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Developing successful Public-Private Partnerships (PPPs) for increased transport connectivity: Case Studies, Experiences and Learning Materials

Draft

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Module 1. Introduction - PPPs for transport infrastructure Development and Maintenance

Overview of PPP Process

1.1 Key Objectives of the Module:

- To get participants to understand what PPPs are and what it takes to develop PPP project.

1.2 Defining the term "PPP"

The PPP Knowledge Lab defines a PPP as a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance. This means that it is a contractual relationship between a government and a private business venture. The business venture delivers and funds public services using a capital asset thereby sharing the associated risks[1].

The rationale for PPPs is based on the claim that PPPs have the potential to close the infrastructure gap by leveraging scarce public funding and introducing private sector technology and innovation to provide better quality public services through improved operational efficiency.

Public-Private Partnerships (PPPs) can be an effective way to build and implement new transport infrastructure or to renovate, operate, maintain, or manage existing facilities. In both hard (physical) and soft (operations) infrastructure areas in need of intervention in LLDCs, PPPs can be a beneficial way to solve critical transportation problems.

PPPs can play a role in all modes of transport – be it aviation, road, rail, ports, inland waterways, or other.

The relatively high transaction costs of implementing a PPP can make PPPs below a certain size unviable. Many governments therefore define a minimum size (or value) for PPP projects:

Examples:

- Singapore's PPP policy (2004): PPPs will be pursued only if they have an estimated capital value of over US$50 million.
- Brazil's PPP law: Minimum size of 20 million reals (USD 11.7 million) for individual projects.

Many commentators show PPPs as lying on a continuum between privatization (maximum involvement of the private sector) and short-term service contracts (minimum involvement of the private sector). This can be misleading if it gives the impression that privatization, for example, is a form of PPP. There is a very clear difference between these two forms of private sector engagement: under a PPP, the public sector retains ultimate accountability to the citizen for the provision of a public service, whereas under privatization, accountability for delivery is transferred to the private party. This can be an important issue when governments seek to

[1] PPP Knowledge Lab-Botswana

engage public understanding of and support for PPPs and begin to identify the skills and processes needed. Some governments have deliberately sought to brand their PPP programs to distinguish them directly from privatization. In Mexico, for example, certain PPP projects are referred to as projects for the provision of services (PPS).

The distinction between PPPs and privatization is also reflected in the fact that privatized industries may be subject to general legal regulations (for example, regarding standards for services or returns on capital), whereas PPPs are usually subject to controls within the specific contract.

1.3 PPP Situation in Botswana

Botswana's National Development Plan for 2017–23 (NDP) recognizes that the availability of good infrastructure is one of the factors that will contribute towards the country's economic growth. To this end, the NDP underscores the government's commitment to make more use of PPPs as a means of procuring and financing infrastructure projects. (Cynthia Olotch-Public Private Partnerships: How does Botswana fare? 25th August 2021)

Botswana does not have a PPP law. Instead, the country has a PPP Policy and Implementation Framework, 2009 (Ministry of Finance and Economic Development, 6th October 2021) that goes a long way to provide guidance on the development and implementation of PPP projects. However, the policy does not have the force of law. In line with the practice adopted by many successful PPP programmes internationally, Botswana has a dedicated PPP Unit under the Ministry of Finance and Economic Development tasked with coordinating the implementation of the country's PPP agenda. The PPP Unit was established in 2016 within the Ministry of Finance and Economic Development to coordinate and oversee the implementation of the PPP Policy. Specifically, the Unit provides technical assistance, advice and guidance on PPP related matters to ministries, local authorities and parastatals in selecting, assessing and implementing PPP projects.

According to the PPP Policy, public institutions undertaking PPP projects are required to establish a PPP Project Committee for each project. The composition of the PPP Project Committee includes representatives from the public institution undertaking the PPP project and a Project Advisor from the PPP Unit.

In addition, Botswana's PPP Policy mandates the PPP Unit to approve the selection of the private party to undertake a PPP project. This, coupled with its role as project advisor on each PPP project, may pose a potential conflict of interest. It is therefore important for the PPP Unit to be designed in a manner that avoids this potential conflict of interest.

Before the PPP Policy was introduced Privatisation Policy was adopted in 2000 aimed at providing an optimal balance between the public and private sectors to achieve sustainable economic growth.

PPPs are important in the context of the Botswana economy in terms of the strategic and operational choices they offer to Government. They are strategic in the form of fostering economic growth by developing new commercial and investment opportunities for citizen investors and foreign direct investment and increasing competition in the provision of public services. They are operational in terms of providing opportunities for efficiency gains in the form of better quality and more cost effective delivery of services by private sector participants.

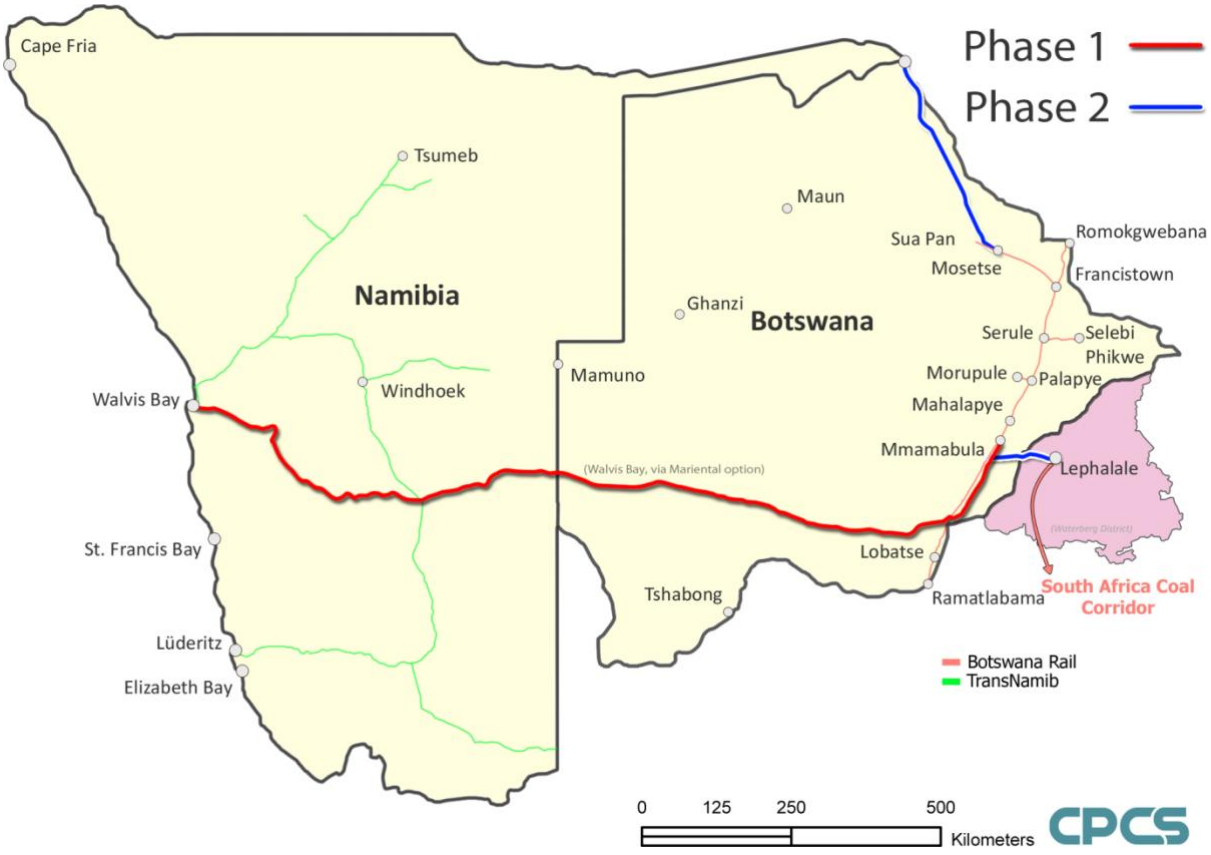
Furthermore, involvement of the private sector, particularly citizen companies, in public service infrastructure provision enhances the role of the private sector in the economy of Botswana.

Accessing private sector financing will develop and strengthen the Botswana financial capital markets and may stimulate additional foreign direct investment.

An example of a successful PPP project in Botswana is found in the energy sector, Orapa and Mmashoro IPP that was developed by Karoo Sustainable Energy as a 90MW Simple Cycle Gas Turbine Power Plant. The project CAPEX was US$104 million and financial closure was reached in 2011.

In terms of PPP projects pipeline there are 11 projects listed as potential PPP schemes of which the following two are from the Transport Sector:

- Mmamabula Lephalale Railway Line; and
- Mosetse Kazungula Railway Line.



1.4 Need for PPP Frameworks

While the Botswana's PPP Implementation Framework (2009) is supportive of private sector participation in infrastructure projects, there are several areas where improvements could make it more effective.

A good PPP framework aims to ensure that:

- The right projects are selected as PPPs; and
- Projects are developed, delivered and managed in a structured, transparent and efficient way.

•A good framework minimizes the risks that a PPP project will not deliver Value for Money.

•PPPs involve multiple conflicting interests:

- If the procurement process fails to consider market conditions, the tender process may not be competitive;
- But if risks are not allocated If risks are not allocated appropriately, the public sector may incur costs that it cannot control and there will be:
- Unexpected fiscal obligations incurred by the government.

- PPP frameworks need to be:
  - Documented; and
  - Enforced
- In developing enforcement mechanisms, governments need to consider:
  - How will the PPP framework be made binding on government officials?
  - How will the PPP framework be communicated to all stakeholders?
  - What will give legal force to PPP agreements?
- How frameworks are documented and given force varies widely between jurisdictions:
  - Some are enacted as laws, others are policy documents and manuals
- PPP frameworks also build on, and incorporate, many pre-existing public sector management frameworks.
- A PPP framework is not constructed in isolation:
  - It builds on, incorporates, and modifies pre-existing frameworks
- It makes sense to use existing frameworks as far as possible and to ensure that PPP-specific elements dovetail with existing systems
- It is good practice to review the legislative and administrative context to ensure that it is not incompatible with key elements of the objectives of the PPP framework

Examples:

- In Brazil and India there are taxation rules which discriminate against private sector subcontracting of operations and maintenance in PPPs
- Discrimination against foreign investors (for example, restrictions on convertibility, confiscatory taxes on repatriation of equity) should be reviewed in order to attract the participation of international/global investors and developers.

1.5 Why have a PPP Framework

PPP frameworks address risks and increase the likelihood that PPPs will succeed by:

- **Increasing the capability of government agencies to deliver PPP**s: Standard practices reduce learning costs and the risk of mistakes, making it easier to transfer skills from one project to another project in another sector.

- **Providing a structured way of reconciling disparate objectives**: A framework can establish a common objective between stakeholders improving the longevity of the PPP programme.

- **Making sure that whole-of-government risk is limited:** A good framework has processes and responsibilities for identifying and mitigating government reputation risk and fiscal risks.

- **Generating market interest**: A good PPP framework can communicate the quality of the PPP programme and government's commitment to potential investors, and reduce investors' perception of risk.

- **Facilitating probity and oversight of the PPP programme:** Having clear processes, decision making criteria, and allocation of responsibilities makes such oversight more effective (traceability and accountability are higher).

1.5.1 Objectives of the PPP Framework

The choice of objectives depends on the government's policies and priorities. They can include:

- Enabling more investment in infrastructure by increasing project financing options;
- Achieving Value for Money in the provision of infrastructure and public services;
- Improving accountability in the provision of infrastructure and public services;
- Harnessing private sector innovation and efficiency;
- Ensuring that the long-term delivery and management of PPPs is sustainable, especially when stakeholders change over time (political actors, champions, representatives in ministries or PPP units); and
- Stimulating growth and development in the country.

The PPP framework should **reduce the risk** that PPPs are used for the **wrong reasons**:

- Some governments have used PPPs to reduce reported levels of government expenditure and borrowing, even when the long-term fiscal implications of the PPP projects are similar to those of a publicly financed project; and
- The framework should ensure PPPs are used to achieve substantial benefits, not to manipulate accounting results.

Key Takeaway and Lessons:

Governments in most countries generally don't need laws to establish PPP frameworks or enter into PPP contracts. In these countries, policy statements and administrative documents are often the best approach.

Examples:

- Britain: HM Treasury sets PPP policy (just for England)
- Australia: National PPP Policy has been agreed to by the Federal government and each state and territory government; departures from the policy and guidelines are possible, but must be approved by the relevant PPP authority (usually treasury or finance)
- Jamaica: PPP policy was adopted by the cabinet, and then published; The Development Bank of Jamaica was mandated with managing the implementation of the policy

In these countries, PPPs are usually **private law contracts**, adjudicated and enforced through the courts or contractual arbitration.

1.6 The PPP Process

1.6.1 Overview

The framework should provide guidance on each stage of developing and implementing a PPP project:

- From initially identifying candidate projects; and
- To managing PPP contracts throughout the project lifecycle.

The Framework should ensure that only 'good' PPP projects are developed:

- PPPs should be cost-benefit justified, provide better Value for Money than traditional public procurement, be financially viable and fiscally responsible, and be attractive to the market;
- These criteria cannot be fully assessed until the PPP is fully designed and structured, but this is costly; and
- Successful PPP programmes tackle this problem through progressively more rigorous screening at successive stages of project development.

1.6.2 Project Identification and Screening

The Process starts with project origination:

- It follows the same or uses a similar process as for originating other public sector investment projects (PPPs are in fact public investments!);
- Projects are screened for their potential suitability as PPPs; and
- Screening at this stage is usually indicative, limited to the information available at relatively low cost.

Decision criteria

- The project should fit in with a broader plan for the sector

- The project should meet PPP program objectives
- The project should be economically viable and fiscally responsible:
  - ✓ Projects should not proceed unless they are economically sound; and
  - ✓ Projects that may impose costs or incur liabilities that are beyond the financial capability of the government should be avoided.

Procedures and institutional responsibility

- The PPP framework should identify who proposes PPP projects:
  - ✓ Can only government entities with investment programs submit a proposal?
  - ✓ Can private proponents also put forward proposals for PPP projects?
- The framework should identify who approves further development of PPP projects.
  - ✓ Successful PPP projects typically require the support of:
    1. The line agency, that is, the department initiating the project;
    2. The finance ministry; and
    3. Other central authorities.
- The framework should identify the level of documentation required to be submitted to the stakeholders involved in approving the project proceeding, so that an informed decision is made.

