7. Benefits and Outcomes of DUTA

## 7.1. Delivering an efficient transport network in Dar es Salaam

Addressing the unbridled growth in car ownership and car use in Dar es Salaam is perhaps the most critical challenge facing DUTA. Developing an integrated public transport network is integral to addressing the problems as it is difficult to restrain private car ownership if quality public transport alternatives do not exist, and where the commuting is a daily problem.

Developing a quality public transport network needs a coordinated and all-encompassing approach, not a reliance on single projects. Only a **fully integrated transport network, with convenient and quality services** will convince motorists to use public transport. The system must also respect its passengers, and in this regard much progress needs to be made. The present inauguration of BRT has been a major step in the right direction.

Prioritising public transport in traffic is a key measure; offering the benefit of travel time saving, but also making public transport more efficient with lower running costs.

**Operational efficiency drives affordability,** as fleet efficiencies reduce operating costs and thus reduce the cost of fares and subsidy. Efficiency helps the system to be commercially viable and reduces the need for public subsidy support.

**Affordability creates accessibility;** and improves social **equity and opportunity** allowing people to be better connected from where they can afford to live to places of work, study and community services. Transport plays a connecting role in a series **of mutually reinforcing relationships that link growth with poverty reduction**. Transport, in meeting the needs of urban social and economic activities, contributes to growth and prosperity and spreads the benefits of such growth more equally.

## 7.2. Restrain the growth of car ownership

Once a good public transport network exists, pro-active measures can be taken to reduce the predominance of car use for private travel. It is evident that no city in the world has been able to contain traffic without the parallel action of better public transport and restrictive measures on cars. These measures are more difficult to implement in African and Asian cities where car ownership is as much a status symbol as it is essential transport.

This highlights the key function of a DUTA, to manage these challenges with full coordination. When successful it will realign the city's development trajectory, fundamentally improving productivity and prosperity of the city and its people, and improving quality of life.

## 7.3. Improving and strengthening financial capacity

Major transport improvements costs money; and resources are always at a premium. A major benefit of DUTA is that it will be able to coordinate investment under a unified and objectives-based policy, improving governance and donor confidence, and developing the planning skills to initiate projects that are 'credit worthy'. DUTA can establish robust funding mechanism and facilities to support investment into transport and mobility.

## 7.4. How DUTA can address risks

The success of DUTA is reliant on how it addresses known risks, especially the risks that plague present policymaking and service delivery.

**Table 7-1** outlines these risks and how DUTA is likely to address them.

**Table 7-1 How DUTA Manages Risks**

| **Identified Risk** | **How DUTA address the risk** |
|---|---|
| Policy does not translate into action | This well-known pitfall will be addressed by DUTA with strong central coordination/ resource planning and accountability with local agencies working together at the local implementation level. |
| Changing and unexpected circumstances frustrate the Master Plan | The Strategic Urban Transport Policy (SUTP) outlines clear key objectives which drive policymaking. It is therefore an adaptive plan helping policymakers to adapt more readily to changing circumstances and helps prioritize actions toward reaching goals. |
| **Conflict of Interest/Corruption, and influence by powerful players.** Political patronage should also be avoided. Large infrastructure projects may attract corruption due to factors of financial scale, political weight and monopolies. Corruption undermines a project's political sustainability, presents a reputation risk for promoters and investors and undermines sound planning and social responsibility. Conflicts of interest will erode project efficiency and distort sound planning principles. | DUTA operates in a transparent and open manner, which is consensus driven. This helps insulate individuals from political interference and will assist accountability and transparency in decision-making and promote good governance. |
| **Energy security** – is a key concern for the future requiring a focused risk analysis on the impacts and effects of rising fuel and energy costs. It will impact both on where people choose to live, their travel choice (greater demand on public transport services) and on the cost of operating public transport. | DUTA will have a strategic perspective of the city's transport needs and can make decisions for the public good, rather than along the lines of specific interests. In this role it will take into account trends, risks and conditions such as energy costs etc. |

| | |
|---|---|
| Agencies are not held accountable for performance | DUTA will carry the ultimate responsibility for transport and mobility in Dar es Salaam and can hold the implementing organizations accountable for their performance. |
| Transport operators bear risks they cannot manage – resulting in survival behaviour (e.g. commuter rail, daladala) resulting in poor service delivery or financial collapse. | Business models should be structured so that risks are carried by the party that can manage them.<br><br>Governments can assist private sector in reducing risk by more actively participating in developing services. DUTA can manage this essential role. |
| **Political interference affects good decision-making –** distorting policy and giving monopolies to powerful players.<br><br>This particularly applies to PPPs. | The transparency and cooperative structure of DUTA supported by mutually agreed objectives will build industry confidence, resulting in a better investment climate. . |
| **Community consultation** - while governments must lead and set the agenda for reform and direction, transport infrastructure must be demand- driven and take on board local needs and requirements. | **The participatory and inclusive nature of DUTA allows it to operate at** a local level, and be demand–driven. Where changes impact local communities, these communities can become involved at an early stage in the process of developing infrastructure solutions. |

# Appendix A: Draft Code of Conduct for DUTA

The following is a sample of a Code of Conduct to be accepted by all Board Members – usually a document worded in the first person and signed on induction to the Board.

## Message from the Chair

This section should state to whom the Code of Conduct applies, and when, meaning only at Board meetings, when representing the Board, or in the wider dealings of all administration linked to the Boards, the work of the respective agencies and personally.

Directors are expected to make a substantial contribution and be an active member of the Board and exercise personal responsibility in the position as a Board Member.

This code of conduct imposes more accountability for professional behaviour compared to Regulation.

The code is not a full statement of director's duties. It outlines fundamental values and principles that identify the standards of behaviour expected of members of our board and associated committees.

## DUTA Values

The Board works for, and in the interests of the public and needs to maintain standards of conduct and ethics that maintain public confidence and trust. Public confidence means that the public has the right to expect that public sector organizations display the highest integrity and competence, treating all citizens fairly and reasonably.

### Conduct

Personal behaviour mandates:

- To act ethically and with integrity;
- To act according to the legislative requirements, policies and ethical codes that apply;
- To make decisions fairly, impartially and promptly, considering all available information, legislation, policies and procedures;
- To treat members of the public and colleagues with respect, courtesy, honesty and fairness, and have proper regard for their interests rights, safety and welfare;
- To not harass, bully or discriminate against colleagues, members of the public and employees;
- To contribute to a harmonious, safe and productive work environment by our work habits, and professional workplace relationships; and
- To serve the government of the day by fulfilling our purpose and statutory requirements.

Fraudulent and corrupt behaviour:

- To not engage in fraud or corruption;
- Report any fraudulent or corrupt behaviour;
- Report any breaches of the code of conduct; and
- Understand and apply the accountability requirements that apply.

In the use of public resources to:

- Be accountable for official expenditure;
- Use publicly-funded resources diligently and efficiently. These include office facilities and equipment, vehicles, Travel entitlements, corporate credit cards;
- Use corporate expenses only for Board-related expenditure;
- Not use office time or resources for party political work or for personal gain, financial or otherwise;
- Keep to policies and guidelines in the use of computing and communication facilities, and use these resources in a responsible and practical manner; and
- Ensure that any travel for official purposes is only done so when absolutely necessary.

Conflicts of interest – to:

- Ensure personal or financial interests do not conflict with the ability to perform official duties in an impartial manner;
- Manage and declare any conflict between personal and public duty; and
- Where conflicts of interest do arise, ensure they are managed in the public interest.

**Commitment to address corruption:**

- Take responsibility for reporting improper conduct or misconduct which has been, or may be occurring in the workplace. To report the details to the relevant people or agency; and
- Take responsibility for contributing in a constructive and positive way to enhance good governance and the reputation of the board.

**Professional Behaviour**

- A director should attend all board meetings. If a board member can't attend a meeting they should obtain a leave of absence and inform all other directors of their non-attendance as early as possible.
- A director should arrive at the location of the meeting before the planned starting time to make sure the meeting runs on time.
- A director should have read, understood and be prepared to discuss all issues included in board papers and/or reports.
- A director must learn about UTA areas of responsibility business, the statutory and regulatory requirements, and be aware of the physical, political and social environment in which UTA operates.

Communication and official information – requirements to:

- Not disclose official information or documents acquired through my work, other than as required by law or where proper authorisation is given;
- Not misuse official information for personal or commercial gain for myself or another;
- Adhere to legal requirements, policies and all other lawful directives regarding communication with Parliament, ministers, ministerial staff, lobbyists, members of the media and members of the public generally; and
- Respect the confidentiality and privacy of all information as it pertains to individuals.

Record keeping and use of information - to:

- Record actions and reasons for decisions to ensure transparency;
- Ensure the secure storage of sensitive or confidential information;
- Comply with our record keeping plan; and
- Where permissible, share information to fulfil our role.

# Appendix B: Draft Budget Estimates for DUTA (subject to refinement)

| TASK/ FUNCTION | Detail | Resources/ Facilities (Budget Items) | Est. Cost (US$ Mil.) | IDA Finance (US$ Mil.) | JICA (US$ Mil.) | GOT Financing (US$ Mil.) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Establishment of DUTA** | | **TOTAL** | **2.1** | **1.8** | **0.0** | **0.3** | **1.10** | **0.72** | **0.12** | **0.07** | **0.07** |
| | Facilities/ staff & training | Secure office space and fit-out | 0.1 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| | | Office furniture and equipment | 0.06 | 0.06 | 0 | 0 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 |
| | | Vehicle Purchase | 0.25 | 0 | 0 | 0.25 | 0.25 | 0 | 0 | 0 | 0 |
| | | Staff recruitment and induction | 0.07 | 0.07 | 0 | 0 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 |
| | | Technical training: (consultant's input & study tours) | 1.6 | 1.6 | 0 | 0 | 0.70 | 0.70 | 0.1 | 0.05 | 0.05 |
| **Ongoing functions of DUTA** | | **TOTAL** | **10.73** | **0.00** | **3.00** | **7.73** | **1.545** | **1.545** | **1.545** | **1.545** | **1.545** |
| **1. To develop a strategic unified urban Transport and Land-Use policy for Dar es Salaam and take full responsibility for its implementation**<br><br>**2. To improve Coordination and address the Institutional gaps** | 1. Update Transport Master Plan & develop Strategic Urban Transport Policy<br><br>2. Provide monitoring and evaluation<br><br>3. Establish financing strategies and enact necessary law/regulations<br><br>4. Carry out specific Feasibility Studies to scale up Priority Transport Infrastructure Projects | Study for update of Transport Master Plan (JICA Support for MP update study) | 3.00 | 0.00 | **3.00** | 0.00 | (JICA will support MP update study commencing 2016) | | | | |
| | | Convening Board Meetings (member meeting fees/travel costs) | 0.23 | 0.00 | 0.00 | **0.23** | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| | | | | | | | | | | | |

| TASK/ FUNCTION | | Resources/ Facilities (Budget Items) | Est. Cost (US$ Mil.) | IDA Finance (US$ Mil.) | JICA (US$ Mil.) | GOT Financing (US$ Mil.) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **3. To deliver improved transport and mobility outcomes for a sustainable future Improved economic performance and a good quality of life in Dar es Salaam.** | 5. Establish Planning Units and staff these Units<br><br>6. Provide technical training and assistance for technical staff<br><br>7. Media and communication costs (including public consultation) | Consultant costs for Technical Assistance | 1.50 | 0.00 | 0.00 | 1.50 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 |
| | | Conduct Study tours | 0.25 | 0.00 | 0.00 | 0.25 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| | | Staffing costs | 4.95 | 0.00 | 0.00 | 4.95 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| | | Office operating / contingency expenses | 0.25 | 0.00 | 0.00 | 0.25 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| | | Vehicle running costs | 0.15 | 0.00 | 0.00 | 0.15 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| | | Surveys & Data Collection costs | 0.15 | 0.00 | 0.00 | 0.15 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| | | Media & communication costs | 0.25 | 0.00 | 0.00 | 0.25 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| **Short-term Kick-off Projects (examples)** | | **TOTAL** | **2.50** | **2.50** | **0.00** | **0.00** | **1.25** | **1.25** | **0.00** | **0.00** | **0.00** |
| | City Traffic circulation and parking control measures | Seed funding for project cost | 0.50 | 0.50 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 |
| | Traffic Safety Improvements | Seed funding for project cost | 0.50 | 0.50 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 |
| | Pedestrian improvements & improved bus terminal facilities | Seed funding for project cost | 0.50 | 0.50 | 0.00 | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 |
| | Establish cycleway | Seed funding for project cost | 1.00 | 1.00 | 0.00 | 0.00 | 0.5 | 0.5 | 0.00 | 0.00 | 0.00 |
| **TOTAL Establishment and Operating Budget (5 Years) (USD Mill.)** | | | **15.3** | | **Annual Breakup** | | **3.895** | **3.515** | **1.665** | **1.615** | **1.615** |
| **Annual budget without project funding (set up and operational only)** | | | **9.8** | | | | **2.645** | **2.265** | **1.665** | **1.615** | **1.615** |

| SALARY LEVELS | Salary level per month | months | annual salary (TShs) | Strength | Tsh | USD |
|---|---|---|---|---|---|---|
| Executive Director | 8,000,000 | 12 | 96,000,000 | 1 | 96,000,000 | 48,000 |
| Secretariat | 2,500,000 | 12 | 30,000,000 | 2 | 60,000,000 | 30,000 |
| PR Person | 3,000,000 | 12 | 36,000,000 | 1 | 36,000,000 | 18,000 |
| Legal counsel | (outsource)** | | | | 0 | 0 |
| Security & Audit | 4,000,000 | 12 | 48,000,000 | 2 | 96,000,000 | 48,000 |
| **Planning units** | | | | | 0 | 0 |
| Director | 6,000,000 | 12 | 72,000,000 | 4 | 288,000,000 | 144,000 |
| Technical staff | 4,500,000 | 12 | 54,000000 | 26 | 1,404,000,000 | 702,000 |
| **TOTAL** | | | | | **TOTAL** | **990,000** |
| **Unit Costs** | | | | | | |
| Board Member meeting fees (Assume Board Members (15 persons) meeting 12 times per year.) | | **months** | **annual amount (Tshs)** | **Strength** | **Tshs** | **USD** |
| Rate for meeting (Tshs) (per person) | 500,000 | 12 | 6,000,000 | 15 | 90,000,000 | 45000 |
| **Estimated cost of Legal Counsel | | | 20,000,000 | | 20,000,000 | 10000 |
| Vehicle costs (5 vehicles at average $50,000 ea.) | | | | | | **250,000** |
| Fuel and running costs (per month /per vehicle) | | | | | | **500** |

# Appendix C: International Experience

The following examples demonstrate the variety of forms that an urban transport authority may take, from a highly strategic role in policy and planning, to a more focused role in public transport.

The first (and most shining example) is the Land Transport Authority (LTA) in Singapore, which serves as an exemplary reference for how to manage urban development and transport. However, Singapore has unique characteristics as a nation city, which may temper the applicability of its experience to other cities.

So, for the second example we present The Dhaka Transport Coordination Authority (DTCA) in Bangladesh which is more similar to the Dar es Salaam situation, and we present an assessment of its experience to date.

Thirdly, we present TransLink of Brisbane Australia as an example of an Authority with particular focus on integrating public transport as its major policy to manage traffic congestion.

The remaining examples are:

**Transport for London (TfL)** – an integrated Transport Authority to implement London's Transport Strategy with a policy to promote and invest in public transport.

**HVV Germany (Hamburg Public Transport Agency Ltd.)** - to achieve full integration of public transport services.

**Dubai RTA** - to develop integrated solutions for road systems and land transportation networks and a comprehensive strategic plan.

**Västtrafik AB, Göteborg, Sweden** – to improve the local environment by reducing traffic sources and improve the overall quality and accessibility of public transport.

**AMA Milan, Italy** - to develop sustainable mobility and reducing traffic and polluting emissions by strengthening public transport, integrating fares and e-ticketing, rationalise traffic in the city centre and develop cyclist mobility.

### The Land Transport Authority (LTA) Singapore

The LTA focusses on holistic planning and development of land use and transport networks, as an overall **Concept Plan** for the long-term future, from which the **Development Master Plan** and the supporting **Transport Master Plan** can be developed.

There is conscious planning to integrate the transport networks with land use, both in terms of planning and implementation. It requires planning well in advance for high density developments at and around major transport nodes such as Mass Rapid Transit (MRT) stations and bus interchanges. This helps to facilitate seamless travel by commuters and encourage public transport use. A holistic package of measures to enhance the integration of the public transport system, manage road use and cater to the diverse needs of the people is adopted.

For more information please see: www.lta.gov.sg

## DTCA - Dhaka Bangladesh

In February 2012, the Government of Bangladesh passed a Bill for the establishment of the **Dhaka Transport Coordination Authority (DTCA)**, to replace the previous Dhaka Transport Coordination Board (DTCB).

This establishment was on the basis of:

- Strategic Transport Plan (2004) recommended a **unifying structure** to address chronic lack of coordination
- Donor agencies (ADB, JICA, WB) jointly recommended **establishing DTCA** as a **regulatory and coordinating** body.
- Approval by parliament 6 February 2012
- Board of Management representative of all implementing agencies and key stakeholders (30 members)

The following report was compiled by Mr. Ashraf Islam, Senior Transport Advisor on the performance and issues facing the DTCA (6 December 2012). It gives an account of the experience of DTCA implementation, its problems and its potential. As follows:

The former **Dhaka Transport Coordination Board (DTCB)**, in addition to common problems like other agencies, had the following shortcomings like shortage of knowledgeable professionals, experts, appropriate authority backed by legal coverage required for fruitful coordination and effective control. Additionally, the DTCB has inherent problems of lack of their own personnel. Most of its officials including the top layers are on deputation. So there is always lack of continuity and belongingness on the part of the deputed officials.

So, for restructuring and strengthening the DTCB, the Govt. has already enacted the **Dhaka Transport Coordination Authority (DTCA)** Act (The DTCA Act 2012) converting DTCB into DTCA with somewhat more legal authority and provision of greater emphasis on mass transit.

As the name suggests, coordination amongst the implementing agencies is one of the most important tasks of DTCA. But it has performed poorly as in case of DTCB, due to lack of appropriate legal coverage and high level dynamic leadership.

However DTCA does not lack potential in that out of 27 clauses of Section-9 (**Power and Functions of the Authority)** of the Act, the following 5 clauses have elaborated specific authorities of DTCA in implementation and approval of Transport Projects within Greater Dhaka:

1. *To evade traffic jam in Dhaka City, formulation of policies and schemes, approval, prepare Transport Master plan and supervision of its implementation activities;*
2. *Approval of final designs of schemes concerned to transport to be implemented by different authority/organizations;*
3. *Formulation of vehicle and transport engineering schemes and approval of it;*
4. *Formulation of different transport route planning and formulation of policy and planning about route and lane determination and implementation.*
5. *Fixing operational activities, fares and formulation of planning, implementation and approval of relevant other functions for transportation owned by government, non-government or public-private partnership to operate Bus Rapid Transit, Metro Rail, and bus or rail (metro/mono/circular/commuter) or expressway (including high*

*capacity lane or vehicles) through route rent or lease (route franchise) under Mass Rapid Transit system to provide speedy and better service;*

However, the DTCA in its present form having deficiency in manpower, expertise, logistics as well appropriate level of leadership is highly unlikely to be able to transform these mandates into reality.

Furthermore the DTCA has difficulty to enforce the same for not having any sort of control in preparing budget proposals and allocating financial resources to support the strategic policies relating to Urban Transport and Development projects within Greater Dhaka. At present different agencies are coming up with projects on their own beyond the scope of Govt. approved Strategic Transport Plan (STP), like Moghbazar –Mouchak Flyover by LGED, Elevated Express Way from Paltan to Mawa by Rajuk etc.

It has also become necessary to reconstitute the existing Board of Management of DTCA with induction of new members due to recent bifurcation of the Dhaka City Corporation as well as to incorporate representative from all the implementing agencies and key stakeholders of Greater Dhaka for making the Board much more effective.

***The Way forward for the DTCA:***

**Strengthening & capacity building:** Strengthening & capacity building as well as empowering the DTCA should be considered in the following manner:

- *DTCA needs to be placed under a super ministry sort of thing (maybe under Prime Minister's Secretariat) so that it can take the expected leadership to command for making the coordination effective and fruitful.*
- *Expansion of the existing organogram (Manpower & Logistics and Equipment) appropriately, allocation of necessary resources and appoint/employ relevant experts for planning and developing a reliable, convenient and safe mass transit network (MRT &BRT & Standard Buses) to improve access, mobility and reduce travel time as well as for enhancement of monitoring and enforcement capability.*
- *The post of Executive Director is very much vital for the success of DTCA. So, appointing of appropriate level(Grade-1) officer with engineering background preferably experience in Urban Transport having vision and dynamism should be ensured and once appointed he should be retained in the post for a reasonable time (Minimum-3 years).*
- *Instead of appointing officers on deputation from other departments, DTCA should recruit knowledgeable and expert professionals as their own personnel for enhancement of capability and sustainability. In order to attract them, their salaries and benefit should be higher than that given to the government employees and as per open market rate. Until they can appoint, they should hire experienced consultants.*
- *The subject of Transportation Engineering is fairly new in the context of Bangladesh. So there are always dearth of Traffic engineers /transport engineers/transport planners/transport modelers in different departments of the country. Therefore, to enhance their capability, DTCA should conduct training needs assessment and arrange continuous training programmes at home and abroad accordingly.*

**Reconstitution of DTCA Board**: Board of Management of DTCA should be reconstituted with induction of following new members due to recent bifurcation of the Dhaka City Corporation as well as to incorporate representative from all the implementing, regulatory and enforcement agencies and key stakeholders of Greater Dhaka to make it more effective and accountable:

- *Mayor, Dhaka City Corporation-North*
- *Mayor, Dhaka City Corporation-South*
- *Police Commissioner, Dhaka Metropolitan Police*
- *Chief Engineer, LGED*
- *Member, Physical Infrastructure, Planning Commission*
- *Managing Director, Dhaka Water and Sewage Authority(WASA)*
- *Managing Director, Dhaka Electric Supply Co.(DESCO)*
- *Managing Director, Dhaka Power Distribution Co.(DPDC)*
- *Managing Director, Titas Gas Co. Ltd, Dhaka*
- *Managing Director, Bangladesh Telephone Co. Ltd(BTCL), Dhaka*
- *Chairman/Director, Federation of Bangladesh Chamber of Commerce and Industries(FBCCI)*

**Financial Control:** For empowering &enabling DTCA to exercise effective control on development of urban transport infrastructures/projects within Greater Dhaka, provision should be made in the Act to channelize all types (Gov. fund/Loan/Grants) resources and funds through DTCA Board.

**Accountability of the Board Members:** Participation and involvement of all the Board members should be ensured in Strategic Policymaking in such a way that the all the members consider the same as their own project and consequently hold them accountable to the board of management for non-performance on the part of concerned department.

(End Report)

Consequently, there is now a dedicated action (and a specific capacity building project under AFD foreign aid funding) to improve and strengthen the function of the DTCA, with the adoption of the following strategy on 18 March 2015. Note that provision for this strategy was included in the Establishment Bill.

As follows:

**Section 1: Dhaka Transport Coordination Authority's Vision, Mission, Strategic Objectives and Functions**

**Vision: (inspiration and motivation)**

To ensure a sustainable and efficient transport network in Dhaka, providing access and equal opportunity for all to participate in the economic and social life of the city.

**Mission: (critical processes)**

1. *To provide strategic planning, integrated policy guidance, coordination and unified executive control and management for urban transport and mobility.*
2. *To supervise investment efficiency, efficient use of infrastructure, and market mechanisms.*
3. *Develop public transport business to improve public transport outcomes and market the services.*
4. *Promote road safety and improve environmental outcomes and create a less energy and emissions-intensive economy.*
5. *Promote good governance and accountability in managing urban transport and mobility.*

**Strategic Objectives**

1. *To regularly revise and update the **Strategic Transport Plan** (STP) and develop **Urban Transport Policy** (UTP) to guide all implementing agencies in their tasks.*
2. *To develop the **mass transit system** as part of an integrated public transport network to improve network access and provide attractive travel alternative to private cars.*
3. *To improve **traffic management** through demand management, improved traffic control and the three 'E's' of Engineering, Education and Enforcement.*
4. ***Improve road safety** with improved data collection, analysis and tailored measures to reduce accidents and improve road discipline.*

**Functions**

1. *Formulate a city vision and UTP in consultation with key stakeholders; resolve political and jurisdictional issues;*
2. *Conduct detailed analysis of the transport system, identify bottlenecks and problems, and produce concrete solutions for its improvement with an **integrated traffic plan** for Dhaka;*
3. *Plan, coordinate, approve designs, prepare budgets and secure funding for all traffic and infrastructure projects and ensure synergy and integration at implementation;*
4. *Improve traffic management and parking policy through improved control and monitoring and enforcement;*
5. *Organize, coordinate and monitor all agencies responsible for service delivery and provide resources and budget to execute policy and provide support and direction to the executing agencies. Address poor performance issues where standard procedures have failed to do so;*
6. *Develop policies to control and manage vehicle fleet, taxation and pricing policies, parking policy engineering standards, vehicle regulation such as safety and emission/fuel standards;*
7. *Provide route and network planning to develop an efficient public transport network;*
8. *Engage private sector bus operators in a PPP contract scheme to operate a higher standard of bus services in Dhaka and develop sound business models and pricing schemes;*
9. *Manage central fare collection and establish and manage clearing house;*
10. *Create a transport data base and an advanced transport modelling to support planning;*
11. *Approve Level of Service (LOS) for public transport and approve operational and business plans.*

## Brisbane Australia – TransLink

TRANSLINK is an Authority created solely for the management of for public transport in the greater SE Queensland Region, for greater Brisbane, Sunshine Coast and Gold Coast regions along 200 km of coastline and 100 km inland to the City of Toowoomba.

The following extract is the introduction to the annual report by the chair, Mr. Geoff Harley as included in the first TransLink Annual Report (2008-9) following its establishment as an Authority.

As follows:

"The TransLink Transit Authority was established under its own Act of Parliament on 1 July 2008. TransLink is responsible for planning and delivering public transport services in South East Queensland. At over 10,000 square kilometres, our public transport network is one of the largest in the world. We work together with our delivery partners to cater for more than half a million passengers each day, equating to over 180 million passenger trips per year. To ensure the continued delivery of an integrated and seamless public transport system, the TransLink board has highlighted the importance of maintaining and strengthening our relationship with our delivery partners. The TransLink board also recognises the enormous investment by the Queensland Government in public transport. This

investment has provided TransLink with a head start in developing the best public transport system in Australia and one that would merit international recognition.

This investment has seen TransLink deliver: • integrated ticketing, allowing customers to interchange seamlessly between participating bus, train and ferry services • the extremely successful go card, which provides a quick and convenient ticketing option • the management of Brisbane's busway network, which carries on average over 165 000 passengers each weekday, greatly improving travel times and reducing congestion on our roads.

Over the past 12 months, the board has reviewed compliance and risk management within TransLink to ensure effective governance. We have established a set of strategic objectives aimed at improving the public transport experience. These outcomes have resulted in improved customer service, with cutting-edge technology, more frequent and reliable services and the provision of a one-stop shop for all public transport information.

We are also finalising the draft **TransLink Network Plan** to ensure public transport demand is met in the future. We are also developing a Fare Strategy which will set the direction for ticketing products and fares over the next five years. In the year ahead, the board will focus on the financial efficiency of our own internal operations, and will continue to work with our delivery partners to deliver the best public transport service at the lowest cost. I would like to take this opportunity to thank my board members, who possess a broad range of skills and experience, for their continued commitment and their excellent service and contribution to public transport services in South East Queensland. Together with the TransLink team, we will continue to refine our business to deliver the best possible public transport service for the South-East Queensland community".

The following sections list specific aims that cities have sought to realize through the establishment of a Transport Authority. Of course, these are not just singular aims as a Transport Authority will have numerous uses, impacts and purposes.

What it does demonstrate is that each city has differing and varying needs and have developed suitable institutions to manage those needs and issues.

The source for these examples is: http://www.uitp.org/Public-Transport/organising-authorities/pdf/OA_PDF/3_CaseStudy_OA.pdf

### Transport for London, United Kingdom

Transport for London (TfL) was created in 2000 and is the integrated body responsible for the capital's transport system. Its main role is to implement the mayor's Transport Strategy for London and manage transport services across the capital for which the mayor has responsibility.

TfL is one of the most comprehensive transport authorities in the world, being responsible for both the strategic road network and public transport. TfL also acts as both an authority and a direct operator, depending on the mode of public transport involved.

One of the most obvious outcomes of an Integrated Transport Authority has been a successful policy to promote and invest in public transport achieving a 5% modal shift from car to public transport, walking and cycling. The scale of this shift has not been matched by any other comparable city in the world.

For more information please see: **www.tfl.gov.uk**

### Hamburger Verkehrsverbund GmbH (Hamburg Public Transport Agency Ltd.)

The Hamburger Verkehrsverbund (HVV) was founded in 1965, working for 10 area municipalities (Gebietskörperschaften). It was the first integrating organisation worldwide and sets out to achieve full integration of public transport services irrespective of operator and competent authority, showing "one face to the customer".

It plans all of thel public transport services in the area taking into account other urban policies, a common fare and ticketing system, marketing of the HVV brand and publishing information on all public transport modes.

For more information please see: www.hvv.de

### Dubai Roads and Transport Authority

The RTA will prepare legislation and develop integrated solutions for road systems and land transportation networks that are safe and in line with Dubai's economic development plans and the highest international standards. With rapid economic and demographic development for the last ten years, Dubai expects 4X traffic (expressed in person-trips) by 2020 requiring increased use and access to public transport, active policies to reduce congestion, and improve the urban environment.

To achieve this, the RTA has developed a comprehensive strategic plan (with 2020 as the target year) around the slogan "safe and smooth transport for all" and includes large investment into rail and bus transport, to reach 30% modal share for public transport by 2020.

For more information please see: www.rta.ae

### Västtrafik AB, Göteborg, Sweden

The objective is to improve the local environment by reducing traffic sources and other forms of pollution. Improve the overall quality and accessibility of public transport, as well as its safety record.

To ensure that the objectives are met, two strategies being 1) environmental emissions by setting minimum strict emission standards as part of the technical specification of buses. 2) incentivizing performance with bonuses so bus operators deliver high quality services.

For more information please see: **www.vasttrafik.se**

### Agenzia Mobilità e Ambiente, Milan, Italy

The objective is to develop sustainable mobility and reducing traffic and polluting emissions. It does this with integrated measures to strengthen the position of public transport in the city, such as integration of fares and e-ticketing in public transport, which is closely linked with policies designed to rationalise traffic in the city centre and develop cyclist mobility, and using ICT technologies to support mobility management and control.

# Discussion Paper (Output 1, 1 Annex 1):
# Draft Act for the Urban Transport Authority (UTA)

Capacity Development Project for

the Improvement of Dar es Salaam

Urban Transport (Phase-2)

# Discussion Paper (Volume 1 Annex1)

Draft Act

for the Urban Transport Authority

(UTA)

This paper has been prepared only for internal discussions amongst the designated stakeholders for this project. Discussions can explore ideas and concepts for policy development and need not be limited to current policies of the Government of Tanzania.

Secretariat for the Capacity Building Project

and

JICA Expert Team

# ARRANGEMENT of SECTIONS

# 1 Preliminary Provisions

## *1.1 Short title*

URBAN TRANSPORT AUTHORITY

1.1.1 This Act may be cited as the Urban Transport Authority Act of Tanzania

## *1.2 Interpretation.*

1.2.1 In this Act:

- "Annual report" means the annual the annual report of the authority referred to in section 32
- "Authority" means the urban Transport Authority established under section 3;
- "Board" means the Board of Directors of the authority referred to in section 8;
- Council means the advisory council referred to in Section
- "Chairman" means the chairman of the board of director;
- "Chief Executive Office" means the Chief executive office of the authority appointed under section 14 of this act;
- "Functions" includes powers and duties;
- "Member" means a member of the Authority;
- "Minister" means the Minister for the time being responsible for urban
- "Public passenger vehicle" and "road license" shall have the same meaning respectively as in the Transport Licensing Act;

## *1.3 Urban area*

1.3.1 In this Act: Urban Area comprises:

a) the City area including all municipal within a city,
b) Municipal area
c) Such other areas as may be declared by order, from time to time, by the Minister.

## *1.4 Commencement*

1.4.1 This Act comes into operation on such day or days as may be fixed therefor by order or orders of the Minister, either generally or with reference to any particular purpose or provision, and different days may be so fixed for different purposes and different provisions of this Act.

## *1.5 General power to make regulations*

1.5.1 The Minister or the Authority, as the case may be, may make regulations for:

a) any purpose in relation to which regulations are provided for in this Act, or
b) prescribing any matter or thing referred to in this Act as prescribed or to be prescribed.

1.5.2 A regulation under this section may contain such consequential, supplementary and ancillary provisions as the Minister or the Authority, as the case may be, considers necessary or expedient.

# 2 Establishment and Functions of the Authority

## *2.1 Establishment of Authority*

2.1.1 There stands established on the establishment day a body to be known as the Tanzania Urban Transport Authority and in this Act referred to as the Authority, to perform the functions assigned to it by or under this Act.

2.1.2 The Authority is a body corporate with perpetual succession and a seal and power to sue and be sued in its corporate name and to acquire hold and dispose of land or any other property or any other interest in land or any other property (freehold or leasehold)

2.1.3 The Authority shall, as soon as may be after its establishment, provide itself with a seal, which shall be authenticated by the signature of a Chief Executive Officer of the Authority or of another person authorized by the Authority to act in that behalf

2.1.4 All courts shall take judicial notice of the seal of the Authority and every instrument purporting to be an instrument made by the Authority and to be sealed with its seal (purporting to be authenticated in accordance with *subsection (3)*) shall be received in evidence and be deemed to be such instrument without further proof, until the contrary is shown.

## *2.2 Legal status and capacity of the Authority*

2.2.1 The UTA functions as an independent and autonomous authority with legal power established under this Act for the purposes of strategic policymaking and coordinated planning of urban transport and land-use planning, while delegating implementation and operations to the various executing and operational agencies.

## *2.3 Scope, Jurisdiction and Power of the Authority*

2.3.1 The UTA is fully responsible for efficient and effective provision of urban transport for the city, its scope being:

a) All urban transportation infrastructure and mobility
b) Private and public transport modes
c) Pedestrian and non-motorized transport
d) Urban development policies and land-use planning.

## *2.4 Objective of Authority*

2.4.1 In exercising its functions the Authority shall seek to achieve the following objectives—

a) The development of an integrated transport infrastructure and system which contributes to environmental sustainability and social cohesion and promotes economic progress,
b) To carry out the comprehensive development and maintenance of roads and related infrastructure, inventory of road, transportation network, continuous valuation of road network status
c) to provide enabling environment for orderly and structured development of mass transit system among other by provision of a well-functioning, attractive, integrated and safe public transport system for all users,
d) To ensure overall improvement in traffic flow and planned and programmed traffic engineering and management work
e) To ensure optimal utilization of intermodal means of transportation including rail, road, waterways and non motorized transport
f) As a a) – e), the Authority will assist in poverty reduction/alleviation by increasing economic efficiency through low transport cost and prices and enhancement of employment and social opportunity
g) To ensure Value for money are achieved in implementation.

## *2.5 Functions of the Authority*

2.5.1 DUTA will have the overall functions of:

a) A Strategic Policy, Planning and Coordinating Authority, developing the vision and appropriate policy for the urban transport and city development, to achieve set goals.
b) Conducting long range planning and analysis, with prioritization of long range infrastructure investments
c) Secure investment funding and manage finances.
d) Agree on standards and regulatory guidelines and contract out specific service delivery where required
e) Monitor performance and outcomes
f) Plan and manage the overall transport network to ensure service coverage & service levels
g) Delegate implementation to the implementing agencies
h) Liaison, Communications and Stakeholder management
i) Data collection, oversight and performance measurement

2.5.2 The specific activities and tasks of the Authority shall be to:

a) Develop the Strategic Transport and Land-use Plan (SUTP) for the city, as a ‘live document adaptable to the changing circumstances over time.
b) Plan transport and mobility solutions – promoting the development of an integrated, accessible public transport network, including MRT, BRT and associated public transport modes – with emphasis on intermodal coordination.
c) Promote policies relating to public safety, road safety, equity, non-discrimination and poverty reduction

d) Develop traffic demand measures as part of strategic planning
e) Manage control over funding and financial resources, develop funding and prioritize infrastructure investment plans and budgets in accordance with the SUTP.
f) Ensure all implemented projects are funded and suitably resourced.
g) Be responsible for developing the overall business model for the delivery of public transport to ensure sustainability, approve business plans, licensing and contracting arrangements as well as developing business opportunities for the private sector.
h) Develop and manage service delivery contracts where required, for operations or supply of infrastructure.
i) Collection of statistical data and information on transport, and conduct the necessary research for efficient and effective planning.
j) Planning and development of large projects of roads and traffic infrastructure and oversight of maintenance
k) Planning and overseeing the implementation of appropriate traffic management and control measures
l) Presentation of annual transport action plan and report

## *2.6 Power of the Authority*

2.6.1 The Authority has the power to approve all transport infrastructure and investments in the city and have powers of veto over land use developments and land-use permissions in cases where the social interest is not served in respect of maintaining transport, mobility and access, and where such proposals and development do not comply with, or are not aligned with the SUTP.

2.6.2 In relation to Section 2.6.1 the Authority it is responsible to approve all transport and related urban projects carried out by municipalities and other agencies.

2.6.3 The Authority has the power to enter into contracting arrangements (PPP's) for the supply of transport infrastructure, or the provision of transport services. But it may also delegate such responsibilities to the responsible implementing agencies.

2.6.4 By virtue of its overall responsibility and accountability, the Authority is empowered to:

a) Coordinate between agencies where multiple agencies are concerned, and will guide agencies in the development of their planning and tactical policies to manage implementation and daily operations.
b) Hold agencies accountable for performance, work with them to resolve issues.
c) Where there are gaps in responsibility the Authority can realign responsibilities or establish or recommend new agencies if required.
d) In cases of unresolved performance issues, the authority can pass a motion to reassign the implementation task, or take over the implementing function itself.

2.6.5 The Authority has the power to centralise funding for transport related functions under its own control, to properly coordinate resources under a unified policy and develop financial efficiency. See Section _____

2.6.6 The Minister may, with the consent of the Minister for Finance, by order confer on the Authority additional functions in relation to transport as, from time to time, he or she considers appropriate.

# 3 Governance Arrangements for Authority

## *3.1 Organisation*

3.1.1 The Authority will comprise a Board of Directors, and an executive structure with planning departments.

3.1.2 The planning departments within the executive arm of the Authority will provide research and planning support and technical expertise for the DUTA Board, and also provide oversight and monitoring of performance and outcomes.

3.1.3 The Authority will be fully transparent and accountable in its functions and all deliberations and decisions of the Board will be conducted in an open and democratic manner. All performance reporting will be fully open to public disclosure.

3.1.4 The Authority is designed as a lean, highly capable and efficient organisation to be effective and reduce unnecessary bureaucracy and duplication.

## *3.2 Establishment of the Board of Directors*

3.2.1 There is hereby established a Board of Directors which shall be the governing body of the Authority and shall consist of the heads of the various ministries and agencies involved in urban transport, including municipalities, roads and traffic, police rail, mass transit, and land-use planning, housing and settlements.

3.2.2 The Authority can elect key members of the Board of Directors to form an executive committee, to conduct any business and act on behalf of the DUTA Board during intermediate periods to the extent the authority vested in it by the Board.

3.2.3 The members of the Board shall be paid such remuneration and allowances as shall be set out in their letters of appointment or as may be determined by the Minister, on the advice of the Authority and after consultation with the relevant sector Minister.

3.2.4 Board Members shall retain their membership only for the period they hold office in their respective organisations. Retirement/ transfer to non-eligible positions shall be handled with propriety, and ensuring current work of the Board is properly handed over with due process and all responsibilities are fulfilled. The Chairman can request ongoing attendance for a retiring member for a set period as circumstances require, ensuring smooth transfer to a new Member.

## *3.3 Standing or ad-hoc advisory committees*

3.3.1 The Board of Directors may elect to form technical advisory or representative committees as ad-hoc or special committees for specific, once-only tasks as designated by the Board of Directors. Members appointed to such committees could comprise technical experts and industry representatives to examine specific issues or represent stakeholder viewpoints or provide specialised technical advice where needed.

3.3.2 Each TWG shall appoint a chairperson to represent the group and formal records of meetings shall be kept.

3.3.3 Committee members attend Board meeting by special invitation where required and do not have voting rights. Remuneration of Committee members (if any) is at the discretion of the Board of Directors.

3.3.4 Ad-hoc Committees may be temporary in nature, or have a continued existence, with members replaced from time to time to constitute a group of persons, which through their representations or associations (or by virtue of their specific skills) can advise and contribute to the work of the Authority. Representatives could include transport experts, non-key stakeholders such as representatives from academic institutions, industry associations, special needs groups, community representatives or donor agencies.

## *3.4 Resources necessary for carrying out the functions of the Authority*

3.4.1 The Authority is responsible to establish its own premises, facilities, equipment, services or other resources, in consultation with the relevant ministry.

3.4.2 The Authority shall be liable for acquisition and operational costs of property lease, staffing, equipment, services or other resources under its control and management.

3.4.3 Where the ministry makes available to the Authority any officer of the Minister, that officer remains an officer of the Minister and shall not be considered to be a member of the staff of the Authority.

## *3.5 Ministerial policy directions and guidelines*

3.5.1 The Minister may, from time to time, give policy directions or guidelines in writing to the Authority regarding any of its functions under this Act. The Authority shall comply with any such direction in the performance of its functions.

3.5.2 The Authority shall, on receipt of a request from the Minister, provide:

a) Advice relating to its functional area of responsibility
b) Research and technical assistance to inform policy-making
c) Performance data and reports of transport outcomes.

3.5.3 Where the Authority provides extended services (including services of staff) to a local government authority or other persons on agreed terms and conditions (including payment for such services) it may fix, require, take and recover such charges as it thinks fit for services provided by it.

## *3.6 Appointment of Chairman of the Board of Directors*

3.6.1 The Chairman of the Board of Directors shall be a presidential nominee, being a person a respected person, held in high esteem, and capable of providing leadership and guidance to develop a vision/policy direction, supported by consultation and collaboration with

stakeholders.

3.6.2 The Chairman will act as a proponent and sponsor of some major project initiatives to create momentum and demonstrate action, actively creating publicity and communications to harness public support, engendering cooperation and support for the implementation of 'on-ground' actions.

3.6.3 The Chairman will work actively with implementing agencies to resolve issues of conflict and disharmony where they occur.

3.6.4 Add possible section on terms and remuneration or status of Chairman

## *3.7 Appointment of the Executive Director (or Chief Executive Officer?)*

3.7.1 The Executive Director position for the Authority:

a) shall be shall be advertised and appointed through a merit-based recruitment process in accordance with standard executive level appointments procedures for public office and with final approval for appointment by the President.
b) may be removed from office at any time for stated reasons by the Authority, with the consent of the Minister.
c) The Executive Director shall hold office for such term and upon and subject to such terms and conditions (including terms and conditions relating to remuneration and allowances for expenses) as may be determined by the Authority with the consent of the Minister given with the approval of the Minister for Finance.

3.7.2 The Executive Director shall carry on and manage, and control generally, the staff, administration and business of the Authority and perform such other functions (if any) as may be determined by the Authority.

3.7.3 The Executive Director shall not hold any other office or position without the consent of the Authority.

3.7.4 Where a competition to appoint an Executive Director is held prior to the establishment day the successful candidate may be appointed by the Minister as the Executive Director designate of the Authority.

3.7.5 Notwithstanding *subsection 3.7.4* the Executive Director designate shall be appointed Executive Director on the establishment of the Authority.

3.7.6 The Executive Director shall provide the Authority with such information, including financial information, in relation to the performance of his or her functions as the Authority may from time to time require.

3.7.7 The functions of the Executive Director may be performed in his or her absence or when the position of Executive Director is vacant by such member of the staff of the Authority as may from time to time be designated for that purpose by the Authority.

## *3.8 Appointment of Executive level staff*

3.8.1 The Authority may appoint such, and such number of, persons to be members of the staff of the Authority as it may determine with the approval of the Minister and the Minister for Finance.

3.8.2 Recruitment for executive level positions and staff of planning units shall be merit-based to secure the services of skilled persons, expert in their field of expertise.

3.8.3 A member of the staff of the Authority (other than the chief executive) shall—

d) be paid such remuneration (including allowances for expenses) on competitive rates, reflective of the skills and experience the candidate offers to the position, as the Authority may determine with the approval of the Minister and the Minister for Finance, and
e) hold his or her office or employment on such other terms and conditions as the Authority may determine.

3.8.4 The categories of the staff of the Authority and the numbers of staff in each category shall be determined by the Authority.

3.8.5 Officers of the Minister may be seconded to the Authority, at its request and at the discretion of the Minister, for a period not exceeding 2 years.

3.8.6 The Authority may at any time remove any member of the staff of the Authority from being a member of its staff where that person fails to perform his or her functions satisfactorily.

3.8.7 No action or other proceedings shall lie or be maintainable (except in the case of wilful neglect or default) against any member of the staff of the Authority arising from a failure to perform or to comply with any of the functions conferred on the Authority by this Act.

## *3.9 Superannuation for staff of Authority.*

3.9.1 The Authority shall prepare and submit to the Minister a scheme or schemes for the granting of superannuation benefits to or in respect of such members of the staff of the Authority as it may think fit.

3.9.2 Every such scheme shall fix the time and conditions of retirement for all persons to or in respect of whom superannuation benefits are payable under the scheme and different times and conditions may be fixed in respect of different classes of persons.

3.9.3 Every such scheme may be amended or revoked by a subsequent scheme prepared, submitted and approved under this section.

3.9.4 A scheme submitted to the Minister under this section shall, if approved of by the Minister, with the consent of the Minister for Finance, be carried out by the Authority in accordance with its terms.

3.9.5 A scheme made under this section shall make provision for appeals.

3.9.6 No superannuation benefits shall be granted by the Authority nor shall any other arrangements be entered into by the Authority for the provision of such benefit to a member

of the staff of the Authority, otherwise than in accordance with a scheme under this section, or otherwise as may be approved of by the Minister, with the consent of the Minister for Finance.

# 4 Financial

## *4.1 The power of the Authority for funding and financial management*

4.1.1 The Authority shall have control over its funding and financial resources to be able to manage investment priorities under its unified policies.

4.1.2 The authority has the power to manage financial /price instruments (such as fees, levies and charges) to raise revenue and to influence demand behaviour (e.g. parking fees/ congestion charging, cross subsidy etc.).

4.1.3 The Authority, with the approval of the Minister of Finance will have the power to implement and enforce policies on the various duties and taxes levied on motor vehicle imports; car registration and road use (tolls) and parking fees, aimed at managing the growth and use of motor vehicles in the city and will work in harmony with the TRA.

4.1.4 Where agencies collect their own revenues to support their own operations, such mechanisms can be maintained, although the Authority has the power to vary such revenue collection levies and taxes in accordance with the plans and policies agreed by the Authority.

4.1.5 At the establishment of the Authority, the LGA's and other Implementing Agencies will cease to make independent funding applications for transport-related works. Where LGA projects are not under the scope of the Authority; and may impact on transport matters, the LGA's shall obtain approval or 'no-objection' letter from the Authority.

4.1.6 At the establishment of the Authority, transitional arrangements may be implemented to transfer full financial powers to the Authority over time, in order to build its capacity for the task and establishes its presence in the policymaking arena.

4.1.7 During such a transition period The Authority has the power to approve all infrastructure investments relating to transport and mobility. This will allow the Authority to begin to exercise its governance responsibilities in the short term.

4.1.8 Under this Act, the Authority has the power to develop the functions of an investment/ infrastructure bank to raise and manage funds to support investments in infrastructure.

## *4.2 Funds of the Authority*

4.2.1 The funds of the Authority shall consist of money:

a) Being such fee or budget support funds as may be paid to it;
b) Being grants or loans subject to the approval of the Minister
c) Money borrowed *subject to section 4.2* by the Authority

for the purpose of meeting any of its obligation and performing its functions.

## *4.3 Borrowings by Authority*

4.3.1 The Authority may borrow sums required by it for meeting any of its obligations or performing its functions.

4.3.2 The power of the Authority to borrow shall be exercisable only with the approval of the Minister after consultation with the Minister responsible for finance as to the amount, as to the sources of borrowing and as to the terms on which the borrowing may be effected; and an approval given in any respect for the purposes of this subsection may be either general or limited to a particular borrowing or otherwise and shall be subject to such conditions as the Minister responsible for finance may stipulate.

## *4.4 Account Audit and Annual report*

4.4.1 The Authority shall keep accounts and records of its transactions and affairs and shall ensure that all moneys received are properly and brought to account and all payments out of its moneys are correctly made and properly authorized and adequate control is maintained over its property and over the incurring of liability authority.

4.4.2 The annual accounts of the Authority shall be audited by a competent and qualified auditor appointed by the Minister.

4.4.3 The Chief Executive officer shall, within three months after the end of each financial year submit to the Minister and the Board an annual report in respect of that year, containing:

a) financial statements;
b) performance indicators and any other related information;
c) a report on the operations of the Authority; and
d) such other information as the Board may, before or after the completion of the annual report, direct.

## *4.5 Quarterly report*

4.5.1 The Chief Executive Officer shall after the end of every three months submit to the Minister a report containing:

a) financial statements;
b) performance indicators and any other related information;
c) the operations of the authority; and
d) such other information as the Board may deem proper.

## *4.6 Internal Audit*

4.6.1 The Head of Internal Audit shall in addition to any other functions assigned to him by the Board or the Chief Executive be responsible for the internal audit of the Authority's accounts and shall submit to the Commissioner General a report in respect of every three months of a financial year.

4.6.2 The Chief Executive officer shall submit the report referred to in subsection (1) to the Board for its consideration at the next meeting of the Board and shall provide a copy of the report to the Minister and the Auditor-General

# Discussion Paper (Output1, Annex 2):
# Summary of DUTA Stakeholder Meetings

Capacity Development Project for

the Improvement of Dar es Salaam

Urban Transport (Phase-2)

# Discussion Paper (Volume 1 Annex 2)

## Summary of DUTA Stakeholder Meetings

This paper has been prepared only for internal discussions amongst the designated stakeholders for this project. Discussions can explore ideas and concepts for policy development and need not be limited to current policies of the Government of Tanzania.

Secretariat for the Capacity Building Project

and

JICA Expert Team

## CONTENTS

## Definition of Terms

Board: Board of Directors (DUTA)

BRT: Bus Rapid Transit

DART: Dar es Salaam Rapid Transit Agency

DARCOBOA: Dar es Salaam Commuter Bus Owners Association

DCC: Dar es Salaam City Council

DSM-RS: Dar es Salaam Regional Secretary Office

DUTA: Dar es Salaam Urban Transport Authority

JICA: Japan International Cooperation Agency

LGA: Local Government Authority (Municipalities)

MOF (or MOFP): Ministry of Finance and Planning

MOLHHSD: Ministry of Lands Human and Housing Settlements Development

MOT: (Former) Ministry of Transport

MOW: (Former) Ministry of Works

MOWTC: Ministry of Works, Transport and Communication

NMT: Non-motorized transport

PO-RALG: President's Office, Regional and Local Government

PPP: Public Private Partnership

RCC: Regional Coordination Committee

RFB: Road Funds Board

RRB: Regional Road Board

SUMATRA: Surface and Marine Transport Regulatory Authority

SUTP: Strategic Urban Transport Policy

TANROADS: Tanzanian National Roads Agency

TARURA: Tanzanian rural and Urban Roads agency

TEMESA: Tanzanian Electrical, Mechanical and Services Agency

TPA: Tanzania Ports Authority

TRL: Tanzanian Rail Limited

The term 'executing agency' and 'implementing' agency or 'relevant' agency are interchangeable and carry the same meaning.

# 1. First Stakeholder Meeting (21 August 2015)

**The following brief report was prepared and presented during the 2nd JCC meeting where the original concept note prepared by PO-RALG was discussed and recommended to incorporate comments from the stakeholders.**

## Re. A BRIEF REPORT ON THE WORK OF SORTING OUT COMMENTS FROM STAKE HOLDERS ON ESTABLISHMENT OF DUTA/UTA.

### 1.0 INRTODUCTION

The Parmanent Secretary, Prime Minister's Office - Regional Administration and Local Government invited Engineers from Dar Es Salaam Regional Secretariat, Dar Es Salaam City Council and Engineers from the three Municipal Council in Dar Es Salaam to join a team at PMO-RALG Head Quarters – Dodoma to sort out comments from various stake holders on establishment of DUTA.

### 2.0 TEAM COMPOSITION

The team composed of 6 members:

1. Vincent C. Lwanda – Engineer – PMO RAL G – Chairman
2. Swalehe M. Nyenye – Engineer – DSM City Council – Secretary
3. Ismail Mafita – Engineer – Kinondoni Municipal Council – Member
4. Josephat H. Shehemba – Engineer – DSM Regional Secretariat - Member
5. Protas G. Kawishe – Engineer – Temeke Municipal Council – Member
6. Victor Mwinyipembe – PMO RALG – Member
7. James E. Mapunda – Town Planner – PMO RALG - Member

### 3.0 SCOPE OF WORK

The team was required to sort out comments from various stake holders who contributed their ideas through written comments which were received by PMO-RALG on establishment of DUTA. However, during sorting out of the comments the team noted that comments were not bound to DUTA but also UTA.

### 4.0 COMMENTS

In organizing collected comments, the team used the matrix proposed by Minister's Cabinet Secretariat their sorting. Generally, the Matrix aimed at Identifying (naming) the stake holder, knowing an issue related to the comment, the stake holders comment and PMO-RALG recommendation/standpoint. The matrix is given as an ***Appendix A.***

### 5.0 CONCLUSION.

Out of 10 stake holders who submitted their comments, 8 support establishment of DUTA/UTA with various accompanying recommendations whereas 2 support establisment of DUTA only but not UTA.

Vincent C. Lwanda
Engineer PMO-RALG.

*Appendix A*

**STAKEHOLDERS' COMMENTS ON THE ESTABLISHMENT OF URBAN TRANSPORT AUTHORITY (UTA)**

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| 1. | Ministry of Works (MoW) | 1. More studies should be done on UTA establishment | • To identify appropriate solution to deal with transport situation in our cities. | • Several studies have been conducted including: feasibility study on establishment of DUTA, DSM Transport and System Development Master Plan 2008 by JICA, Institutional Strengthening of Dar es Salaam Local Authorities by INNOVEX and studies tours to Addis Ababa and Lagos. The studies suggests establishment of UTAs as an appropriate solution. |
| | | | • Authority to deal with mass transit (not only roads) is required. | • The study conducted by JICA has taken into consideration of mass transit. UTAs will lias with TEMESA and Railway to improve and develop marine and railways services. |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | 2. Establishment of UTA/DUTA | • Consideration should be given on DUTA as a bases for establishment of similar authorities in other cities. | • The Act will be of national level. City which qualify for establishment of such Authority will be gazzetted. |
| | | | • UTA establishment at later stage is appropriate. | • The comment has been considered, if the need arise UTA will be established after establishment of the Local Urban Transport Authorities (UTAs). |
| | | 3. Source of fund | • Should be clearly defined | • Sources of fund will be user fees and charges as will be described in the Urban Transport Act. |
| | | 4. Organization structure | • DUTA and BRT is existing. | • The Organization Structure may be restructured after establishment of DUTA BRT will be under DUTA |
| | | | • Urban Rail and Ferries are mentioned but not reflected in the document. | • The DUTA will promote the railway and marine severces liason with TEMESA, RAHACOL and TRL |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | 5. Relationship between agencies. | • DUTA and DART is not mentioned in the document | • DART deals with BRT that will be uder DUTA after the transformation by PMO-RALG. |
| | | **AGREE/DISAGREE** | • AGREE ON ESTABLISHMENT OF DUTA | • Will work on it |
| 2. | Ministry of Transport (MoT) and Surface and Marine Transport Authority (SUMATRA) | 1. **Legal issues** | • SUMATRA is a statutory established body as per section 5 of Act No. 9 of 2001. | • Before the establishment of UTA, there must be a reconciliation between Institutions and Laws that seem to have conflicts.<br>• Enactment of new laws shall cause ammendments to other related laws. |
| | | | • Equal powers, functions and duties of two authorities provided under sections 7 & 8 of Proposed UTA Act 2013, and sections 5 & 6 of SUMATRA Act No. 9 of 2001 will create skirmishing discharge of duties. | |
| | | | • Duplication of Acts Examples:-<br>▪ Part II of Both SUMATRA Act No. 9 of 2001 and Propossed UTA Act, 2013, Part III of SUMATRA and Part V of UTA, Parts VI of both SUMATRA and UTA, Part VIII of SUMATRA and Part VII of UTA. | |
| | | 2. UTA as a sustainable solution to transport | • Doubt of UTA strategies as they are coppied from that of SUMATRA. | • No any function will be same with SUMATRA. |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | problems in Tanzania cities. | • Urban Transport Planning is a paramaount duty vested to LGA and TANROADS hence transfer of functionl duties (Transport Planning) from LGA to an Authority which its primary focus on cities only will cause more confusion than reality on all conceptual idea of establishing UTA. | • This proposal comes due to poor performance and condition of the city. The study carried out shows that independent instution will improve performance. Even Nation Transport Policy states it. |
| | | | • UTA establishment will increase multiplicity of agencies dealing with transport sector. | • UTA will take over transport activity of LGAs. It just shift the function. |
| | | | • Each city (Arusha, Mwanza, Tanga, Mbeya & Dodoma) should have an Executive Agency like DART. | • DART deals with only BRT even in DSM there are specific routes under DART. UTAs will deal with transport sector in all urban authorities. |
| | | | • Establishment of special coordination board to perform coordination activities at urban level. | • The Regional Secretariat has vested the function of coordination. |
| | | | • Regulatory functions should continue to be vested to SUMATRA. | • UTA will not be regulatory authority, this function remains to SUMATRA. |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | | • More study should be done on UTA establishment to cover all parts of cities and not only selected urban parts. | • UTA will established in all Urban Authorities. |
| | | | • Several studies have been neglected with regards to UTA establishmnet | • All studies available were utilized during preparation and will continue to improve accordingly. |
| | | ▪ **Agree/Disagree** | • DISAGREE ON ESTABLISHMENT OF UTA/DUTA | • Thes comment is not accepted MoT should go to Nation Transport Policy. And see what statement of Urban Transprt**.** |
| 3. | **National Institute of Transport (NIT)** | 1. **Responsibilities** | • UTA should be resonsible for planning and managing public transport activities where as SUMATRA should regulate them. | • The coment has been considered. |
| | | | • Success examples of Lagos Metropolitan Transport Authority (LAMATA) should be given. | • Model of UTA involved the example of LAMATA, Addis Ababa Transport Authority and other city |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | | • Option for UTA is the best but regulation responsibilty should be removed in order to enhance control. | • Comment observed. |
| | | 2. **Mission and Vision** | • Vision is writen like a Mission therefore their statements should be combined. | • Comment observed. |
| | | 3. **UTA administration and organisation structure.** | • At Leve 1: - Central Level UTA should not be included only the Ministrial Advisory Board should be included. | • Comment observed, however a specific responsible division for urban infrastructure is in place at PMO-RALG |
| | | | • Instead of Accounting, there should be "Finance and Administration" to deal with Finance, Accounting, Human Resources and Administration activities. | • Comment observed. |
| | | 4. **Role and Functions of UTA** | • Environmental Issues should be added as item (n) *"To ensure transport activities and infrastructure are environmentally friendly and sustainable"*. | • Comment observed. |
| | | | • Modes of Transport:- Air Transport mode should be included to the roles and functions of UTA. | • Comment observed. |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | 5. **DUTA Structure** | • The Chief Executive should be a Director instead of Manager. | • Comment observed. |
| | | | • There should be a Chief of Finance and Administration instead of Chief Accountant. | • Comment observed. |
| | | 6. **Sources of Funds** | • Fare collection and service charges should be added. | • Comment observed. |
| | | ▪ **Agree/Disagree** | • AGREE ON ESTABLISHMENT OF UTA/DUTA | • Agreed |
| 4. | **Dar Rapid Transit (DART) Agency** | 1. **Options for establishment of UTA** | • Option No. I not relevant since all implementation nowadays is done through private contractors | • Option 1 makes one body responsible for Transport issue within its jurisdiction area and most of outcome will be resolved within. Constructions will be contracted according to Public Procurement Act. |
| | | 2. **Sources of Funds** | • Should be financed from local resources | • Comment observed. UTAs will also be financed by Central Government, donors and develop partiners. |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | | • No quantification of financial needs for UTA | • Financial need will be established. |
| | | | • These sources should not be sources of fund for local UTAs: fuel levy, vehicle taxation and liceces, parking charges, traffic fines, transport licences | • These sources are fees and charges from road users, some of it should be used for development and maintanance of transport sector. |
| | | | • Alternative sources proposed: road pricing and congestion, property taxes, and public-private partnerships. | • Except property taxes, other sources will be considered. |
| | | 3. **Role and Functions of UTA** | • Central UTA should not be an implementing entity rather than assisting in the creation of local UTAs, channeling of Central Government funding, dissemination of information, advisory services, coordination with other central Government bodies, etc. | • For the time being Central UTA will not be established unless there is a demand from Local UTAs. Ministry responsible for Local Authoruties will continue to support and coordinate UTAs. |
| | | | • Paving all urban roads should be given a high priority. | • Comment considered. Priority to paving urban roads will be given. |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | 4. **Relationships with other authorities** | • DART should cooperatively work close with DUTA. | • Comment considered. DART will be under DUTA |
| | | | • DART to be represented in the board of director of DUTA. | • Comment considered. DART will be under DUTA |
| | | 5. **Legislation** | • Functions of the central and local UTAs clearly be defined. | • Functions of Local UTAs are clearly defined, there will be no central UTA |
| | | | • For direct operational mode of UTA, many existing Laws will have to be revised hence establishment of the so called super ministry UTA seems to take a long time and remains to be a difficult undertaking. | • There will be no super ministry UTA. |
| | | 6. **AGREE/DISAGREE** | DART agrees establishment of UTA under coordination operating mode (Mode C) | • Comment observed. |
| 5. | **Dar Es Salaam Traffic Police Zone** | **1. Safety** | • Should consider Laws and enforcement to restrict public transport operators on carrying excessive passengers | • Comment considered. |
| | | | • Segragated right of ways to consider safety of different road users (non-motorised transport). | • Comment observed. |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | **2. Institutional capacity** | • UTA to be fully capacitated to deal with urban transport problems. | • Comment observed. |
| | | **3. AGREE/DISAGREE** | • Police Traffic Zone (DSM) AGREES the establishment of UTA due to its usefulness to traffic problems in the city. | • Comment observed |
| 6. | **Dar Es Salaam City Council (DCC)** | **1. Role and Functions of UTA** | • Dublication and Overlapping mandates of LGAs, TANROADS, and SUMATRA will create institutional frictions. | • Functions of UTAs will clearly be defined to avoid dublications |
| | | **2. Governance** | • Mode A has high chance of being not transparent and poor performance as it is accountable to it self. | • Multiple actors will be involved under this Mode A to ensure accountability and high performance. |
| | | 3. More studies should be done on UTA establishment | • To analyze and evaluate the options for choosing the best option. | • Several studies have been conducted including: feasibility study on establishment of DUTA, DSM Transport and System Development Master Plan 2008 by JICA, Institutional Strengthening of Dar es Salaam Local Authorities by INNOVEX and studies tours to Addis Ababa and Lagos. |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | | | The studies suggests establishment of UTAs as an appropriate solution. |
| | | 4. Institutional establishment | • DUTA should be implemented first because of existing supporting studies (Dar Es Salaam Transport Policy and System Development master Plan, JICA 2008) | • Comment considered. |
| | | 5. DUTA administration and organisation structure. | • DUTA manager to report to Dar es Salaam City Council management instead of DUTA advisory board. | • DUTA will be a legal entity with its reporting system and formal relatioship with other institutions. |
| | | | • Each LGA in Dar es Salaam should establish a dedicated department to handle urban transport issues. | • Urban transport issues in LGAs will be shifted to DUTA |
| | | | • Dar es Salaam City Council should be capacitated to offer effective transport planning and management coordination roles. | • Transport planning and management cordination issues will be vested to DUTA |
| | | 6. AGREE/DISAGREE | • DCC AGREES establishment of UTA under Option 3. | • |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| 7. | **Kinondoni Municipal Council (KMC)** | 1. Roles and Function of UTA | • Land use and transport planning to be an intergral component of UTA. | • Comment observed |
| | | 2. Relationships with other Authorities | • The UTA concept paper has not addressed the relationship with other Utility Service Providers such as TTCL, TANESCO, DAWASCO etc to intergrate their development plan with land use and transport planning. | • Comment observed. Utility angecies and other key stakeholders will be involved |
| | | | • Other authorities like TEMESA, TRL and RAHCO are not mentioned in the UTA concept paper for intergrating their functions. | • Comment observed. Key authorities will be involved and intergrated in planning |
| | | **3. Legal issues** | • Empower UTA with the following legislations; Street Works Act, Parking Place Act, Rapid Transit Systems Act, Road Traffic Act and other legal responsibilities regarding Urban Transportation Services | • Comment observed. |
| | | **4. Institutional establishment** | • No single instituon modal fits all situation, the right modal will depend on the political and administrative ethos. | • UTAs will have their own strategies to suit local environment. According to studies conducted, Option 1 |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | | | is suitable for Dar es Salaam City |
| | | | • Urban Transport Instituons will take time to evolve. The ideal may not result at the time of establishment, patience is needed for expectations and possibilities to allign adequately. | • Comment observed |
| | | | • UTA needs decision making authority on financial resources. | • UTAs will have their advisory boards at local level for decision making |
| | | | • UTA must secure political will. | • Comment observed |
| | | ▪ **AGREE/DISAGREE** | • KMC AGREES establishment of UTA under Option A. | • Comment observed |
| 8. | **Ilala Municipal Council (IMC)** | **1. Roles and Function of UTA** | • Urban transport planning and management is proposed to be under LGA. | • Transport planning and management roles will be shifted to DUTA/UTAs and that the institutions will work cooperatively with LGAs |
| | | | • Urban transport planning and management can be more ministerial advisory board. | • Transport planning and management issues wii be done by local UTAs. The Ministry responsible for |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| | | | | Local Authorities will advice, support and coordinate them. |
| | | **2. More studies should be done on UTA establishment** | • More studies are required to provide the required level of analysis and late on to evaluate the various options in order to imrpove more according to the needs. | • Several studies have been conducted including: feasibility study on establishment of DUTA, DSM Transport and System Development Master Plan 2008 by JICA, Institutional Strengthening of Dar es Salaam Local Authorities by INNOVEX and studies tours to Addis Ababa and Lagos. The studies suggests establishment of UTAs as an appropriate solution. |
| | | **3. Legal issues** | • The basis of any Authority is the Laws establishing it. Review of total organization structure is required to avoid interference in the execution of works. | • Laws will be reconcilled. |
| | | ▪ **AGREE/DISAGREE** | • IMC AGREES establishment of UTA by following all procedures required. | • Comments observed |

| SN. | NAME OF STAKEHOLDER | ISSUE | COMMENTS FROM THE STAKEHOLDER | PMORALG - OPINIONS |
|---|---|---|---|---|
| 9. | **Temeke Municipal Council (TMC)** | **1. Role and Functions of UTA** | • DUTA as coordinating authority will carry full responsibility for outcomes collectively it shoulders tasks of policy making, deligation and monitoring progress. | • Policy making is the responsibility of Ministry. DUTA will be implementor |
| | | **2. Institutional establishment** | • PMORALG to establish a coordinating authority (Which is easier to implement) | • Coordination roles is the responsibility of Ministry and Regional Secretariats |
| | | ▪ | • National UTA is supported. | • Currently National/Central UTA will not be established. Ministry responsible for local authorities will coordinate |
| | | **3. UTA administration and organisation structure.** | • Ministirial Advisory Board (MAB) members be included in each board of management of the local UTA so as to be familiar with local issues and challenges. | • Comment observed |
| | | **4. Sources of Funds** | • Outline in the legislation the financing mechanism available for DUTA to support its policies, and support the implementing agencies in the execution and service delivery. | • Financing mechanism will be outlined in the legislation. |
| ▪ | | ▪ **Agree/Disagree** | • AGREE ON ESTABLISHMENT OF DUTA and UTA | • Comment observed |

## 2. Second Stakeholder Meeting (27 September 2016)

**The following brief note was prepared after the 3rd JCC meeting where the ownership of DUTA was suggested to shift from PO-RALG to MOWTC.**

**Background of DUTA**

The Dar es Salaam Transport Authority (DUTA) was first proposed in the **2008 JICA Transport Master Plan** to provide the institutional framework for improved coordination of the transport sector. The **National Transport Policy (2003)** called for institutional reform, as a *"fundamental requirement"* to solve the *"lack of effective coordination of the various components of the transport system"* which has led to the deterioration and poor performance of the sector.

Presently multiple agencies (at least 8) have various responsibilities for transport but there is little or no coordination between them, and there is no coherent or unified urban transport policy. A disconnect between policy and implementation, fragmented decision-making, unclear responsibility and ad-hoc planning and funding underlines the need for institutional body such as DUTA to improve management of the transport sector.

Furthermore, Dar es Salaam faces severe urban transport and mobility challenges now and into the future, with rapidly increasing traffic congestion, which has a direct cost to the city well in excess of $200M p.a. Inaction or inadequate response will have dire consequences for the future liveability, quality of life, health and sustainability of the city, as on present growth rates, population is expected to double in 10 years and motor vehicle ownership will double every 5 years.

To meet the challenge will require a considerable investment into the public transport network, selected road and infrastructure improvements, and a more effective institutional structure. Particularly a strategic, coordinated and integrated transport and land-use policy and planning policy is required, which is a key responsibility for the proposed DUTA.

**The present status of DUTA discussion and consultation**

Since 2008 after numerous DUTA design proposals, and extensive consultations and input from stakeholders, there is now a broad consensus and strong support for the DUTA concept as proposed in the attached Revised DUTA Concept Note.

Now is the time to gain PS/Ministerial approval which has raised a question on where to place DUTA; to determine which ministry should have 'ownership' and be responsible for its establishment. The question is:

- Should DUTA be established under the under the MOWTC who holds the main responsibility for transport? or,
- the PO-RALG-which has developed the DUTA concept since inception - and carries responsibility for local and regional government?

Based on the first argument it is deemed that the decision is one for the Minister of the MOWTC, and this Ministerial Brief examines the issues and provides guidance and recommendations to resolve this question.

**What is DUTA? -its overall role and function**

DUTA is established as an independent and autonomous authority with legal power established under its own special legislation for the purposes of **strategic policymaking and coordinated planning of urban transport in Dar es Salaam**. The supporting legislation will be generic so other cities can establish their own UTA's.

DUTA will act as an 'apex' umbrella organisation with a Board of Management which is fully inclusive of all key stakeholders. The organisation will also include an Executive Level with

specialised planning units to provide technical support to the Board (research & planning) and also oversight and monitoring of service delivery and performance.

The Executive Planning departments are:

1. Policy & Planning, Land use and Environment and Development Coordination
2. Mass Transit and NMT
3. Roads, Traffic and Motor Vehicles
4. Finance and Administration

At the **strategic level** responsibility for DUTA includes:

- The efficient and effective provision of urban transport and mobility solutions for Dar es Salaam;
- Coordination of urban transport infrastructure investment, harmonising transport and land-use development and ensuring the cost efficiency and effectiveness of these developments.
- Monitoring of service performance and outcomes and addressing and failure in performance.

The scope of DUTA's responsibility and jurisdiction includes all modes of transport (public and private) with the management of roads and traffic, bus and rail networks, ferry services, land-use and town planning and funding for transport related infrastructure.

DUTA however is not an implementing agency; it will delegate implementation to the responsible agencies and will carries responsibility for oversight and performance measurement.

DUTA is **fully responsible and accountable** by virtue of its participatory structure (no blame shifting) and is therefore fully capable to address the transport and mobility challenges of the city.

With DUTA's strategic policy and planning oversight the tactical and operational responsibilities are devolved to implementing agencies and transport operators who deliver services.

It is essential to note however that the ministerial chain of command is not affected with the introduction of DUTA. DUTA, while being a strong and capable authority serves as a bridge between ministries for the purpose of unified policy, planning and coordination.

**Where DUTA fits into the transport organisation**

Attachment 1 shows the organisational layout for transport-related institutions both present and future with the proposed DUTA. Critically, DUTA will support and strengthen DCC (future DAR METROPOLITAN) as both these bodies work in the urban space of the city. The role of SUMATRA is also fully preserved as the transport regulator.

**Which ministry should be responsible for DUTA?**

DUTA has a wide range of function covering transport and mobility, land use planning, transport investment, and local governance with an essential coordinating and oversight role. To illustrate, the fourteen nominated Board members represent a range of ministries and agencies across the whole spectrum of governance. So it is not easily compartmentalised into a single ministry.

On one hand, because DUTA is a transport authority planning transport and its investments in Dar es Salaam, and is a key instrument to implement the National Transport Policy, it would seem appropriate to place it under the MOWTC.

On the other hand, given that the **coordination of urban transport** is a key instrument of the PO-RALG and the PO-RALG has a prime responsibility for local and regional government, it is reasonable and justifiifibale to argue that ownership of DUTA should rest with the PO-RALG.

To evaluate the options and develop a recommendation, requires a closer look at actual DUTA functions to see how they align with the respective instruments of each Ministry. The functions

of DUTA are listed in the table below, and alongside each function is aligned to ministerial responsibilities and their respective instruments.

| Function of DUTA | Relevance to the respective ministry |
|---|---|
| 1. Develop Strategic Transport and Land-use Plan for Dar es Salaam (SUTP)<br><br>*The SUTP is the platform upon which decisions are made, priority projects established and investment programs developed. It is a 'live' document adaptable to changing circumstances. Performance benchmarks are measurable and reportable.* | DUTA is a key institution to implement the urban transport policies for Dar es Salaam that are in the National Transport Policy developed by the MOT. This however is a high level guidance as the local SUTP policy is crafted at a very local level, therefore the PO-RALG is the more applicable ministry for this function. |
| 2. Plan Transport and Mobility solutions<br><br>*At the local level DUTA will identify demand, bottlenecks, and options to produce concrete solutions for improve transport and mobility. Customer service delivery and sustainability is its driving aim.* | Guided by the SUTP, local conditions will inform the transport and mobility solutions which is in the span of governance exercised by LGA's and DSM Tanroads. Coordinating these activities is a function of the PO-RALG. SUMATRA, a DUTA Board member is the MOT's arm to regulate transport at local level so service delivery and performance standards are upheld. |
| 3. Plan and prioritize infrastructure investment, and secure funding<br><br>*DUTA will plan and prioritise infrastructure investments and urban development plans, develop investment plans and budgets, with funding proposals to secure funds. These plans will be developed in accordance with the SUTP.* | Based on the plans and solutions developed above, investment plans are developed with the LGA's which is within the scope of local government responsibilities. PO-RALG is the key ministry overseeing this area.<br><br>TANROADS DSM, representing the MOT is a DUTA Board member. |
| 4. Control and mobilise funding for transport investments<br><br>*For DUTA to be effective and be able to implement its policies, requires it to have control over funding and financial resources, either through approval of* | Ultimately, as DUTA develops capacity, the present funding streams can be channelled through DUTA. This has no implications on the issue of ministerial responsibility.<br><br>However, DUTA will have the ability to develop its own sources of funds such as |

| | |
|---|---|
| *disbursements or funding being channelled through DUTA.* | from increases in parking charges or implementing a congestion charge. This requires greater local coordination which is more relevant to PO-RALG responsibilities. |
| 5. Approve all transport infrastructure and investments in Dar es Salaam<br><br>*DUTA will have powers of veto over land use developments and land-use permissions in cases where the social interest is not served in respect of maintaining transport, mobility and access, and where such proposals and development do not comply with, or are not aligned with the SUTP. It will approve all transport and related urban projects carried out by LGAs and agencies.* | Ad-hoc project planning is a major detrimental factor in the city's performance and future sustainability. A very important function of DUTA is to develop a cohesive and efficient plan, and it has the power over LGA's to approve any design or development affecting transport and mobility. Here once again, the PO-RALG is the ministry with the instruments to support this important DUTA function. |
| 6. Delegate implementation, monitor progress and measure performance<br><br>*DUTA will ensure all implemented projects are funded and suitably resourced. By virtue of its full responsibility, DUTA can hold agencies accountable for performance, work with them to resolve issues, and take over or reassign responsibilities as required to achieve its aims and objectives* | This function is closely aligned with the implementing agencies, largely represented by LGA's DART and regional players, all under the scope of the PO-RALG. |
| 7. Realign responsibilities, activities and tasks<br><br>Where there are gaps in responsibility DUTA can realign responsibilities or establish or recommend new agencies if required | This is an issue within the domain of local responsibilities under the span of PO-RALG management. |

**Recommendation**

Based on the assessment above, the MOT has a high level influence on the Strategic Urban Transport Plan while the PO-RALG appears to be largely responsible for developing the local plan, and managing the downstream functions. It is therefore justifiable to recommend the PO-RALG as the responsible ministry to establish and oversee DUTA. The current role of the Regional Commissioner is also very adaptable to becoming the Chairman of the DUTA Board, especially as DUTA will take over the main coordination role of the RRB.

Under such an arrangement the MOT role is not marginal or minimised, as it is predominantly concerned with transport and execution of the National Transport policy. In this regard, the MOWTC can delegate the responsibility and execution for particular aspects of its mandate to DUTA.

# 3. Third Stakeholder Meeting (26 September 2017)

**The following brief report was prepared and presented during the third stakeholder meeting held at MOWTC where the revised concept note prepared by JICA Expert Team/PO-RALG was discussed and recommended to incorporate comments from the stakeholders, particularly those made by SUMATRA.**

We thank SUMATRA for their comments in the letter to the PS/ MOWTC dated 15/9/2017, and following discussions with SUMATRA we are pleased to reply as follows.
The DUTA Concept Paper has now been revised to ***Version 10.1*** to address some of the concerns raised by SUMATRA. The essential changes are some additional parts added as requested, and a regrouping of the subject to more clearly outline the concept. International examples have also been added as Appendix C.

**1. Re: Operational overlaps of responsibilities (being unclear)**

DUTA carries no operational responsibility so there are no overlaps with agencies, and therefore no changes to the instruments of these agencies are required. Only where an agency has a strategic policymaking role will that function be transferred to DUTA. However, every agency is represented on the DUTA Board, so that their input is retained under the new arrangements. E.g. the functions of the RCC may largely be taken over by DUTA but every member of the RCC is a DUTA Board member.

**2. Contradicting accountability**

DUTA has no power over ministries, but has a coordinating role with both ministries and implementing agencies, by virtue of it developing the unified Strategic Urban Transport Policy (SUTP) for DSM. Each Board member whether sector ministry or implementing agency brings their input, their mandates, their delegated power to the discussion. With such a representative and inclusive Board there is no competition between DUTA and any of its members.

**3. Authority or coordinating committee?**

DUTA is established as an Authority – being an apex body (umbrella organisation) which is fully inclusive of all stakeholders. This is its real strength, in that it can take full responsibility and accountability for solving the critical urban transport and development challenges in Dar es Salaam. There cannot be any blame shifting. The planning departments under DUTA at executive level gives it the technical capacity to support the Board and conduct oversight over the outcomes; adding to its capacity as an Authority.

**4. DUTA formulating policy is acting beyond its power?**

While every sector ministry has its policy mandates, the role of DUTA is to harness and develop those mandates into a cohesive urban transport policy for Dar es Salaam. This does not happen at present, in fact while there is a functional land-use planning function, integrated transport and traffic planning is almost non-existent with ad-hoc projects being enacted by decrees.
With the establishment of DUTA the role of each sector ministry does not change, so no instruments need to be amended. If this is accepted as a fact at the outset, it is simply a matter to create the coordinating and governing space in which DUTA will function.

**Specific Opinion**

**(i) and (ii) The role and function of DUTA and SUMATRA.**

SUMATRA is an implementing agency (the regulator) while DUTA manages strategic planning and policy. There is no overlap.

While DUTA will 'delegate' tactical and operational oversight to the implementing agencies, these agencies already have the powers, and functions to manage this. So the agencies, under the SUTP, will accept their responsibilities according to their respective roles and functions. It is not necessary to parse the wording on what powers DUTA has to delegate.

**(iii) Sources of funds for SUMATRA and DUTA**

DUTA will have financial powers including the power to levy funds and charges as well as to amend funding arrangements. But this is decided collectively, and with consensus of all the affected parties. DUTA does compete with any of its members, and funding decisions will be decided at Board level. Funding arrangements are likely to be more cohesive than it is at present.

**(iv) Review of Sumatra ACT**

Addressed above. With the establishment of DUTA, no function of Sumatra will change.

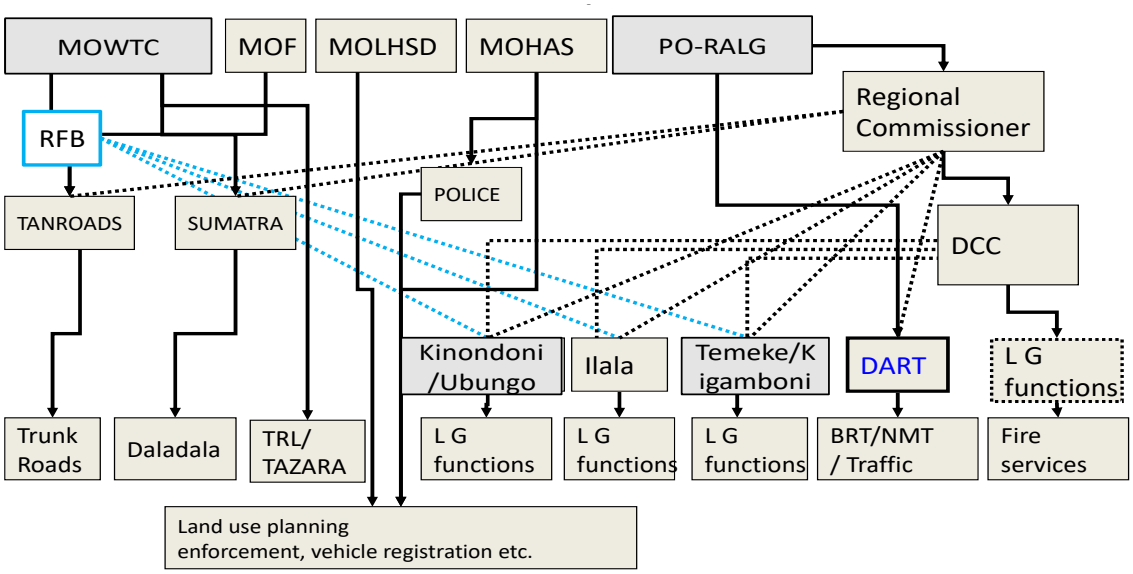
**Points 1-8**

The issues are addressed according to the statements above. Added to the Concept Note is a section on *Regulatory Impact Assessment*, and *International Examples of Urban Transport Authorities*. Note however, that the DUTA concept has been developed for Dar es Salaam specifically, to tailor a solution for the present problems. This structure likely to be applicable to other major cities in Tanzania, although some adjustment could be made to suit local context. For example, while in Dar es Salaam it is not a suitable to place DUTA under DCC, due to its size and complexity, in some cities this may be a suitable option.

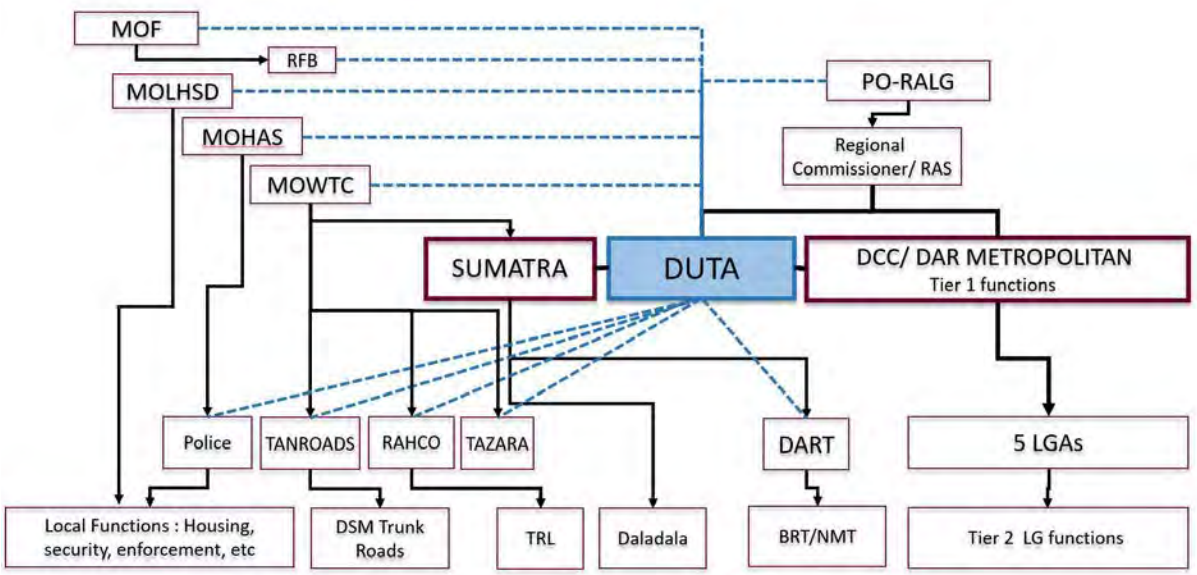
The subjects raised in this letter are also elaborated further in the Concept Note, under FAQ and the body text of explanations.

