URBAN TRANSPORT PLANNING MANUAL

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Addis Ababa
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ACRONYMS

AAMP  =  Addis Ababa Master Plan
ADLI  =  Agricultural Development Led Industrialization
B/C   =  Benefit Cost Ratio
BWUD  =  Bureau of Works and Urban Development
CBO’s =  Community Based Organizations
CES   =  Consulting Engineering Services
ERA   =  Ethiopian Roads Authority
FUPI  =  Federal Urban Planning Institute
IDP   =  Integrated Development planning
IHS   =  Institute of Housing and Social Studies
LG    =  Local Government
LSDS  =  Local Social Development Strategy
MTS   =  Motorized Transport System
MDG   =  Millennium Development Goals
M&E   =  Monitoring and Evaluation
MoFA  =  Ministry of Federal affairs
MSE   =  Medium and Small Scale Enterprises
MWUD  =  Ministry of Works and Urban Development
MT    =  Motorized Transport
MTS   =  Motorized Transport System
MUDH  =  Ministry of Urban Development and Housing
NGO’s, = Non Governmental Organizations
NMT   =  Non Motorized Transport
NMV   =  Non-Motorized Vehicles
NUPI  =  National Urban Planning Institute
ORAAMP = Office for the Revision of Addis Ababa Master Plan
PASDEP = Plan for Accelerated and Sustained Development to End Poverty
RF    =  Representative Forum
RSDP  =  Road Sector Development Program
RTA   =  Roads Transport Authority
SC    =  Steering Committee
SNNPR =  Southern Nations, Nationalities and Peoples Region
SSATP =  Sub Sahara Africa Transport Planning
TC    =  Technical Committee
<table>
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<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>TPTM</td>
<td>Transport Planning and Traffic Management</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>UTTM</td>
<td>Urban Transport and Traffic Management</td>
</tr>
<tr>
<td>UTPTM</td>
<td>Urban Transport Planning and Traffic Management</td>
</tr>
<tr>
<td>UURP</td>
<td>Urban Upgrading and Renewal Project</td>
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PART I
BACKGROUND
STUDY
1. INTRODUCTION

1.1. Background

Transport is both a means and an outcome of urbanization and development. Urban transport planning and traffic management contribute to improve mobility and productivity of labor; to achieve an efficient land use; to optimally integrate transport network with public utilities and social infrastructure and to restructure the urban transport service. Transport efficiency has direct link with poverty alleviation. When transport infrastructure development and operation is managed with due consideration of labor based technology, it could create huge employment opportunity. Urban transport is the sector where Micro and Small Scale Enterprises (MSEs) could take large share in terms of non motorized transport infrastructure development and supply of transport services.

Transport efficiency is considered as an indicator of level of urbanization and development. Transport creates a favorable condition for transaction, exchange, knowledge transfer and economic efficiency. On the other hand economic development and technological advancement enable nations to invest in transport improvements. These relations have not been without difficulties. Congestion, traffic accidents, pollution, and access problems have been the critical challenges of the transport and traffic management sector throughout the world. This puts transport planning and traffic management on top of an urban development agenda.

Concomitant with the level of urbanization and development, urban transport infrastructure and services are at rudimentary stage in urban Ethiopia. Modern urban transport systems are limited to few urban centers. City Buses are operating only in the capital city, Addis Ababa and with very limited services in Jimma and Bahir Dar. Taxis are operating only in Addis Ababa and 10 secondary cities. In the majority of Ethiopian urban centers the urban transport mode is fully pedestrian, and in some cases using animals backs or carts (donkeys, mules and horses) for the transportation of both goods and people.

The road system is partially asphalted in Addis Ababa and few secondary towns. The remaining vast majority of small and medium level urban centers have only pedestrian routes inaccessible by vehicles except for those parts lying on the national highway network system.

A large share of trips is by walk (61%) in Addis Ababa. This figure is bigger in secondary cities. There are no separate pedestrian walkways and related services though the dominant traffic is pedestrian. Due to the inadequacy of pedestrian facilities, the number of road accidents is
alarmingly high. Accidents are increasing particularly in the capital city at a very high rate of 12.5% (There were 305 deaths due to road accidents in 2004). Parking is also emerging as a major demand and problem of the urban transport sector in the capital (CES, 2005).

Transport planning and traffic management were not considered as integral components of urban development agenda until recently. With the preparation of master plans, however, transport planning and traffic management were considered as part of roads network planning. Transport planning and traffic management, as part of the urban planning efforts, have been performed haphazardly in the absence of systematic working manuals and planning procedures based only on the experiences of professionals assigned for the job. More specifically, the absence of more articulated manuals in the overall urban planning, transport system and traffic management has resulted in glaring problems and gaps in the sub-sector. Now, with the rapid growth of urbanization and development, the need to have planned interventions has gained growing importance.

To fill this critical missing link in the modus operandi of the overall urban planning processes in the country, the MoFA (now MWUD) has entrusted to MATHEWOS Consult the task of developing state-of-the-art urban planning procedure manuals that will guide future urban planning efforts in the country. This Transport planning and traffic management manual is, therefore, one of the seven planning manuals developed by MATHEWOS Consult in close cooperation with and involvement of the Federal Urban Planning Institute (FUPI), formerly known as National Urban Planning Institute (NUPI).
1.2 Urban Transport Planning in the Context of Ethiopian Urban Planning System.

Fig.1. A Trend of the Ethiopian Urban Planning System

In the Ethiopian urban planning system, UTTM may be conceived at two major levels. It may be conceived as part of or to evolve from a city wide holistic urban structure plan/master plan/development plan. This UTTM is a long term plan having similar time horizon as the structure plan. Moreover UTTM can be conceived to cover only part of an urban center limited to a locality, eg. an LDP area or an UURP area.
UTTM could also be conceived as a short term/medium term municipal plan that is extracted from the long term IUISP plan. It is from this level of planning that projects are designed for implementation.

1.3 Methodology and Approach

In preparing the manual, both primary and secondary sources of data were employed. The consultant consulted relevant Federal Ministries, Regional Governments and other involved agencies and followed a strategic planning approach, incorporated the concepts, methodologies and approaches of IDP. The consultant with FUPI counter part experts also conducted rapid assessment survey in four regional states (Amhara, Oromia, SNNPR and Tigray). The towns covered by the survey were Mekelle and Axum (Tigray), Bahirdar (Amhara), Awasssa (SNNPR), and Adama (Oromia). Bureau heads, mayors, city managers and professionals were interviewed and brainstorming discussions were undertaken. In-house discussion and experts opinion gathering was the integral part of the process. The regional bureaus and FUPI experts involvement in the process of preparing the manual enabled the consultant to shape the manuals through learning-by-doing approach. The consultant also reviewed relevant literature; assessed international and local experiences.

The Adoption of the IDP Approach: The terms of reference and the frequent discussion conducted between the consultant and the client strongly emphasized the need for adopting the IDP approaches and principles. Particular attention has thus been given to apply the IDP approaches and principles in drafting the manual. Here below are some of the key manifestations in the adoption of the IDP approaches and principles:

1. Municipalities are expected to spearhead urban development endeavors and initiate Transport Planning and Traffic Management and hence playing developmental roles aimed at the optimization of available resources to alleviate poverty and promote sustained economic and social development rather than the usual practice of merely service provision and implementation of regulations. This enables transform municipalities from mere crises management situation to proactive management system.

2. Transport Planning and Traffic Management entail assessment of the existing level of development. UTPTM is thus planned based on identified key developmental priorities expressed on the integrated urban development plans and with focused outputs, and flexible enough to deal with changing environments.
3. Planning and implementation of UTPTM projects are linked to the IDP 5 years plan and the IDP municipal budget.
4. Community and other key stakeholder participation is ensured in the whole process of UTPTM projects and that such participation is formalized/ institutionalized through Representative Forums and the Steering Committees with the required legal backing and capacity building.
5. UTPTM projects planning process ensures that it is well aligned with other municipal programs and plans at the Federal, Regional and Local municipal levels.
6. The preparation of the manual gives attention to integration of such major issues as socio-economic, spatial/and environmental, financial, institutional and the regulatory frameworks.
7. The UTPTM projects meet measurable development objectives and targets and that key performance and output indicators are developed to measure performance.
8. UTPTM projects planning become effective by adequately involving the community.
9. UTPTM projects planning basically follows the IDP planning and Implementation process. The only difference is the separation of the OMME (Operation, Maintenance, Monitoring and Evaluation) phase from the implementation phase. Due to these alterations, the five IDP phases have been slightly modified to seven phases in the preparation of this manual.

1.4 Purpose of the Manual

The general objective of the manual is to show step-by-step detailed procedures that will give a general road map to officials, urban planners and other stakeholders in the preparation of UTPTM that enhances urbanization and development and curtails the negative consequences of these developments.

More specifically the objective of UTPTM manual is to provide a coordinating framework for the long-term UTPTM development of designated city or town by establishing:

- Environmentally sensitive principal direction of growth,
- The legal, institutional arrangements, responsibilities and capacity needs foundation for planning and development
- The economic and resource basis for sustainable urban development

1.5. How to use the Manual

All urban actors involved in transport planning and traffic management may use this manual. The private sector, government bodies such as research and teaching institutions, NGO's and
CBO's may also use the manual. The primary users of this manual are Federal, Regional and LG level decision makers and professionals who are the front-liners in transport planning and traffic management.

Attempt has been made to make the manual user friendly, easy to refer and use. For improved results, all users are advised to take training on the manual. If users find a step or standard irrelevant to their situation, they may readjust it to fit to their specific situation and purposes by conducting prior consultations with FUPI. The manual may also be revised every five years to reflect changes over time.

1.6 The Content of the Manual

The manual is divided into three main parts. The first part contains the introduction, the major conceptions, international and local practices and provisions and tools adopted in urban transport planning and traffic management. The second part deals with planning, implementation and operation procedures. The third part is the annex where different formats and standards are included.
2. REVIEW OF PRACTICES

2.1 General

Urbanization and development are inalienably interlinked in the sense that one is both the cause and consequence of the other. Transport is another aspect of this strong correlation and linkage between urbanization and development. Transport facilitates the movement of goods and services from areas of production to areas of demand. Diffusion of innovations is made possible through transport. Transport impacts the expansion of market exchange and causes the birth and growth of urban areas. Unless guided consciously, the transport sector would give rise to expansion of motorization and the concomitant traffic safety problems of congestion and environmental pollution.

Urbanization rate in developing countries is generally higher than growth rate in the economic sphere. The growth of urban centers in developing countries is ascribed to demographic phenomena due to natural increase and migration rather than economic change. This imbalance between urban growth and economic development in developing countries has driven urban centers to be centers of squalor, shanty towns and poverty. In terms of transport, developing countries are characterized by increasing motorization within ill management conditions. Few of the critical problems characterizing developing countries are traffic congestion, poor public transport service, higher rate of traffic accidents, and costly operation of transport services.

2.2 International Experiences

A number of cases have been considered from different countries having different levels of development. Curitiba in Brazil (Latin America); Philippines, Japan and South Korea from Far East; The Netherlands from Europe as well as African Countries’ (Nigeria, Uganda, Kenya and Tanzania) experiences has been presented in a bid to draw lessons from these variety of planning and implementation of UTPTM.

Curitiba (based on V. Parasram, 2006), the capital city of the State of Paraná, Brazil, experienced some of the highest growths in the country during the 1950-1980s. This uncontrolled increase in population demanded effective city planning that included constructing a consolidated public transportation system to move people easily throughout the metropolitan area and its surrounding municipalities.

With the approval of Curitiba’s Master Plan in 1966, urban planners realized that transportation, land use and road systems can be used as integrative tools of development in compliance with
the guidelines of the master plan. They developed a world-renowned mass transportation system that today covers eight neighboring cities, and transports close two million passengers daily. A peculiar situation was that they addressed the process of transportation as an integrative approach that can assist in the development of the city. They recognized that transportation systems can serve as the backbone for the development and growth of the city. According to the land use and road network plan;

- The land fronting the central road is zoned for high density commercial and residential development,
- The inner frontages of the lateral highways are zoned for medium density residential and commercial uses,
- The outer frontages are reserved for low-density residential development.

Curitiba decided to use buses as the most cost effective primary means of public transport. Slowly, bus routes began to replace trolley routes and later the trolley system stopped transporting passengers completely. They also regulated bus fares and established unified fare. They also created Brazil’s first pedestrian network in the center of the city.

Traditionally the city was partitioned in different zones that were serviced by individual bus companies. But, with the creation of the inter-district routes and the implementation of the Integrated Transportation Network along with the unified fare, passengers could pay one company at a terminal located in a particular zone and ride the system without paying the other bus companies.

The creation of dedicated bus lanes, articulated and bi-articulated buses and thus an express system operating much like a surface subway system enabled to transport large number of passengers to various locations along with the structural corridors.

Curitiba’s system of transportation is an example of effective urban planning and proved that the development of infrastructure in the city can guide the city’s expansion. The city was able to implement and efficiently construct cost-effective transportation system that finances itself.

The entire MTS is currently operated by Urbanization de Curitiba (URBS), a publicly-administrated, privately-funded company that was founded in 1963. Together with IPPUC both agencies are responsible for land use development, maintenance and extension of the mass transportation system.
The case of Curitiba in urban transport planning shows that an integrated and visionary urban planning system results not only in the efficiency of urban transportation system but also generates urban development. The integrated system itself has been used as a point of reference for cities around the world that are planning to implement an efficient transport network.

**The Far East Experience based on (PADECO Co LTD 2000)**

Urban rail becomes particularly important when high-density urban development expands to create distances that are too great for efficient bus transport, and usually when employment remains centralized—Tokyo and Seoul being the obvious cases. In the 1980s, the emphasis was placed more on traffic management measures to pursue more optimal use of limited road space and on improving public transport service levels.

Metro Manila, the capital of the Republic of the Philippines accommodates a population of about 9.5 million (1996 data) within a land area of 636 square kilometers. Disorderly development with highly mixed land use and squatter settlements prevailed in Manila. In the 1970s the city formulated urban transport master plans and undertook major road construction and transport improvements.

Minibus taxis named Jeepneys in Manila (as Matatus in Kenya and Wuyiyit in Ethiopia) are very common and important urban transport providers. Manila’s Jeepneys are the mainstay of the city’s transport system carrying nearly one-half of all peak-period passenger trips. Metro Manila successfully incorporated Jeepneys and bus services, but since the metropolis eventually reached a stage where the concentration of travel demand could not be efficiently handled by the road-based system, the development of an urban rail system has become essential. Along small to medium demand corridors, road-based public transport with exclusive facilities served as an efficient urban transport system. The Manila Metro is currently underused largely due to high fares and difficult access arrangements.

Comprehensive legal framework supporting integrated development is the key success factors in Japanese-Style Integrated Development. Integrated land use and transport planning process at national and local levels; well respected government policies on land use and transport development, which provide incentives to attract investment along corridors, are also noted as success factors for the Spatial Planning Strategies.

The Japanese, Manila and Seoul experiences suggest that public transport development can best be approached with rigorous traffic demand management measures as an integral part of
strategy. It can be concluded that, without traffic demand management or car restraint, the viability of mass transit is undermined. Successful urban rail development is usually associated with careful planning of network and modal integration. Rail passengers typically depend on walking, cycling, or bus rides as feeder modes.

A number of other developing country metropolitan areas have addressed the problems of geographic/jurisdictional and/or functional fragmentation with a more incremental approach by establishing metropolitan-region wide transport and coordinating agencies.


Here the experiences of two metropolitan cities (Dar es Selam and Nairobi), and two secondary cities (Eldoret and Morogoro) are presented. The discussion focuses on how transport infrastructure and services affect the well being of poor households. The experiences in these cities proved that in transport planning and policy, it is better to think in terms of poor cities characterized by significant personal mobility constraints rather than treating the city’s poor as isolated cases with special travel and transport needs.

Employment is so crucial that there is an argument for regarding it as a direct approach to poverty alleviation, and this consideration could be beneficially incorporated into assessments of transport investments.

Positive influences on the livelihoods of the poor have resulted from employment-intensive, settlement infrastructure upgrading schemes; the privatization of bus passenger services which generated unskilled employment opportunities; and the new services provided by non-motorized goods vehicles.

From a household perspective these are pre-eminently cities in which walking dominates. Public transport is next in importance, with cycling as the potentially third most important mode – a potential that presently, for safety reasons, can only be fulfilled in the secondary cities.

Spatially and temporally diversified urban activities appear to require more flexible transport systems for people and goods than the heavily radial movements provided by existing public transport systems. Evidence from Dar es Selam proved that the informal privatization of transport services has reduced the former radial orientation, by the creation of feeder operations, and in so doing is producing a denser pattern of urban settlement.
Motorcycle-based passenger services have become established in both West (Benin, Nigeria) and East (Uganda) Africa. Although they give rise to significant environmental problems – air pollution, accidents – their ability to operate under low demand densities, penetrate congested area, and flexibility gives them inherent advantages over conventional services.

Travel by private car meets less than 10% of demand, but incurs over 50% of total system costs. By contrast, walking meets almost half of trip demand but accounts for only 1% of total costs. These distorted cost distribution patterns represent a serious misallocation of economic resources; and transport policies should aim at their reduction.

Road and footpath improvement was successfully embedded in a diverse program of employment-intensive works in the case of Dar es Selam. Improved mobility and facilitation of solid waste collection were immediate effects.


The Netherlands opted for the approach of decentralization in policy execution. An important role has been laid down for parties other than the central government, such as provinces and municipalities. Experiences of the Netherlands have shown that compact city spatial planning has to be duly considered since short trip distances increase the chance of bicycle use.