1.6.3 Project Appraisal

Candidate projects that survive the "screening" are then developed and appraised:

- This is an iterative, or multi-stage, process.
- The appraisal report, often called a "Business Case" or "Full Feasibility Study", is typically the basis for approval to proceed with the PPP transaction.

The PPP Guide assumes that the **investment decision** and the **procurement decision** are considered as part of the same process

- This requires that the government either:
  - ✓ Establish requirements for the **systematic appraisal of all projects**; and
  - ✓ This requires wide-scale government support and may be impractical.
- Establish a **requirement for the appraisal of PPP projects**
  - ✓ This makes PPPs subject to greater scrutiny than non-PPP projects.
  - ✓ This ensures only worthwhile projects are implemented as PPPs

1.6.4 Decision Criteria

The Investment Decision: A project is a "good project" if it is:

- Economically, technically, environmentally and legally feasible:
  - ✓ All projects, PPP or not, should demonstrate that they are 'good' projects

- ✓ Specialist skills are required to undertake such an appraisal

- Affordable:

  - ✓ Should be assessed from both the government and user perspectives:

    - ➢ Government liabilities, direct and contingent, must be within budget constraints;

    - ➢ Services provided by the PPP need to be affordable to the users.

The Procurement Decision: The project is suitable to be a PPP if:

- It is commercial viable (and bankable):

  ✓ The project must be able to generate returns to the investor and enable investors to raise debt from lenders.

- The project is expected to deliver Value for Money as a PPP:

  ✓ A PPP is considered Value for Money if the project is expected to deliver higher net economic benefits if done as a PPP.

1.6.5 Assessing Value for Money

There are many ways of assessing Value for Money:

- Traditional approach (developed in the UK):

  - Determine whether a PPP will have a lower (risk-adjusted) cost to the government than a conventional procurement;

- Alternative approach:

  - Determine which delivery option will maximize benefits for a given budget

    ✓ E.g. in New Zealand, the test is which approach is likely to deliver greater net economic benefits.

Value for Money assessment is usually qualitative during initial screening and then quantified during full appraisal:

- Quantitative Value for Money analyses are necessarily based on assumptions and forecasts, hence their accuracy is limited; and

- Some jurisdictions (e.g. Canada) also use qualitative indicators to select a procurement option.

1.6.6 Procedures and Institutional Responsibilities

The PPP framework, driven by the relevant Government Ministry or PPP Unit, should specify:

- The **required content** of the PPP appraisal or of the "feasibility study"–this includes:

  ✓ The studies that need to be done (for example, demand forecasts)-the Government stipulates these.

✓ The questions that need to be answered to determine if a project is economically, financially, technically, environmentally, and legally feasible [i.e. the feasibility criteria]- the Government, mostly through their Transaction Advisors, determine these.

- **Who approves** the PPP appraisal:

✓ Any PPP project will require the support of numerous stakeholders to be successful; and

✓ The PPP framework should identify the approval process needed for proceeding to the next phase:

➢ Many jurisdictions require a decision by the cabinet in favour of proceeding; and

➢ Others delegate the decision to a government agency [or a committee/commission], perhaps with the assent of one or more central agencies or a PPP unit.

1.7 The PPP Process in Botswana

In Botswana the 2009 PPP Policy provides the legal basis for the procedures to be undertaken during the implementation of PPP projects (Ministry of Finance and Economic Development, 6th October 2021). The PPP process is required to fulfill the following:

Project Initiation (Inception) Phase

This phase determines whether the selected project can (and should) be delivered as a PPP instead of using conventional public procurement. The identification of PPP projects should be undertaken as part of the national development planning process. This phase involves:

Prefeasibility Assessment

- Carry out needs analysis
- Undertake solutions options analysis
- Perform high-level cost-benefit analysis
- Provide motivation for PPP procurement
- Develop preliminary risk matrix
- Provide project implementation and management plan

Registration as PPP project

- Submit prefeasibility assessment report to PPP Unit
- If found suitable, the project is registered and proceeds to next stage

Output: PPP project is registered with the PPP Unit

Business Case Consideration (Feasibility Study) Phase

The aim of the feasibility study is to confirm that the procurement of the project using PPP will deliver value for money to government. The key steps are:

Project Team

- Establish a Project Team,
- Engage Transaction Advisor

Business Case Consideration

- Carry out technical, legal, financial and environmental/social due diligence, and detailed assessment of project risks to redefine project scope;
- Undertake detailed commercial, financial and risk analysis;
- Define required service standards (output requirements), risk allocation and payment mechanism;
- PPP options assessment, market sounding and PPP pre-structuring;
- Define procurement method and plan including evaluation criteria;
- Draft the PPP tender documents – EOI, RFP, draft PPP contract.

Output – Feasibility Study Report

Project Procurement Phase

Procurement is carried out in accordance with the Public Procurement and Asset Disposal Act. It starts with the invitation of Expression of Interest (EOI) and ends with financial close. The key processes are:

Bidding process

- Issue invitation for EOI;
- Shortlist suitable bidders;
- Send out Request For Proposal to shortlisted bidders;
- Hold bidders conference;
- Manage bidders data room and issue necessary clarifications;
- Evaluate tenders and select preferred bidder.

Contract Negotiations and Award

- Negotiate PPP contract details;
- Award and sign PPP contract.

Financial Close

- Conclude financing and ancillary agreements;
- Sign all PPP related agreements;
- All funding approvals in place.

Output – Private party in place

Contract Management (Implementation) Phase

Once the contract has been signed each party performs its respective role. Contract management requires a good working relationship between the two parties, and continues throughout the project term. Key activities include:

Construction:

- Set up contract management team;
- Approval of designs;
- Site transfer and permits;
- Monitor construction – manage variations, claims and disputes;
- Commissioning and commencement of delivery.

Operations:

- Monitor and manage project outputs;
- Manage claims, changes and disputes.

Hand back and transfer:

- Monitor and manage handover maintenance;
- Handover protocols;
- Ex-post evaluation.

Output – Performance Reports and Value for Money Audits

PPP Models and Program Development

1.7.1 PPP Model Contracts

There are several different types of public-private partnership contracts, depending on various aspects such as the type of project (for example, a road or an airport), level of risk transfer, investment level and the desired outcome. Some types of PPPs include:

- **Build-Own-Operate (BOO):** BOO projects can be likened to the actual privatisation of a facility because often there is no provision of transfer of ownership to the host government. At the end of a BOO concession agreement, the original agreement may be renegotiated for a further concession period.
- **Build-Operate-Transfer (BOT):** The facility is paid for by the investor but is owned by the host. The investor maintains the facility and operates during the concession period.
- **Build-Own-Operate-Transfer (BOOT):** Ownership of the facility rests with the constructor until the end of the concession period, at which point ownership and operating rights are transferred free of charge to the host government.
- **Build-Transfer-Operate (BTO):** The private sector finances a facility and, upon completion, transfers legal ownership to the public sector. The agency then leases the facility back to the private sector under a long-term lease. During the lease, the private sector operates the facility.

- **Design-Build-Finance-Operate (DBFO):** The private sector partner finances the project and is granted a long-term right of access of about 30 years. The DBFO partner is given specified service payments during the life of the project.

Figure 1.1: Various types of PPPs

Public-Private Partnership (PPP)					
Contract Type	**Design-Build-Finance-Operate (DBFO)**	**Build-Transfer-Operate (BTO)**	**Build-Operate-Transfer (BOT)**	**Build-Own-Operate-Transfer (BOOT)**	**Build-Own-Operate (BOO)**
Construction	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
Operation	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
Ownership	Public Sector	Private Sector during construction then Public Sector	Private Sector during Contract then Public Sector	Private Sector during Contract then Public Sector	Private Sector
Who pays?	Users or Offtaker	Users or Offtaker	Users or Offtaker	Users or Offtaker	Users or Offtaker
Who is paid?	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector

1.7.2 Advantages of PPPs as a source of financing project

According to a Canadian report (Government of Quebec, 2004), PPPs present numerous advantages both for the public partner and the private partner. The private partner is likely to get access to new sectors and achieve more business activity, enjoy better margins and get more long-term revenues.

PPPs are advantageous because of the following.

- Improved service quality through the use of contracts and the public partner is able to specify the level of service quality required to be offered to the public. The private sector may also have special expertise and technology that will result in improved service quality.
- May lead to higher quality and timely provision of public services.
- Lower project costs may be incurred since PPP projects usually encompass a wide range of activities – design, construction etc., all in one project rather than being separated into its different parts. Therefore, better overall solutions are possible to accomplish and the chance to exploit scale economies increases.
- Risk sharing in that PPP projects are often designed so that each specific risk associated with the project is borne by the partner best suited to handle this risk. For example, since PPP projects typically give the private sector a greater responsibility for project design, construction, service obligations and financing, there is a net transfer of risk from the public sector to the private sector. Likewise, the public sector would then take care of aspects such as political issues and regulations.
- If the public sector is unable to finance all the projects that are considered to be socio-economically beneficial then the private sector can participate in the financing of some projects, thereby ensuring earlier and quicker construction.
- PPPs are seen as an instrument that combines the relative strength of government and private provision in a way that responds to market failure but minimizes the risk of

government failure. Private sector actors in PPPs can use their management skills and capacity for innovation to improve efficiency and quality standards.

- Efficiency gains play an important role in increasing value for money through PPPs. Governments pay a fee to the private partner for the services provided (for example, in terms of usage fees and availability payments), which the private sector uses to pay operating costs and interest charges and to repay debt and return on equity. In cases where0 efficiency increases offset the higher financing costs of the private sector, the PPP may have a higher value for money and hence be the preferred option for the government. Such efficiency effects may include improved analysis during project selection, better planning, on-time and on-budget implementation, improved construction expertise, and adequate maintenance (WBI 2012).
- PPP projects presume long-term commitment from all parties, which may create locking and reduced flexibility.

If implemented well, PPPs can therefore help overcome inadequate infrastructure, which constrains economic growth, particularly in developing countries. PPP's should however be implemented thoughtfully considering the potential challenges presented in the following sub-section.

1.7.3 Challenges with PPP Projects

It is worth noting that private sector engagement in infrastructure projects is not traditionally a natural fit because PPPs bring together parties with such diverging interests and end goals. While the Principal-Agent incentive theory (i.e. the principal (often government) introduces a set of incentives in order to increase the agent's (private sector) efficiency), conflicting interests can still exist:

- The agent could act contrary to its instructions because the principal's instructions are not in their interests, for example by increasing profit margins despite cost-effectiveness being in the principal's best interests (also known as moral hazard).
- The principal could select an ill-suited agent (adverse selection), which causes problems with project implementation.
- The private sector could be more experienced and have superior knowledge of terms and conditions from previous projects (knowledge asymmetry), compared to the government entity, which has limited PPP experience. This asymmetry could result in reduced access to information as the private sector's engagement in project delivery and operations grows.

Therefore, mitigating against such outcomes in order to enhance congruency of goals involves the publication of best practices guidelines and manuals, making use of knowledgeable transaction advisors and ensuring that costs to the public sector are market related. Additionally, devising a robust monitoring regime can also assist in mitigating 'shirking' during the project implementation.

Some critics have also noted that there is a tendency towards over-engineered and legally complicated agreements because PPPs are risky undertakings. PPPs are thus criticised for their high transaction costs, the long-term and rigid nature of contracts, the difficulty in finding private investors to partners with, and the increased difficulty for local firms and financiers to participate in PPP projects.

1.8 Programme Development

Turning a desirable concept into a realizable public-private partnership (PPP) project requires significant resources. It is common practice to split the project selection phase into a series of

steps. The first step is to conduct a high-level review of the service need (Needs Analysis): the justification for a project and its prospects for delivery as a PPP. This step is sometimes referred to as the "strategic business case" phase. The next step, Project Selection, seeks to turn the projects with a greater chance of success into realistic opportunities for private sector participation, although projects may be eliminated throughout the process. This may also involve an initial market assessment. The selection and preparation of projects are rarely a tidy sequential process; instead they are an iterative process. Thus some of the key questions posed early on will be asked again at later stages; they may simply be addressed in less detail at the early strategic business case stage. The project selection phase seeks to answer three key questions, initially at a high level and then in more detail as the project becomes defined more clearly:

- What are the project's scope and requirements?
- Can the project be delivered as a PPP? and
- Should the project be delivered as a PPP?

Project Scope and Requirements

The basic rationale for a project may appear obvious—to upgrade a major congested intercity road link or build a power-generating facility to meet rapidly increasing demand—and it may be part of an existing higher-level investment program, where the decision may already have been made at a policy level (hence the relevance of an investment plan).

One of the fundamental causes of project failure, for both traditional public sector procurement and PPPs, is often a lack of clarity on the part of the public authority regarding the exact scope and requirements of the project. At the outset, lack of clarity usually means change later on. If this happens during the procurement phase, then the level of private sector interest may be significantly reduced or the procurement phase will be drawn out, which can cause higher costs and delays for both parties. If change takes place during the construction or operating phases of a PPP, this may lead to significantly higher costs for the public sector. Clarity of scope should apply to all infrastructure projects. What distinguishes PPPs is that the long-term contractual relationship requires the public sector to be very clear from the start about the outputs needed from the project.

Given the contractual nature of PPPs and the eventual need to define a project in commercial terms for the private sector, the public sector's requirements need to be identified clearly and unambiguously and expressed in the form of an output requirement (for example, the availability and price of power or water or the quality of accommodation services in a school). If requirements are likely to change significantly over the contract period, a PPP may not be appropriate. For example, experience has shown that projects involving a high component of information technology are often poorly suited to private finance initiative (PFI)–model PPPs: the requirements of the project are likely to change substantially over the medium term (together with the means of delivery as technology changes).

Traditional project procurement has usually focused on inputs, and so PPPs involve fundamental changes in the way projects are prepared and in the information that needs to be provided to private sector investors. A collection of engineering studies, typically produced by a public works department used to viewing projects in terms of inputs, will not engage the private sector in a PPP. Private sector investors expect to see in PPP contracts a clear set of output requirements, associated standards, and the terms by which they can expect to be paid. They want to understand from an early stage the risks they will be asked to assume.