# Attachment 1

Existing Organisational Layout

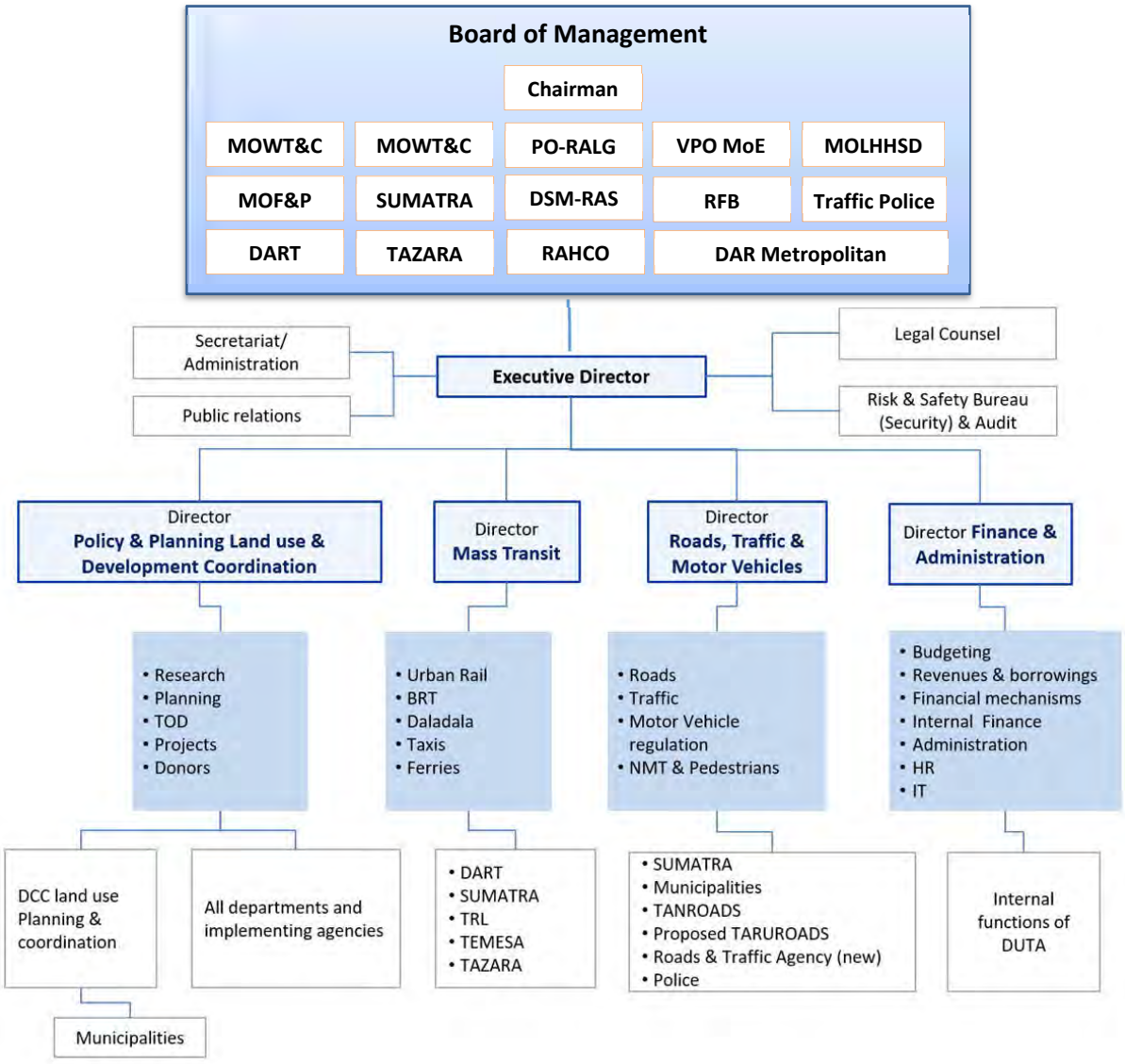



Proposed Organisational Layout (illustrative only – to be revised/confirmed)



# Attachment 2

Organizational Layout for DUTA



**UNITED REPUBLIC OF TANZANIA**

# SUMATRA

For Competitive, Efficient, Quality and Safe Transport Services

Surface and Marine Transport Regulatory Authority
Mamlaka ya Udhibiti Usafiri wa Nchi Kavu na Majini

**Ref. No**: DB 19/319/01/B **Date**: 15/09/ 2017

Permanent Secretary (Transport),
Ministry of Works, Transport and Communications,
Ministry House,
Moshi Street,
P.O. Box 638,
**40470 DODOMA.**

**RE: COMMENTS ON REVISED DRAFT CONCEPT NOTE FOR DAR ES SALAAM URBAN TRANSPORT AUTHORITY (DUTA)**

Reference is made to your letter with Ref. No. CCA.505/523/01 dated 17th August, 2017 requiring us to give opinion/comments on the above mentioned subject.

The Surface and Marine Transport Regulatory Authority (SUMATRA) acknowledges receipts of the concept paper for establishment of Dar es Salaam Urban Transport Authority (DUTA), proposed by the Prime Minister's Office Regional Administration and Local Government (PO RALG).

We reviewed the concept paper and SUMATRA has general and specific comments and opinions as follows:-

**General opinion**

The concept paper indicates that, DUTA will be established as a high level strategic policy making body, specifically and primarily to resolve urban transport/mobility and land use coordination issues and current disconnect between policy and implementation. It notes that coordination shall be achieved both horizontally (at DUTA Board Level) and vertically (between DUTA and the Implementing agencies). The concept seems to be fine. However, firstly, policy making is the primary responsibility of sector Ministry and secondly,

looking at DUTA's responsibilities it appears to pose risk of overlapping and duplication among agencies. For instance, reading between the lines you will find contradicting facts such as:

(i) **Unclear Operational Responsibilities Boundaries**
DUTA will have operational responsibilities and most of them are currently performed by other agencies including SUMATRA. This might bring overlaps and interferences with other agencies during implementation. The boundaries have to be clearly shown.

(ii) **Contradicting Accountability**
DUTA will not be an implementing agency instead it will delegate its powers to the executing agencies. What does this imply? What powers will DUTA have over other implementing agencies/Ministries? What about those agencies' missions, visions and their mandates *vis-a-vis* the delegated powers? If DUTA will delegate powers to other agencies, what will be the role of DUTA established for if the same institution can perform the task is being established for and how will the Ministries, laws and regulations of those implementing agencies work? There are a lot of questions which have not been answered in the concept paper.

(iii) **Uncertainty on whether DUTA will be an Authority or Coordinating Committee**
DUTA will be Authority and not just a coordinating committee. However, in the same paper DUTA is said to be established primarily to resolve land use coordination issues and current disconnect between policy and implementation. It is still not clear what DUTA is established for.

(iv) **Will the role of formulating the policy by DUTA not amounting to ultra vires (acting beyond power)**
DUTA's key role will be making strategic policy, coordination and resolving urban transport mobility and an umbrella organization for coordinating all stakeholders. At the same time, the Ministry of Works, Transport and Communications is mandated *inter alia* to develop transport policy and strategies; oversee implementation of the policy; and coordinate diverse transport activities. It does not come out clearly, how the above said mandate will co-exist with DUTA which will be formed by different government institution i.e. Prime Minister's Office Regional Administration and Local Government (PMO RALG). This might require redefining Ministerial instruments. For example the establishment of DART Agency in 2017 at urban level was part of implementing the National Transport Policy (2003) which is clearly stipulated under proviso 5.8.2.2 (iv) of the Policy. It is our opinion that establishment of DUTA

need to be more clear and show boundaries of operational to avoid confusion and further compounding the existing problem of institutional set up.

**Specific Opinion**

**(i) The functions of SUMATRA and Functions of DUTA**

When looking at the functions of SUMATRA and the functions of DUTA, one may not see the interference at the first place. However, after analyzing the functions of DUTA, it shows, DUTA will carry full responsibility of transport outcomes including service level and coverage. It will delegate/ contracting the implementation to executing agency/regulator. This needs more clarifications on which functions will be contracted or delegated. As it is, it is most likely that there will be interference with the functions of SUMATRA.

**(ii) The role of SUMATRA and the Role of DUTA**

The roles of SUMATRA are clearly spelled out in the SUMATRA Act, while roles of DUTA part 3.1 and 3.3 in the paper are very general. There is a danger of using general terms like Strategic Level, Tactical Level and Operational level. The words can be used impliedly by different organizations at different occasions. It is suggested that, DUTA roles to be specific, precise and concise within its geographical jurisdiction.

**(iii) Source of funds for SUMATRA and DUTA**

SUMATRA sources of funds, includes, fees payable for the grant and renewal of licenses, levies collected from regulated suppliers, all other payment or property due to the Authority, any grants, donations, bequests or other contributions made to the Authority. Under 3.5.3 DUTA has power to levy charges, duties and taxes, on motor vehicle imports, car registration and the use of motor vehicles in the City. It is not clear whether all vehicles, including public passenger bus will be charged as this may be burdensome to the operator with many charges, hence it needs more clarifications.

**(iv) Areas of SUMATRA Act Review in case DUTA Proposal proceed**

In case DUTA proposal proceed without considering Authorities opinion highlighted above, there will be a need to review SUMATRA Role and Functions in order to accommodate how the two institutions will co-exist.

It is our opinion that, the concept of establishment of DUTA is good and has to be supported by all key stakeholders. However, there should be clear

definition(s) of a problem and a focused strategy to address the problem. In this regard, we therefore recommend the following:-

1) DUTA concept paper be revised to introduce multi-level (National and Sub- national) regulatory governance and decentralization,
2) Regulatory impact assessment to measure likely benefits, costs and effects of new regulatory regime should be undertaken,
3) Better communication mechanism between levels of the Government need to be clearly presented, as may help to improve ineffectiveness,
4) The issues of dealing with transport policy have to be very careful dealt with to avoid further compound the existing problem of institution set up(Ministry of Transport, Works and Communications and PO- RALG)
5) Regulatory and other Implementing Agencies' functions should continue to be vested to Regulatory Bodies and Agencies to avoid review of numerous Laws,
6) The enactment of DUTA Act, under PO-RALG can recognize the existence of other implementing Agencies/Regulatory laws while giving specific Role/Power to coordinate **various Projects and Programs within the Dar Es Salaam City,**
7) The concept note should indicate areas of existing Act to be amended to accommodate the new concept,
8) Concept note should cite successful practice (regional/international experiences) of introducing multilevel regulatory governance.

**The Surface and Marine Transport Regulatory Authority**

Gilliard W. Ngewe

**DIRECTOR GENERAL**

# Outputs for the Project Output 2: PDCA through Pilot Project

# Outline of Trial Measures and Short-term Projects

Capacity Development Project for

the Improvement of Dar es Salaam

Urban Transport (Phase-2)

# Discussion Paper (Volume 2)

## Outline of Trial Measures and Short Term Projects

This paper has been prepared only for internal discussions amongst the designated stakeholders for this project. Discussions can explore ideas and concepts for policy development and need not be limited to current policies of the Government of Tanzania.

Secretariat for the Capacity Building Project

and

JICA Expert Team

# CONTENTS

## GLOSSARY OF TERMS

| | |
|---|---|
| *BoQ* | *Bill of Quantities* |
| *CBD* | *Central Business District* |
| *CUPID* | *Consensus for Urban Transport and Policy Improvement in Dar es Salaam* |
| *DCC* | *Dar es Salaam City Council* |
| *DUTA* | *Dar es Salaam Urban Transport Authority* |
| *DARCOBOA* | *Dares Salaam Commuter Bus Owners Association* |
| *DART* | *Dar Rapid Transit Agency* |
| *FC* | *Fare Collector* |
| *HO* | *High Occupancy* |
| *IMC* | *Ilala Municipal Council* |
| *ITS* | *Intelligence Transport System* |
| *JICA* | *Japan International Cooperation Agency* |
| *KMC* | *Kinondoni Municipal Council* |
| *LGAs* | *Local Government Authorities* |
| *MLHHSD* | *Ministry of Lands, Housing and Human Settlement Development* |
| *MOT* | *Ministry of Transport* |
| *MOW* | *Ministry of Works* |
| *NIT* | *National Institute of Transport* |
| *NMT* | *Non-Motorized Transport* |
| *P&R* | *Park and Ride* |
| *PS* | *Permanent Secretary* |
| *PDCA* | ***Plan-Do-Check-Act*** *cycle is a four-step model for carrying out change* |
| *PMO-RALG* | *Prime Minister's Office- Regional Administration and Local Government* |
| *PPP* | *Private Public Partnership* |
| *RAS* | *Regional Administration Secretariat* |
| *RS DSM* | *Regional Secretary- Dar es Salaam* |
| *RAHCO* | *Rail Assets Holding Company* |
| *RFP* | *Request for Proposal* |
| *SUMATRA* | *Surface and Marine Transport Regulatory Authority* |
| *TANROADS* | *Tanzania National Roads Agency* |
| *TAZARA* | *Tanzania Zambia Railway Authority* |
| *TMC* | *Temeke Municipal Council* |
| *TOR* | *Terms of Reference* |
| *TOR* | *Terms of Reference* |
| *UTA* | *Urban Transport Authority* |
| *ZTO* | *Zonal Traffic Office* |

# Introduction

The *Consensus for Urban Transport Improvements in Dar es Salaam* (CUPID) in its Secretariat meeting held on 11 June 2015 selected trial measures and short term projects for alleviating traffic congestion in Dar es Salaam.

For each project there was a brief discussion on implementation risks, constraints, assumptions and opportunities. Responsible agencies were identified, and assignments on Technical Working Groups (TWG) were made.

This document provides the outline of each project, the issues and who manages the projects. It also outlines the preliminary work (the next steps) towards planning and design of the project.

Each TWG can use this document to guide progress, and to assist with communication between concerned parties. Regular updating will be required.

# Strategic Policy Responses to the Traffic Problem

This section illustrates how the selected projects address the agreed 'Strategic Policy Responses', which the Secretariat Committee has previously discussed.

### *Demand Management Measures*

Already discussed are the proactive and restrictive actions that can reduce traffic (travel) demand and they include:

1. **PROACTIVE DEMAND MANAGEMENT MEASURES** THAT IMPROVE PUBLIC TRANSPORT AND NMT OPPORTUNITIES such as:
    a. Improving the Bus & daladala business model to deliver better standards of service
    b. Bus traffic priority to improve bus service level and reduce cost of operation (which has an impact on the business model)
    c. Improve city bus terminals to improve passenger conditions and safety (includes bus rerouting)
    d. Develop cycle-ways as a eco-friendly, active and low cost travel option with many co-benefits for health and environment
    e. Promote ride sharing (incorporated with restrictive action of area control)
2. **RESTRICTIVE DEMAND MANAGEMENT MEASURES** such as:
    a. Parking controls
    b. Increase parking costs
    c. Park & Ride system
    d. Area control by vehicle Plate No. (odd and even numbers)

### *Traffic Management Measures*

Furthermore there are a set of actions to manage traffic. Note that these actions will not be effective without managing demand.

Traffic management measures listed are:

a. Improve on-street parking management
b. Enforce bus bay rules
c. Traffic treatment/ circulation plan

d. Optimise traffic signals
e. Implement reversible tidal flow lanes

### *Selected Priority Short Term Projects*

Certain projects have been selected to cover both the demand management and the traffic management areas. **Figures A & B** show the connection between the projects and the policy.

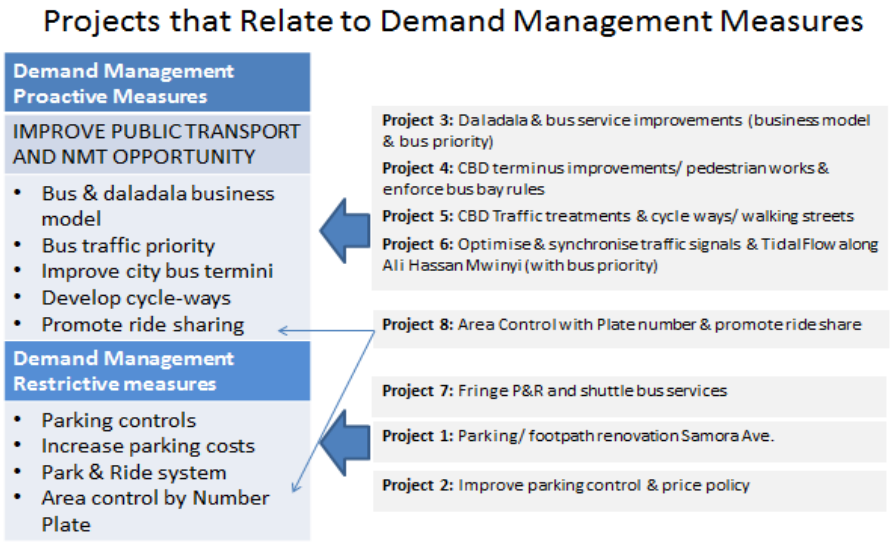



**Figure: A**

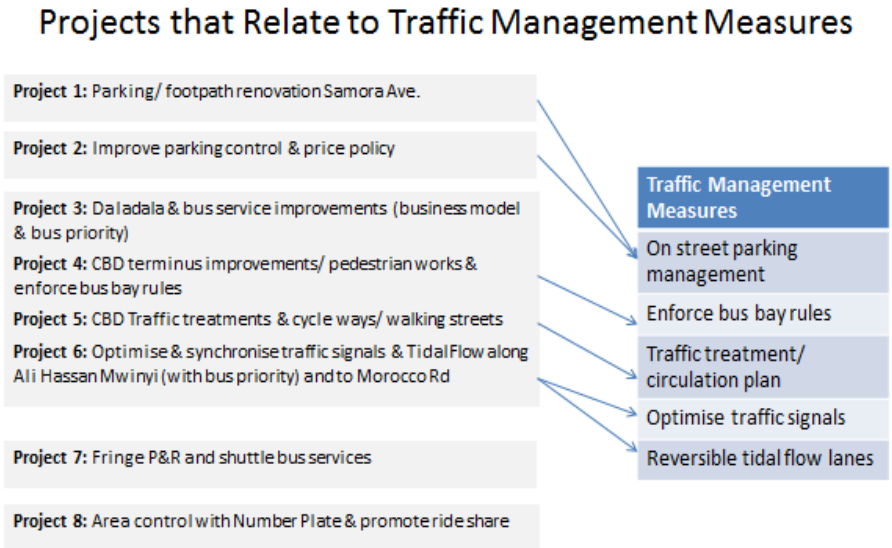



**Figure: B**

# Project Planning Guidance

*"Well executed projects are well-planned projects"*

The CUPID projects are expected to adopt a standard project planning approach involving the following areas. Note that this approach is useful for most management tasks.

**Project Ownership:** Who takes ownership of the project? This is the *'higher authority'* that gives *project authorisation* and to whom the project manager (PM) refers to in case of decisions that are out of the PM control. Within this area reporting obligations need to be defined.

**Define Project Scope:** What is the exact scope of the project? Identify what is within and without scope (what you are, and what you are not responsible for).

**Manage Project Communication:** Link people, ideas and information at all stages in the project life cycle. Identify stakeholders. Develop a communications strategy: who needs to be included in communications? What are their information needs? Are they supporters or blockers? How often should communication take place?

**Manage Project Integration:** What other projects or activities do we need to integrate with? Explore ways to capitalise on synergies. Also ensure that all elements of the project are synchronised (time, cost, quality etc.) and that the sequence of tasks and interdependencies are recognised.

**Manage Project Plan/ Schedule:** Develop the project schedule and duration and prepare timeline for each activity. Identify project milestones. Identify delays and manage project timeliness.

**Manage Project Cost:** Identify, analyse and refine project costs to produce a budget and secure the funds.

**Manage Project Quality:** Agree with higher authority on acceptable quality objectives, standards, and management tools (establish processes to monitor).

**Manage project human resources:** Develop a cohesive project unit of individuals and sub—teams to reach project objectives. Align individual competencies with project tasks and establish a basis of communications. Determine meetings schedule as required.

Appoint Team leader and assign tasks according to specialisation & competencies. It is suggested that the team leader is a representative of the Project Owner. The role of the Team Leader is to arrange meetings and guide progress

**Manage Procurement and Contract management:** Managing the bidding process, purchase contracts, price selection/ negotiation, equipment procurement, warranties, after sales service.

**Manage Project Risk/ Conflict:** Comprehensive risk identification and assessment, including testing the assumptions and identifying the constraints within the project. The aim will be to integrate risk responses into project strategy and project baseline commitments. Plan to manage risks. Assist to resolve any conflicts between parties to ensure smooth and effective implementation.

# Short term Projects

## 1. Project 1: Parking and Footpath Renovation on Samora Avenue

**UPDATE:**

This project is underway with JICA funding the section of street renovation between Clocktower Roundabout and Morogoro Road.

The remainder of the Samora Ave project area is under Ilala MC funding; however it has been mooted that this could be developed under a PPP with an advertising company.

This can be linked to the PPP arrangements of **Project 4: CBD** terminus improvements/ pedestrian works & enforce bus bay rules

**RESPONSIBLE AGENCY:** Ilala Municipality & DCC

The Technical Working Group will consist of:

**RAS:** Eng. Josephat Shehemba

**DCC:** Eng. Swalehe M. Nyenye, Mr Christopher Japhet

**Ilala Municipality:** Eng. Allan Shula

**DART:** Eng. Mohamed Kuganda

**TANROADS:** Eng. Humphrey Kanyenye

**MLHHSD:** Mr Nzori A. Kinero

**THE WAY FORWARD/ NEXT STEPS**

## 2. Project 2: Improve Parking Control & Policy

**UPDATE:**

Ongoing discussions with DCC to assist in reforming the parking contracts.

DCC plans to implement a short term contract using POS enabled cash collection system with a view to installing a cashless system in a long term contract.

JICA Team has prepared the Operational Plan & Draft New Parking Services Agreement to assist in the decision-making

**RESPONSIBLE AGENCY:** DCC

The TWG will consist of:

**DCC:** Mr. Nyenye Swallye.

Mr. Christopher Japheth (to be replaced)

**THE WAY FORWARD/ NEXT STEPS**

Work with City Engineer to progress contracts

Work with **Project 5:** CBD traffic circulation has a large impact on planning designated parking spots & the estimate of street signage requirements.

## 3. Project 3: Daladala & Bus Service Improvements (business model & bus priority)

**Daladala business model:** Bus owner (Christiania Group) and Business Connexions are undertaking the pilot project to demonstrate the E-ticketing. Presently 36 daladala have been fitted with cash-based POS equipment as a first stage and 20 daladala are planned to be added to the system. Proper ticket issue has shown early results with increased revenues, transparency and ability to track the bus in service). JICA members are meeting telecommunication providers to be the stakeholders in the implementation of a fully cashless system.

**Implementing bus traffic priority**. No action has yet been taken to provide traffic priority for buses, such as exclusive bus lanes, queuing lanes at intersections (with signal priority), but this will form part of Project 6: _____

**RESPONSIBLE AGENCY:** is SUMATRA; sharing responsibility with DART, TANROADS/LGAs, RAS

Technical working group consists of

**SUMATRA: Ms Beatrice Chao**

**DART:** Eng. Mohamed Kuganda

**TANROADS:** Eng. Humphrey Kanyenye

**LGAs:** Eng. Ahmed Wamala, Eng. Allan Shula, Eng. Pharles Ngeleja

**DCC:** Eng. Swalehe M. Nyenye, (Mr Christopher Japhet)

**RAS:** Eng. Josephat Shehemba

**Traffic Police:** Insp. Mussa Mabula

**THE WAY FORWARD/ NEXT STEPS**

- Meeting with TELCOS to bring them on Board for ticketing/ work with Pilot Project
- Investigate bus priority locations and work with project 6: Tidal flow and bus priority

## 4. Project 4: CBD terminus improvements/ pedestrian works & enforce bus bay rules

This project involves renovating/ improving bus terminus facilities at Stationi, Old Posta. New Posta and building a new facility opposite YMCA on Upanga Road.

**UPDATE**

There is a strong interest from advertising companies to secure a PPP project to develop and maintain these facilities in return for exclusive advertising rights and IMC has had preliminary discussions with them.

IMC plans to conduct the procurement process to establish a PPP contract. There appears a strong interest by one company JCDecaux, to develop New Posta and YMCA as a combined project and as a demonstration.

Issues that have arisen:

- Both Stationi and New Posta may be impacted by BRT Phase 2 and 3. It just however be kept in mind that these BRT Phases will take years to be finalised and should not hamper improvements that can be made in the short term.

- Stationi has an ongoing function as it is a potential future BRT interchange (future taxi /daladala use).
- Old Posta is a critical BRT connection (park opposite NBC bank)
- Two additional bus terminus sites to be considered are at Bibi Titi Mohammed Rd, being Akiba as a critical BRT connection and Mnazi Mmoja.
- Funding for pedestrian access in the New Posta area (raised crossings) needs to be considered and whether this can form part of the PPP commitment.
- This project will work in conjunction with Project 5: CBD circulation to ensure safe walking paths for pedestrians.

**ENFORCEMENT OF BUS BAY RULES**

In conjunction to the above, some engineering design solutions need to be found in liaison with Traffic Police to resolve this problem and trialled for its effectiveness. This action should be coupled with the removal of hawkers within the bus bay area so as to create order. **In each of the renovated sites a management plan for hawkers will be put in place.**

Further locations for street treatments were nominated as set ot below, but these need to be checked for current validity, considering BRT and Tazara Flyover.

The renovation of certain possible pilot locations is identified as:

(Site 1) Mbagala (Kilwa Rd.),
(Site 2) Fire (Morogoro),
(Site 3) Ngongoramboto,
(Site 4) Tazara (Nyerere) etc.

Treatments could include:

- Identify project location;
- Design and paint yellow-box marking in front of bus bay and other necessary engineering measure.
- Educate daladala / bus drivers, passengers and road vendors;
- Enforcement by traffic police.

The Technical Working Group includes:

**Ilala Municipality:** Eng. Allan Shula

**TANROADS:** Eng. Humphrey Kanyenye

**DART:** Eng. Mohamed Kuganda

**RAS:** Eng. Josephat Shehemba

**RESPONSIBLE AGENCY**: Ilala Municipality (PPP) and TANROADS (for arterial roads bus stop locations)

**THE WAY FORWARD/ NEXT STEPS**

- Sketch locations/ outline requirements
- Call for proposals by IMC
- Negotiate contracts with winning proposals

## 5. Project 5: CBD Traffic and Parking Treatments & Cycleway/ Walking Streets

## 5.1. Project Overview

### *NMT opportunities - walking & cycling*

Walking is a dominant travel mode in DSM which **requires walking paths and street crossings to be improved** and kept free from encroaching hawkers, street vendors and parked cars. Penalties for cars parked on footpaths should be increased and enforced, as often pedestrians are forced to walk on the carriageways. This is a social equity issue; as car owners should not consider they have the right to encroach on footpath areas.

**Providing trees along footpaths** is an important street feature to provide shade and greenery. **Cycling is also an important element of urban transport and especially suitable to DSM if** a safe cycling environment is provided to encourage commuters to take advantage of the personal mobility, exercise and time saving that cycling offers. Cycling has many co-benefits such as improving public health, and a cleaner and less noisy environment.

A proposal for a cycleway from Posta to Seacliff was proposed by DART during BRT planning but did not secure funding. Such a proposal would create an attractive tourist facility, providing opportunity for a bicycle rental business and roadside cafes along the route exploiting the tourism potential of the Dar es Salaam sea coast. It also will provide a low-cost eco-friendly cycle option for local residents.

### *CBD Traffic Circulation and Parking*

CUPID Phase 1 proposed a 4-stage plan for CBD bus terminus improvement; daladala rerouting and changed traffic directions for the CBD. The bus terminal improvements are now included under **Project 4**, and under this **Project 5** the traffic circulation, pedestrianisation issues and parking treatments will be managed. The traffic modifications under this project include selected traffic treatments such as modifying turning permissions and implementing one-way sections and local traffic and parking treatments specifically directed at improving traffic efficiency in the CBD. The work of CUPID 1 can be reviewed and revised.

The TWG comprises:

**Ilala Municipality:** Eng. Allan Shula

**DCC:** Eng. Swalehe M. Nyenye, (Mr Christopher Japhet)

**DART:** Eng. Mohamed Kuganda

**RAS:** Eng. Josephat Shehemba

**Traffic Police:** Insp. Mussa Mabula

Project scope includes:

1. CBD traffic circulation and parking treatments
2. Eco-friendly travel opportunities such as walking and cycling accommodated in the city centre
3. Create pedestrian friendly road crossings
4. Renovation & redesign of selected traffic intersections.
5. Cycleway to Seacliff

Activities Include:

- Review and update of CUPID Phase 1 CBD circulation and Parking Plan with a view to implementation.
- Make available to **Project 2** the parking plans for inner city streets
- As part of the above traffic circulation plan in the CBD, connect cycleway/ pedestrian streets to the BRT cycleway to create an integrated cycle network in the city centre.
- Review the Posta to Seacliff cycleway proposal and investigate funding opportunities with a view to implementation.

## 5.2. Project Assessment

**CONSTRAINTS**:

- Funding & interest in the project of building cycle ways and walking street improvements

**ASSUMPTIONS**:

- Approval from city decision-makers to circulation plan & cooperation of the community

**OPPORTUNITY**:

- To enhance cycling opportunity by capitalizing on BRT cycle way and integrating it with the wider CBD area
- Establish pedestrian friendly road crossings
- Complements associated measures (Project 4 CBD bus terminus and pedestrian improvements)
- Implement traffic treatments to improve CBD traffic flow

**RESPONSIBLE AGENCY**: Ilala Municipality

## 5.3. Project Management

### *Project Ownership*

Ilala Municipality shall be the project owner.

### *Manage Project Human Resources*

Appoint Team leader and assign tasks according to specialization & competencies. The role of the Team Leader is to arrange meetings and guide progress

Establish a basis of communications and schedule regular meetings as required.

### *Manage Project Communication*

Identify stakeholders and communication needs

### *Manage Project Integration*

Synchronise with **Project 2** and **Project 3**

### *Tentative Project Schedule*

Preparations and project scoping in 2015

Define projects & budgets in 2016 for **2016-17** budget period

### *Manage Project Cost and Procurement*

For each project compile BoQ & budget estimates

Support Ilala Council if required.

### *Manage Project Quality*

Agree on project quality standards/ how to specify and describe quality / any cost implications

### *Manage Project Risk/ Conflict:*

Do risk assessment and incorporate risk management in planning

Identified project risks:

- Objections to change of use / direction of city streets
- Motorists compliance to changed circulation pattern (enforcement)
- Others?

### 5.4. The Way Forward/ Next Steps

Review and update the CUPID 1 work & proposals on the traffic circulation plan and specific intersection modifications.

Work with SUMATRA to update on Daladala routes

As part of this project do a plan for city parking for inner city streets

Obtain approvals from DCC and Ilala Council.

Develop TOR for each of the works & components

## 6. Project 6: Optimise & synchronise traffic signals & Tidal Flow along Ali Hassan Mwinyi (with bus priority)

### 6.1. Project Overview

#### *Optimisation of intersection management*

The selected intersections are the two intersection south of Selander Bridge intersections (United Nations Rd and Barack Obama Dr) and the first intersection north of Selander Bridge (Kinandoni Rd and Kenyatta Dr).

These intersections need to be optimised and synchronised so that they operate automatically and efficiently. Furthermore, the signal timings need to be adapted to daily variances of traffic flow. A central control centre installed at Selander Police station would manage the intersections with the use of CCTV video surveillance cameras to monitor traffic flows.

#### *Tidal flow (reversible) lane operation*

The project proposes to combine daladala bus priority with a reversible lane arrangement to give daladala traffic priority in the peak direction.

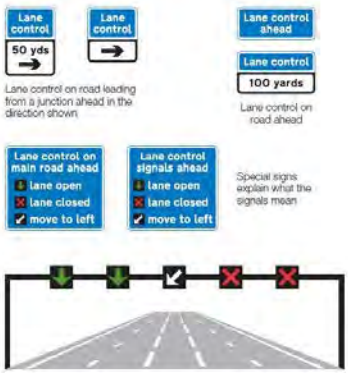



**Figure 6.1**

It had also been suggested to include tidal flow priority up to Mwenge Intersection as tidal flow works presently in an informal fashion. It was agreed that the project can be tested on the initial section south of Selander and expanded northward if successful, and it must also take into account that the roadway has been widened since this was first discussed.

The TWG consists of:

**TANROADS:** Eng. Humphrey Kanyenye

**DART:** Eng. Mohamed Kuganda

**RAS:** Eng. Josephat Shehemba

**LGAs:** Eng. Ahmed Wamala, Eng. Allan Shula, Eng. Pharles Ngeleja

**TEMESA: _____**

**MOT:** Mr Paul Laiser

**Traffic Police:** Insp. Mussa Mabula

## 6.2. Project Scope and Activities

Project Scope includes:

1) Identify project intersection(s); and design traffic measures including HO priority lanes
2) Secure funding
3) Install variable sign boards and road markings (carry out road improvement where necessary)
4) Educate drivers/public and create awareness
5) Agree on management and enforcement protocols by Traffic Police

The methodology and activities include:

- Traffic count survey of directional traffic volume
- Calculate optimum signal phasing in a reasonable cycle time
- Install technology to adjust settings of traffic signals remotely
- Observe effect of change and further adjustment, observing actual traffic flow
- Consultation with bus industry on bus priority

## 6.3. Project Assessment

**CONSTRAINTS**:

- Funding for infrastructure & equipment
- Managing right hand turns from centre lanes

**ASSUMPTIONS**:

- Active support and cooperation of Traffic Police

**OPPORTUNITY**:

- Introduces technology for traffic police
- Demonstrates signal operation and introduces Traffic Control Centre operation
- Creates opportunity for kerbside T3/bus priority lane to operate in direction of AM/PM tidal flow
- Fits with **Project 4 (CBD bus terminus)** to create a bus-only access from Upanga Street to Ohio Intersection (northbound)

**RESPONSIBLE AGENCIES**: TANROADS and TEMESA

## 6.4. Project Management

### *Project Ownership*

TANROADS shall be the project owner.

### *Manage Project Human Resources*

Appoint Team leader and assign tasks according to specialization & competencies. The role of the Team Leader is to arrange meetings and guide progress

Establish a basis of communications and schedule regular meetings as required.

### *Manage Project Communication*

Identify stakeholders and communication needs

### *Manage Project Integration*

Synchronise with **Project 3: CBD Bus terminals improvements (for Upanga Street access)**

### *Tentative Project Schedule:*

Preparations & design work during first and second quarter **2016**

Prepare for budget period **2016-17.**

### *Manage Project Cost and Procurement*

Identify, analyse and refine project costs to produce a scope of work & budget

Who provides the funding and purchases the technology equipment?

Procurement of equipment / Secure supplier (Is it a bidding process?)

Training and after sales service

### *Manage Project Quality*

Agree on project quality standards/ how to specify and describe quality / any cost implications

### *Manage Project Risk/ Conflict:*

Do risk assessment and incorporate risk management in planning

Identified project risks:

- Ensuring proper technology to ensure safe operation
- Suitable enforcement

## 6.5. The Way Forward/ Next Steps

- Conduct traffic counts ( CUPID project funding in November 2016)
- Prepare TOR/ Scoping of the project
- Consult with TANROADS and Traffic Police to develop methodology and design traffic control measures & signaling plan

# 7. Project 7: Fringe Park & Ride Shuttle Bus Services

## 7.1. Project Overview

The objective of providing Park & Ride facilities at fringe locations of the CBD is to reduce the number of cars entering the city centre and reduce demand on inner city parking. To connect passengers to the CBD a circular bus route could operate from the parking location around the CBD.

Initially a some sites close to the CBD were discussed, but it is now considered that they are too close to the CBD to be useful or viable.

Instead sites at Morocco and Ubungo (close to BRT are considered more feasible.

The TWG consists of:

**Ilala Municipality:** Eng. Allan Shula

**DCC:** Eng. Swalehe M. Nyenye, Mr Christopher Japhet

**MLHHSD:** Mr Nzori A. Kinero

**SUMATRA:** Ms Beatrice Chao

**DART:** Eng. Mohamed Kuganda

## 7.2. Project Scope and Activities

The scope of the project includes:

1. Selection of sites
2. Establishment of a shuttle bus service to connect P&R to the CBD

The methodology/activities will include:

- Select/ gain permission to use/ renovate/ commission its use
- Develop concept design of the facility & Operational Plan
- Establish contract for operating bus service
- Develop bus priority measures (exclusive bus lane along Samora Ave. & Uhuru St.);
- Create public awareness
- Increase on-street parking fee in CBD as a complementary measure to incentivise use of park and ride facility.

## 7.3. Project Assessment

**CONSTRAINTS**:

- Relies on participation of private sector to provide shuttle bus services
- Funding to establish the facilities

**ASSUMPTIONS**:

- Available land/ permission to use
- Approval of city decision-makers

**OPPORTUNITY**:

- Creates a PPP opportunity (establish site, collect fees/ operate shuttle)

**RESPONSIBLE AGENCY**: Ilala Municipality (land-use/PPP) and SUMATRA (operators permit)

## 7.4. Project Management

### *Project Ownership*

The Ilala Municipality shall be the project owner.

### *Manage Project Human Resources*

Appoint Team leader and assign tasks according to specialization & competencies. The role of the Team Leader is to arrange meetings and guide progress.

Establish a basis of communications and schedule regular meetings as required.

### *Manage Project Communication*

Identify stakeholders and communication needs

### *Manage Project Integration*

Synchronise with **Project 2 Parking Control by DCC and Project 5: CBD Traffic Treatments**

### *Tentative Project Schedule:*

Preparation & design **2015/16**

Implementation in **2016-17 budget period**

### *Manage Project Cost and Procurement*

Identify, analyse and refine project costs to produce a budget

Assist project owner to develop Request for Proposals (bidding process) for procurement of contractors

### *Manage Project Quality*

Agree on project quality standards/ how to specify and describe quality / any cost implications

Retain present trees on-site to provide shade with view to provide additional trees for shade.

### *Manage Project Risk/ Conflict:*

Do risk assessment and incorporate risk management in planning

Identified project risks:

- Insufficient motivation for motorists to use the P&R location (needs incentives such as increased CBD parking charges) and good quality facility for P&R such as security and shade.
- Meeting the cost of the parking facility (a fee charged?)

## 7.5. The Way Forward/ Next Steps

- Obtain 'in-principle agreement from project owner
- Permissions to use the selected sites
- Input from project holder on design issues
- Develop designs and operational methodology
- Develop RFP

# 8. Project 8: Area Control with Vehicle Plate number & Promote Ride Share

Given the apparent reduction in traffic attributed to the BRT, this Project 8 is deferred until a situation arises when it is necessary to apply more restrictive measures.

# Appendix A: Stages of CBD development (to be revised)

**Previous staged planning approach :**

This project was an element in the overall CBD traffic management improvements proposed in CUPID Stage 1 (2012) involving the following 3 stages in implementation:

**Stage 1: Daladala route modifications and bus facilities improvement**

- Project 1 Old Posta/ Maktaba Traffic Improvements **(P1)**
- Project 2 YMCA & New Posta & pedestrian Improvements **(P2)**
- Project 3 Stationi terminal improvements and pedestrian walkways **(P3)**

(Each project when completed has associated route changes)

**Stage 2: Traffic Modifications**

- Samora/ Sokoine Dr modification

**Stage 3: Local Traffic Treatments**

- India Street pedestrianization and inner CBD traffic /parking modifications
- Mosque St area modifications

Changes to route design has highlighted the necessary infrastructure improvements which become the projects as described previously. In turn, when completed, these projects define the order of route changes that can be implemented.

- All Posta routes will be redirected to Old Posta to terminate once **Project P1** is complete. See Figure C2
- All routes to YMCA can commence once **Project P2** is complete. See Figure C3
- All routes terminating at Stationi can do so once the **Project P3** Stationi development is complete. See Figure C4.

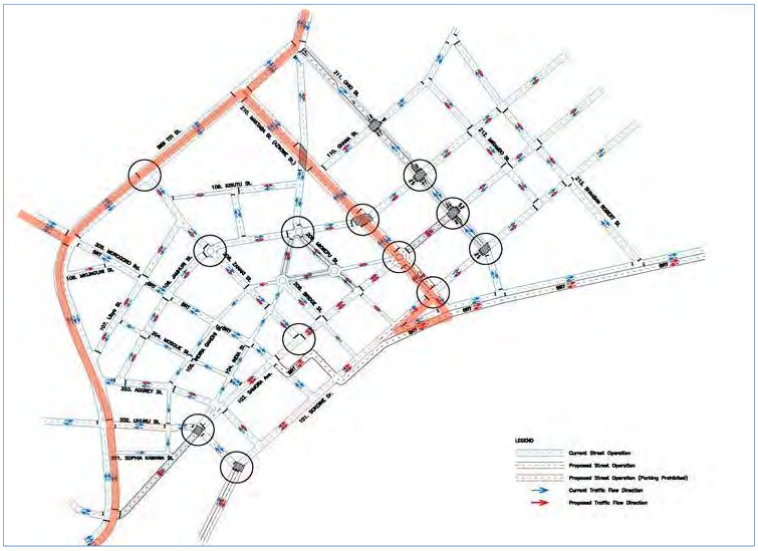


**Figure C2: Modified Daladala routes at P1 completion**

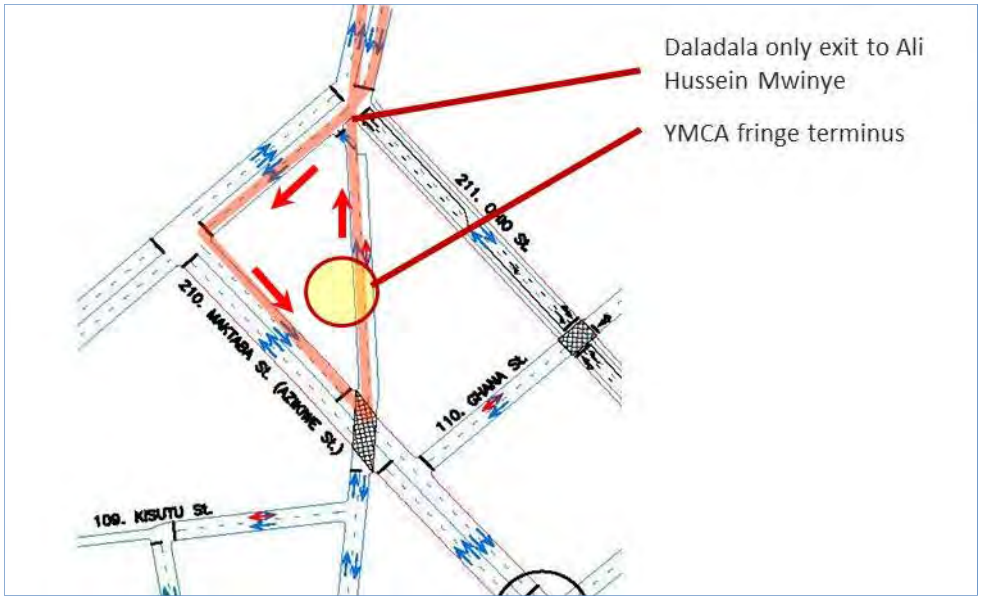



**Figure C3: Modified Daladala routes at P2 completion**

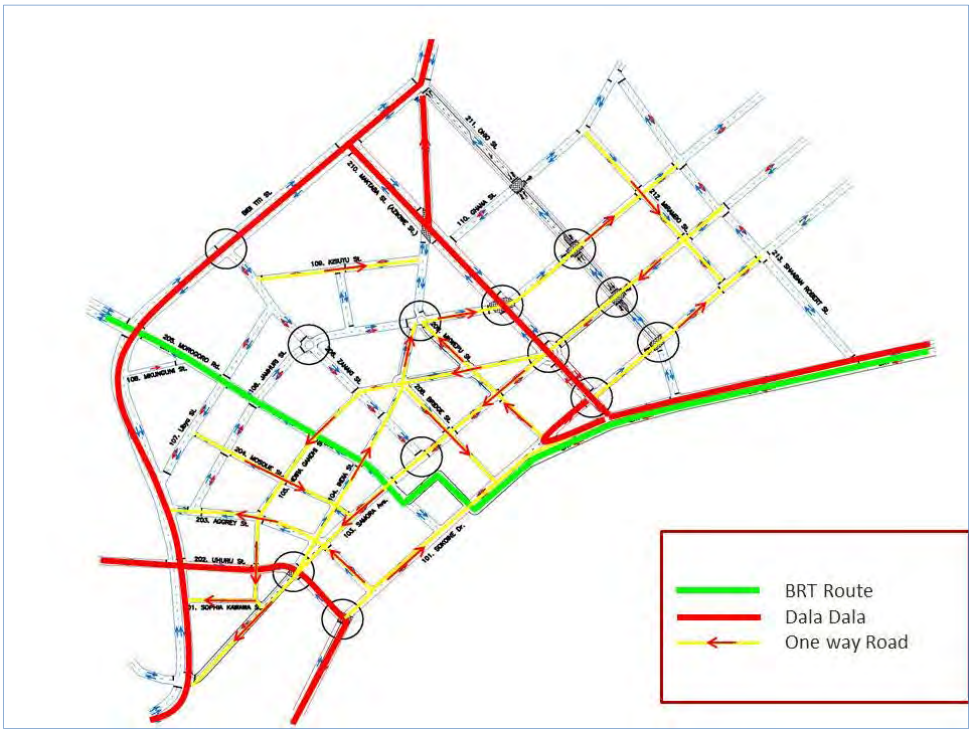



**Figure C4: Modified Daladala routes at Stationi completion (Final)**

## Stage 1 Scope of Works

**Project 1-P1** mainly includes relocation and development of the Old Posta stop from the harbor-side to the kerb-side adjoining the park opposite the NBC Bank to avoid daladala (and pedestrians crossing the BRT lanes).

It must operate in an anticlockwise manner to enable set-down and boarding at the park side instead of the bank side. **Figure C5** shows the layout of the Old Posta terminus.

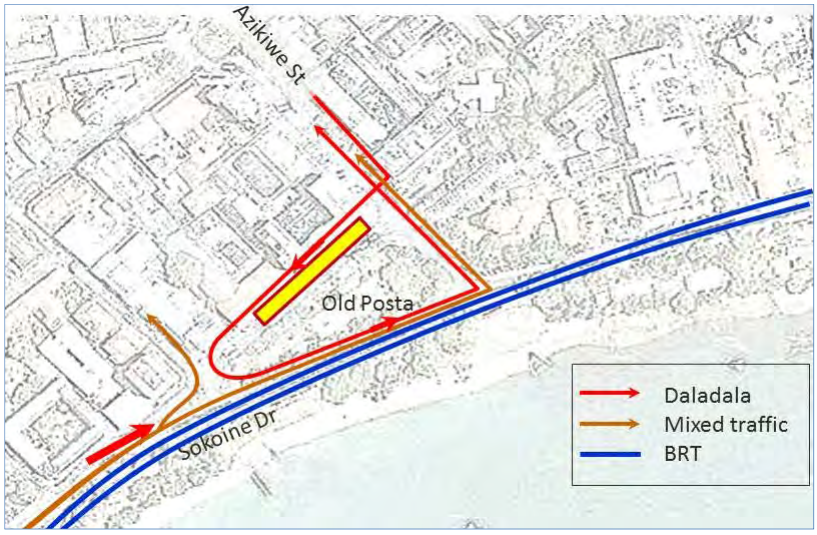



**Figure C5: Daladala Circulation around Old Posta**

Traffic improvements need to be made along Maktaba St to cope with the additional daladala traffic, including:

- Remove angle parking at Maktaba Street – replace with parallel parking to reduce the occurrence of parking vehicles interfering with traffic flow
- Paint lane markings on the full length of Maktaba to define traffic lanes (to be kept free of obstruction)
- At Upanga St to Maktaba St (eastbound) restrict right turn to reduce pressure on this intersection (alternate route via Jamhuri) and make Upanga Street (north past Citibank) a one way northbound for mixed traffic to reduce movements at the Upanga intersection.
- At the intersection of Maktaba St make new left turn to Bibi Titi (one left turn lane and two right turn lanes).
- The traffic signals at Upanga St need to be made operational and new traffic signals must be installed at Jamhuri.

**Figure C6** shows an overview of the Stage 1-P1 project works.

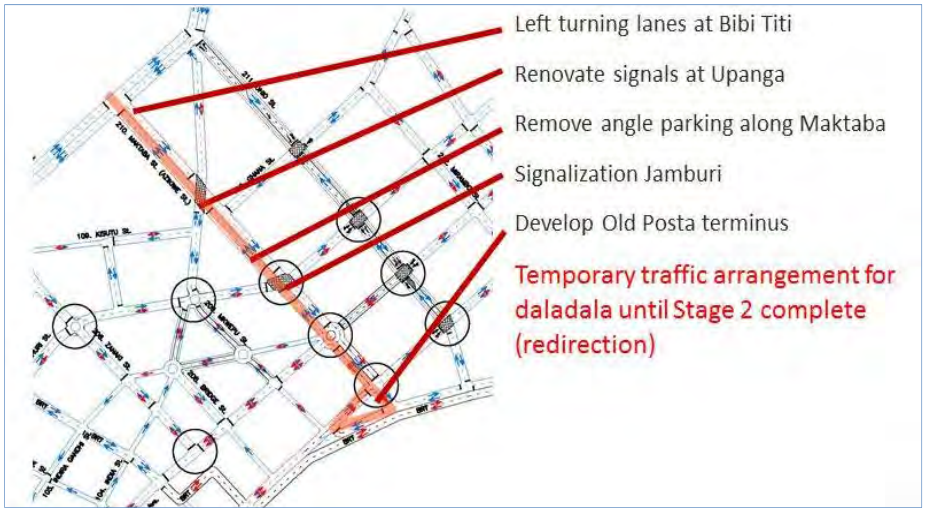



**Figure C6: Overview of Stage1 –P1**

**Project 1-P2** adds to the work done in P1 by developing the YMCA fringe terminal on Upanga St and renovates New Posta bus stop, with extensive pedestrian improvements in this area.

Further necessary works include:

- Ohio St Intersection works – remove bollards to create daladala only exit/ signage
- Develop pedestrian walkway from Askari Monument to Ohio St (Barclays bank) & Upanga St/ Jamhuri St. This includes 3 raised crossings as shown in **Figure C9.**

**Figure C8** shows the poor condition and overcrowding at New Posta Daladala terminus. While some of the passengers will be able to relocate to YMCA around the corner, the Posta stop improvements should include:

- Improve waiting area (shelters/paving/seating)
- Improve lighting
- Control vendor areas to remove obstructions

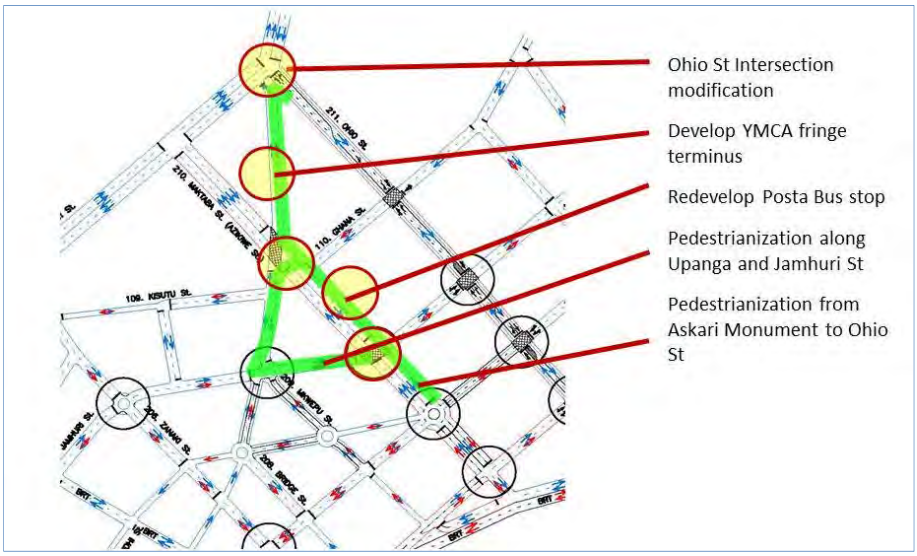



**Figure C7: Overview of P1 projects**

**Figure C8 Present conditions at New Posta Bus Stop area**


**Figure C9: Location & design of raised crossings**

**Project 1-P3** renovates the Stationi Terminal and improves daladala circulation (see overview **Figure C10**.) Under the new routing arrangements the Stationi terminal will be the terminus for

Kilwa Rd and Nyerere/Uhuru Rd routes. **Figure C11** outlines a schematic view of the alterations and improvements.

Pedestrian walkways are constructed from Stationi along Aggrey St to Samora and Morogoro Rd, and along Sokoine Dr. and a pedestrian/cycleway built to Old Posta.

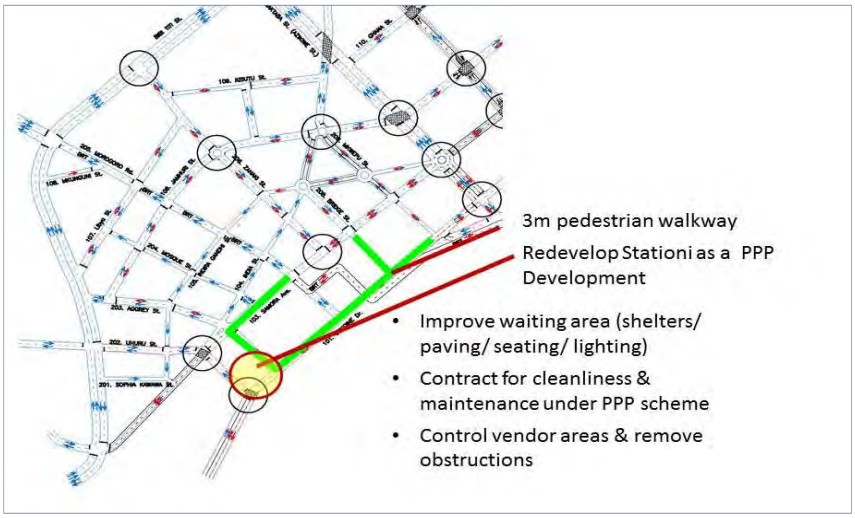



**Figure C10: Overview of 1-P3 projects**

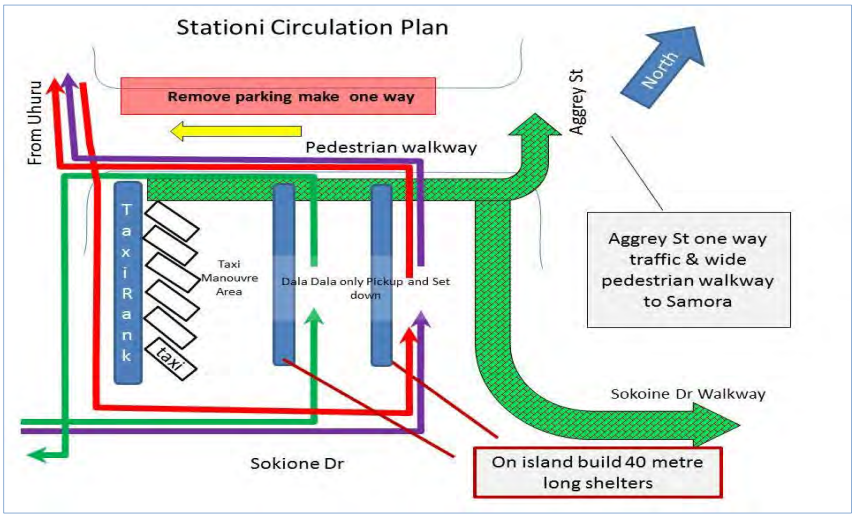



**Figure C11: Stationi Circulation Plan**

# Discussion Paper (Output 2 Annex 1):
# Dar es Salaam Street Design Guide

# Dar es Salaam Urban Street Design Guide

Consensus for Urban Transport and Policy Improvement
in Dar es Salaam (Phase 2)

***Thinking and Working Together for a Livable City***

## Foreword

This *Urban Street Design Guide* is prepared for better urban transport planning in Dar es Salaam under JICA-assisted "Capacity Building Project for the Improvement of Dar es Salaam Transport (CUPID, Phase 2)" and gives an overview of the principles to make streets in Dar es Salaam safe and inviting for people walking, working, shopping, parking, and driving.

We hope that this *Urban Street Design Guide* will be utilized by engineers and consultants for city planning and designing of specific urban streets and that it will contribute to make Dar es Salaam a lively, safe, sustainable and healthy city.

Dar es Salaam
June, 2017

**Ms. Theresia Mmbando**
Regional Administrative Secretary
Dar es Salaam Region

# Table of Contents





# Chapter 1
# Introduction

## 1.1 Background and Objectives

### Economic Growth and Traffic Congestion

- Dar es Salaam faces unprecedented challenges of growing population (+5.6% per annum) and car traffic (+14% per annum), but development of infrastructure for transport has not caught up the rapid growth due to limited governmental investment budget (requires US$ 100-200 mil. of investment per year to maintain current traffic condition).
- Therefore, traffic congestion level in Dar es Salaam is getting worse and becomes a central concern.

### Low Priority on Pedestrian Traffic as a Form of Transport

- Looking at the streets in the Central Business District (CBD) of Dar es Salaam, chronic traffic congestion is observed during not only peak hours but whole daytime in weekdays.
- The streets are occupied with un-controlled on-street parking cars interrupting smooth vehicle traffic flow as well as pedestrians' walking space, and consequently pedestrians are forced to walk on the carriageways.
- Dar es Salaam should focus people-friendly transport environment in order to become more livable city.

### For Lively, Safe, Sustainable and Healthy City

- Dar es Salaam is now transforming transport system from private car based vehicular traffic to public mass transport system with newly introduced Bus Rapid Transit (BRT) network or proposed rail-based Mass Rapid Transit (MRT). Providing good public space and walkable space is indispensable for success of such public transport system.
- This *Urban Street Design Guide* gives some examples and ideas for consideration of street design in urban area.
- Street design or street scape design should be undertaken in consideration of each street's characteristics and requirements from majority of users with a respect for pedestrian traffic as the basis of human activity.



## 1.2 Planning Principles

### Planning Land Use for Better Transport

- Streets are not just for movement but for supporting the activities for work, commercial, social exchange, children playing, etc. and for the enjoyment of residents and visitors.
- Good public space and good public transport system are closely linked each other and are two sides of the same coin.

### Pedestrian Priority

- Street spaces in urban area should have pedestrian priority rather than vehicular traffic to develop lively, safe, sustainable and healthy city.
- In urban areas, on-street parking should be strictly controlled under a comprehensive parking management plan, which provides proper demarcation of street space for pedestrian, vehicular traffic, public activities and on-street parking.

### Good Connectivity for Smooth Traffic

- For providing smooth traffic, some renovation works are necessary to increase capacity of traffic and to decrease traffic congestion with an effective multi-modal transport system. Not only BRT but Daladala should also be a key contributor for public transport system if its operational system or business model are improved.

### Functional Designs

- Enhancing pedestrian comfort can be made by designing streets to accommodate all modes of transport balanced with the streets' roles and required functions.
- The examples described in this guide must be tailored to individual situations and contexts encouraging good engineering judgement in all cases.

## 1.3 A New Approach to Street Design

### Prior Approach

- Designing based on a functional classification of streets categorized only according to their ability to move traffic and provide vehicular access.

### New Approach

- Designing with the principle that streets are public spaces for people as well as corridors for movement based on local context, the needs of multiple users, and larger social, economic and environmental goals.

### For Places

- Examine how the built, natural, social, cultural, and economic context of a street defines the physical scale and character of the space.
- Look at how the surrounding land uses, densities, and larger networks influence mobility and use patterns

### For People

- Identify the people who use a street today and quantify when and how they use it.
- Determine the desired breakdown of users and activities for future street conditions and ensure that the design meets these people's nee

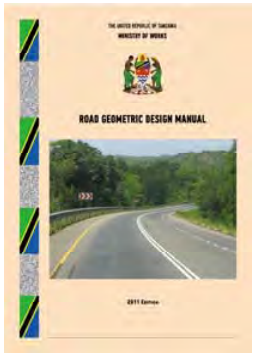
Source: Global Street Design Guide, Global Designing Cities Initiative, National Association of City Transportation Officials



## 1.4 Relationship with Other Manuals

- This *Urban Street Design Guide* is prepared to supplement the existing other manuals utilized in Tanzania with some new contexts especially for urban streets design. Therefore, planners or designers shall comply with the other authorized standards or manuals such as "*Road Geometric Design Manual*" issued by Ministry of Works.
- For preparing this *Guide*, "*Urban Street Design Guide*" and "*Global Street Design Guide*" issued by National Association of City Transportation Officials (NACTO) of the United States and Global Designing Cities Initiative were referred in many aspects of urban street design. The "*Global Street Design Guide*" should also be referred together with this *Guide* and is available for free download from the link below.

https://globaldesigningcities.org/publication/global-street-design-guide/





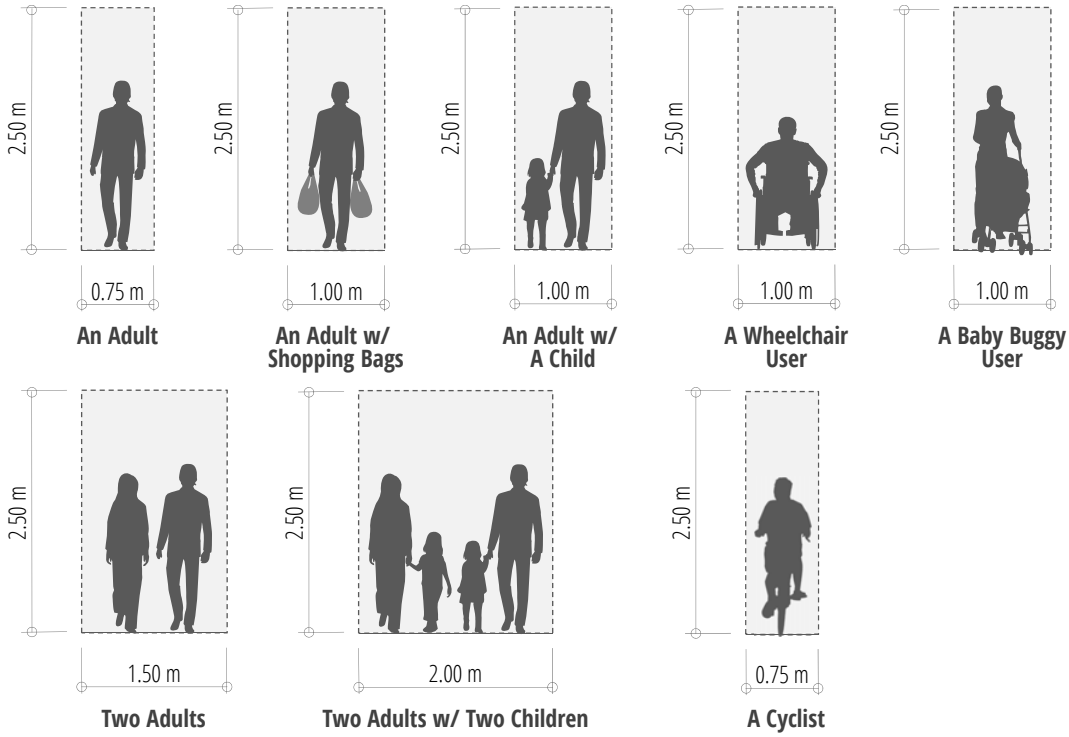
# Chapter 2
# Design Considerations

## 2.1 Definitions and Design Priorities

- This *Urban Street Design Guide* focuses on the design of the streets and public spaces especially in the city center or Kariakoo area where is the complexed, attractive for business, shopping and enjoyment.
- For sustainable development of such urban area, the following user priorities should be taken into consideration for planning and designing urban streets:
  - 1st Priority: Pedestrian
  - 2nd Priority: Public transport users
  - 3rd Priority: Cyclists (in the future)
  - 4th Priority: Motor vehicles

## 2.2 Design Dimensions for Pedestrian & Cyclist

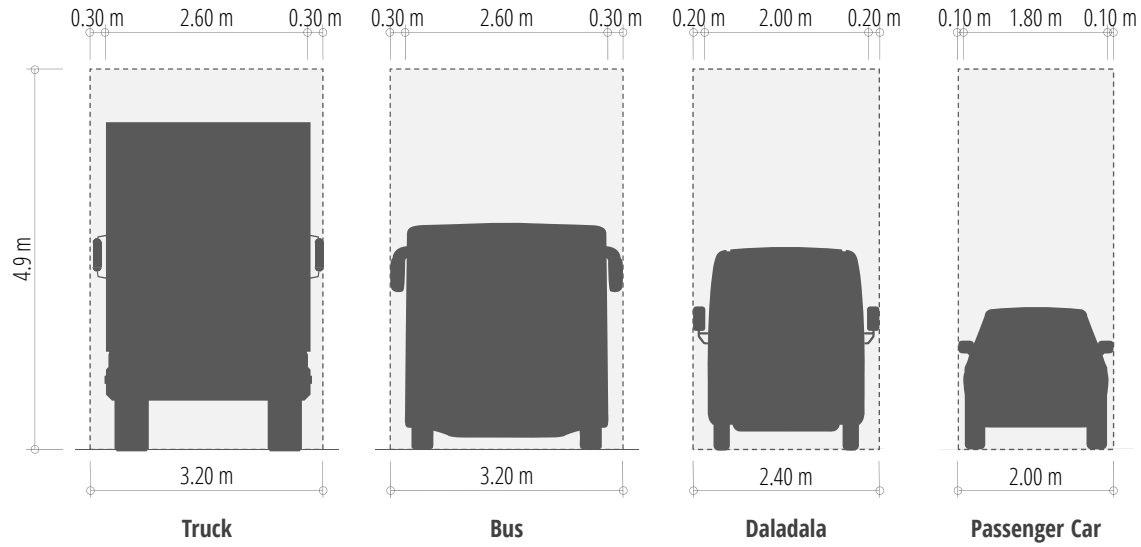
- Typical width of pedestrian and cyclist for street design ranges from 0.75 m to 2.00 m depending on the situations.





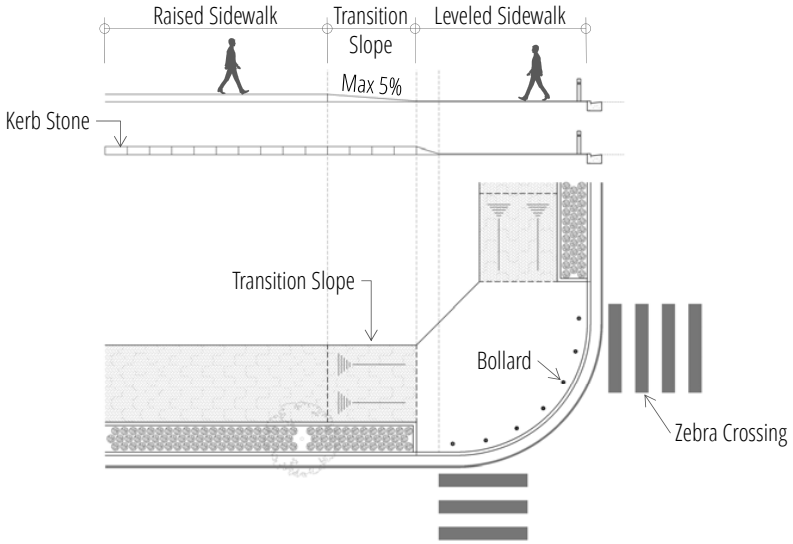

## 2.3 Design Dimensions for Vehicles

- Typical width of vehicle for street design should be 2.00 m for passenger cars and 3.20 m for buses and trucks.
- Vertical clearance above road surface should be 4.90 m.



## 2.4 Universal Design

- This Guide recommends to apply universal design (or inclusive design) which is broad-spectrum ideas meant to produce buildings, products and environments that are inherently accessible to older people, people without disabilities, and people with disabilities.
- Kerb stone cuts or sidewalk ramps, essential for people in wheelchairs but also used by all, are a common example.



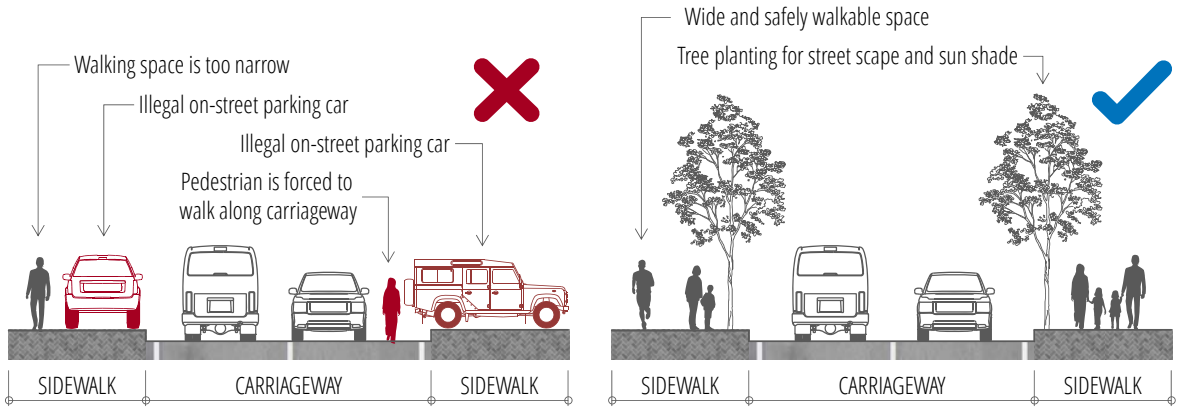

**Example of Universal Design for Intersection Treatment**



# Chapter 3
# Street Design Elements

## 3.1 Composition of Urban Street

- Currently, the spaces of urban streets in Dar es Salaam are occupied by un-controlled illegal on-street parking cars under rapid increase of vehicle number and travel demand into city center.
- In order to change Dar es Salaam to be a lively, safe, sustainable and healthy city, it is necessary to re-allocate street spaces with appropriate composition of street space depending on the characteristics of streets with a respect for pedestrian traffic.
- For designing of composition of urban street, design priorities (e.g.: pedestrian priority) should be considered.

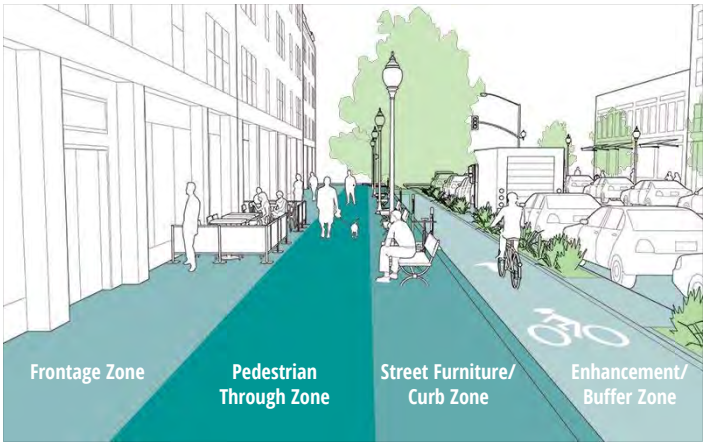



**Current Situation** **Better Use of Urban Street**



## 3.2 Composition of Sidewalk Zone

- The following four (4) categories are known as the composition of sidewalk zones;
  - **Frontage zone**, in front of buildings;
  - **Pedestrian through zone**, for pedestrian mobility;
  - **Street furniture/ curb zone**, for social exchange and enjoyment of residents and visitors; and
  - **Enhancement/ buffer zone**, for Non-Motorized Transport (NMT) users.
- Availability of sidewalk space is often limited so that composition of each street should be carefully considered with the requirements or characteristics of each street.

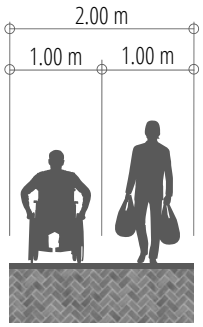
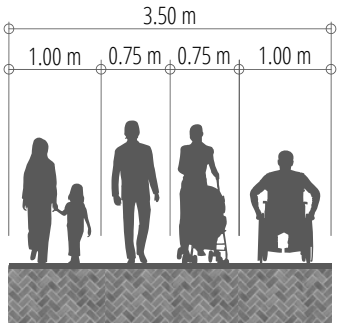




Source: Urban Street Design Guide, National Association of City Transportation Officials

## 3.2.1 Pedestrian Through Zone

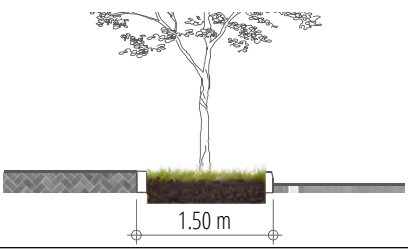
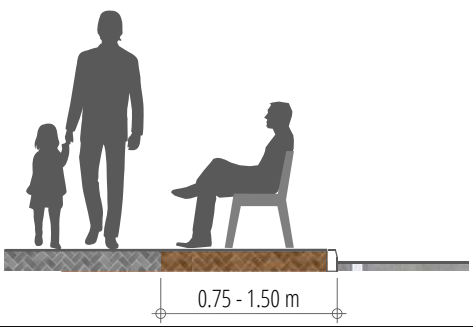
- "Pedestrian Through Zone" acts as the most important function of sidewalk for pedestrian mobility in the city.
- Therefore, proper width for this zone should firstly be provided depending on the demand or expectation of volume of pedestrian traffic.

| For few pedestrian traffic or limited space of street | For many pedestrian traffic street |
|---|---|
| • Minimum width: 2.00 m.<br>• Even if pedestrian traffic is few, width of this zone should accommodate two persons in wheel chairs or having shopping bags in both hands (1.00 m) side by side.<br>  <br> | • Minimum width: 3.50 m.<br>• For many pedestrian traffic streets, width of this zone should accommodate two persons in wheel chairs (1.00 m x 2) and two pedestrians (0.75 m x 2) side by side.<br>  <br> |



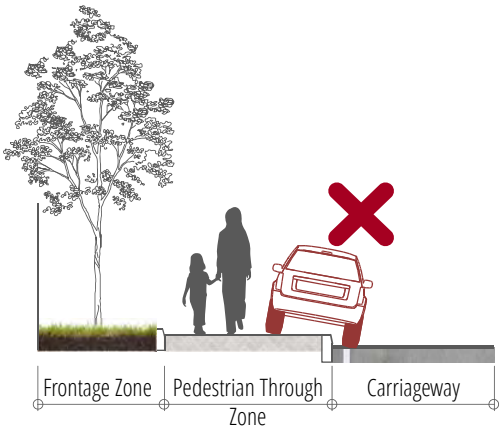
## 3.2.2 Street Furniture/ Curb Zone

- "Street Furniture/ Curb Zone" should also be provided as much as possible for creating spaces for social exchange and enjoyment of residents and visitors in the city.

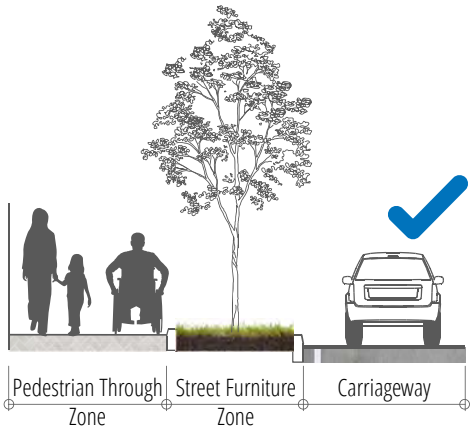
| Vegetation | Furniture (Street Bench) |
|---|---|
| • Vegetation zone should be minimum 1.50 m wide inclusive of curbstone width.<br>• Planting shade trees or shrubs contribute to improve comfortableness of walking environment and quality of streetscape. Type of trees should be selected in consideration of the size to be grown in future and easiness of maintenance.<br>• Longitudinal distance of trees should be at 6.0 - 8.0 m interval for medium trees and at 10.0 - 12.0 m interval for large trees.<br>  <br> | • Street furniture such as street benches should be provided separately from pedestrian through zone.<br>• Street benches contribute to create spaces for social exchange and enjoyment of residents and visitors.<br>• Street benches can be accommodated within 0.75 - 1.50 m width of street furniture zone.<br>  <br> |

## 3.2.3 Frontage Zone

- "Frontage Zone" can be utilized as the space for restaurants, cafés or kiosks. It contributes to improve attractiveness of the city, but should be carefully planned in order not to make the walkable space narrower.
- Currently, the frontage zones along the streets in Dar es Salaam are often utilized as vegetation zones. Although, the vegetation zones itself contribute to betterment of street environment and function well, it should be shifted to the position of the street furniture/ curb zone for separation of spaces for pedestrian and vehicular traffic in order to protect sidewalk zone against illegal on-street parking cars.




**Current Situation**

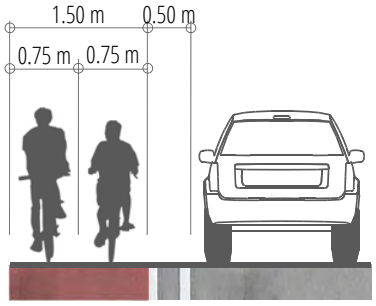
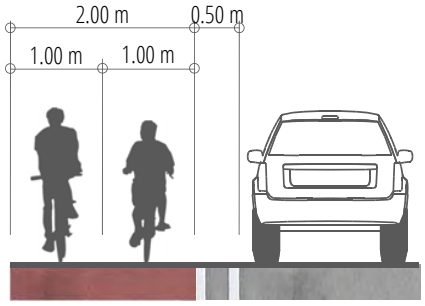



**Better Use of Urban Street**



## 3.2.4 Enhancement/ Buffer Zone

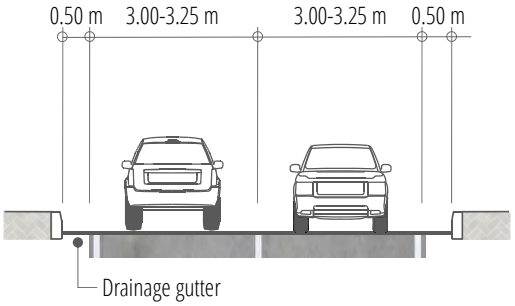
- "Enhancement/ Buffer Zone" is the space for Non-Motorized Transport (NMT) users or pedestrian.
- For provision of this zone, traffic safety should also be considered in order to avoid any conflict with vehicular traffic.

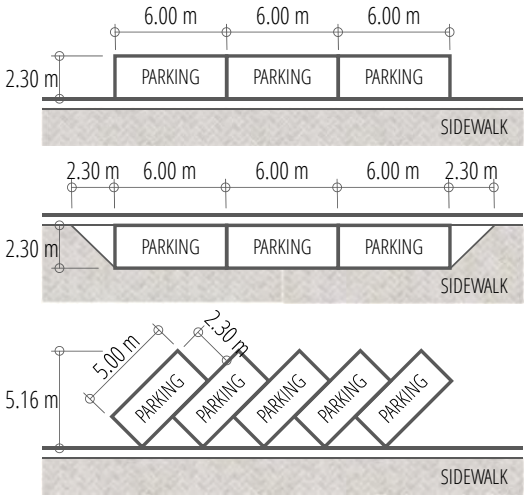
| For limited space of street | For many cyclist traffic street |
|---|---|
| • Cycleway should be at least 1.50 m wide for accommodating two cyclists (0.75 m x 2) traveling side by side.<br>• For safety reason, 0.50 m of margin between carriageway and cycleway should be provided. | • Where there is many cyclist traffic, cycleway should be at least 2.00 m wide for accommodating two cyclists (1.00 m x 2) traveling side by side.<br>• Capacity of cyclist traffic: 1,600 bicycle/hour<br>• For safety reason, 0.50 m of margin between carriageway and cycleway should be provided. |
|  |  |

## 3.3 Carriageway and On-street Parking

- Carriageway width of urban streets should be separately considered with the design standards for inter-city trunk roads.
- Provision of on-street parking space may be necessary to be considered depending on the necessity and availability of space.

| Carriageway | On-street Parking Lots |
|---|---|
| • Lane width should be 3.00 to 3.25 m for urban streets and should not be too wide (wider lane width will attract more illegal on-street parking cars).<br>• In addition to the above, 0.50 m width of shoulder should be provided for drainage gutter. | • Parking lots should have the following dimensions:<br>➢ Parallel parking: 2.30 m wide x 6.00 m long.<br>➢ Angle parking: 2.30 m wide x 5.00 m long. |



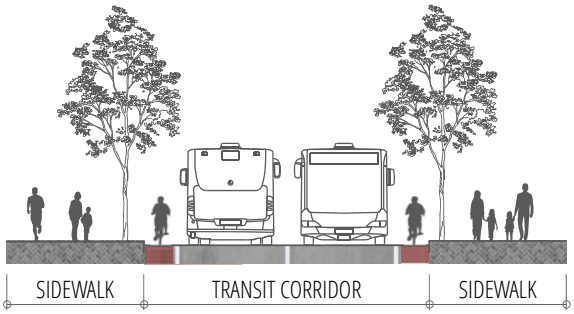






## 3.4 Transit Mall

- A transit mall is a street, or set of streets, in a city or town along which automobile traffic is prohibited or greatly restricted and only public transit vehicles, bicycles, and pedestrians are permitted.
- Transit malls are instituted by communities who feel that it is desirable to have areas not dominated by the automobile, or as a way to speed travel time through an area—usually the city center—for transit vehicles and as a transport hub for interchanges, making them more efficient and thereby more attractive as an alternative to car use.
- Converting a street or an area to a transit mall can be a form of pedestrianization, allowing pedestrians and cyclists as well as transit vehicles to move more freely, unimpeded by private motor traffic, if autos are banned completely.

Bahnhofstrasse, Zurich, Switzerland

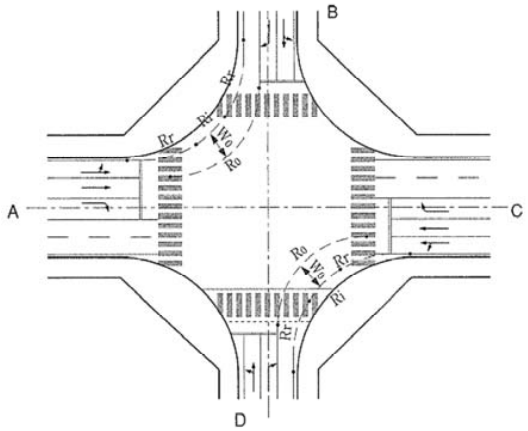



**Transit Mall**

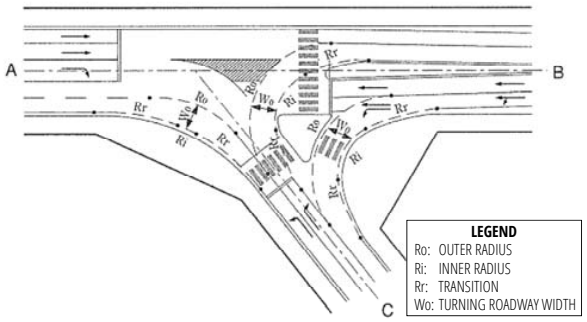
## 3.5 At-Grade Intersections

- Geometric design of intersections should be made in consideration of traffic flow and safety.
- Depending on directional traffic volume, right-turn or left-turn lanes should be provided for ensuring smooth traffic flow.
- At-grade intersection should be designed compactly as much as possible considering drivers' sight distance and minimize loss of signal phasing.

| Outer Radius (m) | Turning Roadway Width (m) | |
|---|---|---|
| | Single-Unit Truck / Bus | Passenger Car |
| 8 – 9 | N/A | 4.0 |
| 9 – 12 | N/A | 3.5 |
| 12 – 13 | N/A | 3.0 |
| 13 – 15 | 5.5 | |
| 15 – 16 | 5.0 | |
| 16 – 19 | | 2.75 |
| 19 – 25 | 4.5 | |
| 25 – 40 | 4.0 | |
| Over 40 | 3.5 | |




**4-Leg At-Grade Intersection**

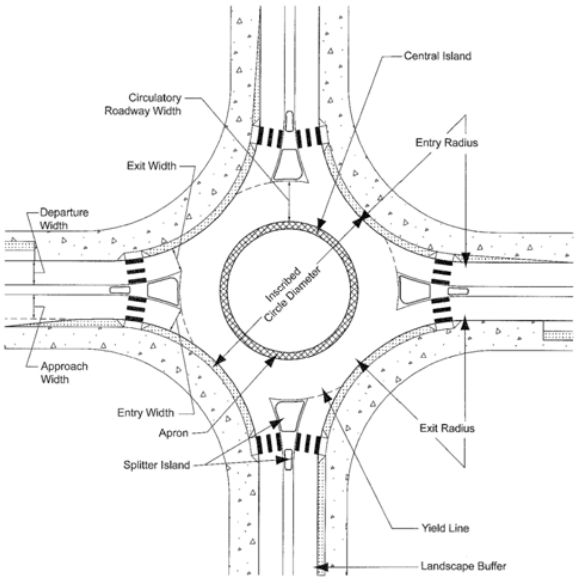



**3-Leg At-Grade Intersection**



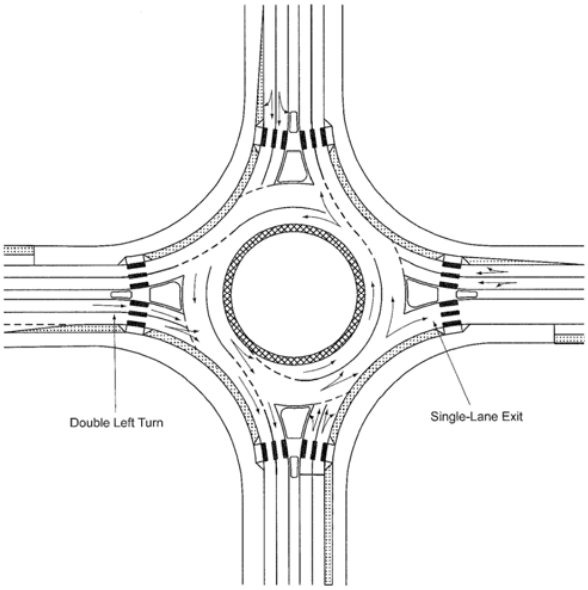
## 3.6 Roundabouts

- Geometric design of roundabouts should also be made in consideration of traffic flow and safety.
- Consideration of weaving maneuvers in the circle is the additional factor of design.