Three scenarios were developed for the valuation of interest between NMT and MT: the Ivory Tower Model, the Populistic and the Balanced Model. The latter model proved realistic because various stakeholders are involved at different phases of policy making, planning, design and valuation of interests of road users.
Though not meant to be a blueprint, the experience recommends the following stages to be followed:

1. Establishment of a proper organizational set-up for urban mobility planning and implementation of user participation set-up and of financing arrangements for interventions.
2. Preparation of an inventory of user needs and of an NMT route network inventory and problem inventory.
3. Preparation of an NMT action plan (‘pilots’)
4. Preparation of a long-term urban network plans
5. Design of a first package of interventions
6. Appraisal of the proposed interventions
7. Development of a complete long-term mobility plan and policies.

Fig. 2 NMT Network Planning Process in the Netherlands.
Servaas identifies three main categories of roads:

1. **Transit roads**: designed for large flows of traffic on longer distances. On these roads there is no direct access to individual addresses.

2. **Distributor roads**: designed to enable the road users to find their way to the area of their destination, but don’t give direct access to individual addresses. The distributor roads should allow for turning maneuvers of road users finding their way. A moderate low speed is appropriated to allow road users to react to sudden maneuvers, and to ‘negotiate’ with other road users.

3. **Access roads**: primarily meant to give access to individual addresses.

The same assessment recommends that in order to have sustainable success, cities in developing countries should:

- Develop an urban mobility plan for bicycle and pedestrian transport as an integral part of a city’s transport and traffic policies and plan.
- Develop an action plan with immediate or short-term, tangible results prior or parallel to the urban mobility plan.
- Distinguish between non-cycling cities/areas and places where cycling has already an important share in traffic.
- Make a functional hierarchy of roads (access, distribution, transit) so that for each category specific measures can be taken.
- Plan NMT interventions following an area-wide approach.

Table 1: An Overview of Costs and Benefits of Interventions Tested in SSATP Projects

<table>
<thead>
<tr>
<th>Test Interventions</th>
<th>Total Benefits (B)</th>
<th>Benefit Components</th>
<th>Total cost (C)</th>
<th>Cost competence</th>
<th>Cost Benefit (B/C) ratio</th>
</tr>
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<tbody>
<tr>
<td>Walkway improvement along Corridor in Morogoro</td>
<td>14400 USD (per year)</td>
<td>Saving travel time</td>
<td>18,000 USD 4,200 USD/year</td>
<td>Repair Culverts Walkway Construct. Build bridges</td>
<td>3.4</td>
</tr>
<tr>
<td>Raised Zebra-crossing in Dares Salaam and Morogoro</td>
<td>4,350 USD (per year)</td>
<td>Avoidance of cost of accidents</td>
<td>4,500 USD per zebra-crossing 1,000 USD/year</td>
<td>Raised zebra crossing</td>
<td>4.4</td>
</tr>
<tr>
<td>NMT bridge in Dares Salaam</td>
<td>6,000 USD (per year)</td>
<td>Saving travel time</td>
<td>11,000 USD per bridge 1,500 USD/year</td>
<td>Bridge Cost reduction because community participation</td>
<td>4</td>
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Cost-benefits analysis of road reconstruction in Delhi has shown a net value of total costs of Rs (Rupees) 121 million and a net present value of benefits of Rs 2,444 million. The cost benefit-cost ratio is thus 20:1. Based on the potential benefits of the bicycle master plan in Bogota, benefit-cost ratio turned out to be 7.3:1.

**Lessons Learned from the International Practices**

An urban transport system will have a profound effect on a city and on the way it develops. It will influence locations of new commercial and residential areas and how people travel thereby affecting the character and lifestyle of the city. Therefore, it is important to integrate transport development with urban development and land use control. It is recommendable to secure transit corridors at an early stage of economic systems and may be introduced when corridor demand grows.

Experiences in developing countries proved that public transport system must be affordable to the poor and that NMT facilities should also be improved. There is thus a need to improve NMT facilities and reduce barriers to the supply of informal transport services. As low-income groups are particularly vulnerable to accidents, improvement of pedestrian and NMV facilities would provide them with safer means of transport as well as improve their mobility. The biases against NMT built into policy decisions in a number of cities originate from policy makers’ common misunderstanding of the goal of urban transport in securing mobility for “vehicles” rather than “people.” (PADECO, 2000)

Vehicular traffic in urban areas generates negative externalities to the urban environment (air and noise pollution, traffic accidents etc). This is managed and controlled by vehicle inspection system to ensure the roadworthiness of vehicles on public roads with respect to safety and environmental regulations through appropriate institutional framework for its effective implementation.

According to PADECO (2000), general observation of cities in developing countries reveals the following points:

- Weak institutions, insufficient and low capacity staff
- Chronic shortage of financial resources
- Often not well coordinated policies
- Non-existent or underdeveloped urban rail system
- In-efficient public railway management
In the face of the above problems, strategies for the development of urban rail in developing countries include:

- Securing of rail rights-of-way at an early stage of urbanization. The rights-of-way can be used, for example, for a dedicated bus way until demand warrants the construction of a fixed track system.
- Involvement of the private sector (domestic or foreign) to introduce technology and efficient management, although public financing of railway construction may be necessary,
- Provision of technical assistance to promote policy coordination and training of staff capable of planning, design and public financing.

The documented approaches to the upgrading of low-income settlement transport infrastructure, and improving the mobility of the low-income population, are two means of providing immediate benefits to the poor. In both cases the focus is on improving the transport system available to poor people rather than to vehicles. They can easily be targeted on specific locations.

Urban transport is influenced by the layout of the city. Cities in developing countries are mega cities with strong integration of activities. The urban goods and person flows are dependent on the organization of the city.

Most weaknesses in urban transport policy implementation in developing countries stem from inadequate administrative and institutional arrangements. To address these issues, both the vertical and horizontal perspectives need to be considered. The reduction of barriers to the supply of informal transport services is advantageous subject to reasonable and enforceable levels of safety. It is important that the orientation of investment identification and planning be changed from a focus on vehicles to one on people.

The most effective immediate pro-poor policies would combine; (i) restoration of an efficient network of walking routes by rebuilding sidewalks and construction of missing links, especially footbridges; (ii) direct targeting of the severe access problems experienced in the informal settlements; and (iii) measures to reduce accidents on the arterial roads where they are concentrated.

Labor intensive working methods can be regarded as the cheapest and most effective working methods for developing countries. The ‘learning by doing’ approach would imply that feedback stages are an essential part of the process. Education and awareness activities should be
combined with other interventions since they seem to have little impact when carried out in isolation.

Unlike Western strategies that are often based on the creation of independent districts with their own segregated residential, commercial and industrial zones, developing countries urban transport strategies should be based on the mixed mode of urban functions.

2.3 Local Experiences
In the past, public transport was one of the sectors highly centralized and administered by the then Public Transport Corporation under the Ministry of Transport and Communication. Among the major towns in the country, only Addis Ababa, Bahir Dar and Jimma are provided with city bus services, while the other major towns are served by private minibus, taxis, traditional and intermediate modes of transport like pack animals, cart and bicycles. Currently, with the overall change of macro-economic policy environment, there has been a general shift in the public transport activities from central manipulation to regional operation with meaningful participation of the private sector. As a result, numerous public transport associations have emerged and have been operational.

Rail transport is one of the most important modes of modern transport next to road and air transports in the Country. The railway transport system connecting Addis Ababa to Djibouti Via Dire Dawa, is the only rail transport in Ethiopia.

Ethiopia has experienced the highest traffic accidents as measured by fatality rate in the world. About 155 deaths for 10,000 motor vehicles per year have been registered as against 30 to 60 fatalities per 10,000 motor vehicles annually in other Developing Countries.

The local experience in Urban Transport Planning and Traffic Management can best be seen under the different periods as follows.

2.3.1 Imperial Era
During the Imperial Era, the road network of the country can be characterized by radial network centering the capital city, Addis Ababa to different ports, resource areas, and regionally important emerging towns and historical sites. Following these radial roads major Ethiopian towns emerged. On top of these, the coming into being of the Ethio-Djibouti Railway line in 1901 contributed to the emergence of nationally important route in the eastern part of the country. It
was in this era that the current major trunk roads running to different corners of the country have come into existence.

Urban plans of this era mainly focused on spatial land use planning where transport planning was dealt with in the road network planning. The 40-towns master plans of the mid 1960s by the Italians are important cases for consideration in this regard.

These plans did not deal adequately with transport facilities like bus and truck terminals, warehouses, parking, junctions, and traffic control points as an integral part of the transport terminals (MUDH-NUPI, 1986). Moreover, they paid little attention to integrate urban transport with regional transport system.

### 2.3.2 Dergue Regime

A major breakthrough in urban transport planning was observed in the 1986 Addis Ababa Mater Plan (AAMP). AAMP had considered the Regional Metropolitan Transport System; the road network; public transport services and basic infrastructures; future urban mobility scenarios; integration of road infrastructure with public utilities; mass transit consisting of metropolitan railway system; a trolley bus service and the main bus system. Though not included in the key projects of AAMP, the development of air transport system had been given due attention from the point of view of enhancing the international image of the City and serving as hub of air transport in the regional network of African Air Transport. Further, AAMP considered key projects priorities and implementation programs though it failed to provide detail action plans for its implementation.

Following the AAMP, many urban plans were prepared by the National Urban Planning Institute (NUPI) and Regional Works and Urban Development Bureaus. In these plans, however, urban transport planning was treated inadequately. In the preparations of these plans efforts have also been made to address regional transport planning with particular emphasis on road network and rarely air transport. Absence of clear, holistic and standardized urban transport planning, and the low-level urban management capacity are the key factors for this inadequate treatment. It is worth mentioning at this juncture that rail and port (air, lake and river, inland) transport have been neglected despite their significant contribution to the local and regional economy.

### 2.3.3 Current Planning Practices

**The Federal Road Sector Development Program (RSDP):** An important current practice in transport planning and traffic management is the implementation of RSDP (1997-2007). In this
program the prime focus of the Government was to create adequate capacity in the road sub sector to facilitate and expedite the economic recovery process and restore the essential road networks to an acceptable condition.

The implementation of RSDP proceeds in phases in which Phase I (1997-2002) has been completed. The second phase of RSDP, which is under implementation, (2002-2007) emphasizes on improving the road network connecting different regions of the country and addresses transport issue of rural villages through Ethiopian Rural Travel and Transport Sub Program.

The Federal Road Sector Development Programs are consistent with the economic policy of the country favoring Agricultural Development Led Industrialization (ADLI) Strategy, which aims at achieving food security, poverty alleviation and widen social service coverage in the country.

Despite the commendable contribution of the RSDP implementation in terms of expanding and upgrading the road network in the country, its focus remained regional integration with little impact on UTPTM. UTPTM issue was only reflected in Master Plan Studies and preparations. Except for the traffic surveys conducted by Cesen in 1982; by Akerman in 2001 as part of Addis Ababa Ring Road Phase 3 Project; and by CAS in 2005, there were no significant traffic count efforts made for urban transport planning. These traffic counts were used as inputs for urban transport studies during the preparations of the two city master plans in 1986 and in 2001.

At the national level, Ethiopian Roads Authority (ERA) has been holding traffic count survey three times a year on all trunk and link roads sections under its responsibility for their maintenance. It is important to note at this juncture that the survey is made in order to make information on volume and composition of vehicular traffic available for various purpose of decision in road maintenance and improvement, planning and management (ERA, 2002).

One important effort in up keeping the quality and standardization of urban plans in Ethiopia is the preparation of national urban planning and implementation manual. The manual considers, among others, design and planning norms and standards for road transport and utility networks. It rather concentrates on road transport and related facilities with little attention to other modes of transport.

FUPI has been developing urban planning methodological approaches. Accordingly, process of urban planning with reference to federal level practice can be summarized as follows:
FUPI requests the regions to prioritize their towns for urban planning in response to five years development plans of the country;
Regions prioritize their towns and express their interest to the Prime Minister Office;
The Prime Minister’s Office, after considering the interest of regions, sends to FUPI for action;
FUPI again, taking into account its capacity and the strategic direction of the Government, develops a five year action plan, and subsequent annual implementation (operational) plans;
Accordingly, the Institute organizes a planning team for the selected towns drawing from the five line departments: Population and Social Affairs; Physical and Environmental Affairs; Economic Affairs; Urban Design and Topographic and Engineering Departments. Although all departments contribute to the transport planning and traffic management, the first three departments are mainly responsible for socio economic aspects while the last two are accountable to the physical design considerations.
Conduct data collection. It is at this stage that the level of participation of different stakeholders is accommodated in the form of focus group discussion to define hinterland of the project town and measure the level of interaction [Rarely conduct fact finding assessment or reconnaissance survey on the study town;]
Within the defined urban region, survey the existing transport modes, road network; and traffic count whenever appropriate; update the road network and transport map; indicate pictures showing existing transport condition and facilities;
Analyze the data collected and develop alternative scenarios of transport development for the planning period; organize and conduct in house presentation on the draft study report;
Accommodating the feed-back gained along in house discussion, prepare draft plans.
Organize and conduct meeting on the project town comprising all stakeholders. This is the second option where significant level of stakeholder participation is largely entertained;
Taking the feedback from stakeholders, finalize final form of the plan. Finally, FUPI provides the plan for respective Regional Bureau of Works and Urban Development or the Regional States;
Municipalities and Regional Bureaus of Works and Urban Development in their own priority and financial capacity construct the proposed road network until the end of the plan period.
Currently there is a national effort to adopt the IDP approach in the overall urban planning activities. This new paradigmatic shift is spearheaded by FUPI and pilot projects have been launched in regional towns. The IDP is believed to be an important tool to bring about an integrated urban transport planning with other urban plans. Regional Bureaus of Works and Urban Development as plan making bodies usually follow the same pattern of planning processes as FUPI.

The Office for Revision of Addis Ababa Master Plan (ORAAMP) and Adama Master Plan Revision Project (AMPRP) attempted to correct the backdrop of the previous planning exercises and adhered to a strategic structure planning approach. They identified transportation and...
traffic management as one of the major strategic issues, and dealt with in depth in the structure plan, in the strategic Development framework, strategic Development Action Plan and in the subsequent Local Development Plans. The east-west and north-south axes were identified as dedicated bus lane routes that could potentially develop into urban rail system. A feasibility study has been conducted by Simaley to further detail the proposals of the east–west axis. The Addis Ababa – Hinterland Linkage treated the regional transport issues tangentially. There was little effort done to integrate the railway line to other urban modes of transport.

In most Ethiopian urban planning exercises, urban road network is functionally classified as: Express or Motorway, Principal Arterial, Minor Arterial, Collector, and Local Street.

2.4 Existing Urban Transport Planning and Traffic Management Considerations

Spatial Considerations: The local transport planning and traffic management practice focuses only on the physical lay out of road network. In some important cities, there have also been efforts made to integrate airport locations as part of urban transport means. Similarly, in some towns located in Eastern part of Ethiopia, where the Ethio-Djibouti Railway crosses including Addis Ababa, Debre Zeit, Adama and Shinile, maximum efforts were made to maintain the railway and terminals to be compatible with other land uses. Although the importance of animal transport and walking was recognized long ago, and appreciated as dominant means of transport in Ethiopia, the prevailing physical oriented urban plans gave little attention to it.

UTPTM so far is considered as a partial fulfillment for crafting a master, or development or an action plan. The major spatial considerations so far exercised in urban transport planning are: topographic considerations; assignment of route location with the possible minimum drainage intercepts, assigning geologically stable land configuration; integrating centers with the possible shortest links; considering the existing settlement structure vis-à-vis creation of compact morphology of a town and identifying natural and man-made constraints.

Socio-economic Considerations: Urban transport planning practices in the past pay little attention to socio-economic issues that addresses the preferred mode of transport affordable to large majority of the citizens. Moreover, employment structure, household size, terms of trade of imported goods and tax structure are some of the most important neglected issues in the previous urban transport planning practices.

Environmental Considerations: The issues of environmental concern in urban transport planning and traffic management is reflected on and explained in different forms. As widely observed on local urban plans, urban greenery is one of the most important areas of concern.
Urban greenery is incorporated within transport and road planning to protect the pedestrians from the hot sun strike and thereby encourage walking to serve as a wind break and protect from the dusty materials emerging from the carriageway during vehicle movements and windy days. On top of these, urban greenery serves as a means to reduce the flood hazard and moderate the micro climate. Despite the understanding of the need and the due concern given to the plans prepared, urban greenery is addressed along the median roads where they can not give sheds to the pedestrians and cyclists while the dominant mode of transport in these cities are walking and cycling. It is a vivid reflection of poor implementation of planning.

In these plans, there are attempts to minimize the effect of erosion and encourage safe flow of storm water to move harmoniously with urban settlement pattern/land use. Notwithstanding the attempts in bringing up integrated urban transport system as part of the overall urban planning process, key problems associated with environmental issues are:

- Topographic inconveniences for road construction;
- Route location along unsuitable slopes;
- Absence of soil test results as an input for construction of roads;
- Low design standard roads;
- Absence of adequate drainage and sewerage structures, and poor management;
- The growing problem of pollution as a result of increasing size of aged vehicles and poor waste disposal;
- Inappropriate location of garages, filling stations and oil depots that potentially pollute down stream surface water, ground water reserve.

**Financial Issue Considerations:** Current UTPTM practices do not adequately indicate the amount of money required, sources of finances and how to raise funds for effective implementation of a plan. One exception is the experience of Addis Ababa Master Plan Revision Project, where a 10 year and a 5 year strategic action plans were prepared, rough cost estimations made, potential sources indicated and key projects were identified.

**Legal and Institutional Considerations:** UTPTM, as part of the overall urban development plans, lacked binding legal frameworks and responsibly running institutions. In most cases, it is the physical plans and supportive written descriptions that serve as references and partially used as a regulatory framework in some towns (when one felt the need).
The road transport policy before 1974 can be defined as regulated private market, while the policies between 1974 and 1991 and the time since 1991 can be designated as regulated state market and deregulated private market respectively.

A survey report on Road Transport Regulation in Ethiopia has revealed that about 12 Proclamations and 37 Regulations have been crafted since 1942. Among the 49 laws which have direct relevance to road transport in Ethiopia, 10 have been repealed or replaced so far (RTA, 2000).