For PFI-model projects, this can be especially demanding. A useful rule when developing output requirements is that they should be SMART—specific, measurable, achievable, realistic, and timely—if they are eventually to form the basis of a contract (see table below). The same principles can apply to a concession PPP (defining, for example, the service requirements in an airport concession or a rail service).

Table 1.1 An Example of Output Specifications for an Accommodation Public-Private Partnership

Characteristic	SMART	Not SMART
Specific	Rehabilitate all access roads within the estate to ensure that they comply with the Highway Authority standards.	Rehabilitate all access roads to good standard.
Measurable	Ensure that all access roads are structurally sound, have adequate street lighting and safe pedestrian crossings.	Ensure that all roads are safe for access.
Achievable	Ensure that for all the access roads Routine and Major Maintenance schedules are drawn up and implemented accordingly.	Ensure that access roads are maintained.
Realistic	Ensure that all faults with Traffic Signals are rectified within 8 during business hours and 16 hours outside business hours.	Ensure that all faults with Traffic Signals are fixed within 2 hours.
Timely	Maintain a log of faults and report every month.	Provide a Annual Report on performance.

Can the Project be delivered as a PPP

Once the scope and requirements of the project have been broadly identified, is it feasible for the project to be delivered under a PPP structure? Three key questions have to be answered:

- Who will pay for the project and how (affordability)?
- What are the risks inherent in the project, and how should these be dealt with (risk allocation)? and
- Will the resulting project be able to raise the required debt financing (bankability) and attract contractors and other equity investors?

Normally the public sector will bring in Transaction Advisors at this stage.

Affordability

Affordability examines the level and structure of the project's overall revenue requirements in relation to the capacity of users or the public authority to pay for the infrastructure service. This requires building up a picture of the expected operating and maintenance costs of the project, together with the levels of cash flow required to repay the loans and provide a return to investors. To determine this, a project Financial Model is developed using the best estimates of capital, operating, and maintenance costs, appropriate cost escalation indexes, and assumed financing structure and terms; this model projects the cash flow over the proposed term of the PPP contract. Development of the model is one of the main roles of the Transaction Advisors. Assessing the private sector's capacity and willingness to deliver on the projected basis forms an important part of the initial market assessment.

Once the expected revenue requirements for the project have been established, for concession PPPs the capacity and willingness of users to pay for the infrastructure service then needs to be examined. This may require significant reform to existing tariff levels. The risks of such reform may be unacceptable to private investors, or the private party may be prepared to assume such risks but will add to the costs of the project a charge for the **24** Attracting Investors to African Public-Private Partnerships risks, further affecting the tariff required.

For availability-based PPPs, where the public authority, not the user, makes the payments over the period of the long-term contract, assessment of affordability is one of the most important aspects in considering deliverability of the project. These long-term payment obligations may present challenges for government (as well as investors), which in turn affect both the scope and level of services in the project design (with implications for value for money).

Risk Identification and Allocation

In addition to assessing the sources of revenue linked with the affordability of the project, a complete picture of the risks that flow from the project requirements also needs to be established.

- Risk Identification -Identifying risk includes determining all the risks relevant to the project, possibly breaking this down over the various phases of the project (for example, construction, commissioning, early operation). Checklists of risks that typically apply to infrastructure projects can be used together with risk workshops in which the authority and relevant stakeholders can brainstorm the expected risks. A "risk register" can be used to record all risks and to serve as a checklist throughout the life of the project. The advisors can play an important role in this process.

- Risk Allocation-This involves allocating or sharing the responsibility for dealing with the consequences of each risk between the parties. The principle is to allocate the risk to the party best able to control its occurrence and consequences as well as to the party in the best position to assess information about the likelihood of the risk within the context of what is likely to be commercially acceptable to the private sector. There are only three parties to whom the risks can be allocated: users, investors (the private sector), and taxpayers (through the government). Risk does not disappear through contractual structuring; it is simply reallocated among the parties.

  Risks associated with design, technology, construction, and operation are typically allocated to the private sector, which is usually more efficient at controlling and managing them. Other risks may be better managed by the public sector, such as regulatory, environmental, and foreign exchange risks, or may be shared, such as demand or change-of-law risks.

- Risk Mitigation-It is important to reduce the likelihood of risks and their consequences for the risk taker. A change in project scope can sometimes reduce risk.

- Risk Monitoring and Review-Risk management is an ongoing process that continues throughout the life of the project. Existing risks need to be monitored and new risks identified as the project develops and the environment changes. The contract management team will normally update the risk management plan, which is linked to the risk register, regularly throughout the life of the project.

Bankability

The majority of third-party funding for PPP projects normally consists of long-term debt finance, which typically varies from 70 percent to as much as 90 percent of the total funding requirement (for example, in a PFI-model PPP), depending on the perceived risks of the project. Debt is a cheaper source of funding than equity, as it carries relatively less risk. Lending to PPP projects (usually referred to as project financing or limited-recourse financing) looks to the cash flow of the project as the principal source of security.

The currency of the project's cash flow must match the currency of the debt service, or the risk of any mismatch must be credibly covered either through hedging or by government taking the risk. As these options are either difficult or very expensive to obtain for long-term debt in many African markets, one of the early considerations in assessing bankability is the availability of long-term funding that matches the currency of the project revenue. The tenure of the debt also has an impact on the affordability of the project: longer-term debt implies lower annual capital repayments and therefore lower annual costs.

Apart from the debt, the balance of funding consists of equity, usually made available by the main contractors or by third-party financial investors. The return on equity also depends on the performance of the project after construction and operating costs. But as the return on equity is only received after the debt has been serviced, usually later in the life of the project, this higher risk implies higher returns. Equity funding is needed because the lenders require some cushion between the cash flow available from the project and that required to service the debt. Equity therefore plays a useful role in absorbing project risk and facilitating debt funding.

Thus a PPP structure involves not just the contractual relationship between the public and private sector, but also the web of contracts governing the relationship between the private sector parties themselves and the allocation of risks among them. A special-purpose project company is usually established as the vehicle to bring all these contractual relationships together within the private sector. Lenders want to ensure that the risks allocated to the project company, to which they are lending, are in turn passed on as much as possible to the various subcontractors who will build and operate the project.

Initial Market Assessment

At this stage, a reasonably well-developed picture of the project's scope and its output, construction, operating, and funding requirements should be available. Projects that are unlikely to be affordable or whose funding requirements are clearly outside the scope of what may be available, can be eliminated quickly. For other projects, the answer may not be so clear. Provided that the public authority can provide a reasonably coherent picture of the intended scope and requirements of the project, it is well placed to initiate a constructive dialogue with the private sector—investors, lenders, and subcontractors—on the feasibility of the project's scope and to establish the potential number of suppliers in the market.

PPPs in Road Sector and Case Studies

1.9 PPPs in Road Sector

Roads have the potential to be a significant asset to any country—both in terms of the physical investment and the social and economic benefits. A well-maintained and managed road network unlocks the region's productive capacity by linking agricultural areas to national or regional markets, and encourages economic growth and social integration by bringing cities and villages closer together. With this in mind, governments are eager to develop and manage their road

networks to meet their economic, political and social needs. In some jurisdictions this means building brand new roads, while in others it requires refurbishing, widening and extending existing road networks.

While the public sector is ultimately responsible for roads, the private sector has a potential role to play in the project lifecycle, whether it be in road construction, operation, financing or maintenance. Partnerships between the public and private sector in roads are by no means a new phenomenon and, when done right in the appropriate circumstances, can improve project quality and increase efficiencies.

The nature of road public-private partnerships (PPPs) varies considerably from project to project and is driven by the local, national and even international factors that make the project a necessity in the first place. Historically, the most common road PPPs have been brownfield concessions. However, since 2000 greenfield projects have become increasingly more popular.

1.9.1 2020 Key Private Participation in Infrastructure (PPI) Investments Highlights:

- The **energy sector** outpaced the transport sector in 2020, attracting US$29.8 billion across 145 projects, accounting for 65% of global PPI investments.
- **Renewable energy** continued to dominate; 62% of electricity generation projects were in renewables. The most popular form of renewable technology was solar.
- Investment commitments in the **transport sector** totaled US$10.5 billion across 41 projects, a 78% decrease from 2019 levels.
- The **roads subsector** continued to dominate the transport sector in 2020, but fell by 70% compared to 2019 investment levels.

2020 was a remarkable year for Sub Saharan Africa (SSA). It received US$6.3 billion across 24 projects, marking a 7 percent increase in investment levels from 2019 and a 14 percent increase from the five-year average of US$5.5 billion. Of the six regions, SSA was the only one that saw an increase from the five-year average.

The Covid-19 pandemic has seen a negative impact in PPI investments. Worldwide lockdown measures affected mass transit services and toll roads. Ports and railways were impacted as well, with decreased volume of containers and cargo. Airport PPPs have been heavily impacted, with sudden and drastic declines in international travel. Hence, a number of projects in the pipeline were also delayed and financial close was pushed back for many projects.

Source: Private Participation in Infrastructure 2020 Annual Report, World Bank

1.9.2 Issues with Road PPP Projects

Revenues and Traffic Forecasts

The principal issue in relation to road projects is a viable off-take purchase. Whereas demand for power is relatively calculable, the off-take purchases in a road project are generally individuals and, as a result, demand risk is more difficult to quantify and harder to allocate. In some cases, local populations are asked to pay a toll for a road they have previously used for free. Instead of paying, they seek alternate routes and as a result of the diminished traffic, the project company will never be able to satisfy debt servicing, much less obtain a sufficient return on its investment.

It is essential that the toll regime for a transportation project be based on reliable economic, technical and financial assumptions. The applicable calculations for shifts in the underlying

assumptions should be flexible. However, it should be noted that renegotiation of the tariff regime after commencement of the project may be very difficult. Therefore, lenders will generally undertake their own traffic forecasting exercises to verify those provided by the grantor and the project company. Unfortunately, many traffic forecasts suffer from political orientation, where they are undertaken with the intent to show the need of the local economy for state investment in infrastructure rather than to provide an objective analysis of demand.

The complexities of traffic forecasts and the cost of risk allocation associated with toll revenues has led to the increasing popularity of availability payment based toll road projects. Availability payments from the grantor compensate the project company for making the road available to users. A performance penalty regime will deduct amounts from such payments for defects in the road or the services provided by the project company, such as major maintenance, signage, safety, and aesthetics. The penalty regime and the key performance indicators (KPI) are even more important in an availability payment regime than under a user-fee based system since the commercial incentives associated with increasing traffic to earn more profit is lost and will need to be replicated through KPIs.

Permitting and Existing Facilities

Road projects are vulnerable to permitting risks associated with the regulatory regimes like noise mitigation, reduction in property value, acquisition of land, resettlement and environmental impact. The construction of toll roads can often interrupt the operation of existing transportation routes, either by roadway or maritime.

For this reason, the programme of works executed by the project company will have to correspond with the need for uninterrupted access routes and any additional requirements from the host government. For example, the host government will want work to be completed to co-ordinate with existing transportation systems during off-peak hours or seasons. Further, where the existing route will need to be closed for other reasons, such as maintenance, then the project company's work should be carried out in parallel with such scheduled closures.

Land

The construction of roads requires a significant amount of land. For this reason, the government will generally be involved in expropriation or procurement of that land and its provision to the project company for construction and use of the road. The time required to complete the procurement of the land necessary for a road project will depend largely on the local legal system and the extent of consultation and legal challenge available to the public in relation to the location of the proposed road and the procurement of the land. This public procurement of land also has a knock-on effect on the willingness of the private sector to bear ground condition risk, as the project company may not have an opportunity to do a proper subsurface analysis or geological survey.

Subsurface Risks

Road projects, in particular tunnels, are vulnerable to subsurface risks, where subsurface conditions encountered differ to those anticipated, requiring changes in construction methodologies and subsequent increases in cost and delays. Often, the grantor will bear the risk of unforeseeable subsurface conditions. Another common approach is to establish a baseline for anticipated ground conditions, sharing costs and delays to the extent that baseline proves inaccurate.

Environmental Risks

A risk that arises frequently in toll road and bridge projects is environmental impact and, in particular, the knock-on sensitivities in the political arena. Roads elicit a large amount of media attention and public anguish because of their visibility and their impact on a multitude of people. The project company will not want to take the risk of protestor action (direct or indirect) or any political interference, public opinion moves the government or local politicians to act against the project. However, the grantor will want the project company's assistance in managing the political image of the project and avoiding any aggravation of public sentiment.

Brownfield Risks

Brownfield road projects can pose a number of unique challenges, perhaps the most obvious being how the road was built in the first place. It's often hard to ask a concessionaire to take risks relating to work done by someone else, which they might not be able to see or adequately assess prior to beginning the project. In response to this, governments are more aggressively structuring the arrangements to reduce the risks for private partners. In toll road projects, for example, governments are reducing investment risk by providing capital grants or financing guarantees, and reducing demand risk by using shadow tolls or guaranteeing part of the revenue through minimum traffic assurances. The key challenge in using these contracting arrangements is to find ways of maintaining performance incentives for the private partners.

Another concern for brownfield projects is the continued employment of existing employees, including their wages, benefits, pensions, working conditions and collective bargaining rights. To address this, some PPP contracts have included workforce protections.

Road Safety

With rapidly increasing motorization rates and changing socioeconomic patterns in low and middle-income countries, road safety has become an international public health crisis. Thanks to steadily growing annual incomes, the pace of vehicle ownership in low and middle-income countries has increased and along with it the frequency of road traffic injuries (RTIs). To face this growing issues, the private sector is partnering with governments and civil society to reduce the burden of RTIs.

Harnessing the private sector's unique ability to influence driver behavior is not a new practice. In countries with stable vehicle ownership rates, insurance companies and concession operators have long been in the vanguard delivering education, research, incentives, and infrastructure, as RTIs directly affect their bottom line. More recently concession contracts have begun including explicit incentives tied to the achievement of pre-agreed road safety outcomes.

1.9.3 PPP Models in the Road Sector

Toll Concession

In a road concession the government grants the private sector the right to exploit a right-of-way for a fixed period. Typically, in a classic concession approach, the traffic and toll collection risks are with the private sector and it is a purely private endeavor, with minimal to no government stake. There have been some cases, as with the M6 Toll Road in the United Kingdom, where the concessionaire has even been permitted the freedom to set tolls and apply time-of-day adjustments. More frequently, however, the government will regulate the toll, linking them to an index or composite index of some form. In this scenario, the concession ends either when a contractually agreed amount has been recovered or a fixed expiry date occurs.