**Basic Geometric Elements**

Source: A Policy on Geometric Design of Highway s and Streets 6th Edition, AASHTO (2011)



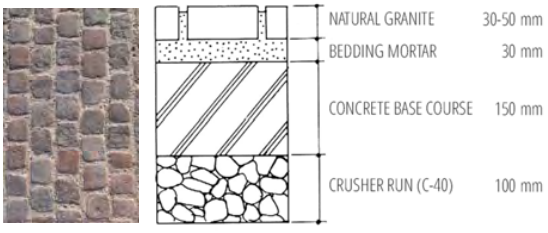

**Lane Configuration Example**

# Chapter 4

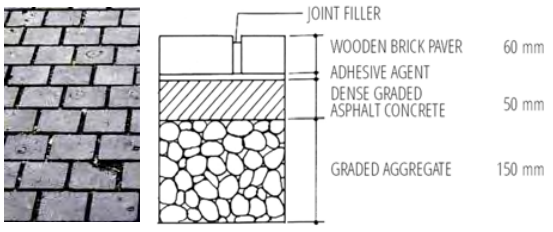
# Materials and Miscellaneous Works

## 4.1 Textures of Sidewalk

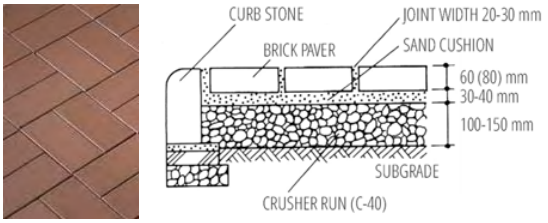
- The following show examples of sidewalk pavement types and its layer compositions. For practical application of the pavement type, it should be verified whether the materials and thickness meet requirement of the strength or the materials are available.



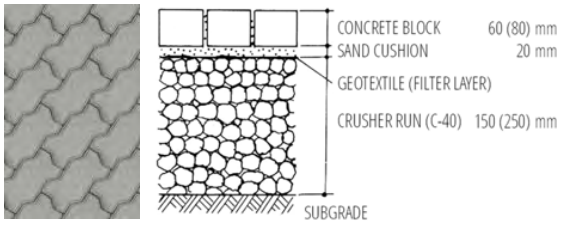

**Natural Granite Pavement**




**Wooden Brick Pavement**



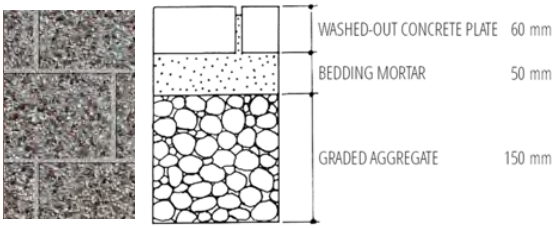

**Brick Pavement**



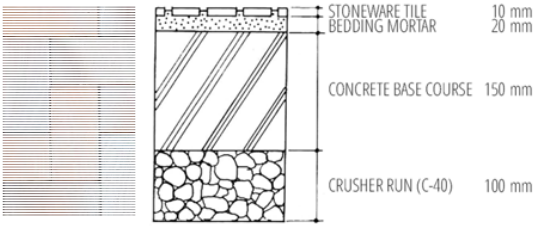

**Interlocking Concrete Block Pavement**

## 4.1 Textures of Sidewalk

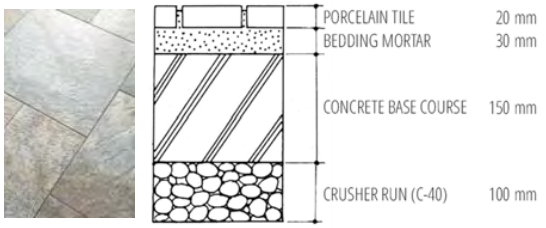
- The following show examples of sidewalk pavement types and its layer compositions. For practical application of the pavement type, it should be verified whether the materials and thickness meet requirement of the strength or the materials are available.



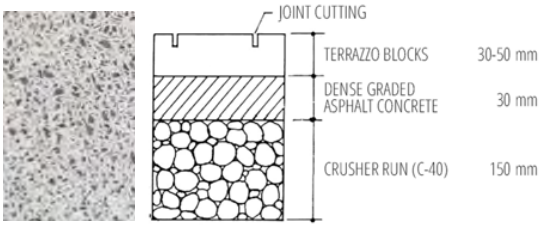

**Washed-out Concrete Plate Pavement**




**Stoneware Tile Pavement**




**Porcelain Tile Pavement**

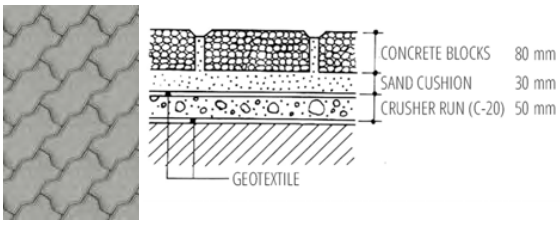



**Terrazzo Block Pavement**

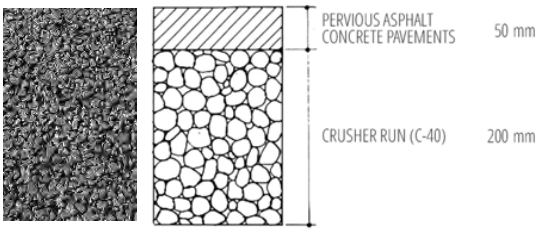


## 4.1 Textures of Sidewalk

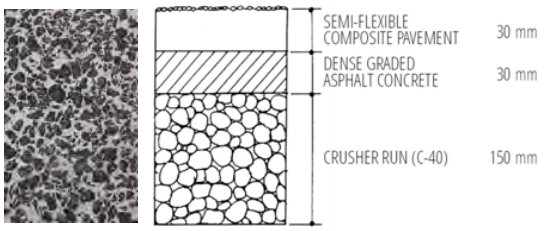
- The following show examples of sidewalk pavement types and its layer compositions. For practical application of the pavement type, it should be verified whether the materials and thickness meet requirement of the strength or the materials are available.



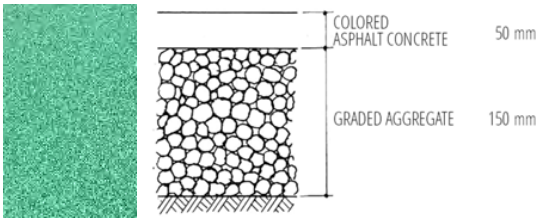

**Pervious Interlocking Concrete Block Pavement**




**Pervious Asphalt Concreate Pavement**



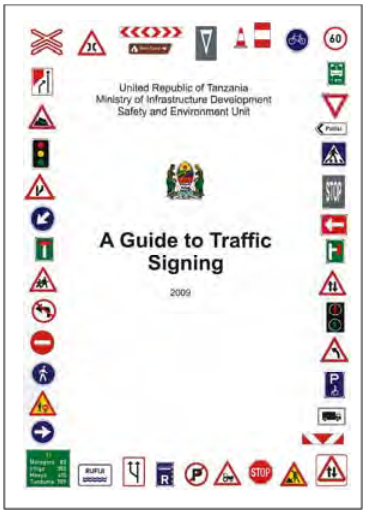

**Semi-Flexible Composite Pavement**




**Colored Asphalt Concrete Pavement**

## 4.2 Road Markings and Signs

- Road markings and signs shall be placed properly in accordance with the national standard "**A Guide to Traffic Signing** (2009)" issued by Safety and Environmental Unit, Ministry of Infrastructure Development of Tanzania.






# Chapter 5

# Operation & Maintenance

## 5.1 Operation and Maintenance

The manager of urban streets (namely, municipal engineers) should have responsibility to maintain the streets in a proper manner. The following are examples of the items to be inspected periodically and be repaired if necessary:

- Pavement (carriageway and sidewalk);
- Roadside facilities (street lightings, road signs, markings, bollards, guardrails, etc.);
- Drainage facilities;
- Trees; and
- Street furniture.

Also, the manager of urban streets is required to operate the streets to be properly used by several road users. The following are examples of the items to be monitored in close coordination with other stakeholders (e.g.: traffic police, on-street parking operators):

- Illegal on-street parking cars shall be removed immediately;
- Illegal motorcycle driving on sidewalk .



## 5.2 Institutional Framework for Maintenance

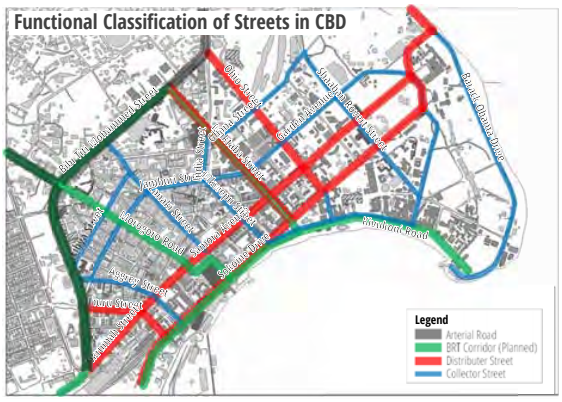
- Municipal Councils must have institutional framework for maintenance of urban streets. However, there are sometimes difficulties to formulate it due to lack of staffs or budget.
- Therefore, involvement of neighbors would be an alternative option for maintenance of urban streets (e.g.: Exim Bank currently maintains several gardens in CBD with people-friendly vegetation beautifully).
- Public-Private Partnership (PPP) would also be taken into consideration for maintenance of streets (e.g.: provision of right to install advertisement with provision of responsibility for maintenance of the street).

# Chapter 6

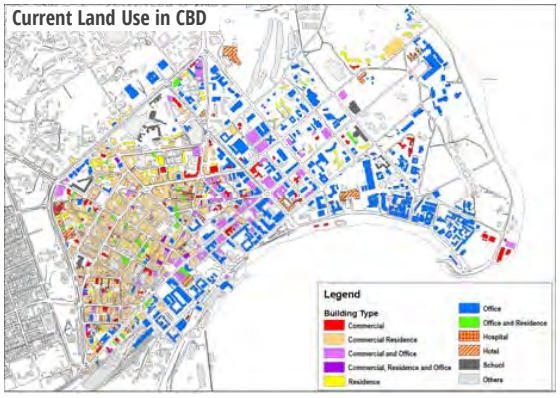
# Case Studies in Dar es Salaam

## 6.1 Practical Examples for the Streets in CBD in Dar es Salaam

- The fundamental information for street planning should be referred from several studies.
- For analyzing the characteristics of each street, the following information should be utilized:
  - Aerial photo
  - Current land use
  - Functional road classification

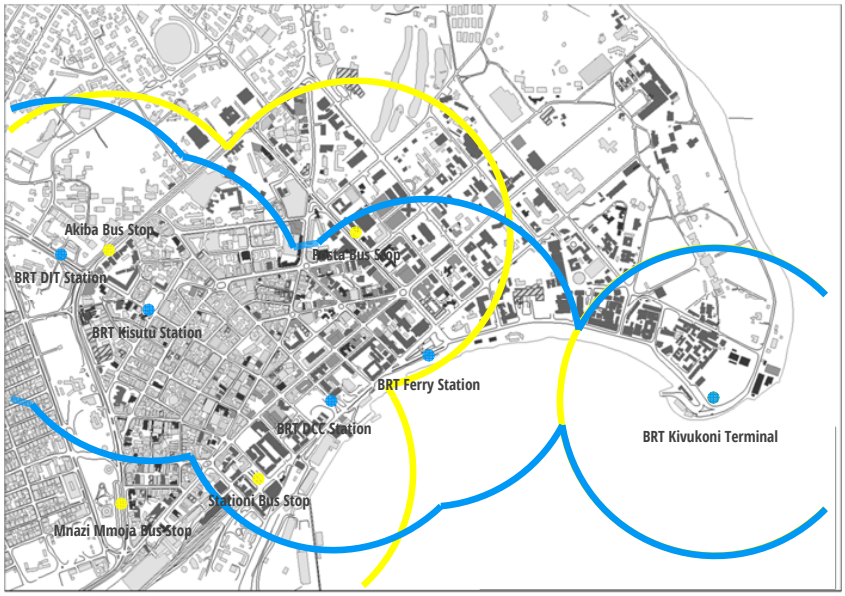






## 6.1.1 Walking Distance from Transit

- The CBD in Dar es Salaam has been formed within the compact area and majority of the area is covered by 500 m (5min) walking distance from the existing transits (namely, BRT stations, Daladala bus stops).
- Along with the improvement of public transportation system in Dar es Salaam, improvement of walking environment would contribute for betterment of traffic condition in Dar es Salaam.






## 6.1.2 Samora Avenue

- Samora Avenue is one of the most important street in CBD. Many pedestrian pass through this street from BRT stations, Posta and Stationi Daladala bus stops. Due to occupancy of the space by parking cars, pedestrian are forced to walk along the carriageway.
- In view of improvement of traffic condition in Dar es Salaam, more walkable space should be provided in order to motivate use of public transport and to provide smooth traffic flow by balancing traffic demand.
- On-street parking should be allowed only at the designated space.

**COMMERCIAL ZONE**
ALONG SAMORA AVE.
BETWEEN CLOCK TOWER & AGGREY ST.

**CURRENT** COMPOSITION

| 1.50 m | 8.40 m | 6.00 m | 3.00 m |
|---|---|---|---|
| SIDEWALK | CARRIAGEWAY | SIDEWALK (OCCUPIED BY ILLEGAL PARKING CARS) | CORRIDOR |

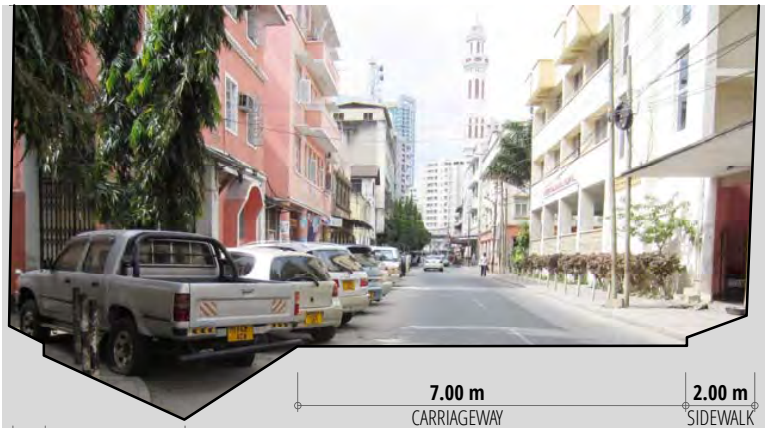
**PROPOSED** COMPOSITION

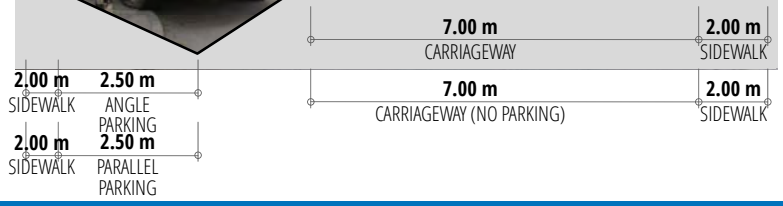
| 1.50 m | 0.50 m | 7.40 m | 0.50 m | 2.30 m | 0.70 m | 3.00 m | 3.00 m |
|---|---|---|---|---|---|---|---|
| SIDEWALK | SHOULDER | CARRIAGEWAY | SHOULDER | PARALLEL PARKNG | STREET FURNTURE ZONE | PEDESTRIAN THROUGH ZONE | CORRIDOR |

## 6.1.3 India Street

- In order to provide safe access to a hospital and a mosque, walkway space should become wider. However, there is no enough room for widening of the sidewalk. For maximizing the use of available space of sidewalk, existing bollards should be removed and replaced to the edge of curbstone.
- Although the existing on-street parking lay-by is provided as parallel parking, vehicles are parked at angle in order to maximize the number of parking cars and then such parking cars invade walking space and carriageway. Therefore, the parking space should stricly be utilized as parallel parking and walking space should be secured.

**COMMUNITY ZONE**
ALONG INDIA ST.
BETWEEN INDIRA GANDHI ST. & JAMHURI ST.






**CURRENT** COMPOSITION

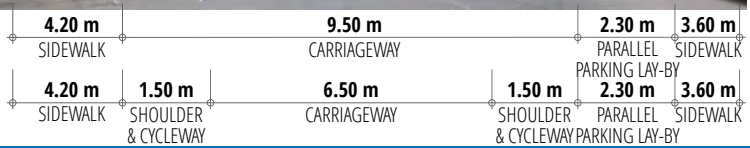
**PROPOSED** COMPOSITION



## 6.1.4 Jamhuri Street

- Jamhuri Street is one of the main streets in CBD and the street width is relatively wider. Parallel parking lay-by is provided at some sections but vehicles are prone to be parked with angle with invading walking space or carriageway in order to maximize the number of parking cars. Not only at the parking lay-bys, vehicles are parked along the both sides of the street and carriageway width is invaded by the parking cars. Car parking should be allowed only at the dedicated parking lay-by.
- A cycleway along Jamhuri Street is proposed under CBD Traffic Improvement Plan. Within 9.50 m of existing carriageway width, 2.00 m width of cycleway can be allocated with 6.50 m width of carriageway and 0.50 m of shoulders.

**COMMERCIAL ZONE**
ALONG JAMHURI St.
MOSQUE ST. & MOROGORO RD.




**CURRENT** COMPOSITION

**PROPOSED** COMPOSITION

## 6.1.5 Maktaba Street

- Currently, due to the vender shops' occupancy in bus loading/unloading area, daladalas is stopping outside of lay-by and it obstacle the traffic on carriageway. Thus, re-demarcation of space for daladala users, vendor shops, bus stop area and mixed vehicular traffic is needed.
- In order to secure loading/unloading space for daladala users, vendor shops should be offset to the edge.

**POSTA DALADALA TERMINAL**
ALONG MAKTABA St.
IN FRONT OF POST OFFICE

**CURRENT** COMPOSITION

| 2.00 m | 1.00 m | 2.00 m | 6.00 m | 1.20 m |
|---|---|---|---|---|
| SIDEWALK | SHOPS | BUS STOP LAY-BY | CARRIAGEWAY | MEDIAN |

**PROPOSED** COMPOSITION

| 1.00 m | 2.00 m | 2.00 m | 6.00 m | 1.20 m |
|---|---|---|---|---|
| SHOPS | SIDEWALK LOADING/UNLOADING AREA | BUS STOP LAY-BY | CARRIAGEWAY | MEDIAN |



## 6.1.6 Zanaki Street

- Enhancement of public space quality with widening of sidewalk for vegetable market zone.
- 9.00 m width carriageway to be reduced to 7.50 m width consisting of 3.25 m width traveled lane and 0.50 m width shoulder on each side (saving of 1.50 m width).
- 2.75 m width sidewalk to be widen to 4.25 m width consisting of 1.75 m width frontage zone for venders and 2.50 m width pedestrian through zone. The other side of sidewalk to be rearranged with providing 2.00 m width parallel parking lay-by.

**VEGETABLE MARKET ZONE**
ALONG ZANAKI St.
BETWEEN LIBYA ST. & JAMHURI ST.

**CURRENT** COMPOSITION

| 2.75 m | 9.00 m | 5.00 m |
|---|---|---|
| SIDEWALK | CARRIAGEWAY | SIDEWALK |

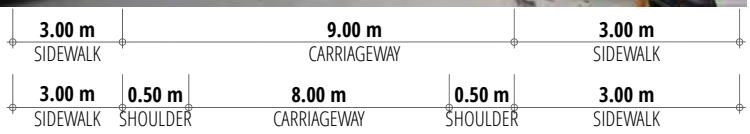
**PROPOSED** COMPOSITION

| 1.75 m | 2.50 m | 0.50 + 3.25 x 2 + 0.50 = **7.50 m** | 2.00 m | 3.00 m |
|---|---|---|---|---|
| FRONTAGE ZONE | PEDESTRIAN ZONE | CARRIAGEWAY | PARALLEL PARKING | SIDEWALK |

## 6.1.7 Uhuru Street

- There are many textile shops along Uhuru Street and the sidewalk space is occupied by parking cars.
- Because of the limited available space, NO on-street parking should be allowed along whole stretch of the street.

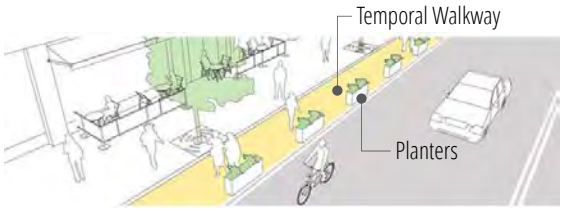
**COMMERCIAL ZONE**
ALONG UHURU St.
BETWEEN BIBI TITI ST. & SAMORA AVE.

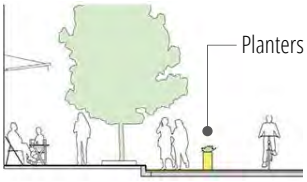




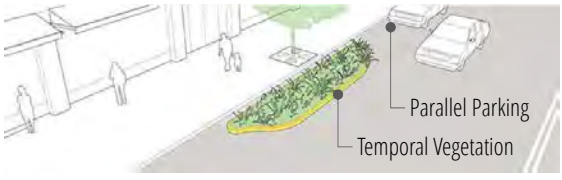

## 6.2 Interim Design

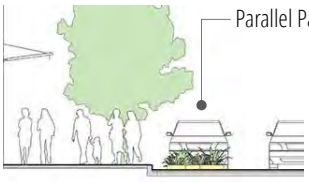
- Before full implementation of improvements, it can be tested through pilot project with interim design.



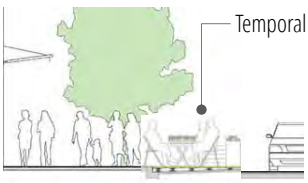




**Widening of Sidewalk with Installation of Planters**




**Installation of Parking Lay-by with Installation of Planters**


**Creation of Café**

## 6.3 Pilot Project: Samora Avenue Renovation

### Objective

- To improve traffic safety and traffic flow through provision of proper on-street parking and footpath;
- To maximize synergy effect with ongoing initiatives by Ilala (street beautification, street lighting).

### Methodology

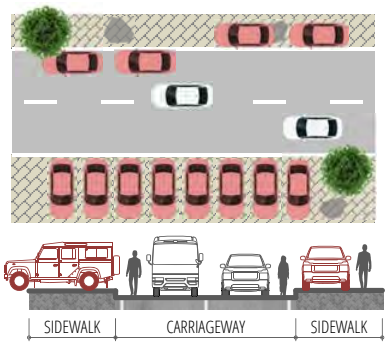
- Establish on-street parking rules depending on availability of space;
- Remove uncontrolled on-street parking cars and create on-street parking spaces based on the above rules;
- Enforce on-street parking rules with road markings & signs;
- Create walkable space by renovating sidewalk pavement and planting trees.

### Expected Positive Impacts (Benefits)

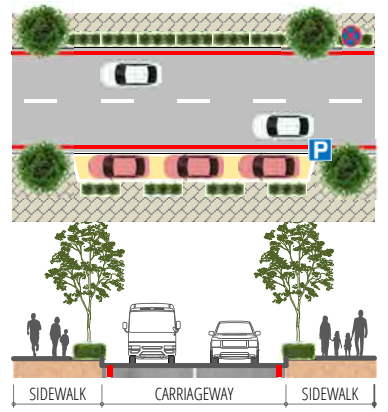
- Walking environment (safety and comfortableness) along Samora Avenue will be improved;
- Better traffic environment will contribute to increase in sales and land/property value.

### Expected Negative Impacts (Risks)

- It may cause less customers/visitors affected your business during construction period;
- On-street parking space will be limited during/after construction;
- Though limited, some environmental adverse impacts, such as noise or dust, expected.




**BEFORE**




**AFTER**



## 6.3.1 Before and After (Clock Tower Roundabout – Aggrey Street)

**BEFORE (JUN 2016)**

**BEFORE (JUN 2016)**

**AFTER (AUG 2017)**

**AFTER (AUG 2017)**

## 6.3.2 Before and After (Aggrey Street – Mosque Street)

BEFORE (JUN 2016)

BEFORE (JUN 2016)

AFTER (AUG 2017)

AFTER (AUG 2017)



## 6.3.3 Before and After (Mosque Street – Morogoro Road)

BEFORE (JUN 2016)

BEFORE (JUN 2016)

AFTER (AUG 2017)


AFTER (AUG 2017)

## 6.3.4 Improvements by Samora Avenue Renovation

Installation of Bollards for Preventing Vehicle Entry to Sidewalk

Installation of Street Benches for Enjoying or Resting

Yellow Box Marking at the Intersection of BRT Crossing

Widening of Roundabout for Providing Smooth Traffic



## References


- Cities for People, Jan Gehl, 2010
- Global Street Design Guide, National Association of City Transportation Officials and Global Designing Cities Initiative, 2017
- Urban Street Design Guide, National Association of City Transportation Officials, 2013
- Abu Dhabi Urban Street Design Manual, Abu Dhabi Urban Planning Council

**THE UNITED REPUBLIC OF TANZANIA**
**PRESIDENT'S OFFICE REGIONL ADMINISTRATION AND LOCAL GOVERNMENT AUTHORITIES**
**TANZANIA RURAL AND URBAN ROADS AGENCY (TARURA)**

TANZANIA RURAL AND URBAN ROADS AGENCY
TARURA
Improved Roads for Sustainable Development

P.O.BOX 5429,
**Dar es Salaam**

**Date 10/10/2017**

**Ref. No CA/298/332/02/72**
JICA- Capacity Development Project,
P. O. Box 9084,
**Dares Salaam.**

**RE: JICA'S CAPACITY DEVELOPMENT FOR THE IMPROVEMENT OF DARES SALAAM TRANSPORT –PHASE 2(CUPID PHASE 2).**

Refer the above heading

I acknowledge to have received a Draft document for Dares Salaam Urban Street Design Guide.

I appreciate your efforts and supports in building capacity on improving urban transport planning in Dares Salaam. I have gone through your documents it capture adequate details and relevants reference that could be usefully in infrastructure development pojects.

It covers a lot of principles that once implemented it will make Dares Salaam streets safer thus inviting people for walking, shopping, parking and driving.

With this letter I would like to say I am satsified with what has been prepared regarding the

Dares Salaam Urban Street Design Guide.

With regards

Eng. George Tarimo
**Regional Coordinator**
**TARURA DARES SALAAM**

**Copy to:** REGIONAL ADMINSTRATIVE SECRETARY
P. O. Box 5429
DARES SALAAM

# Discussion Paper (Output 2 Annex 2):
# Management of Parking Services in Dar es Salaam

Capacity Development Project for

the Improvement of Dar es Salaam

Urban Transport (Phase-2)

# Discussion Paper (Volume 2 Annex 2)

## Management of Parking Services in Dar es Salaam

This paper has been prepared only for internal discussions amongst the designated stakeholders for this project. Discussions can explore ideas and concepts for policy development and need not be limited to current policies of the Government of Tanzania.

Secretariat for the Capacity Building Project

and

JICA Expert Team

# Introduction

Following recent discussions on the management of parking in Dar es Salaam city and representations made by the JICA-CUPID project on this matter to the City Director, the Dar es Salaam City Council (DCC) has requested the CUPID project to consider conducting a feasibility study on the parking proposal. We also understand that an option exists for DCC to hire an outside local consultant for this task.

We are pleased submit our proposal on the basis of the following:

1. The JICA expert team has developed a comprehensive traffic improvement program in CBD, including parking management scheme, based on a series of traffic surveys conducted under the JICA project. Parking management in the CBD is a selected short term project under the CUPID Phase 2 project for the alleviation of traffic.
2. The JICA expert team is accordingly wholly familiar with the matter, while conversely an outside consultant may not be fully cognitive of the issues at hand.
3. Time is not on the side of the DCC. Appointing outside consultants could be inefficient time-wise. Also, if the work of an outside consultant was inadequate it could cause confusion or delays.
4. Under the JICA project the work could commence immediately without procurement delays. We kindly request the support of the DCC City Engineer to provide local information as necessary.
5. The JICA team has specialist personnel experienced in operational methodology and performance-based contracts.
6. The JICA CUPID project will conduct the study at its own cost, thereby allowing DCC to conserve its budget which could be reassigned to the implementation program.

# Background to the Proposal

The contract of the current Parking Services Contractor (NPS) will end in August 2015. The DCC would like to improve efficiency in parking business and hence generate more revenue than that the DCC receives from current contract with NPS.

The JICA CUPID project has selected a short term project improve parking management for alleviation of traffic in the CBD, specifically to improve control of parking; implement policies to make parking more efficient; create order in parking and to reduce traffic interference caused by parking.

To achieve this, requires the improvement of the physical management of parking (infrastructure/ rules/ enforcement) and also the more efficient control of fee collection and revenue.

The JICA team have introduced the cashless mobile payments system as a potential technology that enables such control of parking fees and revenue, which facilitates the DCC to introduce a new Parking Services Agreement, with a business model where DCC has greater control over parking policy and revenue. This will reverse the current arrangement, as instead of DCC receiving a fixed licence fee from the contractor allowing them operate the parking business, the new contract will enable DCC to receive the gross revenue and pay the contractor a fixed fee to manage the parking services.

## Scope of the Feasibility Study

The study will include:

1. Review of JICA 2012 parking survey, and proposed parking management scheme
2. Review of current contract with NPS
3. Scope of the parking contract areas and mapping parking spaces
4. Technology options for fee collection and revenue control
5. Operational Plan, methodology and business model
6. Contract Framework for management of parking (outsourced)
7. Outline of infrastructure requirements, budget and finance options
8. Establishment and procurement processes
9. Project Schedule
10. Ancillary and co-benefits of the parking proposal

## Detailed Content of the Feasibility Study

The specific content of each topic will include (but not be limited to):

### 1. Review of JICA 2012 parking survey, and proposed parking management scheme

We will review the 2012 survey work including the parking demand/supply analysis, on-street parking design concept and proposed parking management scheme; to the extent it may affect the feasibility of the contract or its scope.

### 2. Review of current contract with NPS

This review will both familiarise the study team with the existing/previous contract but also identify critical performance elements that need to be addressed in a new methodology and contract.

### 3. Scope of the parking contract areas and mapping parking spaces

Immediately work will begin on the GIS mapping the parking areas of the city, by recording the GPS coordinates at the start and end point of each street or part thereof (designating parking zones). This GIS information will be required for any electronic system which needs to know the location where revenue is collected. In each zone** the car parking spaces will be counted to establish a full database of available parking in the city.

This will be required for the Transaction Operator to estimate revenue, in order to develop a business proposal (upon which a percentage commission is negotiated).

From this zonal information, viable contract areas will be identified, for example: defining contract areas where each area manages 3000 parking spaces. This allows DCC to let multiple contracts thus engaging multiple operators.

** *Note that a zone represents an area that can be typically managed by 2-4 attendants.*

## 4. Technology options for fee collection and revenue control

Although Boloro has been introduced as suitable technology, a full evaluation of technology alternatives will be considered so that the DCC can be confident that all technology options are examined. The technology will be aligned to the type of business model it allows or requires.

## 5. Operational Plan, methodology and business model

Following the evaluation of the technology options, a recommendation will be made with an outline of the Operational Plan. This plan will outline the complete methodology for efficient parking management and will include a full risk analysis and evaluation.

A business model will also form part of the operational plan, outlining the methodology of pricing policies and mechanisms so that the DCC can develop revenue streams and control parking behaviour through these pricing mechanisms.

## 6. Contract Framework

The operational methodology will be transposed into a contract so that roles, responsibilities rights and obligations of all parties are formally specified and act as a legal agreement between the parties. This it will serve as an instrument for control and monitoring, ensuring compliance and proper accountability.

A number of contracts need to be developed between the parties, namely:

(i) The Operator Contract: The Operational Plan will define the methodology and work practices, and these must be written into a Performance-based Contract under which the operator will perform services and under which the DCC will control and monitor the contract for compliance.

(ii) The Merchant Agreements to legalise the distribution payments between Transaction Operator, the DCC and the Operator according to their respective contracts. This agreement defines the methodology, rules, commission payable and all interaction between the parties. (Note that level of commission will need to be negotiated).

## 7. Outline of infrastructure requirements, budget and finance options

The project will estimate and specify the necessary parking infrastructure improvements within the study area so that a budget can be prepared. This includes roadworks, and parking bays, signage markings etc. This will inform costs and budget estimates.

The purchase and acquisition of the technology will also be estimated, and finance options prepared.

## 8. Establishment and procurement processes

Implementation requires action on numerous fronts and this study will outline methodology on the following items (as a minimum):

- Methodology to procure technology (costs and lead time) and prudential requirements.
- Procurement of contractors (the bidding process and development of Requests for Tender [RFP]). Selection of the Contractors.
- A discussion on the transition process, perhaps an interim contract to familiarise eligible parties or DCC direct involvement for interim parking management.

## 9. Project Schedule

Develop the project schedule and duration and prepare timeline and milestones for each activity.

It is expected that provided a go-ahead is received before end July, that this feasibility study will be completed by end August.

## 10. Ancillary and co-benefits of the parking proposal

A new business model where DCC has greater control over parking policy will yield numerous benefits both directly and indirectly to the City. It also opens up further possibilities where synergies can be found to improve other areas of council management. A discussion of these aspects will be included.

# Appendix1: Parking Policy for Dar es Salaam

## Background

### Traffic congestion and parking saturation (demand vs. supply)

The city's parking practices contribute significantly to traffic congestion, because cars circulate looking for parking spaces, and irregular parking practices hinder traffic flow and pedestrian movement, often causing pedestrians to walk on the road carriageway as car are blocking footpaths.

Street parking is often at saturation point because on-street parking is cheaper than off-street garage parking.

The wide practice of on-street reserved parking reducing parking availability particularly as it reduces the turnover of car parking spots. JICA 2011 study showed an average of only 1-3 times turnover of car parking spots in Dar es Salaam CBD area.

### Demand management

Pricing and availability of parking are tools which may reduce demand, if they change travel behaviour to public transport. Hence the quality of public transport is an important aspect to be managed. Improvements to bus terminus/bus stop facilities as well as walking paths improvements need to be included in the scope of works of the infrastructure work.

Similarly, the provision of park and ride stations peripheral to the city (and either close to BRT or with a dedicated bus service to the city) will encourage motorists to avoid parking in the CBD.

### Parking discipline

Parking is disorganized due to poor marking and signage, with parking fees charged even when cars park illegally. Studies indicate that 14% of the city parking is illegal.

The regular practice of car parking on footpaths, not only obstructs footpaths (and damages them) but cause pedestrians to walk on the carriageway which is a considerable risk to safety.

The uncertain status of many parking locations also needs to be normalized to reduce disputes, settle ownership/payments issues and bring these locations under DCC control.

### Fee Exemptions for government and diplomatic vehicles

The parking fee exemption given to government and diplomatic vehicles undermines the city's parking policy, and serves as a poor example to regular citizens who pay their way. Exemptions seen to favour the 'ruling class' is a remnant of a colonial past, and such prejudicial policy should be discontinued as it will undermine the policy objectives and public support.

### Revenue Capture

Whenever there is cash handling, pilfering and theft will occur, eroding the city's revenues.

The price of city parking is still comparatively low, and certain pricing mechanisms can be introduced with the aim of managing parking demand, raising revenues collected, and efficiently managing parking space availability.

## Areas of attention

There are 4 key areas of attention where policy action needs to be taken:

### Demand vs. supply and availability

Improve parking efficiency and increasing availability by:

1. Discouraging reserved parking (pricing it much higher or placing it away from high demand areas);
2. Increasing charges and placing short time limits on high demand locations, such as banks, where customers do fast turnaround business;
3. Clearly marking legal parking places with road marking and signage to identify them;
4. Placing 'P' signage with arrow to direct motorists to parking garages.

Normalize irregular or ad-hoc parking locations (such as vacant blocks) to determine legality, ownership and permissions. Private land can be made available for parking to the DCC where DCC can collect fees and pay the land owner commission. Signposting should indicate the legal parking permissions which apply.

### Eliminate illegal parking practices through physical measures and enforcement

The clear marking and signposting of legal parking spots should be matched with parallel action to eliminate illegal parking behaviour. This would require physical barriers (bollards or plant boxes) on footpaths to prevent cars parking on footpaths as well as signage and enforcement (penalties and wheel-clamping for offenders).

Good infrastructure will assist in improving parking behaviour, and also make enforcement easier. Motorists will also observe improved parking conditions and this may help mitigate complaints over increased charges.

### Pricing Policy that influences behaviour

Parking charges, as well as providing a revenue stream to council (also to assist in funding the parking management) can also serve as a price mechanism to influence motorist's behaviour.

'Willingness to pay' is a term used to find the price level at which motorists will change their habits, and therefore parking fees can serve as a price mechanism to manage supply and demand, and improve parking efficiency in the city.

These measures can be considered:

1. Removing the price differential between on-street and garage parking, to encourage off-street parking.

2. Increase the cost of parking in high demand areas to increase turnover of parking spots. Selective zonal increases are more palatable than 'across-the-board' increases, as cheaper parking is still available at lesser demand areas.
3. Significantly increase the parking charge for reserved parking, and remove reserved parking from high demand locations.

### Revenue protection and data collection

The only way to eliminate cash pilferage and theft is to introduce a cashless payments system. Any person seen collecting cash will be seen as stealing.

Cashless systems have the added benefit of returning precise data on revenue per parking zone, time of day, and spare capacity. This is an essential tool to improve planning.

All fines and penalties relating to enforcement shall also be managed through a cashless system to prevent bribing the wheel clamp attendant.

## Principles (agreed objectives) that underpin parking policy

Policymakers need to agree on a set of 'agreed objectives' serving as the principles upon which the policy is grounded. These principles are:

**Efficiency**

A vibrant city centre must manage its parking well as it serves as a key instrument to promote the productivity and economy of the city. Proper infrastructure is a key element to improving efficiency.

**Enforcement**

To protect the integrity of the policy, requires active enforcement and equal treatment of all motorists. Principally this will be to improve discipline and behaviour.

**Revenue enhancement and protection**

Prudent management dictates that revenue collection is properly organised to avoid corrupt practices. Protecting council revenues is a mandated responsibility.

**Use of technology**

It is clearly evident that technology offers great opportunity to manage public services, revenue collection and efficiency improvements.

## Parking Policy for Dar es Salaam

The city's urban environment contributes to the physical, social and mental well-being and personal development of all its citizens. Opportunities for cycling and walking modes are critical for mobility, and are low cost, low emission and environmentally friendly means of transport. Personal safety is also paramount.

We commit ourselves to providing a sustainable and environmentally responsible and liveable city.

The city undertakes to design car parking arrangements efficiently, to better manage supply and demand, and at the same time improve parking behaviour to reduce traffic congestion, improving pedestrian safety, and develop communal space that enriches culture and promotes community interaction.

**Improvements to Parking Infrastructure**

The city will commit to funding the necessary infrastructure to improve and manage parking arrangements; to properly identify, mark and signpost legal parking, as well as to signpost, or install barriers where necessary to prevent illegal parking.

Parking arrangements shall be designed according to street design guidelines according to street classification to ensure proper and recognised standards are followed.

Selected areas for taxi parking shall be made available at strategically placed locations to ensure taxis do not park illegally.

Park and ride facilities will be developed to promote the use of public transport and reduce the travel demand into the city. Security and convenience will be high priority to make this an attractive option.

**Permissions for ad-hoc parking facilities**

From time to time vacant lots or spaces may become available for parking. Council has the right to approve or disapprove the use of such lot for parking, requiring the landowner to make application for such use. Council permission for the use of such land for car parking purposes shall be by written permission, allow the council to collect fees for cars parking on such property with consideration of a percentage of such fees (or a set fee as agreed) paid to the owner or landlord of the property.

**Improvements to public transport infrastructure**

Recognising that parking demand will reduce when more motorists opt to use public transport, the city commits to improving public transport infrastructure, such as bus termini with improved walkways to and from bus stations so that pedestrian access and safety is improved for the first mile/last mile of a public transport journey.

The city also commits to provide infrastructure to promote safe cycling as a low cost and low emission mode, to reduce car travel and parking demand.

**Managing Availability and Accessibility**

To improve parking efficiency, high demand locations shall be identified and be controlled by time limit and pricing structure to increase parking turnover and improve accessibility to fast turnaround traffic (e.g. at locations such as banks, council offices).

Reserved parking catering to long term or all-day parkers shall be removed from high demand locations, and replaced with short term ‘fast turnaround’ parkers who shall pay comparatively higher charges (per hour or part thereof).

**Price Structures**

The city is authorised to implement a differential parking price policy, which is reflective of the level of demand, namely increasing the time-based parking charges for high demand parking zones. This policy will be exercised for the purposes of increasing revenues in a judicious manner, influencing motorists parking behaviour, and reducing parking demand.

**Exemptions to Parking charges**

There shall be no exemptions applying to any sector in the payment of the parking charges. Ad-hoc exemptions for diplomatic purposes, such as ceremonies and events involving a VIP cavalcade can be made to the council, so the necessary arrangements can be managed. Such application must be made at least one business day prior to such event in writing, stating the estimated time period and number of vehicles involved.

**Technology Solutions**

The city will explore all technology options to assist it to improve the management of parking and protect its parking revenues.

This will include:

1. The implementation of 'cashless' revenue collection for parking fees as well as the cashless payment of fines and penalties.
2. Through the technology, collecting data to be able to more optimally and efficiently plan the parking arrangements.
3. Advanced parking management technology options which registers each parking event by plate number and by location and time which is synchronized with the central control center.

**Community feedback**

The council is committed to implementing this policy for the overall betterment of the city, to improve its economic productivity, efficiency and quality of life.

Any citizen with complaint or grievance in respect of the implementation of this policy is encouraged to make representation, and the council will review such complaint for remedy, but at all times compliant to the principles and spirit of the policy.

## Issues for further discussion

1. **The idea that motorists can expect the parking staff to watch over their car cannot be built into the policy.**

While parking attendants can be watchful, they (or the parking contractor) cannot take liability for any damage. Quite simply because, to do so, would invite bogus claims where prior damage may be attributed to the parking event, and the attendant would not sufficiently be able to prove otherwise.

2. **So-called 'security' touts who protect cars for a fee.**

This requires a decision:

**Option A:** As long as the motorists pays the parking fee to a parking attendant, any private arrangement with a person offering to look after their car can be a private matter.

**Option B:** As these touts can often retaliate after rejecting their offer, such activity should be outlawed, and replaced by accredited persons who act as security agents in a parking zone. This could be covered by an additional parking levy built into the parking charge. However, to prevent bogus claims for prior damage, it would be a case of prevention, all care taken but no responsibility. The motorist could however make a formal report, which the security attendant would assist with.

**Option B** legitimises the practice, for which motorists are more amenable to pay a fee. It also creates employment opportunity.

3. **Disabled Parking**

There is in DSM no official way of deeming whether a person is classified as disabled or not. In overseas countries, the disabled drivers have an official disabled sticker on the inside of the widescreen to qualify them to use a disabled parking spot.

For a disabled parking spot policy to work effectively will require a concrete way to determine eligibility.

4. **Illegal parking fee collection**

When cashless payment systems are used, any physical payment of cash related to parking becomes an illegal transaction. When a parking attendant employee is involved, the parking contract must

have all the conditions necessary for the city to protect its revenue, and for the city to take action against the contractor (financial penalty) as well as to instruct the dismissal of the employee. In the case of an imposter, the law should provide the means to take legal action with severe consequences.

5. **Illegal parking contracts on public property.**

Should private actors set up mafia-style parking business on public lands, the law should allow the city to take action with e severe consequences.

6. **To charge for taxi parking?**

As a measure of support to the taxi operators who provide public service the taxi parking could be free of charge. Consider that a person catching a taxi instead of a private vehicle is a form of car-sharing and reduces pressure on parking space.

7. **Building development rules that stipulate minimum parking requirements in new buildings.**

Present policy stipulates a set proportion of parking spaces which each new building development needs to provide. However, while it increases the stock of off-street parking, if it increases the aggregate parking spaces in the city, it may stoke further traffic which the road system may not be able to accommodate.

Rather than a unilateral policy one way or the other, the requirements could remain, but allow developers to request exemption if they can prove access to public transport. This would incentivise developers to consider public transport access, and be in a position to be reduce parking provision.

# Appendix 2: Parking Management Log-framea

## For discussion 9 March 2017 CUPID Secretariat

| **Identified Issues/problems** | **Area of Attention** | **Short term Action (1 - 6 months)** | **Outcome** |
|---|---|---|---|
| **Traffic congestion and parking saturation**<br>• Saturation: A significant source of traffic congestion is cars circulating looking for parking<br>• Irregular parking hinders traffic flow and pedestrian traffic<br>• Are parking garages optimally utilized? On-street parking is still cheaper than garage parking<br>• Reserved on-street parking reduces availability and low turnover of car parking spaces: 1-3 x /day (JICA 2011 study)<br>**Parking discipline**<br>• Parking is disorganised with lack of proper marking for legal parking and illegal parking prevalent (also on footpaths) | Examine demand vs. supply.<br>Improve efficiency of available parking<br><br>Eliminate illegal parking practices through physical measures and enforcement<br><br>Pricing Policy that influences behaviour:<br>- Create price incentive to park off-street<br>- Look at charges for all-day parking (to discourage this practice) | **Infrastructure**<br>Improve street parking infrastructure (line marking/signage) and physical barriers to control illegal parking and parking on footpaths<br>**Fees and penalties**<br>Increase penalties for parking on footpaths (wheel clamp)<br>Increase parking fee for legal spot, with higher charges for high demand locations<br>Make street parking fees on-par or exceed off-street parkades.<br>Increase comparative cost of reserved parking<br>- twice the cost of casual parking to discourage this practice<br>- Compensates for loss of availability when not in use | Clearly marks legal parking and eliminate illegal parking<br><br>Increased revenue (value for money is legal spot)<br>Better utilization of off-street parkades by removing price differential.<br>Will reduce some supply by proportion of illegal parking (14%)<br>Higher charges for high-demand locations will result in shorter stays increasing turnover and availability<br>Much higher charges for reserved parking increases revenue return and/or creates more availability. |
| **Constraints**<br>Exemptions for government and diplomatic vehicles<br>Shows non-compliance / bad example/ impunity for disobeying regulation | How these exemptions erode the integrity of rules and enforcements<br>How to manage and solve this issue? | Eliminate exemptions and apply all rules equally<br>Methods and processes to manage special ad-hoc parking requirements | A fair and equitable regulation on parking behaviour. |
| **Revenue Capture**<br>• With POS, pilfering still occurs<br>• Inadequate revenue return to council<br>• Price of parking still comparatively low (but resistance Re: value for money) | Technology solutions<br>Pricing Policy that influences behaviour | Improve revenue collection technology (cashless)<br>Improve the pricing policy for parking:<br>- Higher fees as a general demand control measure<br>- For higher demand locations<br>- For reserved parking<br>Other revenue sources:<br>- Greater revenue capture from better enforcement & penalties<br>- Taxing 'off-street' parking? | Overall better revenue return to DCC<br><br>Better data information to assist planning / pricing policies<br>Fees/ charges used to improve behaviour |
| **Identified Issues/problems** | **Area of Attention** | **Long -term Action (1 – 2 years)** | **Outcome** |
| **Traffic circulation**<br>Traffic management needs to | Optimum parking plan relies on Traffic | Confirm Balanced Traffic Circulation Plan (JICA 2011 | A more efficient and better managed traffic flow |

| | | | |
|---|---|---|---|
| be improved in DSM<br>Long-standing plans for One-way traffic Plan to streamline traffic flows and reduce intersection conflicts | Circulation Plan<br>Plan for proper balance between traffic and communities<br>Promote walking and cycling opportunities /city environment /quality of life | with updates) including NMT (walking/cycle lanes)<br>Design parking according to street classification and design guidelines<br>Follow practice of 'liveable streets'/ community streets to improve human habitat in DSM<br>Develop funding proposal for donor support<br>Secure project funding/support and Implement | A safer community, with less conflict between traffic and pedestrians<br>Improved walking and cycling opportunities (improving 'first/ last mile' public transport access) |

**Capacity Development Project**
**for the Improvement of Dar es Salaam Transport (Phase-2)**

# Mobile Payment Solution for Parking in Dar es Salaam

Presentation to DCC

24th June 2015

## *From the perspective of the CUPID project*

City parking is a key aspect of traffic management and requires:

**1. Greater control of parking policy through control of revenue and a stronger parking service agreement**

- Improvements in physical management of parking
- Using pricing mechanisms as a lever to control behaviour of motorists (a **demand management** tool )
- As a **traffic management measure** by reducing the illegal and ill-disciplined parking behaviour which interrupts smooth traffic flow.

**2. Efficient management of parking & payments**

- The physical management of parking infrastructure (Role of DCC)
  - Signage/markings
  - Rules and enforcement
- The efficient payment and collection of parking fees
  - Cashless
  - Data collection for planning & improvements

## *The role of the BOLORO Technology*

- The BOLORO mobile payment system facilitates a new agreement where DCC has control over parking revenue
- It allows DCC to exercise a pricing policy to build business and control parking behaviour
- It changes the balance of power between client and contractor
- A performance-based contract gives a stronger 'hand of control' over contractor performance

## *Tap & Go – a fast, convenient and secure way to pay*


## *How Boloro Mobile Payment Works*

- The Telco operators partner with Boloro to manage payments via:
  - A smart phone can download an app. or,
  - issue small NFC tags that are attached to the customer's phone
- It links the payment to the customer's phone credit to deduct charges
- Low value charges are just through a 'tap' on the reader device and the customer gets an sms confirming the purchase
- High value purchases a PIN number is used.


## *How to pay for parking*

The motorists selects a parking spot and the parking attendant with a 'reader' (android device) collects payment by:

- The motorist tapping their phone on the reader to log into the parking space.
- The reader can charge the fixed fee (unlimited time) or the maximum fee for time-based.
- Upon leaving the parking spot the motorist taps again to receive a refund for unused time and receives an sms confirming the amount.

## *How the money flows*

- At midnight the Boloro system (via a bank) automatically sweeps the accounts of all the participating Telcos for the value of the day's payments.
- Boloro does not hold any cash at any time
- Disbursements are effected immediately to the participating stakeholders based on contract agreements:
  - The parking operator is paid their fee (percentage)
  - Parking attendants are paid their commissions
  - Boloro is paid a commission
  - DCC is paid the revenue balance
- The mobile system offers a completely transparent system so all parties can be confident their payments are correct.

Capacity Development Project
for the Improvement of Dar es Salaam Transport (Phase-2)

# Dar es Salaam City Council Traffic Management and Parking Policy

15th August 2017

## Traffic is the problem (!!)

Mitigating traffic in the city fundamentally requires:

1. **Proactive demand management measures**:
   - Making public transport 'car competitive' (BRT/ Daladala improvements and integrating them to a full network)
   - Improve NMT modes (walking and cycling)
   - Improving the daladala business model (central fare collection/ develop cooperatives)
   - Improve bus infrastructure and develop bus priority in traffic.
2. **Restrictive demand management measures:**
   - Increase parking cost / decrease availability (parallel to public transport improvement)
   - Developing better Park & Ride facilities (also supporting the BRT)
   - Use traffic rationing methods or congestion charging.

## Traffic Management and Parking are co-dependent actions

- Use parking controls (such as price/ availability) as a traffic demand management measure
- Availability of parking spaces depends on on-street parking space availability which is influenced by street design (one-way/ two way)
- Amount of city travel looking for parking spaces
- Illegal parking or parking behaviour affecting flow of traffic and pedestrian safety
- Parking behaviour (e.g. on footpaths) making walking difficult, discouraging public transport use.

## Present situation and issues *that need a policy response!*

1. BRT provides quality transport option, but daladala facilities are poor
   - Bus terminus infrastructure improvements needed with improved road crossings
   - Walking access to BRT stations and daladala stop need improvement.
2. Traffic congestion and parking saturation
   - A significant source of traffic congestion is cars circulating looking for parking
   - Irregular parking hinders traffic flow and pedestrian traffic
   - Are parking garages optimally utilized ? On-street parking is still cheaper that garage parking
   - Reserved on-street parking reduces availability and
   - Low turnover of car parking spaces: 1-3 x /day (JICA 2011 study)
3. Parking discipline
   - Parking is disorganised with many instances of illegal parking
   - Lack of proper marking for legal parking and illegal parking prevalent (also on footpaths)
4. Revenue control and capture
   - DCC has recently implemented POS machines with a new contractor so revenue collection is transparent, but pilfering still occurs
   - Contract arrangements where council receives its fair share of parking revenue
   - Price of parking is still low although has recently increased.

## Suggested policy objectives for DSM traffic management and parking

**Broad Policy Objectives/ Measures**

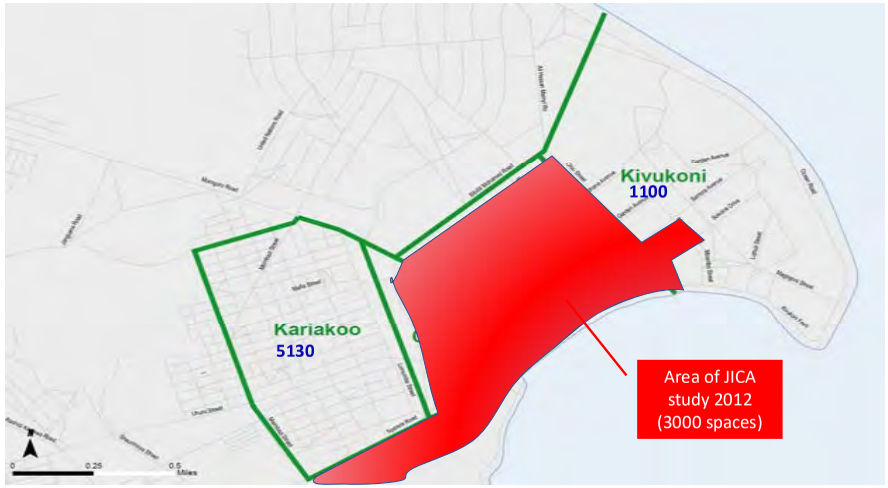
- **Manage parking supply and demand**
  - Manage supply to reduce attractiveness of car use (and provide alternatives)
  - Increase efficiency of parking management (utilisation)
  - Optimisation of off-street parking garages
  - Develop Park and Ride options
- **Implement revenue capture and parking data collection (improved contract)**
  - Mobile payment technology (cashless and location specific payment)
  - Improve enforcement of non-payment and exceeding time limits in managed parking areas
  - Fixing parking prices according to demand
  - Taxing 'off-street' parking?
  - Increasing costs of reserved parking

**Detailed Policy & Action**

- Approve and implement **staged CBD circulation plan**
- Improve **parking infrastructure** (line marking/signage) in conjunction with revised CBD circulation
- **Implement cashless e-payments and parking data collection**
  - Mobile payment technology (cashless and location specific payment)
  - Improve enforcement of non-payment and exceeding time limits in managed parking areas
  - Fixing parking prices according to demand
  - Taxing 'off-street' parking?
  - Increasing costs of reserved parking
- Actively develop **park and ride** options in conjunction with BRT to intercept traffic to CBD

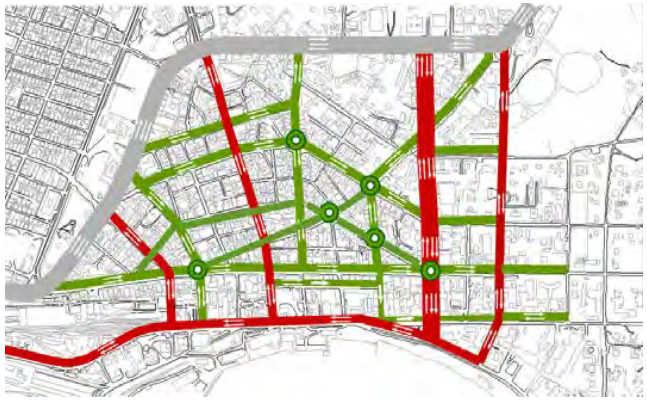
**2006 study ITDP / Nelson Nygaard**

Estimated 10000 on-street parking spaces (post BRT)




JICA parking Survey on selected CBD streets

Cars parked at 10am (peak) : ***3,000 +500 illegal***



## *Key recommendation:* Implement staged traffic circulation plan

- Introduce the balanced parking and traffic flow plan (2012 JICA) with updates - *the traffic circulation plan impacts on parking availability (redesign of street use)*
- Design streets along the principles of safe and liveable cities
- Reduce conflict between pedestrians / parked cars and traffic
- Improve legal parking conditions and eliminate illegal parking
- Introduce NMT lane and improvements to walking spaces for CBD distribution as part of the traffic circulation plan
- Improve management of bus stops/terminus
- Improve pedestrian road crossings

*Detail of CBD circulation plan to be presented separately*

## *Key recommendation:* Improve Parking infrastructure

Following CBD traffic circulation amendments (or preferably as part of the redesign):

- Assign parking by street classification (based on road dimension and whether 1 or 2 way traffic)
- Develop and mark legal parking spaces and set the parking rules for each location depending on area/use
- Place signage and lines for motorist information and easier enforcement

## *Key recommendation:* Manage supply and cost of parking as a demand management measure and an improved source of revenue

- Promote off-street parking in the city centre (remove price differential) – make on street more expensive than parking garages.
- Apply a price policy to influence parking behavior (higher cost for higher demand/turnover locations)
- Increase parking charges to provide budget to invest into parking improvements
- Manage policy of reserved parking in order to discourage this practice and create greater turnover of parking in these inner-city spaces
- Actively implement physical barriers to prevent car parking on sidewalks
- Improve quality of parking (improve value for money to justify higher charges)

## *Key recommendations:* Improve on-street parking management through a performance-based contract

- Confirm inventory of parking spaces to determine full revenue potential
- Implement cashless parking payments system to ensure revenue is protected
- Strengthen enforcement of parking rules through a separate enforcement contract
- Remove exemptions for diplomatic and government vehicles that compromise policy
- Define responsibilities of the parking contractor:
  - Marking and defining spaces?
  - Providing security?
  - Managing defaulters and over-stayers?
  - Enforcement?

## *Key recommendations:* Amend policies for supply of parking in new developments

- Cities often stipulate mandatory off-street parking requirements so that new developments can house car parking requirement of tenants and customers
- This can run counter to policies to reduce congestion, as easy parking availability generates car travel
- Developers realise greater returns when more floor space can be tenanted making car parking rules a burdensome requirement
- A balanced policy is required, for example that developments with easy BRT access can have more lenient parking rules
- This encourages use of the BRT and also encourages more dense development close to BRT (TOD - transit oriented development)

# The way forward

***Package 1:***

- Finalise the traffic circulation and NMT plan and identify parking spaces

***Package 2:***

- Implement changed traffic measures and mark/sign parking spaces

***Package 3:***

- Calculate the total spaces for the business model and design pricing policy by demand/use
- Introduce cashless fee collection with any necessary amendments to contractor agreements
- Establish oversight capacity with DCC to manage contract

Capacity Development Project
for the Improvement of Dar es Salaam Transport (Phase-2)

# Operational Plan for DCC Parking and New Contractual Framework for the Parking Services Agreement

15th August 2017

## City parking is a key aspect of traffic management and requires:

*1. Greater control of parking policy through control of revenue and a stronger parking service agreement*

- Improvements in physical management of parking
- Using pricing mechanisms as a lever to control behaviour of motorists (a demand management tool )
- As a traffic management measure by reducing the illegal and ill-disciplined parking behaviour which interrupts smooth traffic flow.

*2. Efficient management of parking & payments*

- The physical management of parking infrastructure (role of DCC)
  - Signage/markings
  - Rules and enforcement
- The efficient payment and collection of parking fees
  - Cashless
  - Data collection for planning & improvements

## *Boloro Mobile Payments System facilitates cashless revenue collection and a New Parking Services Agreement*

- BOLORO mobile payments technology offers a low-cost, fast and convenient way to pay for parking
- It also collects all data to improve parking planning and management
- Revenue is fully protected and collected directly to DCC
- DCC then pays contractor who manages the on-street parking/fee collection on a performance-based contract

## *How Boloro Mobile Payment Works*

- The Telco operators partner with local Boloro agent to manage payments via:
  - A smart phone app. or,
  - issue small NFC tags that are attached to the customer's phone
- It uses the mobile phone to deduct charges from customers source of funds (e-wallet etc.)
- Can also be used as unmanned facility
- Tap-on/ Tap-off can be used to charge for time. Or ticket issue for selected time period.
- SMS confirms payment. Issued ticket can be issued (placed on car dashboard)

## *Back-office function*

- Revenue goes direct to a central clearing account, or can be programmed to directly transfer to DCC e-wallet account
- Daily Clearance and settlement according to contract agreements
- Parking attendant bonuses paid daily (as a performance incentive)
- DCC & contractor can access merchant side reporting portal (fully transparent) to monitor and collect data

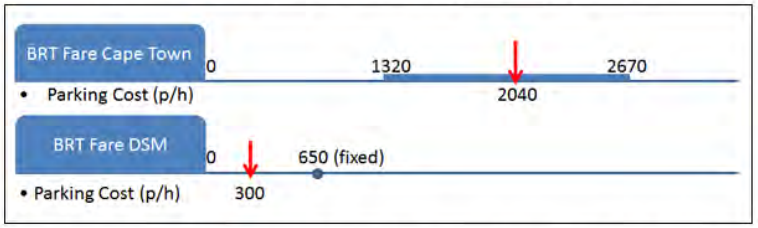
## *Key benefits*

- A parking price policy as a price mechanism to **influence parking behaviour and create higher revenue** and **control demand** (price differential according to location/ time & demand)
- Improves planning and management of parking for a more efficient city.
- DCC benefits directly from **revenue growth**
- A cashless and automated payment system **safeguards revenue**
- The city can **apply this mobile payment system to any council revenue collection,** potentially improving cash collection and reduce revenue leakage

## TShs Comparison of BRT Fare and On-street Parking Fees between Cape Town and Dar es Salaam

| | Cape Town (ZAR/Rand) | Cape Town (equivalent shilling) ZAR 1=TShs 150 | Dar es Salaam TShs |
|---|---|---|---|
| BRT Fare (distance 10- 20 km) | ZAR 8.80 to 17.8 | TShs 1320 to 2670 | Tshs 650 |
| On-street Parking Fare per hour | ZAR 13.6 | TShs 2040 | Tshs 300 |

The relationship between bus fares (10-20 km) and hourly parking charge for the two cities




What the above diagram shows is that potentially the Cape Town parking charge can be much higher than the bus fare, whereas in DSM the hourly parking charge is less than half the bus fare.



## *New Parking Services Agreement*

## Proposal for New Parking Contract in DSM (June 2016)

**Short term Contract (under amended arrangements)**

- Satisfy **immediate and proper procurement** requirements
- Uses simple POS system to return revenue to DCC directly
- Introduce **Multiple contractors**

*Good performance by contractor will permit them to be short-listed for long term contract tender*

Completed

**Long term contract**

- New business model / Cashless payment / protect revenue
- Collects data for efficient planning
- Strengthens DCC control of parking policy & price mechanisms
- Performance-based contract for parking management contractor
- *Suggest a 5 year contract +5 for good performance.*



## *New Service Agreement*

- Bidders will bid a '**Fixed Service Fee**' for **the business to administer and manage the parking arrangements and collect parking fees** using the 'cashless 'mobile system.
- **Performance bonuses** based on revenue percentage paid to Contractor and individual parking attendants to incentivise performance and revenue collection.
- Strong hand of control for DCC & **performance failures penalised** & **Contract cancelled** for on-going poor performance
- **Multiple contracts** can be let on designated areas, so that the DCC can compare performance of the service providers.

## *Obligations & Responsibilities of the DCC*

- Manage the Contract (the parking service agreement) and monitor compliance
- Establish rules for parking
- Install signage and marking of legal designated parking spaces
- Enforcement methodology (built into Parking Contract)

## *Content of the Performance-based Contract*

- All obligations of the Contractor
- Operational specifications
- Transition IN and OUT methodology
- Standards of Services and Performance
- Safety requirements
- Employment conditions
- Reporting requirements
- Methods of payment and variations
- Penalty regime and compliance measures

Plus:

- Standard contract terms

## *The Way Forward*

| Technology | Contract / Bidding/ Award /Implement |
|---|---|
| Agreement with Boloro to sign up Telco Companies & sign merchant agreements | Modification of contracts to Long term with modifications as a performance-based contract |
| Establish software program with Boloro applicable to situation | Signing Contracts/ Lead time for launch including Telco introductions and customer sign up |
| Pilot test for operational systems & consumer familiarisation | Prepare parking signage and markings (requires budget) |
| Secure all equipment and commission systems | Contractor preparations and Transition-IN process |
| LAUNCH | |

# Discussion Paper (Output 2 Annex 3): Daladala and Bus Service Improvement (Ticketing System)

Capacity Development Project for

the Improvement of Dar es Salaam

Urban Transport (Phase-2)

# Discussion Paper (Volume 2 Annex 3)

## Daladala and Bus Service

## Improvement (Ticketing System)

This paper has been prepared only for internal discussions amongst the designated stakeholders for this project. Discussions can explore ideas and concepts for policy development and need not be limited to current policies of the Government of Tanzania.

Secretariat for the Capacity Building Project

and

JICA Expert Team

# Concept Paper for Daladala and Bus Service Improvement

## 1.1. CUPID Project 3: Daladala and Bus Service Improvements

This is a short term JICA project mainly aimed at improving the business model of the buses and dadadala to ensure a more viable business for investors, improving control of daladala operations by SUMATRA, reduction of revenue opportunistic behaviour by drivers (the root cause of unsafe and negative behaviours), and a better service and greater convenience for passengers.

Improving the business model through better management and control of revenue is expected to provide improved returns for the vehicle owners, a better prospect of obtaining finance for new and clean technology vehicles and graduate public transport to a better level of service in Dar es Salaam.

### 1.1.1. Pilot project for introduction of a mobile (cashless) payments system for the daladala

It was agreed at the last joint meeting with SUMATRA, DARCOBOA and JICA project team to conduct a pilot trial of the Boloro mobile payments system with 50 daladala owners.

To progress this, we need to arrange meetings between Boloro, DARCOBOA and SUMATRA to initiate and manage the pilot.

The following is an overview of issues that need to be sorted:

**Step 1** is to select the daladala owners on the nominated route that will participate and introduce them to the system; demonstrate the equipment and outline the business benefits and opportunities.

**Cost of establishing the Pilot**

During discussions with Boloro locally it has been agreed to lower the entry bar regarding the set-up costs. It was not considered prudent to ask SUMATRA or operators to pay a large 'up-front' cost establish the project. However, each owner paying a few hundred dollars towards the android reader to be fitted to the bus may be acceptable, while confirming their commitment and will help ensure they take care of the equipment.

Boloro can be remunerated for the remaining set up costs on a commission basis for a set period.

**Level of Commissions**

The commissions payable under the Boloro payments system can involve a number of players for example:

1. BOLORO for managing the payments system. This will cover their cost and profit margin for programming updates and administering the system, and is in part affected by the volume of revenue (greater revenues = lower commission rate) but it may also need to cover set-up costs if this is not paid separately. The commission cost of the pilot should be treated separately from the negotiated ongoing commission level should the system be expanded.
2. DARCOBOA for collecting the membership fees from bus owners

3. SUMATRA for collecting licence fees for route permits.

Should at a future stage the bus owners enter into finance arrangements for new buses, the finance contract can allow the financial institution the first draw on revenue for bus instalment. This makes the borrower more credit worthy (in that the lender is confidently assured of payment) and will make it easier to obtain finance.

**Sign up of owners**

BOLORO has suggested that a MOU be signed with SUMATRA (as regulator) and SUMATRA enters into agreements with daladala owners or DARCOBOA as facilitator.

SUMATRA will also need to guide and support the bus owners in the formalising of employment contracts for the bus drivers/conductors.

**Labour contracts for driver/conductors**

Assistance needs to be provided to the daladala owners to sign their driver/conductors on to a formal labour contract. While the industry has been agitating for such contracts, removing cash handling from drivers could be seen by certain individuals as reducing their income (removing the possibility of greater returns than simply a salary).

To solve this may require an arrangement whereby the generous percentage of commission is paid to drivers for participating in the pilot. This deal can be renegotiated once the system comes into effect and the economics of the new arrangements becomes clear. The objective will be to ensure that the impact of the new arrangements is not seen by the drivers as too negative (or at least having enough positives to offset the negatives). Full protection of an employment contract is a strong positive, and recognition as the team employing new technology may also be a factor.

Consultations with drivers should also take place to inform them of the overall industry benefits and how they themselves can benefit from it. Assured employment, better buses, more professionalism could be factors to consider as well as supply of uniforms, driver and customer service training qualifications obtained through a driver training course.

**Sign up by the public**

There needs to be a public campaign and promotion (managed by Boloro and the Telcos) to explain and demonstrate the benefits of a cashless system to the public.

Buses accepting Boloro payments should be clearly marked and advertised.

**Duplication**

Should the initial pilot be successful, the growth of the system can be carried out the same way as the pilot was established. We can refer to it as implementation by attrition. The main challenge will be aligning the transition of buses onto the Boloro system and at the same time have sufficient passengers signing up.

To resolve the problems of the expansion by attrition approach, after the Pilot proves successful a campaign could be mounted that will transition the entire system to cashless in a few steps. For example, converting a few routes at a time will allow manageable use of resources yet within a short time transitioning to a cashless system.

Once the Pilot is successful, the successive implementations will be easier as the systems are known and the labour contracts are more or less consistent and applicable across the industry. Owners that are happy with the system will share their experiences others and lessons learnt can be applied.

**Step 3 Operation of the Pilot**

The pilot route has been selected from Makumbusho to Tegeta Nyuki so that a discrete group of passengers can be signed up with their mobile phone accounts.

*Question: what happens when the bus picks up passengers along the route who are not signed up and pay cash? Does the driver return all of the cash to the owner? How to ensure he does? Here is a temptation for the driver to pick up more cash payers to skim more revenue. The pilot may fail if the driver is working against the system.*

There are 2 operational scenarios:

**Option 1. Fully cashless:** Signing up all the passengers to the mobile payment system means that all Telcos need to be involved. The most realistic pilot project experience would be that driver/conductors collect no cash at all, and are paid on a salary basis. Revenue via the payment system is directed to the owner of the bus (less commission).

Under option 1 all cash payment is eliminated and the bus is signed as mobile payments only, to establish and maintain integrity of a cashless system. However the overall daily income could be affected. The pilot could establish whether a loss will actually eventuate (assuming that under the present system, what the driver collects is largely unknown).

To explain it another way: It is entirely possible that the owner's revenue balance after paying the driver/ conductor an acceptable salary, is equal or greater than previous, even with a reduction of passengers. This is because the amount of revenue retained by driver/conductor or otherwise pilfered, is unknown.

**Option 2. Allow parallel cash payments:**

For passengers not using the mobile payments system, and who pays in cash, a ticket can be issued and the end of the day all the revenue is reconciled to tickets sold and the cash returned to the owner. Cash pilfering is likely to be inevitable, but at least a system is in place to manage cash. The owner could randomly place a silent rider on the bus to ensure ticketing procedures are being followed. Notices could also be placed on the bus asking passengers to obtain a ticket or report non-ticket issue.

Deciding on these options depends largely on what the pilot is expected to produce.

- Is it a full demonstration of a cashless system?
- Or simply to demonstrate that the technology works, there are not technical problems and that passengers find it useful.

**Implementation of the Pilot**

A project management unit needs to be established with representatives from SUMATRA, DARCOBOA and BOLORO and with support from the JICA technical working group.

### 1.1.2. Following a successful pilot

**Development of cooperatives and development of open data systems**

Once operators are linked into the payments system, it will be easier to manage the formation of daladala/bus cooperatives. The WB has earmarked funding for this under their **"Support to Public Transport Transformation"** as detailed below.

Formation of cooperatives will assist SUMATRA to introduce common standards, ensure compliance and legal status, assign routes to cooperatives instead of individuals, and develop finance packages for fleet renewal, and clean technology improvements.

The WB also promotes an **"open data in public transport and gender mapping"** project which is easy to implement with the Boloro system as each participating bus is being tracked through the Android mapping function of the reader fitted to the bus.

An application on the phone of user could identify the bus they are on (linked to fare payment data ) and report harassment events, customer satisfaction rating and road safety concerns. The bus owner as well as Sumatra or DART could then follow up incidents with the bus owner /employer.

Details of WB documentation on these projects:

***Support to Public Transport Transformation***: the project will coordinate with JICA and provide support for establishment of DUTA. The project will, further, provide technical support SUMATRA for (i) the ongoing consolidation of Daladala from individual ownership to cooperate or companies arrangement and (ii) capacity strengthening for regulation of mass transit systems. The Bank mission reviewed the Draft Concept Note for establishment of DUTA and provided comments for consideration

***Open Data in public transport and gender mapping.*** The project plans to support the introduction of open data in public transport in Dar es Salaam city through ICT innovation. The ICT innovation would include mapping of public transport routes, bicycle routes, and creation of a mobile-phone system for user feedback on the BRT services. Further, the project will support mapping of gender violence in public transport system to enable the BRT management institute preventive actions.

# *Introducing an integrated mobile E-payments system for public transport and parking fees in Dar es Salaam with potential wider applications*

## *Introduction*

The JICA funded project for Consensus for Urban Transport and Policy Improvement in Dar es Salaam (CUPID), under its objectives of mitigating traffic congestion has undertaken a number of short term project initiatives aimed at providing improved public transport and creating an effective parking policy and controls as a travel demand management measure.

The key objective of the E-ticketing initiative is to improve the business model of public transport and city parking, by through **management of revenue**; transitioning the daladala from a cash-driven enterprise (driving the negative behaviors) to a more formalized and better regulated business and to create effective control and pricing mechanisms for the Dar es Salaam City Council's Parking Policy.

The transport sector is increasingly being shaped by information and communication technology (ICT). ICT is an enabling and integrative technology, particularly in urban transport (but also tourism) helping to provide information, organize transport flows and manage payments, thus affecting the way people use the transport system.

The purpose of this paper is to outline the technology issues to introduce a common E-ticket across all transport modes in Dar es Salaam, inter-operable with wider application such as parking fee payments, bill payments and retail spending. Connecting such technology to the existing e-wallet systems of the Mobile Network Operators, to manage the payments side would be a considerable advantage. The success of such a system, (and the ability to introduce it) is dependent on providing benefits for all stakeholders and establishing a mutually advantageous business case to all the stakeholders involved.

- Consumers will benefit through convenience of cashless payments and having the ability to travel across all modes without a cost penalty when transferring across systems (say, daladala to BRT) as the system will charge for distance only.
- Bus owners (and the DCC) will benefit because revenue is protected, and the system will provide full operational data for control and monitoring; both recorded and in real time. Daladala owners will also benefit as their revenue will increase, and their business can be shown to be credit-worthy to enable investment into new buses. In effect, it is a more sustainable business model for daladala owners.
- SUMATRA benefits as they are able to organize bus owners into cooperatives to better control behaviours, compliance with regulation and removal of shadow illegal operations (DARCOBOA - the daladala association has also supported this). Daladala Owners will also realize collective benefits under the operation of cooperatives, instead of operating single units playing at out-witting each other to survive.
- The city benefits when an integrated public transport system provides a viable alternative to private vehicle use; a first step to averting future traffic gridlock. Improved investment returns, improved regulation and less- revenue driven behaviour will create a system gives more respect to customers.

- The DART BRT benefits from integrating fares with Daladala, as the daladala system becomes a feeder system to BRT (without cost penalty to passenger). BRT can then also offer a distance-based fare; even to locations off the BRT line.
- The DCC will benefit from increased parking revenue, and also be able to manage a more intelligent parking policy with price control levers to manage demand and use of parking spaces.
- MNO's will benefit from the increased revenue turnover of e-wallets and transaction fees. Transit in most cities is generally regarded as a very profitable area for ICT payment technology and increasing market share.

Introducing such technology in Dar es Salaam requires the engagement of multiple stakeholders; such as transport operators, the city, the DART agency, SUMATRA the MNOs. This could be challenging, as all parties need to be convinced of the benefits to them, and to the wider enterprise. Particularly we will need to focus on the interface aspects between systems that are required to make the systems work together, and if this cannot be agreed upon, to assess alternative technology or methodology.

## *Present Situation*

E-ticketing has been introduced to Dar es Salaam on the DART BRT system, but is not integrated with other modes. Ticket kiosks at BRT stations (and reportedly some Max Malipo kiosks) sell and reload these cards. It is unknown if this system is adaptable to be used on Daladala as each bus would require a smart card reader. In any case, DART is not planning daladala integration at this time.

With DCC parking, recent changes to the parking contracts have seen new and multiple contractors and the introduction of POS machines issuing tickets. While this is still cash-based, the DCC now received the gross ticketing revenue instead of the previous arrangement where the contractor simply paid a contract fee to collect and keep revenue. However, being still cash-based the DCC expects that considerable revenue leakage is still occurring.

The daladala business model is typically a system where the driver/conductor 'rent' the bus for a daily fee paid to the owner. The revenue risk is therefore with the driver/conductor who will keep all revenue over and above the rental fee and fuel. As stated earlier, this revenue incentive causes much of the negative behaviour seen in the operation of the daladala. Generally, customer service levels are poor, and there are often disputes over fare collection to which there is little recourse for the passenger.

However, the daladala have many positive aspects for local transport, namely their demand-responsiveness and the small business opportunities they create in local communities, as well as the employment of relatively low skilled labour. The aim of the CUPID project is therefore to amend the business model so that the negative behaviour are addressed while utilizing the positive aspects of the sector.

## *Pilot project*

For the daladala, taking control of revenue through cashless E-ticketing fundamentally changes the business model, so that the bus owners are paid revenue directly, allowing drivers and conductors to be employed under a labour contract (which they have been agitating for). This reduces the revenue-driven incentives for bad behavior, but also allows SUMATRA to organize owners into cooperatives to better organize services (routes to be assigned to cooperatives rather than individual buses). As there are approximately 7,000 daladalas the formation of cooperatives (numbering 10 to 15) would make SUMATRA's regulatory task much easier, and also provides a more consolidated industry structure.

The CUPID project has conducted a pilot project with the aid of SUMATRA, Christiania group and Business Connexions (BCX) to introduce POS machine (with ticket issue) to provide transparency to revenue

collection. It is expected that this will This demonstrated acceptance from the driver/ conductors to such a system and allows payment of salary to these operators. Passengers have also responded well to receiving a formal ticket for fare payment. The system has also encouraged more daladala owners to offer their drivers and vehicles to be managed by Christiana group. This indicates a cooperative-style arrangement developed at grassroots level, enabled by the ICT technology.

## *Where does BOLORO fit in?*

The next generation NFC technology of a 'smart card' is linking the payments system to the mobile phone network via an E-wallet managed by the telephone MNOs.

What this improves over the smart card option, is eliminating the cost of managing tickets and cash at kiosks, administration of the card system (such as issue and recharge) which is typical of a closed system (as is operated by DART). It also widens market penetration as most people have mobile phones, and e-wallets which can be used to make payments. If the payments systems are attached to MNO E-wallets, the MNOs would be paid a transaction fee (percentage of the revenue turnover) as well as increasing the amount of stored value they hold.

BOLORO is a mobile payments system suited to ticketing for transit (bus/rail networks) as well as retail payment and fee/toll collection that uses a fast USSD flash technology to quickly process a fare payment with a simple tap on/off the same as a smart card operates. There is no need for a user PIN under a set amount. The value to make the payment comes from the user's e-wallet (stored value) and there is no cost of buying a smart card or depositing separate stored value on such a card. In Tanzania, mobile phone banking is actually more advanced that most developing countries, so this presents a good opportunity.

A further aspect of the BOLORO system is that the NFC reader (at BRT stations or on the daladala) is an android device (relatively low-cost and robust, modified smart phone) which uses its mapping function to track the vehicle along the bus route. This enables it to process the correct distance-based fare, but also logs the passenger fare payment (on and off) according to time and location. This provides transparent, full and comprehensive passenger data for control, monitoring and service planning. A bus owner can access a web-portal to see in real time the location and number of passengers on a bus, and the full data record is available to the bus company and to SUMATRA to follow up complaints, incidents of overloading etc. and provides recorded data to use for route planning and efficient fleet assignment.

BOLORO capability is provided by the user placing a NFC tag (sticker) to their phone handset which is registered to their phone number (Their e-wallet as a payment source). The system issues an sms confirming log-on/ payment. This requires a pairing between the BOLORO NFC and the MNO customers' E-wallets.

Clearance of funds is performed daily and there is a capability to disburse funds to all contracted parties (paying bus owners by passenger value) commissions to MNO/agents and also can pay employees commissions based on revenue turnover as a performance-incentive.

## *Methodology for establishing the BOLORO system*

BOLORO will license the system to a local entity who will manage the day to day adjustments where required (such as route changes, fare amendments, adding or deleting operators) and also manage the disbursement of data where required.

It has been suggested that DART is a natural choice for such a role, as it is the key transit agency for Dar es Salaam. The DCC could also manage this role, or it could be likely that a tender process selects a private player with experience in such electronic payments area.

For the management of a NFC interface with the MNOs the agent would be required to establish and pre-fund a collection account to 'mirror' the E-wallets, as the MNOs do not permit direct withdrawals from customers E-wallets. They need to establish a disbursement account to manage outgoings.

### *Issues to resolve*

Presently the MNOs are not 'on-board' regarding the NFC tags being interfaced with the E-wallet facility (Mpesa, Tigo-pesa, and Airtel Money).

This should be able to be resolved, as the additional turnover should benefit them via the increased stored value customers are likely to deposit, and also the additional transaction fees.

### *Projected Turnover*

| | | |
|---|---|---|
| **Daladala** | | |
| Total No. Daladala | 7000 | |
| Average Daily Earnings per bus (conservative) (Tshs) | 100000 | |
| Av. fare paid (Tshs) | 450 | |
| Total passenger/day | 1,554,000 | |
| Total Daily income (all buses) | 700,000,000 | |
| US$ | 318,182 | |
| **Total annual passengers** | **486,402,000** | |
| Operating days per year (weekends at 50%) | 313 | |
| **Total annual revenue (US$)** | **USD 99,590,909** | |
| | | |
| **DART BRT (131 buses only** | | |
| Operating km/ day | 40000 | |
| Total Passenger/ day | 240000 | |
| Flat fare (Tshs) | 650 | |
| Total fleet revenue/day (Tshs) | 156,000,000 | |
| Total US$ per day | 70,909 | |
| **Total annual passengers** | **75,120,000** | |
| Operating days per year (weekends at 50%) | 313 | |
| **Total annual revenue (US$)** | **USD 22,194,545** | |
| | | |
| **DCC parking** | | P/H Rate (Tshs) |
| City parking spaces | 30000 | |
| CBD / Kariokoo area | 15000 | 500 |
| Suburban area | 15000 | 300 |
| **Total Daily income (9 hrs)** | **(Tshs)** | |
| City CBD | 135,000,000 | |
| Suburban area | 40,500,000 | |
| Total per day X 90% occupancy | 157,950,000 | |
| Total Revenue (251 days per year) | 39,645,450,000 | |
| **Total annual revenue (US$)** | **18,020,659** | |
| | | |
| **TOTAL (US$) All Sources** | **139,806,114** | |

Future congestion charging (road tolling) is another demand management measure being considered, and the increase in BRT and Rail infrastructure will direct much of the city's population growth to mass transit.

Other than transaction fee income, all stakeholders including MNO's should consider the merits of improving the public transport system in Dar es Salaam. A future 'do-nothing scenario' is an increase in car ownership (doubling every 5 years), and population doubling every 10 years. Developing a fully integrated public transport network involving MRT (elevated rail) BRT, and regular buses and daladala is a critical requirement, to provide motorists with alternative, more efficient travel options. Public transport is therefore a high growth sector, and is critical to a sustainable future for the city.

## *Alternatives to MNO involvement*

The BOLORO system can be implemented without the MNO payment facility being provided, by using the kiosk/POS outlets presently in use for MNO call credit recharge/ and payment systems like Max Malipo. It would mean that BOLORO would issue a NFC card /tag that customers would need to load stored value credit on, and thus fund the purchases made by the card.

The remainder of the BOLORO system (tracking and recording etc.) would work as normal.

It is uncertain how such a system would penetrate the market, as it would rely on some extra effort by customers to secure the card.

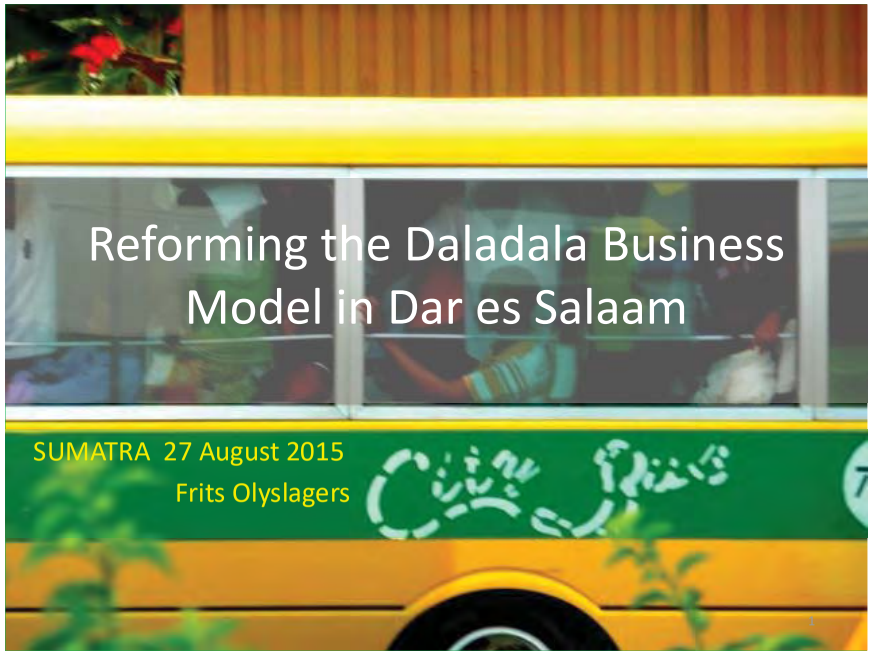
Incentives could be provided that make card use beneficial, so over time the level of take-up would increase. Also consider that the DART BRT cannot be used without a card.

Going cashless in the wider transport field would require a suite of incentive both at operator level and at regulation level.

## *Conclusion*

This proposal is a very practical and realistic endeavor to address the present problems of public transport, by focusing on the root causes of the problems, being the business model of daladala. Strengthening the DCC to manage a parking policy is also an important endeavor, to create order in the city, and improve revenues to support city infrastructure investments.

ICT initiatives for managing revenue and streamlining customer payments will redefine how transport operates in the city, and the data provided will greatly assist in the planning of an efficient and integrated network. Stakeholders on-board with such an initiative will no doubt be well rewarded.