Transport and transport related institutions currently playing active roles are:

- Ministry of Transport and Communication
- Ministry of Works and Urban Development
- Ethiopian Roads Authority;
- Civil Aviation Authority;
- Road Transport Authority;
- Road Fund Office; and
- National Petroleum Reserve Depots Administration.
- The Regional Transport and Road Authorities.

The essence of traffic management in the Ethiopian context is the Ethiopian Road Code. The code consists of seventeen parts and sets standards for traffic rules signals, usage of roads, speed limit. However, Traffic Management in Addis Ababa is experienced by Municipal Committee arrangements formed by the City Roads Authority, the Addis Ababa Transport Bureau, and the Traffic Police (RTA, 2000).

Ministry of Interior (before 1974), Ministry of Housing and Urban Development (1974 -1991), Ministry of Works and Urban Development (1991-2002), Ministry and Regional Bureaus of Works and Urban Development (since 2002 to date) are the major actors in urban planning. Currently, the prominent actor in urban planning, among others, is the FUPI, the successor of NUPI, which is under the auspices of the Ministry of Works and Urban Development.

Except those trunk and link roads and some rural roads planned and implemented by Ethiopian Roads Authority and Regional Road Authorities, intra-urban road network at city/town level is a function of the municipalities and the Works and Urban Development Bureaus and Zonal Works and Urban Development Departments. Although encouraging sign of participation is observed in road development, the benefit from the private sector and the community is not yet tapped to the
desired level. The planning exercises were not adequately participatory and the involvement of basic actors in the implementation of the plans is minimal. It is only a recent practice that there are fragmented efforts of participation and partnerships of the civil society, NGOs, the Government, the private sector and the community in improving mobility and residential environmental quality.

**Urban Transport Planning Monitoring and Evaluation:** Monitoring and Evaluation (M&E) practices in both urban plan preparation and implementation are least considered. As a result, timely adjustment of planning methodologies, revision exercises, and partial correction measures could not be effected. Owing to these gaps, urban transport planning and implementation exercises are unable to accommodate the ever-changing urban dynamism.

One most probable reason for the negligence of M & E of urban planning and implementation exercises is the exclusion of such mandates pertaining to M&E from proclamation 315/87. NUPI had tried to institutionalize M & E function by establishing a Plan,Implementation, M & E Unit within the then Urban Planning Directorate during the Transition Period 1991-1992. The Unit, however, could not go far because of the restructuring of NUPI into five line departments. In 1998, however, NUPI conducted an interim appraisal of implementation problems and came up with critical findings that, inter alia, underlined the importance of M & E in urban transport planning and traffic management.

### 2.5. Gaps Observed from Review of Local UTPTM

- **UTPTM** is usually considered as part of urban development plan and a means to support land use plans. Major emphasis is given only on physical aspect of mainly roads while Non-Motorized and intermediate means of transport are given little attention.
- It is largely considered as a function of the Government and thus other urban development actors (the community, the private sector) and influential stakeholders are not adequately communicated.
- Environmental, institutional, and supportive legal aspects were not adequately addressed in most urban planning exercises.
- Vertical and horizontal integration of plans was poor; failure in transport integration between urban areas and their surrounding hinterlands; no infrastructure integration neither at general planning nor at action plan level.
• The master plans were criticized for not being visionary and flexible to accommodate changes (Mekele 10 years forecasted development boundary were fully covered 5 years before the forecast; Axum MP didn’t forecast University on other and the like). So plans are violated during implementation.

• There is low financial and manpower capacity at all levels.

• There were no proper approval and handing-over of plans to the municipalities; there were no inbuilt M & E mechanisms. In the process, no plan impact and outcome assessment was conducted.
3. URBAN TRANSPORT PLANNING CONCEPTION, PROVISIONS AND CONSIDERATIONS

3.1 General
In urban Ethiopian context, urban transport and traffic management planning will have dual purposes - as the backbone of economic and social development on one hand, and as facilitator of smooth mobility and efficient and effective traffic management on the other.

The Integrated Development Planning approach is a viable tool for urban transport and traffic management planning in urban Ethiopia. Due to the low level of economic development, transport planning should be integrated with other development planning processes at the national, regional and urban levels. Since it forms the backbone and circulatory system of an urban center, its soft and hard component parts (the infrastructure, the modes, the systems, etc.) should be adequately integrated and consistent to serve its objectives.

Urban transport planning is not merely to be integrated with other urban plans; rather it is to be taken at the heart of integration, as the background for ensuring integrated development. A critical strategic focus should be on the integration of the motorized mode of transport with the non-motorized including the pedestrian mode. This is to be given more attention for small and medium level urban centers.

3.1.1. Definitions
For this manual purpose, we defined urban transport as a process of moving mobile matter through variety of means in an urban setting. Urban Transport may be considered as one of the major integrating soft component of urban functions. And Traffic Management as the art & science of managing the smooth & efficient flow of moving matter in an urban transport Network.

Urban transport system consists basically of four major component parts:-

1. Infrastructure:
   - The physical passages:- lines, routes, conduits, tunnels through which mobile matter moves
   - Junctions and connections such as squares, T's or crossings where a number of passages or lines meet.
   - Terminals:- service stations, spaces and the accompanying physical infrastructure where moving matter stop to load and/ or unload, make transit and get services.
• Traffic signs: the physical structures placed in an urban transport network to caution of or to prohibit the traffic from a certain (mobility) activity.

2. Transport Modes (Mobile matter):
   • Moving equipments, machineries or animals or pedestrians that carry other matter (goods/ or passenger) through (transport network)
   • The goods/ or passenger carried by equipments machineries or animals.

3. Network: a system of transport lines, junctions and terminals integrated with their interrelations in terms of hierarchy, size, function, typology, etc so that smooth and efficient traffic flow is secured.

4. Services: the soft components expressed mainly through traffic management and enabling support activities.

3.1.2. Ingredients of Urban Transport and Traffic Management Plan
Contents of urban transport and traffic management plan are:
   • Infrastructure plan expressed mainly in the form of spatial/ physical plans
   • System and services plan
   • Standards and regulations
   • Implementation strategies mainly focusing on institutional arrangements, resources mobilization (human, financial, etc.) and enforcements.

3.1.3. Key Principles
Sustainability: Transport planning and traffic management have far-reaching socioeconomic and environmental consequences. They should thus give emphasis to the long-term development visions while balancing with the short term mobility needs.

Stakeholder Participation and Partnership: Participation of stakeholders should be ensured in the whole process of programs and projects from initiation to completion giving particular emphasis to the informal sector NMT and the urban poor in an institutionalized manner.

Application of the IDP Approach: If the need for integration is more pronounced in urban transport planning, it should be approached in an integrated and holistic fashion where the component parts are internally consistent and mutually reinforcing. It is deemed to play a pivotal role in enhancing the planning and development of other sectors. Integration is also sought in
ensuring implementation through well thought and crafted institutional arrangements, resources management and enforcement mechanisms.

**The Adoption of Incremental and Flexible Approach:** Due to resource limitations (finance, human, institutional, information and knowledge) and the dynamism of the urban needs, urban transport planning should adopt an incremental and process based approach and be able to accommodate emerging needs in the future. Moreover, its flexibility is expected to enable the manual to be applicable to the Ethiopian urban context from all perspectives- socio-economic, environmental, physical, institutional, and legal points of view.

**Simplicity:** The manual should not be a complex set of technical standards and procedures usable only by technocrats but rather should be easily understood and applied by the end users.

**Promotion of Good Governance:** For the proper application of the manual, there should be appropriate levels of good governance manifested in the principles of transparency, accountability, and capacity at local levels. There is also the need to streamline the local, regional and federal level governance structures.

**3.1.4. Paradigm Shifts in Transport Planning and Traffic Management Concepts**
The move towards a more integrated approach to planning has resulted in some fundamental shifts in the way transport planning is approached.
### Table 2: Paradigmatic Shift in UTPTM

<table>
<thead>
<tr>
<th>From...</th>
<th>To ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus only to meet the needs of current generation</td>
<td>Consider the needs of future generations</td>
</tr>
<tr>
<td>Planning transport and land use separately</td>
<td>Planning transport and land use concurrently and iteratively</td>
</tr>
<tr>
<td>Accepting or mitigating the negative impacts of transport on the natural environment</td>
<td>Conserve and enhance the natural environment</td>
</tr>
<tr>
<td>A focus on mobility (the movement of people and goods)</td>
<td>A focus on both mobility and access (to people, places, goods and services)</td>
</tr>
<tr>
<td>Responding to and supplying new transport infrastructure and services</td>
<td>Making best use of existing infrastructure and services and influencing and managing the demands</td>
</tr>
<tr>
<td>Separate planning based on who owns and operates infrastructure and services</td>
<td>Collaborative planning based on achieving good system-wide outcomes</td>
</tr>
<tr>
<td>Focus on movement of vehicles</td>
<td>Focus on movement of people</td>
</tr>
</tbody>
</table>

Integration as a Major Paradigmatic Shift

Integration across sectors, levels of planning, locations, decision makers and solutions is essential for successful transport planning. There are two main aspects to this integration – vertical integration and horizontal integration – as shown below.

**Vertical Integration**
- **Top down**: Incorporate direction, knowledge and priorities from higher-order planning.
- **Bottom up**: Incorporate local needs, knowledge and priorities from lower-order planning.

**Horizontal Integration**
Integrate transport with other sectors and adjoining locations

**Fig. 4: Integration of UTTM**  
Source: Adapted from Queensland (2003) PP. 12.

Vertical integration is about taking direction, knowledge and priorities from other levels of planning into account (top down and bottom up). Higher-order planning guides more localized planning; and this ensures that specific localized planning contributes to achieving higher-order planning and priorities. The reverse also applies. Each local area is unique; and local needs, knowledge, solutions and priorities need to inform and influence higher-order planning and priorities.
Horizontal integration focuses on integrating transport planning, land use planning, economic development planning, education and health planning, etc. This involves making sure that decisions made in one sector complement, but not compromise decisions or interests in the others. Ways to plan for this include ensuring consistent land use decisions made across local government boundaries, and consistent and complementary policy decisions made across sectors and agencies.

Integration also means considering planning choices as a total package, rather than considering them in isolation. Planning the best transport outcome means selecting the right package of complementary measures.

Transport by itself is a means of integration but to serve its purpose and bring sustainable development, integration should be at the core of the planning process. From transport planning dimension, the city level transport plan should be integrated with the national, regional and neighboring urban-urban, and urban—hinterland transport plan. Integration of transport plan with regional and city level structure plans, infrastructure and services plan, city level economic and social plan as well as with local development plans is very critical.

3.2 Provisions and Considerations

3.2.1 General Provisions:
The following are key provisions for considerations in UTTM Planning

- Promoting services which meet the needs of as many people as possible.
- Improving interchange between modes and forms of transport
- Encourage more cycling and walking, through “cycle and walking friendly” initiatives and education of all road uses.
- Balance priorities between modes,
- Provide for vulnerable users
- Widening personal travel choices of walking, cycling, bus and para transit
- Give priority for labor intensive technology, encourage the participation of MSE’ and private sector
- Improving travel safety by considering determinant factors:
  - Technical factors (topography, slope);
  - Economic factors;
  - Social factors and
  - Environmental factors.
- Allocation of 15 to 25 percent of the urbanized areas for road spaces.

### 3.2.2 Strategic Options

A scan should be done of the full range of potential options. In some cases, an option may be a package of proposed measures.

Table 3 provides some examples of potential options, involving many elements of the transport system. A wide range of measures and tools are also highlighted at the end of the directions and principles section. They provide a useful overview of potential options, but options should be tailored to fit specific circumstances.

**Table 3: Some Examples of Strategic Options**

<table>
<thead>
<tr>
<th>OPTIONS</th>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage land use</td>
<td>Influence land use to get better transport outcomes</td>
</tr>
<tr>
<td>Influence travel demand</td>
<td>Influence travel choices, improve driver behavior, introduce educational measures</td>
</tr>
<tr>
<td>Manage operations on existing infrastructure</td>
<td>New services, changes to existing services, better services coordination and integrated ticketing, fares and information</td>
</tr>
<tr>
<td></td>
<td>Manage the use of infrastructure and services (for example, controlling local access points to freight routes, providing priority for vehicles such as public transport)</td>
</tr>
<tr>
<td></td>
<td>Apply new technologies (for example, real-time travel information, traffic management, freight and fleet management, and electronic toll collection)</td>
</tr>
<tr>
<td>Provide necessary new infrastructure</td>
<td>Provide new infrastructure such as roads, rail lines, terminals, bus stops, cycle ways</td>
</tr>
<tr>
<td></td>
<td>Upgrade/maintain existing infrastructure</td>
</tr>
<tr>
<td>Consider different Modes</td>
<td>Freight – truck, train, pipe, conveyor, ship, plane</td>
</tr>
<tr>
<td></td>
<td>Passenger – car, bus, train, plane, bike, walk</td>
</tr>
<tr>
<td></td>
<td>Modal interchanges</td>
</tr>
</tbody>
</table>
### 3.2.3 Transport Planning and Traffic Management Considerations

**Table 4: Criteria in the Selection of Modes of Transport & Facilities Locations:**

<table>
<thead>
<tr>
<th>Issues</th>
<th>Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>selection of modes of transport</td>
<td>➔ Technical factors: topography and slope are determinant factors for choice of modes (for example bicycle requires relatively plain landscape), space requirements of the modes and availability of space and traffic considerations</td>
</tr>
<tr>
<td></td>
<td>➔ Economic factors: economic and financial feasibility of the modes.</td>
</tr>
<tr>
<td></td>
<td>➔ Social factor: The benefits of transport infrastructure products must be equitably shared by all section of community.</td>
</tr>
<tr>
<td></td>
<td>➔ Environmental factors: Environmental implications of the selected modes of transport</td>
</tr>
<tr>
<td>Regional passenger terminal locations selection</td>
<td>➔ Long term environmental impact</td>
</tr>
<tr>
<td></td>
<td>➔ Economic significance and impact</td>
</tr>
<tr>
<td></td>
<td>➔ Integration with the city structure, land use and overall city development concept</td>
</tr>
<tr>
<td></td>
<td>➔ Coordination and integration with other intra-urban and inter-urban transport systems and other necessary services</td>
</tr>
<tr>
<td></td>
<td>➔ Comfort to commuters (in terms of accessibility, commuting cost distance and time)</td>
</tr>
<tr>
<td></td>
<td>➔ Existing and forecasted demand</td>
</tr>
<tr>
<td>Freight terminal location selection</td>
<td>➔ Proximity to industrial and warehouse zones and locations and related services (like customs, airport)</td>
</tr>
<tr>
<td></td>
<td>➔ Integration with the city structure, land use and overall city development concept</td>
</tr>
<tr>
<td></td>
<td>➔ Coordination and integration with other intra-urban and inter-urban transport systems</td>
</tr>
<tr>
<td></td>
<td>➔ Existing and forecasted demand</td>
</tr>
<tr>
<td>planning of road networks and</td>
<td>➔ Traffic considerations</td>
</tr>
<tr>
<td>Determining road width</td>
<td>➔ Existing and planned land use</td>
</tr>
<tr>
<td></td>
<td>➔ Physical and topographic features</td>
</tr>
<tr>
<td></td>
<td>➔ Mode of transportation</td>
</tr>
<tr>
<td></td>
<td>➔ Existing adjacent structure</td>
</tr>
<tr>
<td></td>
<td>➔ Number of pedestrians and other non motorized flow</td>
</tr>
<tr>
<td></td>
<td>➔ Utility provision</td>
</tr>
<tr>
<td></td>
<td>➔ Environmental impacts</td>
</tr>
<tr>
<td></td>
<td>➔ Road network density</td>
</tr>
<tr>
<td></td>
<td>➔ Length of road connectivity to different areas</td>
</tr>
<tr>
<td></td>
<td>➔ Social and environmental features and Cost</td>
</tr>
</tbody>
</table>
3.2.4 Segregation versus Integration

In general there are three options for separation or integration of various means of transport:

**Mixed traffic**: Here, no single mode of transport has an exclusive right to use (specific parts of) the road; it refers to a full integrated transport system. This mode may be applied where the traffic volume is small on local and collector roads.

**Visual segregation**: The second option is a bicycle/pedestrian lane where a strip on the carriageway is reserved for bicyclists or pedestrians. Though the facility is meant to be for pedestrians or cyclists only, one can not speak of a full segregation, since the facility can easily be used by other means of transport.

**Physical segregation**: The third option is a sidewalk for pedestrians or bicycle track for cyclists. Here the exclusive right of the pedestrian or cyclist is recognized. The track can not (or only very difficult) be accessed by motorized transport. Though the track or path itself is unimodal, at intersections one will always have to deal with other means of transport. The following table specifies the preferred type of segregation corresponding the urban level and road classification.