In many cases, projects also end prematurely when the concessionaire becomes illiquid and insolvent due to overestimated demand. These experiences have influenced current thinking on whether it is realistic to transfer demand risk.

Toll and Traffic Guarantee Concession

In a toll concession that includes traffic guarantees the private sector takes some but not all of the demand risk of the road. Under this agreement, the concessionaire will get a minimum usage guarantee from the government. Traffic guarantees have been used around the world to mitigate inaccuracies in traffic forecasting and poor due diligence by banks that tend to be overly optimistic. One variant of the traffic guarantee is the so-called "cap and collar" whereby a cash payment is made to the private operator if usage falls below a stated level and the public sector takes all (or a share) of the excess revenue over a stated percentage.

Direct Payment Models: Shadow Tolls and Availability Payments

In direct payment models, the remuneration for the private partner does not take the form of charges paid by the users of the works or of the service, but of regular payments by the public partner. The two most popular direct payment models are Shadow Tolls and Availability Payments. The former is a demand based model, wherein the government pays the fees for the users. Availability payment models are based on output standards rather than demand. The contractor has to meet certain output standards set out in detail in the PPP agreement and, so long as the terms are met, the contractor receives payment of a pre-agreed sum. If it fails to do

Pure "Availability' based payment structures generally transfer neither of these risks to the private sector. "Shadow Toll" structures are seen as transferring traffic risk, but not revenue risk and "Real-Tolled" structures are usually considered capable of transferring both risks. The advantages and disadvantages of these options are presented in the following table.so, then pre-agreed deductions are made on an accumulated points basis.

Table 0.3: Road Development Payment Mechanism Options

	Real tolls	Shadow tolls	Availability/ performance base mechanisms
Features	• Road users pay for use of asset	• No actual tolls are collected from public • Usually have banding mechanism, which applies different shadow toll payments to different levels of traffic • Concessionaire is paid by authority on road use – the more the road is used the more the	• Concessionaire paid for making road available for public use • Sometimes mixed with real tolls [e.g. Ireland] so that concessionaire pays a non-availability payment to authority for road or lane closures out of toll revenue. • Amount of deduction/

	Real tolls	Shadow tolls	Availability/ performance base mechanisms
		concessionaire is paid • Common to have 4 bands: ○ Base Case: designed to service senior debt but not to provide return on equity ○ Higher bands: provide a return on equity ○ Top band: usually has a toll rate of zero to cap amount payable to concessionaire	non-availability payment usually determined by reference to factors including: • length of project road that is unavailable • Number of lanes affected • Duration of unavailability • Time of day of unavailability
Advantages	• Zero cost to the Government • Government has fiscal space to fund other projects	• Where environment is perceived to be hostile to real tolls, can introduce PPP structures • Prepare way for real-tolled roads in due course by cultivating an industry used to taking traffic risk • Multiple sources of funding can be drawn on by government • Mechanism of traffic risk transfer should reduce complexity of project and reduce level of due diligence required	• Absence of traffic/ revenue risk simplifies project • Lower level of due diligence needed • Reduces risk on concessionaire – making project cheaper • Removes emphasis on monitoring traffic flows during operational period • No consumer resistance
Disadvantages	• High capital construction	• No revenue generation	• No revenue generation

Real tolls		Shadow tolls	Availability/ performance base mechanisms
	costs mean that projects traffic volumes often considered an insufficient revenue stream to meet debt service and equity return for sponsors • Often some form of subsidy/ very long concession period • Reluctance by investors to become involved – costs will be higher to reflect higher risks • Potential consumer resistance to paying for road use and how to mitigate this.	device – total cost of project falls on public purse • If traffic volumes are significantly in excess of forecasts, government may find itself paying more "toll" than it budgeted for [This happened in Portugal].	device – total cost of project falls on public purse • Concessionaire is not concerned how much traffic volume there is and so do not transfer traffic or revenue risk.

Output- and Performance-based Contracts

Output- and performance- based road contracts (OPRCs), which became popular in the 1980s with Argentina's widely known CREMA (Performance-based Road Rehabilitation and Maintenance) contracts, have evolved further in recent years from focusing mostly on routine and periodic maintenance tasks, to include rehabilitation and improvement tasks as performance-based activities. OPRC contracts may cover either individual assets, like traffic signs or bridges, or all road assets within a road corridor or network.

OPRC projects today often follow the design-build-operate-maintain-transfer methodology, where the contractor designs and completes the required rehabilitation and/or improvements to deliver a certain level of service and thereafter operates and maintains the road for several years.

As the name stipulates, OPRC projects are based on output as opposed to input. Under a traditional input-based contract the private contractor gets paid for each repaired pothole, whereas under an OPRC the contractor gets paid for each length of road it maintains at the required condition. In return for achieving this standard, the government will periodically pay a fixed amount to the contractor or allow the firm to collect user fees (e.g., toll fees).

1.9.4 Benefits of Road Tolling to the Public Sector

- **New, Stable and Dedicated Source of Funding and Finance**. Toll revenues represent a "new" source of revenue, where previously highways were supported out of general government revenues (and were free at the point of use). Tolls provide an incremental and ongoing revenue source, which is not tied to the annual government budgetary process; and importantly can be used as collateral to raise third-party finance (e.g. project finance/PPPs) that can fund further expansion of the road network. The funds from toll revenues are dedicated to support the construction and maintenance of a particular highway and therefore do not compete with the requirements of other highways in the network.

- **Applies the ''User Pays' principle and the Internalization of External Costs**. Some governments have introduced tolls in pursuit of a general policy to increase the extent of "use related payment" or with the goal of reducing highway use and internalizing the negative effects of highway usage (e.g. congestion, air pollution and accidents). Charging for highway usage is central to a 'sustainable' transport policy. The "user-pay" principle is considered a fair and precise way of paying for transportation facilities.

- **Facilitates Private Sector Development**. Some governments have sought private sector participation in highway provision and to develop the private sector within their economy. The involvement of the private sector can allow the government to finance at least part of the highway development 'off balance sheet'.

- **Toll revenues can also be used to promote regional equity through cross-subsidization of highway construction and maintenance.** Some countries, including France and Japan, have introduced tolls on one highway in order to support the development of infrastructure networks in less developed regions.

1.9.5 Potential Disbenefits of Road Tolls

The introduction of a toll charge on new or upgraded highways can have far-reaching consequences. Some of these consequences will be deliberate, such as the generation of revenue, but others may not have been foreseen. Intentional and unintentional consequences of tolling may include:

Cost Recovery

Traffic and toll tariff levels may not be sufficient to cover all costs, including construction, operation and maintenance. In developing countries where traffic levels are low or where construction costs are high, it is unlikely that the toll revenues will ever cover more than operation and maintenance and perhaps a part of the construction cost. Tolling is therefore not a complete solution for low-trafficked highways requiring significant capital expenditure. Additional funding will be required from sources such as government subsidy, public (e.g. from development banks) or private borrowing.

Revenue Risk

Whether the risk is held by the public sector, the private sector or shared, there is always a risk that outturn toll revenues may be insufficient to cover debt payments and operating costs which may lead to bankruptcy or sovereign debt guarantees to banks for payment of the debt.

Diversion of Traffic away from New Road

Price elasticity of demand and the provision of toll-free alternatives to the tolled highway, will affect the level of traffic on the facility. In turn this may mean that some potential economic benefits of the new highway are lost since the objective of new highway provision is to move people and goods more reliably and quickly.

Social Impacts

Just as with any highway, toll highways can have positive and negative social impacts in the manner and location of their construction and in their operation. Of particular concern is the potential inequity that can result from charging low-income users, particularly those who use the road frequently.

Political and Public Opposition

Political opposition to highway tolling has been significant in some countries. There is also a common misconception that tolls are a form of double taxation. Motorists often perceive that they are paying for the highway twice, by paying a toll and through their taxes, when in fact their taxes are being used to fund other highway.

1.9.6 User-Pay Principle

Tolling is a method for a motorist to pay only for the section of highway that they are using. This concept is often referred to as the “user-pay” principle because the toll highway is partially or completely funded by those choosing to pay for the use of the facility. Motorists using a toll highway pay directly for the benefits it offers whereas traditionally funded highways receive budgetary funds collected from all tax payers regardless of their use of the highway.

A highway network has very high economic and social benefits and is typically provided by the public sector either toll-free or at minimal cost in the same way as basic health care and education is provided in many countries. However, most other infrastructure networks such as railways, pipelines, power grids, water, broadcasting and broadband networks are all charged for. Many of these networks are provided by the public sector that would (and could) not provide these services free of charge.

The 'user-pay' economic principle recognizes that those responsible for the expenditure of scarce resources should bear at least part of the costs they impose. A second principle of 'competitive neutrality' suggests that the provision of one free transportation network, such as highways, leads to a distorted traffic allocation away from other modes of transport, such as rail.

The 'User Pay' principle is a 'sea change' in the economics of transport supply and demand. It relies on the user paying a fee for all the internal costs of the transport supply facility including the construction, operation and maintenance as well as vehicle operating costs. Internal costs can be quantified and attributed to those who benefit - highway users.

Transport costs can be categorized as internal or external:

Internal Costs

These are incurred from the provision (construction, maintenance) and use of transport infrastructure. These costs are recovered from infrastructure users ("user-pays") or from the public.

External costs

These stem from (mostly negative) side-effects of transportation, such as congestion, accidents, emissions and pollution, noise, and aesthetic factors which all negatively affect people and/or future generations.

Charging for the external costs of transport infrastructure is still rarely undertaken. Congestion charging in large cities goes some way to address the costs of the side-effects of transport. The German truck tolling system 'Toll Collect', which charges tolls according to the emission category of a vehicle, has been responsible for a dramatic improvement in fleet efficiency in Germany and its neighbouring countries. Whilst effective, these measures do not fully recoup all external costs which are often difficult to fully quantify.

1.9.7 Toll Levels

In reality, toll tariffs are a compromise between financial needs and economic benefits i.e. they provide sufficient revenue to service loans or recover budget but are not so high to make them unaffordable or to seriously discourage their use by motorists.

The level of tolls to be set by a government is highly dependent on the level of cost-recovery desired by that government. Toll tariffs can be:

Revenue Maximising

To recover as much of the cost, operation and maintenance of the toll facility as possible. Empirical evidence from South Africa has found that the point of revenue maximisation has been

found to occur where the toll tariff is about 75% - 80% of the perceived benefit to the user resulting in the traffic attraction to a rural toll highway of about 80% - 85% of the total corridor traffic.

Welfare Maximising

To recover a contribution to the operating and maintenance costs of the toll facility whilst maximizing the economic and social benefit of the infrastructure. Tolls designed to maximize the social and economic benefits of a toll highway are lower than the Revenue Maximising tariffs in order to attract high volumes of traffic to the facility, thereby promoting the movement or people and goods. However a lower contribution of toll revenues will result in a higher contribution from government budgets towards the cost of construction, maintenance and operation of the facility.

Operation and Maintenance Cost Recovery

To recover the ongoing operating and maintenance costs of the toll facility (the construction cost having been paid out of government budgets). Many toll highways and bridges in the USA recover their operation and maintenance costs only, the capital cost of the facility being funded by the State Government.

Toll levels also vary according to:

Vehicle classification. In general, the larger the vehicle, the more damage that it inflicts on the road pavement and the higher the toll tariff.

- Time of day or day of week. Variation by time of day is typically used where congestion causes considerable delays to travellers.
- Cost of highway construction. Tolls vary across a country or region because of the different costs of highway construction through different areas (e.g. for toll highways that include expensive structures like a tolled tunnel, tolls tend to be significantly higher on a per km basis).
- Social considerations. Some countries make political decisions to encourage the use of new facilities by specific types of users or vehicles, for example High Occupancy Vehicles.
- Geographical area. Area pricing schemes exist in Singapore and London. Both systems are fully automated and tolls vary by time of day and day of the week to reflect congestion levels.
- Loyalty programs and other discounts. With the introduction of electronic tolling systems, social and commercial discounts and loyalty programs are becoming easier to administer.

Toll systems are classified as either **'open' or 'closed'.**

- *Open System*. A system is typically described as 'open' when there are no toll booths on the entry or exit ramps to the highway. The tolls are collected at points along the highway and are therefore not directly related to actual distance traveled by the user.

- *Closed System*. All exit and entry points are monitored and tolls collected on exit, so that all travelers make payments and the payments are directly related to distance traveled.

The toll system design has a strong influence on the potential for the operator to toll equitably and the types of measures which may be required in order to charge motorists proportionately for their highway use. It is more equitable to charge per distance travelled on a toll highway and distance-based tolling is easily implemented for a closed toll system where no movements can be made toll-free. If the toll system is open, local discounts may be needed to ensure that relatively short trips that straddle a plaza are not charged at the same toll tariff as much longer trips. Under an open system, there may be local trips that take place on the highway between plazas which are intentionally or unintentionally not charged for at all.

1.9.8 Equitable Tolling

Various strategies are used in practice to promote tolling on an equitable basis including:

- **Level of Service Improvements**. Tolls should only be introduced on highways which have received significant upgrading or on new highways of a high standard.
- **Local and frequent user discounts**. For highways with high volumes of local, frequent traffic passing through the toll plazas, local and frequent discounts should be considered to reduce the financial burden on these users.
- **Provision of a parallel toll-free highway**. A free parallel highway ensures that those unable or unwilling to pay a toll can still have access to the highway network. It is generally preferable to locate toll plazas away from population centers and offer local users toll discounts rather than provide a toll-free alternative route.
- **Discounts by payment method**. The cost of toll collection varies significantly according to the technology installed. Many toll concessions reward their users with discounts when they use more cost-effective payment techniques such as electronic tags.
- **Distance between toll plazas**. Some countries specify the distance between toll plazas to ensure that users are not over-burdened with toll payment requests, to allow local toll-free movements between plaza locations (if the toll system is open) and to minimize the cost of toll plaza construction and operation.
- **Cross subsidy between different parts of the network**. Some existing highways have been tolled in order to provide revenue for construction of new segments of the network.

1.9.9 Possible Toll Evasion and Enforcement

Typical techniques to defraud toll highway operators of toll revenue include:

Abuse of local discounts and exempt vehicle status. Strong safeguards must be in place to ensure that only those meeting strict criteria receive a discount or exemption status.