Consensus for Urban Transport and Policy Improvement in Dar es Salaam (Phase 2)

# JICA Project

## Background

**OVERALL GOAL**
Traffic Conditions are improved in Dar es Salaam

**Coordination Mechanism**
- Representative Secretariat
- DUTA

**Local Strategic Decisions**
- Vision /Goals
- City future

**Develop Strategic Policy**
- Understand root causes
- Objective based
- Trial measures
- Learn & revise

**Plan and Implement**
- Assign project ownership
- Technical assistance
- Project proposals
- Funding

2

## *Approach to managing traffic congestion*

**Building roads or just trying to improve traffic management alone, will not address traffic congestion, given the strenuous increases in car ownership and use in Dar es Salaam**

(Present 14% p.a. increase in car ownership will double the car population in 5 years)

***Therefore managing travel demand*** is a key strategy in the project measures as well as employing ***measures better manage traffic***

**8 projects are selected, all of which address demand and 5 of which aim at better traffic management.**

**There is a major policy initiative to improve public transport**

3

2. Planning for Pilot Projects

## *All 8 projects relate to Travel Demand Management Measures*

**Project 3: Daladala & bus service improvements (business model & bus priority)**
**Project 4: CBD terminus improvements/ pedestrian works & enforce bus bay rules**
**Project 5: CBD Traffic treatments & cycle ways/ walking streets**
**Project 6: Optimise & synchronise traffic signals & Tidal Flow along Ali Hassan Mwinyi (with bus priority)**

**Project 8: Area Control with Plate number & promote ride share**

**Project 1: Parking/ footpath renovation Samora Ave.**
**Project 2: Improve parking control & price policy**
**Project 7: Fringe P&R and shuttle bus services**

**Proactive measures to manage travel demand**

IMPROVE PUBLIC TRANSPORT AND NMT OPPORTUNITY

- Bus & daladala business model
- Bus traffic priority
- Improve city bus termini
- Develop cycle-ways
- Promote ride sharing

**Restrictive measures to manage travel demand**

- Parking controls
- Increase parking costs
- Park & Ride system
- Time Restrictions

4

## 2. Planning for Pilot Projects

*5 projects relate to Traffic Management Measures*

| | Traffic Management Measures |
|---|---|
| **Project 1:** Parking/ footpath renovation Samora Ave.<br>**Project 2:** Improve parking control & price policy | On street parking management |
| **Project 4:** CBD terminus improvements/ pedestrian works & enforce bus bay rules | Enforce bus bay rules |
| **Project 5:** CBD Traffic treatments & cycle ways/ walking streets | Traffic treatment/ circulation plan |
| **Project 6:** Optimise & synchronise traffic signals & Tidal Flow along Ali Hassan Mwinyi (with bus priority) and to Morocco Rd | Optimise traffic signals<br>Reversible tidal flow lanes with bus priority |
| **Project 3:** Daladala & bus service improvements (business model & bus priority) | |
| **Project 7:** Fringe P&R and shuttle bus services | |
| **Project 8:** Area control with Number Plate & promote ride share | |

All traffic management measures improve the efficiency of buses and daladala



## Improving Daladala Business Model

- Bus traffic priority measures
  (reducing traffic congestion and improving bus fleet efficiency)
- The business model
  - The main problem of daladala is the business model
  - Drivers leasing buses and operating their own 'micro-business'
  - Business returns marginal for the bus owners causing lack of reinvestment/ maintenance
  - **Inability to manage revenue** and overall the system is starved of revenue
- Regulation
  - Too many players
  - Economic survival and 'revenue motivation' overrides regulation and safety
  - Operational & revenue risk transferred to driver/ conductor
- Poor Quality of Service
  - Captive market & poor service delivery is not penalised
  - But regulation ineffective



## Everybody loses in the present situation

- The city is unable to effectively improve and modernise the public transport
- Bus owners have marginal returns with little incentive to invest and grow
- Bus drivers are often employed as day labour with little economic and employment certainty (present agitation for formal employment contracts)
- Travellers suffer the indignity of low quality of service

However,

- Daladala provide an essential public service at no cost to government
- Provides small business/employment opportunity
- Cooperation to enter into formal company structure for BRT interim services is a progressive step
- Investment to larger buses under company structure is also a move in the right direction



## A policy of formalising of the informal sector into companies is difficult

Presently there is a policy in Dar es Salaam to form daladala operators into companies, however, it is difficult to achieve because:

- Distrust between the industry and operators
- No incentives for daladala operator to join
- Preferences for 'own business' rather than small shareholding of larger business
- Preference for collecting daily cash and having bus parked out front
- Where drivers make good money they may oppose change *(keep your hands of our cash!)*
- Shadow owners using the business for supplementary income

## The experience in South Africa

A similar policy in South Africa, using BRT to drive reform in the mini-bus taxi industry, following examples of Latin America has shown it is not a viable approach.

*"THOUSANDS OF PARATRANSIT OPERATORS WOULD HAVE TO FORMALIZE THEIR BUSINESSES, OR MERGE INTO NEW OR EXISTING OPERATOR ENTITIES IN ORDER TO PARTICIPATE IN THE NEW SYSTEMS.*

***THERE IS ABSENCE OF ACCESSIBLE BUSINESS PLANS AND REGULATORY REGIME PROPOSALS AROUND WHICH PARATRANSIT CAN BE ENGAGED TO CONVINCE IT TO ALTER ITS CURRENT MODUS OPERANDI"***

*(SCHALEKAMP, BEHRENS, 2010, ENGAGING PARATRANSIT ON PUBLIC TRANSPORT REFORM INITIATIVES IN SOUTH AFRICA: A CRITIQUE OF POLICY AND AN INVESTIGATION OF APPROPRIATE ENGAGEMENT APPROACHES)*



## This proposal does not oppose the 'ideal' of forming companies but implements revenue management as a first step to improving the business model

The proposal works to:

- Harness the positive benefits of private entrepreneurship while eliminating the negative behaviours
- Make reforms progressive and easily implementable
- Achieve full cooperation: clear benefits for all, on the principle of *'everybody wins'*
- **Implement new technology to manage revenue** and control services
- This does not rely on formalising into companies

  (although some formalisation into cooperatives can be done later – and is easier to achieve)



## Using Mobile phone technology for fare collection – *How it works and what it does*

- The passengers mobile phone credit serves as a cash source to pay for bus fares
- The mobile phone companies (Telcos) 'collect the cash' when selling phone credit
- Telcos give the passenger a RF sticker (costs 15 cents) to stick on the back of the phone (or a key ring etc.)
- Passengers 'tap' the phone onto a reader in the bus (a low cost modified Android smart phone)
- Cashless and hassle free. Receive an sms confirming payment
- All passenger trip data is stored on this device
- The GPS navigator on the Android reader tracks the bus during its route operation and records all trips and times
- Data Collected: Passenger numbers, time (on/off) bus speed and location, total trip numbers, total revenue



## Back office functions

- **Monitoring & Control:** The owner of the bus can log onto a web portal for a complete overview of his bus' daily operation
- Sumatra has available all data for checking service performance and for route planning
- **Revenue payment:** At midnight each day, the *payments operator* sweeps the Telco accounts to collect all bus revenue (less Telco commission) and distributes it according to the agreements and contracts
- **Bus owners paid daily**
- Can also pay commissions to drivers as a bonus for passengers carried (phone credit)
- Any fees to regulator/ associations can be levied at the same time
- The *payment operator* receives a commission for managing the system
- At no time does the *payment operator* hold any cash.

## Improves operator 'creditworthiness' and moves to larger cooperatives or company structure

- SUMATRA indicates that in 2016 it will issue licences to more professional operations to improve the quality of services.
- For operators to buy new (and larger) buses they need financial capacity and be credit-worthy
- The new payments system gives bus owners a better and more viable business but can also be used to place 'first call' on the revenue to pay bus instalment to the financier.
- This reduces risk for the financier and makes the operator 'credit-worthy', boosting private investment into public transport
- SUMATRA can over time work to 'incentivise' operator cooperatives (or companies) that make it easier for SUMATRA to manage (larger but fewer)
- These cooperatives or companies also give benefit to owners, for managing depots, negotiated cost savings, and joint representation.



## Wider implications

- This system is also suitable for the DART BRT operations
  - Less costly than stored value smart cards
  - Does not require separate fare collection company
  - Does not require workforce to sell cards and recharge credit and the costs that will incur
- Fares between daladala and BRT can be integrated where the passenger pays for total trip distance (no cost penalty –paying twice when transferring)
- Develops and integrated network more able to compete against private modes
- Makes public transport modern and more convenient
- Capturing all revenue improves business prospects for investors (raising investment into public transport)



## Discussion and the Way Forward

**Conceptual**

- Is it interesting? - can it get cooperation?
- Does it benefit all players?
- Is it in the wider public benefit (public good)?

**Questions regarding operation**

- Managing people without phone (children/students)
- Offering a flexible fare policy (distance- based/ discounts)
- Internet drops out
- Other operating risks and methodology
- Ownership of equipment

**Risks – implementation**

- Commission levels to payment operator (based on turnover)
- Scaling the introduction
- Learning through a Pilot Project

**What next?**

- How to proceed/agreement



*The Technology Provider:*

***BOLORO Global Limited USA***

*More information:*

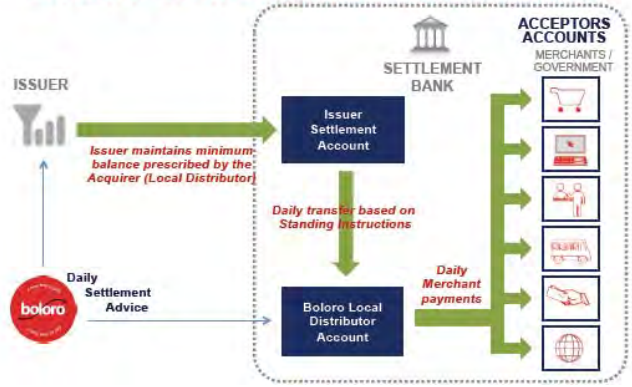
*http://www.boloro.com/aboutboloro.php*


Although new technology, Boloro already operate in half a dozen countries including fare payments in Lahore BRT, mini bus taxis in Pretoria SA ,metro city buses in Kuwait and Bahrain and a pilot in Amman Jordan.

## *Tap & Go – a fast, convenient and secure way to pay*


- The Telco operators partner with Boloro to manage payments via:
  - A smart phone can download an app. or,
  - issue small NFC tags that are attached to the customer's phone
- It links the payment to the customer's phone credit to deduct charges
- Low value charges are just through a 'tap' on the reader device and the customer gets an sms confirming the purchase
- For high value purchases a PIN number is used.

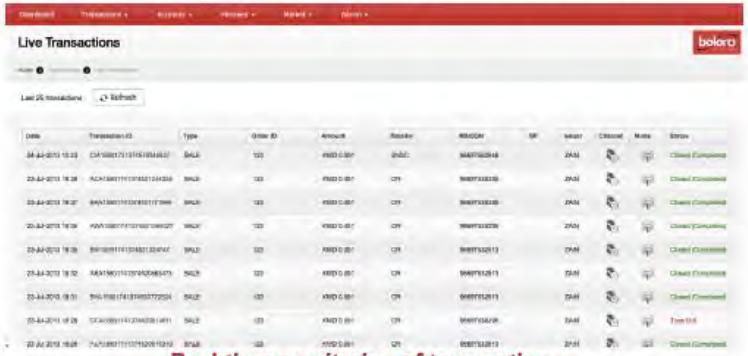
## Boloro Settlement Process Flow




## Transparent Administration

Dashboard to manage & monitor transactions

Analytics and business intelligence capabilities




***Real-time monitoring of transactions***

Consensus for Urban Transport and Policy Improvement in Dar es Salaam (Phase 2)

# Introducing BOLORO E-ticketing in Dar es Salaam

Date: 15 September 2017



## Objectives of this presentation

- Discuss E-ticketing to manage **City Parking Po**licy and reform the **Daladala business model**
- Discuss the importance and benefits of **fare integration** across the network
- Explore **BOLORO next generation techn**ology for E-ticketing and methodology to implement
- **DART Agency** as system network manager to manage E-ticketing



## Disclosure

- In the interests of full disclosure and transparency it is stated that the CUPID project, JICA, (or any member of these organisations) have no vested interest in recommending BOLORO.
- Any explanation or promotion of such product is purely on its own merits of function and technology, as related to the needs of Dar es Salaam.
- Persons engaged in the evaluation and procurement of such product are advised to conduct their own due diligence on the BOLORO technology, its features and capability.
- While the CUPID project may make some recommendations on various aspects of the business model pertaining to BOLORO, the local parties must conduct their own negotiations to protect their interests.



## What is unique about BOLORO's technology?

- A fast single tap-on/tap off process (USSD based) transaction for fare payment
- Linked to MNO E-wallets, gives vast market penetration as opposed to a stored value card (as presently used in DART BRT)
- The NFC reader is programmed to record transactions by location (bus route and parking spaces) to collecting detailed data on boardings, fare paid:
  - Used for service planning
  - Allows payment to the bus operator by passenger – which creates a sustainable bus contract model.

## E-ticketing to manage City Parking Policy

- Manage a more intelligent parking policy
  - More efficient management
  - Control consumer behaviour
- Increases parking revenues
- Improves revenue control through cashless payments
- Allows city to develop a pricing policy to manage parking demand
- Manage payments to parking contractors and commission payments to parking attendants
- Collection of parking data for monitoring and more efficient planning



## Reforming the Daladala Business Model

The root cause of daladala issues is related to revenue:

- ***For the bus owner:*** Rents out bus due to inability to manage revenue and receives in marginal business returns (only the rental fee)
- ***For the driver conductor:*** Negative behaviours due to survival instinct/revenue maximisation (as they carry business risk)
- Driver / conductors have agitated for labour contracts (not readily possible if they are a micro-business)
- The public transport system as a whole is starved of funds and quality suffers even though passengers pay sufficient fare



## How E-ticketing can reform the Daladala Business Model

- Central fare collection, but bus owners are paid a share of revenue based on passengers carried
- Driver conductors are formally employed under labour contract
- Revenue is protected, transparent, and increases investment return for the bus owner
- Bus owners become more credit-worthy to borrow funds, pay tax
- Bus owners are more engaged in the business, and can be organised into cooperatives:
  - With route licences assigned to cooperatives SUMATRA has better control (instead giving route permit to buses)
  - Cooperatives are responsible for controlling 'on-route' compliance and performance of their members – they will also be motivated to remove illegal operators



## How E-ticketing works

- **Passengers use their mobile phone to pay the fare** – NFC tag or smart phone App.
- **NFC tag paired to source of funds (**E-wallet)
- On-Bus equipment (NFC Reader) is low-cost and robust, being a modified Android Phone **with mapping function to track the bus route**
- It logs all passenger boarding/ alighting and fare payments by time and 'geo' location
- This provides **detailed passenger & revenue data** both in real time and recorded, for system monitoring and service planning (fully transparent)
- **Revenue distribution is managed daily** according to contracts
- Daily commissions/revenue share can be paid to drivers/conductors automatically

## Summary of benefits to implementing BOLORO's E-ticketing technology

- Greater passenger convenience with cashless payment & they receive ticket
- Full route network can tracked with comprehensive data collected on passengers carried (by bus)** for better planning and control
- Revenue is protected –bus owners improve business
- Improves investment into the bus fleet (better quality/ cleaner technology)
- Drivers /Conductors gain formal employment under labour contract
- Enables SUMATRA to form cooperatives to better formalise daladala for better control and management (assist in regulation)

***This enables bus owners to be remunerated by passenger avoiding DART taking revenue risk*



## The importance and benefits of Fare Integration

- The BOLORO E-ticketing can also manage a network-wide fare scale which is 'distance-based'
- This allows passengers to transfer during their journey and pay for total distance travelled (avoid cost penalty of paying the boarding fee twice)
- DART benefits as more short distance travel is encouraged
- Increases the BRT 'footprint' (reach and coverage) into surrounding areas – where daladalas become BRT feeders
- Creates a seamless network, creating network travel benefits and a 'network surplus'**

***A 'network surplus' is additional value (surplus benefit) which exceeds the cost of providing the service*



## Integrating BOLORO technology with DART BRT

- BOLORO reader can be installed at BRT ticket gates in parallel to existing FC system, allowing daladala passengers a seamless connection
- Able to manage a more complex fare policy (discounts, concessions, volume travel rewards, off-peak fares) enabling DART to tune fare policy to act as a pricing mechanism to attract and reward passengers
- Simple technology enables DART to manage and not rely on Fare Collection Company
- Provides additional transaction fee income for DART



## Integrating BOLORO technology with DART BRT

- BOLORO reader can be installed at BRT ticket gates in parallel to existing FC system, allowing daladala passengers a seamless connection
- DART benefits as with more short distance travel
- A more complex fare policy can be managed (discounts, concessions, volume travel rewards, off-peak fares) that allow DART to tune fare policy to act as a pricing mechanism to attract and reward passengers
- Simple technology enables DART to manage and not rely on Fare Collection Company
- Provides additional income stream for DART

## Why use the BOLORO system? *why not simply expand the present smart card system?*

- BOLORO is able to **track bus routes and link fare payment to time/place/bus –** allowing payment *per-passenger***
- Improves control, monitoring and planning
- Lower cost by using established payment systems of its Telco partners
- Market reach is also enhanced as mobile phone operators have a large customer base
- It is **low-cost equipment and relatively easy to implement**
- BOLORO offers customer convenience and has ability to manage occasional trips inexpensively

** With the introduction of central fare collection where bus operators are paid by km, the agency takes the business risk by default - The BOLORO system can pay operators on a per-passenger basis, meaning DART can collect revenue without taking risk it may not be able to manage



## Implementation issues

- The procurement process any E-ticketing is complex due to its technical nature (local agencies in weak position)
- With BOLORO an added complication is securing cooperation of MNO/Telcos – however a sound business case would attract their participation
- Cost of BOLORO licence is US$1.25M with annual fees and transaction costs (percentage of turnover) for system maintenance, training, technical support (requires procurement process)
- The MNO/Telcos may require the agency to **pre-fund a settlement account** as they are reluctant to allow NFC transaction to direct debit customer's accounts. The agency/ nominated party would need to be reimbursed for the funding cost.



## Proposal from BOLORO

- **BOLORO can partner with an international FSP** ('financial services provider') such as Visa/Mastercard, who becomes the licensee (paying for the licence fee) and who will get branding rights and the BOLORO system as part of its financial services portfolio
- **BOLORO will train the local agency** (DART) who will implement and operate the system
- This **avoids DART needing to pay the license fee** and all annual costs are levied through the transaction fee (percentage of turnover)
  - This could be a 50/50 split between external and internal parties.
  - *E.g. If the transaction fee is 3% then BOLORO/FSP share 1.5% and the Bus Agency/MNOs share 1.5%.*
- This **may avoid the procurement tendering process**, as it is an agreement to provide a service, the same way a mobile phone contract would operate
- **It is also relatively easy to implement**, as the local agency is in charge, and also gives the agency a substantial income stream (instead of paying an external supplier)



| | | |
|---|---|---|
| **Daladala** | | |
| Total No. Daladala | 7000 | |
| Average Daily Earnings per bus (conservative) (Tshs) | 100000 | |
| Av. fare paid (Tshs) | 450 | |
| Total passenger/day | 1,554,000 | |
| Total Daily income (all buses) | 700,000,000 | |
| US$ | 318,182 | |
| **Total annual passengers** | **486,402,000** | |
| Operating days per year (weekends at 50%) | 313 | |
| **Total annual revenue (US$)** | **USD 99,590,909** | |
| **DART BRT (131 buses only** | | |
| Operating km/ day | 40000 | |
| Total Passenger/ day | 240000 | |
| Flat fare (Tshs) | 650 | |
| Total fleet revenue/day (Tshs) | 156.000,000 | |
| Total US$ per day | 70,909 | |
| **Total annual passengers** | **75,120,000** | |
| Operating days per year (weekends at 50%) | 313 | |
| **Total annual revenue (US$)** | **USD 22,194,545** | |
| **DCC parking** | | P/H Rate (Tshs) |
| City parking spaces | 30000 | |
| CBD / Kariokoo area | 15000 | 500 |
| Suburban area | 15000 | 300 |
| **Total Daily income (9 hrs)** | **(Tshs)** | |
| City CBD | 135,000,000 | |
| Suburban area | 40,500,000 | |
| Total per day X 90% occupancy | 157,950,000 | |
| Total Revenue (251 days per year) | 39,645,450,000 | |
| **Total annual revenue (US$)** | **18,020,659** | |
| **TOTAL (US$) All Sources** | **139,806,114** | |

**Presently, the scale of revenue turnover is approx. US$140M p.a.**

## Strengthening DART as system network manager

- SUMATRA / DART would manage the fare policy of the entire integrated public transport system
- Revenue split can be according to passengers carried (meaning DART does not carry revenue risk for operations out of its control)
- DART does not need to contract an external Fare Collection Company (FCC)
- DART will manage the system operation, and receive a substantial income stream (on current revenue scenario approx. **US$ 900,000 p.a**.) **
- Future MRT rail operations would fall under the integrated fare network with DART as operator (or secure a contracted operator) with rail assets owned by RAHCO
- DART / SUMATRA receive detailed and comprehensive operational data for control, monitoring and efficient service planning

*** based on current turnover for BRT/daladala x 0.75% transaction fee*

# Discussion Paper (Output 2 Annex 4):
# PPP Bus Terminus/Bus Stop Improvement

Capacity Development Project for

the Improvement of Dar es Salaam

Urban Transport (Phase-2)

# Discussion Paper (Volume 2 Annex 4)

## PPP Bus Terminus/Bus Stop Improvement

This paper has been prepared only for internal discussions amongst the designated stakeholders for this project. Discussions can explore ideas and concepts for policy development and need not be limited to current policies of the Government of Tanzania. This paper was originally developed through JICA's capacity building project (Phase 1).

Secretariat for the Capacity Building Project

and

JICA Expert Team

## CONTENTS

# BACKGROUND AND PURPOSE

The City plans the relocation, renovation and new construction of major bus stops and terminus facilities in central Dar es Salaam. Private sector involvement is sought under a Concession Agreement to Design; Build; Operate and Maintain (DBOM) these facilities with the private sector being given the opportunity to exploit the revenue generating potential of such a facility through selling of advertising space and rent of space to formal and informal traders, in return for developing, managing and maintaining the facility.

The concession agreement is therefore designed to create a mutually beneficial arrangement where the private sector 'partners' with the City to deliver public services, and at the same time creating a profitable business opportunity. To achieve a win-win outcome it must ensure the business case is viable with the application of rules and incentives to ensure obligations and responsibilities are met.

# DESCRIPTION AND LOCATIONS

The four nominated locations are:

1. Stationi
2. Old Posta (new location)
3. New Posta
4. YMCA (new location).

## STATIONI

This area comprises a total of approximately 36m X 64m with three 'island type' bays; one bordering the east perimeter with a nature garden and two centre islands. The area to the west is designated as future taxi parking. Existing old shelters are in place with some minor advertising boards. **Figure 1** shows a pictorial overview and **Figure 2** shows the future layout and circulation plan.

**FIGURE 1 SNAPSHOT OF STATIONI**

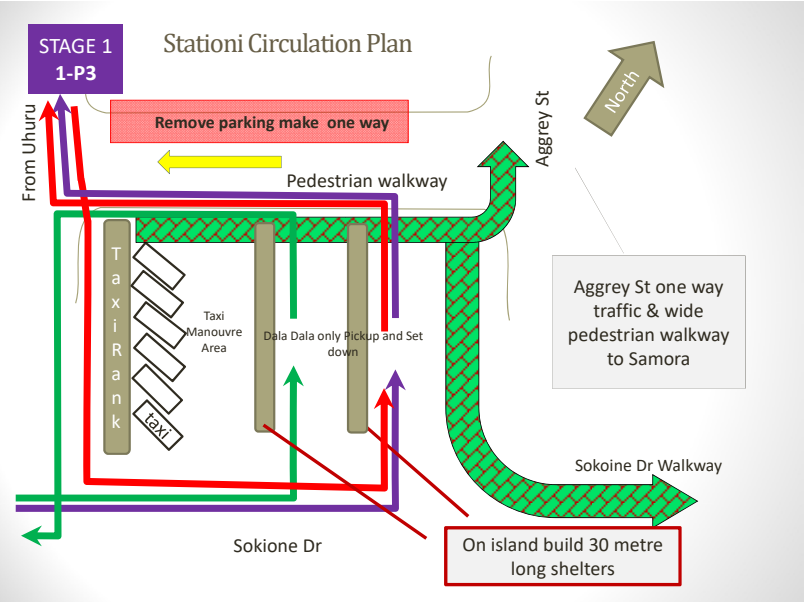



**FIGURE 2 LAYOUT AND CIRCULATION PLAN**

## DESIGN PARAMETERS

All existing structures are to be removed and the garden area is to be maintained. Driveway areas are to be repaired and footpath/waiting areas are to be tiled, with raised pedestrian crossings to be constructed across bus driveways (paved and without steps).

The opportunity exists to build on the two centre islands a 30 metre shelter on each island which creates approximately 200 sq. m of advertising space on the back wall of the shelter (using both sides) as well as 8 sq.m of kiosk space per island. The island at the east (backing the garden) can also accommodate further kiosk and advertising space. A public toilet (small fee for use), constantly maintained, is also planned for this space. The designated area of the taxi rank is also under the site management.

In this location, the contract shall allow the Operator to collect a parking fee from the taxi operators, at a negotiated fee arranged with the City.

Advertising signs can be static or LED/LCD screen and the construction of a freestanding LED screen advertising board is permitted. All facilities must be of a quality construction in order to attract advertising revenue and represent a high quality standard of passenger facility.

**TABLE 1 STATIONI GROUND WORKS**

| SITE LOCATION | TYPE OF GROUND-WORKS REQUIRED | DESIGN FEATURES/ BOQ | ESTIMATED COSTS |
|---|---|---|---|
| **STATIONI**<br>Total area:<br>Approx:<br>**36m X 64m**<br>Shelter structures include: 2 shelters @ 30m long each + space for kiosks | Some minimal repairs to the concrete driveway area. | | Tshs 1,000,000- |
| | Build new bus stop islands (over existing islands) and extend to 4 metres wide. | Islands and passenger waiting areas to be tiled in easy to maintain/ clean granite stone tiles. | Tshs 40,000,000- |
| | Build raised pedestrian crossings and walkways | Level to Islands ramped for buses. Paved and marked to identify the crossing as a 'shared zone' | Tshs 25,000,000- |
| | Build toilet block on Northern side | Ladies and Gents (2 each) | Tshs 30,000,000 |
| | Renovate and beautify garden area. | Existing garden requires some improvement | Tshs 4,000,000 |

### ISSUES AND CONSTRAINTS WITH STATIONI

There are possible issues with existing ownership/use of the site and any such rights and existing advertising rights need to be annulled. If this cannot be achieved, the current owner must redevelop the site under a DBOM concession, and only within the terms of the Contract.

## OLD POSTA

This area comprises the footpath area opposite the NBC bank at the west side of the park. The existing daladala stop at the harbour side of Kivukoni Front will be closed.

### DESIGN PARAMETERS

The area comprised the footpath are approximately 130m long and 4m wide. Three park entrances must be kept clear for park access. Shelter construction shall be between the existing grown trees. The allowable space therefore permits the building of three 12m long shelters in the available spaces. This will provide approximately 144sq.m of advertising space on the back and front wall of the shelter, and space for 3 X 8sqm of kiosk space. **Figure 3** shows a pictorial overview and **Figure 4** shows the daladala circulation plan.

**FIGURE 3 SNAPSHOT OF OLD POSTA**

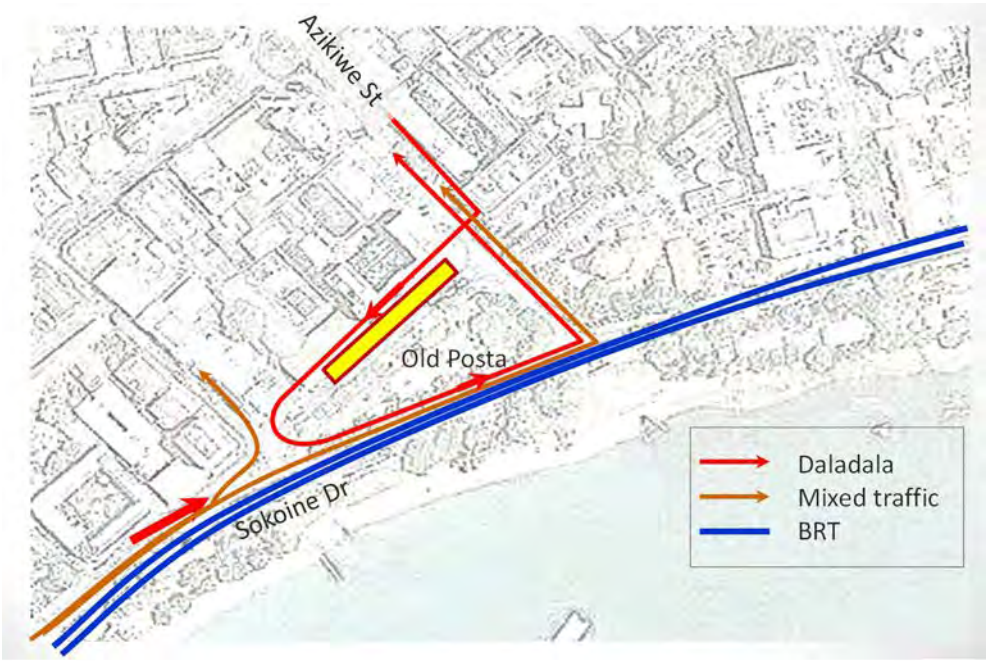



**FIGURE 4 LOCATIONS OF BUS STOP AND CIRCULATION LAYOUT**

**TABLE 2 OLD POSTA GROUND WORKS**

| SITE LOCATION | TYPE OF GROUND-WORKS REQUIRED | DESIGN FEATURES/ BOQ | ESTIMATED COSTS |
|---|---|---|---|
| **OLD POSTA**<br>Total Area<br>Approx. **130m X 4m**<br>3 shelters @ 12m long each + space for kiosks | Minimal works such as removal of old signage posts, repairs to the rear boundary fence and minor repairs to the paving, | | Tshs 8,000,000 |

### ISSUES AND CONSTRAINTS WITH OLD POSTA

Presently it appears that the park area is under the maintenance of NBC bank who may have some agreement or it is done for public service with an allowance to place their corporate image as sponsor.

Any pre-existing agreement should be cleared to allow the new location to be developed under a DBOM concession.

## NEW POSTA

This bus stop is in front of the General Post Office on Maktaba St. The area comprises a total length of approximately 135m long X 4m wide. The area includes walkway access to the footpath behind. The new bus stop at YMCA will reduce some of the activity at New Posta, helping to manage its orderly operation.

### DESIGN PARAMETERS

Within the west of the new LED advertising tower is space to build up to four shelters, ranging from 8 to 22m long depending on passenger requirements. Four shelters of 16m length are sufficient, given the volume of passengers using this bus stop. This will provide approximately 100sq. m of advertising space (one side only) on the back wall of the shelter. Some space at the back of shelters may be available also. Within the site area, there is space for 6 kiosks of 4sq.m each.

The footpath space requires full re-tiling and walkway access to the footpaths cleared. The total width of the bus stop waiting area shall be extended to 4 metres (of which 2 m shall be shelter area with seating).

**TABLE 3 NEW POSTA GROUND WORKS**

| SITE LOCATION | TYPE OF GROUND-WORKS REQUIRED | DESIGN FEATURES/ BOQ | ESTIMATED COSTS |
|---|---|---|---|
| **NEW POSTA**<br>Total Area<br>Between Ghana St and Driveway of Posta.<br>Approx. **135m X 4m**<br>4 shelters @ 16m long each + space for kiosks | Remove all old structures and rebuild the waiting areas 15cm high from road level, 4m wide from the garden boundary to the kerbside. Granite tiling to be used for the waiting area. | The main waiting area (to house the 4 shelters is 80m X 4m.<br>The remaining area for footpath renovations is 54m | Tshs 70,000,000- |
| | Remove old island structures on roadway. | | N/A (city will do) |
| | Renovate surrounding areas both sides of the main bus stop area including footpath improvements from Ghana St to the Posta. | 54 m long area for footpath renovations / paving | Included in main cost |

### ISSUES AND CONSTRAINTS

All existing structures and advertising rights for New Posta must be removed. Should the concessionaire require any modifications to the garden construction, this may have to be negotiated with the entity that has built and maintained the garden. The Client can assist in this regard.

# YMCA

This area comprises a location on the west of Upanga St as shown on **Figure 5**. Rerouting of buses will commence prior to end of 2014 and the footpath/waiting area shall be constructed at this time under the city budget in order for the function of the bus stop to begin.


**FIGURE 5 SHOWING LOCATION OF PROPOSED YMCA BUS STOP**

## DESIGN PARAMETERS

It is expected that this location shall require parking places of up to 6 daladala, requiring a total bus stop length of 60 metres. It is expected that four 12 metre shelters will be sufficient, which will provide seating for up to 100 passengers and 100 sq.m advertising space and space for two 8sq.m kiosks.

The footpath waiting area shall be widened to 3 metres allowing 6.5 metres of road width which provides a one-lane traffic flow and a bus waiting area.

**TABLE 4 YMCA GROUND WORKS**

| SITE LOCATION | TYPE OF GROUND-WORKS REQUIRED | DESIGN FEATURES/ BOQ | ESTIMATED COSTS |
|---|---|---|---|
| **YMCA**<br>60m X 3m<br>4 shelters @ 12m long each + space for kiosks | The city will complete the groundwork prior to the rerouting of the daladala by end 2012 | N/A | N/A |

## ISSUES AND CONSTRAINTS

The City is expected to build the ground works for this site as it may come into operation at the time of daladala rerouting.

# CONCESSION CONTRACT ISSUES

## THE OBJECTIVES FOR SECURING THE PRIVATE SECTOR

The objective to engage the private sector in this business is to create a business opportunity for the private sector that also delivers on public objectives, namely the construction, operation and maintenance of the city's bus stop /terminus facilities. Advertising rights and the ability to raise other revenues from the site will support the business case and the provision of services to the public.

PPP concessions have a poor record in Dar es Salaam, typically due to either an uncertain business case, or the readiness of the private sector to exploit the revenue opportunity yet underperform in its obligations, or due to poor contract agreements that lack incentives, rules and the mechanisms of enforcement.

The concession agreement is therefore designed to allow a viable business, and also ensures that the concessionaire has the built-in incentive to perform in their obligations and responsibilities.

The investor should have the natural incentive to maintain a good quality facility to attract advertisers and command greater advertising revenue, yet often, once revenue is collected the Operator can lose interest in the facility operation.

To solve this issue, and to ensure the facility provides the good service delivery to users, the client will monitor service performance through the use of an Evaluation Scorecard. Should the concessionaire fail in its obligations in O&M, financial penalties shall apply. Continual service failure or non-payment of fines would result in the cancellation of the concession contract.

## PERFORMANCE MEASURES

Suggested service standard measures for the concession are as follows:

- Cleanliness, including daily cleaning, sweeping, emptying litter bins and maintain clean glass and advertising boards and clean seating. Pressure wash cleaning shall be conducted weekly.
- Management, including the control of illegal hawkers and the removal of non-authorised activities and illegal parking on-site. On site management (one person shall be provided through all hours of operation as set by the contract) and casual security surveillance after hours.
- Illegal use, being non-authorized activity by the concessionaire or outside parties.
- Malfunction of facilities e.g. power, lighting failure, or damage or disrepair.
- Maintaining rules of operation as specified in the contract.

## REGULAR FEE PAYMENTS TO THE AGENCY

The option exists in the bidding process for the bidder to propose a period of no fee payment to allow the investor time to recoup the investment. Service failures however shall incur extra financial penalties.

Following such a fee-free period the Operators shall pay monthly fees to the City as stipulated in the contract, and based on the offer made in the bid process.

## EXTERNAL MANAGEMENT ISSUES

Some external factors may impact on the operation of the facility, and these will require a management strategy that includes:

- To acknowledge the role of SUMATRA in governing the operation of daladala and coordinating bus operators. This will be accessed in the case of irregular action or non-compliance by daladala of bus stop rules.

- To concept of daladala paying access fees to use the bus stop facility is considered, but not included in the concessionaire. Free use of the facility is preferable, in order to maintain a fast turnaround of vehicles and ensure daladala do not overstay with long dwell times (waiting for passengers and getting their money's worth) and also do not evade the stop to avoid paying fees.

## CONTRACT PERIOD AND CONTRACT TERMS AND CONDITIONS

The concession agreement must be for a suitable term, commensurate with a fair return on the investment on one hand, and protect the interests of the City on the other hand. Too long a term may cause a situation where the City cannot readjust the contracts to suit changing conditions and too short a term will disadvantage the interests of the investor.

Therefore, ideally a 5 year contract could be considered, with a 5 year automatic extension for good performance.

The contract can be cancelled at any time for the following:

- Violation of the terms of the contract or failure to properly fulfil the obligations of the contract.
- Continual failure to address the performance issues of the contract with due process of warnings followed.
- Non-payment of liquidated damages (fines) for service failures.
- Failure to advise the client on the sale of the business.

## CONCESSIONAIRE/OPERATOR PERFORMANCE

A draft version of the Concession Contract is attached as Appendix 2-1.

The Operator will be held to account to meet performance standards of the contract. It is the responsibility of the Operator to ensure contract conditions are followed and that the facility delivers in good standard of service to the public. The public can expect the bus stop facility to be clean, in a good state of repair, be a safe environment free of harassment by vendors and hawkers. The operation of the bus stop area shall be orderly.

Poor performance could result in:

- Loss of advertising revenue
- Financial penalties for service failures
- Poor record of performance as a concessionaire
- Accidents and injuries
- Poor customer service
- Contract penalties

## CONTRACT MANAGEMENT AND THE PENALTY REGIME

Serious contract breaches leave the option of with legal recourse / cancellation of contract. The 'performance' of service delivery managed through a demerit points system and operational fines.

APPENDIX 2-2 outlines the Penalty Register showing the financial penalty for each item of performance failure, and a Performance Scale that grades performance levels according to demerit point accrual. The purpose of the Penalty and Demerit Points system is to focus the Operator to provide a good standard of service delivery and will:

- Be exercised by the client in good faith to meet quality performance objectives
- Inform the Operator when failures occur, and who has right of reply or explanation
- Use a monthly performance evaluation scorecard to evaluate performance.

The Penalty Regime and Demerit Points will:

- Monitor performance over time to fairly judge overall performance
- Provide a financial incentive for the Operator to comply
- Rate the performance of the operator to determine eligibility for Contract extension/ renewal.

In practice the accrual of Demerit Points will rated according to the Performance Scale, with the accrual of 20 demerit points or more in a 3 month period will require a meeting with the client to establish action steps to resolve the performance issues. The accrual of 30 demerit points or more in a 3 month period will result in a 'show cause' notice why the contract should not be terminated. Failure to resolve will result in cancellation of contract.

## SELECTING A CONCESSIONAIRE

### SHORT LISTING BY PREQUALIFICATION

The process will begin by advertising for 'Expressions of Interest' to secure interested parties to lodge a submission. These interested parties can be pre-qualified in order to streamline the process with only the qualified players. Prequalification on to a 'short list' shall include the following requirements with a suggested scoring for each item:

| **Criteria** | **Scoring**<br>A. Fully meets requirement to a high standard<br>B. Meets requirement to an average level<br>C. Shows some evidence of requirements being met<br>D. Does not meet requirements |
|---|---|
| All bidding entities to be a registered company with tax records in Tanzania and be able to submit financial statements for the past 2 years as evidence of financial capability. | 5 points |
| Demonstrate Management and Staffing capability, and local office facilities. | 5 points |
| Demonstrated experience in the field of on-site display advertising with an established client base. | 20 points if A<br>15 points if B<br>10 points if C<br>0 points if D |
| Can provide evidence of quality advertising structures and successful in-field advertising displays. | 20 points if A<br>15 points if B<br>10 points if C<br>0 points if D |
| References from existing clients showing satisfaction with the conduct of existing accounts. | 20 points if A<br>15 points if B<br>10 points if C<br>0 points if D |

A minimum score of 50 would be required to be short-listed.

### THE BIDDING PROCESS INVOLVING SHORT LISTED QUALIFIERS

The bidding process shall include all sites with only one concessionaire selected to manage all four sites. This is to develop scale of economy into the operation. The criterion for the bid will include the following statement of requirements:

1. FACILITY DESIGN

A key selection criterion is the best design for the facility. Bidders shall as part of the bid provide a design for the facility that includes PLAN layouts, side elevation drawings and a computer generate

perspective view to provide a true to life image of the structure, appearance and design of the structures and advertising spaces.

Bidders should engage architects to develop outstanding designs that contribute positively to the quality and attractiveness of the cityscape.

*Evaluation: These designs shall be judged by an independent panel to arrive at a consensus opinion on the most attractive, sustainable design that portrays a modern and efficient design worthy of a key public infrastructure and amenity.*

2. MANAGEMENT

The bidder shall outline a management plan that demonstrates how the quality of the facility shall be maintained, and the staffing plan for security/ marshaling as per requirements.

*Evaluation: Evident in such a plan is the competence of the planning to ensure quality service is maintained.*

3. FEES AND CHARGES

The bidder has the option to include in the proposal a 'fee-free' period according to what they consider necessary to recoup the investment, and for the remaining period, nominate a monthly fee payable to the City.

*Evaluation: Scoring shall not necessarily accept the highest fee, as this must be balanced against the quality and design of the facility and the management plan. However the fee scale can be considered as a supporting factor in the selection process.*

4. VALUE-ADD ITEMS

The bidder has the opportunity to provide any further detail, which can support the bid, for example any value-added inclusion or special site treatments that enhance to operation of the facility or provide added benefits to the public or the city.

*Evaluation: These items are beyond the minimum stipulated requirements and may differentiate bids from other contenders by delivering additional benefits.*

# APPENDIX 2-1. DRAFT CONCESSION CONTRACT

## SECTION 1 PARTIES TO THE CONTRACT

The Client: The Ilala Municipality

Represented by: _____ (hereinafter called the Client)

and,

The Concessionaire: _____ (hereinafter called the Operator)

Represented by: _____

## SECTION 2 PURPOSE OF THE AGREEMENT

The purpose of the agreement is to develop a business relationship between the City and Private Concessionaire for the Design, Build and the Operation and Maintenance of the City bus stops and termini.

This agreement will outline the basis of the relationship outlining expectations, obligations and responsibilities of each party and describe the terms and conditions of upon which the business will operate.

## SECTION 3 GENERAL TERMS AND CONDITIONS

This contract specifically makes the distinction that during the currency of this agreement the Operator is a contractor to the client and is not an employee or agent of the City and does not have the authority to bind the City contractually to any other party.

Should the function of the facility significantly change throughout the period of the contract, causing material loss of earnings to the Client, the parties may mutually agree to terminate the contract, or may settle the matter with mutual consent with alternative business opportunity secured through negotiation.

The financial and trading records of the Client shall remain 'Commercial-in-Confidence', but should the Client make application to vary the terms of the contract due to financial hardship, a full financial disclosure shall be made to support the claim and establish the bona-fides of the request.

The Operator may not cede or delegate obligations or subcontract services without prior Client approval. Should the Client approve intended subcontracting of services, the Operator remains responsible for quality of service rendered by subcontractor and the insurance required in terms of this agreement. The Client may withdraw consent with 30 day notice due to solvency issues or poor service performance and the Operator shall take over services again.

The Client may terminate this contract should the Client become insolvent. Fail to pay monies due.

The Operator is to advise the Client within 7 days any change in company ownership or control. Failure to do so will result in cancellation of the contract, without any redress to any party concerned.

This contract is for a specific contract period and the Client has no claim, rights or grounds for action against the client beyond the contract termination date.

The client is not permitted to sell any advertising for the period past the contract termination date and upon termination the facility must be handed over to the client in good condition.

All formal correspondence between parties shall be by written correspondence either letter or email.

## SECTION 3 DEFINITION OF LOCATIONS

The site detail for the Bus stop/terminus locations are made available as part of the Bid Documents available to pre-qualified bidders.

*(Insert detailed description here showing boundaries -inclusions and exclusions)*

## SECTION 4 DESIGN OF FACILITIES

The proposed design and specifications of the facilities as contained in the Operators Bidding proposal shall be annexed to this contract as Attachment 1.

Signing of this contract shall indicate that the city accepts the design proposal as shown.

At the completion of construction the City Engineer shall sign off on the completed works and issue a letter of satisfactory completion.

## SECTION 5 DESCRIPTION OF SERVICES

The Operator shall undertake to Design, Build, Operate and Maintain (DBOM) the facility described in Section 3 above. The design and build of the facility shall be fully representative of the design and approved plans provided to the Client and upon which the Contract has been awarded.

The Operator shall supply a Security Marshall to assist passengers and ensure the smooth operation of the facility for a period of sixteen hours per day from Monday to Saturday (6 days per week, excluding public holidays.

The Operators shall maintain the facility in good condition, including daily attendance to cleanliness and regular thorough cleaning, such as weekly pressure washing.

All advertising signage shall be kept in good condition and vacant advertising space shall be neatly presented with alternative decoration or vacant colour panel.

No stickers, political banners, free advertisements, posters shall be allowed, and the Operator shall immediately remove illegal or informal notices.

## SECTION 6 OBLIGATIONS AND RESPONSIBILITY OF THE OPERATOR

The Operator is obliged to arrange comprehensive insurance cover public liability covering all risks, civil commotion etc. Proof of cover and premiums paid to be supplied by Client on request. If not in place, the client may take out insurance and charge the Operator for the premium costs.

The Operator shall indemnify the Client from all action, legal or otherwise by any party using the facility, public, advertiser, tenant etc.

The Operator may request assistance from the Client, to manage any aspect of the facility beyond its control or scope (such as behaviour of daladala etc.).

The Operator shall advertise at each location a call number that will respond to service complaints.

The operator shall keep the Client updated on a contact person responsible for management of the site including an after hours phone contact telephone number.

The Operator shall maintain the facility at own expense in a clean and serviceable condition and to ensure public safety. The operator shall pay the cost of electricity and utilities at the site.

## SECTION 7 FEES AND PAYMENTS

The rights to occupy the site and develop the facility and sell advertising and collect rents for limited commercial use, is subject to the payment of a fee to the Client .

However, the contract shall have a 'fee free' period of _____ *(as proposed in the bid)* years to allow the Operator to recoup the cost of the investment in the facility. In the remaining period of the contract, a monthly fee of TZS _____per month will be paid to the Client.

## SECTION 8 INCENTIVES AND PENALTIES

The Operator will be held to account to meet performance standards of the contract. It is the responsibility of the Operator to ensure contract conditions are followed and that the facility delivers good standard of service to the public.

It is expected that the Operator has the incentive to keep the facility in good condition to attract advertisers to a quality advertising opportunity with a high level of public exposure. However, the Client will monitor operations and use a monthly evaluation scorecard to grade performance and public service delivery.

Breaches of Contract Terms and Conditions will have legal recourse and may result in cancellation of the contract.

For service performance, a penalty system will operate through a demerit points system and operational fines for incidents of service failure according to the Penalty Table attached to this Contract.

Overall performance during the course of the contract and successive months will be graded according to the Performance Scale as shown. Accrual of demerit points over successive month will result in action being taken to improve performance including the option to terminate the contract due to continual poor performance.

The accrual of **20 demerit points** or more over a 3 month period will require a meeting with the client to establish action steps to resolve the performance issues. Failure to improve performance will result in a 'show cause' notice why the contract should not be terminated.

The accrual of **30 demerit points** or more over a 3 month period will result in a 'show cause' notice why the contract should not be terminated. Failure to resolve will result in cancellation of contract.

## SECTION 9 DURATION & CONTRACT RENEWAL

The contract is made for 5 years subject to good performance and compliance.

Provided the Operator has provided good performance during the contract shall have an extension of a further 5 years at the conclusion of which the contract shall be put to competitive open tender.

The incumbent Operator shall have the benefits of incumbency and a supporting record of business during the tender process, which may provide a competitive advantage, however the Client is not obliged in any way to provide advantage in an open tender process.

## SECTION 10 COMMENCEMENT DATE AND START OF OPERATION

At the completion of works the city engineer shall inspect the facilities and if satisfied, will issue a letter of satisfactory completion stating the completion date and that works have been satisfactorily completed according to the stated requirements of the bid proposal and the contract.

The agreed completion date shall be no later than _____ upon which construction shall be completed and operations of all the facilities shall begin.

Failure to compete works prior to the completion date shall incur a penalty of TZS 150,000 per day paid to the city until the date when works are completed. Incomplete or unsatisfactory compliance to the design proposal will cause the penalty period to extend until the construction has been approved.

## SECTION 11 SETTLEMENT OF DISPUTES

**Mediation in non-urgent matters**

- The Operator may appeal to Client against the imposition of a penalty within 14 days of imposition
- The Client must give decision within 14 days of receipt of notice
- The Operator may declare dispute if not satisfied
- Parties must attempt to resolve in 21 days. If not resolved – mediation or arbitration will be sought by an independent mediator as agreed by the parties.
- The Mediator does not have the power to impose a binding decision, and the matter must be resolved by written agreement
- If mediation not successful in 60 days, parties may revert to court for settlement of the dispute

**Arbitration in urgent matters and unresolved disputes**

- If dispute arises from non-agreement after mediation, the Client may refer the matter to arbitration
- Arbitration proceeding must be informal to speed up process and save costs to reach a decision within 30 days
- Arbitrator decision is final and binding and should be made within 30 days. May also make ruling on cost
- Decision may be made by an order of the court should one party not comply

If proceedings agreed to here are deemed to be inappropriate by any of the parties nothing in the contract prevents the party from seeking urgent relief in court.

The Operator must continue providing services despite the fact that a dispute procedure being in process.

## SECTION 12 SPECIAL CONDITIONS

**Confidentiality and Public Announcements**

- Content of contract and information disclosures for contract purposes by parties remain confidential
- The Client will advise the Operator of all public announcements made regarding the operations of the bus stop/ terminus facility, with sufficient notice for the Operators to respond and manage the situation.

**Standards of Advertising**

All advertising shall comply with the Standards of Advertising outlined in the *Code of Ethics for Advertising and Sponsorships for the Advertising and Broadcast Media* of the Tanzania Communications Regulatory Authority.

Specifically, in the interests of public health, no advertising for tobacco products are allowed.

Any audio or TV advertising shall be in accordance with proper standards and without public disturbance, as to noise levels.

# APPENDIX 2-2. PERFORMANCE REGIME

**TABLE 1 PENALTY TABLE**

| **Item** | **Explanation** | **Action/ Penalty** | |
|---|---|---|---|
| Breach of Contract conditions | | Legal Recourse or Cancellation of Contract | |
| **Service failures** | | **Penalty per incidence (TZS)** | **Demerit Points** |
| Facility in state of uncleanliness | Where the facility is dirty, such as excessive litter, sand, and advertising boards, glass that has not been regularly cleaned. | 100,000 | 2 |
| Facility/ equipment in disrepair, or malfunction of equipment | Broken lighting, structures, glass, broken signage/seating, where safety markings are no longer visible. | 400,000 | 4 |
| Facility damage or disrepair that threatens public safety | Where damages can cause injury or cause accidents. | 600,000 | 6 |
| Facility subject to illegal use, by contractor or others | Illegal hawkers, vendors or illegal parking, or any other prohibited activity within the bus stop/terminus area within the control of the Operator | 400,000 | 4 |
| Lack of security attendance in peak periods as specified in the contract. | Manned presence by Security Marshall 20 during peak periods to assist passengers and maintain order in boarding and alighting. | 200,000 | 2 |

**TABLE 2 PERFORMANCE SCALE**

| | |
|---|---|
| 0 points per month | Excellent performance |
| 2 points per month | Acceptable performance |
| 4 points per month | Needs Improvement |
| 6 points per month | Urgent management attention |
| 10 points per month | Poor/ Unacceptable |

**TABLE 3 POINTS ACCRUAL**

| | |
|---|---|
| Accrual of 20 points over a 3 month period | Meeting with client to resolve issues. Failure to resolve will result ‘show cause’ notice. |
| Accrual of 30 points over a 3 month period | Show cause why contract should not be terminated. Failure to resolve will cause cancellation of Contract. |

# APPENDIX 2-3. ADVERTISEMENT FOR BIDDERS

The following is a draft advertisement for interested bidders.

**EXPRESSIONS of INTEREST**

The Ilala Municipal Council plans the relocation, renovation and new construction of major bus stops and terminus facilities in central Dar es Salaam. Private sector involvement is sought under a Concession Agreement to **Design; Build; Operate and Maintain** (DBOM) these bus terminal facilities with the private sector being given the opportunity to exploit the revenue generating potential of such a facility through the selling of advertising space and the rent of space to informal traders, in return for developing, managing and maintaining the facility.

The concession agreement is therefore designed to create a mutually beneficial arrangement where the private sector 'partners' with the City to deliver public services, and at the same time creating a profitable business opportunity. The concession contract shall include performance conditions to ensure obligations and responsibilities are met.

The locations are:

1. Stationi - renovation and construction of new infrastructure
2. Old Posta – relocated site and construction of new infrastructure
3. New Posta - Refurbishment and construction of new infrastructure
4. YMCA – New location and construction of new infrastructure

The bidding process will begin by pre-qualifying interested parties to complete a formal bid process. Prequalification on to a 'short list' shall include the following requirements:

- All bidders are to be a registered company with tax records in Tanzania and be able to submit financial statements for the past 2 years as evidence of financial capability.
- Demonstrated Management and Staffing capability, and local office facilities.
- Demonstrated experience in the field of on-site display advertising with an established client base.
- Can provide evidence of quality advertising structures and successful in-field advertising displays.
- References from existing clients showing satisfaction with the conduct of existing accounts.
- Name of Company Representative
- Address and contact details.

Expressions of Interest shall be lodged at _____ no later than ___pm on (date).

Further enquiries:

*Illala Municipal Council Address & Phone Number*

# Discussion Paper (Output 2 Annex 5): Daladala and Bus Service Improvement (Daladala Reform)

Capacity Development Project for

the Improvement of Dar es Salaam

Urban Transport (Phase-2)

# Discussion Paper (Volume 2 Annex 5)

## Daladala and Bus Service

## Improvement (Daladala Reform)

This paper has been prepared only for internal discussions amongst the designated stakeholders for this project. Discussions can explore ideas and concepts for policy development and need not be limited to current policies of the Government of Tanzania.

Secretariat for the Capacity Building Project

and

JICA Expert Team

# Notes on Cooperatives for Tanzania Transport

A **cooperative society** is an organisation of people who have voluntarily come together for the purpose of solving their socio-economic problems through self-help initiatives, mutual support and investment ventures aimed at equally benefiting the group/members.
Under the Tanzania's **Cooperative Societies Act 2013A** cooperatives are allowed to pool savings for its members and in turn provide them with credit facilities.

This may require being listed as a Savings and Credit Cooperative Society (SACCO) .

The main principles that underpin the formation of cooperatives are:

- Voluntary and open membership
- Democratic member control
- Members economic participation
- Autonomy and independence
- Education, training and information
- Cooperation and mutual support among the cooperatives
- Concern for the community

## Eligibility for membership

Suggest here that SUMATRA list eligibility criteria for bus owners, which could include:

- Current route permit on a registered vehicle carrying out passenger services (existing operator)
- Operating within the designated area or identified route that forms the basis of identifying the cooperative.

And general clauses of eligibility:

- Be 18 years and above
- Have a common bond with other members of the cooperative society
- Be of good character
- Be of sound mind
- Agree to abide by the Cooperative Societies Act, Rules and By-laws of respective cooperative society

## Loss of membership?

Include:

- Sale of the bus and withdrawal from the business
- Criminal conviction
- Continued failure to meet performance standards
  (See performance-based contract terms)

General termination clauses such as:

- Expulsion in accordance to your cooperative society's by-laws
- Death
- Unsound mind
- Voluntary withdrawal or resignation from your cooperative society
- Collapse or dissolution of your cooperative society

## Ability to participate in more than one cooperative?

Yes. This should be possible (but requires approval from the cooperative registrar)

## Each cooperative develops its own by-laws

Can SUMATRA offer a set of by-laws to act as a template for cooperatives to follow?

## What are some of the rights of cooperative society members?

Each cooperative member has certain rights, including the right to:
- Attend general meetings and vote
- Get a share of surplus income at the end of each year
- Inspect your society's books of account
- Apply for loans, in the case of SACCOs
- Approve, reject or defer budget
- Participate in amending the society's by-laws
- Fix borrowing powers of the society

Some of your responsibilities as a member are:
- Attending members' education days
- Adhering to your society's by-laws
- Liability for your society's debts incurred as a member and up to 2 years after ceasing to be a member
- Encouraging potential members to join your society

## What are the duties of a management committee?

The management committee is the governing authority of a SACCO and is subject to any directives of a general meeting. Among other responsibilities, the committee has a duty to:
- Adhere to the Cooperative Societies Act, Rules and By-laws and prudent business practices in all its activities and undertakings
- Determine the interest rates on loans, subject to the society's by-laws
- Ensure the keeping of true and accurate records of account
- Recommend to the annual general meeting, the dividend rate to be paid on shares, and the interest and refund payable to borrowers
- Authorise investments by the society

## Cooperative loans to members?

Can a normal cooperative issue loans or does it require setting up a full SACCO?

Are there rules which govern the issue of loans? Who sets these rules? The Registrar or the by-laws?

Clause 72 covers this: 72 (5) indicates that it can do so only with the sanction of the Registrar who will set limits and rules.

Be clear on:

- Qualifications for loan amounts and if security is required.
- Maximum loan limits and purposes of such loans (and definite repayment periods)
- Procedures when call for loans exceed available funds
- Conflict resolution procedures such a dishonour of repayments, fraudulent use, improper dealings, discrimination.

# Opportunities for Daladala Reform

## Analysis of present Daladala Issues

Below is a brief summary table of issues and problems with daladala services with the adjoining column explaining the issue and outlining some measures to solve/alleviate the problems.

| S/No. | Problem/Issue | Further explanation/ root causes | Alleviating Measure/ solution |
|---|---|---|---|
| 1 | Poor business/ loss-making/ not sustainable as a business<br>(will get worse as traffic congestion increases)<br>Influences 2,3,& 4 | Passengers complain of high fares while operators petition for fare increases (but are operator's owner/drivers or just owners?)<br>**The revenue side:**<br>What inefficiency exists in revenue collection? Drivers do not return full income to owners causing the investor to struggle. This indicates that fares/ revenue is sufficient to cover costs but full revenue is not being captured.<br><br>**The cost of operation:**<br>Traffic congestion has a direct and severe impact on business viability, driving up costs/fares.<br><br>**Driver behaviour/ culture:**<br>Drivers cannot complete sufficient round trips to make money. This leads to cheating and aggressive competition for passengers and malpractice. | Implementing an **electronic central fare collection system** that captures all revenue and returns this to the vehicle owner, who pays the driver a salary and performance bonus. This gives drivers surety of employment, protection and entitlements under labour law.<br>The fare collection system allows:<br>➢ The capture of all revenue will reduce pressure to increase fares.<br>➢ Discounting for volume users, apply concessions for students, and avoid cost penalties of bus transfer.<br>➢ Provides SUMATRA with full system information on fleet information (tracking/level of service per route) as well as all revenue data/ passenger boardings, useful for planning and regulation.<br>➢ Full transparency with each bus owner able to track their bus operation and revenue via a web portal.<br>Improving operating efficiency requires **strong measures implemented to provide bus priority.** This makes public transport more efficient both in terms of operating costs and passenger travel efficiency (saves travel time).<br><br>Central Revenue collection takes the fierce profit motive away from the driver, who can be paid from the fare collection entity), a daily performance bonus (commission) for volume of passengers carried providing them a financial incentive to serve passengers. |
| 2 | Lack of professionalism/ Poor vehicle maintenance / no long term commitment | There is an endless supply of aspiring entrants to the business as it is a low education, self - employment opportunity.<br>But it struggles to make a return. Owners live off the proceeds with no investment in the future. | When bus owners can capture full revenue, the business is more viable and sustainable, able to afford improved maintenance and reinvestment.<br>**SUMATRA can enforce standards more easily** if owners are more financially capable to meet those standards.<br>With SUMATRA improving control through information it is more capable to regulate participation and competition in |

| | | | |
|---|---|---|---|
| | | | the system through licensing.<br>The central fare collection system may also be used dissuade illegal entrants operating daladala. |
| 3 | Poor driver behaviour / fierce competition/ | The revenue of the business being directly connected to the daily income of driver/conductor makes for fierce competition for profit or survival.<br>This impacts on driving behaviour, causes speeding and road accidents.<br>This is the one single factor that makes daladala so difficult for SUMATRA to regulate. | The central fare collection system will alleviate this by breaking the linkage between bus revenue and driver's income.<br>It is expected that drivers may be more accepting of new arrangements as it is the only way they can **receive formal employment contracts** for which they have been agitating.<br>However some drivers may pushback against any measure that is seen as reducing their income, and this is an implementation risk. |

| | | | |
|---|---|---|---|
| 4 | Cream skimming (high competition on peak routes while ignoring low-demand routes)<br>Also refusing students who pay reduced fares. | While this is related to competition, it also is a product of the unscheduled, *Laissez-faire approach in providing public transport. Operators can choose what part of the routes they operate and at what times and also sometimes which routes, if the route assignments are not controlled,* | This will require the introduction of **larger transport bodies, being either companies or cooperatives** that are given concessions with exclusive rights or with limited competition, being responsible for designated routes.<br>A collective/ cooperative of operators are also likely to self-manage and enforce their rights against unauthorised competition.<br>Larger entities can be responsible for a scheduled service to introduce predictability into the services. |
| 5 | Lack of scheduled services, long and unpredictable waiting times | Daladala services can be uncertain in terms of services and available seating.<br>Buses often wait until the bus is full before departing, meaning that travel times are unpredictable | **Scheduled services are a key aspiration** in improving bus services, making them more reliable and able to be supervised.<br>Larger buses operating scheduled are also more likely to be profitable as they will attract passengers who value a more respectful service.<br>Some level of protection from random competition will be required, as a scheduled bus should not be incentivized to join the competition for passengers. |
| 6 | Weak institutions and multiple organisations, with overlapping responsibilities are responsible for public transport.<br><br>The daladala operations are also highly fragmented, making the control and regulatory task of SUMATRA very difficult. | Each organisation is faced with challenges relating to inadequate staff, technical capacity, and funding.<br><br>There are even multiple daladala associations representing different constituencies. | **Better coordination between the various agencies** through DUTA. The proposed Dar es Salaam Urban Transport Authority will carry overall responsibility for transport, with the mandate to direct and coordinate the efforts of the individual agencies and also ensure funding support. The main aim of DUTA is to improve coordination, harmonization of resources and develop clear responsibility and accountability<br>Strengthening the role of the associations as the voice of the transport sector and engaging with them to facilitate reform.<br>Consolidating the daladala sector via the associations and forming collectives/cooperatives help communication, identity and industry representation. Stronger and larger entities are more likely to be able to take up the challenges of industry reform. This has the benefit of being an inclusive process.<br>SUMATRA can incentivise this through offering concessions. |
| 7 | Daladala Reform Formalisation into BRT entities is the only offering.<br>This implies all reform is | Many daladala will be replaced by the BRT system.<br>There has been a long process of 'compensation' discussions and with a singular approach of | Lack of capital and bus operations experience is a major handicap for daladala operators. The premise of DART operator being sourced from daladala is largely unrealistic. |

| | | | |
|---|---|---|---|
| | centred around the roll out of BRT.<br>Alternative solutions are required, but there are no initiatives to develop reform within the daladala sector even though potential exists for cooperation with government in this regard. | formalisation: becoming part of the BRT system (forming a company to become a DART Bus contractor /operator, or to bid for feeder bus contracts).<br><br>Lack of capital and bus operations experience is a major handicap for daladala operators. The premise of DART operator being sourced from daladala is largely unrealistic, and a simplistic solution. Compensation has also been a 'red herring' distorting negotiations from industry transition into a 'money grab'.<br>The highly transient nature of the daladala has also presented the authorities in Dar es Salaam with a huge challenge – in just figuring out who the affected operators are. | As an alternative to this difficult to achieve formalisation process there may be opportunities to collectivise daladalas into organisations that better reflect their experience, skills and develop their role in 'what they are good at'.<br>The central fare collection system is a major instrument to facilitate this, through control of revenue information retrieval.<br>The focus should be on industry reform which is within the capacity of the industry itself. |

## Conclusion from the above analysis

The following key points are taken from the above table, outlining the main elements of the reform landscape.

1. Central Revenue Collection is the element of Reform as it controls and captures revenue and retrieves operational information to improve system management and regulation.
2. Formal driver contracts enabled by the central FC system formalises employment within the industry and enables better control on behaviour.
3. Strengthened government institutions are essential to ensure the transport operating environment supports public transport.
4. The daladala sector needs to be consolidated in terms of association representation and structure of cooperatives.
5. Forming collectives (companies or cooperatives) reduces the highly individualistic nature of operations and creates larger and stronger industry representation.
6. Scheduled services are a key aspiration to make public transport more reliable and more able to be supervised.
7. Bus priority infrastructure is necessary to ensure financial viability and public transport efficiency

For **Items 1-2** The Boloro Fare Payment system is under discussion and a pilot project is proposed under the JICA CUPID pilot projects. Cooperation of DARCOBOA and SUMATRA is required.

**Item 3** will hopefully be addressed through the formation of DUTA which is presently underway. A revised Concept note for establishment of DUTA is being developed by the JICA CUPID project and the Division of Infrastructure Development (DID) and upon completion (December 2015) will be reviewed by stakeholders before proceeding to legislative processes.

**Items 4-5** are the main area for deliberation, and requires a study to develop an understanding of how such a collectivized structure can be organised. Particularly this should compare establishing cooperatives as opposed to forming companies, with an objective of keeping reform within the capacity of the present players. Advantages and disadvantages need to be looked at as well as opportunities this would present.

**Items 6 and 7** are follow-on requirements that are easier to facilitate when large transport entities are formed.

# Forming Daladala Cooperatives

Presentation to SUMATRA

June 2016

## Negative aspects

- It is excessively revenue-driven causing aggressive and competitive driving behaviours and impacts poorly on passenger service
- Highly fragmented, and difficult to regulate. Illegal operators flourish and every bus is individual business entity intent in its own survival and enrichment
- A poor safety and service - passenger security, traffic accidents (and near misses), overcrowding and fighting for entry, personal safety (molestation, pick pockets) and also lack of service predictability and long waiting times.
- Poor labour practices, employing mostly day labourers who have no assurity of employment, are subjected to long driving hours and no safety net in terms of sick leave, or social benefits
- Poor relationships with authorities and no input into framing regulations, mainly due to the fragmented and individualistic nature of the sector
- It is not so evident in Dar es Salaam, but where paratransit feels vulnerable, it can result in mafia-type organisations taking control, using threats and intimidation to control competition and withstand regulatory impositions on the sector

## Positive aspects of Daladala operation

- Participation is through individual ownership is a micro-business opportunity.
- It teaches entrepreneurial / small business skills
- Business opportunity for retired persons supplementing pensions
- Job-creation at local community level, for fuel, repairs, tyres, cleaning and shops and cafes near bus terminals.
- It employs low-skilled male-dominated workforce as drivers and conductors
- Moderate investment means system can finance itself.
- Carries 100% of the business risk, with no imposition on public funds.
- Hs highly demand-responsive adaptable to changes in demand. It has the ability to penetrate local communities to improve access
- Operators are 'street savvy' qualifies them to be competitive, meet market demand, exploit business opportunity and make financial returns.
- Small bus sizes suitable to low-demand periods

## A policy of formalising of the informal sector into companies is difficult

Presently there is a policy in Dar es Salaam to form daladala operators into companies, however, it is difficult to achieve because:

- Distrust between the industry and operators
- No incentives for daladala operator to join
- Preferences for 'own business' rather than small shareholding of larger business
- Preference for collecting daily cash and having bus parked out front
- Where drivers make good money they may oppose change *(keep your hands of our cash!)*
- Shadow owners using the business for supplementary income

## The experience in South Africa

A similar policy in South Africa, using BRT to drive reform in the mini-bus taxi industry, following examples of Latin America has shown it is not a viable approach.

*"THOUSANDS OF PARATRANSIT OPERATORS WOULD HAVE TO FORMALIZE THEIR BUSINESSES, OR MERGE INTO NEW OR EXISTING OPERATOR ENTITIES IN ORDER TO PARTICIPATE IN THE NEW SYSTEMS.*

***THERE IS ABSENCE OF ACCESSIBLE BUSINESS PLANS AND REGULATORY REGIME PROPOSALS AROUND WHICH PARATRANSIT CAN BE ENGAGED TO CONVINCE IT TO ALTER ITS CURRENT MODUS OPERANDI"***

*(SCHALEKAMP, BEHRENS, 2010, ENGAGING PARATRANSIT ON PUBLIC TRANSPORT REFORM INITIATIVES IN SOUTH AFRICA: A CRITIQUE OF POLICY AND AN INVESTIGATION OF APPROPRIATE ENGAGEMENT APPROACHES)*



## Migration Vs. Engagement/Partnership

**Traditional / accepted methodology**

- Migration /formalisation/ capacity building
- Similar to resettlement issue
- Forced/ heavy hand of regulation
- Lack of choice
- Compensation / entitlement
- Suspicion /Resistance
- Shareholding does not provide daily income

**Feeder bus partnership**

- Voluntary/ easy to adapt/ familiar ground
- Business opportunity (spreads benefit of BRT operation)
- Industry can organise itself
- Daily income
- More efficient routes
- Joint objective with BRT for successful outcome
- Equal partnership

## 5 steps of Paratransit Reform : UCT Research


## Revenue is at the heart of the problems

- Bus rental schemes due to **inability to control revenue** collection.
- Drivers need to **maximise revenue** to earn their daily income impacting safety
- **Revenue leakage** & revenue underreporting
- The daily rental amount to the bus owner is usually not sufficient to cover proper maintenance or bus replacement.
- **Overall system funding is inadequate** despite passengers paying a sufficient fare
- **Bus owners are often not considered 'creditworthy'** by lending institutions for the purchase of new buses.
- Regulators are hamstrung in effective quality control as **operators plead 'near bankruptcy'** and an inability to make necessary improvements.
- Poor financial performance often makes the industry a **'revolving door' of participants** using low-skilled labour in self-employment ventures.
- Regulator's task is more difficult, as there are often no long term relationships or trust developed.

## 5 steps of Daladala Reform for DSM


## *Present Daladala Situation*

### System issues:

- Service quality issues of daladala are driven by **the business model** where the driver/ conductor behaviour is directly linked to revenue maximisation (as driver carries business risk)
- The business of renting buses to the driver /conductor is due largely to the **inability of the owner to manage revenue** any other way.
- The 'system' as a whole is 'starved' of funds and quality suffers even though passengers pay sufficient fare
- **Inability to control revenue** is a root cause
- Business is marginal for bus owners

### Passenger issues:

- Single fare/ single trip means 'cost penalty' for passengers when transferring buses
- Negative behaviours impacting on customer service
- Overcharging and bullying by conductors is commonplace

We are not in the position to promote specific brand technology and have no vested interest to do so

but

we need to utilise technology that suits our functional purpose best

## *Describing BOLORO Technology*

- The BOLORO mobile payment system facilitates central revenue collection
- Funds are distributed according to the contracts/ agreements
- Bus owner receives net payments (after commissions)
- Driver bonus payments are possible
- Drivers paid on formal employment agreements
- Bus tracking and passenger data available

## *Tap & Go – a fast, convenient and secure way to pay*


- The Telco operators partner with Boloro to issue small NFC tags that are attached to the customer's phone
- Any type of phone
- It links the payment to the customer's phone credit to deduct charges
- Low value charges are just through a 'tap' on the reader device and the customer gets an sms confirming the purchase
- High value purchases a PIN number is used.
- For casual user a low cost stored value card (with the NFC sticker) can be used

## *How it works*

**USER**

- Passenger uses mobile phone credit to pay the fare when they tap the reader upon entering the bus
- Boloro checks available balance and deducts payment
- Various options for distance-based fares
- Passenger receives notification via sms & E-ticket receipt (paper tickets also possible)
- Bus driver is notified via the console on the reader

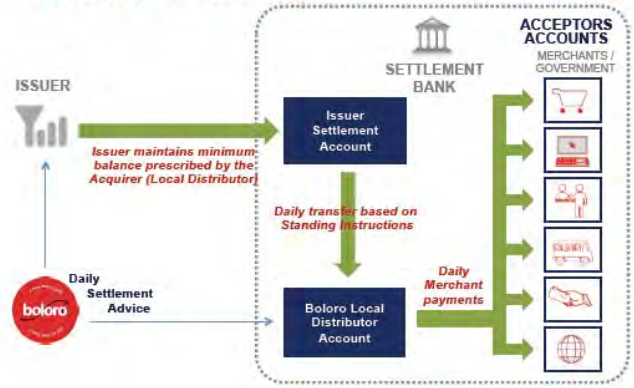
**PAYMENT SYSTEM**

- Boloro performs Daily Clearance and settlement
- Driver bonuses paid daily (as a performance incentive)
- Lending institutions can have first call for bus loan payment
- SUMATRA/ Bus owners can access merchant side reporting portal (fully transparent)

**REGULATION/ PLANNING**

- GPS tracking device (reader) reports all passenger No's / Revenue/ bus tracking for analysis and planning purposes

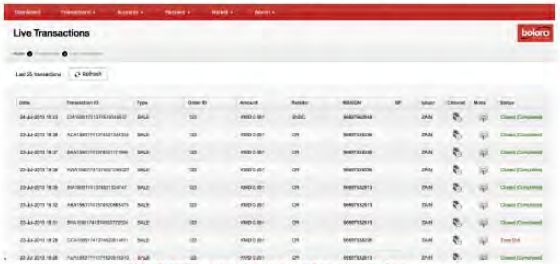
## Boloro Settlement Process Flow




## Transparent Administration

Dashboard to manage & monitor transactions

Analytics and business intelligence capabilities




*Real-time monitoring of transactions*

- Bus Owner & SUMATRA have portal access for vehicle tracking , driver management and fare payment tracking
- Useful for Control & Monitoring as well as service planning

## *System Benefits*

- No cash handling required / reduces passenger confrontation with conductors
- Linkage between revenue and drivers daily return is removed
- Drivers benefit from formal employment agreements & conditions (also daily bonuses)
- Full value of revenue returns to the system (more viable business model)
- Bus owners better informed on vehicle movements
- Improved investment & maintenance = better quality
- Better control for SUMATRA (service information/data)
- Increases options for performance-based contracts
- Assurity for financial institutions (improved credit-worthiness)
- Easy fare integration across the system and with DART (removes cost penalty for transfers)

## *Benefits of Boloro system over stored-value smart cards*

- Boloro system is faster and less costly to implement.
- Does not require the agency to manage issue of smart cards and cash collection (done by participating Telcos). This saves a large amount of labour and cost.
- For DART it negates the need for Fare Collection Company to manage fare collection & ticketing
- Does not require passengers to buy a smart card & assign separate stored value on it.
- Stored value cards can be stolen, requiring additional administration to personally identify each one in case of theft
- If mobile phone stolen, transactions can be locked remotely
- Bus equipment is small, robust and includes GPS location - does not require separate GPS tracking systems fitted on buses
- Fare collection (on bus) linked to location services assists monitoring & useful for service planning.

## Next step: Form Cooperatives

- Centralising revenue collection engages the bus owners as the bus operator (not the driver)
- Operators can find advantages in a cooperative such as:
  - Joint representation / stronger voice
  - Collective bargaining power
  - Improved regulation and less individual competition (cooperatives allocated routes)
  - Access to finance improved by more formal business entity
- Advantages for SUMATRA:
  - Fewer entities to manage
  - Assign route to managed cooperatives
  - Greater accountability in managing standards of service
  - Formalises players into stronger industry and opportunity to build partnership and trust
  - Ability to form companies for BRT type service contracts

## Improvements to bus scheduling on BRT

- **Why is good scheduling important?**
  - Manages resources efficiently
  - Makes service reliable (even spacing)
  - Adapts services to demand (reduce overloading)
  - Contingency facility
  - Be flexible to adapt to sudden changes & be able to recover quickly
- **Elements of the schedule:**
  - Demand requirements (how many buses/ headways)
  - Passenger expectations / needs
  - Fleet availability
  - Driver employment rules/ conditions (fatigue/ safety/ job satisfaction)
  - Efficiency/ costs

## Managing the schedule

- Drivers time- based instruction
- Use of dispatchers (time interval)
- Contingency measures
- Scheduling programs or manual planning
- Advantages and disadvantages of automated scheduling
  - Process large amounts of complex data vs. the 'human' touch
  - Over- 'complexing' the function
  - Use it as a tool if it is useful
  - More suited to fast changing demand requirements

## Fixing BRT Fare Policy

- **Lessons from Cape Town:**
  - Affordability measured by % of household income on travel
  - Distance based fares are more equitable
  - Besides people expect to pay more for longer distance
  - Fare control may be a social requirement or tool to reduce disadvantage
  - Price mechanism is useful to massage demand
  - Price can be an instrument to develop patronage (market competitive/ volume user /loyalty rewards)
  - Price mechanism to build revenue

## Considerations for Fare Policy

- **'Affordability'** means different things to different people (income status/ volume of travel/ perception of value)
- Static fares set by government can remove the ability of using price mechanisms
- Setting fare levels to suit the poor, will deliver a 'poor' system
- **'Willingness to pay'** can be exploited and used to compensate special needs groups
- Modern fare technology can target subsidy and manage complex fare structures
- The 'system manager' can adjust fare policy to increase value to the passengers and increase value to the company:
  - Discounts for volume travel
  - Provide additional value (utilise empty seat capacity)
  - Premium fares for better quality
  - Capping concessions to prescribed limit
  - Tourist cards
  - Family discounts

## The Commercial Fare

- The financial planning will provide the commercial fare *(fare needed to cover all costs)*
- *Are costs too high? Are services tailored to needs?*
- Affordability / willingness to pay is evaluated
- Specific discount to needy groups (fare policy)
- May require assistance to reduce costs
  - Government intervention to improve efficiency
  - Government buys fleet as a 'one-off' subsidy
  - Commercial performance incentives must be retained (no loss compensating subsidy)
  - Cross subsidy from other activity
- *OR* government may decide to pay for non-commercial services

## Control Mechanisms for BRT/ Bus system

- Control and monitoring is easier on a BRT (closed system)
- Control is by issued instructions (various ways to do it)
- Monitoring is collecting management information such as:
  - Service frequency (according to requirements?)
  - Logging kilometres of operation
  - Recording incidents/ breaches/ events

- More complex systems are often not better
- Understand functional requirement and keep it as simple as possible

# Outputs for the Project Output 3: Technical Training for Urban Transport Planning

# Discussion Paper:
# Guideline for Urban Transportation Planning

# URBAN TRANSPORT PLANNING GUIDE BOOK

## VOLUME 1: TRANSPORT PLANNING PROCESS, ANALYSIS AND DEMAND FORECAST


CONSENSUS FOR URBAN TRANSPORT AND POLICY IMPROVEMENT IN DAR ES SALAAM

IICA CUPID PROIECT


ARDHI UNIVERSITY


NATIONAL INSTITUTE OF TRANSPORT

# Urban Transport Planning Guide Book

## Volume 1: Transport Planning Process, Analysis and Demand Forecast

October, 2017

JICA CUPID Project
Ardhi University
National Institute of Transport

## PREFACE

The guide book was prepared for capacity building in terms of transportation courses offered at Ardhi University and National Institute of Transport (NIT). It is part of the CUPID Phase 2 Project (Capacity Development Project for Improvement of Dar es Salaam Urban Transport) funded by JICA that started from October, 2014 and completed in October, 2017. Thus academic staffs from Ardhi University and National Institute of Transport who are responsible for transportation courses were selected to be members of CUPID Phase 2 and offered capacity building training through training workshops as well as study tour in Cape Town, South Africa and training courses in Japan that facilitated production of this guide book. The guide provides useful materials to cover the deficient of relevant text books in relation to knowledge required for transportation improvement in urban areas in Tanzania. The data and models explored in the teaching material is collected and prepared during the JICA funded Urban Transport Master Plan Study.

Currently, Ardhi University as well as NIT registers more than one hundred undergraduate students who pursue transportation course. Upon completion of the course students will be able to: apply urban transport planning models and tools in preparation of urban transport planning and feasibility study on the specific urban transport project, apply traffic management tools and measures in specific areas within the urban setting, and establish urban traffic conditions and develop intervention measures for the identified issues. This guide will enable to achieve the stated learning outcome of the transportation course.

The authors of the guide book are members of CUPID Phase 2 from three institutions. They are Masayuki ISHIYA and Kayoko MIYAO from the International Development Center of Japan (IDCJ), Emmanuel E. MCHOME and Aidan MHONDA from Ardhi University (ARU), and Prosper NYAKI from National Institute of Transport (NIT).

It is our expectations that the guide book will be used as intended.

| | | |
|---|---|---|
| **Kiminari TAKAHASHI** | **Prof. Evaristo J. Liwa** | **Prof. Zacharia Mganilwa** |
| Chief Advisor, | Vice Chancellor, | Rector, |
| JICA CUPID Project | Ardhi University | National Institute of Transport |

# Urban Transport Planning Guide Book

## Table of Contents

# 1. INTRODUCTION

## 1.1 Introduction

From last decade, developing countries have witnessed increasing in transportation demand due to a drastic growth in the number of automobiles (motorization). The rise in traffic demand also has been stemmed from the urbanization and economic growth of individual and nation as a whole. Poor town planning and transportation investment in fast growing cities causes serious unnecessary traffic jams and congestion. Inadequate integration of transportation infrastructure with other modes of transport such as non-motorized modes like bicycle has been given priority in developing countries like Tanzania. There are plenty of reasons on why many people don't opt non-motorized modes of transport when initiating journey. The most notable reasons are inadequate traffic rules, and poor traffic management, riding and walking environment is not conductive, road space is limited to accommodate the need and sharing of available space by implementing land use and transportation is poorly coordinated.

Many transportation experts and researchers agree that to solve these transport problems, comprehensive integration between socioeconomic activities and land use is necessary. Techniques for planning urban transportation are one of core activity to enhance implementation of reliable transportation systems. Therefore, Japan International Cooperation Agency (JICA) decided to offer technical cooperation projects titled "**Capacity Development Project for the Improvement of Dar es Salaam Transport (Phase-2)**" in which the Japanese expert team has been conducting training program in urban transport planning. This guideline was prepared to enable Tanzanian transport engineers and planners to develop effective plans with the adequate knowledge, methodologies and techniques acquired during the training courses in their duties.

There are several ideas and methodologies regarding the planning of urban transportation. Some of these are the target area, time period, target transport sector, and transport facilities to be planned. In this guideline, methodologies and techniques for urban transport planning is discussed thoroughly in this study. The procedure discussed in this document such as conducting surveys, analysis of the

survey results, findings, planning and evaluation of the plan and implementation of the plan is applicable to any kind of transportation plan. The objective of this Guide is to guide transport expertise and researchers as well as road users to understand the principles underlying the transportation planning.

## 1.2 How to Use this Guide

JICA provided comprehensive materials for introduction and background used to frame this Guide Book as shown in Chapter 1. Chapter2 gives various concepts and ideas which may assists transportation planners and engineers to carry out their duties regarding transportation planning. Chapter 3 discusses the transportation database that has been developed for Dar es Salaam by the Transport Master Plan 2008 and JICA's technical cooperation projects. Finally, the typical steps of urban transport planning for developing and evaluating transport plans are explained in Chapter 4.

This Guide will be useful to i) road and transport administrators such as TANROADs and Municipalities, ii) Executive from different organization and agencies dealing with traffic survey or traffic demand forecast.

# 2. URBAN TRANSPORT PLANNING

## 2.1 Role of Urban Transport Planning

In a community, decisions made by those in authority are mostly based on plans that provide information like forecasts for future developments in a particular policy. Transport is one of these policy areas. The community in improving economic and social activities depends on reliable transportation system which are developed through effective performance.

Historically, urban transport planning started in the United States in the 1950s with purpose of informing key decision makers in the government to closely intertwined the transport system. The analysis gives forecasts on the future performance of the system and suggests measures to improve the performance to satisfy the desired level.

In earlier days the studies were mainly concerned with the provision of capacity for the rising demand of motorcar travel. Recently studies have been focusing on how to restrain the growth of motorcar travel, with transport pricing as well as environment issues. Urban transport planning has gained remarkable attentions in the development of transport models because it is essential component in urban transport planning. The techniques developed in the United States were exported to the United Kingdom in the 1960s, followed by many other countries around the globe. l Theoretical developments also received significant consideration in both the United States and Europe in the next twenty years.

The evolutionary of transportation models has facilitated to layout two important changes: A theoretical framework compatible with economic theory was developed for providing a justification and clarification of methods that were originally proposed on practical grounds; and

- The major increase in computing power made for analysing transportation problems with a significantly larger scale and level of detail.

Without loss of generality, the objectives of transportation planning can be summarized as follows:

(i) to propose a basic multi-mode transport system for the future urban area including a road network and public transport systems, (ii) to arrange the transport network in accordance with the proposed system, (iii) to show the location of major transportation facilities, and (iv) to clarify their functions and services.

## 2.2 Urban Transport Planning Process

Transportation planning is defined as a "process'', which requires careful consideration of problem definition; incorporation of alternative viewpoints of analysis and evaluation; development of objectives. Also, a statement of desirable transportation system performance; and completion of the technical analysis needed to determine impacts of alternative decisions.

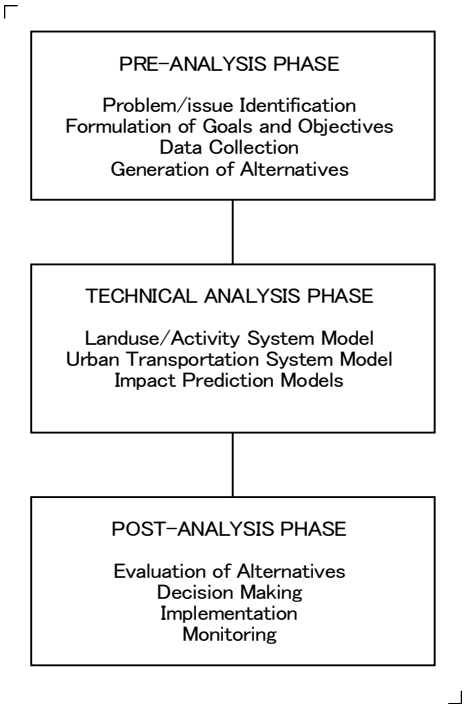
Many countries worldwide utilize the general framework for the urban transportation planning process presented in Chicago and Detroit to improve transportation systems. A system can be defined as a set of objects and the relationship between them, in which land use and transport facilities are the 'object,' and the existing relationship is traffic.