**Table 5: Segregation/Integration of Traffic**

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of Segregation</th>
<th>Urban Level</th>
<th>Road Classification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Mixed/Integrated</td>
<td>Small Towns</td>
<td>Local Roads</td>
<td>Collector Roads</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium Towns</td>
<td>Local Roads</td>
<td>Collector Roads</td>
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<td>Large towns, Cities, and Metropolis</td>
<td>Local Roads</td>
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<td>02</td>
<td>Visual Segregation</td>
<td>Small Towns</td>
<td>Arterial Roads</td>
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<td>Medium Towns</td>
<td>Arterial Roads</td>
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<td>Large towns, Cities, and Metropolis</td>
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<tr>
<td>03</td>
<td>Physical Segregation</td>
<td>Large towns, cities, and metropolis</td>
<td>Arterials</td>
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</tbody>
</table>
### Table 6: Transport System Performance Indicators

<table>
<thead>
<tr>
<th>Desired Outcome</th>
<th>Some Possible Outcome Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic growth, efficiency and effectiveness</strong></td>
<td>- Delays for vehicles (by type) at intersections&lt;br&gt;- Delays for pedestrians at road crossing&lt;br&gt;- Average time and money costs of journeys actually undertaken&lt;br&gt;- Variability in journey time (by type of journey)&lt;br&gt;- Costs of operating different transport services&lt;br&gt;- Indicators for access and mobility by area and economic sector&lt;br&gt;- Tax revenue from vehicle use</td>
</tr>
<tr>
<td><strong>Health, safety And security</strong></td>
<td>- Personal injury accidents by user type per person or per vehicle-kilometer traveled&lt;br&gt;- Security incidents per person or vehicle-kilometer traveled&lt;br&gt;- Perceptions of security while traveling&lt;br&gt;- Percentage of trips/travel made by not-motorized modes (cycling or walking)</td>
</tr>
<tr>
<td><strong>Access and mobility</strong></td>
<td>- Activities (by type within a given time and money cost for a specified origin and mode&lt;br&gt;- Costs of travel to activities (by type) from a specified origin by a specified mode&lt;br&gt;- Indicators as above, considered separately for different impact groups</td>
</tr>
<tr>
<td><strong>Environmental responsibility</strong></td>
<td>- Noise levels&lt;br&gt;- Vibration&lt;br&gt;- Levels of different air quality (local) pollutants&lt;br&gt;- Greenhouse gas emissions&lt;br&gt;- Fuel consumption for the area as a whole&lt;br&gt;- Other environmental considerations</td>
</tr>
<tr>
<td><strong>Livability, Connectivity and Amenity</strong></td>
<td>- Perceptions of security while traveling&lt;br&gt;- Perceptions of community severance&lt;br&gt;- Visual intrusion&lt;br&gt;- Townscape quality (subjective)</td>
</tr>
</tbody>
</table>

Source: Adapted from May, T, and Taylor, M. (2002)

### 3.2.5. Road Pattern types:

There are five basic road pattern types:

a. **Radial pattern of roads:** This kind of pattern tends to channel and concentrate the traffic movement to a square or a place. This kind of pattern concentrates business and activities in the central places and squares. Traffic might be concentrated and therefore congestion problem might occur unless alternative linkages such as the ring roads are developed to distribute the traffic flows. There are three sub types of radial road patterns:
b. **Grid pattern of roads**: In this pattern straight and continuous roads are arranged in a parallel manner with certain spacing, and crossing at 90 degree with another row of parallel straight and continuous roads. Traffic flow in this pattern is distributed in every direction.

**Fig. 6 Grid road pattern**

Source: Adapted from May, T, and Taylor, M., (2002) Web site,
c. **Loophole road pattern**: This kind of pattern is used especially when there is a constraint for expansion (like gorge, mountain ...etc) on the right and left side of the main road forcing the city and its road network to follow a linear pattern of development (like a bay). In this case loophole road pattern could be convenient to connect the areas along the sides of the main road. This kind of pattern is fit for linear towns and star shaped towns. Where there is a difficulty of getting short-cut paths and alternative routes.

This kind of pattern is also designed for quiet residential neighborhoods treated by cul-de-sacs discouraging through traffic flows. In this kind of pattern traffic flow is strictly conveyed to the main road or the collector street.

d. **Organic pattern of road**: In this pattern roads are winding forming acute curves & odd junctions. This kind of pattern is observed in spontaneously formed & developed cities and because of topographic constraints. This kind of pattern fits with difficult topographic conditions that oblige the road network to follow an organic pattern.

Narrow passageway, bottlenecks, wastage of spaces, difficult curves, costly infrastructure provision and congestion could be the disadvantages of such kind of pattern.

e. **Mixed pattern**: Here the road pattern exhibits a mix of two or more types of patterns stated above
<table>
<thead>
<tr>
<th>DIRECTIONS</th>
<th>PRINCIPLES</th>
<th>POSSIBLE MEASURES AND TOOLS TO IMPLEMENT THE DIRECTIONS AND PRINCIPLES</th>
</tr>
</thead>
</table>
| 1. Support good economic, social and environmental outcomes for current and future generations | Make planning decisions financially responsive | ➔ Direct resources to the areas of greatest need and benefit  
 ➔ Select the most cost-effective way of achieving the desired outcomes  
 ➔ Match solutions to available or predicted funding levels |
| | Share the benefits and costs equitably within and across current and future generations | ➔ Provide fair, equitable and affordable access for all via walking, cycling, public transport and car (including those people who experience barriers to access and mobility due to factors such as location, health, income, age)  
 ➔ Consider use-pays mechanisms |
| 2. Integrate the transport system | Integrate infrastructure and services across all modes | ➔ Consider all modes and select the right mode for the transport  
 ➔ Provide connections between modes and services, public transport stops and interchanges; park and ride facilities; integrated ticketing, and coordinated services’ walking and cycling networks linked to road and public transport networks, and inter-modal freight terminals;  
 ➔ Integrate new transport networks with existing networks  
 ➔ Eliminate missing links in transport networks—for example, key walking or cycling links |
| | Make best use of existing infrastructure and services first | ➔ Manage demand and influence travel choices  
 ➔ Provide priority to preferred modes-for  
 ➔ Identify opportunities for multiple uses of infrastructure and corridor land |
| 3. Integrate transport and land use | Identify preferred sequences and locations | ➔ Develop and implement strong and integrated policy positions, legislations, standards and systems  
 ➔ Actively participate in whole-of-government policy and planning processes  
 ➔ Provide open mechanisms for raising, reviewing and developing policy options  
 ➔ Engage stakeholders and keep them informed in the policy development process, including stakeholders responsible for policy implementations (see direction 5) |
| | Match land use activity, location, densities and design with transport routes and services | ➔ Ensure development patterns involve logical extensions of existing transport networks, including public transport, cycling and walking networks  
 ➔ Locate major generators of travel in urban centers close to major public transit nodes  
 ➔ Locate areas identified for increased densities or urban regeneration in areas with good accessibility by public transport, walking and cycling  
 ➔ Locate freight-generating land uses and economic development areas close to major highways, rail lines, ports or other transport infrastructure  
 ➔ Locate areas requiring high levels of accessibility near existing major transit nodes  
 ➔ Locate everyday facilities in local centers that are accessible by walking and cycling  
 ➔ Encourage mixed-use development around major transit nodes to encourage multiple access to services in the same area, and reduce the need for travel  
 ➔ Identify and encourage locations for increased densities based on existing public transport nodes  
 ➔ Support major generators of travel demand with suitable transport infrastructure and services |
<table>
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<tr>
<th><strong>4. Integra transport and other planning</strong></th>
<th><strong>Anticipate and influence transport needs and impacts of future developments</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>Collaborate across governments and industry to take other planning and priorities into account</strong></td>
<td>➔ Develop effective relationships with industry to identify the transport needs of future developments early and work through issues collaboratively &lt;br&gt; ➔ Anticipate the likely timing and transport needs of future developments to provide enough certainty for governments and industry to make investment decisions &lt;br&gt; ➔ Influence the location of suitable development better match existing infrastructure and services and allow for logical extensions to the transport network</td>
</tr>
<tr>
<td><strong>Collaborate across governments and industry to ensure others take transport planning and impacts into account</strong></td>
<td>➔ Collaborate with other government agencies to coordinate land uses, infrastructure, transport and other planning to achieve good whole-of-government outcomes &lt;br&gt; ➔ Take into account other planning and priorities across all levels of government and industry when making transport decisions</td>
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<tr>
<th><strong>5. Engage and develop effective partnerships across governments, industry and the community</strong></th>
<th><strong>Develop an open and accountable process</strong></th>
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<tbody>
<tr>
<td><strong>Build stakeholder capacity to engage, and tailor the process to facilitate effective participation</strong></td>
<td>➔ Jointly develop and agree on desired outcomes and objectives, roles and responsibilities, and the scope and method of engagement with planning partners &lt;br&gt; ➔ Identify stakeholders and develop an plan of action for engaging these stakeholders early &lt;br&gt; ➔ Build in processes for continuous learning—for example, build on learning and information from previous studies, and seek feedback on the processes used to engage stakeholders and conduct the study</td>
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| **Build stakeholder capacity to effectively participate in transport planning and delivery processes** | ➔ Build stakeholder capacity to effectively participate in transport planning and delivery processes <br> ➔ Build flexibility and responsiveness into the engagement process and planning exercise so that it can be adjusted to meet the needs of stakeholders or deal with emerging issues <br> ➔ Tailor the process, tools and techniques to meet the needs of stakeholders |

| **Understand and manage stakeholder needs and expectations** | ➔ Manage stakeholder expectations about the planning process and its outcomes <br> ➔ Clarify the roles, responsibilities and expectations of all participants in the planning exercise <br> ➔ Keep stakeholders informed and updated on the planning exercise and its outcomes |

Source: Adapted from Queensland (2003) PP. 41-48
PART II

THE PROCEDURE MANUAL
Introduction

The previous part of this manual gives the background, concepts, principles, standards and considerations within which to apply the manual. This part of the manual gives a road map that guides users through eight phases of planning. Each phase is broken down into major tasks and the latter into detailed activities. Each task is followed by ‘Tips’ (to expose approaches and examples how to do the task)

The eight planning phases are:

- Preparatory Phase
- Data Collection and Analysis Phase
- Strategies Phase
- Proposals Phase
- Integration Phase
- Appraisal and Approval Phase
- Implementation Phase
- Monitoring and Evaluation Phase

At the end of each phase, expected deliverables and key checkup questions have been included. This will enable the involved planners to monitor and evaluate each planning phase and check whether that particular phase has met its objectives before proceeding to the next phase.

Here it is important to note that the width and breadth of preparatory works in this regard depends on the urban systems complexity in a particular city/town. Bearing this in mind, the following steps are deemed to provide a general applicable sequence for the process of preparing Urban Transport Plan (UTP).
PHASE 1: PREPARATORY WORK

The purpose of this step is to get consensus to proceed with the planning exercise. It is important that planning partners have a common view of the purpose and issues to be addressed in the planning process.

TASK 1: PLANNING PURPOSE AND SCOPE DELIMITATION

Activity 1: Initiate planning

- Express the need for and initiate planning
- Share the intentions with key partners in the institution
- Hold a meeting and discuss the intentions

Activity 2: Establish objectives of the planning exercise

Objectives state what planning partners hope to achieve or learn from the planning exercise.

- Clearly define the purpose of planning,
- Highlight an indication of issues to be addressed.

Activity 3: Define the scope of the plan

- Delimit what is in scope and out of scope: Define the items to be dealt with by the planning exercise. Deciding what is out is just as important as deciding what is in. Reasons for excluding elements from the scope should be clearly defined.
- Define the planning boundaries
- Determine the Planning time horizon
- Identify other plans that are related strongly to UTTM, SP, Regional plan, Infrastructure plan, etc are such plans.
- State major assumptions
- List the practical constraints:
- Determine the level of detail or quality required: The output of the planning process needs to suit its purpose. This governs the levels of:
  - Detail – for example, whether an effective outcome can be achieved with a broad-scale overview of macro factors, or with very detailed technical analysis, modeling or research of world’s best practice.
  - Quality – for example, whether the quality of the option should meet standards that are basic or world class.
**Tips to Task:**

Objectives should be:

- **S**: Stated – documented
- **M**: Measurable - able to measure what the project is to achieve
- **A**: Agreed – all parties must agree
- **R**: Reasonable – realistic for the nature of the exercise
- **T**: Timely – setting a time frame for the objective or setting an objective to determine the timeframe.

**Example of an objective:**

The objective of Urban transport planning and traffic management of ‘X’ town is to remove the obstacles faced by the NMT and hence promote their development to enable smooth and safe traffic flow.

A planning boundary defines the area or issues to be considered. Planning boundaries are usually based on geographical, political, operational and/or environmental boundaries. The planning exercise should also consider links to elements outside the boundary (for example, adjoining locations, other levels of planning, other modes).

**Some of the factors that influence the selection of planning horizons include:**

- The life span of the item
- The consequences of delaying or bringing forward planning and delivery
- The type of planning process – for example, strategic planning or operational planning
- Budget and electoral cycles of all levels of government, particularly for short-term planning
- Planning horizons used for related planning exercises
- Timeframes needed to account for longer – term benefits and costs, including intergenerational consequences

Assumptions simplify the study and exclude elements outside its control. Assumptions should be explicit, for example:

- Government policy directions will not change
- Strategic directions of the organization will not change
- Any concurrent study will not affect the study
- Existing services will be maintained.
- Economic development will be based on the current trend

**Constraints on the planning exercise can vary widely, but may include:**

- Community values and behaviors
- Available funds
- Available information and data
- Staff availability and skills
- Standards and regulations
- The geology and climate of an area.
### TASK 2. SCAN THE CONTEXT

This is a broad brush assessment where a rapid appraisal technique is adopted. It gives core areas of focus for detailed data collection and analysis. The background data may be obtained from the BWUD, or from the municipality and refined through discussions with senior officials and professionals.

**Activity 1. Background Review**

- Review previous urban transport and traffic management studies and plans
- Identify the key areas of proposals, programs and projects of the previous studies and plans
- Identify the major implementation problems of the previous plans and studies
- Identify key areas of attention (e.g., traffic accident level, travel time span, traffic volume, infrastructure problems, etc.)
- Review other plans, studies and ongoing projects that have direct impact on urban transport and traffic (examples are regional transport/infrastructure plan, structure plan, urban infrastructure plan, etc.)
- Identify key areas of considerations relating urban transport and traffic management with other plans, studies and ongoing projects. (For example, location of bus terminals on the structure plan and ongoing major road projects are key issues to be considered in the UTP.)
- Identify major connections with regional routes (urban-urban and urban-rural)
- Identify the major role of the urban center (for example: administrative, transport hub, exchange center, industrial center, etc.)
- Identify major areas of consideration related to urban transport and traffic management with job creation and MSE development
- Identify the poverty level and the impact of HIV/AIDS
- Identify the core issues of the Five-years Urban Development PASDEP
- Identify the core issues of the Ethiopian Urban Sector MDG.
- Identify the importance of the issue and the level of commitment to address it
- Identify community needs and values, public opinion and political context
- Identify factors driving demand for transport (for example, trends in economic development, demographics and population growth, land use, etc.)
Activity 1: Establish Project Governance and Arrangements

- Determine project organization structure - vertical and horizontal relations and job description preparation.
- Establish a project management team/office (This could be a team of experts drawn from the existing structures or a private consulting firm commissioned to conduct the study)
- Establish a steering committee, a technical advisory committee and a representative forum. Committee structures are useful to guide the planning process. These committees often need to be supported by political approval (for example, by cabinet or council) and senior management approval of partner organizations. This is particularly important where there are significant policy or financial implications. Prior attempt should be made to use the existing structures. If there is an IDP committee, we may use this committee for UTP purpose by filling the required representational gaps.
  - **Steering Committee** provides direction to the study and are the main decision-making body. Its members are essential to making coordinated decisions across organizations. Members usually represent the customer/planning partners funding the study.
  - **Technical Advisory Committee** provides advice on technical aspects of the work. They are not the decision makers. In some cases, there may be more than one technical committee - for example, one for transport modeling, another for financial analysis and another for implementation of actions. Technical committees usually represent the planning partners, but may include other internal and external stakeholders.
  - **Representative Forum**: The selection of the members has to be based on criteria which ensure geographical and social representation.

TASK 3: DESIGN AND GET APPROVAL OF THE PLANNING PROCESS

Activity 2: Identify the major stakeholders and identify their roles and interests

(Use Format in the Annex)

- Identify individuals/groups and institutions
  - Who have decision making roles, e.g. the city council, the city managers etc…
  - That may contribute financially to the planning process,
  - That are responsible for the implementation. E.g. Rural Roads Authority, City Roads Authority, Taxi Associations and Gari Association etc…
  - That may have an advisory role. E.g. Universities, and Professional Associations
- Identify stakeholders’ likely interests, roles and influences.
It provides an organizational mechanism for discussion, negotiation and decision making between the stakeholders and the municipality.

- It also monitors the performance of the planning and implementation process.
- It may be chaired by the mayor or his/her representative.
- The members include counselors, traditional leaders, community leaders, Edir and Ekub Chairpersons, Woreda and Zonal Chairpersons, Heads of Departments, organized stakeholders representatives selected from each kebele, Non-governmental organization, resource persons etc...

Activity 2: Determine activities to engage and communicate with stakeholders

- With Planning partners identified in task 2, determine activities to engage stakeholders in the planning exercise. This then provides a structure in which participation can be encouraged at all the key stages in decision making.

- Select engagement and communication activities and timeframes: The engagement process will vary according to the stakeholder group and/or stage of the planning process, and may be broad based or targeted. It may involve:
  - One-way information sharing
  - Two-way information sharing
  - Active participation in decision making
  - A combination of these approaches

- Establish processes for input to decision making and feedback: It is important to establish:
  - How stakeholders’ views will be recorded and taken into account in decision making
  - How and when to provide feedback to stakeholders on how all views were taken into account (to establish basically representative forum to ensure participation process)

- Establish processes for media liaison: Protocols for liaising with the media often include elements such as:
  - A nominated study spokesperson
  - Processes for preparing media statements or responding to media enquiries
  - Monitoring media related to the study.

Activity 3: Develop a study schedule and budget

A study schedule is a time and resource management tool that sets out the sequence of planning events, tasks and milestones, and staff and budget requirements. It guides the work of the project team and enables managers to keep track of progress.

- Organize tasks into major groups based on their interdependence
Determine timeframes for tasks and milestones

Outline resource requirements – for example, the skills and staff needed for each task, the use of external consultants and the allocated budget.

Calculate the budget for the planning process and identify sources. Source could be community contribution through Edirs, city administration budget, Non-governmental support, regional government support, Federal government support or other.

Activity 4: Get Approval

Have a meeting of key stakeholders (call for the representative forum)

Make presentations of the planning purpose, the benefits, the costs and the work organization

Get stakeholders consent on minutes of commitment

Get the documents approved by the representative forum and steering committee and finally by the respective government body (City Council, Woreda or Kebele)

Major Deliverables

- Objectives of the planning process
- Summary of main planning issues
- TOR of the planning project

Key checkup questions

1. Have the major stakeholders been identified?
2. Have the key stakeholders agreed to take up the planning process?
3. Are the critical Institutional/Human resources, financial and legal requirements been identified?
4. Are the documents approved by the relevant authorities?