- **Unregistered vehicles**. A small but common problem for electronic toll highway operators is the cost and ability of operators to trace drivers of unregistered

vehicles which can result in both significant revenue losses and high collection enforcement costs.

- **False/unreadable/obscured licence plates**. Systems that rely on licence plate matching can be liable to toll evasion by the use of false, unreadable or obscured licence plates.
- **Pilferage of the toll revenues**. Often governments have considered privatization of toll collection because of the difficulty of ensuring that toll revenues are not removed illegally by members of the collection or counting team.
- **Informal Tolls**. In some countries "informal tolls" or fines/fees levied by police, bandits, or others, can be considerable, and make a significant difference in driver's behavior.
- **Diversion around toll plazas**. If a parallel highway exists, some diversion around toll plazas is expected. However diversion around plazas on informal roads such as farm accesses can take place resulting in safety concerns and loss of toll revenue.
- **Toll ticket transfers**. Drivers have been caught using toll tickets for shorter distances than actually travelled.

Failure to properly enforce toll evasion can threaten the financial viability of a toll highway. Most governments permit a charging authority (public or private) to take civil enforcement action against drivers who fail to pay a highway user fee. Tolling Regulations are generally passed in law to establish the 'right to toll', define an 'offence' and prescribe measures to enforce payment. A charging authority is typically permitted to recover an unpaid toll as a contract debt including any collection fees, penalty or costs that may apply.

1.10 Case Studies

1.10.1 Case Study: New Limpopo Bridge between Zimbabwe and South Africa

Beitbridge border post in Zimbabwe is located across the Limpopo River from Messina border post in South Africa. Beitbridge is one of the busiest ports of entry in Southern Africa; thousands of pedestrians, vehicles and trains carrying goods and groceries cross the border daily. As of 2016, an average of 8,000 travellers were accessing the border per day increasing to around 20,000 during peak periods. A total of 2,100 buses, 14,000 to 15,000 haulage trucks and 25,000 private cars were also passing through the border on a monthly basis as of the same year.

A bridge was first constructed across the Limpopo River at the beginning of the 20th century. The old bridge had only one narrow path to facilitate the enormous amount of human and commercial traffic. Long queues were common and often caused severe safety hazards. For this reason, and the growing demand for transport of commercial goods between South Africa and the rest of the continent, it was clear that the old bridge was no longer appropriate.

The shareholders of a company called New Limpopo Bridge (PVT) Limited (NLB) identified the potential in building a new bridge over the Limpopo. The governments of Zimbabwe and South Africa welcomed the initiative.

The New Limpopo Bridge (NLB) project was one of the first Build Operate Transfer (BOT) projects in Africa. NLB ltd entered into a 20 year concession agreement with the Governments of Zimbabwe and South Africa and provided funding for construction of the Bridge project. The bridge was completed in 13 months.

The bridge provides an essential link with strategic importance. It promotes trade and development primarily between Zimbabwe and South Africa but also facilitates trade between South Africa and other LLDCs namely Zambia and Malawi, and other developing countries such as Democratic Republic of Congo (DRC) and Tanzania.

Since its commencement, the new bridge has operated successfully. As of 2016, a total of 10 million vehicles had also passed through Beitbridge border post since 1994. The border post also employs local workforce and is one of the most important employers in Beitbridge. However, the border post is still a bottleneck as service is slow and crossing time at the busy border post is currently still very long.

Shareholders in the project included an Israeli consortium who were the main developers, Old Mutual, Ned bank and Sanlam Bank. The project became the first Southern Africa Public-Private Partnership to reach the BOT transfer stage and is now under the ownership of the Zimbabwean Government after the BOT agreement expired in mid-2014. It was transferred at no cost to the Government.

Key Takeaways and Lessons

- Bridges, owing to their natural monopoly of sorts (they are usually the only permanent crossing over a river), have good potential to attract private sector investment.
- Beitbridge border post is one of the busiest border posts in Africa. The traffic across the bridge was a key factor in making this project bankable. Project proponents should look for similar opportunities where traffic is high.
- Owing to the existence of the old bridge, it was also easier to accurately forecast future traffic volume and revenues i.e. traffic and revenues were predictable. This supports the common adage that private sector are more attracted to brownfield projects (even though the bridge was completely new infrastructure, the old bridge provided a basis for analysis).
- PPPs, if structured right work properly and the recipient governments will retain the infrastructure and toll revenues on expiry of the concession.

1.10.2 Case Study: Kazungula Bridge, Botswana and Zambia *Background of the Project*

The North-South Corridor (NSC) is a key trade route in Africa. It is approximately 2800km long stretching from the mining region of Lubumbashi in the Democratic Republic of the Congo (DRC) to the port city of Durban in South Africa. Along the way it passes though the Copperbelt (Zambia's industrial heartland) and Gaborone, the capital of Botswana. With spill over effects, the corridor further integrates Namibia, Zimbabwe, Lesotho and Eswatini.

The NSC is primarily road-based and the Kazungula crossing point at the Zambezi River at a confluence between Zambia, Botswana, Zimbabwe and Namibia was a critical bottleneck that prevented the efficient flow of goods due to the lack of a bridge across the river (a ferry was being used instead). The development of a Bridge at the crossing (refer to Figure 2.1 below) was

an opportunity to increase the capacity and speed of transit and also introduce an alternative mobility mode: railway transportation.

Figure 2.1: Location of the New Kazungula Bridge Project

Source: https://capetocairo.africa/kazungula-bridge/

The Kazungula Bridge Project (KBP) is a multi-national project on the NSC within the Southern African Development Community (SADC) region and part of a corridor-long infrastructure improvement programme. The project was identified as a key project under SADC's regional development plan and is spearheaded by the governments of Botswana and Zambia.

The project scope includes a bridge linking Botswana and Zambia over the Zambezi River to replace the existing ferry and juxtaposed one-stop border facilities at Kazungula. The project's development objective is to improve the efficiency of transit traffic through the Kazungula border to facilitate and increase trade activities and global competitiveness of Zambia and Botswana; improve regional connectivity of the NSC; and contribute to economic regional integration within the SADC region. The project's stated outcomes include: (i) reduced border transit time; (ii) improved procedures on trade facilitation; (iii) improved border management operations, and consequently (iv) increased traffic throughput and (v) reduced time-based transport and trade cost (African Development Fund (ADF), 2011).

Previously, trucks could only cross two at a time at the border using one of two ferries. The waiting period to make the crossing could take up to three days. This turned into five days and more if one of the ferries broke down. The new bridge promises to reduce waiting times to around two hours with a one-stop border post will be placed on both sides of the bridge so that drivers stop only once at their point of exit/entry (SADC, 2017).

The Bridge

Technical details[2] of the bridge are as follows:

It is a 925m long, 18.5m wide viaduct across the Zambezi River

Design type: extradose cable stayed bridge

Longest span: 129m

Number of road lanes: 2

Railway tracks: 1, narrow gauge 1.067m

US$260 million capital cost

Main contractor Daewoo of South Korea

One-stop border crossing facility located on the Zambian side

Source: African Development Bank. Retrieved from https://capetocairo.africa/kazungula-bridge/

Financing the Project

The estimated total project cost is USD 259.3 million funded through a co-financing arrangement between the African Development Fund (ADF) and JICA. The African Development Bank (through ADF) covers 31.5% of the total project cost. The balance is shared between JICA (57.5%), Governments of Botswana and Zambia (9.2%) and EU-ITF Grant (1.8%) (ADF Project Appraisal, 2011). The project implementation period is five (5) years.

Table 1.1: Kazungula Bridge Financing Contribution

Organisation	Percentage of project funding provided
JICA	Appendix A. 57.5%
ADF	Appendix B. 31.5%
Zambian Government	Appendix C. 5.2%
Botswanan Government	Appendix D. 4.0%
ITF Grant	Appendix E. 1.8%

Source: ADF Project Appraisal, 2011

The implementation of KBP is divided into three contract packages namely:

[2]African Development Bank. Retrieved from https://capetocairo.africa/kazungula-bridge/

Package one: bridge and approach Ramps;

Package two: one stop border post (OSBP) facilities Botswana side and approach road; and

Package three: one stop border Post (OSBP) facilities Zambia side and approach road.

Package one which involves the construction of a Bridge and approach ramps is a Government financed project where the Republics of Zambia and Botswana are financing the project on a 50-50 basis. On the other hand, Package 2 which involves the construction of a One Stop Border Post facility on the Botswana side is JICA financed whilst package 3 which involves the construction of a one stop border post facility on the Zambian side is financed by the African Development Bank (AfDB).

The loans from AfDB and JICA are zero interest, with a tenure period of 50 years inclusive of a 10 -year grace period (ADF, 2011). The executing agency for the project is a combination of the Zambian and Botswana road authorities.

Governance

Once operational, the bridge will be managed by the Kazungula Bridge Authority, which will be set-up using the European Union Infrastructure Trust Fund (EU-ITF) grant. In effect, the project will be run similar to other trans-boundary projects such as the Zambezi River Authority, a body corporate enacted by parallel legislation in the Parliaments of Zambia and Zimbabwe.

Economic Sustainability

Evaluation of economic sustainability was based on the economic internal rate of return (EIRR) and the net present value (NPV) of toll revenue. With an assumed opportunity cost in Zambia of 12%, the base case of the project yielded an EIRR of 23% and a benefit-cost ratio of 2.34. Even with an increase in costs of 20% and reduction in benefits of 20%, an EIRR of 17.5% and benefit-cost ratio of 1.56 provided a convincing case for financing the project (ADF, 2011). The cost of operating the bridge (OPEX) was intended to be covered by the toll revenue. A conservative assumption of 2.5% annual growth in traffic and 5% annual growth in OPEX were assumed and found to be covered by projected toll revenue (ADF, 2011).

Challenges

There were a number of challenges that the project went through as detailed below.

Boundary Dispute

A boundary dispute ensued among the partner countries. Botswana and Zambia had originally intended to work with Zimbabwe on the project. However, Zimbabwe later pulled out of the project as a result of some dispute at the time about the country's boundary. Zambia and Botswana decided to go ahead with the project but Zimbabwe refused passage of the bridge through her territory. The Bridge, which was supposed to be 600 metres long, had to undergo design alterations and have its belly stretch away from Zimbabwe and curve into Zambia (see curvature of the bridge in **Figure 2**). The changes to the bridge design saw it stretching to 923 metres.

Tender Dispute

The KBP also experienced a delay in its development due to a tender dispute. The disputed contract was for the Bridge construction only, but was sorted out after further discussions.

Key Takeaways/Lessons

Utilizing **Error! Reference source not found.** that was presented in the previous section, the following table (Table 1.2) highlights the steps that were taken to make the Kazungula bridge project bankable and can act as lessons learnt. The project was seen as a regional priority and financially viable.

Table 1.2: Steps taken to make the Kazungula Bridge Project (KBP) bankable

Criteria	Steps taken to make the KBP bankable
Pre-development	Appendix F. The project was identified by Botswana and Zambia and screened in the 1990s. The project was documented as a national priority in both countries. Appendix G. SADC documents also identified the bridge as a regional priority project that would rectify a major bottleneck in the NSC and promote an unobstructed and free flow of traffic in the SADC region. Appendix H. The Governments of Botswana and Zambia requested the Government of Japan to support early-stage preparation of the project. Japan agreed and supported the development of a feasibility study through JICA in 2001. Appendix I. The AfDB also carried out a thorough assessment of the project and prepared an appraisal document in 2011, the results of which supported the funding of the project by AfDB. Appendix J. One-stop Border Posts that are part of the KBP are recommended in line with SADC's Protocol (1996) to reduce border delays among SADC nations.
Project definition	Appendix K. The governments of Zambia and Botswana clearly defined the bottleneck at Kazungula crossing including the challenge of using ferries. Appendix L. They defined the potential of the project to promote corridor development along the NSC, and the social and economic benefits. Appendix M. With the support of JICA early project documents (such as the 2001 feasibility study) identified expected service outcomes in line with overall development priorities, project concepts, project boundaries and scope, technical options and demand projections.
Feasibility studies	Appendix N. JICA commissioned a feasibility study by Nippon Koei and Oriental Consultant, which was published in 2001 and confirmed the technical and economic feasibility the project. Appendix O. The feasibility study assessed Without Bridge Case (fixing the existing ferry and associated facilities only) and With Bridge Case

Criteria	Steps taken to make the KBP bankable
	Appendix P. In the 2001 study, three of the project components; the bridge at Kazungula, one-stop border post and ferry improvement were individually evaluated. It was found that the bridge and the one-stop border are both economically feasible in high growth of traffic scenario with calculated Internal Rate of Return (IRR) of more than 12%, which are the official discount rates for both Botswana and Zambia. Appendix Q. The feasibility study also stated positive economic attributes such as job creation schemes, injection of money into the local economy for the duration of construction, and expected tax revenues. Appendix R. New businesses in terms of direct service provision associated with the bridge, where stated in the feasibility study and included toll and bridge management, border clearance services, and small-scale trade and retail trade. Appendix S. It was also indicated that the bridge will link two primary tourism centres increasing business opportunities serving goods and services. Appendix T. An Environmental and Social Impact Assessment was carried out on the project. Special attention had to be paid to the existing national parks and wild animal protection areas nearby the project site, and the existing towns and villages on both sides of the Zambezi River. In order to minimise negative impacts on the ecology and human settlement, special consideration was made in the design of the bridge and access road in terms of their location, scale and structure. In addition to the above, measures to minimize the negative environmental impact during the construction work, including protections of water contamination, noise and vibration were proposed. Appendix U. A Project Management Joint Committee, responsible for arrangement of the project financial source(s), determination of the property ownership and the project implementation/ procurement method, and setting up of project management policy and maintenance strategy, and establishing an Environmental Management Sub-committee, was proposed in the feasibility study and established by the Governments of Botswana and Zambia. Appendix V. The AfDB also carried out a thorough assessment of the project and prepared an appraisal document in 2011.
Capacity of the technology	Appendix W. As the main bridge, PC Extra-dosed type was selected for the reasons that it has superior points in construction costs, concrete works, economical design and environmental impact, compared with PC Box Girder and PC Cable-stayed bridge types.
Site acquisition and access	Appendix X. There was a dispute with Zimbabwe, resulting in the country's refusal to give passage of the bridge through her

Criteria	Steps taken to make the KBP bankable
	territory. This led to design alterations and illustrates the challenge of multi-country projects. Appendix Y. An agreement was eventually reached between Zambia, Botswana and Namibia to allow for the project to go ahead, excluding Zimbabwe
License, permits, and authorizations	Appendix Z. Acquisition of necessary licenses, permits and authorisations required to develop the project were obtained by the governments of Zambia and Botswana.
Shareholders' credibility **Public sector's reliability**	Appendix AA. The project appraisal document prepared by AfDB thoroughly examined the credibility and governance structures of both Zambia and Botswana. In some areas, such as procurement, the AfDB decided to use their own systems where they found that the existing systems did not match their funding criteria (refer to AfDB, 2011)
EPC contractor's credibility	Appendix BB. In 2015, Botswana and Zambia invited bids for the construction of Kazungula Bridge Project. Daewoo Engineering and Construction was selected to be the contractor of the project. Appendix CC. Although concerns were raised about the technical evaluation of bids, which led to one of the financiers dropping out, Zambia and Botswana stated that Daewoo were technically qualified to do the work.
Financial structure	Appendix DD. A number of financing options were investigated including PPP financing with varying combination of public and private (equity and or debt) investment from 100% public to 100% private against varying scenarios of traffic and revenue generation. The feasibility study concluded that an attractive return on investment required an investment of approximately 20% of capital cost with 100% of revenue as private income, an unattractive option to the Governments. The financing of capital expenditure with 100% public funds was therefore recommended for the project. The study however recommended a PPP option to be considered in the medium to long term for operations and maintenance on the basis that, excluding capital cost, the financial return could potentially be attractive for private sector participation.
Insurance arrangement	Appendix EE. Details not available publicly.
Concession agreement	Appendix FF. N/A – the project was financed by MDBs Appendix GG. A PPP option may be considered in the medium to long term for operations and maintenance

Sources: African Development Fund Project Appraisal (2011); JICA KBP Feasibility Study (2001); various articles

1.10.3 Case Study: N4 Toll Road from South Africa to Mozambique (Transit Countries)

The N4 Toll Route is a **brownfield toll road concession of 630 km running from Pretoria**, South Africa's administrative capital, to Maputo, the capital of Mozambique and a deep-sea port on the Indian Ocean.