TThe following essential components should be analyzed to understand a system:

- Definition: What problem is the plan intended to solve?
- Projection: How will the situation develop if the problem continues?
- Constraint: What are the limitation such as finance, time, the planning must take in place?
- Options: What are the main alternatives and their pros and cons?
- Formulation: What are the main alternative plans, i.e., packages of available options within the prevailing constraints?
- Testing: How would each of the alternative plans work out in practice?
- Evaluation: Which plan gives the greatest value (within the constraints) regarding solving the problems already defined?

The results and proposals of this analysis will be sent as feedback into the policy makers for appraisal; often adaptations will have to be made to the plan so that the process can be seen as a leaning one.

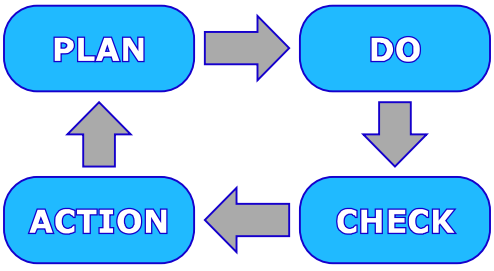
**Figure 2.1 A General Representation of Urban Transport Planning Process**




Source: Pas, 1986

The planning process of urban transport is formulated using Plan - Do - Check - Action (PDCA) cycle adopted in new public management not only for planners but also for decision makers. The two actors will identify problems, examine and select alternative policies and plans which are elaborated in planning by planners. In the process of "Do," the decision makers implement the plans leading to post-evaluation and give feedback on planning in the "Check and Action" process.

**Figure 2.2 PDCA Cycle**




## 2.3 Comprehensiveness

Effective urban transport planning and efficient implementation of the plan can be achieved through a comprehensive coverage of the following aspects:

i) Modes

People living in a city, travel every day using different modes of transport which may result to unnecessary traffic congestion. Therefore, transport plans should be developed taking into consideration each mode of transport to realize an appropriate and efficient modal share in the entire city.

ii) Transport and Land Use Plan

There is a close relationship between land use and transport planning in the city. This close relationship has to be analyzed efficiently to address the transportation problems in the city. For example, for the development of transport plans to reduce/eliminate congestion in the central business district (CBD) area, land use is used not just as an input for a precondition of the transport plan, but also for proposing an image of the future urban city and examining the optimality of the future urban image with quantitative approach in the viewpoint of transportation.

iii) Hard and Soft Measure

For the effective use of existing infrastructures, introducing soft measures such as traffic demand management (TDM) should be carefully examined. TDM measures are tools designed to prompt travelers to make changes in their travel behaviour. For example, in the destination, departure time, mode, and route the effect of the measures depends on the attributes of individuals and household they belong.

iv) A Transport Master Plan and District Transport Plan

A transport master plan aims to draw a future image of transportation systems and facilities covering the entire study area. Also, this plan will be the basis for minor scale plans such as district transport plans and development plans in the central area. In case of transportation plans in a metropolitan area, the traffic data obtained for the plan should be used in analysis and evaluation of district transport plans.

v) Long-range and Short-range Plan

Transportation planning should include short-term and long-term perspectives. The long-term component for transportation plan must be flexible and responsive in the level of detail, alternatives and impacts considered. The short-term component takes into account the more immediate needs of transportation

system performance and may focus on operational changes of existing infrastructures or demand management.

## 2.4 Data Collection

Data are an essential component of transport modeling. It is therefore vital that transport planners with appropriate knowledge can interpret the collected data in the right way. Also for improving knowledge about transport systems in general.

Data are needed for three primary purposes:

- Description of the present situation often called the base-year situation.
- The input to the development and use of transport models.
- Monitoring the effects of the implementation of policies, strategies, and investments.

The data that are required for transport studies can be subdivided into the categories of supply and demand:

Supply data

- Capacity (function of number of lanes or public transport vehicles)
- Design speed
- Type of service provided (e.g., freeway, local road, express-bus service, train service)
- Use restrictions (e.g., turn prohibitions, parking permitted or prohibited, operation only in peak
- Public transport services
- Parking places.

Demand data

- Volumes of use by time of day, trip purpose, means of travel and specific location
- Current actual speed (peak and off-peak)
- Costs and times experiences by users, by time of day or by origin-destination locations
- Attributes of users that relate to levels of use and methods of use (e.g., income, age, car ownership, household size, working status).

It is not possible to collect all these types of data in one survey because of the difference in survey methods, survey instruments and sampling procedures.

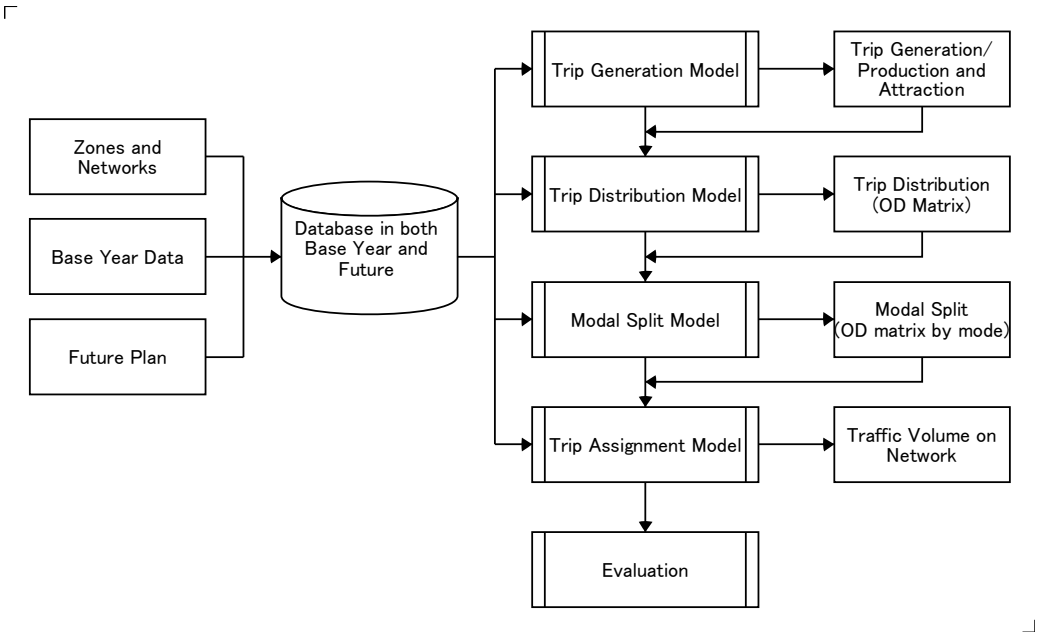
## 2.5 Traditional Four-stage Model

### 2.5.1 General

General structure has been derived through experimentation and development resulting to classic transport model. It resulted from practice in the 1970s and 1980s.

The approach starts with considering a network, zoning system and the collection of data. This data is used to estimate a model of the total number of trips generated by or attracted to each zone of the study area called the trip generation model. The next step is to allocate these trips to particular destinations, so a trip matrix, an origin and destination table, can be produced. This is called trip distribution. The following stage is usually the modelling of the choice of the mode by which each traveler makes a trip from origin to destination, which is called a modal split. The last stage in the classic approach requires the assignment of the trip by each mode to their corresponding networks so that traffic volume can be obtained by each network section that represents the segments of road and public transport systems.

**Figure 2.3 Traditional Four-stage Model**




Source: JICA Expert Team

Although there are many sequences presenting the transportation planning, the sequences described in Figure 2.3 is the most common Some studies have placed modal split between trip generation and trip distribution to obtain greater emphasis

on decision variables depending on the trip generation unit, e.g., household. However, it is challenge to include attributes of the journey and the service level of each mode in the model. Therefore, it would be better to perform modal split after trip distribution.

### 2.5.2 Model

A lot of models and ideas have been widely studied and proposed for each step in the above mentioned conventional approach of demand forecasting. It may not be suitable to discuss the details of all models, so only the common models and similar ideas supposed to be useful and practical for cities in Tanzania are summarized in this section.

#### (1) Trip Generation

The estimation of trip generation is to calculate the total number of trips relating to the target area. There are various trip or trip maker attributes. About predicting the number of trips that originate in or is destined for a given zone using trip rates, attention must be paid to an individual or household attributes of trip makers.

Commonly used methodologies to develop a trip generation model are as follows:

- Use of trip rate observed in transport surveys
- Modification of the observed trip rate by including other socio-economic indicators
- Development of a formula such as linear regression that explains the trip rate by several socio-economic indicators

When the trip rate is selected as a model, the following points should be considered:

- Stability: It is desirable to select a trip rate with a small variance as possible.
- Fixed rate: Trip rate is assumed to remain constant in the future.
- Predictability: The value of attributes for the future can be easily predicted.

#### (2) Trip Production and Attraction

Zone estimates trip productions and attractions. Therefore, the relationship between trip production/attraction and socio-economic activity of each zone should be analyzed for building models. Socio-economic indicators that represent an activity of each zone will be collected for the analysis. For example, population, number of workers at the place of residence, number of employees at workplace and amount of sales. Models used for trip production and attraction can be grouped into the following:

1) Growth Rate

The number of trips ($T_i'$) produced and attracted is estimated by multiplying the existing value of trips ($T_i$) produced and attracted of each zone with growth rate ($F_i$) of each zone.

$$T_i' = F_i \times T_i$$

The increase rate of population in each zone is often presented as a growth rate.

2) Trip Rate

There are two common types of the trip rate that are employed for trip production and attraction estimation:

Model 1: ratio ($r^A$) between trip production and attraction, and landuse or floor space ($A_i$)

$$T_i' = A_i \times r^A \qquad \text{formula 1}$$

Model 2: ratios $\left(r^P, r^E\right)$ between trip production and attraction, and the number of population at place of residence ($P_i$) and the number of employees at working place ($E_i$)

$$T_i' = P_i \times r^P + E_i \times r^E \qquad \text{formula 2}$$

3) Function Model

Function model is the most popular method for trip production and attraction model. This model aims to explain the number of trips produced and attracted in each zone formulated mathematically by including socio-economic indicators of each zone as explanatory variables. Variables which have a logical relationship with the attributes of trips such as trip purpose are applied as explanatory variables.

The following three formulas are popularly used for functional modeling, and formula 1 is often used as a function model for trip production and attraction:

$$T_i' = a_0 \prod_{n=11}^{N} a_{in} \times x_{in} \quad T_i' = a_o \prod_{n=1}^{N} a_{in} \cdot \qquad \text{formula 2}$$

$$T_i' = a_0 \cdot exp(\sum_{n=1}^{N} a_{in} \cdot x_{in}) \qquad \text{formula 3}$$

**(3) Trip Distribution**

The movement of persons or goods from one zone to another can be called *origin-destination* (OD) trips. A model that estimates OD trips under the condition of trip production and attraction is called a trip distribution model. The standard models of trip distribution are summarized as follows:

1) Present Pattern Method

This method estimates future trip distribution by using the existing trip distribution pattern. In present pattern method, the future trip OD can be obtained by multiplying the existing trip OD with the growth rate of each zonal production and attraction. This operation will be repeated until the difference between the sum of trip OD by column and future trip attraction and that by row and future trip production becomes much smaller and more tolerable.

2) Gravity Model

The gravity model is a formula which is adapted from Newton's law of gravitation dealing with the volume of OD trips by trip production, trip attraction and the impedance between origin and destination.

The simple Gravity Model is described as follows:

$$T'_{ij} = k \cdot \frac{P_i^{\alpha} \cdot A_j^{\beta}}{f(d_{ij})}$$

Besides the formula above, the $f(d_{ij}) = d_{ij}^{\gamma}$, is most popular for impedance in a gravity model.

3) Stochastic Model

This method uses the idea of probability to build a trip distribution model. The stochastic model involves *Opportunity model*, *Entropy model*, and *Competitive opportunity model*.

**(4) Modal Share**

Modal share is a key factor to provide information regarding transport demand for designing transport facilities and establishing policies on the service level of each transport mode. Therefore, some methodologies have been studied and developed for the estimation purpose. Important elements determining the type of modal share

models are a grouping of modes, the process of mode choice and type of formula. The following are proposed ideas that are suitable for the cities in Tanzania.

Grouped of Modes

Travel modes are surveyed in detail and grouped into a few representative modes in demand forecasting.

Process of Mode Choice

- Binary Choice: repeat process of splitting into two modes
- Multinomial: split all available modes simultaneously

Type of Formula

$$P_k = \frac{exp(V_k)}{\sum_{j=1}^{N} exp(V_j)}$$

Where, $V_j = \alpha C_j + \beta T_j + \gamma$

$P_k$: Probability of choice for $k$ mode

$V_j$: Utility of $j$ mode

$C_j$、$T_j$: Service variables such as cost and time of $j$ mode

α、β、γ: parameters of formula

**(5) Trip Assignment**

The trips on which travelers already decided a mode of transport to use are assigned to routes between starting point to the ending point of travel on a network. On the network, between centroid nodes which represent a centre of each zone, minimum travel cost routes are found by *Dijkstra's algorithm*. Methodologies to load transport demand on a network can be summarized as follows:

- Minimum path assignment (Incremental assignment)

  In this model, all flows are loaded onto uncongested minimum travel time routes for each OD pair.

- Equilibrium assignment

  This model assumes that network link costs depend on the volume and can search for a user-equilibrium solution.

- Stochastic assignment

  This model contains errors of road users in the selection of the route, while above model assumes that all users have perfect information.

- Transit assignment

  Transit assignment is a model to estimate the number of passengers by searching feasible paths in public transport network

### 2.5.3 Calibration

It is necessary to assess the scientific validity and reliability of models developed prepared for demand forecasting before the models and dataset are used for estimating future transport demand.

These tasks are called *calibration* or *validation,* and it is desirable to perform validation at the following three stages:

- Model Building

  Statistical model formulas and parameters shall be adopted in each stage of demand forecasting model building. Development of Existing OD Tables

- Development of OD Table

  For the models to estimate trip generation, trip production and attraction, trip distribution, and modal share, it is necessary to minimize variations of present values and estimated values obtained by substituting variables into the models developed.

- Traffic Assignment

  Traffic assignment estimates traffic volume of each link on the network. The present traffic volume that can be estimated by assigning present OD table on the present network shall be compared with observed traffic count. If there is a difference between estimated and observed volume, development of present OD table and network should be re-examined. It is recommended that as many locations of traffic data as possible shall be used.

## 2.6 Outline of Network Planning

Objectives of transport planning are to propose a primary multi-mode transport system for the future urban area, to arrange the transport network by the proposed

system, to show the location of major transportation facilities, and to clarify their functions and services.

Network planning may include several components:

(i) a road network,

(ii) public transport systems, and

(iii) other transportation facilities which connect two mode of transport.

**Table 2.1 Examples of Planning Standard on Road Density**

| Land-use | Road Density (km/hm2) | Network Structure | Note |
|---|---|---|---|
| Residential | 4.0 | ・Arterial road: 2km/km$^2$<br>・Secondary arterial road: 2km/km$^2$<br>・Total network forms a grid of 500m square | Assumed population density is 70 to 80 persons/ha |
| Commercial | 6.0 | ・Arterial road: 4km/km2<br>・Secondary arterial road: 2km/km2<br>・Total network forms a grid of 330m square | |
| Semi-industrial | 2.0 | ・A grid of 1km square for semi-industrial area<br>・A grid of 2km square for industrial area | |
| Industrial | 1.0 | | |
| Average | 3.5 | | Average number weighted by land-use category |

Source: 8th Five Year Road Development Plan, Ministry of Construction (MOC), 1978

**Table 2.2 Potential Functional Classification Profiles**

| Classification | Facility Stratification | Design Speed (km/hr) | Lane Width (meters) | Typical Number of Lanes |
|---|---|---|---|---|
| Expressway/ Motorway | Tolled or non-tolled | 80 – 100 | 3.50 – 3.75 | 4 – 6 |
| Arterial Roads | Primary Arterial | 60 – 80 (less with BRT busway) | 3.25 – 3.50 | 4 – 8 (including BRT lanes) |
| | Secondary Arterial | 40 – 60 | 3.25 – 3.50 | 4 (plus turning lanes) |
| | Tertiary Arterial | 30 – 40 | 3.00 – 3.25 | 2 |

| | | | | |
|---|---|---|---|---|
| Community Roads | Access Roads (Local collector roads) | Varies by use | 3.00 | 2 |
| Special Roads | | Varies by purpose | Varies by purpose | Varies by purpose |

Source: Technical Report 2, Transport Policy and System Development Master Plan, JICA, 2008

**Table 2.3 Profile of Urban Transport System**

| Mode | Metro (MRT) | LRT | Monorail, AGT | BRT | Guideway Bus | Ordinary Bus |
|---|---|---|---|---|---|---|
| Separation | | | | | | |
| Bus stop/station interval | 700 – 2,100m | 400 – 1,000m | 800 – 1,200m | 400 – 1,000m | 800m | 300 – 500m |
| Operating speed | 22 – 46km/h | 18 – 40km/h | 20 – 46km/h | 15 – 35km/h | - 30km/h | – 15km/h |
| Transportation capacity | 4,000 – 85,000 pax/hr | 6,000 – 20,000 pax/hr | 2,000 – 22,000 pax/hr | - 8,000 pax/hr | - 4,000 pax/hr | - 2,000 pax/hr |
| Minimum radius of curve | 160m | 18m | 50 – 120m | - | 16m | - |
| Maximum grade | 35‰ | 80‰ | 40 - 74‰ | - | 60‰ | 90‰ |
| Construction cost | 60 – 100 million USD/km | 30 – 50 million USD/km | 30 – 50 million USD/km | 6 – 13 million USD/km | 30 – 40 million USD/km | - |

Source: Council of Transport Policy, Minister of Land, Infrastructure, Transport and Tourism (MLITT), Japan
Research on Practical Approach for Urban Transport Planning, JICA, 2011

## 2.7 Expected Output

The expected outputs of transport planning are as follows:

(i) Urban transport database developed through collection of statistical data and transport surveys

(ii) Transport planning orientation and development strategies

(iii) Formulation of long-term, medium term and a short-term action plan; and

(iv) Prioritized projects for further study, i.e., feasibility study.

The long-term plan, which is a part of comprehensive transportation master plan, consists of a future image of the study area, urban structure, development of transportation facilities such as a road network and public transport systems, and soft measures such as traffic demand management (TDM) and mobility management in the future target year.

Prioritized projects are to be implemented earlier than the target year are proposed for short-term and medium-term plans to eliminate current transport problems.

**Table 2.4 Examples of Transport Strategy**

| Sector | Subsector | Strategy |
|---|---|---|
| Land-use/ Urban Structure | | ・Polycentric city structure<br>・Compact city |
| Infrastructure | Road network | ・Construction of highway/motorway<br>・Completion of missing links<br>・Development of hierarchical network<br>・Provision of collector/local road<br>・Strengthening of road maintenance system<br>・Grade separation of major intersections<br>・Improvement of at-grade intersection<br>・Construction/widening of bridges |
| | Public transport | ・Introduction of mass transit system<br>・Reorganization of bus network<br>・Development of bus stops/terminals<br>・Introduction of advanced vehicles<br>・Modernization of bus service |
| Traffic Management | Road traffic | ・Signalization of major intersections<br>・Improvement of signal control<br>・Area control of traffic<br>・Efficient traffic control<br>・Construction of parking space<br>・Control of illegal parking |
| | Transportation demand management (TDM) | ・Control of private car use<br>・Promotion of modal shift to public transport<br>・Prioritization of public transport<br>・Reduction of demand concentration |
| | Traffic safety | ・Construction of safe traffic facility<br>・Traffic safety education<br>・Tightening of enforcement for traffic violation |
| Institutional/ Administrative | Transport planning | ・Clarification of sharing role of transport-related agencies<br>・Establishment of coordinating organization<br>・Capacity development |
| | Public transport management/operation | ・Optimization of management system<br>・Self-sustainability on finance<br>・Modernization of management structure |
| | Project implementation | ・Regulation of land acquisition mechanism<br>・Establishment of private public partnership (PPP) scheme<br>・Capacity development |

| | | |
|---|---|---|
| | Fund/finance management | ・Financing<br>・Legislation of specific revenue source for transportation |

Source: Research on Practical Approach for Urban Transport Planning, JICA, 2011

**Table 2.5 Examples of Transportation Facility Plan by City Group**

| City Group | Population ('000) | Basic Policy for Transport Plan | Transportation Modes and Facilities Included | | |
|---|---|---|---|---|---|
| | | | Road | Public Transport | Other Facilities |
| Major Metropolitan Area | 3,000 or more | Urban rapid rail, urban expressway, and highway covering the whole are | ・Urban express highway network<br>・Major arterial road network<br>・Arterial network | ・Urban rapid rail network<br>・LRT<br>・BRT<br>・Bus network | ・Car parking<br>・Transportation Plaza<br>・Bus terminal<br>・Truck terminal |
| Regional Urban Area | 1,000 - 3,000 | Urban rapid rail and expressway on main axes to compose the whole network | ・Urban express highway network<br>・Major arterial road network<br>・Arterial road network | ・Urban rapid rail network<br>・LRT<br>・BRT<br>・Bus network | Ditto |
| Reginal Urban Area | 500 - 1,000 | Urban rapid rail to compose network | ・Urban express highway network<br>・Major arterial road network<br>・Arterial road network | ・Urban rapid rail<br>・LRT<br>・BRT<br>・Bus network | Ditto |
| Regional Urban Area | 200 - 500 | Road network base | ・Major arterial road network<br>・Arterial road network | ・LRT<br>・BRT<br>・Bus network | ・Car parking<br>・Transportation Plaza<br>・Bus terminal |
| Local Cities | 50 - 200 | Ditto | ・Arterial road network<br>・Collector road network | Ditto | ・Transportation Plaza<br>・Bus terminal |
| | 30 - 50 | Ditto | Ditto | ・Bus | ・Transportation plaza |

Source: JICA Expert Team

# 3. TRANSPORT DATABASE AND GIS

## 3.1 Transport Database

### 3.1.1 General

Transportation is formed by a trip from an origin to a destination taken mostly to accomplish certain activity or purpose. The main goal of transportation in the certain study area with the aggregation of the trips and transportation system is to provide the facilities and services that enable the travelers and goods to satisfy their purposes and activities. The characteristics of these travel flow, the facilities and services are the essence of the analysis for finding transport problems and development of models to estimate travel pattern of the individual trips and goods movement. For this purpose, the preparation of information expressing the characteristics of travel demand; individual travel and goods movement, and transportation system itself; the level of service in the transport system or system performance should be necessary for the transportation database in urban transport planning.

Moreover, socioeconomic data is of paramount because the data are required in developing a community vision with the corresponding set of goals and objectives and will be used for the analysis of the relationship between the travel and demand. The importance of transport database can be summarized as follows.

i) Transportation system performance data:

In general, transport network system can be grouped into two: highway network and public transport called transit network. The information about the former system consists of the level of services such as location and alignment, road width, number of lanes, speed limit, transportation capacity, and pavement condition. On the other hand, the latter system includes the information of route and its level of services such as frequency, passenger capacity of a vehicle and operating speed.

Both systems can be built as a database in the form of network that consists of nodes and links, in which each information is compiled by the link. It is desirable that this database be created on the GIS platform so that anyone can access and maintain the transport database easily.

Furthermore, this transportation database on the face of GIS will be transformed into STRADA format data that will be used for transportation planning process discussed in this guideline.

ii) Travel demand information:

The information about travel demand are in various forms and the methodology depends on the complexity of the transportation structure. In this document, we discuss the travel demand information that can be collected by the series of transport surveys conducted in the transport master plan study.

The data collected by these surveys shall be roughly classified into two groups: Transport demand or movement pattern of trips that are produced in the study area, and traffic volume which is obtained at road sections in the study area by counting survey. The travel demand or movement pattern data can be expressed in the form of matrix which represents the volume of start and end point of travel. There are two types of matrices representing travel demand of present and future; the matrix of existing travel demand is developed based on the result of transport surveys, and the matrix of future travel demand is developed by demand forecasting using models developed with the characteristics of existing travel demand collected by the surveys.

iii) Socioeconomic data:

Socioeconomic data comprises information representing socioeconomic activities in the selected area of study and expressing characteristics of economic conditions in each area. The former data are the total number of population, GDP, and vehicle ownership ratio. These data were collected to analyse the past information. The recent data such as demographic information can be extracted from the population census.

The following data should be required for transportation database.

Data in the entire area of study:

population, number of households, GDP, enrolment rate, employment rate, number of workers by industrial sector, vehicle ownership rate, etc.

Data by TAZ:

population, number of students, number of workers, students at school place, workers at workplace, etc.

### 3.1.2 Classification Scheme

Specific category often arranges transportation data. For example, transport demand data is structured by geographical location and the study area is divided into analysis units, often called traffic analysis zones (TAZ), forming the basis for the analysis of travel movements that start from and/or end to. These zones should be defined with the following considerations.

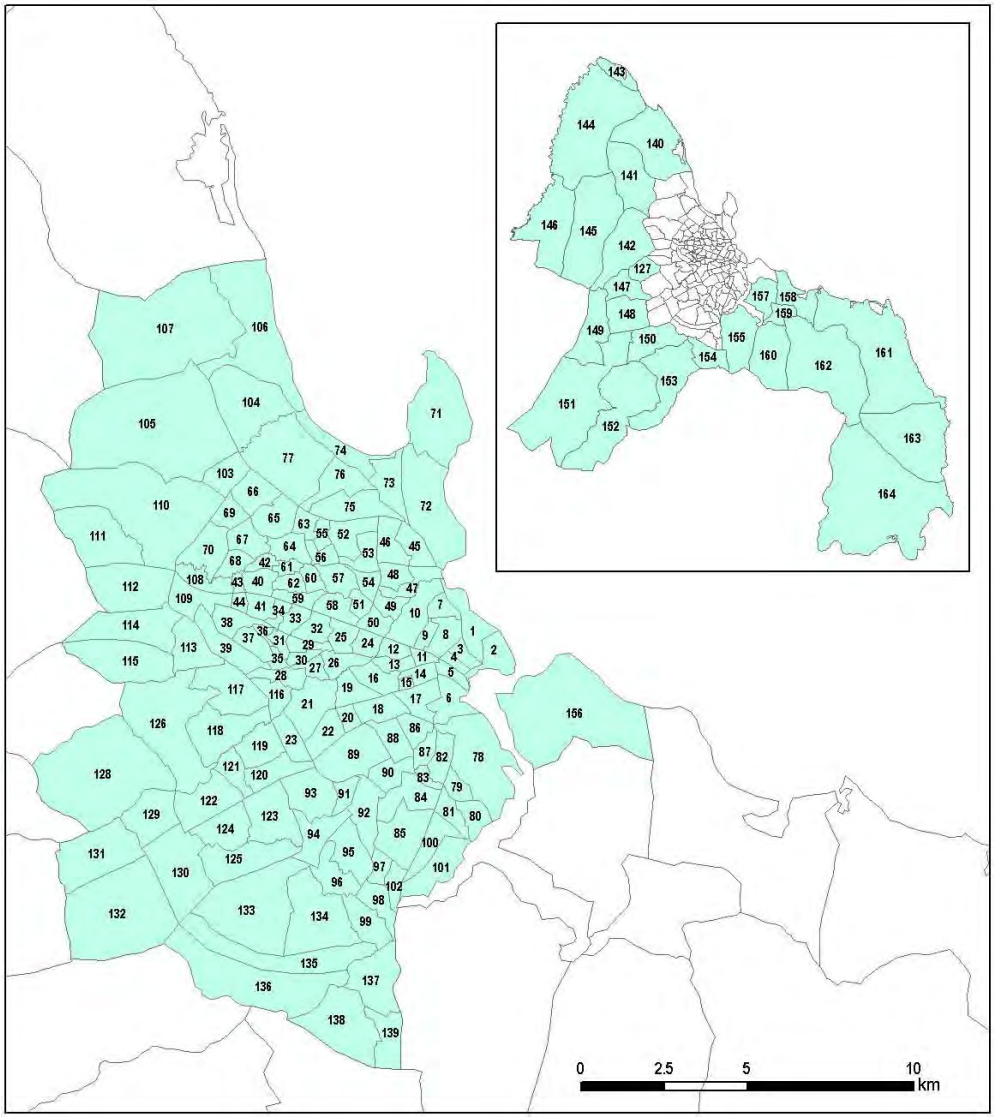
i) Achieving homogeneous socioeconomic characteristics for each zone

ii) Recognizing physical, political, jurisdictional, and historical boundaries.

iii) Generating only connected zones and avoiding zones that are completely overlap with other zone.

Figure 3.1 shows traffic analysis zone used in the Master Plan study in 2008, the definition of each traffic analysis zone is attached in Appendix.

**Figure 3.1 Traffic Analysis Zone (TAZ) for Dar es Salaam**




Source: JICA Expert Team

Another example of a classification scheme for transport facility is functional classification often groups that highway network. Table 3.1 provides the classification scheme of urban road function proposed by Transport Policy and System Development Master Plan in 2008. The database for highway road network is built according to this classification.

**Table 3.1 Proposed Urban Road Functional Classification Scheme**

| Classification | Facility Stratification | Application | Intent |
|---|---|---|---|
| Expressway/ Motorway | Tolled or non-tolled | ・Entire Region | ・Exclusively vehicular use; no pedestrian facilities<br>・Access controlled with grade-separated interchanges<br>・Accommodate longer and faster trips |
| Arterial Roads | Primary Arterial | ・Entire Region<br>・Lin to trunk roads outside of Dar es Salaam | ・Form core metropolitan spines<br>・Accommodate longer trips<br>・Connect significant trip generators (sub-centers, port, airport, etc.)<br>・Link to national trunk roads<br>・Can accommodate BRT busways |
| | Secondary Arterial | ・Between wards<br>・Link to primary arterial | ・Accommodate travel demands between wards in the region<br>・Link to primary arterial roads<br>・Network bus services provided<br>・Transit priority (but nor BRT busways) possible |
| | Tertiary Arterial (collector roads) | ・Between neighboring precincts<br>・Link to primary and secondary arterial roads | ・Provide circulation within, as well as between, wards, sub-wards, and residential areas<br>・Link to secondary roads<br>・Network bus services (likely smaller vehicles) possible |
| Community Roads | Access Roads (local collector roads) | ・Within community and residential area<br>・Link to tertiary arterial roads | ・Local circulation and property access<br>・Can be used by informal forms of public transport |
| Special Roads | BRT Roads | ・Exclusive BRT road excluding other vehicle types | ・Enhanced BRT operation in support of primary arterial network within unique precincts |
| | Transit Mall | ・Within CBD or busy commercial areas | ・Only for public transport (buses) and pedestrian uses |
| | Roads for Non-Motorized Modes | ・Various locations | ・Safe roads exclusive for pedestrians and no-motorized vehicles |
| | Scenic Roads/ Walkway | ・Along the coast and other scenic areas | ・Improve landscape, provide comfort and facilitate tourism |
| | Pedestrian Mall | ・Within CBD or busy commercial area | ・Provide exclusive pedestrian space and related amenities |

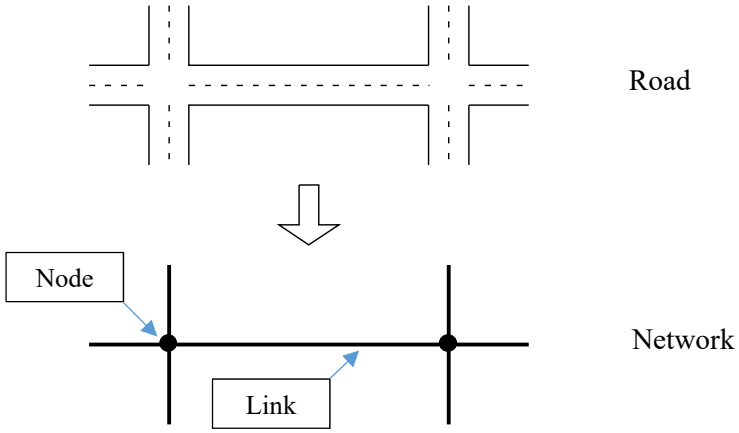
Source: Technical Report 2, Transport Policy and System Development Master Plan, JICA, 2008

### 3.1.3 Network Database

#### (1) Highway Network

A highway network data in general composed of a set of nodes representing intersections and a set of links connecting nodes. The nodes may include the centroids of origin and destination zones as well as other nodes that constitute the beginning and end of links. Each link may have characteristics of physical conditions, the level of services and traffic volume.

**Figure 3.2 Component of Network Database**




Source: JICA Expert Team

These characteristics are listed in Table 3.2. First, the name of the link should be specified and followed by the name of two nodes at the both ends. The way of data collection varies. Inventory survey can collect information about the structure of road, design, and operation. Traffic count surveys can obtain the existing traffic volume; the future traffic volume can be estimated by demand forecasting especially traffic assignment method.

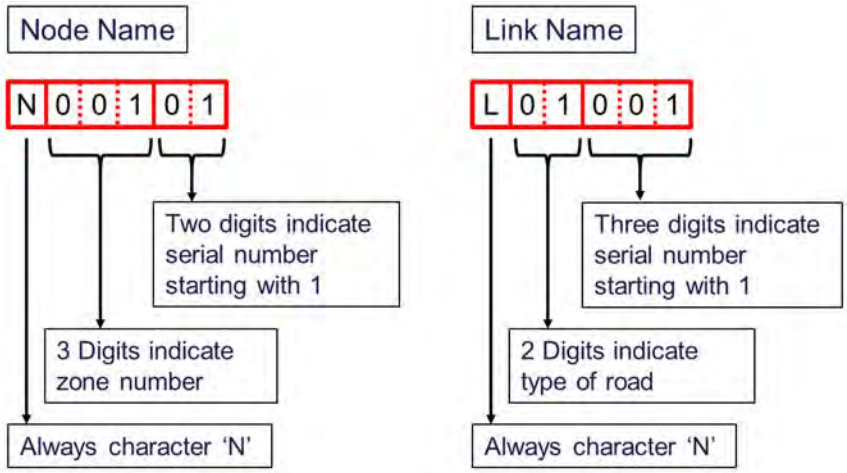
**Table 3.2 Example of Highway Network Data**

| Field Name | Contents | How to collect information |
|---|---|---|
| LinkName | Unique name of each road section | |
| NodeName1 | Node name of start point of each road section | |
| NodeName2 | Node name of end point of each road section | |
| Length | Length of road section (km) | Inventory survey |
| Paved15 | Condition of pavement | Ditto |
| Lane15 | Existing number of lanes | Ditto |
| V15 | Existing speed limit of operation | Ditto |
| Q15 | Existing traffic capacity (pcu) | Estimated from conditions |
| Volume | Traffic volume observed/estimated | Traffic count survey/demand forecast |
| ObsDate | Date of traffic volume observation | Ditto |
| ProjCode | Project code used in MP2008 | Urban transport master plan study |
| RoadClass | Indicates road classification *1) | Ditto |
| Status | Indicates progress of project *2) | Inventory survey |
| Lane30 | Planned number of lanes in the future | Plan |
| V30 | Planned speed limit in the future | Ditto |
| Q30 | Planned traffic capacity in the future | Ditto |

Note: *1) Road classification: =1 expressway, =2 primary, =3 secondary, =4 tertiary, =5 others
*2) Status: =1 Not yet started, =2 Ongoing, =3 Completed
Source: JICA Expert Team

A unique name should be given to each link and node. This is done by using a naming rule. Figure 3.3 shows an example of naming rule for links and nodes.

**Figure 3.3 Example of Naming Rule for Nodes and Links in Network Database**

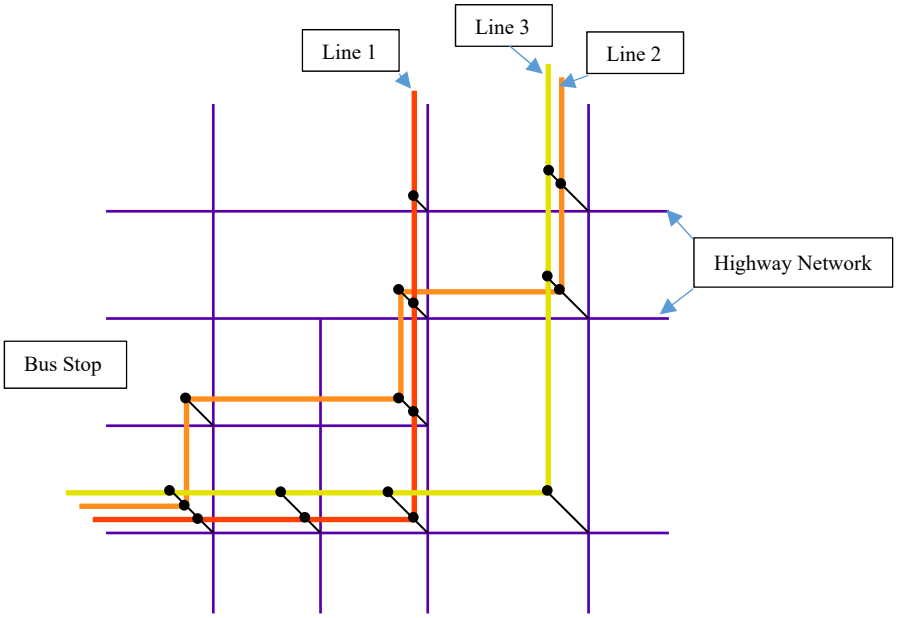



Source: JICA Expert Team

**(2) Transit Network**

Public transport system is operated on the highway network links and one on exclusive lines that connect with only station nodes on the highway network links. Network data for the former system can be constructed by connecting the links on the highway network along the public transport route and adding information of the service data to the route. The latter system can be expressed with the same structure as the highway network data.

**Figure 3.4 Transit Network on Highway Network**




Source: JICA Expert Team

The information of public transport network prepared for transport demand forecast is obtained by calculating transport capacity and for estimating the utility in particular public transport route. Table 3.3 summarises an example of public transport network data.

**Table 3.3 Example of Public Transport Network Data**

| Field Name | Contents | How to collect information |
|---|---|---|
| LineName | Unique name of line | |
| NodeName1 | Start point of line | |
| NodeName2 | Endpoint of line | |
| Freq | Frequency of services per hour | Inventory survey |
| Speed | Schedule speed | Ditto |
| Stops | Total number of stops and terminals on the line | Ditto |
| BaseFare | Base Fare | Ditto |
| DistFare | Distance for base fare (km) | Ditto |
| ExFare | Excess fare | Ditto |
| PCU | Passenger car unit | Ditto |
| Capacity | Passenger capacity of vehicle | Ditto |
| ObsDate | Survey date | Survey |
| ObsPax | Number of passengers surveyed | Survey |

Source: JICA Expert Team

### 3.1.4 Travel Demand Database

#### (1) Traffic Counts Data

Among the representative indicators exhibiting transport characteristics is traffic volume. The traffic volume data can be collected by conducting vehicle count survey. A vehicle count survey is often conducted at significant intersections or road sections that have heavy traffic aiming to observe the number of vehicles passing the survey location at a certain period. There is no specific form to record surveyed traffic volume. Especially, spreadsheets such as Microsoft Excel is often used to save traffic volume data and to calculate indicators such as daily traffic volume, peak hour volume, large vehicle rate that are associated with links in the highway network data. An example is shown in the Figure 3.5.

Besides, vehicle classification applied in traffic count survey is exhibited in Appendix.

**Figure 3.5 Example of Summary on Traffic Count Data**

Result of Counting in Screen Line Survey

Survey Location: SL2 Ali Hassan Mwinyi Road (Salender Bridge) (Both Direction) Both

| | Time | Passenger Car | Taxi | Pick-up, Van | Dala dala (small) | Dala dala (Medium) | Inter-city bus | School bus, Company | 2 Axles truck | 3 Axles truck | Trailer truck, more than 3 | Motor cycle | Bhajaj | Motorized Vehicle Total | Bicycle | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | 13 | |
| 7 | 14:00-15:00 | 1,989 | 540 | 352 | 92 | 67 | 1 | 53 | 95 | 16 | 4 | 111 | 15 | 3,335 | 82 | 3,417 |
| 8 | 15:00-16:00 | 2,176 | 495 | 435 | 154 | 108 | 4 | 67 | 84 | 6 | 1 | 169 | 24 | 3,723 | 71 | 3,794 |
| 9 | 16:00-17:00 | 2,329 | 441 | 335 | 138 | 99 | 1 | 68 | 80 | 2 | 2 | 102 | 13 | 3,610 | 118 | 3,728 |
| 10 | 17:00-18:00 | 2,720 | 479 | 399 | 139 | 100 | 0 | 61 | 68 | 8 | 4 | 121 | 7 | 4,106 | 158 | 4,264 |
| 11 | 18:00-19:00 | 2,733 | 443 | 379 | 130 | 89 | 0 | 37 | 63 | 16 | 4 | 90 | 6 | 3,990 | 134 | 4,124 |
| 12 | 19:00-20:00 | 2,022 | 373 | 254 | 62 | 73 | 0 | 21 | 42 | 13 | 3 | 52 | 4 | 2,919 | 49 | 2,968 |
| 13 | 20:00-21:00 | 1,573 | 278 | 160 | 23 | 37 | 0 | 18 | 26 | 3 | 2 | 35 | 4 | 2,159 | 22 | 2,181 |
| 14 | 21:00-22:00 | 1,163 | 253 | 126 | 9 | 8 | 0 | 12 | 15 | 1 | 0 | 24 | 1 | 1,612 | 13 | 1,625 |
| 15 | 22:00-23:00 | 651 | 117 | 99 | 11 | 6 | 1 | 44 | 14 | 0 | 0 | 8 | 1 | 952 | 9 | 961 |
| 16 | 23:00-0:00 | 406 | 102 | 67 | 6 | 3 | 0 | 22 | 9 | 0 | 0 | 8 | 0 | 623 | 4 | 627 |
| 17 | 0:00-1:00 | 270 | 50 | 39 | 4 | 9 | 0 | 13 | 7 | 1 | 0 | 10 | 0 | 403 | 1 | 404 |
| 18 | 1:00-2:00 | 129 | 34 | 13 | 6 | 0 | 0 | 5 | 1 | 0 | 0 | 4 | 0 | 192 | 0 | 192 |
| 19 | 2:00-3:00 | 64 | 26 | 7 | 10 | 4 | 0 | 6 | 3 | 0 | 0 | 5 | 0 | 125 | 0 | 125 |
| 20 | 3:00-4:00 | 29 | 9 | 5 | 17 | 4 | 1 | 5 | 3 | 0 | 0 | 2 | 1 | 76 | 1 | 77 |
| 21 | 4:00-5:00 | 60 | 14 | 15 | 10 | 2 | 0 | 6 | 2 | 1 | 0 | 5 | 0 | 115 | 1 | 116 |
| 22 | 5:00-6:00 | 174 | 35 | 27 | 39 | 35 | 3 | 16 | 7 | 1 | 1 | 6 | 0 | 344 | 29 | 373 |
| 23 | 6:00-7:00 | 1,543 | 268 | 247 | 125 | 121 | 0 | 74 | 16 | 2 | 1 | 58 | 9 | 2,464 | 128 | 2,592 |
| 24 | 7:00-8:00 | 3,481 | 1,014 | 715 | 154 | 116 | 0 | 53 | 28 | 7 | 4 | 108 | 9 | 5,689 | 169 | 5,858 |
| 25 | 8:00-9:00 | 2,562 | 780 | 543 | 138 | 125 | 0 | 13 | 43 | 5 | 2 | 144 | 21 | 4,376 | 181 | 4,557 |
| 26 | 9:00-10:00 | 2,088 | 553 | 537 | 135 | 115 | 0 | 23 | 77 | 5 | 4 | 108 | 15 | 3,660 | 89 | 3,749 |
| 27 | 10:00-11:00 | 2,513 | 674 | 667 | 123 | 99 | 0 | 29 | 109 | 12 | 7 | 104 | 29 | 4,366 | 86 | 4,452 |
| 28 | 11:00-12:00 | 2,148 | 585 | 515 | 107 | 97 | 0 | 7 | 72 | 3 | 0 | 119 | 24 | 3,677 | 55 | 3,732 |
| 29 | 12:00-13:00 | 2,019 | 449 | 447 | 117 | 92 | 0 | 50 | 72 | 6 | 4 | 115 | 16 | 3,387 | 47 | 3,434 |
| 30 | 13:00-14:00 | 2,135 | 513 | 454 | 122 | 101 | 1 | 20 | 76 | 3 | 2 | 146 | 29 | 3,602 | 83 | 3,685 |
| 31 | Total | 36,977 | 8,525 | 6,837 | 1,871 | 1,510 | 12 | 723 | 1,012 | 111 | 45 | 1,654 | 228 | 59,505 | 1,530 | 61,035 |
| 32 | | 32,458 | 7,607 | 6,279 | 1,736 | 1,402 | 7 | 576 | 925 | 104 | 42 | 1,547 | 221 | 52,904 | 1,450 | 54,354 |
| 33 | | 0.878 | 0.892 | 0.918 | 0.928 | 0.928 | 0.583 | 0.797 | 0.914 | 0.937 | 0.933 | 0.935 | 0.969 | 0.889 | 0.948 | 0.891 |
| 34 | | | | | | | | | | | | | | | | |

... SL1-2 SL1-3 SL1-4 SL1-5 **SL2-6** SL2-7 SL2-8 SL2-9 SL3-1

Source: Transport Policy and System Development Master Plan, JICA, 2008

### (2) Travel Demand

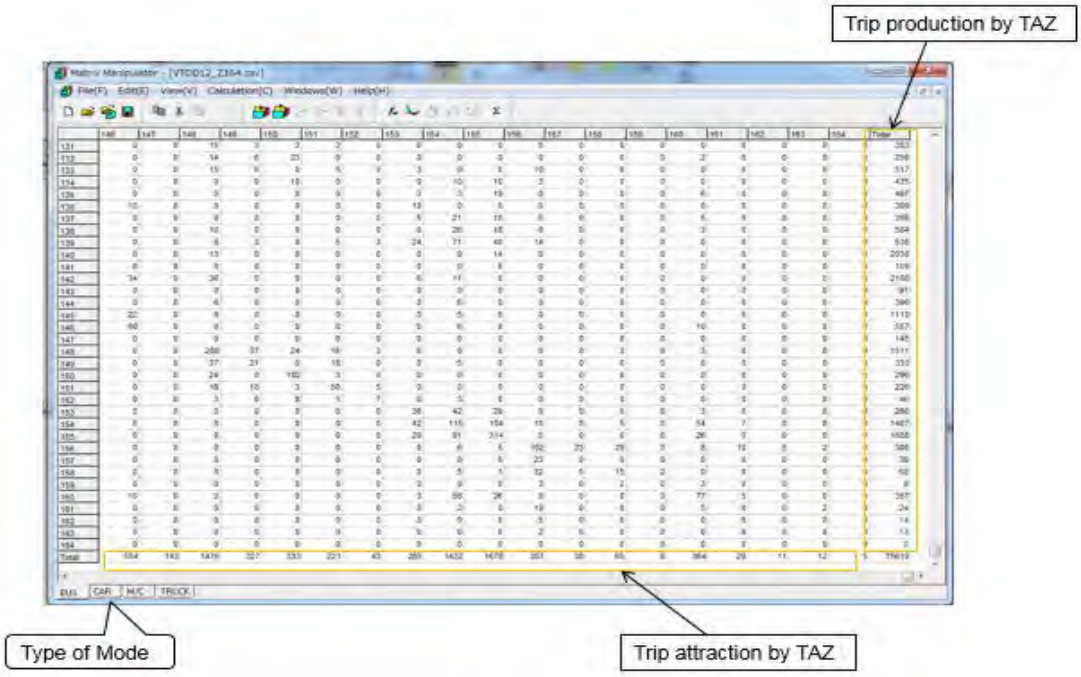
The aim of the Travel demand is to show the moving pattern and the volume of trips traveled by the residents and commodity in the study area. The changing pattern is described with origin and destination place of travel, which is coded by traffic analysis zones (TAZ) and is compiled in the form of origin and destination (OD) table. Current OD table contains several types according to the subject of movement: individual person trip OD table, vehicle OD table, and commodity OD table.

Household interview survey is often conducted as in Transport Master Plan study in 2008 to develop a person trip OD table. For the development of vehicle OD table, interviews with sampled drivers at roadside and with people having a driving license at home are common methodologies.

It is complicated and difficult to develop commodity OD table because the flow of commodity consisting of production, process and consumption which cannot be obtained easily from survey. The development commodity OD table is not discussed in this document.

Travel demand is formed in OD table as previously discussed. For this, the format of JICA STRADA is beneficial, which is shown in Appendix.

**Figure 3.6 Example of OD Table Form**




Source: JICA Expert Team

## 3.2 Analysis on GIS

### 3.2.1 Overview of GIS

GIS provides an integrating information to understand issues and problems faces in particular area such as Dar es Salaam city. Today such as uncontrolled urbanization and traffic congestion shall help organize data regarding these problems, to understand their spatial relationships and provide various maps as a result of spatial analysis to share information quickly among stakeholders. These understandings shall lead to more sensitive and intelligent decision-making.

GIS provides excellent means to acquire, store, manage and, above all, geographically integrate vast amounts of information from multi-disciplinary

information sources. Further, it is an excellent tool for visualizing and analyzing urban and urban transport planning data to find out trends, inter-dependencies, inter-relationship such as accessibility of facilities, availability of modes of transportation.

GIS is also highly recognized as a tool for developing surveillance activities. Advantages of GIS are seen in many aspects when compared to conventional methods used in transportation planning and management. The usefulness of the tools can be enumerated as follows:

1) Overlay

GIS facilitates overlay of different kinds of information such as transportation network, census, land use and socio-economy. This helps in identifying interrelationships and trends in a particular phenomenon and can be used in planning and decision making through multi-criteria modeling.

2) Query

GIS allows making queries in spatial domain that is not supported in other databases. These queries can be made to find out a suitable location for new facilities serving a given number of areas with defined access time or distance.

3) Buffer

Buffer analysis can be carried out to define the area to be considered to influence a person's activities or impact zones of vector breeding sites, where control activity needs to be strengthened, etc.

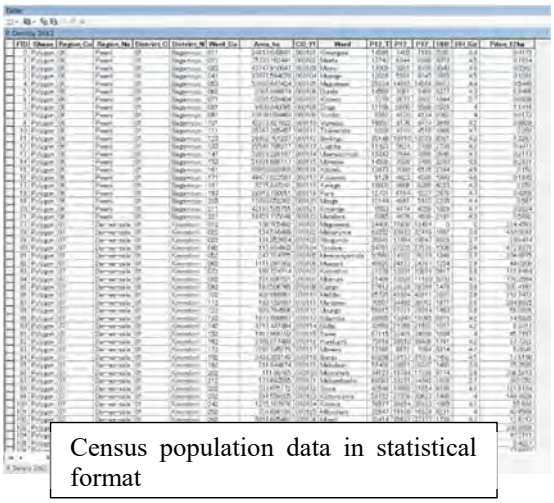
4) Network

This is a suitable analysis procedure for locating an efficient route for various facilities, locating bus stops, or identifying walking distance area using road network data.

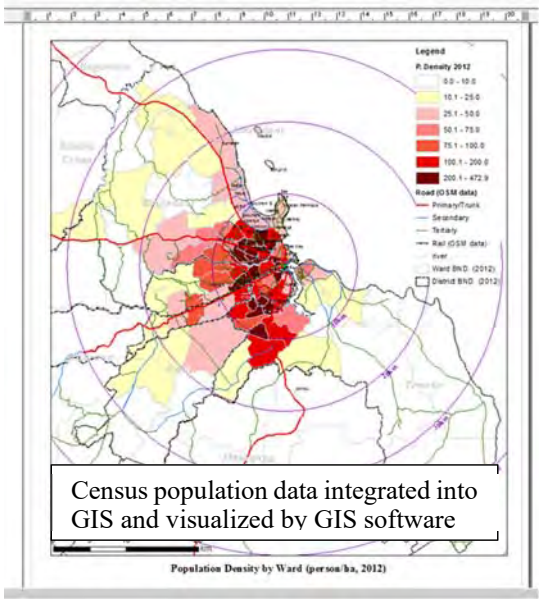
5) Statistics

GIS provides statistical analysis similar to most of other database systems, but its direct linkage to geographical location provides additional meaning and better interpretation to statistical interference.

**Figure 3.7 Comparison Expression of Statistical data and GIS software**



Census population data in statistical format




Census population data integrated into GIS and visualized by GIS software

Source: JICA Expert Team

GIS technology offers many tools for visualizing, creating, managing and analyzing GIS data in the transport planning process, summary of usages of GIS are: Data exchange routine (s) between multiple data sources and GIS data;

- Analyze current condition;
- Provide future planning parameters;
- Simulate future condition;
- Evaluate plans;
- Monitoring implementation of planned projects;
- Accumulate data in GIS format for future planning activities.

In the next section, usage of GIS by planning steps.

### 3.2.2 Usage of GIS by Transport Planning Steps

There are seven transport planning steps as mentioned in Chapter 4 of this Guide in detail. In this section, necessary activities using GIS for transport planning are explain by planning step.

The seven steps of transport planning are;

STEP 1: Data Collection and Situation Analysis
STEP 2: Development Framework and Goals
STEP 3: Transport Demand Forecast
STEP 4: Alternative Scenario Analysis

STEP 5: Transport Development Strategy Formulation

STEP 6: Plan Implementation

STEP 7: Plan Monitoring

In each step, GIS is utilized as one of the tools to support efficient and effective transport planning.

**(1) Utilization GIS in STEP 1**

Preparation of GIS data is a basis of utilization of GIS technology and this data preparation including data collection is time-consuming work. However, it is essential for efficient and effective transport planning. For transport planning, it is necessary to collect different data in various formats, such as MS Excel, AutoCAD drawing, GPS waypoints and GIS data such as ESRI Shapefile, It is necessary to integrate into GIS format in the same coordinate system to utilize these collected data for spatial analysis to be parameters for traffic demand forecast and base data for transport planning. The approach is a typical method to prepare collected data into GIS format by data type.

**Table 3.4 Major Methodology to Prepare GIS data**

| | Data format of collected data | Methodology to create GIS format | Example of data |
|---|---|---|---|
| 1 | ESRI Shapefile (popular GIS data format) | Not necessary to convert, but it is necessary to examine coordinate system are same as other GIS data. | Administrative boundary data prepared by NBS. |
| 2 | AutoCAD | Conversion tool in GIS software or digitize it using GIS software | Planned road data |
| 3 | MS Excel data | 1) Summarized data in particular administrative unit (e.g., by Ward or by District)<br>2) Import summarized data into GIS software<br>3) Integrate GIS data and MS Excel data | Population data, Students data, etc. |
| 4 | GPS waypoints | 1) Convert waypoints data into data exchange format<br>2) Import waypoint data into GIS software<br>3) Convert into GIS format | Location data collected by GPS, travel speed survey data, etc. |

Source: JICA Expert Team

Also, it is important to use the same coordinate system to perform accurate spatial analysis. Otherwise the result of spatial analysis might have inaccurate results. In the previous master plan study in 2008, all GIS data are prepared in the coordinate system of WGS84/ UTM37S.

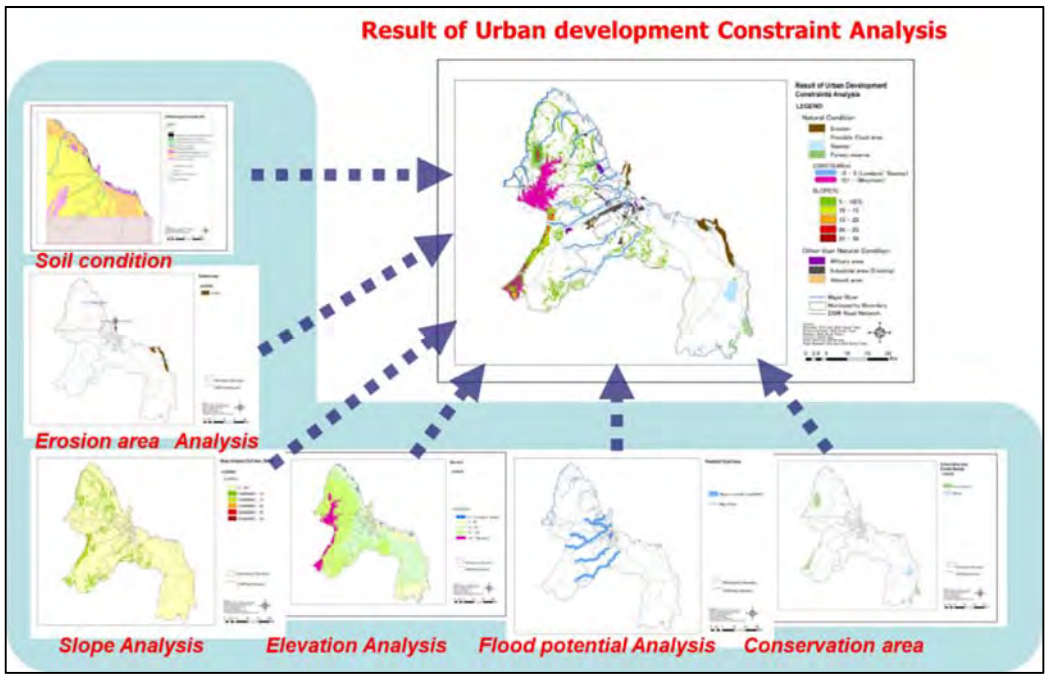
Following data collection, it is necessary to carry out situation analysis to clarify urban structure and land use;

- Transport demand characteristics and conditions
- Gaps of transport services and demand
- Existing transport issues and problems

Transport demand characteristics are used for development of demand forecast models.

Figure 3.8 shows samples of the situation analysis.

**Figure 3.8 Sample of Situation Analysis from Urban Transport Master Plan 2008**




Source: JICA Expert Team

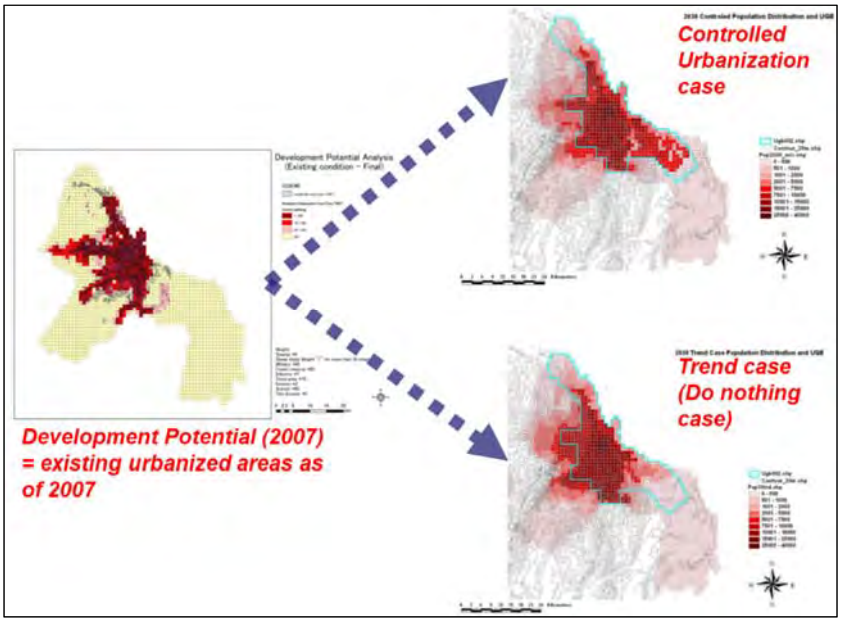
**(2) Utilization GIS in STEP 2, 3 and 4**

A Master Plan includes a network plan that represents the services of several transport modes. Alternative network plans are prepared according to development scenarios and the most effective one is selected as the master plan network to make a better plan.

For example, GIS is utilized for future population distribution based on development framework, provide various planning parameters for traffic demand forecast and simulate future urbanized area based on alternative development

scenarios and transport network plan. These analysis results are visualized on maps with quantitative data to facilitate discussion and contribute to make consensus among stakeholders.

**Figure 3.9 Sample of Future Urbanized Area from Urban Transport Master Plan 2008**




Source: JICA Expert Team

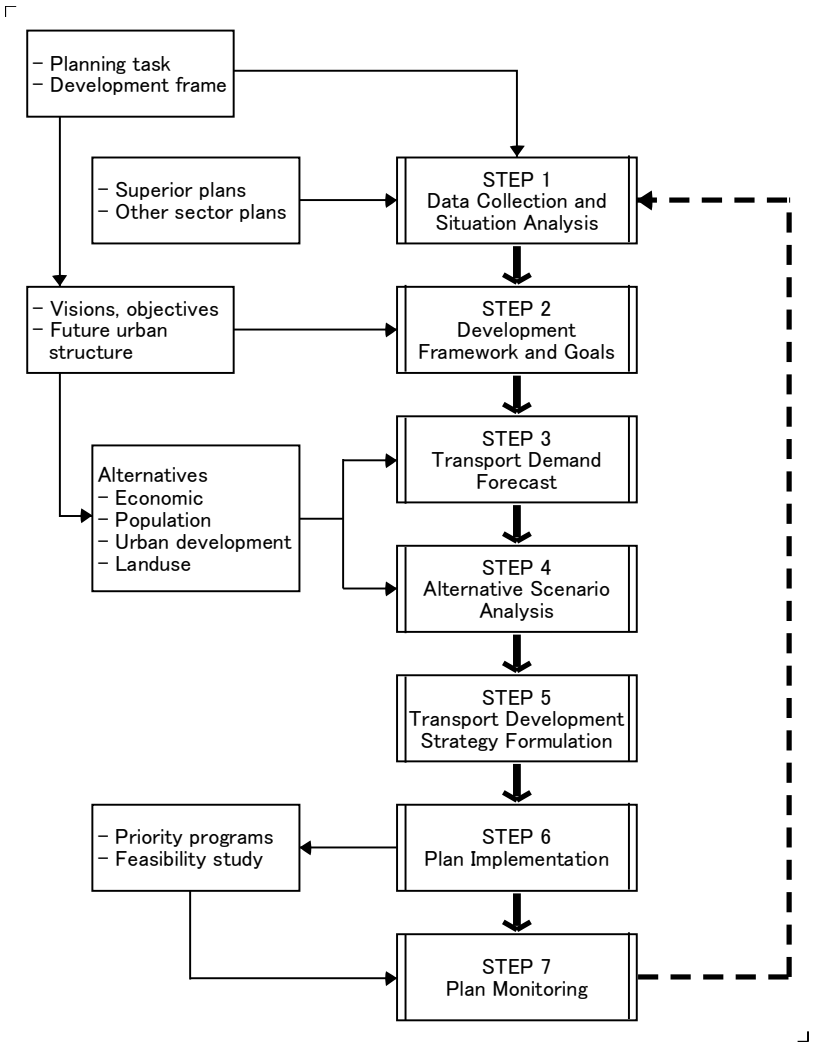
### (3) Utilization GIS in STEP 5, 6 and 7

After the development of the master plan, overall evaluation of a master plan package is summarized, and each project is prioritized which will be summarized as an implementation plan with other proposals of actions for the realization of plans and projects. GIS utilized for one of the tools to evaluate the master plan and provide maps for monitoring implementation of the master plan. To do this activity, all of the master plan data should be prepared in GIS format to monitor implementation of projects efficiently and visually, and accumulation of these GIS data would be a basis for revision of the master plan.

# 4. PROCEDURE OF URBAN TRANSPORT PLANNING

Steps of urban transport planning process are exhibited in Figure 4.1. The procedure consists of seven steps to formulate, implement a transportation plan and to monitor the progress of the plan. Each step will be explained in this chapter.

**Figure 4.1 Transport Planning Steps**




Source: JICA Expert Team

## 4.1 Step 1: Data Collection and Situation Analysis

### 4.1.1 Data Collection

#### (1) Basic Data

Choosing the correct data collection methodology is very important as the data analysis is only as good as the data that was collected. Data collection is an integral part of transport planning, which is most costly regarding money and time. The collection of data should be as comprehensive as possible, covering not only the present situation but also the history and the situation expected in the future.

The objectives of data collection vary depending on a transport plan. In the case of transport master plan study, the following information is necessary:

Situation analysis:

- Information by which the state of urban structure and land use is analyzed
- Leve of services of existing transport and urban facilities
- Characteristics of transport demand which cause transport problems

Demand analysis:

- Indicators that represent social and economic activity performed in study area
- Transport demand formed in OD table
- Characteristics of trip generation and the selection of destination
- Frequency of travel by individual attribute
- Individual preference of transport mode selection
- Information to clarify existing problems and to assess the impact of transport measures for specific issues

Network planning:

- Urban development plans
- Regional development plans, etc.

Other specific transport issues:

- Information to clarify existing problems and to assess the impact of countermeasures for specific issues in transportation

Furthermore, a base map should also be prepared for the whole planning area in sizes adequate for analysis and reports. If the map is prepared in GIS, it can function as a working map where land-use can be drawn upon, traffic analysis zones are specified, transport characteristics be geographically analyzed, and network plan is visually presented.

The following table shows underlying data for urban transport planning.

**Table 4.1 Basic Data for Urban Transport Planning**

| Area/Aspect | | Existing Data |
|---|---|---|
| Present Conditions | Socioeconomic Conditions | · Government statistics<br>· National economy<br>· Industrial structure<br>· Employment<br>· Population<br>· Vehicle ownership<br>· Gender, poverty, etc. |
| | Urban Development | · Land use<br>· Urban services<br>· Large-scale urban development |
| | Environmental Condition | · Topography<br>· Meteorology<br>· Air pollution<br>· Historical buildings, landscape |
| Review of Studies and Plans | National Plan | · Socioeconomic development<br>· National transport development strategy |
| | Regional Plan | · Economic master plan<br>· City development master plan |
| | Transport Plan | · Urban transport studies<br>· Planning for any transport subsector<br>· Feasibility study of any transport projects |
| Institutions and Funding | | · Transport-related organizations<br>· Tax and budgeting system for transport development |
| Urban Transport Policies | | · Public transport, parking, etc.<br>· Traffic demand management |
| Demand | By Area | · Population<br>· Student and enrolment<br>· Worker and employment<br>· Traffic count survey results |
| | Network | · Road profile data<br>· Public transport services<br>· Network information in GIS |
| Subsector Plan | Road network | · Road inventory<br>· Transport facility inventory<br>· Maintenance system<br>· Design standard |
| | Traffic management | · Directional control<br>· Traffic signal<br>· Traffic accident statistics |
| | Public transport | · Public transport service routes<br>· Vehicle<br>· Operator information<br>· Licensing system |
| | Pedestrian | · Sidewalk conditions |
| | Freight transport | · Freight traffic volume<br>· Vehicle type<br>· Operation control |
| Economic and Financial | | · Construction cost<br>· Tax system<br>· Vehicle operating cost |

Source: JICA Expert Team

**(2) Transport Surveys**

1) General

The most important basis for transport planning is the identification of the actual transport situation in the urban area. As for the survey of the present transport situation, significant surveys are an OD survey, a survey of characteristics of traffic flow, and inventory survey of transport facilities and services.

The OD survey aims to collect extraordinary movement of people and vehicles, using a trip as a unit. A trip can be defined as the movement of a person or vehicle from origin area, especially expressed using traffic analysis zones, to the destination area. The OD survey will obtain the information of trips, i.e., origin and destination zones, time of departure and arrival, means of transport and travel purpose, and attributes of travelers, i.e., age, gender, occupation, work or school place, and vehicle ownership, by interviewing the travelers. Therefore, this survey is conducted based on the selected sample households or travelers and the answers will be expanded to the population for providing the OD matrix representing the travel behaviour in the whole study area.

2) Methodology for OD Survey

The survey methodology for obtaining travelers' origin and destination of their trips varies, depending on the objective of the project, type of target traveler, an area to be covered. For example, in case of vehicle OD survey in some corridors, drivers who are driving a car in the corridor are randomly selected, stopped and interviewed at the roadside. In case the objective is to obtain whole trips covering all person trips made by all residents in a particular study area, an interview survey with members of the selected household by way of a Household Interview Survey (HIS) is the most popular survey.

Methodologies for HIS survey generally include i) visit survey: surveyors visiting households, ii) post survey: survey forms sent by email, and iii) Web survey: respondents answering through the internet. The manner of distribution of survey forms, completion of the forms, and collection of answers, and the advantages and disadvantages of each of the methodology mentioned earlier are summarized in the following table.

**Table 4.2 Characteristics, Advantage, and Disadvantage of Each Survey Method**

| | Visit Survey | Post Survey | IT/Web Survey |
|---|---|---|---|
| Distribution of survey forms | ・Surveyors visit the selected households and distribute survey forms | ・Survey forms are sent by email to selected households | ・Request letter, guidance, and material are sent by email to selected households |
| Completion and collection of answers | ・Surveyors fill in survey forms according to answers when visiting household or respondents fill in survey forms and surveyors collect them | ・Respondents fill in survey forms and return them by email | ・Respondents enter answers at Website through the internet<br>・Recently, in some cases, part of answers is automatically collected by GPS equipment |
| Advantage | ・Surveyors can check completion of survey forms at household<br>・Enable to achieve target response rate | ・Burdens of preparing materials such as survey forms and manuals can be reduced.<br>・Able to survey the whole population | ・Answers can be automatically checked when entering at Website.<br>・Easy to collect and process data |
| Disadvantage | ・Training of surveyors and management of surveyors' activities are necessary.<br>・Preparing materials for surveyors is necessary. | ・The collection rate is low.<br>・Accuracy and reliability of answers depend on respondents | ・Respondents are limited to owners of a personal computer<br>・Accuracy and reliability of answers depend on respondents |

Source: JICA Expert Team

Methodologies for obtaining information of individual travel using Big Data to estimate existing OD tables for transport planning have been proposed for practical use. The aim is to explore information about typical and daily travel behaviour within the considerable information collected every moment through the following information and communications technology (ICT) networks:

- Cellular Phone
  Call detail records (CDR) data, location data (cellular base station, GPS)
- Probe Data
  Flow data of probe car and probe person, car navigation trace data, electric toll collection (ETC), bus location, etc.
- Public Transport IC Card

The above ICT networks can provide relevant information such as locations of person or vehicle and travel route on a network at any time. However, use of the information is often limited because of privacy protection.

3) Other Transport Surveys

The OD matrix is an output of the estimates produced based on the information collected by the survey so that the matrix should be verified with the output from other surveys such as traffic volume surveys. The traffic volume survey will count the number of vehicles, by which the volume of trips estimated in the OD matrix can be compared to the specific road sections of major roads.

For example, in the Transport Master Plan 2008, transport surveys listed in the following Table 4.3 were conducted to collect the information for the development of urban transport plans.

**Table.4.3 Example of Transport Surveys**

| Survey | Objectives | Method | Examples of Coverage |
|---|---|---|---|
| Person Trip Survey | ・Household and individual attributes and trip information of residents<br>・Perception of transport services and environment | ・Direct interview with household head and household members in the selected samples | ・1% to 3% of households in the Study area<br>・Information about ordinary trips on weekdays |
| Cordon Line Survey | ・Traffic volume on cordon line<br>・Individual attributes and trip information of non-residents | ・Counting vehicles by type of vehicles<br>・Direct interview with drivers and passengers at roadside | ・Boundaries of the Study area along significant corridors<br>・Major transport terminals: seaport, airport and railway stations |
| Screen Line Survey | ・Traffic volume on-screen line<br>・Occupancy by vehicle type | ・Counting traffic by vehicle type<br>・Occupancy observation of sampled vehicles | ・At major road crossing screen line which divides the Study area into two parts<br>・24 hours or 16 hours |
| Traffic Count Survey | ・Traffic volume at major road sections | ・Counting traffic by vehicle type | ・At major road sections<br>・24 hours or 16 hours |
| Intersection Traffic Count Survey | ・Traffic volume at congested intersections by turning direction | ・Counting traffic by turning direction and vehicle type | ・At congested intersections<br>・3 hours in am/pm peak and off-peak |
| Travel Speed Survey | ・Travel speed on major routes by section and vehicle type<br>・Bottleneck sections | ・Floating car method<br>・Onboard measurement by GPS device | ・Major corridor, high-frequency bus routes<br>・3 hours in am/pm peak and off-peak<br>・Car, public transport, motorcycle, etc. |
| Public Transport Passenger Interview Survey | ・Travel characteristics<br>・Perception of users on public transport services | ・Direct interview with selected public transport passengers | ・500 samples by type of public transport and route |

| | | | |
|---|---|---|---|
| Public Transport Onboard Survey | ・Boarding and alighting passengers by stop on the route | ・On-board counting of passengers | ・Representative routes<br>・3 hours in am/pm peak and off-peak |
| Private Mode User Interview Survey | ・Profile of users<br>・Travel route choice<br>・Perception on-road services and public transport services | ・Direct interview with selected private mode users on selected vehicles | ・500 samples by type of mode |
| Parking Survey | ・Parking capacity<br>・Parking demand<br>・Perception of parking users | ・Facility inventory<br>・Demand survey<br>・Direct interview with selected drivers | ・On/off street parking in the area |
| Freight Transport Survey | ・Characteristics of freight vehicle movement | ・Counting traffic and direct interview with selected drivers<br>・Interview with transport-related companies | ・Significant terminals such as ICD, SEZ, etc.<br>・50 to 100 transport related companies |

Source: Transport Policy and System Development Master Plan, JICA, 2008

4) Subcontract of Surveys

In many cases, the surveys mentioned above are large in scale and expensive to conduct. Therefore, it is necessary to draw up detailed practical survey plan which are cost effective. It is recommended that a sample of HIS survey forms and terms of reference for traffic count survey, which is attached in Appendix, be used as a template.

When surveys are subcontracted to consultants or a survey company outside, the following points should be assessed at survey planning stage and survey implementation stage:

Survey Planning Stage

- Are the background and objective of the survey well understood?
- Does the plan satisfy instructions in the TOR?
- Is productivity appropriately estimated? Is the number of surveyors sufficient?
- Is the structure of survey team adequate? Is the role of each team member clear?
- Does the plan include guaranteeing the safety of persons concerned against traffic accident and criminal acts? Is emergency response outlined?
- Are there measures to ensure accuracy or to confirm the correctness of information answered? What is the check system of survey forms?
- Are cost items adequate, the amount of item necessary, unit cost reasonable?

Survey Implementation Stage

- Were the surveys implemented as planned?

- Is output provided as stated in the TOR?
- Are the results of survey accurate?
- Are all the points suggested in the TOR to be reported described in the survey report?
- How should difficulties and problems during the survey be handled?

### 4.1.2 Situation Analysis

#### (1) Objective

The objective of situation analysis for transportation planning is to clarify the urban structure of the study area, the change of land use between the past and existent, existing transport situation and their past trend, and those effects and issues. It is recommended that planning issues be listed, and aspect and items for analysis are determined before starting the situation analysis for the effective and efficient procedure.

The situation analysis should cover a wide range of issues such as land use, the trend of transport situation, the service level of transport facilities, socioeconomic situation (population, economic activities, lifestyle, etc.) materializing transport behavior of citizens, and past studies and plans conducted, and trend of development projects in private sector. The analysis on data for the past several years is useful to identify existing urban transport problems and issues on measures done in the past so that surveys are desirable to carry out periodically for the collection of data.

#### (2) Methodology

1) Items for basic situation analysis

The primary situation analysis is recommended to be done in several particular areas for the comparison, such as the study area, urban area, and central business district, etc. The items for basic situation analysis are as follows:

(i) Example of basic analysis items

- Trip generation (trip rate)
- Trip production/attraction (number of production/attraction trips by area, purpose of trips, and mode of travel)
- Trip distribution (number of trips between areas), trip length distribution by mode of travel
- Travel time distribution (travel time between areas by purpose of trips and mode of travel)

(ii) Example of cross-analysis items

- Mode of travel
- Purpose of trips
- Departure and arrival time
- Individual attributes (gender, age group, occupation, level of income, etc.)
- Household attributes (vehicle ownership, level of income, etc.)
- Traffic analysis zone (from now on called TAZ)

2) Finding transport problems

The basic situation analysis for finding existing transport problems is recommended to be done in several particular areas for the comparison, such as the study area, urban area, and central business district, etc. The items for basic situation analysis are as follows:

**Table 4.4 Examples of Urban Transport Problem**

| Issue | Category | Cause |
|---|---|---|
| Congestion on road | ・Highway/Motor way | ・Shortage of capacity |
| | ・Arterial road | ・Shortage of road capacity<br>・Mixture of urban and inter-urban traffic<br>・Poor pavement<br>・Bad driving behavior<br>・Parking<br>・Roadside frictions |
| | ・CBD area | ・Demand concentration<br>・Increase of private trips<br>・Parking<br>・Mixture of car and motorcycles<br>・Inefficient public transport service<br>・Bad driving behavior |
| | ・Intersection | ・Capacity deficiency<br>・Inefficient signal control<br>・Bad driving behavior |
| | ・Bus stop/ terminal | ・Oversupply of bus service<br>・Lack of bus stopping space<br>・Boarding and alighting passengers<br>・Bad driving behavior of bus driver |
| Inconvenience of public transport | ・Convenience | ・No service of routes<br>・Poor accessibility to public transport stations<br>・Long waiting time and less punctuality |
| | ・Comfortability and safety | ・Crowded on board<br>・Criminal/ onboard safety |
| | ・Intermodal | ・Inconvenient transfer of route<br>・Waiting time at transfer |
| | ・Taxi | ・No fair charge system |
| Traffic Safety | ・Pedestrian | ・Violent driving manner<br>・Lack of pedestrian facilities |
| | ・Accident | ・Mixture of pedestrians and vehicles |

| | | |
|---|---|---|
| | | ・Poor pavement<br>・Reckless driving<br>・Poor visibility |
| Environment | ・Air pollution | ・Increase of vehicle ownership<br>・Poor maintained vehicles<br>・Poor pavement of road |
| | ・Noise and vibration | ・Poor maintained vehicles<br>・Poor pavement of road |
| | ・Scenery | ・Destroyed by transport facility construction |
| Social unfairness | ・Transport disadvantaged | ・Public transport undeveloped area<br>・Lack of barrier-free transport facility<br>・Difference in mobility by gender |
| | ・Influence residents | ・Compensation for resettlement |
| | ・Traffic accident victims | ・Lack of insurance system for traffic accident |
| | ・Level of public transport fare | ・Subsidy<br>・Appropriate fare level |

Source: Research on Practical Approach for Urban Transport Planning, JICA, 2011

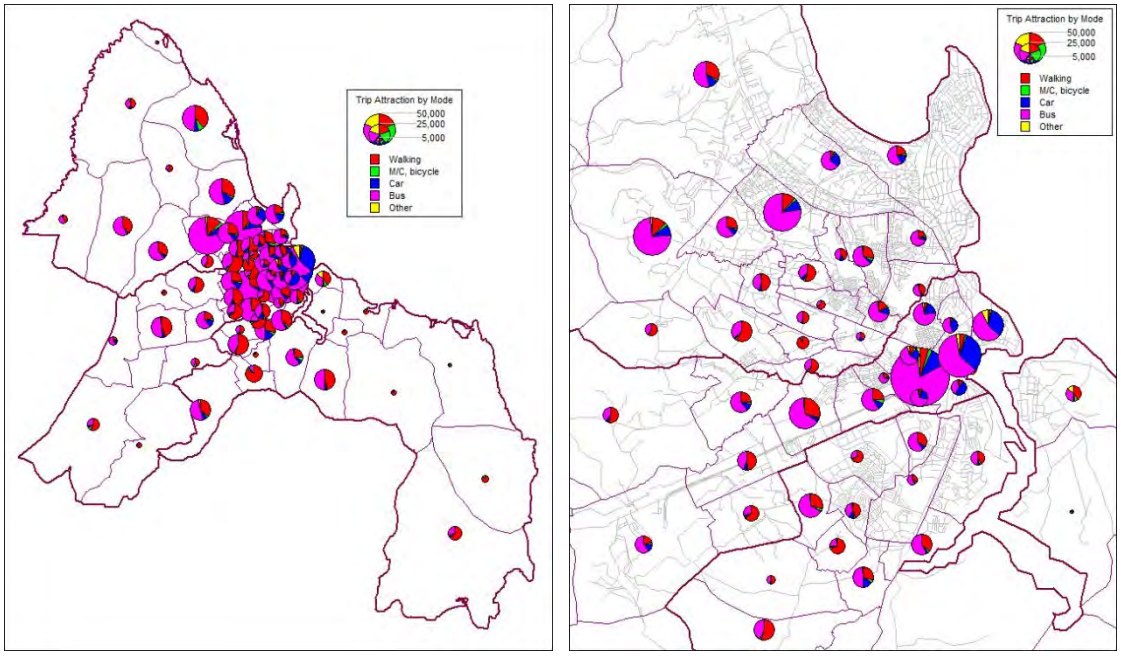
3) Example of issues to be analyzed

Analysis corresponding to particular transport issues provides effective and specific in-formation on transport planning as well as the presentation of the plans and strategies to related organization and citizens. The way of analysis and presentation should be well determined according to the type of available data and issues to be analyzed. Planning issues vary with the characteristic of transport and area. It is, therefore, necessary to carefully determine a methodology for analysis in advance. The following samples of the analysis with particular transport issues may be for reference to the practical analysis for the users.