Fig. 9. Sample Organizational Structure for UTTMP

NB. It is to be ensured that the private sector through its associations (eg. Taxis, buses, freight, chamber, etc) is given adequate space in the steering committee and in the representative forum.
PHASE 2: DATA COLLECTION AND ANALYSIS (DEFINE THE DESIRED FUTURE AND CURRENT STATE)

The purpose of this step is to define the desired future characteristics and performance of the transport system and assess this against current and predicted future demands and planning scenarios. By doing so, planners and decision makers have a logical basis for identifying and assessing solutions.

TASK I: DEFINE THE DESIRED FUTURE STATE

The desired future state outlines what stakeholders want. It is used to guide the process and determine future requirements for the transport system. It should take a holistic view and account for links between transport and broader systems. The desired future state is often defined according to outcomes.

Activity 1: Visioning and outcome desire expression

- Visioning
- Bring together the representative forum members who represent a broad range of interests,
- Present a summary of the purpose of planning and key issues to be addressed
- Explain what vision is and the need for visioning
- Allow participants to express their visions
- Conduct discussions on the visions
- Summarize the main points of the visioning discussion
- Present the summary draft vision and get more feedbacks
- Document the draft vision and share with all stakeholders

Activity 2: Develop Goals and Objectives

- Developing goals and objectives:
  E.g. Goal: To improve transportation safety
  Objective: Develop a transportation system that reduces the number of conflict points.
- Ensure that the goals and objectives correspond with the Ethiopian MDG
- Ensure that the goals and objectives correspond with the Urban Development Component of PASDEP
Tips to the Tasks

- As you develop your community’s transportation vision you should consider your land use vision and the overall city vision.
- Your transportation vision will help guide transportation planning process. Generally, the vision process will address the overall question of “what do you want your community’s transportation system to look like in 5, 10, or 20 years? “
- The visioning process should address other questions such as:
  - How will future growth impact your community’s transportation system?
  - What do you like best about your community’s current transportation system?
  - What do you dislike about your community’s transportation system?
  - What transportation areas can be improved?

Attaching priorities to desired outcomes ...To make planning decisions, priorities have to be attached to the desired outcomes and impact groups. For example, that protection of the environment is more (or less) important than economic development. This helps to identify what are the ‘must haves’ of the planning process in order to achieve the desired outcomes. In articulating the desired future state it is important to encourage lateral thinking, but avoid creating unrealistic expectations. At this stage, it will be less constrained by funding or technical constraints than later in the process. In task 2.5 the desired future state is reviewed and may be adjusted to account for issues and constraints.

Potential areas for which to develop goals and objectives may include:

1. Providing transportation choices
2. Maintenance and improvements
3. Enhancing and improving the local street connectivity
4. Safety
5. Economic development
6. Environment
7. Aesthetics
8. Public involvement:
9. Accessibility
10. Efficiency
11. Land use
12. Cost
Two approaches to conduct visioning

Community Transportation Planning

1. Vision

Goals and objectives

Inventory

Assessment of Needs: Current, Future

Development of community policies

Inventory

Vision

Goals and objectives

Fig. 10. Visioning Process Source: Wisconsin (2001) PP. 27
Defining the current state is about assessing the performance of the current transport system. To enable easy comparison to the desired future state, this assessment is usually linked to the outcomes identified in task 2.1.

Whatever the project, an issues-based analysis is usually an important element of defining the current state. Stakeholders can assist in identifying and understanding existing issues and deficiencies. For more complex or detailed planning exercises, this may be supported by a transport model or other analytical tools.

**Activity 1: Conduct an inventory of transportation system**

- Identify what types of transportation are present in your community (include all types of services and facilities including animal carts and other forms of transports)
- Consider regional transportation services and ways that may impact your community’s transportation system
- Identify major connections of the regional transport and urban transport systems
- Gather data on the impact of regional / national transportation service on your transport system.
- Analyze the current and future needs of your transportation system, you should also consider all types of transportation including over which your community does not have direct responsibility.
- Consider the inter relationships between different modes, and transportation system with your regional and neighboring communities.
- Gather road and highways data about.
  - Maps identifying (road network, key traffic generators, accident locations
  - Road way condition
  - Mileage by functional classification
  - Opportunities to develop links transfers to other transportation choices
  - Average daily traffic
  - Parking availability
  - Number of accidents by type (property injury fatality)
  - Condition of bridges and structures
  - Maintenance and improvement history
  - Roadway characteristics (width)
  - Road geometrics in-terms of cross section elements
  - Existing street infrastructure in-terms of street lighting, signs, marks, guard rail etc
Activity 2: Undertake traffic survey

- Identify traffic analysis zone: The purpose is for better understanding of the travel pattern: Zoning could be designed based on network connectivity and the impact of the towns/regions with respect to the study area.

- Identify Screen and Cordon Lines: Cordon lines are imaginary lines representing the boundary of the study area while screen line is an imaginary line along the physical and natural barriers having roads crossing points within the study area.

- Identify characteristics of existing demand for travel

- Identify accident details on the road network

- Identify existing supply of transport infrastructure including fleet size of mass transport system, operation, cost, performance regulation and utilization

- Conduct Speed and Delay Survey: The objective is to assess the speed and delay characteristics along the existing transport network, identify bottleneck locations and their probable causes. The expected data from the survey are
  - Journey speed along the corridors
  - Running speed along links between intersections
  - Nature and extent of delays at intersections and mid blocks

- Conduct Classified Traffic Volume Survey: (It should be done in the outer cordon and mid-block) Its purpose is to appreciate the traffic characteristics in terms of volume, composition, peak hour and directional split at individual survey location, at the cordon and screen lines. (It should be conducted for 24 hours on a typical working day)

- Conduct Origin-Destination Survey: The objective is to obtain information on travel pattern of passenger and goods vehicles at the cordon line along with the trip desire in terms of destined and through trips to the study area. (It should be conducted for 24 hours on a typical working day)

- Conduct Household Travel Survey: the objective is to assess the household, socio-economic and trip characteristics of residents within the city, sample size 1-5% of the population,

- Conduct Intermediate Public Transport Survey: The objective is to assess the operational characteristics of the intermediate public transport (minibus and wuyiyt taxi); identify problems and issues and suggest appropriate policy for its rational development. The expected data from the survey are
  - Traffic regulation and management measures
  - Existing capacity levels bottleneck zones
- Existing and potential capacity of the link
- Potentials, problems, and constraints for evaluating traffic management plans
- Identification of existing road hierarchy

Collect transit data: Map identifying transit routes, area of service (regional, local), ridership, site design/building orientation, frequency of service, types of service (e.g. shared ride taxi, bus), service hours (e.g. night, weekend), opportunity to develop links/transfer to other transportation choices.

Gather rail transport data (maps identifying the location of rail road tracks, location and type and No of highway – rail crossings (e.g. lights, gates, crossbucks) and intermodal connections types of services (freight, passenger), track mileage traveling through the community, types of crossing protection number of rail/highway crashes and opportunities to develop links/transfer to other transportation choices.

Collect water based similar transport features data

Collect similar features data in air transportation (airports, etc.)

Collect data on bicycles: Map identifying bike accommodations by type (multi-use paths, dedicated bike lanes), crash locations and total number of bike routes, and over/under passes, percentage of population that bikes, number of bicycle crashes, suitability of current roads for bicycling, generators of bicycle trips, barriers to bicycling, opportunities to develop links/transfer to other transportation choices.

Gather data on the emerging scooters in cities and large towns

Gather data on existing taxi terminals

Gather data on pedestrians (identifying pedestrian facilities, e.g. overpass, multiuse paths, worn paths, crosswalks, signals, sidewalk network, total miles of sidewalks, opportunities to develop links/transfer to other transportation choices, general condition of sidewalks, percentage of population that walks, number of pedestrians crashes, site design/building orientation, barriers (such as rivers, highways and freeways), street crossing problems and school route barriers.

Make inventory of pedestrian accommodations. Instead of sidewalks, your inventory may include assessing the availability of walking paths, and paved and unpaved shoulders.

Gather data on animal movement routes (donkey routes, Gari and other animals movement corridor identification.

Gather environmental data (air and water quality, noise, endangered species, historic places).

Gather Land use and zoning data (agriculture, residential and commercial)

Collect data on present and proposed land use pattern.
Collect data on planned transport investment, policy changes and other government actions

Collect data on funding sources and expected funds available for transport improvement

- Trip characteristics in terms of origin and destination
- Purpose of trip
- Frequency and cost of trips
- Operational characteristics in terms of route of operation, vehicle utilization, passenger carried,
- Operating cost and revenue

Conduct Parking Survey: the objective is to appreciate the parking demand and supply characteristics; identify issues and constraints and suggest appropriate policies for meeting the horizon year parking demand (on-street and off-street)

Conduct Pedestrian Survey: The objective is to assess the pedestrian flow along and across the intersecting arms at important junctions and to suggest measures for safe movement of pedestrians.

Conduct Intersection Turning Movement Survey: the objective is to assess the traffic flow and delay characteristics on individual arms at the intersection.

Conduct Bus Terminal Survey: The objective is to assess the physical characteristics (size, space) and user characteristics (origin, destination, mode, trip length and travel cost) for bus transport system at the bus terminals.

Conduct Animals Movement Route Survey: the objective is to designate routes and regulate or provide alternative modes and routes
**TASK 3. REDEFINE THE FUTURE STATE AND IDENTIFY THE GAPS**

(Use FORMATS in the Annex)

Forecasts should extend to the planning time horizon(s) or trigger points. This step allows an assessment of how the current transport system would perform in meeting future needs if no action is taken to change and/or improve the system.

**Activity 1: Determine demand (10-20 years traffic forecast) based on:**
- Land use patterns and development – such as trip generators, employment and freight nodes
- Socio –economic profile of the population – such as income, home ownership, employment
- Population and industry growth
- Analysis of resident, visitor and commercial vehicle travel patterns as well as trips into, out of, or passing through the study area
- Other transport system drivers and any additional factors that come to light during data collection.

**Activity 2: Determine the distribution of forecasted trips to surrounding areas based on**
- Known travel patterns – such as origins and destinations.

**Activity 3: Determine the travel mode chosen for these trips based on**
- Characteristics of the journey to be made – such as length, time of day, purpose
- Characteristics of the person making the journey or freight being transported – such as car ownership, income, gender, tonnage, just in time supply
- Characteristics of the transport system – such as travel time, cost, accessibility, comfort.

**Activity 4: Agree on the redefined desired future state:**
- Review and adjust the aspired goals and objectives: The desired future state should be reviewed at this stage and adjusted where necessary to account for issues and constraints that have emerged in previous tasks. This will be influenced by the timeframe for planning – the longer the horizon, the more likely constraints are to change (for example, new constraints may emerge or previous ones may no longer be constraints). While the desired future state should remain inspiring, it should also be achievable. The desired future state is the basis for the development and assessment of options.
- Build a consensus: Stakeholders may have diverging visions or desired outcomes and, in these cases, several futures may be identified, identifying the desired future state is an iterative process, but level of agreement is essential before moving on.

**Activity 5. Store Data for Future Reference**
- Compile the summary data and analysis findings
- Organize the information in soft and hard copies
- Submit to a central information center.
Major deliverables

- Shared Vision
- Summary of analyzed data
- Summary of problems and gaps

Key checkup questions

1. Are the vision and targets clear enough to key stake-holders
2. Are there any major data not collected or analyzed?
3. Do the traffic data show the clear picture of the situation?
4. Do the data collected suggest modes of transportation?
PHASE 3: DEVELOPING OPTIONS AND STRATEGIES

The purpose of this step is to identify and evaluate potential options against the desired outcomes. It ensures that the evaluation of alternative options is conducted in a logical, consistent and comprehensive way against the full set of outcomes. The key output of this stage is an informed decision.

**TASK 1. DEVELOP OPTIONS**

**Activity 1: Develop evaluation framework and assessment criteria**

The evaluation framework and the choice of assessment criteria are the most important steps in good evaluation practice. A well designed and formalized framework ensures that all options are assessed against the same set of criteria.

- Establish evaluation framework: It should be objective, open, transparent and comprehensive. The evaluation framework should be designed to suit the specific exercise and should include stakeholders in its development.

- Develop possible evaluation criteria: It can be:
  - Objective – such as the number of traffic accidents
  - Subjective – such as the quality of public transport services
  - Monetary – such as the cost of the option
  - Non-monetary – such as environmental, social or cultural impacts

- Select the best assessment criteria: The criteria should:
  - Enable comparison of whole-of-life costs and benefits - for example, economic, environmental, social and financial impacts that are short term, continuous and intermediate
  - Enable comparison of who will be affected by the option; for example, those who will benefit and those who will be adversely affected.

**Activity 2: Identify options**

- Develop 3-4 possible options (see the example in the annex). It is designed in a broader sense before detail design of the selected option.
- Determine impacts of the options
- Determine technical feasibility of the option.
- Identify risks and opportunities for each option.
- Evaluate options against assessment criteria
- Select preferred option
- Select the option or package of options that best satisfies the assessment criteria
- Conduct an informed discussion and understand the implications of their decisions.
is the options analysis report.

**TASK 2. DEVELOP THE DESIGNING STRATEGY**

The purpose is to recommend an appropriate plan of action to design the preferred option or package of measures and realize the desired future state. The key output of this stage is approval of the study report/strategy/ to undertake the design stage properly.

**Activity 1: Develop the basic directions and principles that govern the design process** (Refer to the Annex in crafting the directions and principles)
- Define the designing philosophy
- Set basic Directions
- Set principles
- Develop design strategies

**Activity 2: Design directives and strategies consensus building**
- Check the need, urgency and/or importance of a particular action to overall implementation
- Develop the designing work action plan
- Conduct discussion at different level and create consensus at least at technical level

**Tips to the Tasks**

**Examples of assessment criteria**
- Strategic fitness of the option with existing plans, policies and projects
- Intergenerational consequences
- Ability to finance the option
- Ability to make some early gains to encourage perseverance with other actions
- Ability to respond if an alternative future situation happens
- Ability to accommodate changing needs
- Capacity to provide sufficient certainty for industry and the community

**Major Deliverables**
- Alternative planning options
- The selected most optimal option

**Key checkup questions**
1. Are the criteria sound enough to make option choices?
2. Are the options clear enough?
3. Do the strategies clearly correspond to the options?
PHASE 4: PROPOSALS OF URBAN TRANSPORT AND TRAFFIC MANAGEMENT

TASK 1. PROPOSE THE TRANSPORT NETWORK

Activity 1: Transport network design
Based on the mobility pattern and mobility data analysis and referring to the standards provided in this manual
- Develop major regional and inter urban connections giving focus to the major urban centers and the near by rural areas
- Develop alternative routes for intra-urban transport network
- Compare routes based on cost, benefit, environmental and social factors
- Compare the routes based on the major economic locations (business center, MSE, Low cost housing neighborhoods, etc)
- Select the best route that minimizes cost, achieve better efficiency, safe and environmental friendly (in designing the network start from the major ones and take into consideration the regional network before you go to the local/city level network design)
- Consider the existing and planned infrastructure and utilities in designing the network.