The rehabilitation of the N4 toll road forms part of the Maputo Development Corridor (MDC) project, between Johannesburg and Maputo, which also includes other modes of transport. Projects such as the MDC are seen in a larger context of a Spatial Development Initiative (SDI) by the South African government to promote development where export-oriented economic potential exists and with the assistance of the private sector.

In 1996 the governments of South Africa and Mozambique signed a 30-year concession for a private consortium, Trans African Concessions (TRAC), to build and operate the N4 toll road from Witbank, South Africa to Maputo, Mozambique. After the 30-year period, control and management of the road reverts to the governments. The contract was worth R3 billion (at 1996 estimates).

For toll pricing purposes, four types of vehicles were considered (light, medium heavy, large heavy and extra heavy). Tolls are collected at six main line toll plazas and at two ramp plazas. However, only two toll plazas are located in Mozambique, implying that the project is by and large supported by toll revenues collected along the South African road stretches and that South African road users subsidise Mozambican users of the entire toll road.

The N4 was financed from 20% equity and 80% debt. The three construction companies who are the sponsors of the project contributed R331 million worth of equity with the rest of the capital provided by the SA Infrastructure Fund; Rand Merchant Bank Asset Management and five other investors. The debt investors include South Africa's four major banks: ABSA, Nedcor, Standard Bank and First National Bank; the Development Bank of Southern Africa; and the Mine Employees and Officials Pension Funds. The governments of South Africa and Mozambique jointly and severally guarantee the debt of TRAC and, under certain conditions, guarantee the equity as well.

Extent of the Toll Road- Initially the project involved the upgrading and rehabilitation of 390km of existing road between Balmoral (20km west of Witbank) and Moamba (proximity of RSA/Mozambique border) and a further 50km long road between Moamba and Maputo. The project was later extended to include the N4 road sections between Witbank and Pretoria, a total of 630km. The road is partly 4-lane separated carriageways and partly 2-lanes with widening to accommodate large hauling vehicles. A one-stop border facility was developed at Komatiport/ Ressano Garcia in order to reduce cross-border bottlenecks between the two countries.

At the time it was the biggest project finance deal in Southern Africa. The N4 faced demand risk – would cars pay to use this road when less well-maintained but free alternative routes existed? Traffic volumes, which were dependent on increased regional trade and economic growth in Mozambique, have not been as high as the financers projected. But TRAC has previously stated that the traffic has been 'acceptable'. There was also considerable user payment risk in Mozambique as the poor communities were unable and unwilling to pay high toll fees. TRAC cross-subsidised the Mozambican portion of the road with higher revenues from the South African side. It also provided substantial discounts to local users and public transport on both sides of the border

Issue of Overloading- although one of the major concerns of the concessionaire was the potential damage caused by overloading, the concession agreement did not specify regulations of truck loads. In order to overcome this problem, the concessionaire began assisting both governments in establishing axle load control measures. The project which is operational since 2002 consists of a set of six traffic control centres, adequately equipped with measuring equipment to weigh axle loads. These are complemented by mobile units that are dispatched to pre-defined lay-bye areas in the surrounding, where weigh bridges are installed and by weigh-in-motion equipment at certain points, which serve to identify possible overloaded trucks.

Since 2007, a sophisticated overload control center operates east of Pretoria on 24-hour basis / 7-days a week, enabling vehicle testing and electronic tagging facilities. Between 2001 and 2004, it was noticed that overloaded vehicles fell from 23% to 9%. When a truck is found to be overloaded, it is placed in a holding yard where the load needs to be rectified, for example, either by redistributing the load more evenly over the axles or by downloading part of the load to be carried by another vehicle to be dispatched by the owner.

Key Takeaways / Lessons

- The commercial risk was shared between a range of partners. Cross-subsidisation (from the more affluent South African users) and substantial discounts for regular Mozambican users helped to reduce the user payment risk.
- The risk associated with the financing of the project was borne entirely by the TRAC consortium (no government subsidies were allocated), although the two governments guarantee the debt.
- The road facilitated further private sector investment in Mozambique, which in turn raised traffic volumes.
- The N4 toll road showed the viability of PPPs in the road sector where the users are willing and able to pay. The N4 has successfully reduced overloading of heavy vehicles, a major cause of road deterioration. It has also facilitated the growth of tourism in the region as well as other sectoral investments in Mozambique such as the Mozal aluminium smelter and the natural gas plants at Pande and Temane.
- Recognition by African countries to promote self-reliance in view of enhancing economic development via a major transportation project.
- The project stems out of a political will for economic cooperation between neighbouring countries South Africa and Mozambique but which also has wider ramifications for other regional SADC countries.
- Some **criticism** levelled by the general public to the South African government regarding the massive investment in such a transport project included the fact that the project is likely to benefit big business and not much the poor. The governments of both countries indicated that mega projects such as Mozal Aluminum smelter near Maputo or the Pende gas extraction project are likely to benefit the economies of both countries and that in return is going to benefit the citizens.
- **Complaints** by commuters and other normal users, to the effect that a road that was previously free of charge becomes a toll road after upgrading. This subject was addressed by introducing much lower toll fees for these categories of road users.

1.10.4 Case Study: Dakar-Diamniadio Toll Road, Senegal

In 2007 the Public-Private Infrastructure Advisory Facility (PPIAF) approved a $250,200 grant to help establish the institutional and regulatory framework for the transport sector in Senegal. The PPIAF grant supported technical assistance to the National Agency for the Promotion of Investments (APIX) to consolidate the institutional framework and develop contractual arrangements for the Dakar–Diamniadio Toll Highway project.

The highway was to reinforce the Dakar metropolitan area as the driver of Senegal's economic development. It would also help expand this densely populated capital city and integrate it with the rest of the country and sub-region, directly benefiting its people, businesses, and economy. The highway was expected to reduce congestion and travel time by more than half.

The Dakar–Diamniadio Toll road project exemplifies PPIAF's strategy to encourage public-private partnerships for developing priority infrastructure projects in Sub-Saharan Africa. PPIAF support was focused on five areas:

- Designing and proposing a framework for the oversight of the highway project that reflects the context and institutional characteristics of Senegal.
- Helping to build consensus on the option or models preferred by the government through seminars for specific stakeholder groups.
- Recommending an operational organization for the administrative entity responsible for the oversight of the highway concession.
- Providing tailored technical assistance for that entity's efforts in building technical and operational capacity.
- Contributing to a broader review of the institutional management of public-private partnerships in Senegal under the direction of APIX.

The institutional and regulatory framework developed under the PPIAF technical assistance for the oversight of the highway concession contract was adopted by the government of Senegal in early 2009. In addition, a segment of the road to be developed pursuant to a 30 year concession was successfully awarded to a private sector company.

PPIAF's intervention in Senegal contributed to the development of the €448 million project, one of the first toll roads in Sub Saharan Africa (excluding South Africa) structured as a public-private partnerships (PPP), where various road segments are being financed either by the public sector ("the public sector component"), or by both the public and private sectors ("the PPP component").

The **PPP** component of the road consisted of the 20.4 km Pikine–Diamniadio section. This road segment was concessioned to Société Eiffage de la Nouvelle Autoroute Concédée ("SENAC"), a Senegalese special purpose company created to implement the project, owned by the Eiffage Group, one of the leading construction groups worldwide and one of France's main toll road operator. The concession contract between the government of Senegal and SENAC was signed on July 2, 2009; it required the concessionaire to build, finance, operate and maintain the Pikine–Diamniadio segment for 30 years, and to operate and maintain other existing road segments for the same period of time.

The PPP component of the road reached financial closure on November 15, 2010. This road segment in the amount of €225 million was financed as follows: €95 million, representing 42% of total project costs, with equity from the sponsors and debt from international financial institutions, and the remaining €130 million, representing 58% of total project costs, was financed with public sector funds, consisting of loans from: AfDB in the amount of €50 million, AFD in the amount of €25 million, and government of Senegal in the amount of €55 million.

The Public sector component of the road consists of the 4.2 km road segment Pikine-Patte d'Oie. This component in the amount of €223 million was financed as follows: funds from the government of Senegal in the amount of €120 million and loans from the World Bank IDA in the amount of €70 and from AFD in the amount of €33 million.

Key Takeaways/Lessons

1. **Political commitment.** The Government of Senegal set the project as a priority. The first driver on the road was the President – who paid the toll. But commitment alone isn't enough; it needs to be turned into action by government agencies. An intra-agency coordinating committee was set up. The National Agency for the Promotion of Investments (APIX) oversaw the preparation of the concession. The Public Private Infrastructure Advisory Facility (PPIAF) supported APIX with technical assistance, including the design of a framework for the oversight of the project.

2. Toll plaza along the road **Consensus-building and stakeholder engagement.** Part of PPIAF's US$250,000 grant to the Government of Senegal helped to pay for seminars with stakeholder groups to discuss structuring options for the road and socio-economic drivers of the willingness to pay. The final structure chosen involved a relatively low toll, with an upfront contribution by the government to the cost, with the concessionaire taking full construction, operating and traffic risk. The combination of careful outreach to stakeholders, a fairly low toll, significant time savings and a well-maintained road meant that the first toll road in the country was accepted by the population. In addition, the fact that there is a free alternative road helped the Government and other stakeholders point out that motorists could always choose to use the other route.

3. **Experienced concessionaire with strong commitment to Senegal.** The concessionaire, the Eiffage Group is one of Europe's leading construction and toll road operating companies, with a long history of involvement in, and commitment to, Senegal. Eiffage, through the special purpose company set up to construct and operate for 30 years the road, SENAC S.A., ensured that the road was constructed and is being operated to a high standard, on time and within budget.

4. **Strong involvement of development institutions in both public and private financing.** The public sector component, financed by the Government of Senegal, the African Development Bank, the Agence Francaise de Developpement and the World Bank, covered right-of-way clearance, urban restructuring and re-settlement of households – up to 30,000 people – affected by the road. On the private side, IFC served as the lead arranger and global coordinator for this landmark €230 million toll road project, committing €22.5 million in long-term debt facilities. In all, the total private equity and debt raised by the concessionaire amounted to €100 million. The amount of the debt financing package was €65 million, of which €45 million was mobilized from the

Western African Development Bank (BOAD), the African Development Bank and CBAO, one of the main Senegalese commercial banks.

5. **Clear, visible benefits.** Commuters are saving three hours a day. The road is safer and the quality of the ride is higher. There is economic development sprouting all around the road. Small farmer businesses have been developed with women associations alongside the road. For those who do not wish to use the new highway, the previous road remains as a free – and now more fluid – alternative.

The Dakar-Diamniadio Toll Road.

1.10.5 Case Study: The Lekki-Epe Toll Road Concession Project

The Lekki Toll Road Infrastructure Project, along 49.4KM of the Eti-Osa Lekki-Epe axis of Lagos consisted of the construction of new highway, culvert structures, provision of street lightings, and construction of two new toll plazas (Olele, 2016). A concession company was obliged to design, rehabilitate, construct, operate, maintain and toll the existing expressway planned for expansion, under a 30-year Concession mandate from the Lagos State Government. The project was successfully undertaken due to an experienced and committed concessionaire, due diligence, and involvement of local lending institutions. The state government's commitment and support in the loan of N5billion to the concessionaire assisted in the overall financing of the project.

However, the project initially faced challenges as a result of high upfront cost including procurement costs, lack of strong support and commitment from the federal government, change in state government and managing stakeholders (Trinity, 2009; Olele, 2016).

Other main challenges were:

- There were no privately financed toll road precedents to follow in West Africa. The project was truly a first for the region.

- There is no doubt that Lagos is viewed as a challenging environment in which to undertake an urban toll road project. In addition, the city end of the corridor is very narrow and massively congested. The results of this perception were many. In the first place, international organizations and contractors were not convinced that the environment in Lagos would support such a scheme. While certain international organizations enquired about the transaction, none were prepared to bid for the EPC and O&M roles in the transaction. Equally, equity investors were challenged by the raw politics of the environment and the unpredictability of everyday life.

- Local lenders had no real experience of long-term limited recourse financing of infrastructure concession projects. In addition, the financial terms that they were able to offer were constrained by limited tenors which were not consistent with the long-term nature of the financing that was required.

- At the outset of the project, there was a lack of any real procurement and regulatory regime for concession projects at the State level.