(i) Trip attraction of commuting trips and automobile trips by TAZ

TAZs with massive attraction of commuting trips in the morning peak hours and trips by automobiles (motorcycles and passenger cars)

**Figure 4.2 Trip Attraction by Zone**

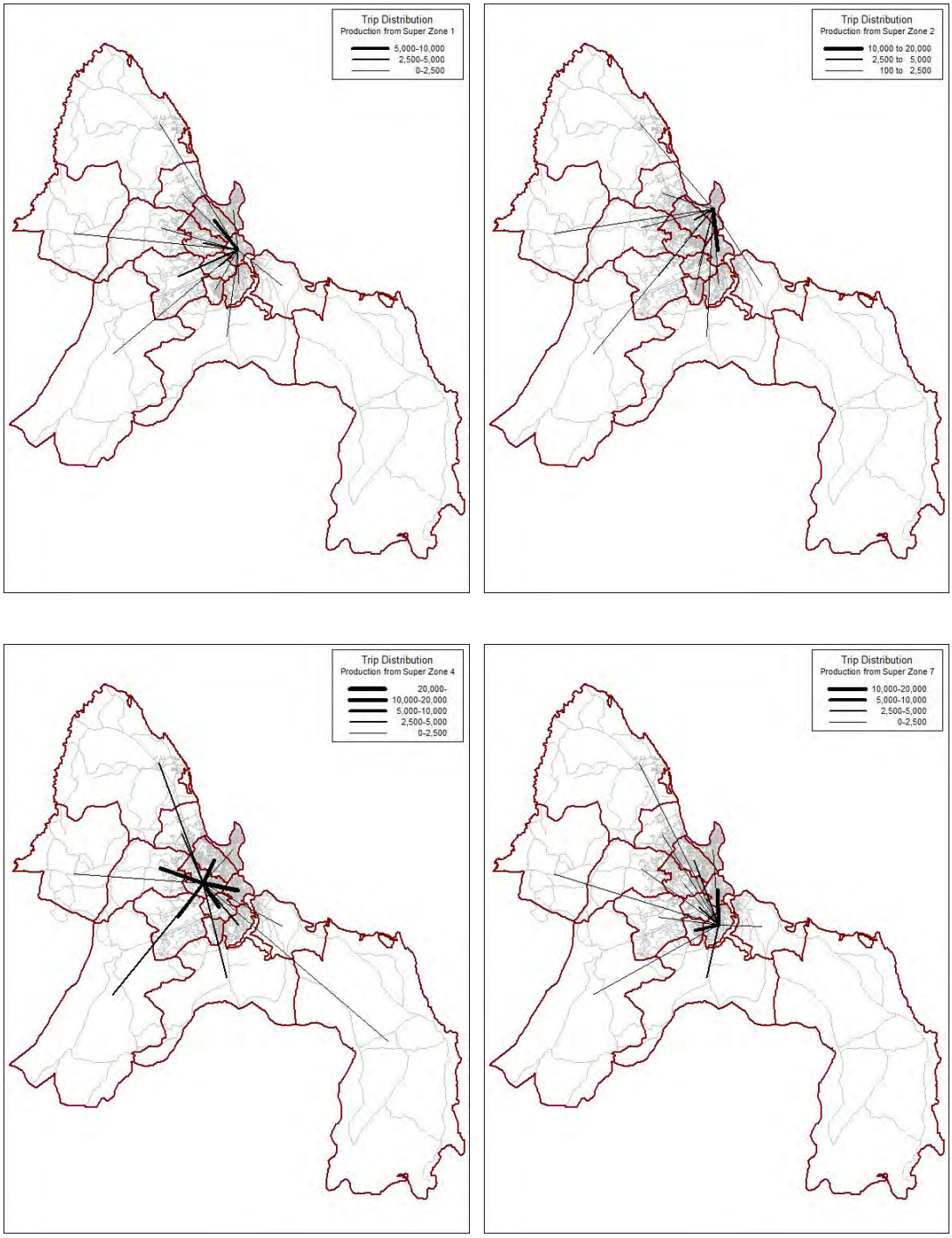



Source: Transport Policy and System Development Master Plan, JICA, 2008

(ii) Transport demand corridor and imbalance with supply

To check deficiency of the capacity of transport facilities with transport demand by major corridor

**Figure 4.3 Desired Lines**

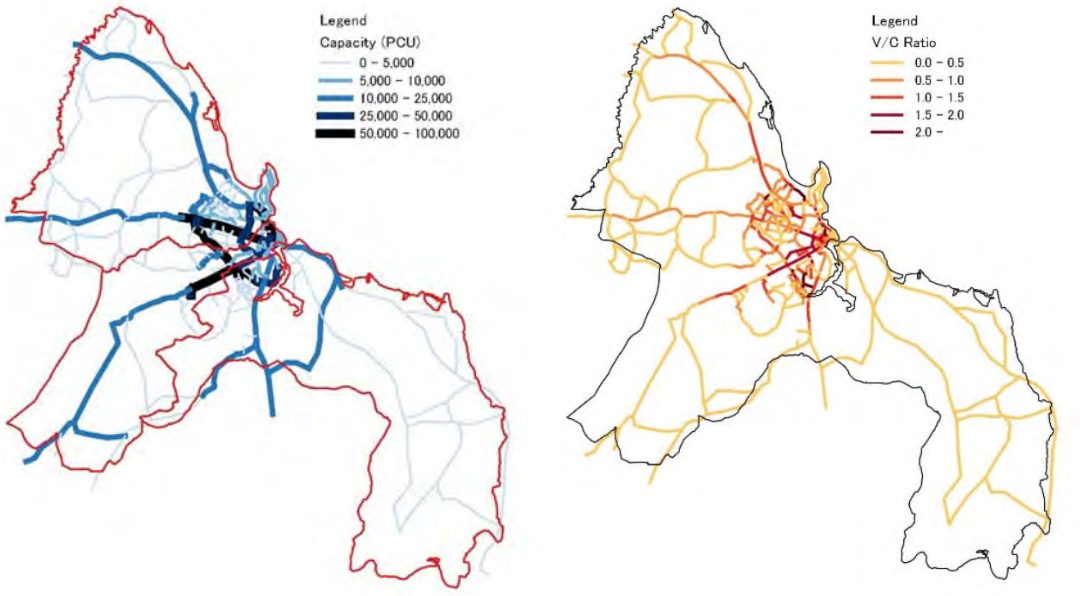



Source: Transport Policy and System Development Master Plan, JICA, 2008

(iii) Bottlenecks to traffic

To clear bottlenecks on the road network and those caused by traffic attraction

**Figure 4.4 Bottlenecks on Network and Traffic Attraction**

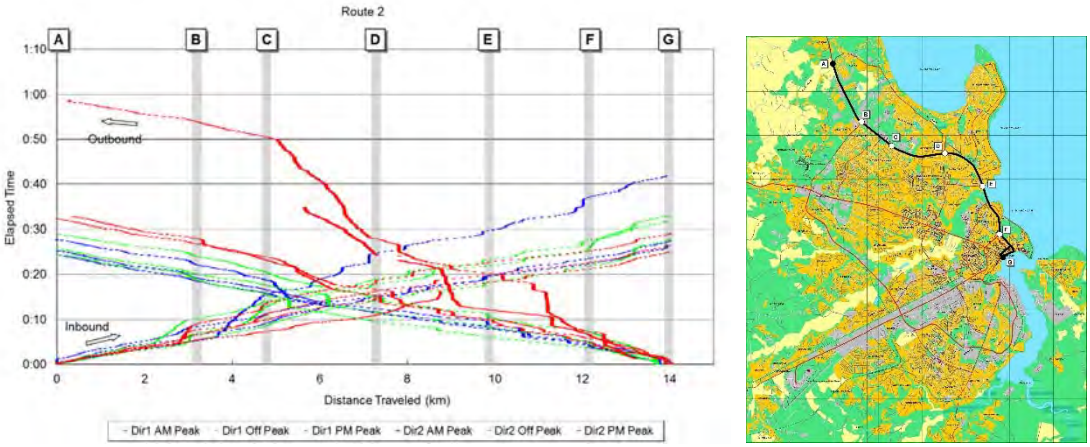


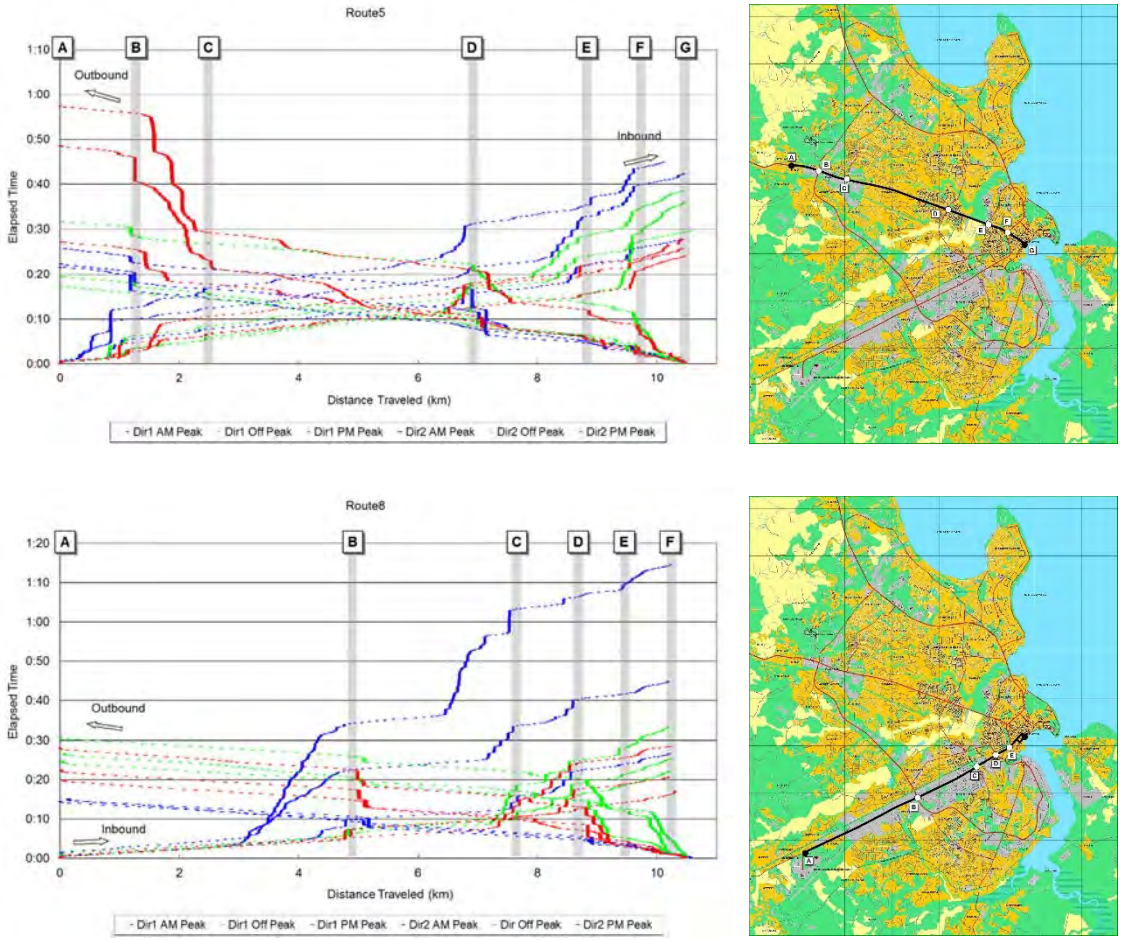

Source: Transport Policy and System Development Master Plan, JICA, 2008

(iv) Analysis at congested point

To analyze the congestion period and delay time at specific congestion point based on surveyed data

**Figure 4.5 Travel Speed and Traffic Jam**






Source: Transport Policy and System Development Master Plan, JICA, 2008

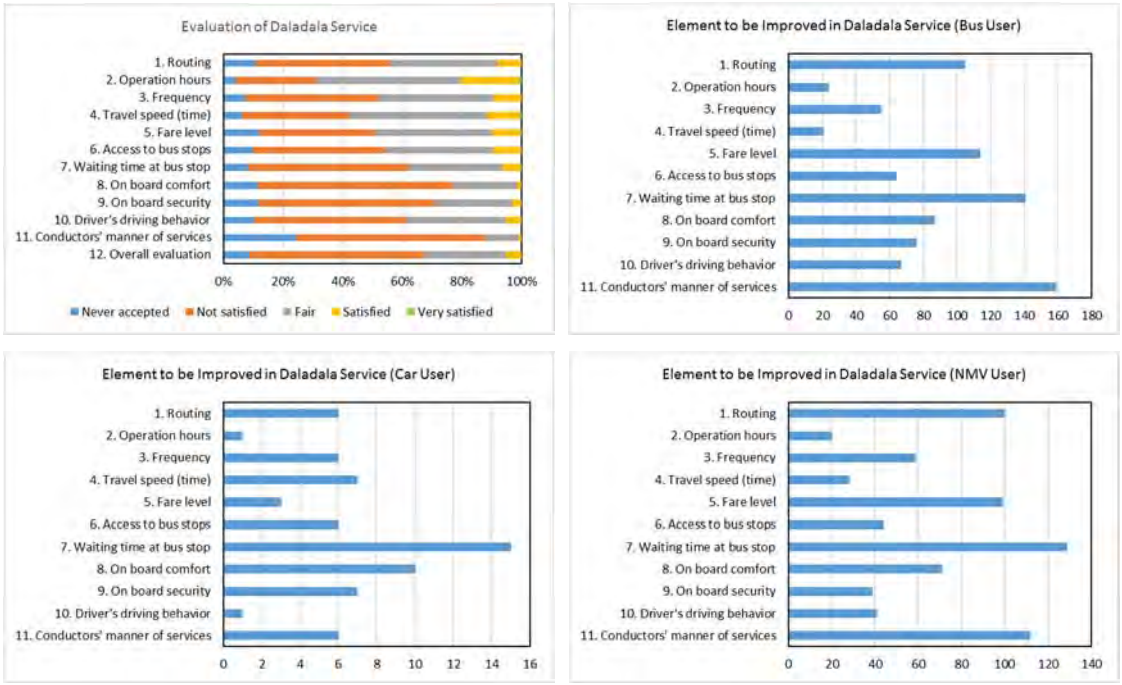
(v) Service level of public transportation

- Railway route, railway stations, and their coverage area (population and number of trips within 1km radius-circle from the stations, etc.)
- Inventory of station plaza (area, number of feeder bus routes, number of berth, etc.)
- Frequency of railway operation (transportation power)
- Cover area by bus route
- Distribution of distance to bus stop from resident place

(vi) Opinion and preference on public transport services

To analyze the result of interviews with citizens about public transport service and propose beneficial plans to users.

**Figure 4.6 User Perception on Issues of Bus Operation**




Source: Transport Policy and System Development Master Plan, JICA, 2008

## 4.2 Step 2: Development Framework and Goals

After grasping transportation environment and finding problems for the area in the step of situation analysis, urban transportation process focusses on developing a vision in the future. The vision shall describe the desired states and directions that the area wants to achieve in the future. This vision will be then further transformed and clarified with more specific goals and objectives, which ranges from general statements of desired policy and directions to indicators that define specific levels of acceptable outcomes.

The transportation system strongly influences urban form, a region's economy, environmental health, and quality of life in the community. One way of establishing these linkages in the transportation planning process is to develop a vision of what the area wants to be, then define how the transportation system plan relate to this vision. The following table shows an example of how goals and objectives are defined.

**Table 4.5 Development Goals and Strategy**

| Goal | Objective |
|---|---|
| Accessibility and mobility for people and goods | ・Develop intermodal passenger connections and equalize accessibility<br>・Implement transit/land-use changes to support transit/pedestrian development<br>・Increase the accessibility and mobility options available to people and for freight<br>・Enhance the integration and connectivity of the transportation system across and between modes for people and freight |
| Attain air-quality goals | ・Meet air-quality attainment target for Nox<br>・Meet air-quality attainment target for VOC<br>・Protect and enhance the environment, promote energy conservation, and improve quality of life |
| Improve and maintain system performance and system preservation | ・Improve connections between truck, rail, and air freight facilities<br>・Promote efficient system management and operation<br>・Emphasize the preservation of the existing transportation system<br>・Preserve historic resources<br>・Minimize community and environmental impacts<br>・Create incentives and regional policies to promote livable cities<br>・Protect and enhance the environment, promote energy conservation, and improve the quality of life<br>・Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency<br>・Increase the safety and security of the transportation system for motorized and non-motorized users<br>・Improve connectivity between low-income and minority populations and significant employment and activity centers<br>・Improve social and environmental equity for all the region's citizens |

Source: Atlanta Regional Commission, 2000

Furthermore, it has to be remembered here that the objectives of transport planning should be established by taking several standpoints into account. For example, as shown in the following table, different groups of objectives exist according to different standpoints such as those of community, non-users of the transport system, users and operators. Then, the objectives will be represented by indicators that the planners can measure the impacts of the changes to transportation systems. For example, accessibility improvement is indicated by a reduction in trip time and

costs. It is clear that these differentiated objectives are, as they are, items of evaluation.

**Table 4.6 Objectives of Transport Planning**

| ViewPoint | Objectives |
|---|---|
| Community | ・Fair sharing of costs and benefits<br>・Orderly regional development<br>・Conservation of community and natural resources<br>・Improvement in the quality of environment |
| Non-users | ・Increase in and conservation of private resources<br>・Advancement of neighboring residential area /minimization of disruption |
| Users | ・Increase in accessibility to opportunities<br>・Conservation of private resources<br>・Improvement in the quality of transport |
| Operators | ・Easy management<br>・Improvement in the rate of returns |

Source: New systems requirements analysis program: transportation system evaluation indicators, PMM Co., 1973

## 4.3 Step 3: Transport Demand Forecast

### 4.3.1 Objective

The demand forecast is included in "Forecasting of Project Impact" of "Alternative Plan" in the transportation planning process. Method and expected output of demand forecast, therefore, depends on the type of alternative plan proposed and evaluated. Workflow of demand forecast should be considered through i) clarification of expected output of demand forecast, and ii) available data and information or transport survey for the input of demand forecast.

### 4.3.2 Methodology

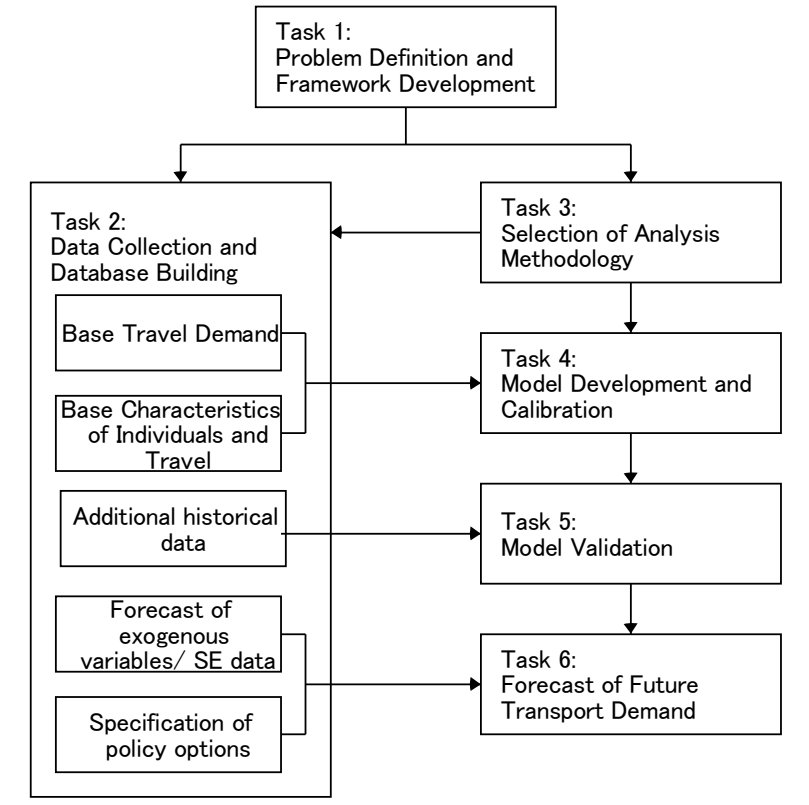
Transport demand forecast consists of several tasks that are mostly independent of the actual techniques used to predict travel flows. Figure 4.7 shows typical tasks that are part of any demand analysis for transport planning. In the figure, tasks can be seen in the linear and one-way relationship among them. However, some tasks are very much interconnected in some cases. For example, data availability often determines the analysis methodology to be applied. If model validation does not result well, the process is repeated by selecting analytical methodology for task flow.

Task 1: Problem Definition and Framework Development

Taking transport problems found in the step of situation analysis, visions and

objectives determined in the step of development framework and goals, a framework for demand forecasting should be determined. The framework consists of i) special scale; study area where transport plan influences and its impact should be analyzed, 2) target year; timescale for planning, the establishment of the socioeconomic framework, and demand forecast, 3) policy variables; planning indicators by which the impact of transport plan can be measured.

**Figure 4.7 Forecasting Procedure**




Source: Chapter 5 Demand Analysis, Urban Transportation Planning, McGraw-Hill Series in Transportation

Note: Some expressions in the flowchart are modified from the original.

Task 2: Data Collection and Database Building

The data collected in step 1 will be compiled in transportation database. Principal transportation database necessary for demand forecasting are 1) network for both existing and future; future network shall include transport network plan, 2) existing travel demand that is summarized in the form of origin and destination matrix, 3) statistics that represent the demographic situation, land-use and economic activity by area.

It is recommended that GIS software will be used for development of network database, JICA STRADA software for OD matrix, and statistics data will be compiled in spreadsheet software such as Microsoft Excel. Detail of transport network database as discussed in Chapter 3.

Task 3: Selection of Analysis Methodology

In transportation planning, the analysis approach and models for demand forecasting vary depending on the purpose of analysis and indicators which models will estimate or by which models will calculate. As mentioned in previous chapters, the purpose of this document aims to describe general steps of urban transport planning for comprehensive transport master plan so that traditional four-stage model is applied analysis approach.

Task 4: Model Development and Calibration

All transportation demand models consist of a dependent variable, the demand for transportation, expressed as a function of one or more independent variables or explanatory variables, and parameters that are coefficient or weights of the variables to estimate the demand. Once formulas of models are determined and dependent variable and explanatory variables are prepared, statistical estimation procedures can estimate the parameters. Then, this estimation procedure involves a comparison of observed demand levels with the levels of forecasted values by the model.

Task 5: Model Validation

Before using the model developed in task 4 to forecast future demand, the analyst should be satisfied as best as possible that the models are capable of forecasting reasonably well. Testing the models' predictive capabilities is known as validation. At least there are three stages for model validation. First is the calibration stage where coefficients are examined for statistical significance and a priori expected signs. Second, the travel demand calculated from OD matrix estimated by the model will be compared with the observed figures collected by surveys. For example, a total number of trips at screen line, travel length by purpose, and average modal share can be variables for the comparison. The last stage of the model validation is a trip assignment that estimates traffic volume on the network. The estimated traffic volume will be compared with the observed traffic volume.

Task 6: Forecast of Future Transport Demand

The final stage in transport demand forecast is the use of the calibrated and

validated analysis techniques and models to generate demand forecasts for each policy alternatives and forecast year under consideration. Thisis the ultimate purpose of the whole demand analysis process. Ideally, a wide range of forecasts should be performed corresponding to a full set of possible alternatives and future scenarios. Besides, the sensitivity of the forecasts to crucial modeling assumptions should also be examined.

## 4.4 Step 4: Alternative Scenario Analysis

### 4.4.1 Transport Network Plan

The objective of transport network planning is to show the structure and function of the road network, public transport system, the general idea of the location of significant transport facilities, and important transport strategies including intangible measure such as TDM and MM, corresponding to the future urban development. Therefore, the network planning should consider not only expansion of road capacity corresponding to traffic demand but appropriate modal share between a private vehicle and public transport. Furthermore, the network should be hierarchical to cope with the wide range of trips such as long-distance travel and short access trips inside the city centre, safely and efficiently without impeding the smooth social and economic activity.

According to a guideline for transport network planning from Japan, network planning shall formulate a brief plan of transport infrastructure and demand management measures, which are completed to develop by the target year such as twenty years later from the present, by the future transport demand. The following is also recommended as a component of transport network plan.

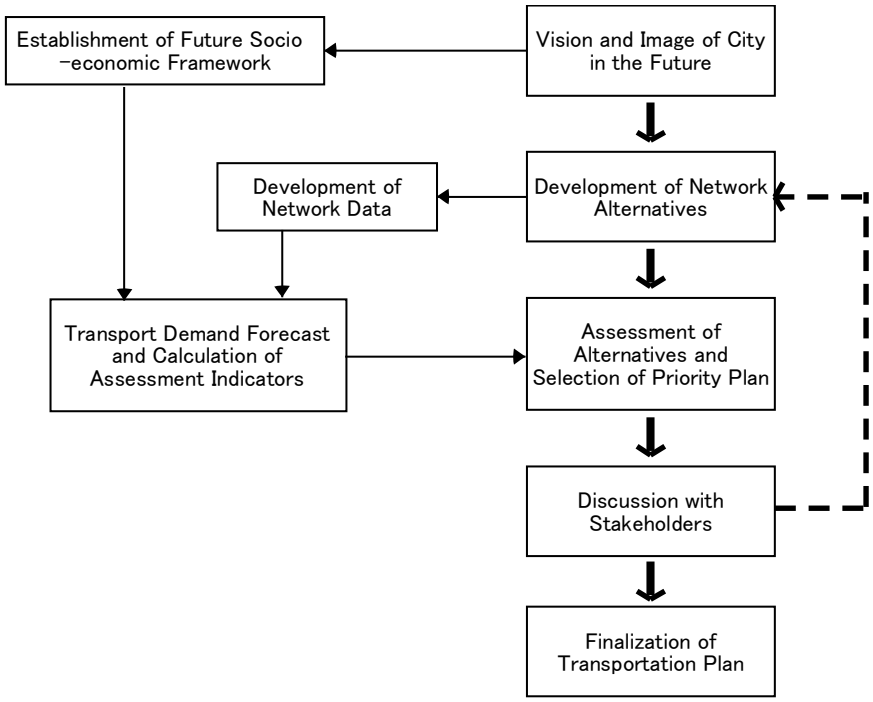
1) Road Network
   - Location:
     starting and ending place, and its rough route
   - Size:
     total length of roads (km), number of lanes by each road
   - Level of development:
     density of road network (km/km2)
   - Type:
     motorway, major arterial road, arterial road.

2) Public Transport Network
   - Location:
     starting and ending place, and its rough route
   - Size:
     total length of routes (km)
   - Level of development:
     density of public transport network (km/km2)
   - Level of services:
     operational headway/ frequency, fare

### 4.4.2 Procedure

Figure 4.8 illustrates a standard procedure for network planning. This is a general flow of steps to formulate transport network plan by arranging the procedure in the flow depending on situation and characteristics of the target area. On the practical side, the cost and work time for the planning may increase according to the number of alternatives and their intricacy, and it is desirable to determine the formulation procedure with considering those factors.

**Figure 4.8 General Procedure for Network Planning**




Source: JICA Expert Team

1) Establishment of Future Socioeconomic Framework

In this step, the socioeconomic framework in the future target year is established based on the future city vision and land use. For the establishment of socioeconomic frame-work, macro indicators such as the total number of population in the study area are first estimated and then it is distributed into each TAZ. If GIS software is available, it must be helpful to enable to establish a more detailed figure for the framework. These indicators are inputs to the models to forecast future transportation demand by TAZ.

The following indicators are examples of the socioeconomic framework for demand forecasting.

- Population, number of households
- Number of workers at resident place by sector, number of employees at working place by sector
- Number of pupils and students at resident place, number of pupils and students at school place

When alternatives for a city vision and land use are established, and network alternatives are prepared for each land use alternative, the socioeconomic framework should be established for each land use an alternative.

2) Set up of Network Alternatives

When setting up network alternatives, various factors should be considered. The most important factor is how to share private and public transport demand on each network. There are several public transports means, and it is essential to consider how to make a linkage of the services of those means, which is another factor for the establishment of alternatives. The level of services should be considered. If the level of service of the network is high, the users' satisfaction increases but the cost for the plan also increases. Contrarily, the users' satisfaction becomes low if the level of service of the network is low. Besides, the location of terminals such as bus terminal and railway station might be a factor for the establishment of alternatives. Network alternatives are established with considering these factors in many cases. Table 4.7 shows an example of ideas for network alternative establishment.

**Table 4.7 Example of Network Alternatives**

| | | Transport Mode | | |
|---|---|---|---|---|
| | | Road network Only | Railway + Bus (Railway Priority) | BRT + Bus (BRT Priority) |
| Level of Services | High | ・Motorway network<br>・Major arterial road and arterial road network development<br>・District road<br>・Raking facilities in CBD | ・Arterial road development<br>・District road<br>・Express and ordinary railway network development | ・Arterial road network development<br>・District road<br>・BRT network development<br>・Re-routing plan of bus network system |
| | Low | ・Major arterial road network development<br>・District road | ・Arterial road network development<br>・District road<br>・Ordinary railway corridor development | ・Arterial road network development<br>・District road<br>・BRT corridor development<br>・Bus network development |

Source: JICA Expert Team

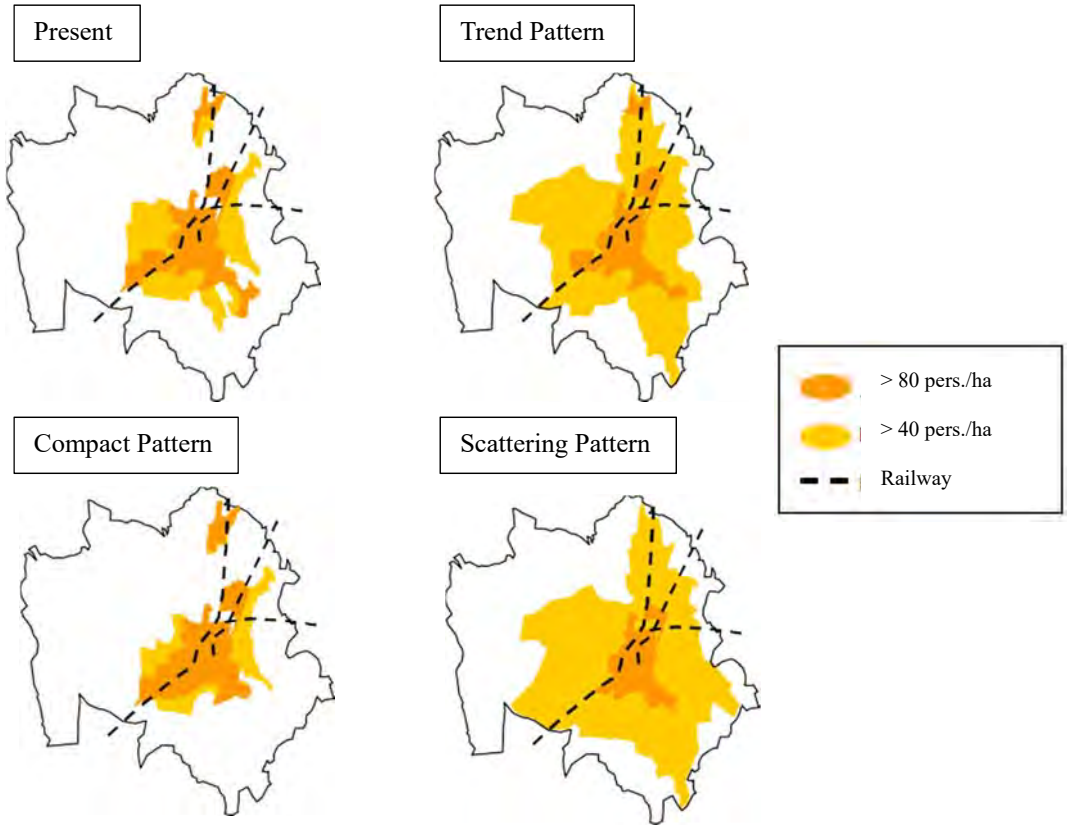
3) Development of Network Data

Transport demand forecasting is carried by including the socioeconomic indicators established in the previous step into forecasting models to assess the network alternatives regarding transport demand. Network data representing the idea of alternatives are required for transport demand forecasting. The network data mainly composes of two different types: road network data and public transport data. The following information should be prepared in each network data for the estimates.

- Road network data
  Length of each link (road section)
  Capacity (or number of lanes, width of carriageway, etc.)
  Travel speed
  One-way/two-way
  Toll by type of vehicle

- Public transport network
  Route, location of starting point and terminals
  Location of railway stations and bus stops
  Distance between stations
  Frequency/headway
  Size of wagons/passenger capacity
  Fare

**Figure 4.9 Example of Alternative Scenarios**




Source: Guideline of Comprehensive Study for Urban Transport System, MLIT and IBS Japan, 2007

4) Transport Demand Forecasting and Calculation of Assessment Indicators

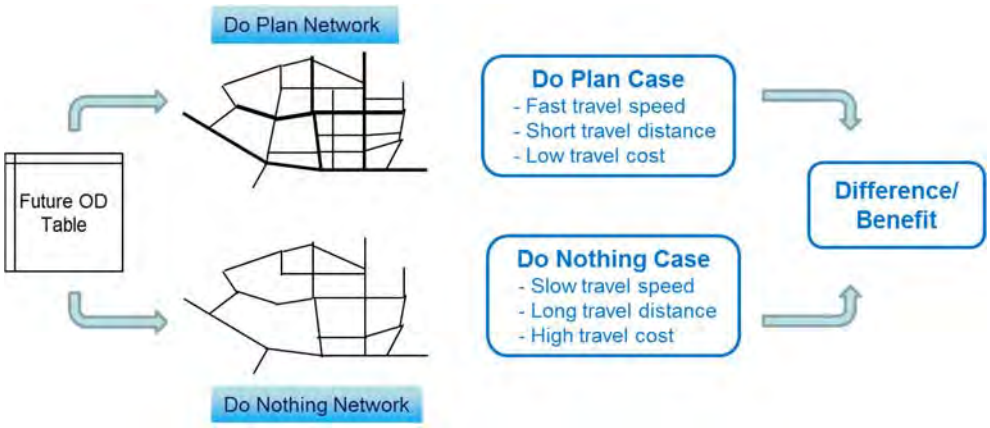
The transportation characteristic, and impact of each alternative network plan are analyzed to most selected priority alternative. Indicators for quantitative assessment of alternative plans can be obtained in transportation demand forecasting. For transport demand forecasting, the travel demand that can be called as an OD table is first forecasted by inputting the socioeconomic framework established in step 1) into the forecasting models. Second, the OD tables estimated in the first step are distributed on the network of each alternative developed in step 3) and indicators representing traffic situation and network performance are calculated for assessment of the alternatives.

If traffic demand forecasting could show how much the problems/issues would be improved in alternative plans by using quantitative indicators, this would be explainable, and it is easy to select priority alternative. For this context, an ideal case on a combination of future travel demand and an existing network is often calculated, and the result of this case is compared with the result of a combination

of future travel demand and alternative network so that the difference can show how much the problem is alleviated. This hypothetical case is called as "Do Nothing" case, while the case of alternatives is called as "Do Something" case.

The benefit of travelers on each alternative network can be measured based on the impact that is calculated by comparison of these two cases, and cost-benefit analysis can be done if the cost of construction of the alternative network is obtained. The benefit of travelers using the alternative network is calculated by subtracting the total travel cost of "Do Nothing" case from those of "Do Something" case. The total travel cost consists of two factors: total travel time multiplied with travel time cost unit of travelers, and total travel distance multiplied with travel distance unit of each mode of travel.

**Figure 4.10 Image on Impact Assessment of Alternatives**




Source: JICA Expert Team

5) Assessment of Alternatives and Selection of Priority Plan

After calculation of assessment indicators based on the results of transport demand forecasting, alternative priority plan is selected by assessing indicators calculated with the forecasted demand. The indicators that can be calculated based on the transport demand forecasting is summarized as follows:

- Traffic Volume
  - Trip generation/attraction by purpose and TAZ
  - Trip generation/attraction by mode of travel and TAZ
  - Traffic volume of each road section
  - Volume capacity ratio of each road section
  - Average travel speed of each road section
  - Heavy vehicle ratio if type of vehicle makes OD table

- Network Performance Indicators

  - Total travel cost (total travel distance, total travel time)
  - Average volume capacity ratio in the whole network
  - Average travel speed in the whole network
  - Economic indicators such as NPV, CBR, EIRR, etc.
  - Environmental indicators for NOx, CO2, etc.

All of these indicators are quantitative information. It is advisable to include also qualitative information of each alternative plans to select priority plan. Detail of indicators for alternative assessment is described in tables in A.5. Intelligible materials for discussion with related organization and explanation to the citizens should be prepared using indicators.

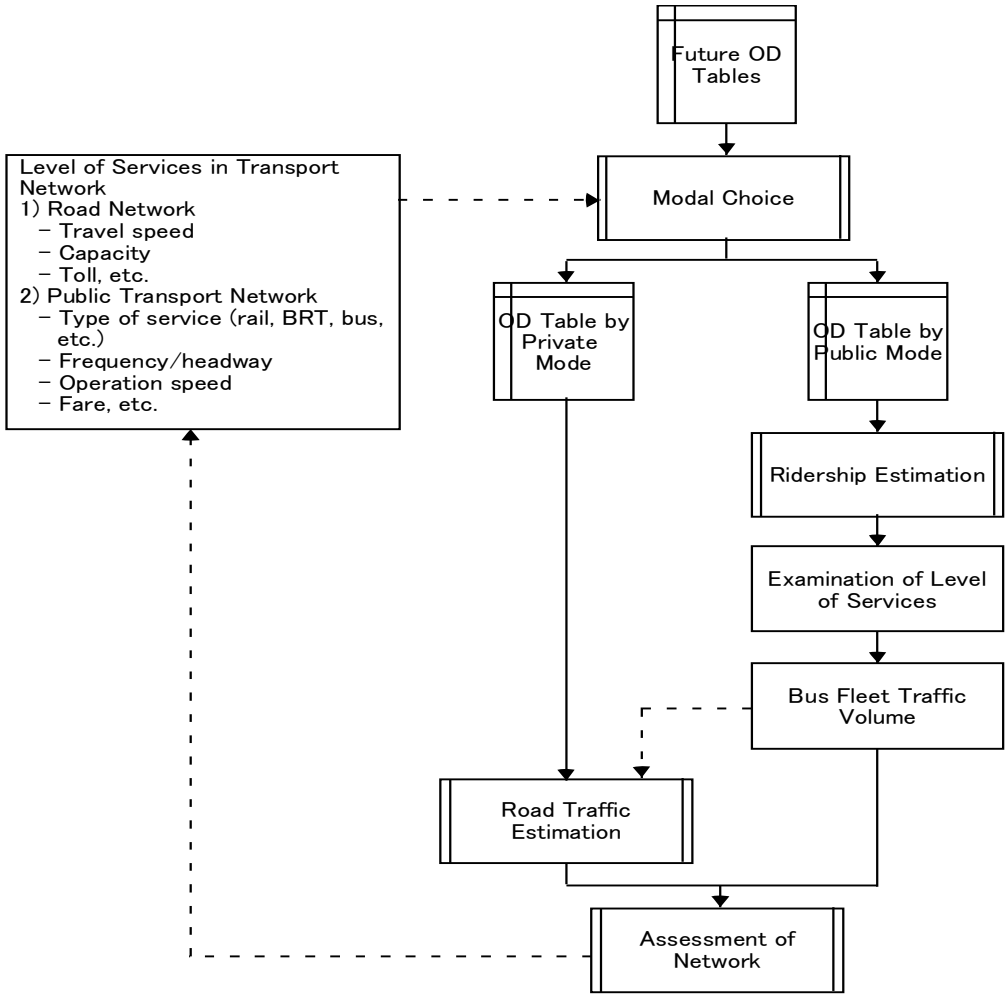
### 4.4.3 Examination of Public Transport Network

The role of the public transport network is substantial in transport network planning because its impact to improve transport problems is big, and the cost of development is high. However, there is no authorized methodology of ridership estimation and public transport network planning, which can be applied in a wide range of public transport plans, and several methodologies have been studied for each plan with considering their type and characteristic. This may be caused of intricacy of modal choice:

a) modal choice depends on the level of service on each network, b) contrary, travel demand is one of the factors to decide the level of service of each network, c) difference methodology is applied to find route selection of each network, d) route selection can be done with several factors such as travel time, waiting time, fare, and convenience of fleet.

Therefore, a practically simple methodology is presented here as shown in the following figure.

**Figure 4.11 Procedure of Public Transport Network Planning**




Source: JICA Expert Team

1) Modal Choice

In the procedure, future travel demand, which is formed in an OD table, is first divided into two OD tables of private and public transport mode. A modal choice model that calculates the probability of mode choice based on the utility of each network is often used for this calculation. Parameters of this model can be estimated using results and preference of mode choice of citizens surveyed by HIS.

Tendency and preference of modal choice may depend on individual attributes and accessibility of areas they start and finish traveling. For instance, if travelers have motorbike or car, the probability of public mode choice is lower than that of those who have no motorbike or car. For that reason, the modal choice model is frequently built by household, or individual attribute and this model can provide an answer to

how many private mode users will shift to public mode according to the development of public transport mode.

2) Ridership Estimation

The number of public transport passengers can be estimated by route with distributing the OD table of public mode user trips on the public transport network. If there are several routes from starting and finishing points of traveling, parameters combined with indicators such as distance to station, waiting time, travel time, transfer time, and fare are calculated, and the probability of choice of each route is estimated with the model discussed in the previous section, and a Logit type formula is applied for this model in many cases.

**Figure 4.12 Example of Alternative Route and Factors of Public Transport Mode**

Source: JICA Expert Team

3) Road Traffic Estimation

There are two types of methodology for estimation of traffic volume on road network which is: potential assignment and simulated assignment. The potential assignment is also called as "All or Nothing" and distributes all trips of OD table once on the minimum path in the road network on which there is no capacity restriction. As a result of this calculation, the potential of transport demand on the network can be seen.

On the other hand, the simulated assignment is a method to reproduce traffic situation very similar to the real situation and "Incremental Assignment" using QV equation which describes the relationship between traffic volume and travel speed of each road section, and "Equilibrium Assignment" is famous methodologies. Especially, user equilibrium assignment can simulate travel time between two

points in the network with a particular level of accuracy. Therefore, network alternative plans can be assessed by using travel time-related indicators.

If there is a congested road section or bottleneck of capacity in the network, travelers by private mode can avoid the congestion or bottlenecks and select a shorter path in the calculation. On the other hand, the routes of public transport mode cannot usually be changed according to the congestion even though there is a congested road section, and public mode users are not able to avoid the congested road section. Consequently, traffic volume on the road network is sometimes calculated on the pre-loaded traffic volume that is calculated based on public transport ridership by route.

## 4.5 Step 5: Transport Development Strategy Formulation

The target year of the transportation plan developed in a transportation master plan study and others is about 20 years or later from now. It is vital that what transportation measures and actions shall be implemented by the target year to realize the transportation plan at the target year, and a package of measures and actions in short-term and mid-term is called "Transport Development Strategy" plan or "Action" plan in short.

A transport development strategy is recommended to have the following items.

- Planning Framework
  Target Year: 5 years later (short-term), ten years later (mid-term)
  Target Area and Issue: transportation issues in each area (city, CBD, district, etc.)
- Numerical Target
- Package of Measures and Actions to reach the target
- Strategies for Realization
  Implementation body
  Sequence of actions (program)
- Management System for Implementation of Plan
  PDCA
  Information sharing with related organization and citizens

### 4.5.1 Planning Framework

For the planning framework, it is necessary to show two factors clearly: target years, and target field and issues. Target years are often set up as 5 years later for short-term and 10 years later for mid-term. It is necessary to establish numerical target at

each target year to review of the achievement and reconsider the strategy plan at the target years.

On the other hand, it is desirable that target area shall be defined by specifying the problem influencing areas such as metropolitan, city, and particular district. If the target area is specified, it is easy to specify stakeholders for sharing information and plans and make a strategic plan.

### 4.5.2 Numerical Target and Package of Measures and Actions

Numerical target included in the transport strategy plan should be established with considering the long-term target set up in the transportation master plan. The numerical target may be desirable to employ clear outcome indicators of the projects at short-term and mid-term target years.

**Table 4.8 Example of Numerical Target and Measures**

| Goal | Numerical Target | Example of Measures |
|---|---|---|
| Revitalization of Central Area | To increase the number of pedestrians and visitors by 10% in the central area | ・Improvement of level of public transport services (new railway station, extension of bus and tram route, upgrading of rolling stocks and vehicles, etc.)<br>・Introduction of radial road network to access to CBD<br>・Improvement of bottleneck intersections<br>・Development of pedestrian space (pedestrian streets, transit mall, etc.)<br>・Parking regulation in CBD (fringe parking, parking information and guidance system, enforcement regulation, etc.)<br>・Encouragement of residing in central area |
| Increase of mobility for aged and disabled people | Residence reachable to CBD within 30 minutes by public transport | ・Development of public transportation facility and space (carriageway, etc.)<br>・Improvement of public transport services (new railway station, extension of bus and tram route, upgrading of rolling stocks and vehicles, etc.)<br>・Introduction of public transport priority lane and road (transit mall, PTPS, bus-exclusive lanes, etc.) |
| Improvement of accessibility to public transport | Increase 20% of shares of areas where you can get to the nearest railway station in 15 minutes | ・Construction of new railway station<br>・Development of station plaza<br>・Improvement of feeder bus services from railway stations (introduction new bus route and bus stops, increase of bus frequency, etc.) |

| | | |
|---|---|---|
| | | ・Introduction of bus priority measure for feeder buses (transit mall, PTPS, bus-exclusive lanes, etc.)<br>・Urban development based on public transport corridor (promotion of land development, redevelopment project, etc.) |
| Mitigation of Environmental Burden | 8% reduction of CO2 emission in the city | ・Improvement of public transport services (construction of new stations, extension of bus and tram route, upgrading of rolling stocks and vehicles, etc.)<br>・Development of radial and ring road for smooth traffic flow<br>・Implementation of TDM measures (staggered commuting, park and ride, mobility management, etc.)<br>・Development of urban structure emphasizing public transport services (promotion area for residing, urban development, redevelopment project, arrangement of urban functions, etc.)<br>・Promotion of LEV (low-emission vehicle) |

Source: Training on Comprehensive Urban Transport Planning, The Institute of Behavioral Sciences, 2006

## 4.6 Step 6: Plan Implementation

To actualize and realize plans and measures proposed in a transportation plan, it is necessary to tackle with various actions continuously. The various actions are studies for detailed planning, social experiment toward implementation, and clarification of the position of the plan in superior plans.

### (1) Studies for Detailed Planning

Network plans in a transport master plan study usually aim to propose policies for the development of network and strategies of measures, and the consensus to implement the plans is reached with these policies. For more actions to go forward, the following examples of activities should be taken.

(i) Examples of detailed planning

- Reviewing of urban planning road
- Profitability and feasibility studies for railway transport route
- Detailed planning of railway-related facilities
- Traffic management plan for major areas such as CBD, urban center, etc.
- Re-routing plan of bus network

(ii) Actions for realization of plans

- Establishment of urban transport strategy council
- Plan and implementation of social experiment
- Promotion and campaign of strengthening public transport to citizens

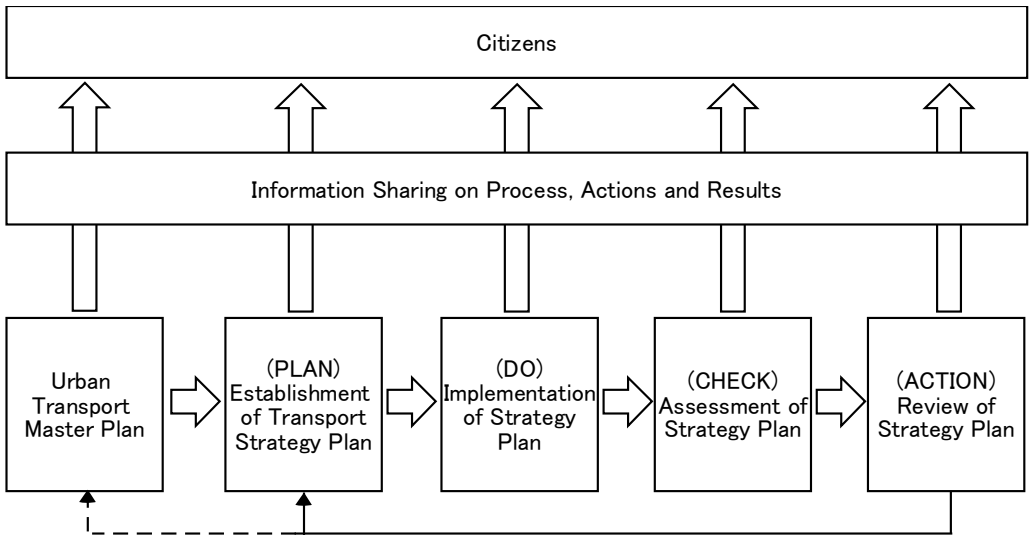
**(2) Positioning of Plans and Regulation**

For the realization of transport plans the wide-range cooperation from stakeholders such as transport-related organization, project operators, and citizens. It is desirable to clarify the position of the plans in superior plans and associate with other transport plans and to prepare regulation and legal framework to ensure the cooperation of the stakeholders.

## 4.7 Step 7: Plan Monitoring

It is necessary for the efficient and effective achievement of the strategic plan to establish management system enabling to carry out the steps in PDCA circle uninterruptedly. The management system should involve not only governmental organization and operators but citizens. The discussion process and the results of each step in PDCA should also be shared with all stakeholders and citizens.

**Figure 4.13 PDCA for Strategic Plan Implementation**




Source: JICA Expert Team

# 5. APPENDIX

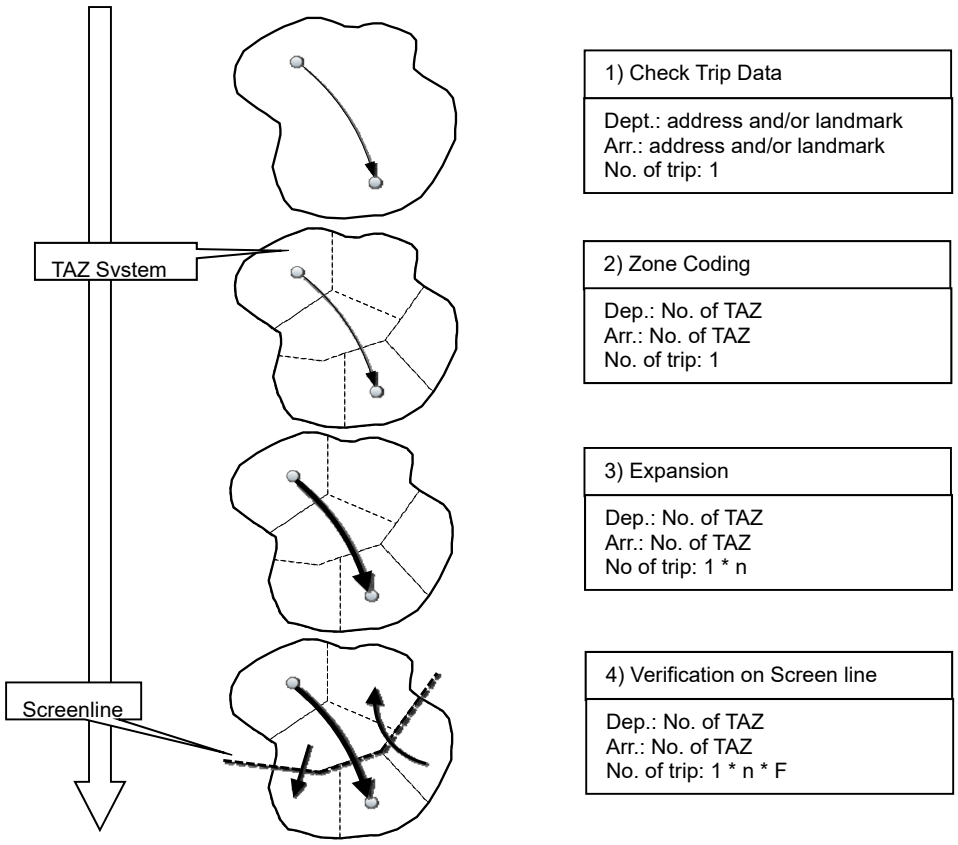
## 5.1 Development of Existing OD Matrix

Practical methodology to develop an OD table that is basic and vital information to represent present travel demand is described in this section. This present OD table is also the base for the development of forecasting models of future transportation demand.

The development procedure of present OD table is composed of four major steps as shown in the following figure. The first step is to check trip data obtained with the OD survey, correct errors and create a database by compiling valid data. The trip data includes departure and arrival place specified with address and name of landmarks. Then, the description of address and/or the name of landmarks will be translated into numbers that represent TAZ. This is the second step, which is called 'Zone Coding.'

The OD survey is an interview survey with the selected sample households and individuals so that the sample data must be expanded by putting weight factor of population sample ratio to each sample to represent the population trips in the third step. Weight factor can be determined by analysing the population sample ratio with a comparison to the number of samples and statistic such as population and the number of households by TAZ. The last step is to verify the result of procedures mentioned above by comparing the number of trips calculated from the OD table with the traffic counts observed on the screen line. If there is a big difference between those, the number of trips in the OD tables will be adjusted. The OD table composes of the number of individual trips, and the results of traffic count on the screen line are vehicle trip-base. Therefore, an average number of passengers by type of vehicle is necessary to compare two figures, and this should be surveyed at the same time OD survey is conducted.

**Figure 5.1 Methodology of Present OD Table Development**




Source: JICA Expert Team

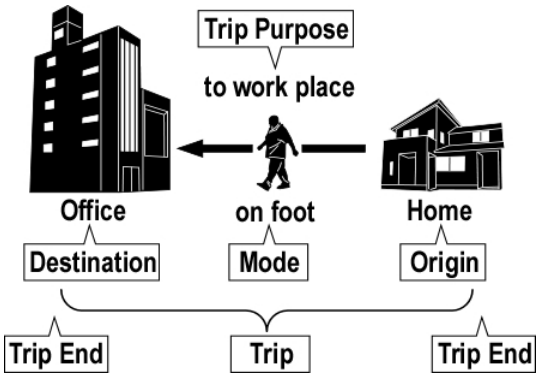
## 5.2 Demand Forecast

### 5.2.1 Demand Forecast Model

#### (1) Concept of Trip and OD Matrix

Four steps demand forecast model be based on the concept of "trip." Trip means a movement of people from certain place to another place with a purpose. Trip consists of two trip ends, namely, origin and destination. The trip has characteristics such as transport mode and trip purpose.

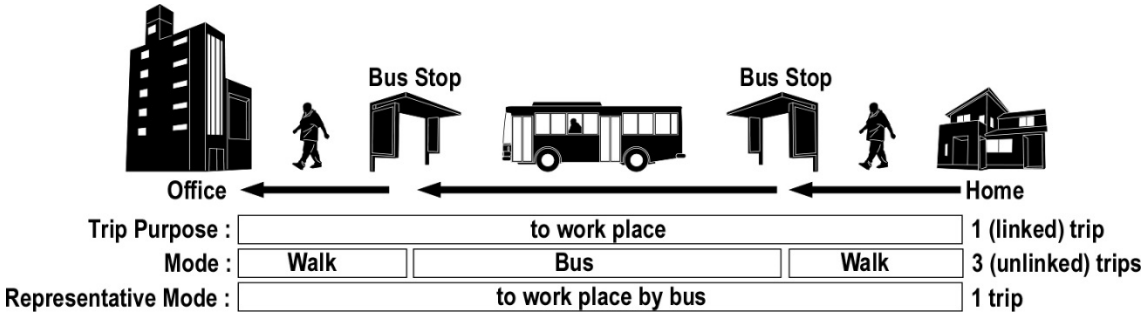
**Figure 5.2 Image of Trip**




Source: JICA Expert Team

In general, the trip is summarized by trip purpose due to building demand forecast model. A trip by trip purpose often consists of several transport modes from origin to destination of the trip, and it is representing a representative transport mode. A trip by representative transport mode is called "linked trip" because origin and destination are linked, and a trip by each transport mode is called "unlinked trip." For the transport modeling and future traffic demand forecast of current four steps demand forecast model be basically based on the "linked" trip by trip purpose and representative mode.

**Figure 5.3 Image of Linked and Unlinked Trip**

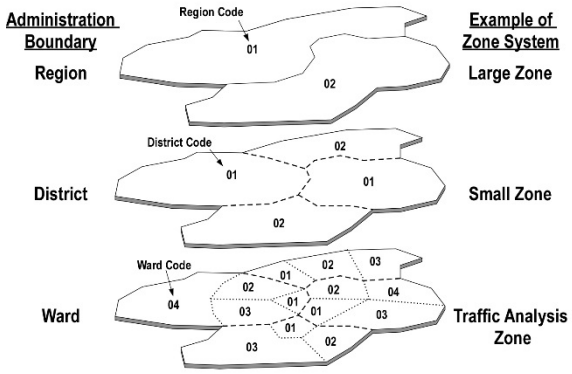



Source: JICA Expert Team

The study area is divided into "zone" in order to make efficient data collection and analysis, and geographical location such as address and the trip origin and destination are usually assigned "zone" code. A table includes actual geographical location and "zone" code is called code table, and work for the building of zone system is called "zoning." The "zone" system should i) be matched with administration boundaries or census zone to obtain zonal attributes such as

population, ii) be hierarchy called "zone system" which includes several zone systems by geographical size in order to correspond to various analysis and transport planning, iii) be able to compare with existing zone system prepared by previous study or survey.

**Figure 5.4 Concept of Zoning System**



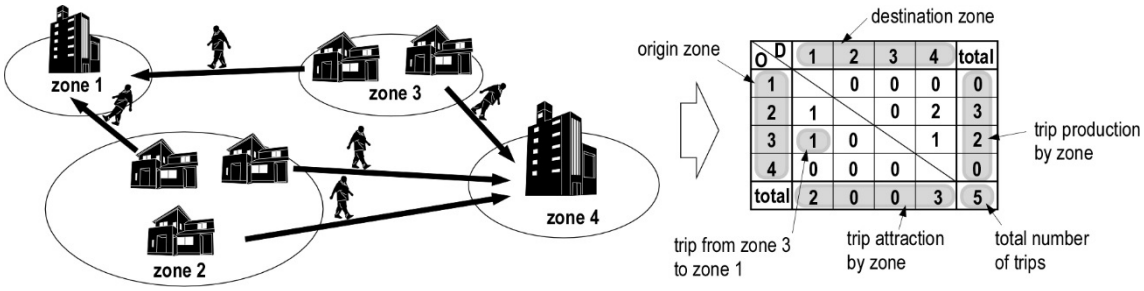

| Region Code | District Code | Ward Code | Admin Code | Large Zone Code | Small Zone Code | TAZ Code |
|---|---|---|---|---|---|---|
| 01 | 01 | 01 | 010101 | 01 | 01 | 01 |
| 01 | 01 | 02 | 010102 | 01 | 01 | 02 |
| 01 | 01 | 03 | 010103 | 01 | 01 | 03 |
| 01 | 01 | 04 | 010104 | 01 | 01 | 04 |
| 01 | 02 | 01 | 010201 | 01 | 02 | 05 |
| 01 | 02 | 02 | 010202 | 01 | 02 | 06 |
| 01 | 02 | 03 | 010203 | 01 | 02 | 07 |
| 02 | 01 | 01 | 020101 | 02 | 03 | 08 |
| 02 | 01 | 02 | 020102 | 02 | 03 | 09 |
| 02 | 01 | 03 | 020103 | 02 | 03 | 10 |
| 02 | 01 | 04 | 020104 | 02 | 03 | 11 |
| 02 | 02 | 01 | 020201 | 02 | 04 | 12 |
| 02 | 02 | 02 | 020202 | 02 | 04 | 13 |
| 02 | 02 | 03 | 020203 | 02 | 04 | 14 |

Administration Code should be unique and zone code should be sequential.

Source: JICA Expert Team

OD matrix is a matrix table which has an origin in column, and destination in a row. Trip generation consists of "trip production" and "trip attraction." The total trip by origin is "trip production" and a total trip by destination is "trip attraction."

**Figure 5.5 Concept of OD Table**

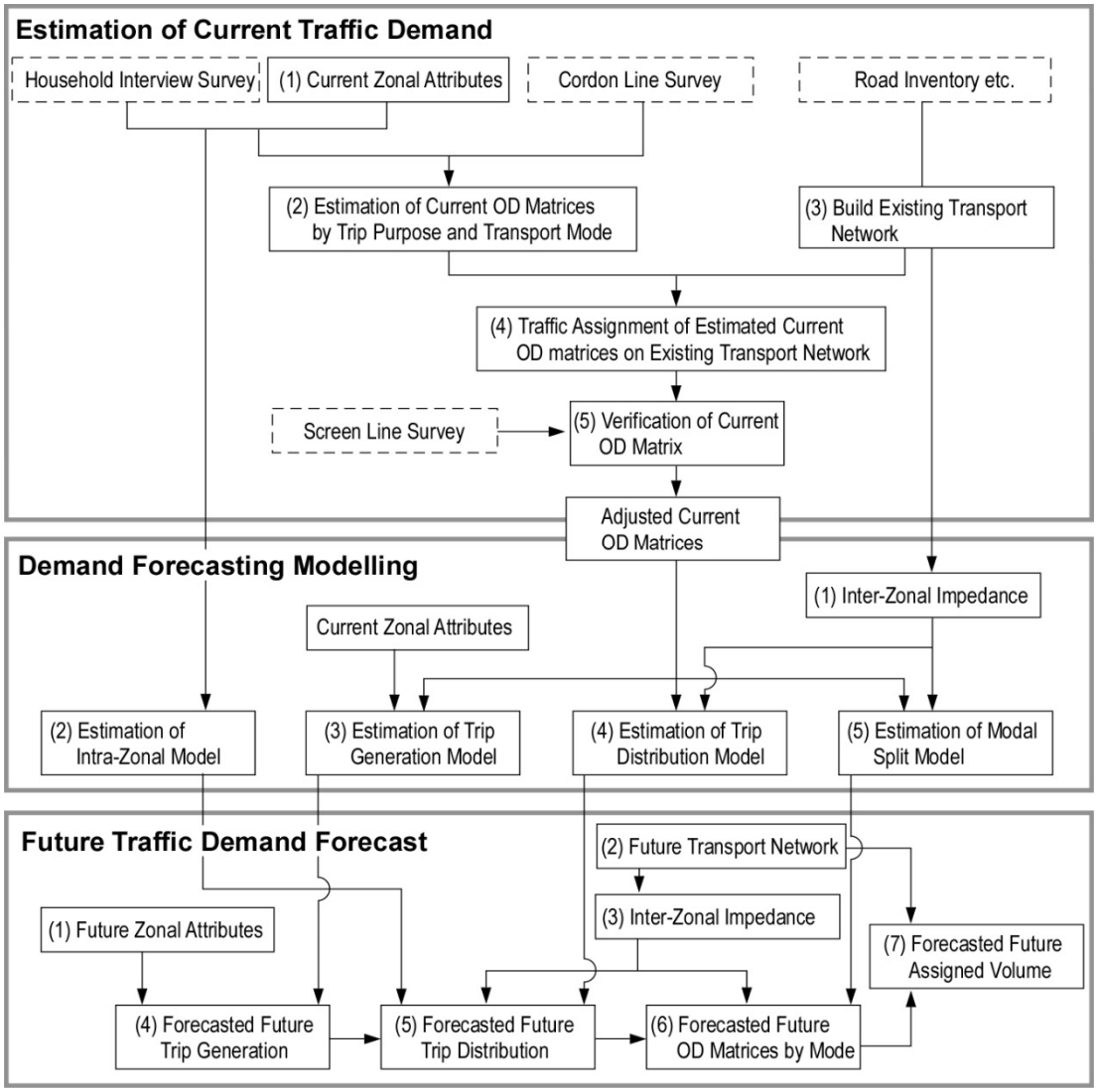



Source: JICA Expert Team

### (2) Four Steps Demand Forecast Procedure

Traffic demand forecast by four steps forecast mode consists of three stages, namely, i) estimation of current traffic demand, ii) demand forecasting model building, and iii) future traffic demand forecasting

**Figure 5.6 Four Steps Traffic Demand Forecast Procedure**




Source: JICA Expert Team

### 5.2.2 Estimation of Current Traffic Demand

#### (1) Current Zonal Attributes

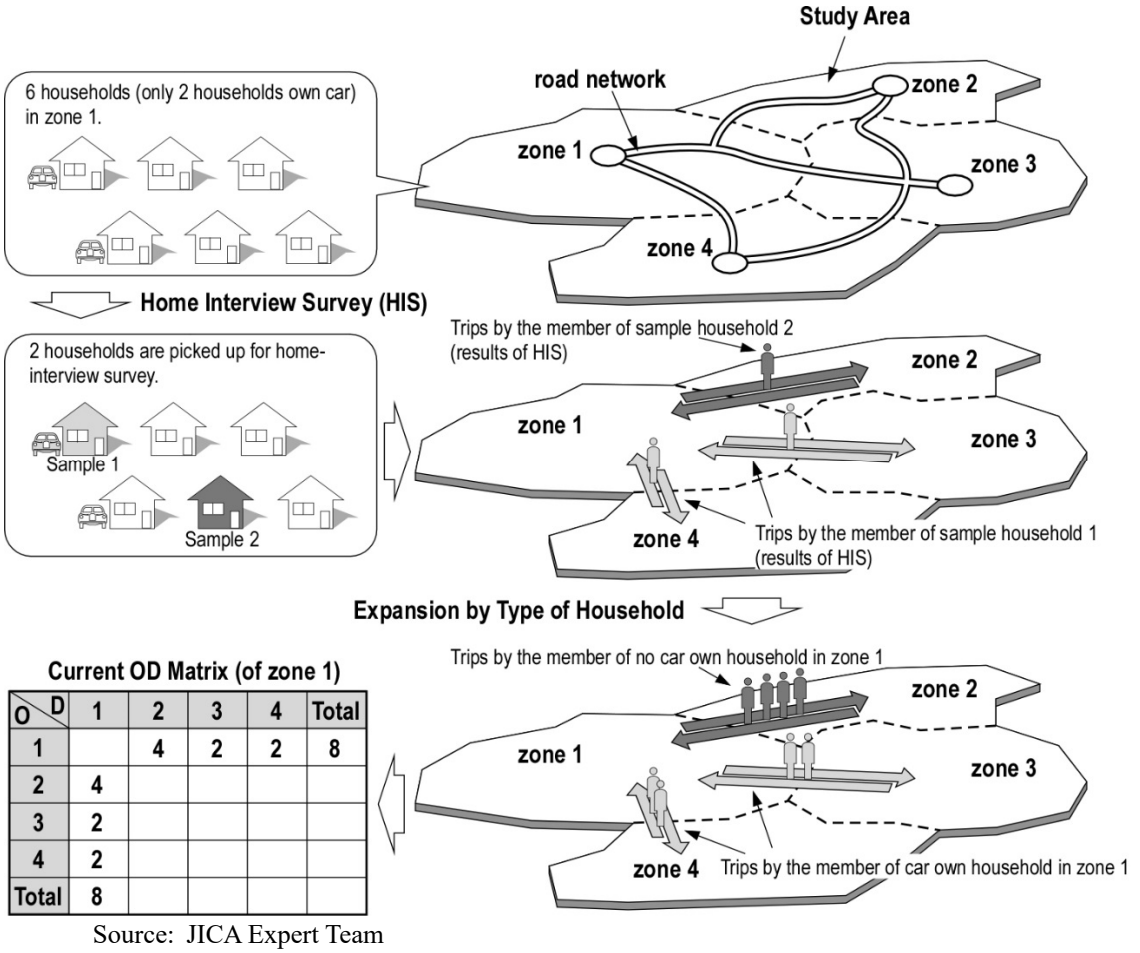
Based on the existing statistics and relevant data, zonal attribute data should be collected for i) preparation of population and expansion factor for the results of person trip survey, and ii) preparation of explanatory variable in the traffic demand forecasting model. Zonal attributes should be prepared by each Traffic Analysis Zone (TAZ) which is the geographic unit for the traffic demand forecast. Future zonal attributes for the forecasting of future traffic demand forecast also prepared by TAZ, therefore, the zonal attribute should be a likely factor and total of an attribute by TAZ should be consistent with control total of the attribute.

### (2) Estimation of Current OD Matrices

I estimate preliminary current OD matrices) expansion of person trip survey by zonal attributes, ii) combination or replacement with an external trip by the results of cordon line survey.

Current OD matrices of internal of Study Area is estimated by the expansion of sampled person trip information collected by home interview survey to the population of each zone. Concerning expansion factor, a method of expansion should be considered in the planning of home interview survey to achieve proper sample ratio.

**Figure 5.7 Image of Expansion of Household Interview Survey Results**




**Current OD Matrix (of zone 1)**

| O \ D | 1 | 2 | 3 | 4 | Total |
|---|---|---|---|---|---|
| 1 | | 4 | 2 | 2 | 8 |
| 2 | 4 | | | | |
| 3 | 2 | | | | |
| 4 | 2 | | | | |
| Total | 8 | | | | |

Source: JICA Expert Team

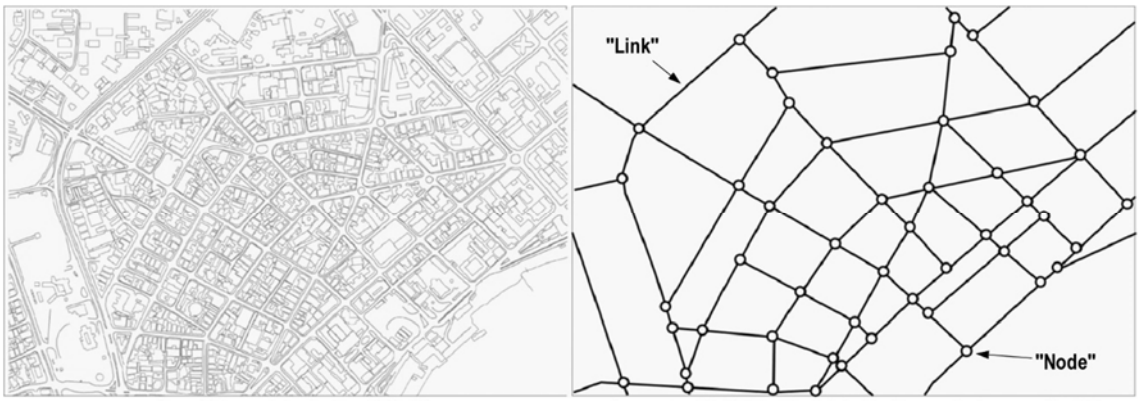
### (3) Build Existing Transport Network

Based on the road network and inventory data, road network for the static demand forecast model should be built. In the static traffic demand forecast model such as STRADA, network consists of "node" and "link." "Node" and "link" are a computer model of "intersection" and "un-intersection" of real-world respectively. "Node"

has coordinates data due to visualize network on the computer. "Link" has attributes due to calculating travel speed by traffic flow, based on the road inventory and other condition.

Concerning public transport such as railway and regular bus, line (by the series of "links" or "nodes") and capacity also required. The capacity of public transport is decided by the capacity of each vehicle and frequency.

**Figure 5.8 Example of Road Network in Static Demand Forecasting Model**




Source: JICA Expert Team

All "Links" in the network model has attributes such as link length, maximum speed, and road capacity, etc. Free flow speed and road capacity depend on actual road inventory such as a number of lanes, surface condition, and road class. For the network building, systematic Q-V code table should be prepared.

**(4) Traffic Assignment of Current OD Matrices**

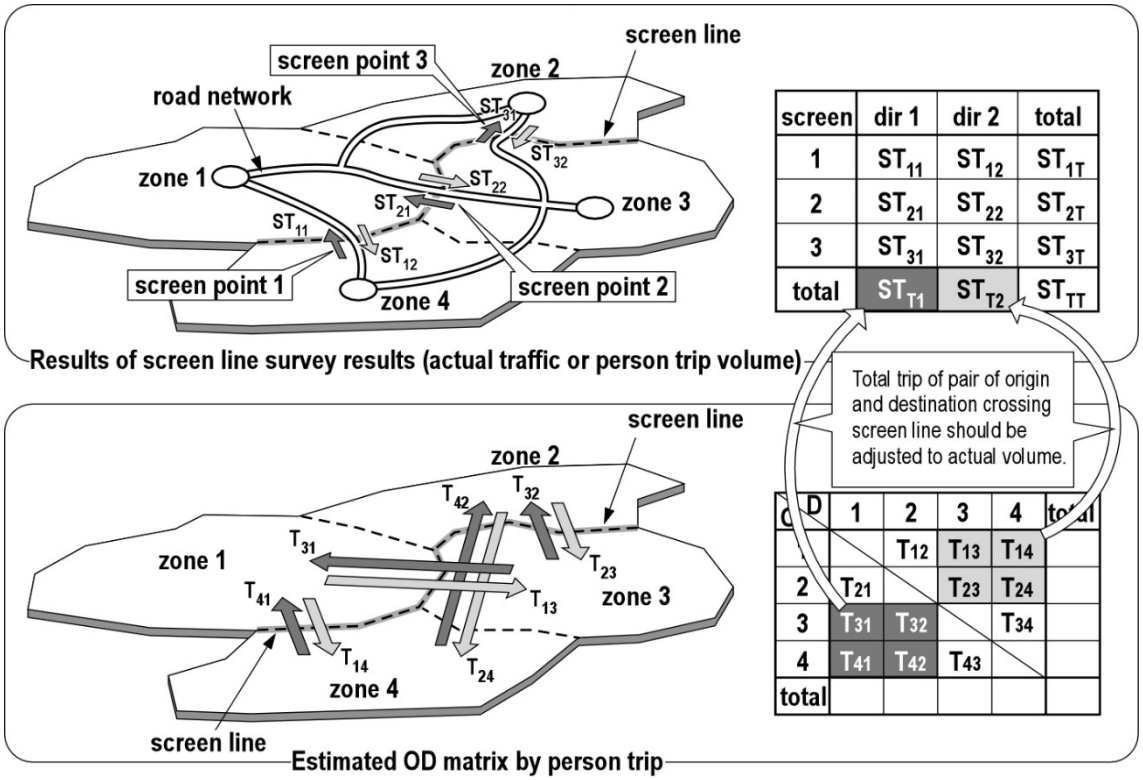
Estimated current OD matrices should be assigned on the existing transport network by static demand forecast model to verify the reproducibility of estimated OD matrices.

Assigned traffic volume at all links to be consistent with actual screen line point should be extracted to compare with actual traffic volume by screen line survey.

**(5) Verification of Current OD Matrices**

Verification of estimated current OD matrices is based on a comparison between actual screen line traffic volume and the results of traffic assignment. If differences between actual traffic volume at screen line and assigned traffic volume are significant, adjustment factor calculated by actual and estimated traffic volume should be applied to traffic demand of OD pair crossing screen line.

**Figure 5.9 Image of OD Table Calibration by Screen Line Survey Results**




| screen | dir 1 | dir 2 | total |
|---|---|---|---|
| 1 | $ST_{11}$ | $ST_{12}$ | $ST_{1T}$ |
| 2 | $ST_{21}$ | $ST_{22}$ | $ST_{2T}$ |
| 3 | $ST_{31}$ | $ST_{32}$ | $ST_{3T}$ |
| total | $ST_{T1}$ | $ST_{T2}$ | $ST_{TT}$ |

| O \ D | 1 | 2 | 3 | 4 | total |
|---|---|---|---|---|---|
| 1 | | $T_{12}$ | $T_{13}$ | $T_{14}$ | |
| 2 | $T_{21}$ | | $T_{23}$ | $T_{24}$ | |
| 3 | $T_{31}$ | $T_{32}$ | | $T_{34}$ | |
| 4 | $T_{41}$ | $T_{42}$ | $T_{43}$ | | |
| total | | | | | |

Source: JICA Expert Team

### 5.2.3 Forecasting Model Development

#### (1) Inter-Zonal Impedance

Inter-zonal impedance includes distance, travel time and travel cost by each pair of origin and destination zones. The shortest route searching or analysis is estimated by transport network for person trip survey. Inter-zonal impedance is typically calculated by a pair of origin and destination.

#### (2) Estimation of Intra-Zonal Model

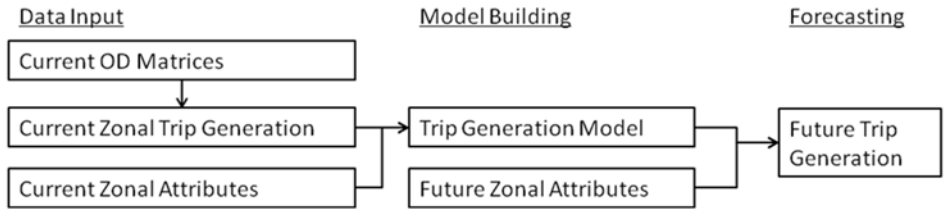
Intra-zonal trip means both of origin and destination are the same zone. Trip distribution model by gravity model can forecast intra-zonal trip at the same time with the inter-zonal trip if zonal impedance for the intra-zonal trip is defined appropriately. However, i) intra-zonal trip length is unreliable because it depends on the size and shape of each zone and distribution of a sample of the home-interview survey, ii) non-motorized trip dominates intra-zonal trip because of the short trip. Therefore, the intra-zonal trip has different characteristics from an inter-zonal trip using another transport mode.

Intra-zonal tripis often separately calculated from inter-zonal trip. Forecasted trip generation by model includes an intra-zonal trip. Therefore, control total of inter-zonal trip estimated by trip distribution model should exclude intra-zonal trip.

**(3) Estimation of Trip Generation Model**

Trip generation model consists of trip production model and trip attraction model is the first step in the conventional four-step model of traffic demand forecasting. The outputs of trip generation analysis serve as input to the second step of the four-step process, trip distribution model. Trip generation models is the number of trip origins and destinations associated with a given set of activities for a zone.

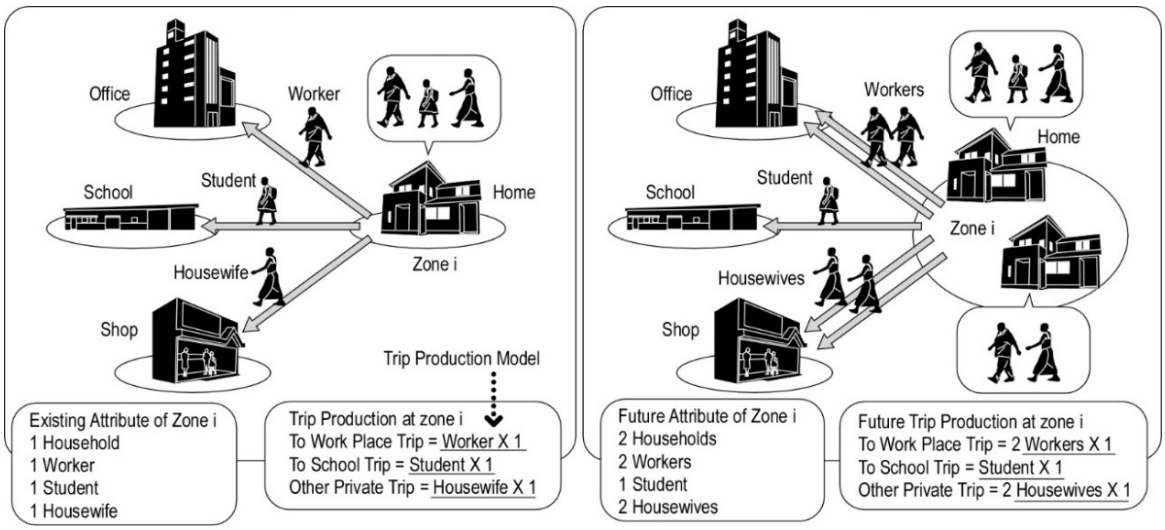
**Figure 5.10 Glow of Trip Generation Forecasting**




Source: JICA Expert Team

Trip generation model is estimated by multiple regression analysis based on the existing trip production and attraction and zonal attributes in general.

**Figure 5.11 Trip generation and Zonal Attributes**



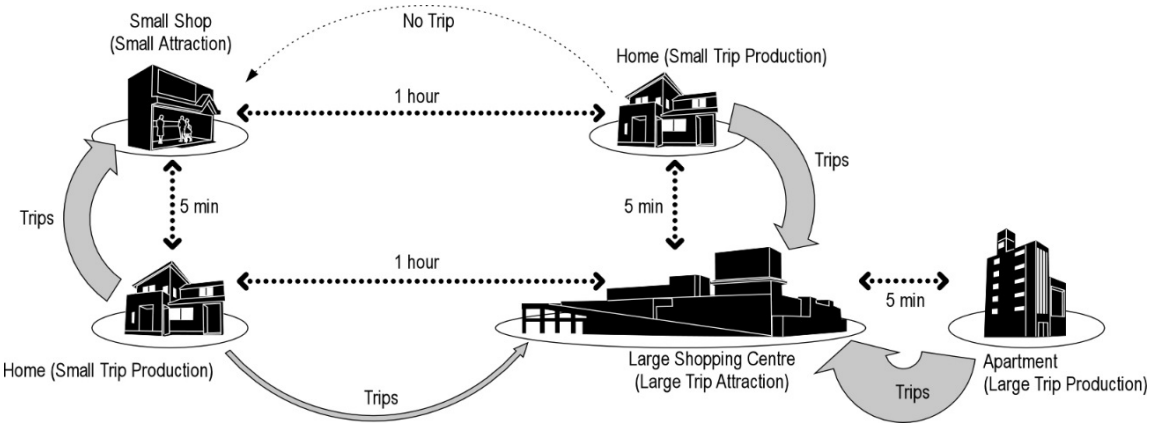

Source: JICA Expert Team

### (4) Estimation of Trip Distribution Model

Trip distribution model determines the number of trips between each pair of zones. The outputs of trip distribution model is OD matrix tables with each cell containing the number of trips between a pair of zones. For the forecasting of future trip distribution, present pattern method and gravity model are used. Present pattern method is the method for the forecasting future trip distribution based on the current OD matrix and future trip generation without a model building. As the trip distribution model building, gravity model is explained below.

The number of inter-zonal trips is affected by the trip attraction of destination zone, trip production of origin zone and distance between origin and destination in general.

**Figure 5.12 Concept of Gravity Model**




Source: JICA Expert Team

The gravity model is a spatial model explaining such strength of the relationship between two locations based on the law of gravitation as follows.

$$T_{ij} = \frac{P_i \cdot A_j}{D_{ij}}$$

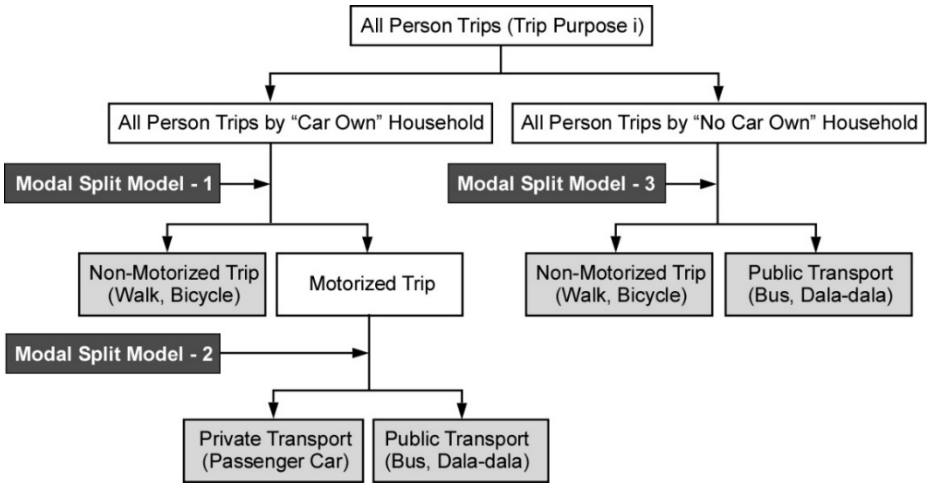
Where, Tij: Trip distribution (number of trips),
Pi: Trip production at origin zone i,
Aj: Trip attraction at destination zone j, and
Dij: Inter-zonal impedance such as distance or travel time between zone i and j

**(5) Estimation of Modal Split Model**

Modal Split model estimates travelers' choices of transportation modes for their trips, given trip's purpose, distance, travel time and cost between origin and destination.

For the estimation of modal split model, at first i) shares of transport mode for modal split model are calculated by each pair of origin and destination and trip purpose by the expanded and adjusted person trip OD matrices based on the person trip survey, ii) inter-zonal impedance such as distance, travel time and cost of each transport mode are prepared by each pair of origin and destination based on the results of person trip survey or transport network in the computer model, and iii) suitable model and parameters in the model are estimated by the share of transport model to be estimated and inter-zonal impedance of each pair of origin and destination by regression analysis.

**Figure 5.13 Binary Choice Modal Split Model**




Source: JICA Expert Team

### 5.2.4 Future Traffic Demand Forecast

**(1) Future Zonal Attributes**

For the forecasting of future trip generation, future zonal attributes used in the trip generation model are required. Total of each future zonal attributes are forecasted by future framework, and share of each zone are forecasted taking account of existing share of the attribute, future land use and density, etc.

**(2) Future Transport Network**

The future transport network is required for future trip distribution by the gravity model which is calculated by future trip generation and future inter-zonal

impedance such as distance, travel time and travel cost of each pair of zones. The future transport network is built by updating of existing transport network such as i) upgrade the level of services such as increase of road capacity by extension of a number of lanes, improvement of travel speed by pavement, etc., ii) addition of new links, for example, construction of the new bridge and missing link of the road. Link attributes of added new links or improved links should be assigned designated Q-V code in the building of existing transport network.

For the building of future transport network, i) information of existing road and other transport improvement plan including location, schedule, level of services such as road class should be collected, ii) existing improvement plan should be added to existing transport network with defined attributes such as the Q-V condition of road link.

**(3) Inter-Zonal Impedance**

Inter-zonal impedance in the future transport network will be changed from existing network because of improvement of the level of service or new services. Existing inter-zonal impedance can be obtained by the analysis. The results of person trip survey or computed by transport network model. Future inter-zonal impedance should be estimated by transport network od computer model only. Future trip distribution will be calculated by using trip distribution model and future inter-zonal impedance.

**(4) Future Trip Generation**

Future trip generation is estimated by trip production and attraction model and future zonal parameters. Estimated future trip generation should be adjusted to control total which is calculated by trip rate and future framework.

**(5) Future Trip Distribution**

For the forecasting of future trip distribution, namely, a number of trips by each pair of origin and destination, present pattern method or gravity model are used.

- Present Pattern Method (or Growth Factor Model)

This method is applied under the assumption that a future trip distribution pattern remains same to the present pattern. (If the trip generation doubled, the trip distribution also doubled.)

For the present pattern method, current OD matrix and trip generation in future should be known. Future trips of each pair of origin and destination (u11..unn) are unknown and expected to forecast by present pattern method.

- Gravity Model

Future trip distribution by the gravity model is estimated by substitution future trip generation and inter-zonal impedance for estimated gravity model built by the analysis on the current OD matrices and inter-zonal impedance.

**(6) Future OD Matrices by Mode**

By using modal split models and future trip distribution and inter-zonal impedances, future OD matrices by transport mode are forecasted.

**(7) Future Traffic Assignment**

Estimated future vehicular OD matrices should be assigned on the future road network. If transit network is prepared for the demand forecasting of public transport mode, future person trip OD matrix should be assigned on transit network.

As the results of traffic assignment, following figures are obtained for the transport planning and analysis.

- Daily traffic volume, the degree of traffic congestion (volume capacity ratio), and average travel speed of each link.
- Total distance traveled and travel time of the whole network.

Daily traffic volume and degree of congestion shows the expected future congestion point and provide the information for the considering of the improvement plan.

## 5.3 Traffic Analysis Zone

| 2012 WardCode | 2012 WardName | TAZ | 2012 WardCode | 2012 WardName | TAZ | 2012 WardCode | 2012 WardName | TAZ | 2012 WardCode | 2012 WardName | TAZ | 2012 WardCode | 2012 WardName | TAZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0702182 | Kivukoni | 1 | 0701102 | Mabibo | 38 | 0701252 | Mikocheni | 75 | 0701122 | Ubungo | 112 | 0701332 | Mabwepande | 144 |
| 0702182 | Kivukoni | 2 | 0701102 | Mabibo | 39 | 0701252 | Mikocheni | 76 | 0701192 | Makuburi | 113 | 0701262 | Mbezi | 145 |
| 0702142 | Kisutu | 3 | 0701112 | Manzese | 40 | 0701252 | Mikocheni | 77 | 0701192 | Makuburi | 114 | 0701132 | Kibamba | 146 |
| 0702142 | Kisutu | 4 | 0701112 | Manzese | 41 | 0703162 | Kurasini | 78 | 0701192 | Makuburi | 115 | 0702052 | Kinyerezi | 147 |
| 0702152 | Mchafukoge | 5 | 0701112 | Manzese | 42 | 0703162 | Kurasini | 79 | 0702042 | Tabata | 116 | 0702012 | Ukonga | 148 |
| 0702152 | Mchafukoge | 6 | 0701112 | Manzese | 43 | 0703162 | Kurasini | 80 | 0702042 | Tabata | 117 | 0702242 | G/Mboto | 148 |
| 0702162 | Upanga Mashariki | 7 | 0701112 | Manzese | 44 | 0703162 | Kurasini | 81 | 0702042 | Tabata | 118 | 0702022 | Pugu | 149 |
| 0702162 | Upanga Mashariki | 8 | 0701072 | Kinondoni | 45 | 0703122 | Miburani | 82 | 0702082 | Vingunguti | 119 | 0702212 | Kitunda | 150 |
| 0702172 | Upanga Magharibi | 9 | 0701072 | Kinondoni | 46 | 0703122 | Miburani | 83 | 0702082 | Vingunguti | 120 | 0702232 | Kivule | 150 |
| 0702172 | Upanga Magharibi | 10 | 0701272 | Hananasif | 47 | 0703122 | Miburani | 84 | 0702082 | Vingunguti | 121 | 0702222 | Chanika | 151 |
| 0702122 | Jangwani | 11 | 0701272 | Hananasif | 48 | 0703122 | Miburani | 85 | 0702082 | Vingunguti | 122 | 0702252 | Majohe | 151 |
| 0702122 | Jangwani | 12 | 0701272 | Hananasif | 49 | 0703152 | Keko | 86 | 0702192 | Kiwalani | 123 | 0702032 | Msongola | 152 |
| 0702122 | Jangwani | 13 | 0701012 | Magomeni | 50 | 0703152 | Keko | 87 | 0702192 | Kiwalani | 124 | 0703082 | Chamazi | 153 |
| 0702112 | Kariakoo | 14 | 0701012 | Magomeni | 51 | 0703202 | Chang'ombe | 88 | 0702192 | Kiwalani | 125 | 0703102 | Charambe | 154 |
| 0702072 | Mchikichini | 15 | 0701052 | Mwananyamala | 52 | 0703202 | Chang'ombe | 89 | 0702202 | Segerea | 126 | 0703212 | Mbagala Kuu | 155 |
| 0702072 | Mchikichini | 16 | 0701052 | Mwananyamala | 53 | 0703202 | Chang'ombe | 90 | 0702262 | Kimanga | 126 | 0703262 | Kijichi | 155 |
| 0702132 | Gerezani | 17 | 0701052 | Mwananyamala | 54 | 0703132 | Temeke | 91 | 0702262 | Kimanga | 127 | 0703272 | Mianzini | 155 |
| 0702062 | Ilala | 18 | 0701212 | Makumbusho | 55 | 0703132 | Temeke | 92 | 0702202 | Segerea | 128 | 0703012 | Kigamboni | 156 |
| 0702062 | Ilala | 19 | 0701212 | Makumbusho | 56 | 0703192 | Sandali | 93 | 0702092 | Kipawa | 129 | 0703252 | Tungi | 156 |
| 0702062 | Ilala | 20 | 0701212 | Makumbusho | 57 | 0703192 | Sandali | 94 | 0702092 | Kipawa | 131 | 0703022 | Vijibweni | 157 |
| 0702102 | Buguruni | 21 | 0701032 | Ndugumbi | 58 | 0703182 | Tandika | 95 | 0702092 | Kipawa | 132 | 0703242 | Mjimwema | 158 |
| 0702102 | Buguruni | 22 | 0701032 | Ndugumbi | 59 | 0703182 | Tandika | 96 | 0703092 | Yombo Vituka | 133 | 0703032 | Kibada | 159 |
| 0702102 | Buguruni | 23 | 0701042 | Tandale | 60 | 0703172 | Azimio | 97 | 0703302 | Kilakala | 134 | 0703112 | Toangoma | 160 |
| 0701082 | Mzimuni | 24 | 0701042 | Tandale | 61 | 0703172 | Azimio | 98 | 0703222 | Makangarawe | 135 | 0703052 | Somangila | 161 |
| 0701082 | Mzimuni | 25 | 0701042 | Tandale | 62 | 0703172 | Azimio | 99 | 0703292 | Buza | 136 | 0703042 | Kisarawe II | 162 |
| 0701092 | Kigogo | 26 | 0701232 | Kijitonyama | 63 | 0703142 | Mtoni | 100 | 0703072 | Mbagala | 137 | 0703062 | Kimbiji | 163 |
| 0701092 | Kigogo | 27 | 0701232 | Kijitonyama | 64 | 0703142 | Mtoni | 101 | 0703282 | Kiburugwa | 138 | 0703232 | Pembamnazi | 164 |
| 0701092 | Kigogo | 28 | 0701232 | Kijitonyama | 65 | 0703142 | Mtoni | 102 | 0703072 | Mbagala | 139 | | Bagamoyo | 165 |
| 0701202 | Mburahati | 29 | 0701232 | Kijitonyama | 66 | 0701322 | Makongo | 103 | 0701162 | Kunduchi | 140 | | Other Tanzania | 166 |
| 0701202 | Mburahati | 30 | 0701222 | Sinza | 67 | 0701152 | Kawe | 104 | 0701342 | Wazo | 140 | | Kibaha | 167 |
| 0701202 | Mburahati | 31 | 0701222 | Sinza | 68 | 0701322 | Makongo | 105 | 0701142 | Goba | 141 | | South Tanzania | 168 |
| 0701022 | Makurumla | 32 | 0701222 | Sinza | 69 | 0701152 | Kawe | 106 | 0701242 | Kimara | 142 | | Ilands | 169 |
| 0701022 | Makurumla | 33 | 0701222 | Sinza | 70 | 0701312 | Mbezi Juu | 107 | 0701282 | Saranga | 142 | | Outside Tanzania | 170 |
| 0701022 | Makurumla | 34 | 0701062 | Msasani | 71 | 0701122 | Ubungo | 108 | 0701292 | Kwembe | 142 | | | |
| 0701102 | Mabibo | 35 | 0701062 | Msasani | 72 | 0701122 | Ubungo | 109 | 0701302 | Msigani | 142 | | | |
| 0701102 | Mabibo | 36 | 0701062 | Msasani | 73 | 0701122 | Ubungo | 110 | 0701172 | Mbweni | 143 | | | |
| 0701102 | Mabibo | 37 | 0701062 | Msasani | 74 | 0701122 | Ubungo | 111 | 0701182 | Bunju | 144 | | | |

Source: JICA Expert Team

## 5.4 Vehicle Classification for Traffic Count Survey


Source: JICA Expert Team

## 5.5 Format for Origin and Destination Table in JICA STRADA



### Record Format of OD Matrix
### *****.AOD

#### 1. General

The OD matrix file contains OD trip data. In addition to the standard record format described below, the JICA STRADA programs read the CSV format file (separation by the comma).