Activity 2: Transport system mix design
Based on the mobility data analysis and referring to the standards provided in this manual
- List the possible transport system in the selected routes
- Set evaluation criteria (cost, benefit, environmental and social factors)
- Select the appropriate system
- Design the network for the selected system separately. This includes: Road network, Railway network, water and air transport network, etc. (as appropriate)
- Provide enough space that could carry the current traffic and could at least respond to the 10 years traffic forecast
- Indicate the interchange and connection system
### Activity 3: Mode of transport identification

Based on the mobility data analysis and with reference to the standards provided in this manual

- List the possible mode of transport along the selected routes
- Set evaluation criteria (cost, benefit, environmental and social factors)
- Select the appropriate separate/or mixed mode of transport
- Design the network for the selected mode of transport separately. This includes: Public transport, Cycling, Pedestrian walkway freight transport network, animal driven carts (gari) donkey transport route etc
- Incorporate green corridors along the network and try to make the green in the side of walkways and cycle lanes. When the network passes along water side/river/lake reserve, the sideway to pedestrian and cycling shall adjoin the water body.
- Set the modes of transport the road network accommodates (buses, taxis, carts, pedestrians, animals, etc)
- Clearly state the prohibited uses (carts, animals, etc)
- Indicate the interchange and connection system

### TASK 2. DESIGN TRANSPORT FACILITIES

#### Activity 1: Passenger terminal delineation

Based on the mobility data analysis and with reference to the standards provided in this manual

- Identify location options (refer to table 4 for location selection)
- Develop location comparison criteria (cost, benefit, environmental and social factors)
- Compare locations
- Select the best location that minimizes cost and maximizes benefits
- Determine the size (refer to table 13)
- Design the site layout of the selected terminal location.
- Provide enough space that could carry the current traffic and could at least fit or respond to the 10 year traffic forecast. It should provide space for necessary services and facilities by commuters
- Design measures and strategies to mitigate the negative impact and optimize the positive ones
- Indicate the development phasing (The base of phasing should be the emergence of the need as indicated by stakeholders, capacity constraints and trends demand)
Activity 2: Freight terminal delineation
Based on the mobility data analysis and with reference to the standards provided in this manual
- Identify location options
- Develop location comparison criteria (cost, benefit, environmental and social factors)
- Compare locations
- Select the best location that minimizes cost and maximizes benefits
- Determine the size
- Design the site layout of the selected terminals.
- Provide enough space that could carry the current traffic and could respond to the 10 year traffic forecast. It should provide space for necessary services and facilities by commuters
- Ensure attractiveness, comfort and auxiliary services for users (public toilet, passenger and goods security, shades, waiting areas, refreshments…)
- Design measures and strategies to mitigate the negative impact and optimize the positive ones
- Indicate the development phasing (The basis of phasing should be the emergence of the need as indicated by stakeholders, capacity constraints and trends demand)

Activity 3: Indicate parking area requirement
Based on the traffic situation analysis and with reference to the standards provided in this manual
- Select off-street parking location/ It is better to locate the parking areas near market places, commercial centers and recreation areas/
- Determine the size and indicate parking provisions requirement for each building classified based on floor area and function, and again indicate areas where that is possible to make on-street parking
- Plan and design temporary parking areas on road bays
- Plan and design parking facilities for NMT (cycles, carts, for transport animals…)
- Determine the location and the size of bus stations, bus and taxi stops (try to locate the stations in transport network interchange areas and incorporate bus and taxi stops at 200-300 meters interval along arterial and sub-arterial roads)

Activity 4: Other transport facilities design
Based on the mobility data analysis and referring to the standards provided in this manual
- Identify fuel-station, garages, and storage facility locations options
- Identify transport and traffic management training sites.
- Develop location comparison criteria (cost, benefit, environmental and social factors)
- Compare locations
- Select the best location that minimizes cost and maximizes benefits
<table>
<thead>
<tr>
<th>TASK 3. PROPOSE TRAFFIC EFFICIENCY, EFFECTIVENESS AND SAFETY IMPROVEMENT MEASURES</th>
</tr>
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<tbody>
<tr>
<td><strong>Activity 1: Propose policy measures</strong></td>
</tr>
<tr>
<td>➔ Propose new regulations needed</td>
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<tr>
<td>➔ Propose enforcement measures</td>
</tr>
<tr>
<td><strong>Activity 2: Propose Speed Control Measures</strong></td>
</tr>
<tr>
<td>➔ Use traffic calming methods (infrastructure measures (e.g. Humps, chicanes, etc.)</td>
</tr>
<tr>
<td>➔ Apply new technologies of speed recording and controlling systems (eg. Radar and other IT tools)</td>
</tr>
<tr>
<td>➔ Apply speed control measures in planning the layout (eg. by discouraging through traffic movements in residential neighborhoods)</td>
</tr>
<tr>
<td><strong>Activity 3: Road Design Measures</strong></td>
</tr>
<tr>
<td>➔ Use physical separation b/n road shoulder &amp; the carriageways</td>
</tr>
<tr>
<td>➔ Provide pedestrian refuge zones (eg. medians with separate grades).</td>
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<tr>
<td>➔ Special design bicycle lanes or walk ways</td>
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<tr>
<td>➔ Provide access to handicaps</td>
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<tr>
<td><strong>Activity 4: Propose Traffic signs</strong></td>
</tr>
<tr>
<td>➔ Indicate the different location for road and traffic signals (the location should be selected based on accident risks, security reason, traffic smooth flow and damage risk on the facilities)</td>
</tr>
<tr>
<td>➔ Select types of road marks and junction solutions (roundabouts, traffic lights, overpass, underpass etc)</td>
</tr>
<tr>
<td><strong>Activity 5: Propose Traffic Restraint Measures</strong></td>
</tr>
<tr>
<td>➔ Use park meters to reduce traffic congestion</td>
</tr>
<tr>
<td>➔ Use prohibited zones for parking.</td>
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<tr>
<td><strong>Activity 6: Propose Education &amp; Awareness Raising Measures</strong></td>
</tr>
<tr>
<td>➔ Design awareness creation and training programs (for whom, in what modality, to drivers, pedestrians, students etc)</td>
</tr>
<tr>
<td>➔ Make pedestrians rights &amp; responsibilities clear</td>
</tr>
<tr>
<td>➔ Make bicyclists rights &amp; responsibilities clear</td>
</tr>
<tr>
<td>➔ Make carts drivers rights &amp; responsibilities clear</td>
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</table>
TASK 4. DEVELOP CONTINGENCY PLAN FOR ALTERNATIVE FUTURE SCENARIOS

Scenario planning recognizes the difficulties in predicting the future and helps decision makers to accommodate uncertainty and identify solutions that can perform well in the future. Scenario planning identifies plausible future rather than desired future. It makes assumptions about things that will influence the size or nature of the transport task – things like demographics, industrial development, economic growth, community values and technology.

Alternative futures are used

- To test the ability of selected and designed options to be responsive to change and perform well against a range of possible futures (this can also be used to assess risk and uncertainty)
- To test a range of possible futures to determine what stakeholders might like to see, what they might like to avoid, and what they might find acceptable (this can be a way of testing the desired future state).
- Contingency plans need to deal with issues and opportunities which may arise over time. This can help to manage risks by having plans in place to adjust implementation if unexpected changes occur in the future

Activity 1: Identify possible changes

- List the conditions that may change through time but assumed not to be changed in the designing process (political, legal, economic, social etc)
- Forecast the likelihood of change
- Based on the likelihood of occurrence and the impact they had on the plan, prioritize the factors of changes

Activity 2: Contingency plan development: Contingency plans need to deal with issues and opportunities which may arise over time. This can help to manage risks by having plans in place to adjust implementation if unexpected changes occur in the future

- Based on the priority given to the factors of change craft possible alternate measures to adapt
- Options can then be selected that perform well against the desired outcomes, regardless of the future that eventuates – whether it is the desired, the predicted or any of the alternative futures.
- For the selected scenario, develop implementable design and plan of action
- Test the ability of selected and designed options to be responsive to change and perform well against a range of possible futures (this can also be used to assess risk and uncertainty)
- Test a range of possible futures to determine what stakeholders might like to see, what they might like to avoid, and what they might find acceptable (this can be a way of testing the desired future state).
TASK 5. DETERMINE OUTCOMES AND OUTPUTS MEASUREMENT

Activity 1: Outcome measurement setting
- Identify key performance/outcome indicators
- Relate the indicators to the desired outcomes (with the objectives stated in phase 2)
- Check the measurability of the indicators
- Consider suitable and cost-effective information and data availability to measure
- Set targets for each indicator. These targets can be optimistic but should be realistic.

Activity 2: Output measurement setting
- Identify key outputs indicators that could help to measure the implementation of the plan in terms of
  - Quantity
  - Quality standard
  - Time
  - Cost.
- Check the measurability of the indicators
- Consider suitable and cost-effective information and data availability to measure
- Set targets for each indicator. These targets can be optimistic, but should be realistic.

Activity 3: Measurement system development
- Determine outcome measurement at regular time intervals (at least once a year)
- Determine output measurement at regular time intervals (at least make it quarterly)
- Assign responsibility for measuring the performance indicators (It is advisable to give this responsibility to the transport department/units under the municipality)
Activity 1: Estimate cost of the proposed options
- Costs, meeting both present and future urban transport needs of the local community, have to be calculated. The cost estimate should incorporate:
  - Transport network infrastructure
  - Transport facilities and services
  - Contingency plans
  - Maintenance and operation of facilities
  - Design and building of new expanded and replacement facilities
  - Costs of acquiring new public transit means/equipment
  - Operating costs of facilities and services
  - Administering and planning costs of general transportation system of urban local
  - Costs related to land use action for new and expansion

Activity 2: Financial analysis
- Forecast future revenue from different sources
- Compare the cost with the estimated available resources
- Explore the affordability level of funds required and means of obtaining the resource
- Assess and indicate the status of local community’s role in funding in the short and long term period.

Activity 3: Design financial plan
- Indicate financial policies and schedule in relation to funding (matching cost and revenue) availability
- Identify how the budgeting and allocation approach takes place
- Match prioritized plan/projects with the status of fund obtained
- Develop capital improvement program that incorporates urban transport elements and other infrastructure
- Create clear ways for cooperative agreement in the process of funding between your local administrations and neighboring communities (towns, woreda, zone, etc…)
- Exploit the use of Road Fund provided by the Federal and Regional Governments.
- Develop schedules according to the needs and available resources
- Design a strategy that could help to:
  - Raise revenue
  - Improve assets management
  - Enhance cost-effectiveness
  - Ensure sound capital and operational financing and control system

TASK 6. FUNDING CONSIDERATIONS (FINANCIAL RESOURCE OPTIONS)
TASK 7. PROPOSE THE LEGAL AND ADMINISTRATION FRAMEWORK REQUIRED

Activities 1: Identify legal framework

- Indicate the regulatory condition required in plan implementation
- Show the legal condition how land and other resource allocation will take place
- Zoning ordinances and land division regulation
- Identify the administration condition through which the land use and control regulations and community development patterns take place
- Put standards as means of controlling legal frameworks
  - Considering neighborhood in plan process and conversion to project
  - Applying the mixed use development concept (motorized, bicycling and pedestrian, etc, application rules)
- Indicate how the land acquisition needs should take place
- Emphasis on the need of applying official mapping for having present and future right-of-way.
- Identify legal gaps
- Recommend legal considerations to fill the gaps

Activity 2: Institutional arrangement recommendations (It is advisable to look for the assignment of responsibilities to the existing institutions before trying to organize new ones)

- Determine top governance options
- Develop proposal for project implementation, operation and maintenance organization and management arrangement
- Determine key implementing institutions
- Identify the role of the these institutions
- Indicate interaction, integration and coordination level required among partners and stakeholders
- Recommend optimal solutions to fill the institutional gaps
- Recommend optimal solutions to fill the human resource gaps
Tips to the Tasks

- For spatial and physical planning components softwares such as MapInfo, AutoCad, etc may be used. For qualitative data analysis excel spread sheets may be used.

Major Deliverables

- Proposed transport network plan
- Proposed transport facilities plan
- Proposed traffic control measures
- Proposed finance and sources
- Proposed legal and administrative framework

Key checkup questions

1. Have all the necessary proposals been made?
2. Are all the proposals in agreement with the gaps and problems identified?
3. Are all the proposals sound enough?
## PHASE 5: INTEGRATION

### TASK 1. IDENTIFY MISMATCHES AND INTEGRATE THE PROPOSAL

<table>
<thead>
<tr>
<th>Activity 1: Integrate the different motorized modes of Urban Transport</th>
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<tbody>
<tr>
<td>➔ Integrate the motorized modes of transport</td>
</tr>
<tr>
<td>➔ Check for smooth interchange between buses and taxis</td>
</tr>
<tr>
<td>➔ Check for smooth flow/coherence between motorized modes</td>
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<table>
<thead>
<tr>
<th>Activity 2: Integrate the different NMT modes</th>
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</thead>
<tbody>
<tr>
<td>➔ Check the mismatches between proposals for carts, bicycles</td>
</tr>
<tr>
<td>➔ Ensure conformity of carts bicycles and pedestrians</td>
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</table>

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<tr>
<th>Activity 3: Integrate the MT and the NMT modes</th>
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<tbody>
<tr>
<td>➔ Check for the mismatches between motorized transport modes</td>
</tr>
<tr>
<td>➔ Ensure conformity of MT and NMT modes.</td>
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<table>
<thead>
<tr>
<th>Activity 4: Integrate the transport network with the proposed</th>
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<tbody>
<tr>
<td>➔ Identify mismatches between MT and their terminals</td>
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<tr>
<td>➔ Identify mismatches between MT and the parking spaces</td>
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<tr>
<td>➔ Identify mismatches between MT and their facilities</td>
</tr>
<tr>
<td>➔ Identify mismatches between NMT and their stations and</td>
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### TASK 2. INTEGRATE TRANSPORT SYSTEM WITH THE CITY LAND USE PLAN/STRUCTURE PLAN/MASTER PLAN

<table>
<thead>
<tr>
<th>Activity 1: Check for integration with the housing areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>➔ Identify any mismatches between the MT and residential</td>
</tr>
<tr>
<td>➔ Check whether residential areas are accessible</td>
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<tr>
<td>➔ Check whether there are no through traffic provisions in</td>
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<table>
<thead>
<tr>
<th>Activity 2: Check for coherence with the major public areas</th>
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</thead>
<tbody>
<tr>
<td>➔ Identify gaps between the major public spaces (existing and/or proposed) and the transport mode proposed</td>
</tr>
<tr>
<td>➔ Ensure that all public spaces are accessible by public</td>
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<tr>
<th>Activity 3: Check for coherence with the major environmental</th>
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</table>
TASK 3. INTEGRATE WITH OTHER REGIONAL AND URBAN PLANS

Activity 1: Check for coherence with the integrated infrastructure plan
- Identify the connections between the proposed city transport plan and integrated infrastructure plan
- Check for coherence in relation with the location of terminals
- Check for coherence in relation with the traffic volume

Activity 2: Integrate with other regional and national transport network
- Integrate with the road network
- Integrate with the other networks, railway, waterway, airway, etc.
- Check for smooth interchange between different networks.
- Check for smooth flow/coherence between transport network, the services and terminals

Activity 3: Integrate with the MDG, PASDEP and other urban poverty, gender and HIV/AIDS Issues
- Check coherence with the urban and rural poverty reduction programs and projects
- Check coherence with gender based programs and projects
- Check coherence with HIV/AIDS programs and projects
- Integrate with the Urban Development Component of PASDEP.
- Integrate with the urban sector Ethiopian MDG

Major deliverables
- Integrated urban transport proposal issues.
- Integrated urban transport proposals with other plans and programs
- Integrated urban transport proposals with financial, legal and institutional issues.

Key checkup questions
1. Is the network design complete for the problems identified?
2. Are the recommend facilities in agreement with the network?
3. Are the sizes and locations of the terminals justifiable from the flow and size of traffic point of view?
4. Do the proposed network and traffic measures ensure safety?
5. Are the proposed designs flexible enough to accommodate new ideas in the future?
6. Are there adequate institutional, financial and legal provisions?
PHASE 6: APPRAISAL AND APPROVAL

All levels of government, industry and the community play a role in creating and operating the transport system. Therefore, people within government, industry and the community need to work collaboratively to shape the transport system.

A partnership approach to transport planning can help to:

- gain a better understanding of needs, priorities and expectations across governments, industry and the community, and the opportunities and constraints in meeting these needs, priorities and expectations
- break down silos within and between agencies, levels of government and stakeholders to ensure open, accountable and informed processes

<table>
<thead>
<tr>
<th>TASK 1. UNDERTAKE PRE-APPROVAL CONSULTATIONS</th>
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<tbody>
<tr>
<td><strong>Activity 1: Disseminate Relevant Documents to Key Stakeholders (Steering Committee, Stakeholder Forums and Relevant Institutions)</strong></td>
</tr>
<tr>
<td>➔ Spell out key issues for stakeholders discussion</td>
</tr>
<tr>
<td>➔ Prepare executive summary of the plan</td>
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<tr>
<td>➔ Duplicate the documents in sufficient copies</td>
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<tr>
<td>➔ Disseminate the necessary documents to the respective stakeholders</td>
</tr>
<tr>
<td><strong>Activity 2: Publicize the Appraisal and Approval Process</strong></td>
</tr>
</tbody>
</table>
| ➔ Disclose the public forums through available means of communication such as,  
  ➔ media  
  ➔ notice board  
  ➔ public networks (Edirs, CBOs, NGOs, etc) |
| ➔ Organize different meetings |
| ➔ Display the proposed basic transport network plan in some public centers |
| ➔ Incorporate feedbacks of the different forums in agendas of forthcoming wider forums |
### TASK 2. UNDERTAKE STAKEHOLDER FORUM DISCUSSIONS

**Activity 1: Approve agenda for wider public discussion**
- Submit proposal agenda to the steering committee
- Undertake discussion on the proposed agendas in presence of key officials and head of municipal departments
- Get the agendas approved

**Activity 2: Finalize the public forum preparations**
- Send official invitation to participants
- Prepare official speeches and brief presentations for the planned public forum
- Organize venue and other necessary workshop logistics

**Activity 3: Undertake the public discussion**
- Officially open the forum and introduce the agendas
- Make brief presentation on key thematic urban issues in the ongoing LDP
- Undertake plenary and group discussion on key issues
- Organize workshop outcomes and incorporate in the final LDP documents

### TASK 3. APPROVAL OF THE PLAN

**Activity 1: Prepare the final documents for approval**
- Integrate stakeholders’ feedbacks
- Prepare the final documents both in graphics and texts
- Prepare executive summary of the final documents
- Prepare the required legal document for enactment of the plan

**Activity 2: Approve the Plan**
- Disseminate executive summary documents to members of the decision-making body at least a week before
- Hold formal decision-makers meeting
- Respond to any request for clarification
- Get the plan formal approval
TASK 4. DISSEMINATION OF APPROVED PLAN DOCUMENTS

Activity 1: Publish the document
- Make final refinement to the plan documents by integrating input generated in the approval process
- Produce the final version of the Plan document
- Duplicate documents

Activity 2: Disseminate the documents
- Publicize the plan enactment officially with possible means
  - In national and regional capitals through medias and official letters
  - In medium and small towns through official letters
- Disseminate the documents to concerned institutions with accompanying official letters
- Make available for those who want to get the documents on sale

Major deliverables
- Summary of Appraisal Report
- Legal Approval Notice
- Approved Plans Disseminated

Key checkup questions
1. Are the recommended modes integrated with each other?
2. Are the transport recommendations in agreement with other city plans?
3. Are the transport recommendations in concordance with the regional and national plans?
4. Are conflicting proposals adequately rectified?
5. Is the plan approved by appropriate body?
PHASE 7: IMPLEMENTATION

The purpose of this step is to ensure that the recommendations of the study are implemented. This section focuses on the planning element of implementation – which is more about monitoring and implementation than the actual delivery of the outputs of the study.