- During its development phase, the project was faced with the uncertainty of the first transition of power between civilian administrations in Nigeria. At the same time, there was a change in the government of Lagos State with a new Executive Governor being elected.

Nevertheless, these challenges were overcome partly by the PPP framework that took cognizance of the risks (financial and economic, mostly) of the project (Olele, ibid.).

Successes:

Achieving the financial close milestone was the product of a number of different factors.

- ARM (Asset & Resource Management Company Limited) the developer, took the decision to gather together a team of experienced infrastructure development advisors for the project at a very early stage in the process. At any time during the long gestation period for the project, it would have been very easy and understandable for ARM to seek to cut its losses and abandon the project.

- LCC (Lekki Concessions Company Ltd) was very quickly established as a substantive entity in Lagos. It was able to hire a dynamic chief executive with wide ranging experience of developing and financing concession based infrastructure projects. The LCC team was absolutely vital in driving the process along, not only in relation to the financing of the project but also dealing with the myriad of commercial, political and legal issues facing the project. There is no doubt that without the energy, enthusiasm and dedication of the LCC team in Lagos, the project would not have achieved financial close.

- The State proved itself to be an effective partner in the scheme. Not only did the State show considerable patience in the development phase (a quality not often shown by political entities), it proved its commitment to the scheme in a difficult political arena by agreeing firstly to guarantee the investment required to enable the pre-financial works to proceed and then to provide a mezzanine loan to LCC of N5 billion to assist in the overall financing of the project.

- The patience, dedication and pragmatism of the senior lenders was a key aspect. Local lenders had stuck with the project from the outset and with ADB and Standard Bank providing 15 year money, the local lenders (buoyed by consolidation and an extended bond yield curve) were able to push the market by offering 12 year tenors not previously seen in the Nigerian market.

- The project underwent significant amounts of due diligence. The involvement of the African Infrastructure Investment Fund, co-managed by Macquarie, in the equity led to an extremely detailed, thorough and robust due diligence process. In addition, the senior lenders conducted their own traffic, technical, financial and legal reviews and there is no doubt that the rigorous nature of the process served to flush out many issues which were then addressed appropriately.

- Political reality required the construction works on the scheme to commence prior to first drawdown of the senior debt. In fact, the progress of the pre-financial close works was an enabling factor in itself. With the assistance of the State, ARM and local lending institutions, LCC was able to proceed with and complete the first section of the construction works before financial close was achieved. The completion of these works, in the most congested part of the road corridor, was a clear demonstration of the management capabilities of LCC and of the contractor, Hitech.

- The transaction is predominantly a Nigerian deal. The LCC team is Nigerian, the local lenders are all strong Nigerian financial institutions, the contractor is Nigerian and the majority of the shareholders are also Nigerian. With such a high level of local participation came much needed know how and understanding as to how the maze of local conditions should best be negotiated. This “on the ground” experience and presence was absolutely vital to address the public relations, technical, political, financial, commercial and legal issues that arose throughout the process.

Ref: Olele, C. A. (2016). The Challenges of Public Private Partnership (PPP) Projects in a Developing Country: The Case Study of the Lekki Toll Road Infrastructure Project in Lagos, Nigeria. PM World Journal, V(X): 1-11

Trinity (2009). A review of the Lekki-Epe Expressway toll road concession project. Trinity International LLP. http://www.trinityllp.com/a-review-of-the-lekki-epe-expressway-toll-roadconcession-project/ Accessed 18 June, 2018

1.10.6 Case Study: Kasomeno Mwenda Toll Road

Background:

The Kasomeno-Mwenda Toll Road and associated One Stop Border Posts are located in the Democratic Republic of Congo (DRC) and Zambia.

The project is currently undergoing its development cycle which has included the preparation of a pre-feasibility study (2017-2019), full feasibility bankable study (2019-2020) and fund raising (2020-2021).

Implementation of the project was expected to commence in April 2021 through a PPP regime with a 25-year concession given to the private sector after which the road and ancillary infrastructure will revert to the governments of DRC and Zambia.

The project preparation studies were funded by the Development Bank of Southern Africa (DBSA) (Athari Advisory Group, 2020). The winning Concessioner and financier is Groupe Europeen de Development Africa (GED Africa) together with another equity investor from Hungary, Duna Aszfalt Investments (Athari Advisory Group, 2020).

Key Elements:

- 182 km of new single carriageway road – around 96km of the road is situated in the DRC and 86 km in Zambia;
- Construction of a 345 metres cable-stayed bridge across the River Luapula;
- Construction of one-stop border posts on each side of the River Bridge with associated parking and warehousing facilities;
- Construction of toll plazas on both sides of the bridge;
- Construction of four satellite toll plazas; and
- Provision of an access road to the proposed airport at Kasenga.

Scheme Costs:

- The preliminary Capital Cost (CAPEX) and Operating Cost (OPEX) cost estimates for the baseline solution were USD 770 million and USD 970 million, respectively.
- The preliminary CAPEX and OPEX cost estimates for the Potential Southern Route – Option 1 are USD 541 million and USD 1,001 million, respectively.
- The preferred option was (2) for the potential southern Route with a total CAPEX and OPEX of US$1,541 million.

Challenges:

- Project Preparation- being a bilateral project (DR Congo and Zambia) meant that concessions for the Toll Road had to be negotiated for each country and this delayed project commencement by almost two years. In addition the Feasibility Studies took a while to prepare due to the flooding in Democratic Republic of Congo in the Kasenga area making accessibility impossible for the study team for about 3.5 months. Traffic and Hydrological Surveys had to be put on hold.
- Resettlement Issues-the project scoping had greatly underestimated the impact of the road on village settlements. When the Environmental and Social Impact Assessment was carried out it revealed that at least 35 families would be to be resettled in the DR Congo area. A land resettlement plan for the affected persons was then drawn up in mitigation.

Key Take Aways:

- Project preparation was funded by Development Bank of Southern Africa which is a South African Government owned bank with regional interests within SADC. Members of SADC – a number of which are also LLDCs - can take advantage of the bank.
- Road Pricing is proving to be a sustainable way of funding road infrastructure in Africa and a good way of attracting the private sector as development partners.

1.10.7 Case Study: Vadodara Toll Road, India

The Vadodara Halol Toll Road (VHTR) was one of the first State Highway widening projects developed on a Public Private Partnership basis in India and it has subsequently paved the way for a large number of projects to be undertaken on a similar format in Gujarat and the rest of India.

VHTR was an initiative commissioned as a part of the Vision 2010 – an infrastructure master plan developed by the Government of Gujarat (GoG). The underlying principle of the vision was to develop infrastructure projects in Gujarat by attracting private sector participation. The project involved widening and strengthening of 32 kilometres (km) of the existing two-lane State Highway (SH 87) connecting Vadodara to the industrial town of Halol into a four-lane tolled expressway.

The GoG commissioned the Infrastructure Leasing and Financial Services (IL&FS) to jointly develop two road projects in the State, i.e. Vadodara-Halol and Ahmedabad-Mahesana. The Roads and Buildings Department (R&B), GoG and IL&FS signed a Memorandum of Agreement (MoA) to this effect on 31st October 1995.

A special purpose vehicle (SPV) was constituted for this purpose named the Vadodara Halol Toll Road Company Limited (VHTRL)4 . VHTRL in turn appointed a contractor, through international competitive bidding, for the construction, operation and maintenance of the project. The construction of VHTR commenced on 1st March 1999 and completed on 15th September 2000. The toll operations commenced on 24th October 2000. VHTRL manages, operates and maintains the road for 30 years starting from 2000.

The VHTR project is developed under the Built, Own, Operate and Transfer (BOOT) basis. For the purpose of effectively executing the project, an SPV – VHTRL was created. VHTRL was promoted

by the GoG and IL&FS. It entered into a concession agreement with GoG to design, finance, build, operate, maintain, and transfer the facility after recovery of a predetermined return. VHTRL in turn appointed a consortium of Punj Lloyd Limited and IRCON International Limited as contractors to construct, operate and maintain the project. The contractors also have an equity stake in VHTRL.

GoG entitled VHTRL the exclusive right and authority, during the concession period:

- to develop, design, engineer, finance, procure and construct the highway project;
- upon completion of construction, to manage, operate and maintain the highway project and regulate the use by third parties;
- to demand, collect, retain and appropriate toll from the users of the facility and apply the same to recover the total cost of the project;
- to enforce the collection of toll from all delinquent users of the facility and impound the vehicles and goods to enter into private contracts with the users for regular use of the facility or any special use; and
- to sell, distribute or issue at various outlets coupons or tokens against the payment of toll; and to appoint subcontractors or agents to assist in fulfilling its obligations.

Results

The development of the 31.7 km stretch was achieved in a single phase with all the required road works and related facilities being developed. While the Concessionaire was to ensure completion of all works within a period of 18 months, the construction of the entire stretch was completed 4 months ahead of schedule.

The contract made provision for four major items of operation and maintenance during the life of the project. These were:

- Routine Maintenance (continuous);
- Periodic Overlay (every five years);
- Periodic Renewal (every fifteen years); and
- Toll Operation and Management (once a year).

The project has been operational since 2000. The traffic on the road has however not been in line with the expected traffic levels as had been established in the traffic study. The primary reason is that the traffic estimates were based on the assumption that the incentives for industrial development available in Halol area were to continue over the long term. These incentives were eventually withdrawn and hence the traffic did not grow to the estimated levels. Due to this, the financial condition of VHTRL started deteriorating and it was unable to service its debt obligations. This resulted in the company resorting to corporate debt restructuring in 2004.

The concession period is expected to end in 2030. However, in case the developer is unable to recover project cost and earn a return, there is a possibility of extension of the concession period. The typical extension allowed under the Concession Agreement is for two years. This is a rolling

period, which means that the Concession period will keep extending by 2 years till the time the Concessionaire is able to gain a return of 20% on investment.

Key Takeaways and Lessons

Pre-development market assessment is critical: The VHTR case makes it amply clear that the pre-development preparations need to be more robust since such preparations can impact the long term objectives of the project. For instance, the traffic estimations for the project were based on the assumptions that the industrial incentives available for the area would continue for long-term. Eventually, with time the incentives were withdrawn and the traffic was almost 50% lower than the projected traffic. Such unaccounted risk factors can jeopardize the project and lead to significant losses.

Competitive bidding can ensure a "better deal": Competitive bidding for a longterm concession for critical infrastructure projects is extremely critical. This not only brings in the best private sector capabilities, but also allows the government to get the best possible financial terms by ensuring competition and a level playing field. This also, to an extent, requires capabilities within the government machinery to structure projects in fashion where the private sector capabilities are tapped in the best possible manner. VHTR was developed through a MoA between the GoG and IL&FS and did not create adequate competitive tension since there were no precedents that were available to develop such a structure. The appointment of the contractor was, however, through a competitive bid process.

Need to create a balanced risk return profile: The risk return profile of the project was skewed in favour of the private developer. For instance, the concession agreement ensured that the private developer earned toll revenues till he was able to achieve a return of 20% on the overall investment. This was further protected with a provision for additional revenues i.e. development rights on land parcels abutting the road, in case the toll revenues did not result in the expected returns.

There was also an annual toll revision linked to WPI / CPI to the extent of 100% of the rates which resulted in the developer having an assured revenue stream. Further, the lack of penal provision for non-compliance with performance standards during operation and maintenance meant that the developer could save on costs if desired. Adverse effects of Change in Law, occurrence of a Force Majeure event, unexpected increase (more than 25%) in the estimated costs of any maintenance expenditure, interest rates fluctuations, inflation exceeding 50%, were all made pass through to the consumers.

Conflicts of interest should be identified early and avoided: Conflicts of interest need to be identified early in the development process to ensure that transparency and integrity of the transaction are not compromised. In the case of VHTR, IL&FS itself was the developer/promoter, the consultant, financier in the project leading to serious conflicts of interest. A conflict of interest also existed on the Government side as it was the Grantor of Concessions and also held 11% of the Equity in the project.

Innovative financing mechanisms: VHTR was one of the first projects to utilize several innovative financing methods. One of the instruments used was that of Deep Discount Bonds with an option of take-out financing. The project further utilized several other instruments like cumulative

convertible preference shares and long term loans from IL & FS. This project thus created several examples that were eventually followed in the country for infrastructure development.

Environmentally and Socially responsive development framework: The VHTRL was the first project that introduced Environmental and Social Safeguards measures as part of the contractual obligation of the developer. This created a benchmark and had immense demonstration value since it highlighted that infrastructure can be developed in an environmentally and socially responsible manner

Module 2: Traffic Impact Analysis.

2.1. Key Objectives of the Module:

For participants to gain the knowledge of what a Traffic Impact Analysis report should contain when submitted with Planning Application.

2.2. What is a Transport Impact Analysis

A Traffic Impact Analysis study or Traffic Impact Assessment (Transport Assessment) is a **study which assesses the effect that a particular development has on the transportation network**. A traffic impact study is generally required by roads authorities to evaluate the impact of a change in land use.

A traffic impact study varies in complexity depending on the size of the development, the current and proposed land use and the location of the development. Various traffic engineering concepts and principles are applied while conducting a traffic impact assessment. A Traffic Impact Analysis study is generally used for:

- Assess impact of traffic due to new development (or re-development);
- Support comprehensive plan amendments;
- Rezoning applications;
- Subdivision of land applications;
- Obtain site plan approvals;
- Obtain driveway or access permits;
- As a part of environmental impact assessment;
- Prepare traffic mitigation plans;
- Determine developer /bulk contribution;
- Determine cost apportionment; and
- Development access/egress and on-site circulation plans.

Now there is a move away from merely Traffic Impact Analysis/Assessment (TIA) to Transport Assessment (TA). Planning regulations, such as PPG 13 in the UK, also makes clear that the assessment of new development proposals should include their accessibility by a range of transport methods and developers are required to demonstrate how they will reduce travel to the site by car. So a thorough, properly-prepared Transport Assessment is often essential to support a development proposal. A Transport Assessment Report should be accompanied by a Scoping Report.

A TA is a comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures will be taken to deal with the anticipated

transport impacts of the scheme and to improve accessibility and safety for all modes of travel, particularly for alternatives to the car such as walking, cycling and public transport.