#### 2. File Structure

The OD matrix file consists of three record types in the order shown below.

**(1) Header**
The header record contains the data type and version identifications. (For details of the record format, see p. A-2 of this annex.)

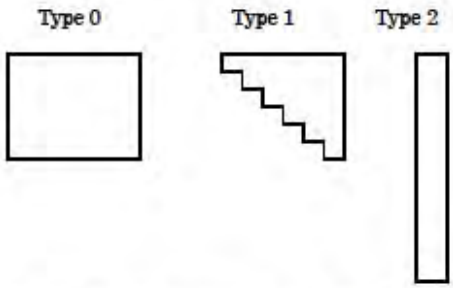
**(2) Data size**
The record describes the total number respectively of zones and modes, the OD matrix type and the names of OD matrices.

**(3) OD trip matrices**
These records describe the OD trips in the user-specified OD matrix type.

#### 3. Record Format

#### 3.1 Description of Data Size

| Columns | Format | Remarks |
|---|---|---|
| 1 - 5 | int | Total number of zones |
| 6 - 10 | int | Total number of modes<br>The "modes" here do not strictly mean transport modes. They could be trip purposes if OD matrices are prepared by purpose. If OD matrices are prepared by transport mode and purpose, the total number of "modes" should be the number of transport modes multiplied by the number of purposes. |
| 11 - 15 | int | Code number to identify the OD matrix type, as shown below |




The type 0 is the square matrix, which describes OD trips per mode starting from Mode 1 through the last mode.
Type 1 is the triangular matrix as shown above. The manner of describing OD trips is basically the same as the square matrix, except that the data size per row gradually decreases.
Type-2 describes OD trips in the sequence of the zone *i* (origin), the zone *j* (destination) and the volume of *i* to *j* trips. In this column matrix type, un-described zone pairs are regarded as having no traffic.

| | | |
|---|---|---|
| 16 - | chr | Names of OD matrices, 10 columns per name<br>The total number of names must correspond to the number of modes specified in the Columns 6 - 10 above. The sequence indicates the order of the matrices in the file. The entry of the names may be omitted (i.e. left blank). However, you will find it more convenient to specify them for the purpose of identification. |

## 3.2 Description of the OD Matrix Data

### (1) Type-0 and Type-1

| Columns | Format | Remarks |
|---|---|---|
| Per 8 columns | int | Enter OD trips per origin zone, starting from Zone 1, in 8 columns per destination zone for each origin zone. |

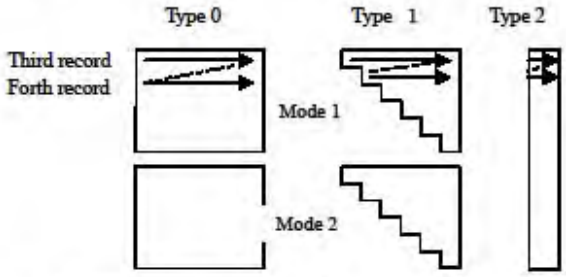
### (2) Type-2

| Columns | Format | Remarks |
|---|---|---|
| 1 - 5 | int | Origin zone number |
| 6 - 10 | int | Destination zone number |
| 11 - | int | OD trips per mode in 8 columns each, in the sequence from Mode 1 through the last |

Type-0 matrix : Describe the trips originating in Zone 1 per destination zone, one row per origin zone. Repeat the same for Zone 2 in the next row. If there are two or more modes, complete the descriptions of all origin zones for Mode 1, and then repeat the same specifications for Mode 2.

Type-1 matrix : Follow the same procedure as the Type-0 matrix. The length of a row will decrease from Zone 1 through the last zone.

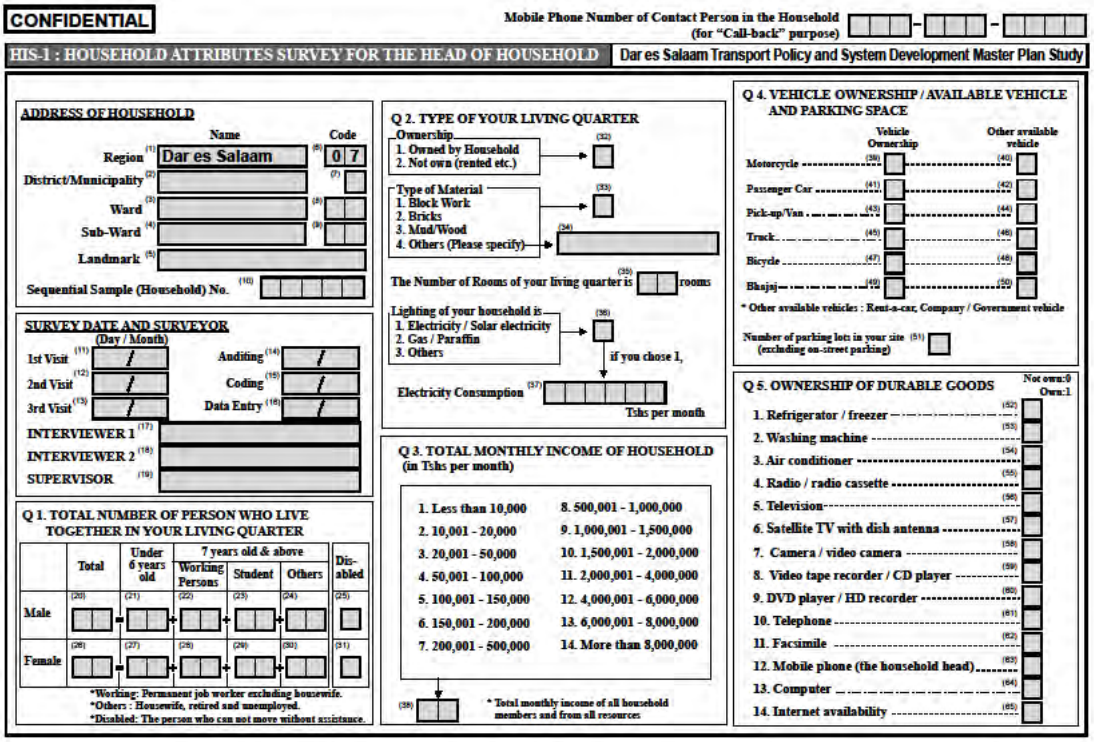
Type-2 matrix : Describe the origin zone number, the destination zone number, trips of Mode 1, trips of Mode 2 and so on to the trips of the last mode. Repeat the same specification on the rest of the zone pairs.




If the data is written in the CSV format, begin from the description of the data size above. The data size and OD trips must be written by the comma separation, following the sequence indicated in the diagram above.

## 5.6 Household Interview Survey (HIS) Forms applied in 2008MP Study

(1) Household and Individual Information



CONFIDENTIAL

Mobile Phone Number of Contact Person in the Household (for "Call-back" purpose) ( ) - ( ) - ( )

HIS-1 : HOUSEHOLD ATTRIBUTES SURVEY FOR THE HEAD OF HOUSEHOLD — Dar es Salaam Transport Policy and System Development Master Plan Study

ADDRESS OF HOUSEHOLD

| | Name | Code |
|---|---|---|
| Region (1) | Dar es Salaam | 0 7 |
| District/Municipality (2) | | |
| Ward (3) | | |
| Sub-Ward (4) | | |
| Landmark (5) | | |
| Sequential Sample (Household) No. (10) | | |

SURVEY DATE AND SURVEYOR (Day / Month)

| | | | |
|---|---|---|---|
| 1st Visit (11) | / | Auditing (14) | / |
| 2nd Visit (12) | / | Coding (15) | / |
| 3rd Visit (13) | / | Data Entry (16) | / |
| INTERVIEWER 1 (17) | | | |
| INTERVIEWER 2 (18) | | | |
| SUPERVISOR (19) | | | |

Q 1. TOTAL NUMBER OF PERSON WHO LIVE TOGETHER IN YOUR LIVING QUARTER

| | Total | Under 6 years old | 7 years old & above | | | Disabled |
|---|---|---|---|---|---|---|
| | | | Working Persons | Student | Others | |
| Male | (20) | (21) | (22) | (23) | (24) | (25) |
| Female | (26) | (27) | (28) | (29) | (30) | (31) |

*Working: Permanent job worker excluding housewife.
*Others : Housewife, retired and unemployed.
*Disabled: The person who can not move without assistance.

Q 2. TYPE OF YOUR LIVING QUARTER

Ownership (32)
1. Owned by Household
2. Not own (rented etc.)

Type of Material (33)
1. Block Work
2. Bricks
3. Mud/Wood
4. Others (Please specify) (34)

The Number of Rooms of your living quarter is (35) rooms

Lighting of your household is (36)
1. Electricity / Solar electricity
2. Gas / Paraffin
3. Others

if you chose 1,
Electricity Consumption (37) Tshs per month

Q 3. TOTAL MONTHLY INCOME OF HOUSEHOLD (in Tshs per month)

| | |
|---|---|
| 1. Less than 10,000 | 8. 500,001 - 1,000,000 |
| 2. 10,001 - 20,000 | 9. 1,000,001 - 1,500,000 |
| 3. 20,001 - 50,000 | 10. 1,500,001 - 2,000,000 |
| 4. 50,001 - 100,000 | 11. 2,000,001 - 4,000,000 |
| 5. 100,001 - 150,000 | 12. 4,000,001 - 6,000,000 |
| 6. 150,001 - 200,000 | 13. 6,000,001 - 8,000,000 |
| 7. 200,001 - 500,000 | 14. More than 8,000,000 |

(38)

* Total monthly income of all household members and from all resources

Q 4. VEHICLE OWNERSHIP / AVAILABLE VEHICLE AND PARKING SPACE

| | Vehicle Ownership | Other available vehicle |
|---|---|---|
| Motorcycle | (39) | (40) |
| Passenger Car | (41) | (42) |
| Pick-up/Van | (43) | (44) |
| Truck | (45) | (46) |
| Bicycle | (47) | (48) |
| Bkajaj | (49) | (50) |

* Other available vehicles : Rent-a-car, Company / Government vehicle

Number of parking lots in your site (excluding on-street parking) (51)

Q 5. OWNERSHIP OF DURABLE GOODS (Not own:0, Own:1)

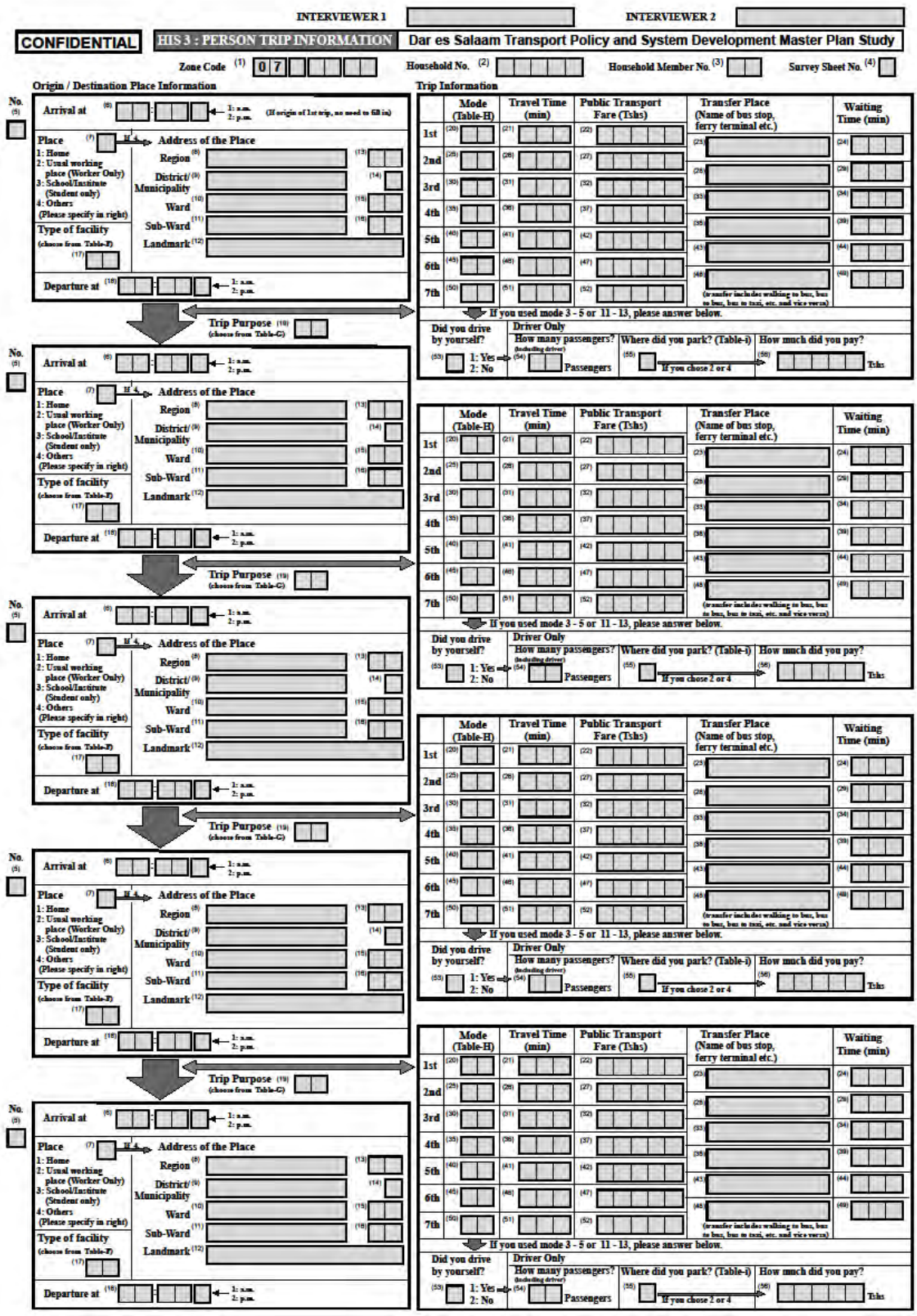
1. Refrigerator / freezer (52)
2. Washing machine (53)
3. Air conditioner (54)
4. Radio / radio cassette (55)
5. Television (56)
6. Satellite TV with dish antenna (57)
7. Camera / video camera (58)
8. Video tape recorder / CD player (59)
9. DVD player / HD recorder (60)
10. Telephone (61)
11. Facsimile (62)
12. Mobile phone (the household head) (63)
13. Computer (64)
14. Internet availability (65)

HIS-2 : HOUSEHOLD MEMBER INFORMATION FOR 7 YEARS OLD AND ABOVE — Dar es Salaam Transport Policy and System Development Master Plan Study

Zone Code (1) 0 7 ( ) Household No. (2) ( )

| No. | Sex (1. Male 2. Female) | Age | Occupation (Table-A) | Working Person and Student (Occupation: 1 - 18) only: Address of Working place (occupation 1-14 only) or School (occupation 15-18 only) | (7) Region (8) District/Municipality (9) Ward | (10) Sub-ward (11) Landmark (12) - (15) Codes | Usual working / school hour (1: a.m. 2: p.m.) | Usual working / school days in a week | Working Person (Occupation 1-14 only) Main Industry (Table-B) | Monthly Income (Table-C) | Driving License (Table-D) | Car Owner -ship (Table-E) | Did you make a trip? 0:No 1: Yes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (3) 1 | (4) | (5) | (6) | (7) (8) (9) | | (10) (11) (12) (13) (14) (15) | (16) From (17) To | (18) days | (19) | (20) | (21) | (22) | (23) |
| (3) 2 | (4) | (5) | (6) | (7) (8) (9) | | (10) (11) (12) (13) (14) (15) | (16) From (17) To | (18) days | (19) | (20) | (21) | (22) | (23) |
| (3) 3 | (4) | (5) | (6) | (7) (8) (9) | | (10) (11) (12) (13) (14) (15) | (16) From (17) To | (18) days | (19) | (20) | (21) | (22) | (23) |
| (3) 4 | (4) | (5) | (6) | (7) (8) (9) | | (10) (11) (12) (13) (14) (15) | (16) From (17) To | (18) days | (19) | (20) | (21) | (22) | (23) |
| (3) 5 | (4) | (5) | (6) | (7) (8) (9) | | (10) (11) (12) (13) (14) (15) | (16) From (17) To | (18) days | (19) | (20) | (21) | (22) | (23) |
| (3) 6 | (4) | (5) | (6) | (7) (8) (9) | | (10) (11) (12) (13) (14) (15) | (16) From (17) To | (18) days | (19) | (20) | (21) | (22) | (23) |
| (3) 7 | (4) | (5) | (6) | (7) (8) (9) | | (10) (11) (12) (13) (14) (15) | (16) From (17) To | (18) days | (19) | (20) | (21) | (22) | (23) |
| (3) 8 | (4) | (5) | (6) | (7) (8) (9) | | (10) (11) (12) (13) (14) (15) | (16) From (17) To | (18) days | (19) | (20) | (21) | (22) | (23) |

## (2) Trip Information



(3) Code Table

**CODE TABLE FOR HOUSEHOLD MEMBER INFORMATION** Dar es Salaam Transport Policy and System Development Master Plan Study

**Table-A : Occupation**

Worker
1. Legislators, Administrators, and Managers
2. Professionals
3. Tech. and Associate Professionals
4. Clerks
5. Small Business Managers
6. Service & Shop sales workers
7. Street Venders
8. Craftsmen
9. Farmers
10. Livestock Keepers
11. Fishermen
12. Plant Operators, Assemblers
13. Element. Occupations
14. Other working

Student
15. Student (Elementary)
16. Student (Secondary)
17. Student (University/ Institute)
18. Student (Others)

Non-worker
19. Not working but looking for work
20. Not working but not looking for work
21. Home Maker, Housewife
22. Retired / Too old, pensioner
23. Unable to work
24. Others

**Table-B : Main Industry**

1. Agriculture
2. Forestry, Fishing & Other
3. Mining & Quarrying
4. Manufacturing
5. Electricity, Gas and Water
6. Construction
7. Raw food sales (Un-cooked)
8. Trade and Commerce
9. Transport and Communication
10. Finance & Insurance
11. Education
12. Public (Government)
13. Others

**Table-C : Monthly Income**

1. Less than 5,000
2. 5,001 - 10,000
3. 10,001 - 25,000
4. 25,001 - 50,000
5. 50,001 - 75,000
6. 75,001 - 100,000
7. 100,001 - 250,000
8. 250,001 - 500,000
9. 500,001 - 750,000
10. 750,001 - 1,000,000
11. 1,000,001 - 2,000,000
12. 2,000,001 - 3,000,000
13. 3,000,001 - 4,000,000
14. More than 4,000,001

**Table-D : Driving License**

Own
1. Class A: Motorcycle
2. Class B: Saloon Car
3. Class C: All type of vehicle
4. Class D: Pick-up and station wagon
5. Class E: Trucks
6. Class F: Harvest Machines
7. Class G: Mining equipment and machines
8. Class H: Learner/ provisional license

None
9. None

**Table-E : Car Ownership**

1. One Car only
2. One Motorcycle only
3. 2 or more cars (includes motorcycle)
4. None

**CODE TABLE FOR TRIP INFORMATION** Dar es Salaam Transport Policy and System Development Master Plan Study

**Table-F: Facility**

1. Residential
2. School/Institute
3. Religious/Cultural
4. Hospital/Medical centre
5. Private company office/bank
6. Government office
7. Market/shopping centre/shop
8. Restaurant/street stand
9. Hotel/Leisure facility
10. Factory/workshop/warehouse
11. Transport facility
12. Cultivated field
13. Construction site
14. Others

**Table-G : Trip Purpose**

1. To go home
2. To go usual work place
3. To school/institute (student only)
4. Business activities (sale, delivering, meeting, etc.)
5. Back to working place
6. Private/social activities (eating, shopping etc.)
7. Pick up or send off (taking children to school and back etc.)

**Table-H : Transport Mode**

1. Walking
2. Bicycle
3. Motorcycle
4. Passenger Car
5. Pick-up, Van
6. Taxi
7. Bhajaj
8. Dala dala
9. Intercity bus
10. School/Company bus
11. 2 axles truck
12. 3 axles truck
13. Trailer truck, more than 3 axles truck
14. Railway
15. Ferry/boat

**Table-i : Parking Type**

On-street
1. On-street free parking
2. On-street pay parking

Off-street
3. Off-street free parking
4. Off-street pay parking
5. Residential garage

Not use
6. Not use parking

## 5.7 Example of TOR for Traffic Count Survey

**Terms of Reference for**

**TRAFFIC COUNT SURVEY**

**Project for the Improvement of**
**Dar es Salaam Transport**

### 1. Introduction

#### 1.1. Project Background

The city of Dar es Salaam, the former capital city of Tanzania, functions as one of the major gateways to East Africa. It generates 70% of economic production of the whole country and has population of over 4.3 million (2012 Population Census). Like other major cities in the world, a rapid population growth and current motorization all contribute to an increase of the traffic in the city. Accordingly, traffic congestion in Dar es Salaam has become a central issue that needs to be addressed to ensure sustainable development of the city.

In response to the request from the Government of Tanzania, JICA has conducted the Study on "Urban Transport Policy and System Development Master Plan for the City of Dar es Salaam" (hereinafter referred to as the Master Plan) and the transport Master Plan was proposed to the Government of Tanzania in 2008. The Government of Tanzania have been making significant efforts to improve road and public transport infrastructures in Dar es Salaam, following proposals in the Master Plan. However, the supply of these infrastructure projects lags behind the increase of the traffic. Accordingly, the traffic congestion in the city has worsened year by year.

Under budgetary constraints, the line ministries and agencies should embark upon remedying the situation to ease the traffic congestion by physical (hard) infrastructure projects together with soft components to make maximum use of the available infrastructure. And these hard and soft measures taken need to be consistently implemented. The Government of Tanzania has been actively involved in implementation of the urban transport projects. However, these projects have not yielded the expected benefits due to the inappropriate planning and lack of the coordination amongst concerned agencies.

In this regards, JICA has supported the capacity building project, entitled 'Capacity Building Project for the Improvement of Dar es Salaam Transport since October, 2010, aiming at establishing and enhancing a coordination mechanism among the concerned departments and agencies to harmonize the urban transport project(s) and program(s).

#### 1.2. Positioning of Traffic Count Survey

The duration of the Project is 3 years from October 2014 until September 2017. The Project aims to make the coordination mechanism well function and to ensure implementation of selected project(s). As a result of the Project, the following three outputs are expected to contribute to improving traffic conditions in Dar es Salaam.

1) A coordination mechanism among the relevant agencies is enhanced towards establishment of DUTA.
2) Organizational capacity on planning, implementation, monitoring and evaluation (PDCA) of the relevant agencies is strengthened through selected project(s).
3) Technical capacities to address urban transport issues are improved through various training methods.

1

In related with output 3, the Project prepared training plan on urban transport planning in which the transport Master plan developed in 2008 will be reviewed and updated by using current information and transport data. There are several type of information to be used for reviewing and updating the Master plan. The most important data is a traffic count at locations at major roads. This will be used to calibrate the volume of current travel demand that is assigned on a network to estimate traffic demand on each road section.

## 2. Scope of Work

### 2.1. Survey Objectives

A TRAFFIC COUNT SURVEY aims to obtain the traffic volume by counting the number of vehicles at several locations on major corridors in Dar es Salaam city. The traffic volume counted by the TRAFFIC COUNT SURVEY will be used not only for evaluating traffic characteristics at each location but for calibrating the current trip origin and destination information estimated based on the OD table developed in 2008 Transport Master Plan Study, in terms of vehicular and passenger travel.

Accordingly, in order to obtain the data, the following two surveys are to be conducted at the road section in the Study area:

- Traffic count survey; and
- Vehicle occupancy observation survey.

### 2.2. Survey Locations

The locations of TRAFFIC COUNT SURVEY include twenty one (21) points illustrated in Figure 1. The exact survey points should be finalized on the field after the discussion with the Study team later.

**Figure 1 Survey Locations**

2

### 2.3. Survey Duration

The traffic count survey and vehicle occupancy observation survey are conducted for 24 hours at major three locations and 14 hours from 6:00 to 20:00 at the rest of the stations. These surveys are conducted on one-day of weekdays selected from Tuesday through Thursday except singular day such as public holidays. The coverage of the TRAFFIC COUNT SURVEY is summarized in Table 1 List of Survey Locations.

**Table 1 List of Survey Locations**

| No. | Survey Location | | | Coverage | |
|---|---|---|---|---|---|
| | Code | Road Name | Survey Location | Traffic Count | Vehicle Occupancy Observation |
| 1 | SL1-1 | Old Bagamoyo Road | Mlalakuwa JKT | 14 | 14 |
| 2 | SL1-2 | Bagamoyo Road | Makongo | 14 | 14 |
| 3 | SL1-3 | Morogoro Road | Kibo | 14 | 14 |
| 4 | SL1-4 | Nyerere Road | Tazara | 14 | 14 |
| 5 | SL1-5 | Kilwa Road | Mbagala Misheni | 14 | 14 |
| 6 | SL2-6 | Ali Hassan Mwinyi Road | Salender Bridge | 24 | 24 |
| 7 | SL2-7 | Morogoro Road | Jangwani Konoike | 24 | 24 |
| 8 | SL2-8 | Rashid Kawawa Road | Kibobo Sambusa | 14 | 14 |
| 9 | SL2-9 | Nelson Mandela Road | Sukita | 14 | 14 |
| 10 | SL3-10 | Uhuru Street | Breweries TLB | 14 | 14 |
| 11 | SL3-11 | Nyerere Road | Darajani/Shoprite | 24 | 24 |
| 12 | SL3-12 | Bandari Road | Railway Bridge | 14 | 14 |
| 13 | NS-1 | Bagamoyo Road | | 14 | 14 |
| 14 | NS-2 | Morogoro Road | | 14 | 14 |
| 15 | NS-3 | Pugu Road | | 14 | 14 |
| 16 | NS-4 | Nelson Mandela Road | | 14 | 14 |
| 17 | NS-5 | Morogoro Road | | 14 | 14 |
| 18 | NS-6 | Kawawa Road | | 14 | 14 |
| 19 | NS-7 | Nelson Mandela Road | | 14 | 14 |
| 20 | NS-8 | Kigamboni Road | | 14 | 14 |
| 21 | NS-9 | Kigamboni Road | | 14 | 14 |

3

### 2.4. Vehicle Classifications

The types of vehicles to be counted are classified into the following thirteen (13) categories.

1) Passenger car
2) Taxi
3) Pickup and van (including light commodity vehicle)
4) Daladala (small: 15 passengers)
5) Daladala (medium: 25 -35 passengers)
6) Inter-city buses
7) Other private buses (school bus, company and tourist bus, etc.)
8) 2 Axles truck.
9) 3 Axles truck.
10) Trailer truck, more than 3 axles (heavy truck, lorry, semi-trailer, etc.)
11) Motorcycle.
12) Bajaj
13) Bicycle

### 2.5. Survey Method

The basic survey methodology for TRAFFIC COUNT SURVEY is described as follows. The detailed survey methodology will be finalized after the discussion with the Study team.

- A survey team led by a supervisor should stand by before the starting time of the survey period at each location. The supervisor should visit the survey location in advance to be familiar to the location and to define the exact point where the surveyors conduct the survey.
- The surveyors for the TRAFFIC COUNT SURVEY count continuously the number of vehicles by direction and by designated vehicle type at roadside.
- The surveyors record the number of vehicles counted on the survey sheet and the number of counted vehicles will be summarized every fifteen (15) minutes.
- The surveyors for the VEHICLE OCCUPANCY SURVEY observe the number of passengers, including drivers, of each vehicle by vehicle type and by direction, and record it on the survey sheet.
- The supervisors should pay attention to find out the count mistake of the vehicle type. The counting and observation survey should not be interrupted by meal or rest.

### 2.6. Work Items

The survey should include the following work items. The consultant should conduct the following work items without delay, and report the situation of the preparation and the survey progress to the Study team.

**(1) Preparatory works**

- Site investigation and confirmation of the precise count locations.
- Preparation of the survey program and mobilization plan.
- Preparation of survey forms.
- Preparation of the survey manual for the surveyors both in English and Swahili.
- Recruiting and training of supervisors and surveyors.

- Organizing the survey team.

**(2) Field survey**

- Traffic counts by direction and by vehicle type.
- Vehicle occupancy observation by direction and by vehicle type.
- Supervision of the surveys and examination of survey results.

**(3) Data processing**

- Data entry to computer, error check and the validation of the data.

**(4) Outputs**

- Survey report including preliminary analyses.
- Computer files of survey data.

### 2.7. Contents of Survey Report

It is desirable that the following items should be described in the above mentioned survey report.

- Background and objectives of the survey
- Details of survey framework: survey locations, survey team structure and number of surveyors, survey date and period, implementation schedule, etc.
- Survey methodology: survey forms, surveying and recording method, responsibility of surveyors, etc.
- Methods to ensure the accuracy of collected data
- Data processing: coding, data entry, processing in a computer, format of computer files, etc.
- Constraints and difficulties encountered during the survey and solutions

### 2.8. Schedule

The screen line survey should be carried out according the schedule shown in Table 2.

**Table 2 Implementation Schedule**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Preparatory Works | | | | | | | | | | |
| a) Site Observation | | | | | | | | | | |
| b) Survey Program | | | | | | | | | | |
| c) Survey Forms and Manuals | | | | | | | | | | |
| d) Recruiting | | | | | | | | | | |
| e) Training and Organization | | | | | | | | | | |
| 2. Field Survey | | | | | | | | | | |
| a) Scheduling | | | | | | | | | | |
| b) Field Survey | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| 3. Data Processing | | | | | | | | | | |
| a) Data Check | | | | | | | | | | |
| b) Data Entry | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

5

Teaching Material for Urban Transportation Planning
August 2017

Comments or Questions
If you have comments or questions about this document, you may contact the following persons.

Mr. Prosper NYAKI, National Institute of Transport (NIT)
Email: nyakiprosper@yahoo.com
Dr. Emmanuel Mchome, Ardhi University
Email: emamchome@yahoo.com
Mr. Masayuki ISHIYA, IT Urban Planning Co., Ltd.
Email: ishiya@intel-tech.co.jp
Ms. Kayoko MIYAO, International Development Center of Japan. Ltd.
Email: miyao.k@idcj.or.jp

# Discussion Paper:
# Report on Cape Town Study Tour

# Report on Cape Town Study Tour
# 12 -19 June 2016

Prepared for: JICA and Study Tour Participants

Date: 8 July 2016 (Revised on 19 Sep 2016)

# TABLE OF CONTENTS

# 1. Purpose of the Study Tour

Cape Town implemented in 2011 their BRT system called the MyCiTi, referred to as IRT (Integrated Rapid Transit). Therefore a key reason to select Cape Town for the study tour is that it offers a good post-BRT implementation experience. Dar es Salaam's DART system (which has just commenced operating) followed a similar planning approach to Cape Town so this study could show *'what has worked and what has not'*. Cape Town's planning approach for the transition of mini-bus taxis to formal bus companies has been difficult and problematic area, leaving some legacies that make the system less efficient than it could be.

For the continued improvement and development of public transport in cape Town, planners are now accepting that they must work more closely with the existing transport sector (paratransit mini-bus taxi operators) to provide services where it is inefficient for the BRT model to do so. The issues of MyCiTi efficiency and the passenger services business model will become evident throughout this report.

Dar es Salaam has already proceeded with plans to engage more with the daladala sector under the CUPID project and with SUMATRA facilitating a pilot of the Boloro mobile payments system for central fare collection to improve revenue management, with a future development of cooperatives.

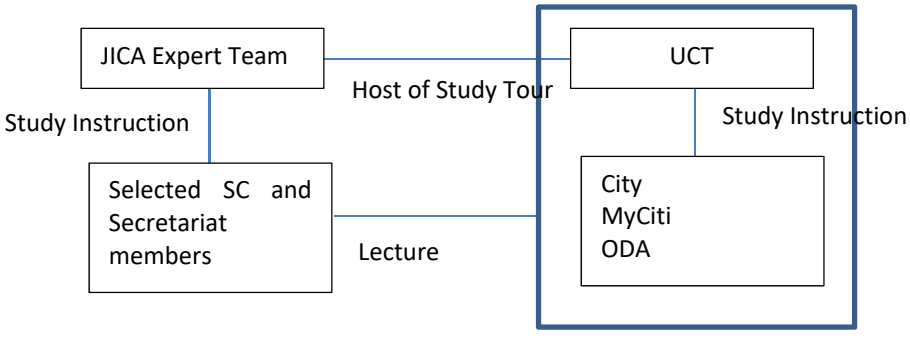
This is an area in which researchers at the Centre for Transport Studies at University of Cape Town (UCT) have a particular interest, and they are researching multiple African cities (including Dar es Salaam) leading to the proposition of a 'hybrid' approach to public transport, being the combination of paratransit services with BRT in a complementary and integrated system instead of BRT just displacing them. The My Citi experience has demonstrated that this is not only just a worthwhile endeavour (in that it uses existing expertise of the industry stakeholders) but due to the high cost of BRT is a financial imperative as the fiscal capacity of government cannot sustain an 'across the board' BRT implementation as the only path to bus system improvement.

Cape Town has also established a transport authority called Transport for Cape Town (TCT) to provide the institutional strength to manage all facets of transport investment and operations. This has provided some helpful perspectives for the establishment of DUTA in Dar es Salaam.

We acknowledge the kind cooperation, assistance of Professor Roger Behrens, Researcher Herrie Schalekamp (UCT), Nico McLachlan (ODA Consultants), and Gershwin Fortune (TCT Systems Planner) who generously gave their time and shared their knowledge and experience.

We also acknowledge and thank our study team members for their active participation and keen interest in all the subject matter.

# 2. Study Tour Structure



# 3. Study Tour Participants

Participants were selected from among Steering Committee and Secretariat members, considering relevance to the study tour subject and their duties/responsibilities, availability of the members and confirmed through consultative meeting in the Secretariat meeting.

| No | Institution | Surname | Given Name |
|---|---|---|---|
| 1 | ARU | Mchome | Emmanuel Elifadhili |
| 2 | DART | Kuganda | Mohamed Bakari |
| 3 | DART | Tigahwa | Serapion Kata |
| 4 | DCC | Kazeri | Christopher Japhet |
| 5 | DCC | Nyenye | Swalehe Mohamedy |
| 6 | IMC | Shula | Allan Twangale |
| 7 | JICA Team | Morimoto | Hiroyuki |
| 8 | JICA Team | Olyslagers | Frits |
| 9 | KMC | Wamala | Ahmed Omar |
| 10 | MLHHSD | Kinero | Nzori Abdallah |
| 11 | NIT | Nyaki | Prosper |
| 12 | NIT | Uriyo | Lucas Edward |
| 13 | PO-RALG | Ndyamukama | Emmanuel Kanjara |
| 14 | PO-RALG- Assistant Director | Shemangale | Davis Ben |
| 15 | RAS | Ole-Mungaya | Michael Moses |
| 16 | RAS-DSM | Shehemba | Josephat Nestory |
| 17 | SUMATRA | Kahatano | Johansen Jonathan |
| 18 | SUMATRA-Director | Ngewe | Gilliard Wilson |
| 19 | TANROADS | Kanyenye | Humphrey Nelson |
| 20 | TMC | Kawishe | Protas Gervas |
| 21 | TMC | Maziku | Benjamin Michael |

# 4. Study Tour Research Programme

## 4.1. Overview of technical sessions

| | |
|---|---|
| Mon 13 June | AM Cape Town Site visit |
| | PM Hotel Session 1: Introduction to Cape Town and Transport Authority (TCT) |
| | CBD walk-around hosted by ODA Consultant Nico McLachlan to view transport integration in PM peak hour |
| Tue 14 June | AM Site Visit to MyCiTi Phase 1 (BRT TO1 to Table View connecting to MyCiTi feeder to Big Bay) |
| | PM Hotel Session 2: UCT Herrie Schalekamp – Key lessons from BRT, costs, moderation and operator structure. |
| Wed 15 June | AM Site visit to MyCiTi Phase 2 (intermediate) Route D01 /D02 to Khayelitsha |
| | PM Hotel Session 3: Transport System Planning & Modelling Manager – Planning of Feeder routes and intermediate phase 2 routes |
| Thurs 16 June | (Public Holiday) |
| | AM Hotel Session 4: Findings, Applicability and adaptability to Dar es Salaam |

PM Trip to Camp Bay, Houts Bay (end of My Citi line) and Simonstown

Fri 17 June AM Hotel Session 5: BRT financial performance, subsidy issues, fare collection, engagement with daladala for public transport improvement.

Streetwise Parking Solutions: Overview of parking management technology used in Cape Town

PM Hotel Session 6: The prospect of hybrid transport systems – experience in Africa, current research projects.

## 4.2. Introduction to Cape Town

**MyCiTi IRT**

Cape Town has a population of 3.7M with a metropolitan area of 2,455.km$^2$. 55% of the population rely on public transport. The MyCiTi Phase 1 network operates approximately 800 vehicles and has 24.4km of median BRT busway and 25km of dedicated bus lanes.

The My Citi IRT system has without doubt had a very positive effect on Cape Town one researcher reporting that 40% of all passengers are former private car users, 30% of the N2 expressway services are former rail passengers (unreliable and unsafe) and 25% formerly used mini-bus taxi. It appears that MyCiTi has also had an indirect effect on 'raising the bar' on quality, in part due to the paratransit sector losing their near monopoly status.

The fare level demands on whether the customer uses a standard fare card or a transit only Mover package card and whether travel is during peak time or off peak. Mover packages offer a 30% discount for travel and off-peak offers 20% lower fares indicating a potential 50% saving on standard fares.

Typical MyCiTi bus fares over distance are as follows:

| **MyCiTi Fares in ZAR (Rand)** | | | |
|---|---|---|---|
| **Km** | Max | Minimum | Maximum Saving |
| **5-10** | 13.3 | 6.9 | -48% |
| **10-20** | 17.8 | 8.1 | -54% |
| **20-30** | 19.8 | 10.4 | -47% |
| **30-40** | 21 | 11.6 | -45% |

**Historical and Political**

Cape Town has unique historical factor that influence the city structure and the policies of government

Group areas Act of 1969 under the Apartheid regime forcibly removed the coloured and black populations to remote townships causing chronic disadvantage and isolation. Hence, townships such as Mitchell's Plain and Khayelitsha were developed. Population counts are hard to verify but Khayelitsha reportedly houses up to 2 million and Mitchells Plan around 500,000. Unemployment and crime are major problems of these areas.

Hence servicing these more remote townships with transport is a critical social and economic necessity but the cost of travel is an issue with a high percentage of household income committed to cost of travel.

Until the introduction of My Citi IRT system in 2010 the bulk of passenger road transport was carried by rail or mini-bus taxis (paratransit) operating similar to Dar es Salaam's daladala. However, in SA paratransit is organised under militant and often violent mini-bus taxi associations and the city government has had to engage with these associations to develop formal bus companies. As a result, these associations own 30% of the newly formed bus companies with individual taxi owners owning the balance.

One effect of this industry engagement has been that the city found itself in a weak bargaining position, resulting in these negotiated bus operating contracts being more costly and inflexible due to long tenure of the contract. The cost of compensating mini-bus taxis out of their licences has also been expensive, making the transition to formal bus companies a formidable financial burden. However, once these operators were compensated out of their licences the bus -operating companies they formed were given gross cost contracts where they are being paid on a km basis to provide services. This appears to be a double compensation, but indicate the extent to which government has been held to ransom by the mini-bus industry.

In general, the history of apartheid has left a legacy of social injustice and inequity that governments of today need to redress. Social justice policies underpin the transport policy, which is important to remember as it defines the context in which Cape Town designs its policies and systems.

## 4.3. Session 1A- Cape Town TCT Overview

Presenter: Frits Olyslagers

### *4.3.1. Overview*

Cape Town has developed a Transport Authority – Transport for Cape Town (TCT) which has a ***'Transport Vision of 1'*** being fully aligned to the city's 5 pillars as identified in the IDP for 2012-2018. These are:

- an Opportunity City;
- an Inclusive City;
- a Safe City;
- a Caring City; and
- a Well Run City


TCT serves nine defined functions, serving as a:

- Planning Authority;
- Contracting Authority;
- Municipal Regulatory Entity;
- Performance Monitoring and Evaluation;
- Financial Management;
- Public Transport Law Enforcement;
- Liaison, Communication and Stakeholder Management;
- Infrastructure Management; and
- Network Operations Management.

TCT mission is outlined as follows:

The City of Cape Town's Transport Authority, Transport for Cape Town (TCT) through its TCT Constitution By-Law, is responsible for planning, costing, contracting, regulating, monitoring, evaluating, communicating, managing and maintaining the City of Cape Town's transport infrastructure, systems, operations, facilities and network.

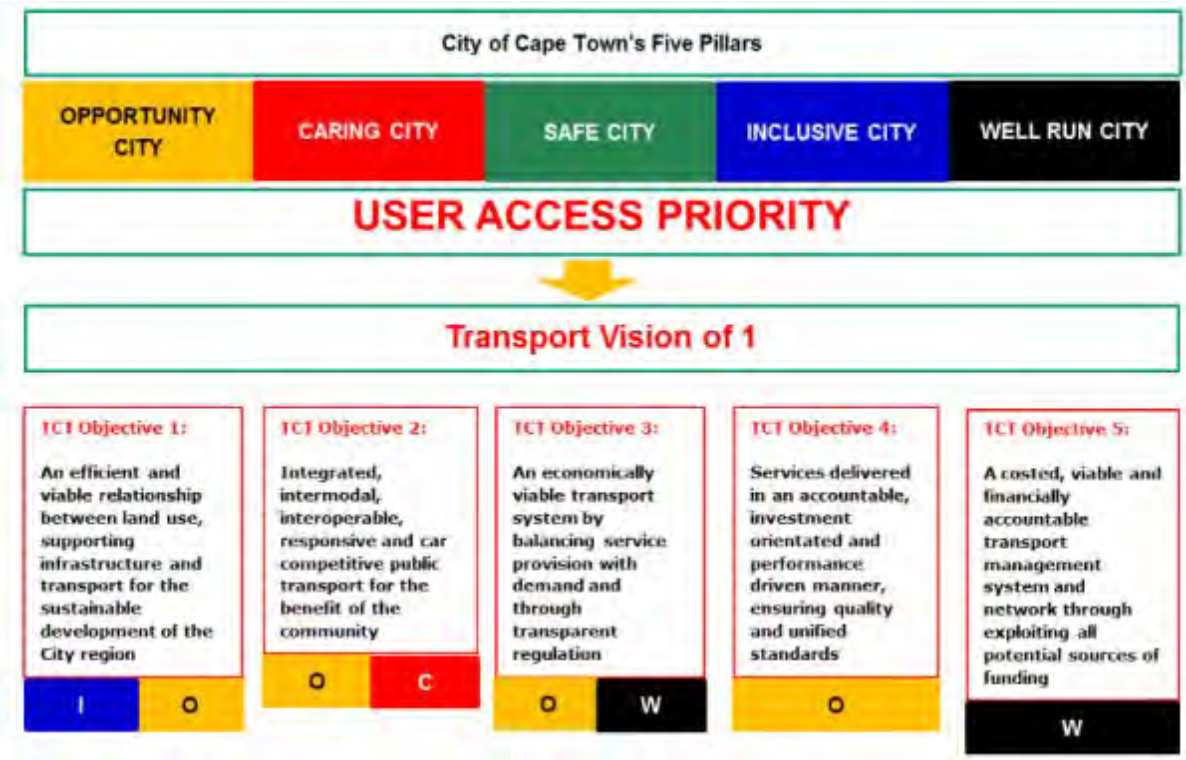
Transport for Cape Town is the custodian and authority over the entire ambit of the transport and related lifecycle for infrastructure in Cape Town. TCT aims to improve the transport system in a pioneering, industrious and fair manner, through setting the standards and managing a complex environment. Further, it is required to regulate efficient and safe, integrated, intermodal and inter-operable transport systems, as well as ensuring performance oriented service

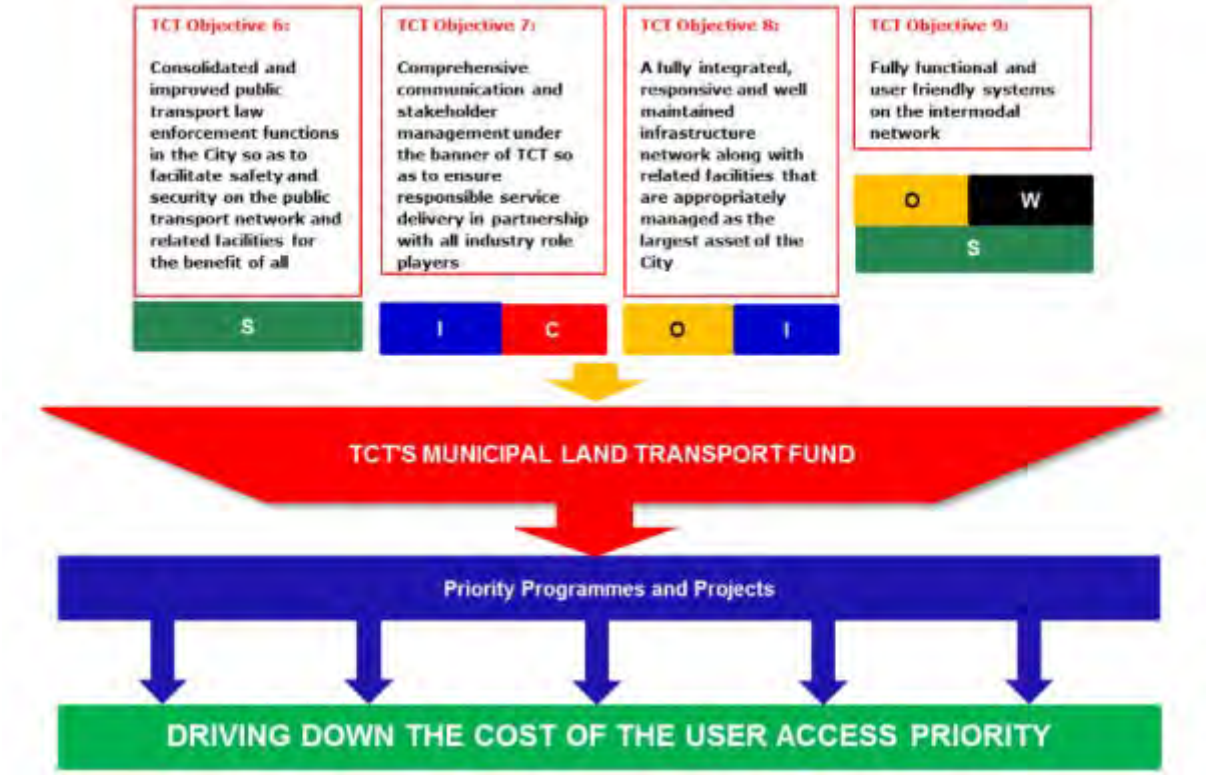
delivery for all citizens and visitors to Cape Town. Our focus is to invest in a new transport legacy for Cape Town, South Africa.

It has 9 departments:

- - TCT Performance and Coordination;
- - Planning;
- - Contract Operations;
- - Financial Management;
- - Infrastructure;
- - Maintenance;
- - Network Management; and
- - Regulations.

The following diagram shows TCT investment methodology. It connects the five pillars to objectives and by using the *Municipal Land Transport Fund (MLTF)* channels funding to TCT's investment priority projects. Each Priority Project is linked to the respective pillars it addresses and shows departmental leads (who is responsible for implementation) and the priority projects themselves are identified by category : **Institutional** framework, the **mechanism** used and the **investment** needed.






### *4.3.2. Comments & findings*

We found the strategic policy of TCT well linked to its mission and identifying the transport needs of all users as ***'user access priorities'***. While this appears a straightforward concept, there are many different factors in play. Identifying for each category of user their 'access priorities' puts into clear focus user needs and their demands on the system. *User access issues* generally includes time efficiency, convenience, reliability, comfort, safety, congestion, and cost.

Particularly interesting was that TCT aims to reduce the cost of 'user access priorities' as a measure of performance. We did not get the opportunity to discuss this with TCT (as to how they actually propose to do it) but it raises an interesting concept, being that transport strategy should be clearly aimed at the user needs in an economic way.

This approach will no doubt realign the future BRT planning in Cape Town is the Phase 1 BRT was built under a very prescriptive model dictated by international consultants, and it appears not to have considered many aspects of user demand.

### *4.3.3. Potential policy and planning direction for DSM*

DSM planning for DUTA can learn from the approach Cape Town has made in its transport planning, particularly the clear vision, mission and objectives, leading to defined priority projects.

## 4.4. Session 1B – Walk-around in CBD

Nico McLachlan from ODA consultants hosted a walking tour of the CBD to view to PM peak operations. We viewed the Civic Centre BRT station, the top-deck taxi rank above the rail station and the railways station itself.

Some observations/ learnings were:

- That due to a number of factors (cable theft, destruction of carriages through violence, better alternatives such as MyCiTi services, and lack of safety on trains) the dominance of the railways has declined to the point that it is no longer the backbone of Cape Town

transport network. As the rail system is nationally operated (heavily subsidised) the Cape Town municipality has little say or influence over its operation, limiting its integration into the city planning.

- The taxi rank is a significant infrastructure serving as a main terminal for mini bus taxi.
- Due to the government's taxi recapitalization scheme (subsidizing mini bus taxi operators to new vehicles) the average age of the taxi fleet is fairly new. There are no standees allowed and services are very demand-oriented. This makes the mini-bus taxi a strong competitor to MyCiTi.
- Nevertheless some taxi routes are cancelled to force passengers onto MyCiTi to help support the IRT, but the style of vehicle may mean passengers need to stand on long trips.
- Rail , mini bus and MyCiTi are well integrated in the city centre, supporting the notion that BRT in Cape Town is referred to as IRT (Integrated Rapid Transit).
- The value of well-designed infrastructure for mini-bus taxi (covered, route/destination signage), and consistent enforcement of rules

## 4.5. Session 2 – Key lessons from BRT, costs, moderation and operator structure

Presenter: Herrie Schalekamp, Researcher, Centre for Transport Studies UCT

### *4.5.1. Overview*

As an independent UCT researcher Herrie Schalekamp was able to present an 'outsiders view' on the MyCiTi experience and its performance.

He explained that MyCiTi planning had followed very prescriptive BRT design concepts modelled on the Bogota BRT and heavily promoted by ITDP and consultants. These proponents of BRT sold the BRT concept on the basis of: 1) being free of operating subsidy, 2) that paratransit operators (mini-bus taxis) would simply be compensated out of business and would form bus operating companies (BOC), and 3) that international operators would establish business in Africa for technology transfer.

However, events proved otherwise and things did not go to plan. The financial performance of the system has resulted in MyCiTi recouping only 25% of its total costs and **requires a 75% subsidy**. Transitioning operators into companies was very challenging (and costly) and overseas investment did not materialise due to business uncertainty (and most likely lack of confidence in the business model).

Furthermore, BOC operators would be paid under a gross contract[1] where the operator takes no revenue risk. The BRT trunk line was to operate with high floor bus design onto raised station platforms to ensure level-boarding on closed stations. Feeder bus contracts (also as a gross cost contract) were established to service the BRT stations from surrounding areas.

Significant grant funding is required to keep the system operating, presenting substantial risk to the city to provide a long-term funding framework. The fiscal capacity of government is insufficient to allow a full metropolitan-wide rollout of BRT, and some costs are difficult to predict over the longer term, such as the fuel price. The city has apportioned 4% of its budget to support MyCiTi losses.

There are a variety of reasons[2] behind the poor financial performance. Herrie Schalekamp offered the view that the system was in some respects inappropriate for the conditions and that building a 'fancy' and costly system did not mean that it will automatically fulfil the objectives of public transport improvement. He suggested the city should *"work with what it has"* and concentrate on providing bus priority. The city should also proceed with a BRT design *"more grounded in reality",* and be more attentive to the business model. This was not saying that BRT did not upgrade public transport, but given the experience with MyCiTi, future expansion needs a far more tailored and innovative approach, particularly in the engagement with existing stakeholders (the paratransit/mini-bus taxi sector). This view is endorsed in the amended Business Plan for MyCiTi which states that *"The fact that a full rollout of MyCiTi services, based on replacement of mini-bus taxis is too expensive, has driven thinking on the need for a hybrid model in which the formal services and informal services co-exist optimally*."

Also highlighted as a performance issue is that BRT's ability to attract passengers relies on what transport alternatives passengers have available. While the policy of eliminating competing paratransit routes aims to force people onto MyCiTi, high levels of car ownership and good roads act as a competitor to BRT. In some cases the convenience of Mini-bus taxi was better than BRT because there is less need to make a transfer. In fact , the high cost of providing services on BRT has resulted in some minibus routes being re-introduced, to reduce BRT operating costs. These routes apply in the peak hours and are referred to as peak capping.[3]

[1] Gross Cost Contract pays the operator on a km basis, with penalties and sanctions for poor performance/incidents. The system (MyCiTi) collects all fare revenue) and the bus operator carries no revenue risk. Under a net cost contract, the operators either take all or share the revenue risk. Usually they collect revenue but under modern ticketing technology, a net cost contract can operate under a central fare collection system.

[2] Some of these reasons became more apparent in later sessions.

[3] The total fleet numbers for any operation is dependent on the peak fleet requirement, so reducing this requirement, significantly reduces costs.

Peak capping is an example of the moderating of services on MyCiTi, where the city needed to reevaluate service levels given the high cost of operation. Off peak headways were also reevaluated to reduce costs.

### 4.5.2. Comments & findings

The poor financial performance of MyCiTi was a 'surprise finding' leading to many questions as to the cause. High Vehicle operating cost was mentioned, as was the fact that passenger demand, especially on feeder services is low.

As financial performance can be directly linked to fare levels (and passenger volumes) increasing fares could reduce the subsidy burden (but also likely to result in losing more passenger ). However, it has been found that on average, travel cost can exceed 45% of the household budget, so it appears that the affordability cap has been reached.

This leaves the system cost and passenger demand it can attract as the main areas to examine. It was mentioned that the trunk services alone can almost meet their cost of operation, indicating that the financial problem area is the feeder services.

### 4.5.3. Potential policy and planning direction for DSM

Even at the early stages of the DART system, it is becoming clear that the level of service is much higher and much more preferred than the daladala system, indicating that it should have no difficulty attracting sufficient passengers to be viable. If the buses can maintain good speed along the bus way (more or less assured through its exclusive use) then the operating costs will be efficient, making the system financially viable.

The cost of station management (mainly staffing), fare collection costs (staffing & commissions) are key areas that need attention to ensure costs are contained.

Herrie Schalekamp offered general advice for BRT planning, based on MyCiTi experience being:

- Get a good grasp of demand. Operating an intermediate service (with minimum infrastructure but good level of service) helps to gauge real demand levels before building expensive infrastructure.
- Partner with existing operators and take a 'do-minimum' approach; concentrating on bus priority and partnership with operators. Work with what you have.
- Use available funding to develop the capacity of operators (training).
- Understand the difference between policy and what happens in reality, paying particular attention to the business model.
- For every city the question is: How to define sustainability? It is more than just survival. Is it meeting real needs /objectives and the sustainability aims of the city?
- Key issues for Dar es Salaam:
- DART will need to re-examine its policy for feeder bus contracts as a gross cost contract does not give the operator the incentive for passenger growth and making routes efficient (this will be discussed further in this document).
- The next phases of BRT design need to be examined to ensure they are fit for purpose. Is it possible to reduce the cost of infrastructure and do more with less?
- Low cost extensions along trunk routes e.g. to Mbezi need to be considered.
- Engagement with Daladala for quality improvements to public transport is a key area of focus. Bus priority lanes for daladala and regular buses with electronic ticketing and enhanced passenger facilities could have significant benefit for lower cost.

## 4.6. Session 3 - Planning of Feeder routes and intermediate Phase 2 routes

Presenter: Gershwin Fortune, Transport System Planning & Modelling Manager TCT

### *4.6.1. Overview*

The issue of financial performance was further examined as well as a discussion on the N2 Express services, which represents an intermediate MyCiTi Phase 2. There was also a discussion on BRT design, namely the use of low floor buses to extend the reach of BRT.

Gershwin stated that the main causes of financial problems were that:

- During planning the passenger demand assumptions were highly optimistic, not taking into account alternative means of travel to BRT. This resulted in actual fare revenues being significantly lower than modelled fare revenues.
- System costs were higher than expected. These included station costs such as staffing, costs of fare collection/ticketing system and high VOC (kilometre cost of operation.
- Low demand on feeder routes.

Gershwin indicated that the financial problems related to overall BRT, but the feeder routes in particular did not carry sufficient passengers relative to the kilometres they operated. He stated that a future model would be under a net-cost model (carrying their own revenue risk) would be more likely to improve matters. He acknowledged that the present business model of gross contract, guaranteed kilometres and revenue paid by kilometre of service operated , did not give operators any incentive for passenger growth or trimming services to meet demand.

Regarding the planning and design of BRT he stated that:

- BRT in its present form, takes too long to roll out, and more innovative ways must be found to expand the system.
- Risk must be shared with operators as presently the government takes 100% of the risk.
- Staggered stations were an advantage to save road space, but a bad idea as they significantly increase operational and staffing costs.
- Initial planning of capacity for BRT passenger was highly over-rated, based on a bus capacity of 150 passengers. In real life conditions bus capacity proves to be 120 passengers per bus, and operational headways less than 90 seconds presents operational difficulties. As a result BRT capacity for MyCiTi is around 4800 for a line operation and could reach around 9000 passengers with express buses added.
- MyCiTi target headways of no less than 2 minutes.
- Mini-bus taxis can often be a passenger choice due to point to point travel without need for transfer.
- High floor design of BRT buses (fleet type) meant that the service provides no flexibility for allowing disabled access ‘off-BRT’
- Extending trunk services along the route (without BRT lanes) will be a strategy to reduce transfers that passengers need to make.

### *4.6.2. Comments & findings*

The fact that Gershwin expected that the private sector could operate the feeder routes profitably raised the question: *Why is that so?*

It appears the only logical explanation is that the private sector, on a net cost contract where they take the revenue risk could reduce their costs and possibly realise some passenger growth. The present gross cost contract under MyCiTi does not incentivize the operator to reduce non-profitable

services or work to increase passenger numbers. In fact, the system works against efficiency improvements as payment by km does not create any effort to win passengers and the operator will have no interest to reduce kilometres even if buses are running with low passenger numbers.

The question of high floor vs. low floor buses was discussed, and it was indicated that in future SA would opt for low floor buses to improve flexibility of services. This however does not properly address the operational limitations of low floor (higher capital cost, potentially higher maintenance costs, less internal space for passenger movements, design issues in placing equipment that normally goes under the floor etc.) A conclusion may be that each system needs to work out its needs and requirements and select the bus type accordingly. Feeder buses that dock at BRT stations (high floor) can also be made to either pickup at kerbside level (front door) or use raised platform bus stop on feeder routes (as used in Jakarta and Palembang in Indonesia).

### *4.6.3. Potential policy and planning direction for DSM*

DART expansion into feeder routes should not be by gross contract, but rather DART should partner with the bus operator to provide services.

Integrating the feeder bus to the BRT is an important integration issue – if the transfer cannot be avoided, then let it be as seamless as possible. In Johannesburg the feeder buses dock directly onto the BRT platform using a BRT style door. If necessary it also allows the feeder bus to operate part way along the BRT to provide better connectivity (reduce transfers). This option should be considered for the DART system.

Local concerns on the total passenger volume capacity for BRT have been vindicated by the Cape Town experience. It seems conclusive that a maximum capacity of 10,000 passengers per hour per direction (phpd) is the limit for a trunk line BRT. This would indicate that for the Nyerere Rd and the Bagamoyo road corridor an elevated MRT rail system be considered instead of BRT. Each of these corridors is expected to carry 20,000 passengers phpd with 15 years. It is entirely possible that a BRT will be overcapacity even at its completion date. A modified bus-priority system (using existing road space) should be considered to deliver early stage improvement pending the MRT development.

As the World Bank is committing itself to funding a BRT for Nyerere Rd, urgent representations need to be made to ensure that this high cost investment is not wasted; building a system that will not meet demand in the future.

## 4.7. Session 4 – Site visit feedback, comments, applicability and adaptability to Dar es Salaam

Moderator: Frits Olyslagers

### *4.7.1. Overview*

In this session, study members shared their impressions and comments on the Cape Town system. Comparisons were inevitably drawn with the DART system and in some cases can be instructive.

### *4.7.2. Comments & findings*

Briefly, the comments related to the following observations:

**Fare collection and ticketing** in MyCiTi does not operate smoothly. It took 2 hours to purchase the MyConnect smart cards for our study team members (21 in total) to use the MyCiTi system. As the ticketing system is the first point of interaction for customers, it did not provide a good impression.

**Door operation** at platform was slow and the benefit of the slide out (or flip out) ramp made the door opening procedure noticeably slow. Drivers often did not dock accurately.

**Passengers need 'next station' advice** on the bus.

Cape Town experience has shown the possibility of **reducing the high level of BRT investment**, and even **extending coverage** with more targeted treatments of bus priority and more innovative services (example the N2 Express services).

**Extending trunk routes:** The idea of the N2 express (off-BRT service) could be used to extend DART past Kimara to Mbezi.

Some comments:

- The N2 service in Cape Town did not appear viable in the off-peak. (Comment: In South Africa, the nature of demand to and from remote townships is very peak demand oriented. Off-peak services are a social provision which should be able to be compensated by peak profitable routes).
- BRT in mixed traffic will be ineffective (low efficiency). (Comment: But if it serves a remote but important centre even at slightly slower speeds it extends coverage of the system.)
- Hybrid service would be useful in Dar es Salaam.

**City Parking** in Cape Town is managed by a contractor who has an innovative parking management system which could be useful in DSM. (See Section 3.12 Session 9)

**The influence of minibus taxi associations** was questioned, in that they become major shareholders in the bus operating companies, and some of the compensated operators reinstated dormant taxi licences to compete against the system. *(Comment: This is the political context of South Africa. Governments have a weak negotiating hand against these powerful organisations, which readily resort to violence to impose their will).*

**Bus network integration** is important in Dar es Salaam. The BRT should not be a single corridor system but be part of a total integrated network that includes multiple modes.

**Transit-oriented development (TOD)** should be implemented in Dar es Salaam to support the BRT as well as BRT being able to support development. Government must actively create the development guidelines so that the transport and land-use are working together to optimise benefits.

**Feeder routes** to service BRT need to be established on a sustainable footing. Effective feeder services will extend the BRT 'footprint' so more people can access the system conveniently. Also, feeder routes

should be designed to cross over BRT provide cross suburb travel and in some cases be allowed to duplicate part of BRT to reduce transfers.

A **Transport/BRT Research Unit** should be established in DSM, to provide independent research and analysis for Dar es Salaam public Transport. The Centre for Transport Studies at UCT provides such an example.

On the **issue of subsidy:** A comment was made that given the social objective of Cape Town to improve public transport to create an 'opportunity' city, that the use of subsidy was not necessarily a bad thing; *if MyCiTi cost 4% of the municipal budget to provide services then so what?* BRT can serve as a catalyst for growth and prosperity. *(Comment: This is a fair comment. The problem was that the subsidy was not expected given the promises of BRT proponents that the system could cover operational cost. It raises a further question, when is a subsidy good and when is it bad?)* We covered this in the next day session – see Section 3.8 Secession 5)

For DSM, **why not open the BRT for use of taxis and emergency vehicles? It will help traffic flow.** This idea was rejected, firstly because DART explicitly has a policy of the busway being exclusive for BRT, secondly, enforcing the BRT dedicated lane would be much more difficult when people see multiple users, and lastly, such mixed traffic on the busway will interfere with scheduled nature of the BRT, defeating its purpose. *(Comment: It should also be noted that with introduction of BRT (and stop-staring daladala removed from mixed traffic) general traffic should experience an improved flow. BRT should also be designed as part of the total transport economy – not BRT at the expense of all others.)*

In DSM the **condition of stations** (cleanliness and behaviour) should be better policed to ensure the good image is maintained. In Cape Town, the standard of cleanliness is high.

**Disabled access** has not been considered in Dar es Salaam whereas in Cape Town it is an important priority.

**Pedestrian signalling** also needs to be installed on the DART system. It was noted that in cape Town this was well managed.

**On the issue of unauthorised competition in Cape Town.** A clear regulatory regime is required to regulate completion, and maintain service levels and standards. This should also enforce rules of competition and this is the task for the regulator not the paratransit associations. Government must have a clear conflict resolution mechanism.

Further comments were submitted by team members and have been included as ***Appendix C.***

### *4.7.3. Potential policy and planning direction for DSM*

**Issues raised relevant to DART**

Engineer Kuganda from DART shared a detailed summary of DART design issues in response to member's enquiry. This highlighted some current DART issues, however as DART is in early stages many of this issues will be resolved as the system establishes itself.

**Fare Collection/smart card ticketing**

Fare collection was identified as a key issue in system quality that directly affects passengers. In DSM, DART was forced to adopt a system purchased by UDA-RT the bus contractor(illegally, i.e. outside their contract provision). This is now implemented and appears to be working satisfactorily.

The proposed Boloro system being piloted on the daladala can easily be integrated with DART BRT in parallel to the smart card) and this possibility needs to be examined for seamless daladala/BRT connection.

**Tailoring BRT design more appropriate to needs**

Numerous comments held that the high investment of BRT could be moderated to deliver a more appropriate system for Dar es Salaam.

As an example, one team member proposes implementing a median bus priority system along Nyerere Rd using the existing median road lanes and build station platforms in the median but use 'on-bus' ticketing. This would significantly reduce infrastructure cost, with investment diverted to more needy areas.

Such a system could be implemented quickly and serve as an interim measure until MRT is built (refer to discussion on BRT capacity). This suggestion need active evaluation and is supported by the lessons from Cape Town.

## 4.8. Session 5 - BRT financial performance and subsidy issues

Presenter: Frits Olyslagers.

### *4.8.1. Overview*

This session addressed some theoretical and practical issues of financial performance. The fact that MyCiTi relies on a 75% subsidy to cover its operations has been a revealing fact.

### *4.8.2. Comments & findings*

**Financial performance of a bus system**

Financial losses need to be compensated by subsidy (which can be costly). Financial subsidy can be expected and planned for, where:

- It has a purpose such as paying for service delivery or is aimed to deliver an economic benefits or social services
- As such it supports BRT as part of a city's function to achieve a goal (sustainability objective) or,
- It can be a 'commercial' instrument, planned to achieve a business objective (e.g. affordability)

Bus subsidy can also be unexpected, unplanned and inconvenient, simply covering operating losses or inefficiency. This could be due to:

- Inappropriate business model
- Insufficient passengers (revenue)
- Low price
- Too high operating cost

In a bus operation, tools to reduce subsidy can be:

- Reduce system cost:
  - Do not over-design station functions, and design appropriate to conditions;
  - Ensure realistic vehicle operating costs (VOC) and implement bus operating contracts where risk is shared;
- Win more customers; by designing services that attract passengers by meeting user needs better, price mechanism (fare policy), innovation;
- Adjust services for demand/ efficiency (increase or decrease);
- Find supplementary sources of income (advertising, road toll cross subsidy)

High system costs can be fatal for a BRT:

- Creates conditions where a monopoly forces people to use BRT by eliminating competitors to BRT (reduces passenger choice)
- Makes it too expensive to operate off-peak social services (more services are non-commercial)
- When we reduce non-commercial services (to reduce operating costs) we lose more passengers

### *4.8.3. Potential policy and planning direction for DSM*

On financial performance

- Dar es Salaam needs to evaluate design principles for BRT to ensure suitability to context.
- Carefully evaluate present Phase 1 for critical performance issues affecting its service objectives

To be sustainable:

- DART needs to meet the needs of the market
  - Who is the market?
  - How does the market see or perceive quality?
- With a service people prefer to use (willingly)
  - Safe, respectful, convenient, reliable and affordable
  - The service must integrate with feeder/ daladala (not a stand-alone system)
  - All transport service make up the network
  - And actively manage costs
  - Efficient bus contracts (VOC)
  - Efficient infrastructure/ overheads (e.g. stations/ ticketing costs)

## 4.9. Session 6 – Engagement with existing industry to improve public transport outcomes

Presenter: Frits Olyslagers.

### *4.9.1. Overview*

*Note that the term 'paratransit' is used to describe mini-bus taxis/daladala type services. It represents the fragmented bus operations of owner-drivers or small micro businesses where the bus is rented to driver/conductors who manage daily revenues. The regulatory structure usually involves operating under a permit for a set route and often there are illegal paratransit operators in the mix, meeting demand wherever they see it.*

South Africa has shown the difficulty in formalizing paratransit operators through BRT into formal companies. **Due to its fragmented and highly individualistic nature, paratransit services are the most difficult to reform.** This has caused the Centre of Transport Studies at UCT to research a more incremental step by step approach to developing capacity in the mini-bus taxi sector so that system reform is less reliant on the model of BRT and formation of BOC.

Clearly the current BRT-led methodology is not working, with one researcher stating that: *"thousands of paratransit operators would have to formalize their businesses, or merge into new or existing operator entities in order to participate in the new systems. - there is absence of accessible business*

*plans and regulatory regime proposals around which paratransit can be engaged to convince it to alter its current modus operandi"*

It should also be stated that reform through BRT is very expensive, and Cape Town BRT expansion is being limited by government's fiscal position.

### *4.9.2. Comments & findings*

Note that it can be argued that the greatest **improvement to public transport in Cape Town been in the mini-bus taxi sector.** The Phase 1 MyCiTi system carries only an **estimated 3%** of total passenger trips but represents an investment of **ZAR 4.6 billion.** The South African government has contributed **nearly $900 million to build and run MyCiTi** through its Public Transport Infrastructure and Systems Grant program (Source: http://www.citylab.com/commute/2013/03/limits-bus-rapid-transit-cape-town-case-study/4968/.

On the other hand, the investments into the taxi recapitalization scheme has also been significant with **ZAR 50000** available per vehicle as a scrapping allowance for any MBT owner to modernize their fleet. Compliant safety standards in new vehicle mean all passengers have seatbelts, and buses have rollover crash protection and dual braking systems. As a result 80% of the fleet has been replaced with new vehicles.

**Minibus taxis parked at the Main taxi terminal in Cape Town awaiting passengers**

The Cape Town experience shows that it may be better to work with the existing industry to improve its capacity for better quality outcomes. Simply put, it needs the design of a business model that utilizes the positive aspects of the paratransit while eradicating the negative behaviours.

UCT research is proposing a **5 step transition process** that starts with establishing cooperatives, and progressing through a sequence of improvements of fare collection, collective fleets, new bus purchases and eventually forming companies to operate bus service contracts

Engaging with the paratransit operators to deliver the feeder services to MyCiTi would appear to be a forward thinking step, with a sharing of risk and a greater incentive for efficiency and passenger growth that presently occurs MyCiTi Feeder bus contracts.

### *4.9.3. Potential policy and planning direction for DSM*

In Dar es Salaam, under the CUPID program and with SUMATRA as the lead facilitator we are using a similar approach to engagement with the daladala sector. The difference is that we are commencing with central fare collection using the Boloro technology and SUMATRA is presently facilitating a pilot

project (20 daladala) as proof of concept. The reason for this approach is that it can be shown that revenue is at the heart of most of the problems that beset the daladala business. See ***Appendix A.***

While the Boloro Technology offers the benefits of total revenue capture (thereby improving business viability), providing greater convenience for passengers, being transparent and collecting all revenue and operating data, its greatest benefit is **that it allows central fare collection without requiring the authority to take revenue risk.**

It is expected that when revenue management is under control, it will be easier to form cooperatives.

## 4.10. Session 7- Fare Collection Technology

### *4.10.1. Overview*

Fare collection for the MyCITi is via the stored value card, being either a standard card or a 'Mover' Card. The standard card operates like an electronic purse, able to be used for a range of purchases across many merchant outlets. The bank holds the stored value balance of these cards.

On the other hand, the Mover card can be loaded with set amounts only and used only for the MyCiTi system. Funds deposited go directly to MyCiTi, and to incentivize their use a 20% discount on bus fares is offered to passengers using this card.

### *4.10.2. Comments & findings*

One finding was that the present system handles new customers poorly with a time consuming process to enrol on the system and obtain a card. It emphasised the importance of the customer interface in fare collection technology.

### *4.10.3. Potential policy and planning direction for DSM*

Presently the DART BRT has adopted the stored value and there are no plans at this stage to integrate fare collection with daladala.

As stated in the previous section, centralised fare collection is instrumental to managing revenue, and this is the key to forming cooperatives to better regulate the daladala sector.

The Boloro technology is being piloted for this purpose. For a more detailed overview of the technology see ***Appendix B***.

*Note that we are not in the position to promote specific brand technology and have no vested interest to do so but we need to utilise technology that suits our functional purpose best.*

It is expected that the Boloro technology can easily be fitted to BRT stations, even in parallel to the existing system. This would enable a 'one-ticket ride' while transferring without incurring the cost penalty of a new fare.

Such integration would strengthen both the business of daladala and the BRT system.

## 4.11. Session 8 – Determining Fare Policy

### *4.11.1. Overview*

It was noted in Cape Town that fare setting is a highly sensitive issue with strong socio-economic rationale. This concerns the demographics and disadvantage/ equity issues that Cape Town faces.

Of particular note was the fact that while internationally, the proportion of household budget for transport is in the range of 5-10% in Cape Town it ranges over 45% (with some data indicating as high as 70%).

### *4.11.2. Findings and Conclusions*

**Lessons from Cape Town:**

- Affordability can be measured by **percentage of household income on travel**. Relative to income fare levels are high.
- **Distance based fares are more equitable** – besides, people expect to pay more for longer distance (can exploit willingness to pay)
- Fare control may be a social requirement or **tool to reduce disadvantage**
- Price mechanism is useful to **massage demand** (Cape Town increased peak fares to be able reduce demand on peak services to reduce overall fleet size /fleet costs)
- Or price can be an instrument to **develop patronage** (market competitive/ volume user /loyalty rewards) and build revenue

This fact brings us to certain conclusions:

- **To make good quality transport accessible may require a user- subsidy** to assist with affordability issues for the low-income sector
- High cost system increase pressure on affordability/subsidy issues.
- The MyCiTi fare policy needs to offer discounts for volume travel to assist workers to access their daily employment.

### *4.11.3. Potential policy and planning direction for DSM*

For DART and daladala services there should be a commercially –oriented fare setting policy. By this we mean acknowledging that services have to be paid for, and you 'get what you pay for' and price is a deciding factor in the customer's choice of travel.

So a FARE POLICY needs to be developed.

**Facts on setting fare policy**

- **'Affordability'** means different things to different people (income status/ volume of travel/ perception of value).
- Static fares set by government (the traditional method) can remove the ability of the business to use price mechanisms to attract customers.
- Static fare levels affordable to the poor, will deliver a 'poor' system
- **'Willingness to pay'** can be exploited and used to compensate special needs or disadvantaged groups.
- Modern fare technology can target user-subsidy more accurately and manage complex fare structures such as volume discounts.
- The **'system manager'** (DART) can adjust fare policy to increase value to the passengers and increase value to the operator/company, such as:
  - Discounts for volume travel
  - Provide additional value (utilize empty seat capacity)
  - Charge premium fares for better quality
  - Capping concessions to prescribed limit
  - Tourist cards (greater willingness to pay)
  - Family discounts (as a social concession)

**Fixing the Fare Policy**

- The Operational/financial model will provide the commercial fare (sometimes called the technical fare – being the average per trip fare needed to cover all costs – total cost /total passengers). Then evaluate:
  - Are costs too high? Are services tailored to needs?
  - Affordability / willingness to pay is evaluated
  - Specific discount to needy groups (fare policy)
- May require assistance to reduce costs
  - Government intervention to improve efficiency (say, building bus priority traffic lanes)
  - Government provides assistance to buy fleet - as a 'one-off' subsidy
  - Commercial performance incentives must be retained (no loss- compensating subsidy)
  - Provide cross subsidy from other activity (road tolls on parallel roads, developers levy where land values/ commercial activity increases along major transport corridors.
- OR government may decide to pay for non-commercial services where social needs are provided for.

Setting a fare policy for Dar es Salaam is a business decision for DART based on the above guidelines. It is the same pricing exercise that applies to any business; setting a price that attracts customers and increases turnover and revenue. The only difference is that social impacts need to be assessed and considered (and managed).

## 4.12. Session 9 – Parking Policy and Management in Cape Town

### *4.12.1. Overview*

As an introduction to this section we include the parking policy contained in the Comprehensive Integrated Transport Plan 2013-2018

The Strategic Intent of this Parking Policy is to manage parking supply and demand in high parking demand areas efficiently and to reduce private car dependency. This Policy is one of the components under the Comprehensive Integrated Transport Plan 2013-2018.

One of the interesting points of the Policy is that the Policy targets the service level of 75% to 85% of occupancy for any parking spaces. This targeted service level is aimed to be achieved through the following 20 policies, such as adjustment of the parking fees depending on the demand.

Policy 1: Undertake regular enforcement of on-street and public off-street parking and areas to ensure compliance with the City's By laws.

Policy 2: Improve enforcement of non-payment and exceeding time limits in managed parking areas.

Policy 3: Investigate the introduction of payment with Europay, MasterCard and Visa (EMV) compliant smart cards in priced parking areas.

Policy 4: Communicate with the public on the benefits of managed parking and the availability of parking in managed areas.

Policy 5: Expand managed parking areas with the implementation of parking management contracts.

Policy 6: Implement performance based pricing as a new pricing strategy.

Policy 7: Implement reduced parking requirements to support new development and address private car dependency proactively.

Policy 8: Support land-use and building plan applications for the development of remote parking in proximity of urban nodes.

| | |
|---|---|
| Policy 9: | Implement design requirements that will enable the future conversion of on-site structured parking into other land-uses. |
| Policy 10: | Provide a high quality customer experience at Park & Ride facilities. |
| Policy 11: | Reserve Park & Ride parking for public transport users. |
| Policy 12: | Improve enforcement to eliminate illegal use of loading bays. |
| Policy 13: | Improve the availability and efficient use of loading bays by bona fide freight vehicles. |
| Policy 14: | Improve enforcement to eliminate illegal use of bus bays. |
| Policy 15: | Investigate the provision of appropriately located and designed facilities for long distance bus services. |
| Policy 16: | Improve enforcement to eliminate illegal use of reserved parking bays. |
| Policy 17: | Introduce a new parking permit and parking pricing for the disabled to address abuse of reserved parking for the disabled. |
| Policy 18: | Introduce a Resident Parking Permit system in managed parking areas or areas where access and parking is restricted during major events. |
| Policy 19: | Reserve parking temporarily through the hiring out of parking bays at the applicable tariff in terms of the TCT Tariff Schedule. |
| Policy 20: | Implement bicycle and motorcycle parking in support of the TDM Strategy and sustainable modes of transport. |

### *4.12.2. On-street Parking System in Cape Town*

During site visit of the Cape Town CBD, we found a designated on-street parking area and its parking marshals. We interviewed a parking marshal about their parking management system and the parking marshal gave some explanations. During the interview, a parking supervisor appeared and advised us to contact with their manager for more details.

On-street parking spaces are well-managed by the service provider (Street Parking Solutions) under contract with Transport for Cape Town. Mr Zunade Loghley and Josh Lindenberg of Street Parking Solutions addressed one of our sessions. The following explanations are provided by them and includes some of our observations.

They introduced the subject with a discussion on the necessity of on-street parking management; being to maintain the attractiveness and economic life of the city, the viability of businesses whose customers can park close by, and vibrancy of communities and land values. Managed parking (by uniformed and radio equipped parking attendants) also aided to reduce crime and improve public safety.

They also emphasized the human element in parking management, that enforcement and penalties for non-compliance could be less draconian through the use of technology. Enforcement for non-payment was also assisted by technology that keeps irrefutable records, helping to retrieve payments.

**Efficient Control System with New Technology:** The Street Parking Solutions system uses an embedded sensor system to manage space occupancy and payment is collected manually by parking marshals using a range of payment options including cash, card payment, MyCiTi MyConnect cards, or phone app. such as SnapScan).

Parking marshals use a smartphone to register every parking car with its plate number, time of arrival and parking slot number. The embedded sensors on each parking slot detect the existence of parking cars and the information. Both information from parking marshals and embedded sensors are synchronized with the central control center. Their latest application does not require sensors on each space, instead it centrally processes all data to identify vacant spaces and makes this information available to motorists looking for parking.

**Embedded sensor on the center of parking slot** **Data communication antenna**

**Procedure of Fare Collection:**

1) **Registration of parking:** The Parking Marshal resisters each parking car individually when a car parks. Plate number and entire vehicle characteristics are captured smartphone camera application, which is equipped with number plate recognition, storing both photograph and plate number information on the centralized data system.
2) **Print parking ticket:** once the registration is finished, the parking marshal prints a parking ticket using a Bluetooth printer which shows time of arrival, plate number, parking slot number and ID number of parking marshal.
3) **Payment of parking fee:** Parking users are allowed to park only for the set time limit as signposted. Once parking user come back to his/her parking car, the parking marshal calculates the parking fee using the smartphone and collects payment. Parking is charged in 15 minute increments.


Parking marshal with credit card reader Parking ticket issued after registration of parking

**Parking Regulations:** Basic parking policy and parking fees are set by Transport for Cape Town. The city's parking policy aims to balance transportation demand by managing parking supply and demand in high parking demand areas efficiently and with an aim to reduce private car dependency. It was observed that the targeted service level of 75% to 85% of parking space occupancy is achieved.

**Basic Parking Fare Rate in CBD of Cape Town**

| Time | Fare (ZAR) |
|---|---|
| **0 – 15 min** | 3.40 |
| **16 – 30 min** | 6.80 |
| **31 – 45 min** | 10.20 |
| **45 – 60 min** | 13.60 |

**Control & Management System:** All data information is monitored by control center in real time. It monitors the occupancy level of parking, fee collection and battery level of each parking marshal's

smartphone. For monitoring the performance of parking marshals, supervisors circulate around their designated area by bicycle. Parking marshals are assigned for specific area and control about 20-30 parking bays per person.

Graphic User Interface at Control Centre Source: http://www.streetparkingsolutions.co.za/

### 4.12.3. Comments & findings

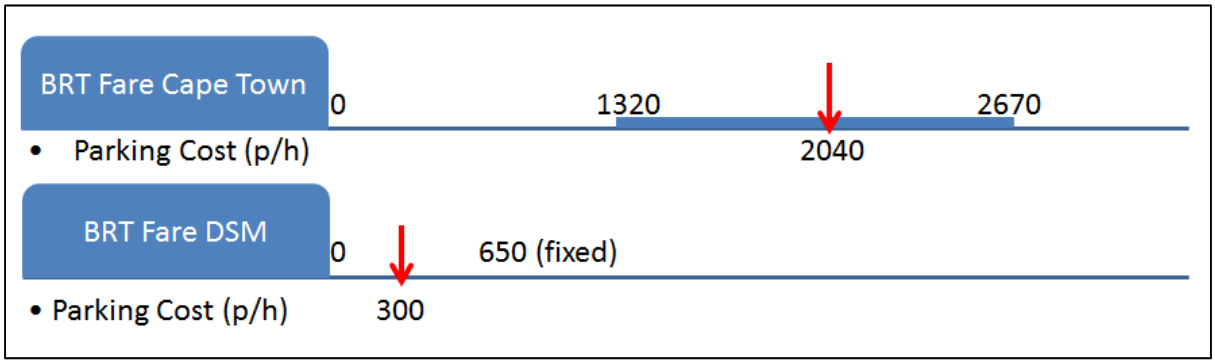
The parking technology looked well-functioned and well-organized. Both initial investment cost and operating cost would not be so high but the revenue from on-street parking would be assured.