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<th>TASK 1. ACTION PLANNING</th>
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<td><strong>Activity 1: Prioritizing Components of the Plan</strong></td>
</tr>
<tr>
<td>➔ Identify critical actions that should be undertaken depending on historical and present problems identified</td>
</tr>
<tr>
<td>➔ Put in ranks the elements according to community’s need and expertise analysis</td>
</tr>
<tr>
<td>➔ Prepare a 5 year UTTM – IDP</td>
</tr>
<tr>
<td>➔ Prepare a 1 Year UTTM plan</td>
</tr>
<tr>
<td><strong>Activity 2: Putting down strategy for applying the plan</strong></td>
</tr>
<tr>
<td>➔ Identify actions and steps to be followed</td>
</tr>
<tr>
<td>➔ Check conformity with the vision, goals and objectives</td>
</tr>
<tr>
<td>➔ Check for consistency with national, regional and neighboring community transportation policy and regulation</td>
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</tbody>
</table>
Activity 1: Organize the Required Institution

(It is better to reorganize the existing institutions rather than having new, again it is recommended to integrate with other ongoing organizational studies)

- Explore the required stakeholders
- Show the duties and responsibilities of the planning unit, the steering committee, technical committee and the representative forum
- Identify the level and scope of the institutional body that can attend and regulate the implementation process
- Indicate the linkage and network level of the main actors in converting plan into projects.
- Develop partnership for implementation.

Activity 2: Resource mobilization

- Identify the required manpower
- Mobilize the community
- Collect and allocate the required finance
- Purchase and avail the required logistical inputs

Activity 3: Support implementation

- Having someone to champion the plan.
- The champion of the plan should be a respected community figure, political figure, executive or officer tasked with the driving implementation.
- The planners should play an active role in assisting those responsible for delivery to scope and define the delivery project. This helps to provide the context and thinking behind the solution.

Major deliverables

- Action plans for implementation
- Required resources

Key checkup questions

1. Does the action planning show logical sequencing?
2. Is the lead implementing institution strong enough to influence others?
3. Are the performance and outcome indicators clear and simple enough?
This is the stage where the urban transport plan under implementation is transferred to operation, means actualizing the planning process of urban transport plan process. This actualization also contains the upgrading, correcting and improving the plan process under consideration.

### TASK 1. MONITOR THE IMPLEMENTATION PROCESS

**Activity 1: Establish process to monitor implementation**

Having a known process for monitoring and review establishes a consistent way of determining whether implementation is on track.

- Specify time-frames and triggers for implementation
- Indicate how action plans are reviewed and possibly adjusted to take account of emerging priorities, issues and alternative solutions
- Agree on the process delivery agencies will report on implementation of actions
- Make sure that the other planning actions (for example, of other agencies, private developers) do not adversely impact on the desired outcomes.
- Make use of advisory networks through technical committee and representative forum. Broader advisory networks can assist implementation by:
  - maintaining community, industry and political momentum
  - providing a forum to report on progress and deal with emerging issues and changing priorities
  - providing a forum to resolve competing interests

**Activity 2: Measure the ongoing performance**

- Collect performance outputs data
- Evaluate the achievement on output against the target and the indicators established.
- Collect outcomes data
- Evaluate the achievement in outcome against the target and the indicators established

**Activity 3: Take the necessary corrective actions**

- Celebrate success
- Take corrective actions when there are mismatches of performance with the plan.
### TASK 2. OPERATION OF INFRASTRUCTURE, SERVICES AND URBAN TRANSPORT SYSTEM.

**Activity 1: System setting**
- Establish a benchmark for the status of utilization of infrastructures.
- Establish a benchmark for transport infrastructure, facilities and service time standard.
- Give priority for public transport and non-motorized transport modes mainly cyclists, pedestrians and others.
- Consider the interest of local community and neighboring community.
- Try to run the system at least on cost recovery basis.

**Activity 2: Legal and institutional setting**
- Identify transport and facility ownership and management internal responsible body.
- Enforce transport system and traffic management law.
- Conduct awareness creation, education and system development.

### TASK 3. MAINTENANCE OF URBAN TRANSPORT SYSTEM.

**Activity 1: System development**
- Develop transport and traffic condition assessment criteria like: physical condition, operation efficiency, effectiveness and safety.
- Develop transport system feedback capturing system.

**Activity 2: Decision process**
- Capture data and keep records.
- Conduct condition survey at a specified time interval.
- Based on the condition survey and their importance, rate the transport infrastructure and facilities.
- Decide on the intervention measures.
### TASK 4. CONDUCT POST-IMPLEMENTATION REVIEWS

The purpose of a formal post-implementation review is to determine if the implemented actions have achieved what was predicted. This also enables future predictions to be improved.

#### Activity 1: Plan and organize the review task
- Define the scope of the post-implementation review (at least it should cover the transport network, transport facilities, plan and implementations)
- Determine how the outcomes and benefits generated by the original project and the final costs of the project are to be identified and evaluated
- Indicate stakeholders to be involved
- Forecast the risks and opportunities
- Outline activities and resources (for example, human resources and budget).
- Determine responsible body for review work and define the role

#### Activity 2: Conduct the Review
- Assess whether the outputs delivered are suitable
- Assess whether the expected benefits have resulted and satisfied the original needs
- Evaluate whether operating costs are in line with expectations
- Draw lessons learned in terms of organizational processes and procedures
- Assess whether the outcomes are still relevant given new information or changes to the operating situation
- Examine whether there are any emerging risks and opportunities.

#### Activity 3: Take the necessary corrective action
- Develop a revised plan
- Design implementation strategy for the revised plan
- Take corrective action in line with the review recommendations

#### Tips to the Task
- Review is conducted after the planning exercise is completed and the study recommendations have been implemented and operating over a period of time. The key output of this stage is a post-implementation review report. (This phase could be considered as the other side of starting the process from phase one)
- A post-implementation review is generally initiated by the planning team/unit/organization. If a formal review is needed, it should be planned and managed as a small project in its own right. Review timing should be linked to need rather than a set time. This need may relate to reaching a significant trigger, or where there is a significant and ongoing gap between reality and forecasts. It can also help if the timing of a review is linked to the availability of relevant data and the timing of related planning.
• For some strategic and long-term planning processes, a review may be part of an exercise to update the plan. In these cases, the review becomes part of a new planning process.

• The review will draw from and build on the ongoing monitoring conducted. The review requires consultation with stakeholders

Major deliverables

• Implemented projects
• Evaluation and monitoring reports
• Corrective measures taken

Key checkup questions

1. Are there capable institutions and systems set to carry out operation & maintenance?
2. Is there a mechanism for sustainable financial flow?
3. Are there sound evaluation tools?
4. Are the review and corrective measures sound enough?
PART III

ANNEXES
## Format. 1. Options Evaluation Format

<table>
<thead>
<tr>
<th>Criteria Type</th>
<th>Value out of 10.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective – such as reducing the number of traffic accidents</td>
<td>Option 1</td>
</tr>
<tr>
<td>Subjective – such as the quality of public transport services</td>
<td></td>
</tr>
<tr>
<td>Monetary – such as the cost of the option</td>
<td></td>
</tr>
<tr>
<td>Non-monetary – such as environmental, social or cultural impacts.</td>
<td></td>
</tr>
<tr>
<td>Strategic fit of the option with existing plans, policies and projects</td>
<td></td>
</tr>
<tr>
<td>Intergenerational consequences</td>
<td></td>
</tr>
<tr>
<td>Ability to finance the option</td>
<td></td>
</tr>
<tr>
<td>Ability to make some early gains to encourage perseverance with other actions</td>
<td></td>
</tr>
<tr>
<td>Ability to respond if an alternative future eventuates</td>
<td></td>
</tr>
<tr>
<td>Ability to accommodate changing needs</td>
<td></td>
</tr>
<tr>
<td>Capacity to provide sufficient certainty for industry and the community</td>
<td></td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td></td>
</tr>
</tbody>
</table>
Format 2: Institutional Data Collection and Analysis Format

- **Name of Organization** ______________________________________________

- **Organizational Status**
  - Branch Office of Federal Agency  Branch Office of Regional Agency
  - Town/City agency  Private  Other

- **Responsibilities**
  - Regulatory function  Transport service provision
  - Transport support services provision

- **Technical Competency**
  - Adequately equipped with necessary machineries and manpower
  - Dependent on head office support
  - Neither self-equipped nor externally assisted
  - Solely dependent on services rendered by private contractors
  - Number of employees: ____________________________
  - Yearly budget: capital---- recurrent------------------------
  - Source of finance: ____________________________
  - Total paid-up capital: ____________________________
  - When the institute is transporter: Number of flight it has----
  - Number of customers served by the institute: pre year----------

- **Legal Competency**
  - Fully authorized to manage the sector in the city/town & adjacent areas
  - Head office liaison
  - mandated to manage only technical affairs

- **Strength of the institution**: ____________________________
- **Problems/ weakness of the institution**: ____________________________
- **Other opinions regarding institutional issues**: ____________________________
Format 3: Legal Information Collection and Analysis Format

1. Relevant Legislations, Decrees and Directives
   - Name,______________________________________________________________
   - Reference number, date & year of issuance_____________________________
   - Issuing authority_____________________________________________________
   - Key Provisions which have significant implications to the issue of Transport and Traffic management
     ___________________________________________________________________
     ___________________________________________________________________
     ___________________________________________________________________
     ___________________________________________________________________

2. Strength of the Law
   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________

3. Weak side/ gaps in the law
   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________
Format 4: Municipality’s Capacity Assessment Survey Format

1. Yearly budget

Recruent ______________ Capital ______________ Total ______________

Allotted budget for transport and traffic management related function

For running cost--------------
For infrastructure development -----------------------------Others-------------------

2. Source of Finance

➢ Recurrent Budget

From Federal govt’ -------- From Regional govt’ -------- Own income--------

If any other source mention the amount and source

➢ Capital Budget

From Federal govt’ -------- From Regional govt’ -------- Own income--------

Direct loan/project finance-------- Community contribution------------------------

If any other source mention the amount and source,

3. Manpower

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>BA and above</th>
<th>10 &amp; 10+</th>
<th>Below 10 grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the municipality total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In transport infrastructure development</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In traffic management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Strength of the town-----------------------------------------------

---------------------------------------------------------------------------------------------------------------

5. Weakness of the town-----------------------------------------------

---------------------------------------------------------------------------------------------------------------

6. Potentials of the town-----------------------------------------------

---------------------------------------------------------------------------------------------------------------

7. Major transport related issues in the town-----------------------------

---------------------------------------------------------------------------------------------------------------

---------------------------------------------------------------------------------------------------------------
## Format 5: Existing Transport Networks and Facilities Data Collection and Analysis Format

<table>
<thead>
<tr>
<th>Type of Transport network &amp; facilities</th>
<th>Unit Of measurement</th>
<th>Unit</th>
<th>Capacity</th>
<th>Condition in %</th>
<th>Infrastructure Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Measurement</td>
<td>Good (when &lt;75% is ok)</td>
<td>Fair (when 50&lt;75% is ok)</td>
</tr>
<tr>
<td>Asphalted roads</td>
<td></td>
<td></td>
<td>Size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non asphalted but vehicular accessible roads</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paved Pedestrian walkway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graveled Pedestrian walkway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Railway line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non motorized transport route</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger Terminals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fright terminals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car parking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel station</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Format 6: Major Settlements Spatial Distribution Data Collection and Analysis Format

6.1 Alpha -numeric

<table>
<thead>
<tr>
<th>S/N</th>
<th>sub-city/ Kebele</th>
<th>Total Population</th>
<th>Age (in year)</th>
<th>Density/ hectare</th>
<th>Household’s income category (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;5</td>
<td>5-22</td>
<td>&gt;75</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;5</td>
<td>5-22</td>
<td>&gt;75</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;5</td>
<td>5-22</td>
<td>&gt;75</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;5</td>
<td>5-22</td>
<td>&gt;75</td>
</tr>
</tbody>
</table>

Housing

Affluent (>2000/month)

Middle income (450-2000/month)

Poor family (<450/month)

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>dense</th>
<th>Good</th>
<th>supersede</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

URBAN TRANSPORT PLANNING MANUAL (FINAL DRAFT) MATHEWOS Consult
### Format 7. Major Activities Spatial Distribution Data Collection and Analysis Format

**7.1 Alpha-numeric**

<table>
<thead>
<tr>
<th>S/N</th>
<th>sub - city/Kebele</th>
<th>Share of major activities (% in terms of land-use)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Industry</td>
<td>Commerce</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Format 8: Accident Data Collection and Analysis Format

8.1: Identification Particulars by Location From year------month----- to year--------month--------

<table>
<thead>
<tr>
<th>Kebele/Name of the Road</th>
<th>Types of Accident</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overrunning</td>
</tr>
<tr>
<td></td>
<td>Head on collision</td>
</tr>
<tr>
<td></td>
<td>Rear end collision</td>
</tr>
<tr>
<td></td>
<td>Collision brush/side swipe</td>
</tr>
<tr>
<td></td>
<td>Right angled collision</td>
</tr>
<tr>
<td></td>
<td>Skidding</td>
</tr>
<tr>
<td></td>
<td>Right turn collision</td>
</tr>
<tr>
<td></td>
<td>Others (describe)</td>
</tr>
</tbody>
</table>

8.2: Cause and Impact of Traffic Accident From year------month----- to year--------month--------

<table>
<thead>
<tr>
<th>Cause of Accident</th>
<th>Impacts/ outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads design and conditions</td>
<td>Loss in Birr</td>
</tr>
<tr>
<td>Fault of drivers (skill problem)</td>
<td></td>
</tr>
<tr>
<td>Fault of drivers (behavior problem)</td>
<td></td>
</tr>
<tr>
<td>Vehicles conditions</td>
<td></td>
</tr>
<tr>
<td>Fault of Pedestrian</td>
<td></td>
</tr>
<tr>
<td>Poor light condition (including street light)</td>
<td></td>
</tr>
<tr>
<td>Result of weather conditions</td>
<td></td>
</tr>
<tr>
<td>Stray animal</td>
<td></td>
</tr>
<tr>
<td>Other causes (specify)</td>
<td></td>
</tr>
</tbody>
</table>
8.3: Accidents Classified According to location From year-----month----- to year--------month---------

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fatal</td>
</tr>
<tr>
<td>1. Near school or college</td>
<td></td>
</tr>
<tr>
<td>2. Near of inside a village</td>
<td></td>
</tr>
<tr>
<td>3. Near a factory/industrial area</td>
<td></td>
</tr>
<tr>
<td>4. Near religious place</td>
<td></td>
</tr>
<tr>
<td>5. Near a recreation place/cinema</td>
<td></td>
</tr>
<tr>
<td>6. in bazaar</td>
<td></td>
</tr>
<tr>
<td>7. Near office complex</td>
<td></td>
</tr>
<tr>
<td>8. Near hospital</td>
<td></td>
</tr>
<tr>
<td>9. Residential area</td>
<td></td>
</tr>
<tr>
<td>10. Open area</td>
<td></td>
</tr>
<tr>
<td>11. Near bus stop</td>
<td></td>
</tr>
<tr>
<td>12. Near petrol pump</td>
<td></td>
</tr>
<tr>
<td>13. At pedestrian crossing</td>
<td></td>
</tr>
<tr>
<td>14. Affecting by encroachments</td>
<td></td>
</tr>
<tr>
<td>15. Narrow bridge or culvert</td>
<td></td>
</tr>
<tr>
<td>16. Near market area</td>
<td></td>
</tr>
<tr>
<td>17. High speed curving</td>
<td></td>
</tr>
</tbody>
</table>
### 8.4. Accidents Classified According to Road Feature From year-----month----- to year--------month------

<table>
<thead>
<tr>
<th>Carriageway width</th>
<th>Number of Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fatal</td>
</tr>
<tr>
<td>1. Single lane</td>
<td></td>
</tr>
<tr>
<td>2. Two lanes</td>
<td></td>
</tr>
<tr>
<td>3. Three lanes or more without median</td>
<td></td>
</tr>
<tr>
<td>4. Four lanes or more with central divider</td>
<td></td>
</tr>
</tbody>
</table>

### 8.5. Accidents Classified According to Junction Type Traffic Control From year-----month----- to year--------month------

<table>
<thead>
<tr>
<th>Carriageway width</th>
<th>Number of Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fatal</td>
</tr>
<tr>
<td>(A) Type of junction</td>
<td></td>
</tr>
<tr>
<td>1. T-junction</td>
<td></td>
</tr>
<tr>
<td>2. Y-junction</td>
<td></td>
</tr>
<tr>
<td>3. Four arm/multiple junction</td>
<td></td>
</tr>
<tr>
<td>4. Staged junction</td>
<td></td>
</tr>
<tr>
<td>5. Junction with more than four arms</td>
<td></td>
</tr>
<tr>
<td>6. Roundabout junction</td>
<td></td>
</tr>
<tr>
<td>7. Manned rail crossing</td>
<td></td>
</tr>
<tr>
<td>8. Unmanned rail crossing</td>
<td></td>
</tr>
<tr>
<td>(B) Type of Traffic Control</td>
<td></td>
</tr>
<tr>
<td>1. Traffic light signal</td>
<td></td>
</tr>
<tr>
<td>2. Police control</td>
<td></td>
</tr>
<tr>
<td>3. Stop sign</td>
<td></td>
</tr>
<tr>
<td>4. Flashing signal/blinker</td>
<td></td>
</tr>
<tr>
<td>5. uncontrolled</td>
<td></td>
</tr>
</tbody>
</table>
Format 9: Transport System Capacity Assessment Format   year------month-----

<table>
<thead>
<tr>
<th>Mode of transport</th>
<th>Number</th>
<th>Capacity</th>
<th>coverage</th>
<th>Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>%</td>
<td>Private</td>
</tr>
<tr>
<td>Motorized public transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxi</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Motorized public transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private car</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No-motorized private transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crouse-country vehicles using the rout/year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Freight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Public transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Private car</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Format 10: Origin-Destination Survey Format

10.1. Passenger Transport

1. Station Number & name----------------
2. Survey date---------year--month—time-------
3. Trip origin---------
4. Trip destiny----------
5. Purpose of the trip
   ➢ To work □ from work back home □ Visiting relatives and friends □ Shopping □ Recreation /relaxing □
   ➢ other mention it ---------
6. Mode of Transport used
   ➢ Private car □ Motorized Public Transport □ Taxi □ Non-Motorized Public Transport □
   ➢ Non-Motorized Private Transport □ Walking □
   ➢ Other-------
7. Personal data

<table>
<thead>
<tr>
<th>Age</th>
<th>sex</th>
<th>Occupation</th>
<th>Income level (in Birr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 5</td>
<td></td>
<td></td>
<td>less than 300</td>
</tr>
<tr>
<td>5-22</td>
<td></td>
<td></td>
<td>300-1500</td>
</tr>
<tr>
<td>23-65</td>
<td></td>
<td></td>
<td>1501-3000</td>
</tr>
<tr>
<td>more than 65</td>
<td></td>
<td></td>
<td>more than 3000</td>
</tr>
</tbody>
</table>

8. Why they select the mode of transport
   ➢ No other option □ Best in terms of cost □ Best in terms of comfort □
   ➢ others---------------------------------------------------------------------------------------------------------------------------------
---------------------------------------------------------------------------------------------------------------------------------------------------
10.2. Freight Transport

1. Station Number & name

2. Survey date year—month—the time

3. Trip origin

4. Trip destiny

5. Purpose of the trip
   - To transfer the load
   - Final destiny of goods
   - Other, mention it

6. Transported good
   - Type
   - Size in tone

7. Vehicle/mode of transport capacity in tone

8. Why the user selects the mode of transport
   - No other option
   - Best in terms of cost
   - Best in terms of comfort
   - Other

9. Why the transporter selects the route
   - No other option
   - Traffic problem with the other options
   - It is the shortest route
   - Other
Format 11: Traffic Count Format

1. Station Number & name----------------
2. Survey date----------------

<table>
<thead>
<tr>
<th>Mode of transport</th>
<th>Number of vehicles/pedestrians per hour :</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Passenger transport</td>
<td></td>
</tr>
<tr>
<td>• Large size bus (more than 45 set)</td>
<td></td>
</tr>
<tr>
<td>• Mini bus (11-45 set)</td>
<td></td>
</tr>
<tr>
<td>• taxi (1-10)</td>
<td></td>
</tr>
<tr>
<td>• Private car</td>
<td></td>
</tr>
<tr>
<td>• NMPT</td>
<td></td>
</tr>
<tr>
<td>• Walking</td>
<td></td>
</tr>
<tr>
<td>Freight</td>
<td></td>
</tr>
<tr>
<td>• large size</td>
<td></td>
</tr>
<tr>
<td>• Medium size</td>
<td></td>
</tr>
<tr>
<td>• Small size</td>
<td></td>
</tr>
</tbody>
</table>
## ANNEX II. STANDARDS

### Standard 1. Mode of Transport Selection Standard

<table>
<thead>
<tr>
<th>Mode of transport</th>
<th>Urban center</th>
<th>Conditions</th>
<th>Remark</th>
</tr>
</thead>
</table>
| Mass transport (tram and train line) | Metropolis | • On the major movement direction/axis  
• Slope not more than 5%  
• Traffic volume more than 1 million passengers per day  
• Line distance should be more than 20 km | If the traffic level does not deserve in the immediate near future, at least reserve the space |
| Mass transport bus line | - Metropolis  
- Cities  
- Large towns | • On the major movement direction  
• Slope 5-25%  
• Traffic volume 20,000 -1 million passenger per day  
• Distance should be more than 10 km | If the traffic level don’t deserve in the immediate near future at least reserve the space |
| Pedestrian only zone | - Metropolis  
- Cities  
- Large towns | • On the main market place, recreational areas, Children’s park  
• When there is alternative route for other modes | Parking facilities must be considered in the surrounding area |
| Cycle lane | - Metropolis  
- Cities  
- Large towns | • On the major cycle movement direction  
• Slope 5-25%  
• Along the route where vehicles traffic volume is more than 30 vehicles per hour | |
| Pedestrian walkway | - Metropolis  
- Cities  
- Large towns  
- Medium towns | • On the main centers, along schools, churches, mosques, and other public places in all road hierarchy  
• On the other and residential areas along arterials and collector roads | |
| Taxi and other para transit mode of transport | All categories | • From residential areas to the city sub-centers. | |
| Animal carts routes | - Medium towns  
- Small towns | • On the major animal carts movement direction  
• Slope 5-25%  
• Along the route where traffic vehicles volume is not more then 30 vehicles per hour | |
| Animal movement rout | All categories | • Along river sides,  
• Out of the city centers and arterial roads | |
| Integrated multiple public transport modes | - Metropolitans  
- Cities  
- Large Towns  
- Medium towns  
- Small towns | • Make the mass transport route on the mainlines, design connection sub-centers and organize other modes.  
• Organize nodes and sub-stations for MT and NMT modes connections | When the situation doesn’t allow to have a multiple modes, the public transport route should be designed in patterns to reach out all neighborhoods |
Standard 2. Streets Spacing Standards

<table>
<thead>
<tr>
<th>No</th>
<th>Streets</th>
<th>Standard Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Core area</td>
</tr>
<tr>
<td>1</td>
<td>Express way:</td>
<td>1-1.5km</td>
</tr>
<tr>
<td>2</td>
<td>Arterial</td>
<td>0.5-0.8km</td>
</tr>
<tr>
<td>3</td>
<td>Collector Street</td>
<td>100-500m</td>
</tr>
<tr>
<td>4</td>
<td>Local Street</td>
<td>80-150m</td>
</tr>
<tr>
<td>5</td>
<td>Access roads</td>
<td>Depending on the size of specific block</td>
</tr>
</tbody>
</table>

NB: km: kilometer; m: meter

Standard 3. Recommended Design and Ceiling Speed Standards

<table>
<thead>
<tr>
<th>Class of Road</th>
<th>Width (meter)</th>
<th>Design speed (km/hr.)</th>
<th>Ceiling speed (km/hr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal arterial streets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free ways</td>
<td>&gt; 60</td>
<td>100-120</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vehicles only</td>
<td>50 - 60</td>
<td>70 - 100</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Mixed usage (high order)</td>
<td>40 - 50</td>
<td>60 - 80</td>
<td>50 – 60</td>
</tr>
<tr>
<td>Sub-arterial streets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed usage (middle order)</td>
<td>25 - 40</td>
<td>40 - 60</td>
<td>30 – 50</td>
</tr>
<tr>
<td>Collector streets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed usage (low order)</td>
<td>15 - 25</td>
<td>30</td>
<td>20 – 30</td>
</tr>
<tr>
<td>Local streets</td>
<td>8 - 15</td>
<td>&lt;30</td>
<td>&lt; 20</td>
</tr>
</tbody>
</table>

NB: KM/Hr.: Kilo meter per hour

- The radius of round about island should not be less than 8 meters and for greater carriage ways it should not be greater than one third of the outer carriage way.
- The minimum horizontal alignment curvature of a road for design speed of 60 km/h radius is 150 meter (allowable urban speed) and for high speed (80-100km/h) minimum radius is 230m.
- The gradient of continuous ramps for pedestrian ways should not be steeper than 10%
Standard 4. Gradient Lane and Curvature Standards.

<table>
<thead>
<tr>
<th>Mode of Transport</th>
<th>Gradient (%)</th>
<th>Lane Width (meter)</th>
<th>Junction Curvature (meter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorized vehicle</td>
<td>12</td>
<td>&gt; 2.5</td>
<td>7-15</td>
</tr>
<tr>
<td>Articulated and trolley Bus</td>
<td>13</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Tram way</td>
<td>7-10</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Non – Motorized vehicle</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Pedestrian</td>
<td>10</td>
<td>3</td>
<td>-</td>
</tr>
</tbody>
</table>

Different junction types will be appropriate under different circumstances depending on traffic flows, speeds, and site limitations. Types of junctions include:

1) T-Junctions
2) Cross-Junctions
3) Roundabouts junctions
4) Grade-Separated Junctions

Standard 5. General Guidelines for Location of Intersections

- A junction is considered safe when it is visible, comprehensible, and maneuverable. These three requirements can generally be met by complying with the following guidelines. Intersections on major links of vehicle with high order require a minimum space of 500 m, mixed usage streets.
- On local streets: Spacing of intersections should not be so close to generate a queue of traffic extending beyond the next upstream intersection.
- Generally an intersection should not be located on a curve with a super elevation greater than 6%.
- Also an intersection should not be located on grades steeper than 3%. If it is not possible to locate on grades steeper than 3%, road could have steeper gradient therefore vehicles on intersecting road have to stop or yield.
- Lateral obstruction of sight distance should also be considered when the location of an intersection is being determined.
- Preferably, roads should meet at, or nearly at right angles.
- Angles of skew between 60° and 120° is desirable for passenger cars. But roads should intersect at skew angles ranging between sights to trunk drivers.
Standard 6. Pedestrian Movement Standards

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Pedestrians/minute</th>
<th>Areas to be Applied on</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 - 3</td>
<td>Long highways and individual zones</td>
</tr>
<tr>
<td>B</td>
<td>4 - 6</td>
<td>All purpose roads</td>
</tr>
<tr>
<td>C</td>
<td>7 - 9</td>
<td>Residential areas</td>
</tr>
<tr>
<td>D</td>
<td>10 - 14</td>
<td>Business and commercial areas</td>
</tr>
<tr>
<td>E</td>
<td>15 - 30</td>
<td>Shopping frontages</td>
</tr>
</tbody>
</table>

Standard 7. Guidelines and Standard Type of Parking Facilities

- On street facilities: on street curb can be divided into two, unrestricted curb parking and restricted curb parking. The restricted curb parking could be police controlled (through enforcing, restriction, posted sign or meter control).
- Off-street parking facilities: there are two basic types of off-street parking facilities: surface lots and multi floor structure. Off street parking should at least be provided within 500 meter distance along express ways and arterial roads.
- Parking should be regulated while issuance of building permit based on the parking generation of the land use type. Based on the type of land use, the following parking space requirement is set as standard.

Standard 8. Parking Standards:

<table>
<thead>
<tr>
<th>Use Type</th>
<th>Required parking sepals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwelling</td>
<td>One space per housing unit.</td>
</tr>
<tr>
<td>Industry</td>
<td>One space per 3-20 workers</td>
</tr>
<tr>
<td>Office</td>
<td>One space per 2-10 workers</td>
</tr>
<tr>
<td>Theater</td>
<td>One space per 10-15 seats</td>
</tr>
<tr>
<td>Hotels</td>
<td>One per 5 bed rooms</td>
</tr>
</tbody>
</table>
Standard 9. Passenger Terminal Standards

<table>
<thead>
<tr>
<th>No.</th>
<th>Levels of Terminal</th>
<th>Number of Vehicles per day</th>
<th>Required area in hectares</th>
<th>Location Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small</td>
<td>Large</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Small Town</td>
<td>10-25</td>
<td>10- 25</td>
<td>0.37- 0.61</td>
</tr>
<tr>
<td>2</td>
<td>Medium Towns</td>
<td>26-50</td>
<td>26- 50</td>
<td>0.63- 1.02</td>
</tr>
<tr>
<td>3</td>
<td>Large Towns and Cities</td>
<td>51-100</td>
<td>51- 100</td>
<td>1.04- 1.82</td>
</tr>
<tr>
<td>4</td>
<td>Cities</td>
<td>&gt;101</td>
<td>101- 150</td>
<td>1.86- 2.67</td>
</tr>
<tr>
<td>5</td>
<td>Metropolitans</td>
<td>&gt;101</td>
<td>101- 150</td>
<td>1.86- 2.67</td>
</tr>
</tbody>
</table>

The area required for bus terminal has been determined on the basis of number of vehicles (projected) to be assigned per day and facilities

Standard 10. Freight Terminal Standards

<table>
<thead>
<tr>
<th>No.</th>
<th>Levels of Terminal</th>
<th>No. Of vehicles per day</th>
<th>Required Area in hectares</th>
<th>Locations specification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small</td>
<td>Large</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Level I</td>
<td>10-25</td>
<td>10- 25</td>
<td>0.48- 0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Level II</td>
<td>26-50</td>
<td>26- 50</td>
<td>1.03- 1.6</td>
</tr>
<tr>
<td>3</td>
<td>Level III</td>
<td>51-100</td>
<td>51- 100</td>
<td>1.63- 3.00</td>
</tr>
<tr>
<td>4</td>
<td>Level IV</td>
<td>&gt;101</td>
<td>101- 150</td>
<td>3.73- 4.40</td>
</tr>
</tbody>
</table>

Like that of the bus terminals, the level for freight terminals falls in to four categories. Similarly, the area required for freight terminal can be determined depending mainly on the number of vehicles with or with out trailers to park the size of administrative block to be built, the area reserved for circulation of vehicles and pedestrians.
Standard 11. Carriageway Width Standards

<table>
<thead>
<tr>
<th>Road Category</th>
<th>Usage</th>
<th>Minimum Carriageway Width(m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Road Reserve (meter) Parking Lane Cycle Lane Traffic Lane Median Traffic Lane Cycle Lane Parking Lane Minimum Carriageway width** (meter)</td>
</tr>
<tr>
<td>Primary Arterial</td>
<td>Regional</td>
<td>30 2.2* 1.5 3.0 2.8 3.0 1.5 2.2</td>
</tr>
<tr>
<td>Secondary Arterial</td>
<td>District</td>
<td>22 2.2* 1.5 3.0 2.5* 3.0 1.5 2.2</td>
</tr>
<tr>
<td>Collector Industrial</td>
<td>20 2.2 1.5* 3.0 2.5 3.0 1.5* 2.2</td>
<td>13.5</td>
</tr>
<tr>
<td>Residential</td>
<td>20 2.2 1.5* 3.0 2.5* 3.0 1.5* 2.2</td>
<td>11.0</td>
</tr>
<tr>
<td>Local Industrial</td>
<td>22 2.2 1.5* 3.0 2.5* 3.0 1.5* 2.2</td>
<td>11.0</td>
</tr>
<tr>
<td>Residential</td>
<td>20 2.2* 1.5* 3.0 2.5* 3.0 1.5* 2.2</td>
<td>8.8</td>
</tr>
</tbody>
</table>

* - Minimum Width of Optional Components

** - Includes 300milimeter diameter allowance for drainage channel (both sides)

Notes:
- Road reserve width may need to be widened or reduced for reasons other than traffic. The road reserve width is measured from property boundary to another property boundary.
- A 300mm allowance for the drainage channel shall be added on each side of the road.

Standard 12. Horizontal Curves, Super-Elevation, Gradients and Cross-fall Standards

<table>
<thead>
<tr>
<th>Design speed ( V_0 ) (kilo meter per hour)</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Slope for super elevation %</td>
<td>1.50</td>
<td>1.25</td>
<td>1.00</td>
<td>0.75</td>
<td>0.50</td>
</tr>
<tr>
<td>Mini. Slope for super elevation %</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
</tr>
<tr>
<td>Mini. Hor. Radius ( R ) min (m)</td>
<td>60</td>
<td>100</td>
<td>160</td>
<td>250</td>
<td>350</td>
</tr>
<tr>
<td>TOPOGRAPHY Maximum gradient, Max. g, (%)</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Flat</td>
<td>-</td>
<td>7</td>
<td>6</td>
<td>5.5</td>
<td>5</td>
</tr>
<tr>
<td>Rolling</td>
<td>-</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

Single Cross fall Roads

Single cross fall roads will be acceptable for roads with a carriageway of up to 6m wide.

<table>
<thead>
<tr>
<th>Design speed $V_o$ (kilometer per hour)</th>
<th>MINIMUM STOPPING SIGHT DISTANCES (METER) FOR GRADIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(UP)</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>70</td>
<td>-</td>
</tr>
<tr>
<td>80</td>
<td>-</td>
</tr>
</tbody>
</table>

Sight distances for stopping, overtaking, curves and obstructions shall be calculated to ensure that the driver perceives all possible road hazards within an appropriate time.

Standard 14. Road Accident Counter Measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High-friction surfacing</td>
</tr>
<tr>
<td>2</td>
<td>Bus stops and bus lanes</td>
</tr>
<tr>
<td>3</td>
<td>Red light cameras</td>
</tr>
<tr>
<td>4</td>
<td>Speed cameras</td>
</tr>
<tr>
<td>5</td>
<td>Chevron markings for:</td>
</tr>
<tr>
<td>6</td>
<td>Chicanes/narrowing</td>
</tr>
<tr>
<td>7</td>
<td>Colored road surfacing</td>
</tr>
<tr>
<td>8</td>
<td>Cycling facilities</td>
</tr>
<tr>
<td>9</td>
<td>Pedestrian crossings</td>
</tr>
<tr>
<td>10</td>
<td>Refuges/traffic islands</td>
</tr>
<tr>
<td>11</td>
<td>Road humps and raised junctions</td>
</tr>
<tr>
<td>12</td>
<td>Road restraint systems</td>
</tr>
<tr>
<td>13</td>
<td>Rising bollards</td>
</tr>
<tr>
<td>14</td>
<td>Roundabouts and mini-roundabouts</td>
</tr>
<tr>
<td>15</td>
<td>Roundel road markings</td>
</tr>
<tr>
<td>16</td>
<td>Safe routes to school</td>
</tr>
<tr>
<td>17</td>
<td>Segregation</td>
</tr>
<tr>
<td>18</td>
<td>Signs and markings</td>
</tr>
<tr>
<td>19</td>
<td>Speed cushions</td>
</tr>
<tr>
<td>20</td>
<td>Speed limit</td>
</tr>
<tr>
<td>21</td>
<td>20 meter per hour zones</td>
</tr>
<tr>
<td>22</td>
<td>Traffic signals</td>
</tr>
<tr>
<td>23</td>
<td>Vehicle-activated warning signs</td>
</tr>
<tr>
<td>24</td>
<td>Yellow bar markings Before roundabout: and dual carriageway</td>
</tr>
</tbody>
</table>

NB. For detailed and elaborated standards use the SP and IUISP Manuals and the Draft Urban Planning Manual of the MoFA.
REFERENCES

- Maurits Servaas, I-ce, (2000): *The Significance of No-Motorized Transport in Developing Countries*, Interface for Cycling Expertise, Final Report, Utrecht, the Netherlands,
- Vidisha Parasram, 2006, Horizon Solutions.