Comparing parking cost between Cape Town and Dar es Salaam, the on-street parking fee in Dar es Salaam seems too low. Compare also the relationship of parking cost to BRT fare in both cases, because these costs need to be linked to discourage parking and encouraging public transport use. Note that cheaper BRT fares in Dar es Salaam reflect local conditions with higher passenger numbers than MyCiTi.

**Comparison of BRT and On-street Parking Fares**

| | Cape Town (ZAR/Rand) | Cape Town (equivalent shilling) ZAR 1=TShs 150 | Dar es Salaam TShs |
|---|---|---|---|
| **BRT Fare (distance 10- 20 km)** | ZAR 8.80 to 17.8 | TShs 1320 to 2670 | Tshs 650 |
| **On-street Parking Fare per hour** | ZAR 13.6 | TShs 2040 | Tshs 300 |

**The relationship between bus fares (10-20 km) and hourly parking charge for the two cities**




What the above diagram shows is that potentially the Cape Town parking charge can be much higher than the bus fare, whereas in DSM the hourly parking charge is less than half the bus fare.

### 4.12.4. Potential policy and planning direction for DSM

Introduction of this parking management technology is worth considering for Dar es Salaam. Better rationing of parking spots will benefit motorists who often have to park a long distance from their destination due to the habit of all-day parking.

Under the CUPID project for improving parking policy in Dar es Salaam (commencing with central revenue collection) this parking management technology can be incorporated so as to better manage the parking spaces.

It is also clear that parking charges need to be increased, to be higher than cost of bus fares and the city will also reap the benefits of additional revenue (where it directly received parking fee revenue centrally).

## 4.13. Session 10 - The prospect of hybrid transport systems – experience in Africa, research projects

Presenter: Prof. Roger Behrens UCT and Nico McLachlan ODA.

### *4.13.1. Overview*

Professor Behrens outlined the ambitious South African 2007 Public Transport Strategy aimed to deliver full coverage with scheduled PT networks and mini-bus taxi formalisation in 18 cities/towns over 3 phases in 14 years.

One of the aims included reducing or eliminating operational subsidies via the path of more efficient BRT. However, he showed that BRT operating subsidies are significantly higher (2-3 times higher) than existing subsidy levels in SA (taking into account the 6 largest SA metros). So despite heavy investment in BRT and the policy efforts, the unscheduled mini-bus taxis are gaining market share.

So it is concluded that Cape Town and SA cities will need to depend on hybrid systems containing both scheduled and paratransit operators and the transport reform strategies should recognize both the presence and value of the paratransit services, not ignore them or seek to displace them.

This will require a more incremental/flexible approach to paratransit reform than implementing 'big bang' BRT . Finding ways to work complementary with paratransit to deliver integrated transport networks will be the key.

Also, Professor Behrens stated that BRT development will require a more a unique/contextually grounded model of BRT (that does not conform to some silly notion of a universal 'gold standard' promoted by ITDP and cohorts)

The idea of hybrid system (a balance of BRT and paratransit business models) was shown to have three types:

- de facto hybrid systems (e.g. early Bogota) where the continued existence of paratransit is not recognised
- modified de facto hybrid systems (e.g. Delhi) the public transport strategy is amended in order to recognise the unintended continued presence of paratransit operators
- de jure hybrid systems (e.g. Jakarta) the public transport reform strategy explicitly recognises the continued presence of paratransit and seeks complementarity

The sharing of the public transport task in the design of routes between the players can take different forms. It may include paratransit simply providing feeder services; or they could operate the secondary routes that cross over or partly duplicate BRT for short local trips (and also act as feeders to BRT); or even sharing peak load demands as is used in Cape Town (termed peak lopping).

Different types of contract/licence/permit types can be used in the mix. It is important not to get locked into an ideology in this regard; each model must contain the right incentives to drive performance and in particular, each risk must be assigned to the party that can manage it best.

There is no single transferable 'magic bullet' model for contract/service design. Trade-offs may need to be made.

The case studies shown in the presentation showed that each city had unique circumstances, but offered lessons which can be taken heed of.

Areas of focus in developing these paratransit business models were:

- Business development – Consolidation (cooperatives /associations), training, diversification (other business opportunities), collective purchasing advantages.
- Operating environment – rank/terminus provision, bus stops and signage/ traffic priority treatments.
- Vehicle fleet - vehicle renewal incentives, cooperative loans ( vehicle purchases and repairs)
- Operations - driver training/recruitment, uniforms, vehicle tracking, fare collection, passenger information

Some research areas were discussed involving the service integration with scheduled trunk operations. It showed the importance of calibrating feeder services to the trunk route schedules to ensure a more seamless connection.

Some further questions were tabled, which may also be applied to Dar es Salaam )

- what complementary roles might unscheduled paratransit services play in Cape Town's IPTN?
- how should market entry and service provision by these complimentary services be regulated?
- what is possible within the current legislative framework?
- how willing are the incumbent operators to change?
- how might unscheduled service operators be incentivized to provide feeder/distributor services that match trunk service durations, and minimize off-peak transfer time?
- can cashless fare collection systems facilitate subsidies targeted to off-peak service provision, and to designated passenger groups?

### *4.13.2. Comments & findings*

From the above presentation we learned that:

- BRT led reform/operator transitioning to companies in SA has proved not feasible and unaffordable
- A more flexible complementary system is needed that involves priority trunk systems as well as local services working as an integrated network
- BRT planning must be less ideological and more grounded in reality
- Developing a sustainable business model for paratransit is an important step to deliver quality transport outcomes

### *4.13.3. Potential policy and planning direction for DSM*

It is worthwhile to note that the same BRT/operator transition thinking that supported the Cape Town MyCiTi planning was also applied to Dar es Salaam.

This gives some understanding as to why the Dar es Salaam system has been so difficult to implement, in that this planning has proved not well adapted to unique and local conditions. This is not to say Dar es Salaam's system will not perform well, but to strike a cautionary note that the daladala operators need to be engaged (and not just be displaced).

While Cape Town and Dar es Salaam are different in many respects, the lessons of Cape Town are salutary for Dar es Salaam showing that the informal industry needs to pay a complementary role but under an improved business model.

# 5. Lessons Learned and Policy Direction

## 5.1. Individual comments & findings

The submitted comments and feedback from participants is included in Appendix C.

## 5.2. Potential policy and planning direction for DSM

Cape Town has unique political and historical factors that drive policy:

- Displacement of black populations to remote townships in 1969 caused areas of chronic disadvantage and isolation where unemployment and crime are still major problems today. Cost of travel as a percentage of income is a big issue.
- Social injustice also affects negotiations with mini-bus taxis as these are a business dominated by black people. The MBT associations are often militant and violent, causing government to over-compensate to achieve their cooperation. This affects the business model of MyCiTi.
- These issues define the context in which Cape Town designs its policies and systems, so we cannot adopt Cape Town's policies in a wholesale manner without proper analysis to offer guidance to DSM policies.

### *On BRT Business Planning*

| | |
|---|---|
| **Poor demand is not an issue facing DSM.** | In Cape Town there are some viable alternative to BRT, so passengers have some choice |
| **Pay particular attention to the business model**<br>**The design of stations and cost of management affects the business costs** | Vehicle operating costs & overheads<br>It's a station design issue. Closed stations are high capacity, but on bus ticketing can reduce station management costs. |
| **Intermediate type BRT services helps to gauge real demand levels before building expensive infrastructure** | This means building improvements with minimum infrastructure intervention but good level of service to determine design approach |
| **Partner with existing operators and take a 'do-minimum' approach** | Concentrating on bus priority and partnership with operators. "Work with what you have" |

| | |
|---|---|
| **Understand the difference between policy and what happens in reality** | Use available funding to develop the capacity of operators (training) and work on consolidation |
| **Review next phases of BRT design to ensure they are fit for purpose** | Is it possible to reduce the cost of infrastructure and still achieve objectives? |

### *On BRT Service Planning*

| **Use an 'Objective-based' approach:** | |
|---|---|
| **Develop the network by partnering with daladala for Feeder services, on a risk share model**<br>**Change DART policy of gross cost contracts on Feeders**<br>**In Cape Town, MyCiTi taking business risk on Feeder services has proved expensive. There is no incentive for operators to grow patronage or operate more efficiently.** | Establish Cooperatives for daladala will help formalize the industry and be an achievable step to establish companies in the future<br>Bus priority lanes for daladala and regular buses with electronic ticketing and enhanced passenger facilities could have significant benefit at lower cost<br>In Cape Town the greatest improvements to public transport has been through MBT |
| **Introduce:**<br>**Low cost extensions along trunk routes &**<br>**Physical integration of Feeders** | e.g. to Mbezi need to be considered.<br>e.g. From Tazara and Mwenge |
| **Integrated fares is a key network issue, affecting affordability and car competitiveness** | Integrate daladala ticketing with DART BRT |

### *Engagement with Daladala*

- CUPID - Short term Project 3 to improve quality of public transport (business model)
- Aim: To harness to positives of daladala and removing the negatives
- Introducing Boloro to centralize fare collection as a first step
- Most daladala problems relate or a motivated by revenue
- Makes it easier to form cooperatives to formalize and create order in the business

### *BRT design issues*

| | |
|---|---|
| **Cape Town experience shows a maximum capacity of 10,000 passengers (phpd) is the limit for a trunk line BRT**<br>**(90 sec headways )** | In Dar es Salaam similar conditions would indicate likewise |
| **Nyerere Rd and the Bagamoyo Rd corridor have a forecasted 20,000 passengers ph/pd within 15 years.** | This potentially makes Phase 3&4 BRT under-capacity even at its start date |

| | |
|---|---|
| **Elevated MRT should be urgently considered** | A priority busway (using existing road space) should be considered to deliver early stage improvement pending the MRT development |
| **The World Bank is committed to funding a Phase 3 BRT for Nyerere Rd** | Urgent representations need to be made to ensure that this high cost investment is not wasted; building a system that will not meet demand in the future |

### *DART's business objectives need to be clear*

| | |
|---|---|
| **To meet the needs of the market** | Who is the market?<br>How does the market see or perceive quality? |
| **Provide a service people prefer to use (willingly)** | Safe, respectful, convenient, reliable and affordable |
| **To be car competitive and must offer a network - not a stand-alone system** | The service must integrate with feeder/ daladala. Both physically and with fares and ticketing |
| **Actively manage costs** | Efficient bus contracts<br>Efficient infrastructure/ overheads (e.g. stations/ ticketing costs) |

### *Financial Performance of BRT & Subsidy Needs*

1. **Ensure a sustainable funding base for public transport**
   - Not all subsidy is bad
   - What is the government 'buying' with its subsidy? Access, inclusion, opportunity, economic growth?
   - Or is it compensating inefficiency?
     - Bad business model?
     - Low patronage, poor services?
     - Poor systems design not meeting market needs?
     - High system operating costs (VOC, overheads)?
     - Loss-compensating subsidy can make management lazy
     - Look for supplementary revenue sources

2. **Fixing Fare Policy**
   - Understand vehicle operating costs –it's a key to negotiating efficient bus contracts
   - Take a business-like approach (with social considerations)
   - Understand affordability (it's not a static figure) and willingness to pay
   - Consider how to manage special needs groups
   - Price mechanisms to manage willingness to pay and affordability issues.

**3. Government support**

- Direct subsidy support (paying for social and economic benefits)
- Special industry support (subsidy, infrastructure, facilities)
- Indirect subsidies (loan guarantees, tax exemptions)
- Supplementary funding (property levies, roads tolls etc. that are 'ring-fenced' for supporting mass transit)

### *Fare Collection*

- Ticketing is the first impression a passenger experiences
- Fare integration across the network is a critical service issue
- Distance–based fares are more accurate and equitable
- Boloro Technology for daladala allows the control of revenue without government taking the business risk (an alternative to Gross Cost contracts)
- No technical issue to fit Boloro reader to DART BRT to enable daladala fare integration

### *Parking - Why is parking management important?*

- To manage demand for car parking spaces so that motorists can more easily find parking
- To implement price mechanisms to encourage motorist to choose public transport (parking should not be cheaper than bus fares)
- To maintain the attractiveness and economic life of the city, the viability of businesses whose customers can park close by, and vibrancy of communities and land values.
- Managed parking (by uniformed and radio equipped parking attendants) also helps to reduce crime and improve public safety.

### *Action on Parking*

- Under the CUPID Short Term Project 2 project for improving parking policy in DSM starts with central revenue collection
- New contracts for parking contractor (O&M fee & performance-based)
- Parking management technology (as seen in cape Town) can be incorporated so as to better manage the parking spaces
- DCC takes control of parking policy:
  - *Parking charges need to be revised upwards to control demand*
  - *Incentivise public transport use and improve revenues for the city*

### *Summary of Policy Direction for DSM*

- **Consider intermediate-type BRT services** especially on future MRT corridors (moderate designs)
- **Partner with existing operators** to develop the network and develop capacity of daladala sector to provide feeder services (change DART Policy on implementing Gross Cost contracts for Feeders)
- **Develop the BRT network** with integrated ticketing, physical connections and low cost trunk extensions
- **Implement bus priority** as a key part of developing sustainable business and improving service delivery
- **Raise profile of MRT Concept** in light of passenger forecasts – design BRT accordingly. Engage with key stakeholders to change investment approach

- **DART to operate on commercial business principles** (part of its charter)
  - Understanding the market, to provide service people use willingly and be car competitive with a network.
  - Fixing a market-based and equitable fare policy
- **Secure funding sources** to be developed to support public transport
- **New Business model** for parking to give DCC policy control - led by central revenue (cashless) collection and new technology for managing parking spaces under new O&M contracts. Parking costs as a price mechanism to influence demand & behaviour.

# Appendix A: Notes for Session 6 - Engagement with existing industry to improve public transport outcomes

## Negative aspects of Daladala operation

- It is excessively revenue-driven causing aggressive and competitive driving behaviours and impacts poorly on passenger service
- Highly fragmented, and difficult to regulate. Illegal operators flourish and every bus is individual business entity intent in its own survival and enrichment
- A poor safety and service - passenger security, traffic accidents (and near misses), overcrowding and fighting for entry, personal safety (molestation, pick pockets) and also lack of service predictability and long waiting times.
- Poor labour practices, employing mostly day labourers who have no assurity of employment, are subjected to long driving hours and no safety net in terms of sick leave, or social benefits
- Poor relationships with authorities and no input into framing regulations, mainly due to the fragmented and individualistic nature of the sector
- It is not so evident in Dar es Salaam, but where paratransit feels vulnerable, it can result in mafia-type organisations taking control, using threats and intimidation to control competition and withstand regulatory impositions on the sector

## Positive aspects of Daladala operation

- Participation is through individual ownership is a micro-business opportunity.
- It teaches entrepreneurial / small business skills
- Business opportunity for retired persons supplementing pensions
- Job-creation at local community level, for fuel, repairs, tyres, cleaning and shops and cafes near bus terminals.
- It employs low-skilled male-dominated workforce as drivers and conductors
- Moderate investment means system can finance itself.
- Carries 100% of the business risk, with no imposition on public funds.
- Hs highly demand-responsive adaptable to changes in demand. It has the ability to penetrate local communities to improve access
- Operators are 'street savvy' qualifies them to be competitive, meet market demand, exploit business opportunity and make financial returns.
- Small bus sizes suitable to low-demand periods

## A policy of formalising of the informal sector into companies is difficult

Presently there is a policy in Dar es Salaam to form daladala operators into companies, however, it is difficult to achieve because:

- Distrust between the industry and operators
- No incentives for daladala operator to join
- Preferences for 'own business' rather than small shareholding of larger business
- Preference for collecting daily cash and having bus parked out front
- Where drivers make good money they may oppose change *(keep your hands of our cash!)*
- Shadow owners using the business for supplementary income

## Transition to companies vs. Engagement/Partnership

**Traditional / accepted methodology**

- Form companies/capacity building
- Similar to resettlement issue
- Forced/ heavy hand of regulation
- Lack of choice
- Compensation / entitlement
- Suspicion /Resistance
- Shareholding does not provide daily income

Requires Gross Cost Contracts

Central planning does not produce efficient operation and subsidy increases

**Feeder bus partnership**

- Voluntary/ easy to adapt/ familiar ground
- Business opportunity (spreads benefit of BRT operation)
- Industry can organise itself
- Daily income
- More efficient routes
- Joint objective with BRT for successful outcome
- Equal partnership

Uses Net Cost Contracts with 'value' payments

Operators are locally attuned to demand

## Revenue is at the heart of the problems

- Bus rental schemes due to **inability to control revenue** collection.
- Drivers need to **maximise revenue** to earn their daily income impacting safety
- **Revenue leakage** & revenue underreporting
- **Insufficient earnings** to cover proper maintenance or bus replacement.
- **Overall system funding is inadequate** despite passengers paying a sufficient fare
- **Bus owners are often not considered 'creditworthy'** by lending institutions for the purchase of new buses.
- Regulators are hamstrung in effective quality control as **operators plead 'near bankruptcy'** and an inability to make necessary improvements.
- **Poor financial performance** often makes the industry a **'revolving door' of participants** using low-skilled labour in self-employment ventures.
- Regulator's task is more difficult, as there are often no long term relationships or trust developed.

## Using Centralized Fare Collection to spearhead paratransit reform

- Experience testifies to the fact that it is a difficult and slow process to reform paratransit through formalization into companies.
- Implementing central fare collection removes the revenue/ driver remuneration linkage which has detrimental impacts on behaviour and performance. Also the authority will engage with the bus owners directly instead of trying to govern the microbusinesses of the driver/conductors.
- One particular effect is that the overall 'revenue take' (to the owner/investor) should be significantly improved and centralising revenue collection engages the bus owners as the bus operator (not the driver)

## **Operators advantages** in a cooperative

- Joint representation / stronger voice
- Collective bargaining power
- Improved regulation and less individual competition (cooperatives allocated routes)
- Access to finance improved by more formal business entity

## **Advantages for the authority** in managing cooperatives

- Fewer operators to manage
- Can assign routes to managed cooperatives
- Greater accountability in managing standards of service
- Formalizes players into stronger industry and opportunity to build partnership and trust
- Easier to form companies for later formal bus service contracts

The advantages of developing cooperatives are that it utilises the skills of the industry to develop locally oriented services and it enhances business opportunity, keeping them doing what they do best, while removing negative behaviour

- Participation is voluntary, but the authority may not issue a licence without membership under a cooperative
- This business model is easy for operators to adapt to (familiar ground)
- It formalises them into a regulated transport organisation
- Industry can organise itself through the cooperatives
- It does not place complete risk on authority (as in a gross contract)
- Operators have local knowledge for route and service planning
- Provide operators daily income
- Creates a respectful and equal partnership

# Appendix B: Notes for Session 7 - Fare Technology: Boloro Platform Capabilities Overview

## Describing BOLORO Payments System Technology

- Centralizes revenue collection (cashless)
- Payment by mobile phone
- Funds are distributed according to the contracts/ agreements
- Bus owner receives net payments (after commissions)
- Driver bonus payments are possible
- Drivers paid on formal employment agreements
- Enables bus tracking with passenger data

## Tap & Go – a fast, convenient and secure way to pay


- The Telco operators partner with Boloro to issue small NFC tags that are attached to the customer's phone
- Any type of phone
- It links the payment to the customer's phone credit to deduct charges
- Low value charges are just through a 'tap' on the reader device and the customer gets an sms confirming the purchase
- High value purchases a PIN number is used.
- For casual user a low cost stored value card (with the NFC sticker) can be used

## *How it works*

**USER**

- Passenger uses mobile phone credit to pay the fare when they tap the reader upon entering the bus
- Boloro checks available balance and deducts payment
- Various options for distance-based fares
- Passenger receives notification via sms & E-ticket receipt (paper tickets also possible)
- Bus driver is notified via the console on the reader

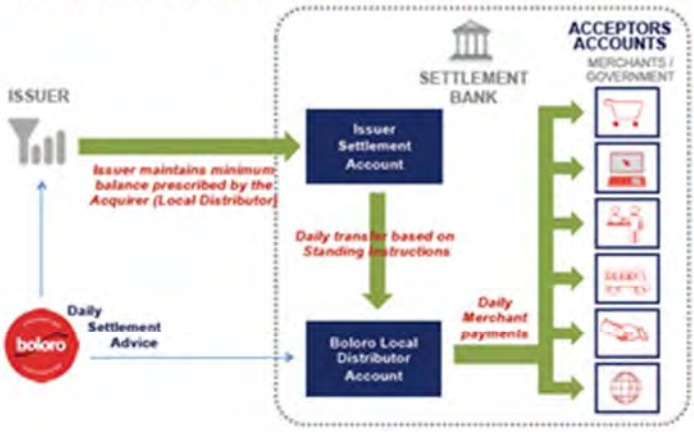
**PAYMENT SYSTEM**

- Boloro performs Daily Clearance and settlement
- Driver bonuses paid daily (as a performance incentive)
- Lending institutions can have first call for bus loan payment
- SUMATRA/ Bus owners can access merchant side reporting portal (fully transparent)

**REGULATION/ PLANNING**

- GPS tracking device (reader) reports all passenger No's / Revenue/ bus tracking for analysis and planning purposes

## Boloro Settlement Process Flow




## Transparent Administration

Dashboard to manage & monitor transactions
Analytics and business intelligence capabilities


*Real-time monitoring of transactions*

- Bus Owner & SUMATRA have portal access for vehicle tracking, driver management and fare payment tracking
- Useful for Control & Monitoring as well as service planning

## System Benefits

- No cash handling required / reduces passenger confrontation with conductors
- Linkage between revenue and drivers daily return is removed
- Drivers benefit from formal employment agreements & conditions (also daily bonuses)
- Full value of revenue returns to the system (more viable business model)
- Bus owners better informed on vehicle movements
- Improved investment & maintenance = better quality
- Better control for SUMATRA (service information/data)
- Increases options for performance-based contracts
- Assurity for financial institutions (improved credit-worthiness)
- Easy fare integration across the system and with DART (removes cost penalty for transfers) & makes data available for service analysis

## Benefits of Boloro system over stored-value smart cards

- Boloro is faster and less costly to implement.
- Does not require the agency to manage issue of smart cards and cash collection (done by participating Telcos). This saves a large amount of labour and cost.
- For DART it negates the need for Fare Collection Company to manage fare collection & ticketing
- Does not require passengers to **buy a smart card** & pay stored value amount on it.
- Stored value cards can be stolen, requiring additional administration to personally identify each one in case of theft
- If mobile phone stolen, transactions can be locked remotely
- Bus equipment is small, robust and includes GPS location - does not require separate GPS tracking systems fitted on buses
- Fare collection (on bus) linked to location services assists monitoring & useful for service planning.

# Appendix C: Submitted Comments and Feedback from Participants

*Note that not all participants lodged written comments. Comments received are contained here.*

**Davis Ben SHEMANGALE (PO-RALG)**

1. To maximize utilization of BRT benefits, need improve the Feeder roads to BRT. Under DMDP Programmes a total of 32.94 km feeder roads will be improved to enable maximization of accessibility and attract more passengers and hence decrease on the subsidy need. Under BRT phase one the following feeder roads will undergo rehabilitation from the start of FY 2016/17

| S/NO | ROAD NAME | LENGTH km | LOCATION |
|---|---|---|---|
| 1 | Kilimani Road | 1.3 | Urafiki area |
| 2 | Shekilango Road | 3.8 | Shekilango |
| 3 | Makanya road | 5.1 | Along kawawa |
| 4 | Muhimbili Hospital | 1.75 | Near Fire |
| 5 | Magomeni Mapipa - Urafiki | 3.4 | Magomeni / Urafiki |
| 6 | Morocco - Kawe | 7.65 | Morocco |
| 7 | Makumbusho Mwanamboka | 4.15 | Along kawawa |
| 8 | Argentina | 0.424 | Argentina Manzese |
| 9 | Tibaijuka Road | 1.187 | Along kawawa |
| 10 | Cham cha Walimu | 0.893 | Along kawawa |
| 11 | Majembe Road | 0.45 | Along kawawa |
| 12 | Korogwe - Kilungule | 2.88 | Kimara |
| | **TOTAL** | **32.984** | |

**Emmanuel Kanjara NDYAMUKAMA (PO-RALG)**

4. There is a need of integrated transportation system with BRT corridors in Dar es Salaam.
5. In DMDP programme, one of the strategies is the integrated BRT development with land use plan to guide the detailed development of Transit Oriented development (TOD) and densification of real estate around the first line and stations of the Dar es Salaam BRT Corridor.
6. Under this strategy, real estate investment, capturing market opportunities and other potential investment will be earmarked to foster economic development within the corridor in order to enhance sustainability. In another way TOD and Pedestrian Friendly initiatives along the corridor will be looked at.

**Nzori Abdallah KINERO (MLHHSD)**

1. The MyCiTi express route to Kuyasa (N2 Express) is not the express route in the real sense but rather a route to the outer suburban hinterland areas about and from Vuyani to Kuyasa. The route is not paying much because it is long and has few stations.
2. The raised platform stations are not very necessary as they increase investment and capital cost. Experience of Sweden and other European countries has shown that low floor stations/platforms are possible. Even in Cape Town these are low level platforms stations and they suffice.
3. Separate/different timing of traffic signals for IRT/BRT is not necessary because it is a complication for other users of the road including pedestrians who has to wait for IRT/BRT and then other traffic/vehicles.
4. IRT/BRT routes should only cover economic viable routes which have adequate commuters to justify running costs of the IRT/BRT. Where it is not feasible it should be left to other service provider so as to avoid loss and the necessity of subsidization from the government.

**Michael Moses OLE-MUNGAYA (RAS Office)**

1. As observed there are several Companies which operate Taxis (Mini Buses) services within the Cape Town City which is almost of the same size as Dar es Salaam City. These Companies are formed from existing Transport Societies /Associations from different specific areas and they are also responsible to regulate the operation of their services in their localities. The BRT system was established in 2007 and it has started full operation in Cape Town as MyCiTi in 2010 during the World Cup in South Africa.
   In Dar es Salaam and other urban areas in Tanzania, we have an association for a specific urban area, for example in Dar es Salaam there is DARCOBOA which represent Mini bus transport operators. In case of BRT system operation in Dar es Salaam it is in Phase 1 along a 20.9 kilometer route of Kivukoni to Kimara areas with branches to Gerezani from Fire area and to Morocco from Magomeni area. There are more than six phases to Planned to undergo construction before the full scale city operation coverage. The operation of Phase 1 is done by UDART which is a local Company as pilot program for two years and from the period it has started is still premature give a clear experience. Both Mini Buses and BRT systems are regulated by a government agency known as SUMATRA
2. The Public Transport operation (MyCiTi) is subsidized by the Municipal Authorities (the Government) and the Taxis (mini buses) were also enabled in order to make the Public Transport to operate in order to meet the intended city's objectives and risk is taken care by the Government. In areas of the city, these public modes of Transport complement to each other in some routes they compete.
   In Dar es Salaam, the Central Government has provided good infrastructure for BRT system to operate under the private sector operation. The Dala dala operates without government subsidies.
3. The city pattern/ form of Cape Town is largely sprawling and sparsely developed to more than 40 kilometers from a mono centric city center and due to these reasons transport costs are very high especially for low income group who are living in Suburban areas. The basic reasons for such settlement patterns have root cause from the former apartheid regime where blacks were forced to live in remote areas and being involved in casual labour. The feeder routes are well established in such suburban areas to connect to truck routes and public transport operation in such areas are complemented by Taxis which are more profitable and commercially efficient than that of BRT (MyCiTi). In Phase II, it was observed that the MyCiTi has incorporated the Taxis operation in some of their routes and it also adopted to operate low floor buses and uses bus stops which are on the same side like those of Taxis and Big buses (Golden Arrows). Such adoption have helped speed up the service provision to wider areas.
   In Dar es Salaam, the BRT system is still at earlier stages of operation of Phase I with little experience to assess. The private sector operations i.e. the Dala dala are still dominating the public transport in the city.
4. The experience learnt in Cape Town operation of Public Transport have a lot of input and can help Dar es Salaam City to improve the existing and the intended Public Transport to work more efficiently and be demand-oriented if (and only if) the best examples are incorporated in UDART and Dala Dala system's operations. These two public transport providers they are supposed to complement to each other rather than competing as the city of Dar es Salaam is still not covered with the BRT operations and it will took more time and money to reach this objective.
   In the City of Cape Town context, the City Center which is also the Civic Center is the hub for intermodal types of transport such as Taxis (Mini Buses), Golden Arrows (Big Buses), MyCiTi (BRT) and Train. These public transport types start or end in the same locality where anybody has a chance to select any mode of transport he/she wants to use for a specific reason. In such a hub, it was observed to have multi land uses such as mini business activities, public offices, recreational functions etc. and in this context the hub is more active and lively.
   In Dar es Salaam, we have Gerezani Public Transport hub with resembling activities like that of Cape Town but which is not actively and lively most of the time and this is due to the absence of different intermodal public transport services and nonexistence of multi-land uses makes these areas in the night hours become dead part of city.
   The experience learnt can be useful if it will be applied in order promote liveliness of such transport hubs and this can revitalize the decay part of inner city and make it more active throughout the day and night.

**Christopher Japhet KAZERI (DCC)**

1. Subsidy: transport should be the link to business, public services.

   This Comment was raised by Mr. Kinero (MLHHSD) that BRT should only be targeted to areas or locations which are economically viable instead of extending the BRT system into areas for which the project does not bring about positive returns thus necessitating subsidization.

   My reaction to this comment was that the transport sector is vital in facilitating other sectors of the economy to perform their functions. It is transport that link the poor to the economy and facilitates access to basic public services such as education, heath etc. An urbanizing city should be an inclusive city whereby even the poor and marginalized groups of the society have an assurance of access to various services available in that particular city. This can only be attained when transport infrastructure is in place and so the need for the BRT system to extend into the City suburbs to cater for transport needs of residents in those areas.

2. Inclusion of taxis for BRT dedicated corridors.

   The BRT System in Dar es Salaam especially Phase I is a closed type which does not allow access and use by any other traffic. Experience from other Cities like Geneva in Switzerland indicates that Bus lanes are used by other traffic like taxis and are clearly marked "BUS AND TAXI". The point is that in emergency situations people are forced to hire taxis to hurry their sick ones to hospitals for medication. Similarly, vehicles in emergencies such as "AMBULANCES AND FIRE FIGHTERS" need to be considered.

   However, the current BRT design as exemplified under Phase I does not provide room for VEHICLES IN EMERGENCY to use the BRT lanes. My recommendation is that the BRT Design under PHASE II should be an OPEN TYPE in order to allow such kind of traffic to use the BRT lanes. This is possible considering the fact that vehicles in emergencies are few and occasional. What is required is to put in place very strict laws or regulations with effective enforcement to achieve compliance.

**Swalehe Mohamedy NYENYE (DCC)**

| SN | Area | Lesson Learnt | Comments |
|---|---|---|---|
| 1 | On-street Parking | POS system<br>Cashless/cash payment<br>Control mechanism | The system is good to be implemented in the DSM City. However, more studies should be done in order to cater DSM environments. |
| 2 | MyCiTi BRT | High floor vs, Low Floor buses<br>Bus Connection<br>Routes allocation<br>Bus scheduling | The system is very efficient and it should be introduced to areas where there is no MyCiTi routes.<br>Where the system is in place the Government should think of removing all the Taxis (buses with 15 passengers or less carrying capacity). |
| 3 | Street Improvement | Walking ways/ Pedestrian | Pedestrian streets are well designed/ planned however those petty traders and illegal parking along the corridors should be removed. |
| 4 | Street Lighting and Traffic lights synchronization | Bus priorities<br>Pedestrian Priority etc. | Most traffic lights are synchronized and work properly as planned but some street lights are not working at all. |
| 5 | MyCiTi Route Planning | Trunk – Feeder<br>Feeder- Trunk<br>Bus lanes/ Priority lanes on mixed traffic<br>Dropping of passengers illegally<br>Traffic lights control system | Planning and scheduling of the MyCiTi routes should be also prioritized to those areas where there is no MyCiTi route.<br>Drivers should not drop passenger on non-designated places such as on traffic light as was seen earlier in the morning in front of St. George Mall/Building, hence revenue losses to MyCiTi. |
| 6 | MyCiTi Negotiation Techniques | How taxis were organized to form the BOC | The techniques used was quite OK though it was supposed to be done earlier before the Taxi Operators Associations could have planned for |

| SN | Area | Lesson Learnt | Comments |
|---|---|---|---|
| | | Government compensation/ subsidy<br>Alcohol tests to drivers | compensation as they came up with high compensation costs than actual planned. |
| 7 | Beaches improvements and utilization | Big Bay<br>Water front<br>Camps Bay | The beaches such as Big Bay and Camps Bay are strategically located but they seem to be very expensive to those people with low income. Beaches are public areas and they should be accessed by all people. |
| 8 | Tourism | Information centers<br>Revenue generation<br>Tourist buses | Tourism is well advertised but the entry costs are high. This limits the number of tourist who could have access affecting revenue generation. |

**Ahmed Omar WAMALA (KMC)**

1. There should be restrictions on people who get into the BRT stations from entering into the buses and stations with food stuffs and eat, also restrict people from entering into the terminals with bottles of water because some people use these bottles as urinals and leave them into the stations. By doing this will ensure cleanliness of the stations
2. It is high time we install pedestrian signals at all crossings adjacent to the stations to enable pedestrians to cross the roads safely.

**Allan Twangale SHULA (IMC)**

1. It is very important for BRT to have their own Research and Development Unit which will be dealing with foreseeing its sustainability and all necessary improvements instead of depending on external consultants who might have little knowledge of local behaviors that might have tremendous effects to our system. This will have a strong hand to avoid 'cut & paste' tendencies from other countries
2. Vehicle system (bus and platform gap): Our BRT buses should have a foot landing flaps at their door steps to avoid people stepping into the gaps and falling between the bus and the platform as I once experienced this personally.
3. Ticket system (centralize system) vs poor internet connection in Dar: The ticketing system should not depend on internet network as poor connections have been experienced throughout the city.
4. Weather condition (rain season) presents problem with long queues for buying ticket: If possible a rain protection shades should be provided to avoid passenger getting wet while buying tickets.
5. Time table: Our BRT system doesn't have a time table. It looks like they're just running around without any specified time based schedule. Would be nice to know which bus is coming at a station at what time and not just hanging waiting without proper timing.

**Protas Gervas KAWISHE (TMC)**

1. DART BRT to involve daladalas in the feeder system but in a well-organized and scheduled pattern to enhance efficiency in the trunk operation Trunk routes can mostly cover operation costs.
2. In DSM, to enhance collection of bus fare and monitor local behavior , all BRT trunk stations be enclosed rather than left open (as is the case at Kimara and Ubungo terminal). Passengers often disembark from the bus and take random directions as they wish to.
3. BRT introduce bus boarding guides (platform markings/ belts) to manage orderly boarding and alighting.
4. BRT to name route buses with identity numbers as well as boarding platforms at the stations with clear information to the passengers with respective boarding platforms and the route identification.
5. On the study Tour the tour, we learned that the efficient mobility within the CBD was by a well-organized and enforced parking system, limitation on vehicle capacity (e.g.: < 2 tons), signalizing every intersection, and converting some intra-city roads into one way running.
6. It could be achieved in DSM CBD if CUPID projects on mobility and parking improvements were implemented.

7. Incoming bus system designs to be simple and demand oriented, fostering the concept of paratransit / Hybrid City passenger transportation system.

**Benjamin Michael MAZIKU (TMC)**

1. BRT in Kigamboni should be started soon before land development as to minimize compensation cost.
2. Introduce Morocco to Tegeta Nyuki, Morocco to new post office, Airport to Ubungo via Tazara BRT services using normal lanes but BRT type of vehicles.
3. Consideration of disabled people by Indication of next station by voice also indication of next station by display
4. Electronic ticket purchase should be introduced as soon as possible.

**Serapion TIGAHWA (DART)**

1. Observation that some MyCiTi BRT routes operated in mixed traffic which may affect future reliability of service if traffic increases.
2. Given the Cape Town's comparable population sizes along the BRT to that of Dar es Salaam, it appears that DART stations are excessively large. This should be reviewed at future phases.
3. It was suggested that DART buses need to display names of 'next station' and to display 'full' sign so passengers know to wait for next bus.
4. No need to have park and ride in CBD instead have them at outer areas of trunks and in the CBD develop more pedestrian walkways
5. Initiate Daladala associations which will be more capable to formulate companies to compete in DART SP bidding procurement.
6. Introduce levies on developments such as high rise buildings that derive commercial benefit from BRT as happens in Cape Town City.
7. MyCiTi was established by political will to increase living standards, so some subsidy may be justified. It also uses some dedicated marked lanes instead of fully constructed dedicated lanes like DART's ones. This reduces capital investment in construction of the lanes but creates a problem that they may be regarded as 'A dedicated lanes for special purposes' open to multiple use.

**Johansen Jonathan KAHATANO (SUMATRA)**

1. Daladala compensations: We were informed that Cape Town minibus taxies were compensated to provide space for MyCiTi to replace their service but surprisingly there are still some mini bus taxi operating in parallel with MyCiTi thus jeopardizing financial performance of MyCiTi. That was clear indication of weak regulatory framework or poor enforcement of public transport. Also that should be taken as a lesson to DART as some Daladala operators who were affected by BRT are claiming have not compensated thus threatening not to remove their vehicles in Morogoro Rd once UDART operations get stabilized or they may possibly call for a citywide daladala strike if they will be forced to leave Morogoro Rd.
2. Cutting down overhead cost by reducing the number of staff at bus stations: experience in Cape Town showed that MyCiTi stations have got many staff who are permanently deployed at stations to man security and facilitate issuance and recharge of fare cards thus adding overhead costs. A lesson to be learnt by DART is selling and recharge of fare cards should be outsourced to private enterprises to reduce number of station attendants. Also big space available in stations can be installed with several kiosks which can be rent to small business entrepreneurs (creating additional income) and also reducing need to have large deployment of security guards and high costs of running the stations.

**Humphrey Nelson KANYENYE (TANROADS)**

1. Grievances redress mechanism for MyCiTi is not clear to the people. Thus people are complaining anywhere. Therefore DART should establish a clear grievance redress mechanism to enable people to channel their complaints to the proper agency and avoid "complaints on media"

2. Trunk Extension along My City bus routes is a good initiative whereby people from outskirts can reach and take part in their economy. The same should be done to DART buses for areas like Mbezi Mwisho, Mwenge, and Buguruni centers. Feeder buses should come to operation in order for people to appreciate the project.
3. Paratransit bus operations: Based on the experience gained in Cape Town bus operations, it is imperative to continue running the Daladala in line with DART buses until the BRT operations are stabilized. "Let's give people the best options".
4. BRT Closed System: Based on the experience during study tour, it is high time to start considering the use of existing carriageways of our trunk roads to incorporate dedicated bus lanes. The current carriageways including shoulders are 11m. The lane widths can be reduces to 3.2m, thus 3 lanes can be obtained in which one lane can be used as dedicated lane for buses. The medians should be left for future use or be used for Bus stations/bays. This will give room for future plans in times of undue demand (i.e. construction of Elevated MRTs) and reduce costs to a great extent (cost analysis has to be conducted)
5. Infrastructure Improvement: As it was seen in the Cape Town MyCiTi bus routes, the bus bays are not weather friendly. People once dropped off the bus or when waiting for the buses, especially in the extended trunk, there is insufficient shelter to protect the people from rain/sun. Likewise for BRT routes. DART could consider fixing shades on pedestrian bridges and approach walkways for passenger convenience.

**Emmanuel Elifadhili MCHOME (Ardhi Univ.)**

1. Investment, operation of BRT is expensive in Cape Town and needs subsidy, this helps transportation be an inclusive system of all people.
2. Integrated transportation plan shall be achieved by government with some subsidy and its performance should be well-examined.
3. In Dar, the motive behind BRT should be an economic transport system in the city.
4. New technology of on-street parking management system in Cape Town is functioning well. LGAs should consider the possibility of application of the technology in Dar es Salaam. It is better to facilitate the same presentation to be held in Dar es Salaam in which Directors and Mayors from Ilala, Temeke and Kinondoni should be invited.

**Prosper NYAKI (NIT)**

1. BRT infrastructure is heavily invested which may not necessary. BRT should be created based on specific environment and travelers behaviors e.g. complex bus terminals, fully concrete busway may not be necessary etc.
2. BRT and other public Transport should be integrated to the major hubs in Dar es salaam, example in Railway station, Airport, Ubungo terminal (Long-distance buses), Mbagala terminal (to connect southern buses ) and Tegeta Terminal.
3. It seems in order for BRT to perform efficiently it should be able to get sufficient amount of passengers to be able to cover operation costs, meanwhile some parts of Dar es Salaam the demand of public transport may be too low to allow BRT to operate profitably. BRT to should think how Daladala can be integrated with BRT in mutual relationship.
4. Urban planners can create conducive environment for BRT to operate efficiently by having specific zones for particular land use, e.g. business and commercial zones residential zones etc. This can be achieved by good coordination between urban transport planner and land use planners.

**Lucas Edward URIYO (NIT)**

1. In Cape Town we sometimes observed the problem of the station and bus doors not opening simultaneously. In Dar, the doors are a problem.
2. In the Zebra Crossing in Tanzania, there is no traffic signal which allow pedestrian to cross the road or wait. Pedestrians in Tanzania they see themselves has having the right to cross anytime, while in Cape Town there is traffic signal to manage it.

3. In Dart, the problem of waiting time during buying the ticket from the service provider takes long compared to person who use the card to swipe in.
4. The signs in the BRT stations like those we found in Cape Town City are not implemented in DART BRT stations at all. Even the board to indicate the route direction is not shown. Also we see in Civic Center Station that there is a symbol which indicate this place you should keep quiet, don't speak loud, don't listen the music, don't make noise.
5. Also the name of BRT station should appear everywhere, when the bus reach the next station but in Tanzania this does not occur.
6. The advertisement on the bus should be in back side only and not both side left and right side in the bus. In Tanzania we have put all side the advertisement and no any information of DART.

**Frits OLYSLAGERS (JICA Expert)**

1. DART is new organization, and its establishment has been difficult but finally achieved and we congratulate the efforts of those who have brought it to reality. Suggestions for its operation and improvement should be made in a constructive way.
2. Cape Town shows clearly that the issue of sharing business risk and the business model giving operators incentive for efficiency and passenger growth is essential.
3. The Gross Coast contract where the city takes all the risk is a major part of MyCiTi's problems. Working out a model where risk is shared and the paratransit sector manages feeders looks like an obvious solution. Such a contract should be an equal partnership working as an integrated system.
4. The concerns on the capacity of BRT (passengers per hour) is shown in Cape Town where they admit bus headways are problematic is less than 90 seconds (120 seconds is what they aim for). This shows that BRT will have difficulty when passenger loads are more than 10,000 passengers per hour per direction.
5. Future BRT operations should be carefully assessed to ensure they are fit for purpose ort MRT considered where passenger forecasts are 20000 pax phpd.
6. Another lesson from Cape Town has been that every city must work out the design of BRT that suits their unique context, situation and local environment or requirement.

**Hiroyuki MORIMOTO (JICA Expert)**

1. Issue of financial viability and subsidy: Not only financial viability but also betterment of public transportation system (including mitigation of traffic congestion) with economic viability should be the focus. Provision of high-quality public transportation system such as DART BRT would highly contribute to transformation from private car dependency to public transport use.
2. It was acknowledged that ticketing system is quite important for users as the first impression to take BRT. In Cape Town we took 2 hours for issuing 20 BRT cards. Poor experiences such as this will disappoint and discourage passengers to use BRT and consequently they will go back to private car.
3. In Cape Town, traffic signal cycle and intersection management for BRT and mixed traffic are functioning well. DART BRT has discouraged right-turning movements at every intersection and traffic police manage traffic flow at intersections without consideration of proper cycle time. The experience in Cape Town would be valuable for future planning of such issues.
4. 25% discounted fare for off-peak hour would be a good policy to balance the transport demand.

# Appendix D: Photos

Session 1: Study objectives, introduction and relationship to Dar projects
Mon, 13 June 2016

Session 1: Study objectives, introduction and relationship to Dar projects
Mon, 13 June 2016

Session 2: Introduction of MyCiTi project by Mr. Nico MCLACHLAN (ODA)
Mon, 13 June 2016

Site visit to Central Station (train, BRT, mini bus taxi, long distance bus) guided by Mr. Nico MCLACHLAN (ODA)
Mon, 13 June 2016

Cape Town Station (train station)
Mon, 13 June 2016

Cape Town Station (mini bus taxi terminal)
Mon, 13 June 2016

Cape Town Station (long distance bus terminal)
Mon, 13 June 2016

Civic Center BRT Station
Mon, 13 June 2016

Purchase of tickets for MyCiTi
Tue, 14 June 2016

Equipment for pre-paid loading to MyCiTi smart card
Tue, 14 June 2016


Thibault Station (MyCiti T01)
Tue, 14 June 2016

BRT ride (MyCiTi T01) to Table View Station
Tue, 14 June 2016

Transfer to the feeder BRT route No. 217
Tue, 14 June 2016

Dropping off feeder BRT at Camps Bay Station
Tue, 14 June 2016

Return to Thibault Station

Tue, 14 June 2016

Session 3: Key lessons of BRT: costs, moderation, operator structure by Mr. Herrie SCHALEKAMP (UCT)
Tue, 14 June 2016

BRT ride (MyCiTi Phase 2, expressway line No. D01) to Kuyasa Station
Wed, 15 June 2016

Civic Center MyCiTi BRT Station

Wed, 15 June 2016


A caution for passengers
Wed, 15 June 2016

Walking in CBD
Wed, 15 June 2016

Parking marshal in CBD (Street Parking Solutions)
Fare collections are made with smart phone and other equipment
Wed, 15 June 2016

Dedicated parking bays controlled by Street Parking Solutions under contract with Transport for Cape Town. Max. 60 minutes, ZAR 3.4 per 15 min.
Wed, 15 June 2016

Dedicated on-street parking bay (max. 60 minutes)
Wed, 15 June 2016


Parking ticket placed by parking marshal after registration
Wed, 15 June 2016

CBD in Cape Town
Wed, 15 June 2016

Well-developed pedestrian environment
Wed, 15 June 2016

Session 4: Key lessons: hybridity, operator training, pilot contract by TCT
Wed, 15 June 2016

Session 4: Key lessons: hybridity, operator training, pilot contract by TCT
Wed, 15 June 2016

Dinner among study tour participants
Wed, 15 June 2016

Dinner among study tour participants
Wed, 15 June 2016

Session 5: Workshop for reviewing last 2 days and consideration of lessons and implications for Dar es Salaam
Thu, 16 June 2016

Session 6: Presentation of parking management system in Cape Town from Mr. Zunade LOGHDEY and Mr. Josh LINDENBERG, STREET PARKING SOLUTIONS
Fri, 17 June 2016

Presentation of parking control system
Fri, 17 June 2016

Session 7: Key lessons of BRT (The prospects of hybrid public transport system) by Mr. Roger Behrens (UCT)
Fri, 17 June 2016

Session 7: Key lessons of BRT (The prospects of hybrid public transport system) by Mr. Roger Behrens (UCT)
Fri, 17 June 2016

At Cape Town International Airport back to Dar es Salaam
Sun, 19 June 2016

# in Dar es Salaam

Kimara Station: From Nyerere Square to Kimara took 40 min.
Wed, 22 June 2016

Newly introduced pre-paid card for BRT

Wed, 22 June 2016

Frequency of bus operation is high (every 2 min. in average) but inside of bus was full of passengers.
Wed, 22 June 2016


Signage of route and destination is not clear.

Wed, 22 June 2016

There is no signage of station name at every station.

Wed, 22 June 2016

Traffic operation by traffic police is not clear. Traffic signal for BRT is green but bus couldn't start.
Wed, 22 June 2016

Yellow box marking should be painted especially at the intersections in CBD where there is no traffic signal.

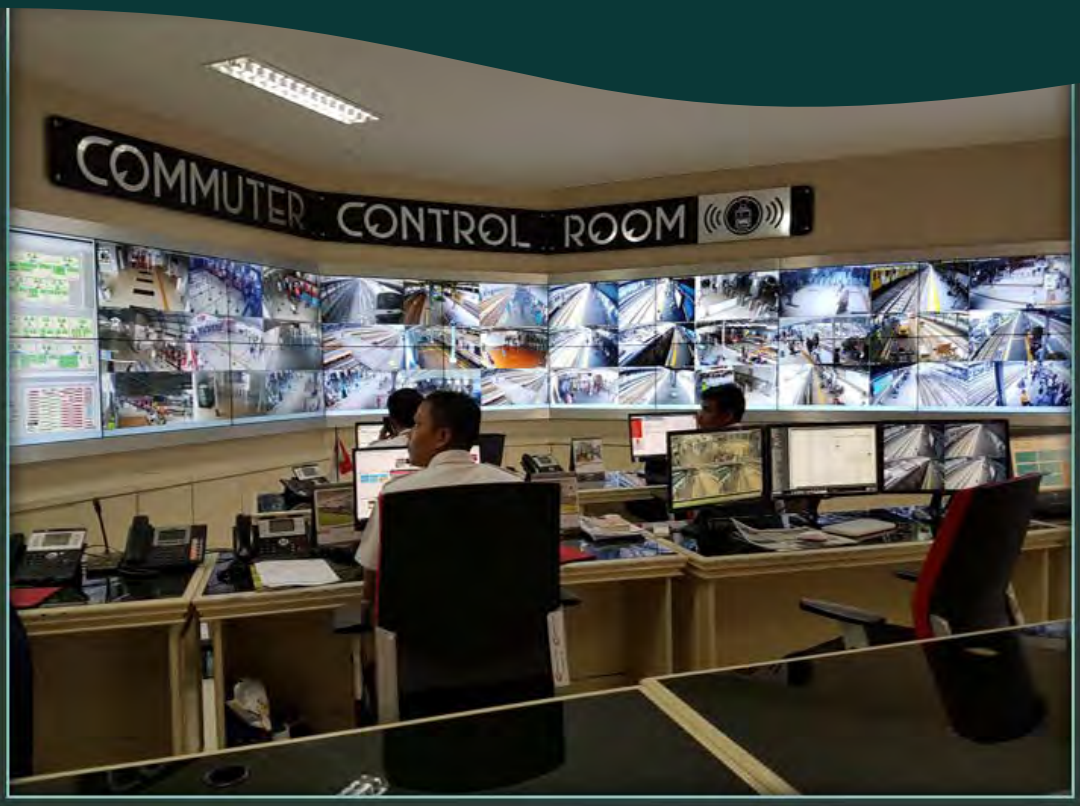
Wed, 22 June 2016

Waiting and boarding area for Daladala should be improved and enforcement of operation rules should be enhanced.
Wed, 22 June 2016

# Discussion Paper:
# Report on Jakarta Study Tour

# *Report on Jakarta Study Tour*

*July 2017*




***Capacity Development Project for the Improvement of Dar es Salaam Transport (Phase-2)***

**Table of Contents**

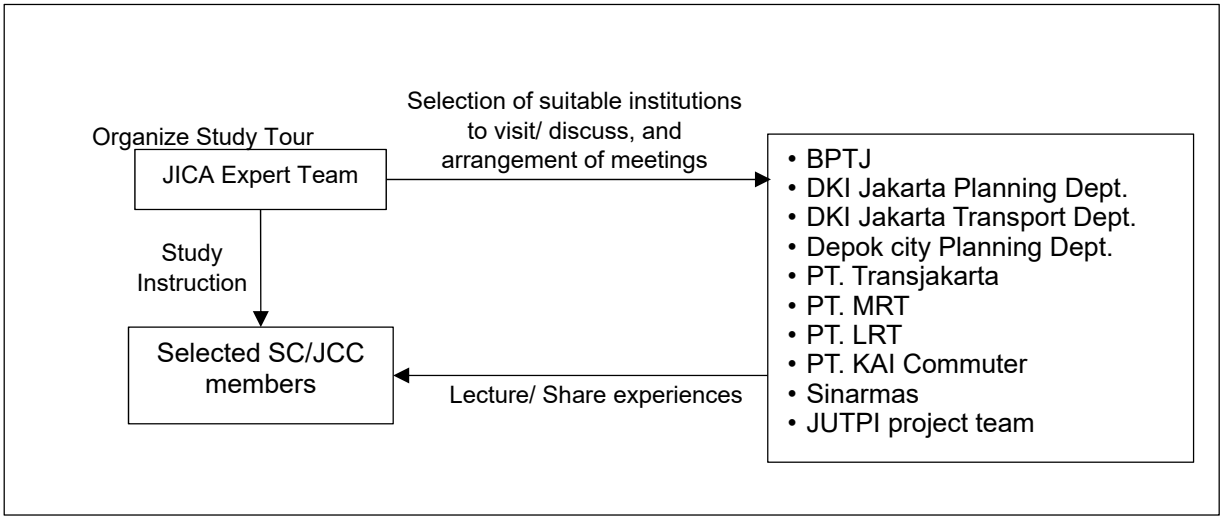
## 1. PURPOSE OF JAKARTA STUDY TOUR

The theme of the study tour is “Improving Integration of Public Transport System" with particular emphasis on Jakarta’s urban transport policy and planning and the institutional management of public transport. It will examine the progress of urban transport system development in Jakarta in implementing the BRT and MRT systems particularly the ongoing task of integrating BRT and MRT, through network integration, terminus development, introduction of common ticketing system, etc.

Jakarta as a study destination also offers a good example of a post-BRT implementation (what worked, what didn’t and why) and the subsequent work of the JICA’s Urban Transport Master Plan to facilitate development and integration of public transport system. The Dar es Salaam delegation will find this visit incredibly informative for the improvement of public transport in our city, which is a key task under the CUPID project.

This study tour is designed for Director (or Steering Committee member) to gain knowledge in policy planning to establish integrated public transport, but in case that Director himself/herself is not available, Director is requested to appoint Secretariat member to participate in the tour on behalf.

## 2. STUDY TOUR STRUCTURE



## 3. PARTICIPANTS

In total 6 participants from Tanzanian counter parts out of seven nominees and two member from CUPID expert team are take part in this study tour as follows;

| | Name | Organization | Position |
|---|---|---|---|
| 1 | Ms. Elina Nziku Kayanda | PO-RALG:<br>President's Office Regional Administration and Local Government | Director of Infrastructure Development |
| 2 | Ms. Theresia Louis Mmbando | RC-OFFICE:<br>Regional Commissioner Office | Regional Administrative Secretary |
| 3 | Ms. Sipora Jonathan Liana | DCC:<br>Dar es Salaam City Council | City Director |
| 4 | Dr. Gabriel Migire Joseph | MOWTC:<br>Ministry of Works, Transportation and Communication | Director of Planning |
| 5 | Eng. Ronald Muberwa Lwakatare | DART:<br>Dar es Salaam Rapid Transit Agency | Chief Executive |
| 6 | Mr. Masanja Kungu Kadogosa | RAHCO:<br>Reli Assets Holding Company Ltd. | Managing Director |
| 7 | Mr. Frits Olyslagers | CUPID expert team | Public Transport Planner |
| 8 | Ms. Kayoko Miyao | CUPID expert team | Database expert |

Unfortunately the nominee from SUMATRA could not get permission to travel abroad from State house of Tanzania.

## 4. OUTLINE OF JAKARTA STUDY TOUR

| Day | Date | Activities | | | |
|---|---|---|---|---|---|
| | | AM | | PM | |
| 1&2 | 18th/19th July | Travel to Jakarta | | | |
| | | | | Arrival in Jakarta (EY474, 15:00) | |
| 3 | 20th July (THU) | <Session 1><br>Lecture and Discussion: Current situation of urban transport in Jakarta metropolitan area (by JICA-CUPID and JICA-JUTPI Expert Team) | | <Session 2><br>Transport Planning & Budgeting system for Implementation of plans/ Lessons learned from Experiences of JKT transport planning & implementation (Jakarta Province, Planning Dept.) | |
| 4 | 21st July (FRI) | <Session 3><br>Roles and Function of BPTJ (by BPTJ: Coordination agency for urban transport in Jakarta metropolitan area) | | <Session 4-1><br>Roles & Functions of Transport Dept (Dept. of Transport, Jakarta Prov.) | <Session 4-2><br>Site Visit:<br>Center for Area Traffic Control System (ATCS) |
| 5 | 22nd July (SAT) | <Session 5><br>Site visit Satellite City Development with Railway sta. area Development (by SinarMas, provate developper of BSD: Bumi Serpong Damai) | | Free time | |
| 6 | 23rd July (SUN) | Free time | | <Session 6><br>City Tour (BRT terminal connection with Commuter railway Sta. at Kota Station area) | |
| 7 | 24th July (MON) | <Session 7><br>Roles and Function of Commuter rail company ( PT. KAI Commuter Jabodetabek) | Site Visit :<br>Commuter rail ride (Djuanda -Kota Sta.) | <Session 8><br>Discussion: Lessons Learnt from Study tour and wayforward to establishment of DUTA (1) | |
| 8 | 25th July (TUE) | <Session 9><br>Discussion: Lessons Learnt from Study tour and wayforward to establishment of DUTA (2) | | <Session 10><br>BRT operation center and BRT Operation, plans & Funding, etc. (PT. TransJakarta) | |
| 9 | 26th July (WED) | <Session 11><br>Coordination among cities and central government in Jakarta Metropolitan area (by Planning Dept.& Transport Dept. Depok city) | | <Session 12><br>Improving the Transport system in Greater Jakarta and History to develop Coordination agency for urban transport in Jakarta metropolitan area (by CMEA – Coordination Ministry of Economic Affairs) | |
| 10 | 27th July (THU) | <Session 13-1><br>Implementation of MRT development:<br>(by PT. MRT Jakarta) | <Session 13-2><br>Site visit<br>(MRT construction site) | Discussion and Closing | Mobilization to Airport |
| 11 | 28th July (FRI) | Travel to Dar (EY471, 00:10) | | Arrival in Dar | |

The contents of each session is explained in the next section in this report.

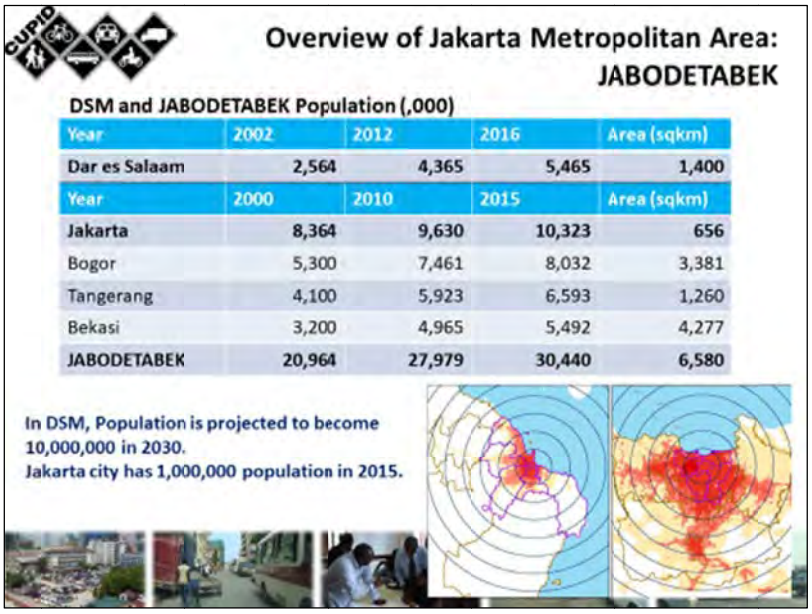
# 5. CONTENTS OF JAKARTA STUDY TOUR

## 5.1. SESSION 1: Lecture and Discussion: Current situation of urban transport in Jakarta metropolitan area

*(by JICA-CUPID and JICA-JUTPI2 Expert Team)*

In the session 1, it was explained about Jakarta Metropolitan area, so called JABODETABEK[1] area, such as transport system, information of relevant organizations and history of transport planning of JABODETABEK, in addition to overall schedule of the study tour by CUPID expert team.

Following explanation by CUPID expert team, the current condition of transport development and various activities under JUTPI2[2] project were presented. In this presentation, various challenges of urban transport planning in JABODETABEK were explained such as traffic control measures, enhancement of public transport usage and establishment of coordination body of urban transport. Following the presentation, discussion session was held among JUTPI2 team and CUPID participants. Through this Session 1, participants understood overall condition of current urban transport system and plans in JABODETABEK, to discuss in detail with Indonesian organizations which plan to visit following this session 1.




| Year | 2002 | 2012 | 2016 | Area (sqkm) |
|---|---|---|---|---|
| Dar es Salaam | 2,564 | 4,365 | 5,465 | 1,400 |
| **Year** | **2000** | **2010** | **2015** | **Area (sqkm)** |
| Jakarta | 8,364 | 9,630 | 10,323 | 656 |
| Bogor | 5,300 | 7,461 | 8,032 | 3,381 |
| Tangerang | 4,100 | 5,923 | 6,593 | 1,260 |
| Bekasi | 3,200 | 4,965 | 5,492 | 4,277 |
| JABODETABEK | 20,964 | 27,979 | 30,440 | 6,580 |

**Figure 2.1 Sample of Material: Comparison between JABODETABEK and Dar es Salaam**

[1] *JABODETABEK: JAkarta, BOgor, DEpok, TAngerang, and BEKasi*
[2] *Jabodetabek Urban Transportation Policy Integration Project (JUTPI) Phase 2*

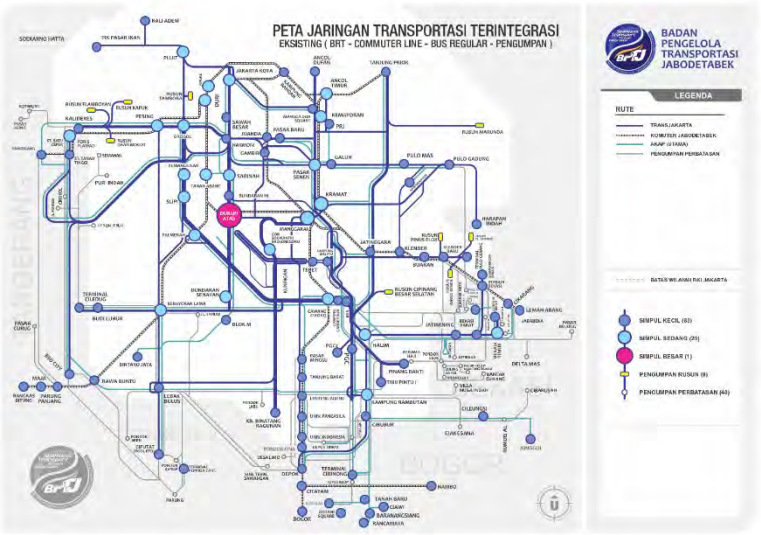



**Figure 2.2 Current Public Transport Network System in JABODETABEK**

## 5.2. SESSION 2: Transport Planning & Budgeting system for Implementation of Plans

*(by BAPPEDA, Jakarta Province[3])*

In the Session 2, the presentation was about transport planning, budgeting and implementation of various projects based on current traffic conditions of Jakarta by BAPPEDA, Jakarta Province. In this session, three of subsidiary companies under Jakarta Provinces, such as PT. MRT Jakarta, PT. Transjakarta and PT. LRT, also attended and presented of their activities and relationship among Jakarta Province and three subsidiary companies.

In the discussion after presentation by BAPPEDA, information about subsidy for BRT per passenger was explained and the cost is around Rp. 8,500. It was also explained about public transport network plan in Jakarta that it is consists from 3 types of public transport mode which are MRT, LRT and BRT. MRT is for carrying large passenger volumes, LRT for medium passenger volumes and BRT for lower volumes. Each of public transport modes, such as MRT, LRT and BRT have their own route (not overlapping route each other), in order not to disturb other public transport mode.

3 *BAPPEDA: Planning and Development Dept.*

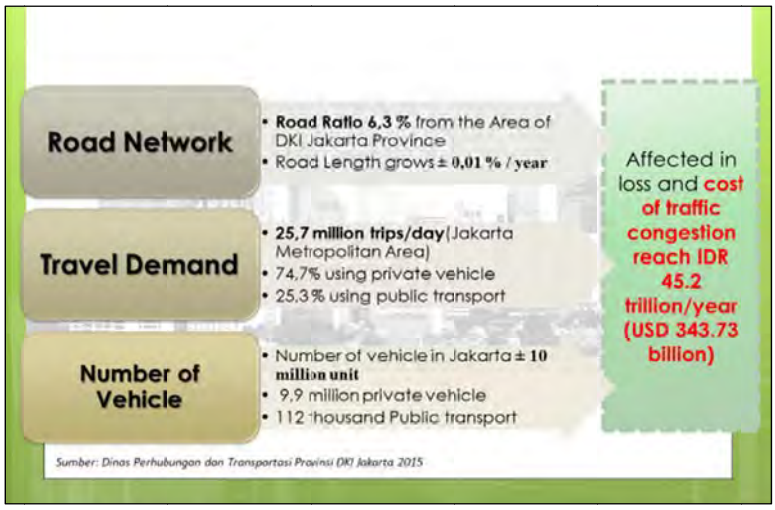



**Figure 2.3 Sample of Presentation by BAPPEDA, Jakarta Province**

At the end of the discussion, it was emphasized by Jakarta Province officer that massive road development was implemented in Jakarta several decades including toll road development before introduction of various public transport, however rapid increase of number of cars are far beyond projection, so it is significantly important to consider introduction of public transport as early as possible.

## 5.3. SESSION 3: Roles and Function of BPTJ

*(by BPTJ: Coordination agency for urban transport in Jakarta Metropolitan area)*

In session 3, the presentation included roles and functions of BPTJ which is newly established in 2016 to coordinate related organizations of urban transport in JABODETABEK under Ministry of Transport. The presentation, explained about the road map to establish BPTJ. The necessity of establishment urban transport authority for JABODETBEK was proposed in the master plan study (SITRAMP, 2004) and following JUTPI phase 1 project in 2011. In the proposal it was recommended to establish under president authority. However BPTJ was established under Ministry of Transportation and the operational budget come from Ministry of Transportation. As a next step, BPTJ is proposed to be an Authority directly under the president, so BPTJ be more influential to manage and coordinate the transportation in JABODETABEK.

In addition, current traffic condition of JABODETABEK was presented. Currently, there are around 24.9 million vehicles in JABODETABEK which are divided into 18.5 million motorcycles, 5.9 million private car and 512,000 buses. Number of daily trips are around 47.5 million in JABODETABEK.

In the discussion, various questions about establishment of coordination agency are raised from Tanzanian delegation, and issues and difficulties are shared by BPTJ. BPTJ commented that their power was limited under the present arrangement, but could still be

effective in a coordinating role. Tanzanian delegation shared the DUTA plans of it being an apex 'umbrella' organization over all stakeholders, which BPTJ commented positively on.


**Figure 2.4 Sample of Presentation by BPTJ**

## 5.4. SESSION 4: Roles and Function of Dept. of Transport in Jakarta Province

*(by Dept. of Transport in Jakarta Province)*

This session, presented the strategy of transport improvements and its measures to achieve their target, in addition to traffic control management and implementation of new mode of public transport such as MRT and LRT.

In the presentation, it was explained about government solutions to improve traffic issues in Jakarta, these are 1) improvement of public transportation, 2) traffic control and management and 3) Improvement of road network. For improvement of public transport in Jakarta, it is essential to provide a good, comfort and reliable public transportation. So that government of Jakarta is building reliable MRT, LRT and BRT system as an integrated public transport system in Jakarta.

As part of traffic management measures; the "Odd-Even number control" methodology during peak hours along Sudirman- Thamrin streets was presented. This measure was introduced as a transition measure until introduction of ERP (Electronic Road Pricing) which plans to start operation in 2019, replacing the notorious 3 in 1 traffic rules[4] along same route.

[4] *A system where only cars with three or more occupants can use main roads during peak hours*

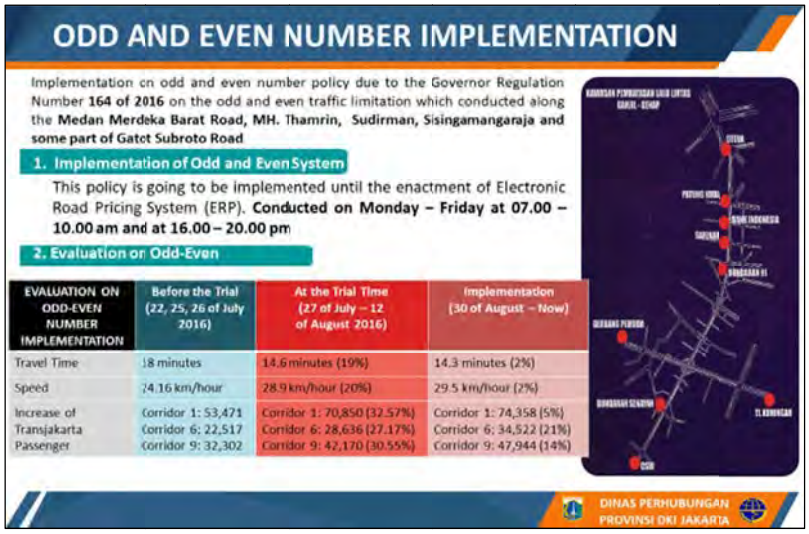



**Figure 2.5 Sample of Presentation by Dept. of Transport, Jakarta Province**

Following presentation and discussion, participants visited traffic control center of Jakarta Province. There are 310 CCTV cameras are installed in the city to observe traffic, and only 74 of them installed by ATCS center under Jakarta Province, the rest of CCTV cameras are installed by mobile phone operators or internet providers, because these companies which would like to build BTS tower must install and provide CCTV camera to the city and it is mandate by Jakarta Provincial government. Location of installation of cameras are sometime suggestion from community where area has a traffic issue. These CCTV camera data is utilized not only for this ATCS center, also utilized by police.


**Figure 2.6 Site Visit: Traffic Control Center of Jakarta Province**

## 5.6. SESSION 5 Site Visit: BSD (Bumi Serpon Damai) Satellite City Development

*(by Sinar Mas, Private Land Developer)*

In this session, participants visited BSD as a one of sample of satellite city development and railway station area/ plaza development. This BSD development is located approximately 30km from Jakarta CBD and connects from/to CBD both toll road and railway. BSD City is famous for its ambitious urban planning schemes in Indonesia to combine housing, business and commercial properties.


**Figure 2.7 Site Visit: BSD**

## 5.7. SESSION 6 Site Visit: Kota railway station and BRT Kota station

*(by CUPID Expert team)*

In this session, participants visited Kota railway station and BRT Kota station which are located next each other and observed the linkage/ connection of both stations and facilities within both stations.


**Figure 2.8 Site Visit: Kota Station area (Connection corridor of Rail & BRT, and facilities in station)**

## 5.8. SESSION 7: Roles and Function of Commuter Rail Company

*(by PT. KAI Commuter Jabodetabek)*

PT. KCJ was established in 2008 as a subsidiary company of state own railway company PT. Kereta Api to achieve commuter train transportation services as the top and best choice for urban transportation in JABODETABEK. PT. KCJ operates 384.5 km of railway and serves more than 833 thousand passengers per day (on weekdays), which mostly comes from surrounding areas of Jakarta, such as Bogor and Depok City (69.95%). Up to 2017, PT KCJ plan to procure 904 trains in total and, 100 trains per year for the average number of procurement.

As a core business (fare collection), the E-ticketing system started on July 2013. The fare is related to distance, being Rp. 3000 or (USD 0.23), for the first 25 km and an additional Rp.1000 for each 10 km thereafter. PT. KCJ also has non-core business of advertising and cooperation with private sector, especially cellular operators.

In improving their business, PT. KCJ also have some innovation and services development for passengers' convenience such as, 1) Making guiding block for user with disability, 2) Expanding station hall, 3) Installation of pedestrian bridge and underpass, 4) Providing on-line application to monitor the departure and arrival of trains, namely KRL Access Application.

PT. KCJ achieved some acknowledgements and certifications regarding to their management and services. In terms of business, their financial performance is IDR 2,045 billion (USD 155.5 million) total revenue per year.

After presentation and discussion at office, participants visited train operation center, and ride commuter train to observe actual operation and services.

In the train-ride session, it was explained that many of rolling stocks using in PT. KAI Commuter are second-hand rolling stocks from Japan.

**Figure 2.9 Site Visit: Commuter Train Operation Center and Inside of Commuter Train**

## 5.9. SESSION 8&9 Discussion: Lessons Learnt from Study tour and way forward to establishment of DUTA (1) & (2)

*(by CUPID Expert Team)*

In this session, participants discussed about establishment of DUTA based on lessons learnt from this Jakarta study tour, especially discussion with DKI Jakarta Planning Dept. and BPTJ. In this session, participants who are all on a level of decision-making in Dar es Salaam, agreed on the necessity of coordination agency for urban transport in Dar es Salaam, and also agreed to have continuous discussion after this study tour to implement establishment of DUTA.

## 5.10. SESSION 10: BRT operation, plans and funding

*(by PT. TransJakarta)*

In this session, outline of PT. TransJakarta (BRT operation company) is explained. Being established on 2004, it was previously a part of DKI Jakarta Transportation Service Unit, and in 2015 TransJakarta changed into DKI Jakarta State-owned company. The DKI Jakarta Government has invested into PT. TransJakarta partially funded by Public Service Obligation (PSO) and developed as a service-oriented operation. As the company has expanded, they are working together with private bus operators. To facilitate the use of public transport, TransJakarta apply flat-fare rate of IDR 3,500 (USD 0.26). To improve integration with local public transport operators, PT. TransJakarta has collaborated with 6 bus operators in main BRT routes, integrated with 10 routes which connect to local housing area, and 33 routes of feeder small bus operation.

From 2004-2017, number of dedicated BRT corridors has continued to grow, from 1 BRT corridor to 13 BRT corridors in 2017. The most significant achievement is developing more routes and passengers, from 39 routes to 88 routes, and gaining more passengers (12.4 million passengers per month in 2017). Basic services provided by PT. TransJakarta are BRT bus services, feeder bus services (inner city), free-service routes, TransJabodetabek buses, 'TransJakarta Cares' for disabled, and Tour Buses. Until the year 2017, PT TransJakarta has 240.8 km dedicated BRT corridor, owning 325 buses, and cooperating with other bus operator to run 953 buses. Their ultimate goal is to reach 1 million passengers per day. Ticketing system is E-ticketing, with a reloadable multi-use card provided by major banks, so that passanger can simply tap-in and tap-out on board. Passengers can top up or reload the card by handing over their ticket to cashier and pay with cash. This tap-in and tap-out system is useful to capture passenger movement, and this data is utilized for planning and improving services. A key issue for PT TransJakarta is that are fully reliant on subsidy from the DKI Jakarta government. The level of cost recovery is still very small, being only 20% revenue from ticket sales.

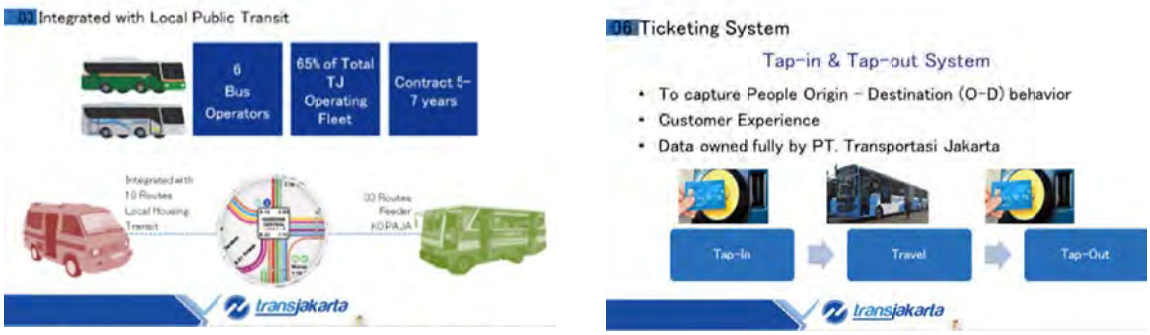



**Figure 2.10 Sample of Presentation by PT. TransJakarta**

After the presentation and discussion, participants visited BRT operation center. In the control center, it was explained about procedure of monitoring operation and methodology of collecting necessary data for smooth operation.

**Figure 2.11 Site Visit of TransJakarta Control Center**

## 5.11. SESSION 11 Coordination between City and Central government

*(by BAPPEDA, Depok City)*

This session, included a presentation on Depok City, transportation issues, demarcation of central and local government functions. Also explained was the role of Depok City as the satellite city and buffer area of DKI Jakarta.

Depok City locates adjacent to DKI Jakarta and Banten Province. This city population is 2.18 million with 3.5% annual growth rate. Current big issue faced is difficulties of implementation of planned projects.

Regarding demarcation of central government and local government, based on the Indonesian Law on Local Government, there is a separation of authorities between central government and local government. Local government does not get involved in central government affairs even if it is located in the city. Based on the law, Depok City is

responsible for spatial planning, issuing development permits, transport regulations and infrastructure development on the city level. In order to coordinate with surrounding cities, Depok City prepared an integrated transportation development plan, which considers Depok city as a part of JABODETABEK and endorsed by presidential decree. Regarding coordination among surrounding cities, there is an annual meeting every year to discuss and deliberate the annual plan which is a part of national development plan which set from lower level to the upper level. Every local institution is invited in order to coordinate the plans and planning process. By arranging such a meeting, it is hoped that there will be no miscommunication and misinterpretation among the regions.


**Figure 2.12 Sample of Presentation by Depok City**

## 5.12. SESSION 12: Improvement of Transport System in JABODETABEK and history to establish coordination agency for urban transport in JABODETABEK

*(by CMEA: Coordination Ministry of Economic Affairs)*

In this session, it was explained about the issue and history of urban transport planning of JABODETABEK area, in addition to efforts to establish the urban transport coordination agency, BPTJ.

The Vice President's Instruction on January 2011, proposed 20 steps on handling transportation in Jabodetabek, covering four main areas: 1) transport facilities and Infrastructure; 2) spatial planning; 3) public transportation, and 4) regulation and governance. Out of the four aspects, CMEA is responsible for regulation and governance, which includes establishment of Jabodetabek Transport Authority (JTA) based on BPTJ and revision of the integrated transport master plan.

Now CMEA is implementing JUTPI phase 2 project together with JICA to achieve their goal, with three main activities in JUTPI phase 2, being:

- Revision of Urban Transportation Masterplan, to develop a cross-ministerial and

cross-boundary framework to promote integrated urban transport policies in Jabodetabek

- Implement of Pilot Projects to improve public transport facilities
- Implement a comprehensive study to enhance capacity of urban transport related agencies to implement TOD.

In the discussion, the experience of establishment of BPTJ was shared. Until establishment of BPTJ, there were cross-ministerial gaps and administration issues to overcome, so the establishment of BPTJ took a long time. As a responsible ministry, CMEA made lots of efforts to coordinate all related ministries, agencies and institutions.

The biggest challenge of CMEA as the coordination board today is to prepare and implement their policies to facilitate public transport use in nationwide, especially JABODETABEK.

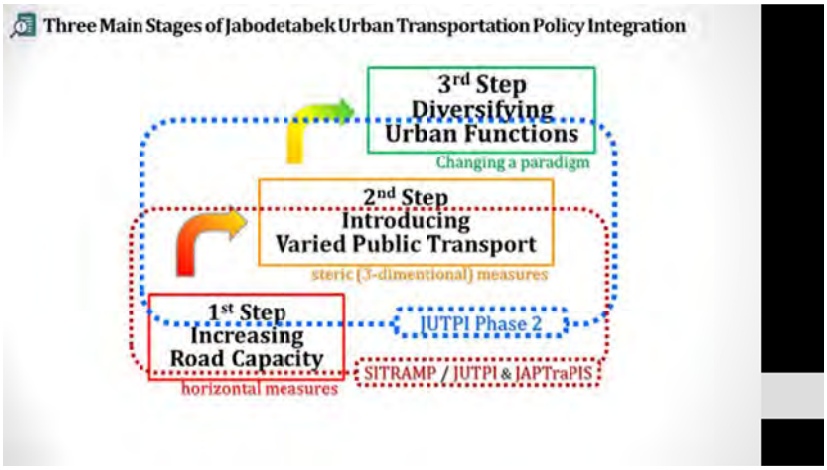



**Figure 2.13 Sample of Presentation by CMEA**

## 5.13. SESSION 13: Implementation of MRT development

*(by PT. MRT)*

In this session, implementation work of MRT construction project was explained together with issues on urban transport and public transport in Jakarta.

MRT is presented as a future high capacity public transport mode in Jakarta, which potentially will carry up to 80,000 passenger per hour and could cope with the limited space of Jakarta. The implementation of MRT is a mandate from Governor of Jakarta in 2008 and financial resources to build MRT mostly comes from JICA's loan with low interest.

MRT construction plan is divided into two phases. The first phase is North –South Corridor (Lebak Bulus to Bundaran HI), with elevated and underground structures. Elevated section will be built in 7 stations, and 6 underground stations. The structure was chosen based on soil characteristic and topological reasons. In the implementation of MRT, several cutting

edge engineering design and techniques are implemented, including the use of tunnel boring machine (TBM) for boring the soil, Communication-Based Train Control for signaling and automated driver for the MRT operations.

Implementation of MRT is considering TOD Development. There are several candidate areas to be introduce TOD. PT. MRT is looking for the most suitable scheme in terms of business development, financial and institutional settings to implement TOD around station areas.

In the discussion, it was explained about one of targets related to public transport development of Jakarta Province, being accessibility to public transport. According to the surveys, acceptable distance by walk to public transport was 350m, so positioning of stations or bus stops are planned to approximately 500m radius of origin-destinations.

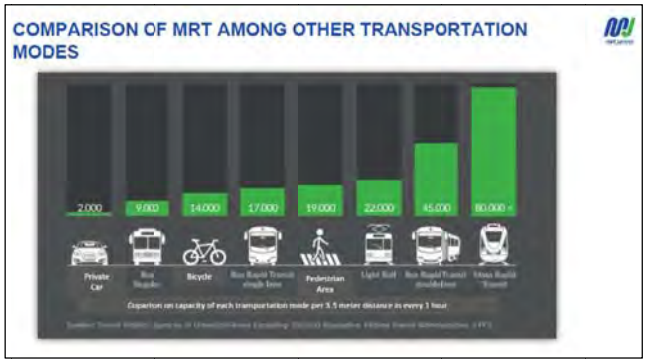




**Figure 2.14 Sample of Presentation by PT. MRT**

After the presentation, participants visited on-going MRT construction site.

**Photo 2.15 Site Visit of MRT Construction**

# 6. LESSONS LEARNED AND POLICY DIRECTION

Each participant will have drawn their own conclusions lessons from the study tour. Jakarta was a suitable city to visit, as it shares many similarities to Dar es Salaam. It is a port city with over 10 million population, which is the projected population in Dar es Salaam for 2030. Presently Dar es Salaam's GDP growth rate exceeds that of Jakarta. In this regard, Jakarta offers development lessons for Dar es Salaam, demonstrating lessons and experiences.

To summarize a few main points:

1. Jakarta has invested heavily in road infrastructure, but this has not solved the traffic congestion issues. Belatedly Jakarta is investing in rail mass transit for the main corridors.
2. Jakarta has also heavily invested in BRT, which has provided a faster than car bus service for travellers. However, BRT while it is heavily patronised, with low fares, and at a high subsidy cost to government, has not delivered the level of service necessary to reduce private car use.
3. BRT on many routes is operating at maximum capacity, therefore the decision to invest in higher capacity MRT / LRT systems is essential and is expected to deliver a much higher service standard, allowing government to consider more restrictive measures to reduce private car use, such as electronic road pricing.

*Lesson for Dar es Salaam:*

- *To not rely on road building and flyovers to solve traffic. Jakarta invested heavily in such works but it has not solved traffic congestion. Early investment into public transport is needed.*
- *To understand the capacity limitations of BRT and consider MRT for higher demand corridors.*
- *Ultimately with good quality mass transit pro-active policies to restrict private car use.*

4. Coordination of Urban Transport policies is essential, (through the BPTJ) but is shown to be lack strength unless it is at a sufficient high level.

*Lesson for Dar es Salaam:*

- *DUTA need to operate as the apex organisation to ensure full coordination and cooperation in strategic planning.*

5. Jakarta has invested heavily in CCTV and control centre technology to make the task of traffic management easier.

6. The BSD development appears to be an excellent urban structure, as it develops a multi-functional community of commercial, educational and housing areas. While connected to rail systems the integration of public transport seemed lacking and insufficient to make a major impact on car use in some respects (like rail stations being some distance from housing suburbs).
7. The Commuter rail service with its priority for service improvements and high level of customer service was of key interest, showing that a government -owned system with the right goals and leadership was up to the task.
8. TransJakarta BRT operation is highly subsidized, almost to the point where there appears to be no limit to the funding the government will provide to support the service. When this was questioned, this appeared as an active policy to promote the use of public transport, and also acts as a policy for social intervention to keep transport costs affordable.
9. The work of the CMEA (Coordination Ministry of Economic Affairs) in promoting public transport, indicated the central importance the city places on this issue, as an economic driver. This is no doubt due to the chronic and severe traffic problems which have threatened to grind the city to a halt, stifle economic growth, and damage the prospect of a good standard of living for the future.

*Lesson for Dar es Salaam:*

- *The level of government interest, its intervention and commitment to solving transport problems to improve the city's future is exemplary, but borne out of necessity. Dar es Salaam can be 'ahead of the game' compared to Jakarta which seems to be playing catch up.*
- *The work of the CMEA also reflects the need for DUTA is emphasized in the light of the issues Jakarta is dealing with.*

10. The MRT development in Jakarta showed a real-life example of high capacity rail technology for major corridors, especially corridors where BRT is under-capacity compared to demand. This is particularly pertinent for Dar es Salaam's BRT future Phase 3 and 4.

*Lesson for Dar es Salaam:*

- *During the tour, an internal discussion was about the option of MRT on the 2 corridors of Nyerere Rd and Bagamoyo Road. Any BRT development must keep space for future pylons for an elevated MRT.*