In some cases, the transport issues arising out of development proposals may not require a full TA to inform the process adequately and identify suitable mitigation. In these instances, it has become common practice to produce a simplified report in the form of a Transport Statement (TS). There will also be situations where the transport issues relating to a development proposal are limited, and no formal assessment is necessary.

Objectives of Transport Assessments:

- **Encouraging Environmental Sustainability**
    - Reducing the need to travel, especially by car. Development should be located close to the services that a community needs, to seek to reduce the number and length of journeys made by car.
    - Tackling the environmental impact of travel. Improve transport choices and make it safer and easier for people to access jobs, shopping, leisure facilities and services by public transport, walking, and cycling.
    - The accessibility of the location. Consider how accessible a site is, or could be, without using a car. This is particularly important for large developments that create a big demand for travel.
    - Other measures which may help to influence travel behaviour (ITB). Reduce car usage (particularly journeys with just one person), by measures such as travel plans, free bus passes and so on.
- **Managing the Existing Network**
    - Making best possible use of existing transport infrastructure. Improve the local public transport network and use advanced signal control systems, public transport priority measures (bus lanes), or other forms of Intelligent Transport Systems (ITS) to improve how the highway network operates.
    - Managing access to the highway network. Take steps to make the development 'fit' within the available highway capacity. This can be done by managing travel habits through travel plans, supported, as necessary, by measures to manage access from developments onto the highway network.
- **Mitigating any Remaining Impacts**
    - Through demand management. Use traffic control measures across a wide network to regulate flows.
    - Through improvements to the local public transport network, and walking and cycling facilities. Provide new bus routes, extend existing bus routes and increasing bus frequencies, and design sites to make walking and cycling as easy as is possible.

- Through physical improvements to existing roads. It may be possible to improve the capacity of some existing roads by physical changes such as improving the geometry of junctions and so on.
- Through providing new or expanded roads. This is particularly where this would provide relief to existing roads to provide increased capacity for buses, walking and cycling.

Key Issues at Pre-application Stage

The key issues to be considered during pre-application stages are:

- Planning policy context of development proposal;
- Catchments or study area for the proposed development;
- Assessment years – year of opening and horizon year(s);
- Assessment of public transport capacity, walking/cycling capacity and the road network capacity;
- Person trip generation and trip distribution methodologies and/or assumptions;
- Measures to promote sustainable travel; and
- Mitigation measures (where applicable) – scope and implementation strategy.

General Requirements for Transport Statements

- **Transport Statement**-A Transport statement (TS) should set out the transport issues relating to a proposed development site (existing conditions) and details of the development proposals (proposed development). Transport Statements normally accompany small development proposals that are not expected to make huge impacts on the transport networks nor services.
- **Existing Conditions-**A TS should be based on a sound analysis of existing conditions giving a full description of:
  - Existing site information - describing the current physical infrastructure and characteristics of the site and its surroundings: and
  - Baseline transport data - background transport data and current transport infrastructure details.

For Existing Site Information the following is required:

→ a location plan that shows the proposed development site and its surrounding area and transport system;

→ the existing permitted use of the site;

→ the existing land uses near the site, including any development plan proposals, or possible future uses in the case of undeveloped sites;

- → existing site access arrangements including access restrictions, where appropriate;
- → whether the location of the site is within or near a designated Air Quality Management Area (AQMA); and
- → any use of abnormal loads on the current site.

For Baseline Transport Data the following would be required:

- → A qualitative description of the travel characteristics of the existing site, including pedestrian and cyclist movements and facilities, where these apply;
- → A review of existing public transport, including which services are provided and their frequency, location of bus stops and train stations and park-and-ride facilities;
- → A description and functional classification (that is what is a particular roads main function, such as carrying long distance traffic, local traffic, main bus route and so on) of the highway network near the site; and
- → An analysis of the injury accident records on the public highway near the site access for the most recent three-year period, or five-year period if the proposed site is within a high accident area.

In terms of the **Proposed Development**, a TS should clearly demonstrate how you are going to provide safe and satisfactory access to the development for pedestrians, cyclists (and if appropriate) public transport. As well as the site access junction, it should also consider any barriers to walking, cycling or using public transport in the immediate vicinity of the site access.

The TS should contain a full description of the proposed development including the following.

- → Plans and drawings, which clearly show the development's size and layout, particularly the proposed pedestrian routes, cycle routes and vehicle routes, and, as necessary, bus access points.
- → An estimate of the total number of trips your proposal will generate, including how people will make these trips (such as walk, cycle, use a bus or car). You should support this with details of any proposed improvements required to improve access to the site (for example a new footway or cycle path, bus stop improvements or works to make sure access to the site is safe and satisfactory).
- → Proposed parking provision and any proposals for how on-site car parking will be managed.
- → Construction traffic details, such as likely numbers of Lorries and their routes to and from the site.

Further Requirements for Transport Assessments

A detailed TA will be required where a proposed development is likely to have significant transport and related environmental impacts. The study area for a proposed development should be determined in discussion between the developer and appropriate authorities. It will generally depend on the type and scale of the development, and early consultations with the appropriate authorities will assist in defining its extent.

Wherever pre-application consultation identifies a need for a TA, it is good practice to agree, as part of the pre-application consultation, the preparation of a **Scoping Study** before the TA is begun. A Scoping Study should identify the issues the TA will address, the methodologies to be adopted, additional supporting data required, and the limits of the assessment area.

An agreed Scoping Study will help to reduce the potential for misunderstandings about the form of the TA and avoid abortive work. It does not preclude varying the TA to reflect the findings of survey results or more detailed analysis. However, it is recommended that any significant variations are agreed with the appropriate authorities during the development of the TA.

A Transport Assessment study should address the following key issues:

- → **Reducing the need to travel, especially by ca**r – ensure, at the outset, that thought is given to reducing the need to travel; consider the types of uses (or mix of uses) and the scale of development in order to promote multipurpose or linked trips.
- → **Sustainable accessibility** – promote accessibility by all modes of travel, in particular public transport, cycling and walking; assess the likely travel behaviour or travel pattern to and from the proposed site; and develop appropriate measures to influence travel behaviour.
- → **Dealing with residual trips** – provide accurate quantitative and qualitative analyses of the predicted impacts of residual trips from the proposed development and ensure that suitable measures are proposed to manage these impacts.
- → **Mitigation measures** – ensure as much as possible that the proposed mitigation measures avoid unnecessary physical improvements to highways and promote innovative and sustainable transport solutions.

An iterative approach may be necessary where initial work on a TA indicates that revisions may be necessary to the proposed development, or to the approach taken to the issues identified above. The iterative approach ensures that the stages of the TA are not viewed in isolation, but that the full implications of each stage are thought through and revisions made either to the development proposal or to measures considered at another stage. Where revisions are made, their implications are analysed across the whole proposal in turn. The final outcome is a TA that improves the development proposal to achieve the optimum level of sustainability.

A Transport Assessment should be prepared with regard to the relevant planning policy framework for the development proposal, usually Local Development Framework (LDF) or equivalent. It should also be consistent with the Transport Master Plan. The TA should indicate the transport aspects of the proposal, how the proposal will help to deliver the aims and

objectives of the development plan, and how it responds to relevant Government planning policy guidance and statements.

The requirements or issues that need to be addressed in a typical TA are outlined below.

Existing Conditions

In preparing a TA, a full description of existing site information should be provided by the developer. These baseline conditions need to be established accurately to understand fully the context of the development proposal. This description should include as a minimum:

- Existing Site Information
    - site location plan that shows the proposed development site in relation to the surrounding area and transport system;
    - the permitted and existing use of the site;
    - a detailed description of the existing land uses in the vicinity of the site, including development plan allocations or potential future uses in the case of undeveloped sites;
    - existing site access layout and access constraints, where appropriate;
    - whether the location of the site is within or near a designated Air Quality Management Area (AQMA);
    - any abnormal load uses of the current site;
- Baseline Transport Data
    - the quantification of the person trips generated from the existing site and their modal distribution, or, where the site is vacant or partially vacant, the person trips which might realistically be generated by any extant planning permission or permitted uses;
    - existing public transport facilities (including provision/frequency of services, location of bus stops/train stations, park-and-ride facilities) in the study area; if available, the current level of patronage or usage on the public transport network in the vicinity of the site;
    - parking facilities available in the vicinity of the site;
    - existing pedestrian and cycle facilities in the vicinity of the site;
    - pedestrian and cyclists movements in the vicinity of the site;
    - a description and functional classification of the road network in the vicinity of the site;
    - current traffic flows on links and at junctions within the study area;

- identification of the critical links and junctions on the highway network, with calibrated
- capacity tests to reflect existing conditions;
- for the study area, establish the current personal injury accident records for the most recent three-year period, or five years if this is considered to be more appropriate;
- a summary of planned transport improvements within the study area (including type of improvement, implementation schedule and sponsoring agency or highway authority);
- identify current peak periods on the adjacent road network and, as required, daily traffic flow data to and from the development site or in the vicinity of the site;
- levels for air quality and noise for the highway network at the site entrance and any other locations where statutory limits might be breached by additional development traffic;
- baseline carbon emissions data for the site, broken down by mode.

- Public Transport Assessment

  A key issue in seeking the most sustainable solution for a particular development is the need to encourage the use of public transport. An assessment should be made of the available capacity on the existing public transport infrastructure relevant to the development. The capacity of a public transport route or service is the maximum number of people that can be accommodated on the route within the licensing laws of that particular mode.

  A recommended methodology for assessing the capacity of public transport involves the following:

  - Identify the analysis period, particularly the peak hours of the development and/or the entire transport system;
  - Establish the total person trip generation from the proposed development for all travel modes;
  - Estimate the likely modal split for the public transport network (buses, rail and tram);
  - Identify the public transport services relevant to, and in the vicinity of, the proposed development;
  - Estimate the existing capacity of the bus/train/tram service by multiplying the number of services by the maximum passenger capacity for each mode (bus, train carriages);
  - Estimate the current level of patronage or usage on the public transport network, using the most comprehensive data publicly available;

- Estimate the spare capacity on the public transport network; and
- Identify measures to address any shortfall in capacity, where applicable.

- Walking and Cycling Assessment

  Another key issue in assessing the sustainability of a development's location will be its accessibility for those walking and cycling. An assessment should be made of the available capacity of the existing cycleway and footpath network in the area of the development. This assessment will help to inform the later stages of the TA process in respect of determining modal split, and travel plan objectives. It will also indicate what enhancements, if any, are required to the local cycleway and footpath network. These assessments should be undertaken using the appropriate analytical tools and methodologies, as agreed with the relevant authorities.

- Road Network Assessment

  In addition to assessing the public transport capacity and walking/cycling capacity, an assessment of the available vehicular capacity on the road network in the vicinity of the site should be undertaken in order to establish the potential impacts from the development, as well as the likely mitigation measures that may be required to sustain the development.

Consideration should be given to the available parking facilities in the vicinity of the site and the impact that development could have upon them. This assessment should be made in the context of the parking strategy set by the local planning authority.

These assessments should be undertaken using the appropriate analytical tools and methodologies, as agreed with the relevant highway authorities.

- Traffic data and Forecasts

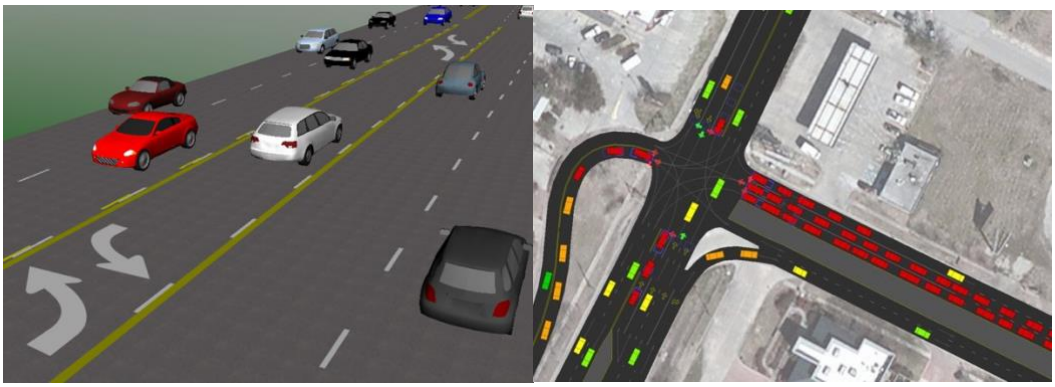
The assessment should include recent counts (normally surveyed within the last three years) for peak period turning movements at critical junctions. In certain instances, for example, where there is known to be a significant level of heavy goods vehicles (HGV) traffic, a classified count should be provided. Additional counts that may be required could include:

  - manual turning counts (should be conducted at 15-minute intervals) to identify all relevant highway network peak periods;
  - 12-hour/24-hour automatic traffic counts (ATC);
  - queue length surveys at signal junctions to establish demand and actual traffic flows;
  - journey time surveys;
  - freight counts;
  - abnormal load counts;
  - pedestrian and cyclists counts.

The traffic data should reflect the normal traffic flow conditions on the transport network (e.g. non-school holiday periods, typical weather conditions etc.) in the vicinity of the site, and should be valid for the intended purposes. It should also take account of holiday periods in tourist areas, where peaks could occur in periods that might normally be considered non-neutral. The criteria for the use of historical traffic data in a TA should be agreed by the Local Planning Authority together with the appropriate highway authority at the pre-application stage.

Where there is a need to project existing or historical traffic data for future year assessments, the preferred option is the use of appropriate local traffic forecasts (in the UK they use TEMPRO), provided they offer a robust assessment. In some cases, where available, National Road Traffic Forecast (NRTF) growth rates would be appropriate.

The use of any area-wide traffic models or background growth rates should be agreed with the Local Planning Authority in conjunction with the relevant highway authority at the pre-application stage.



- Safety Considerations and Accident Analysis

The assessment should also identify any significant highway safety issues and provide an analysis of the recent accident history of the study area. The extent of the safety issue considerations and accident analysis will depend on the scale of the proposed development and its location. The need to minimise conflicts between vehicles and other road-user groups should be adequately addressed.

Critical locations on the road network with poor accident records should be identified. This is to determine if the proposed development will exacerbate existing problems or, if proposed, whether highway mitigation works or traffic management measures will help to alleviate the problems. The accident records at a particular location should be compared with local average accident rates. Where the Strategic Road Network (SRN) is involved, it is recommended that appropriate national statistics are also used as a comparison.

Site inspections should be conducted to determine if the proposed location and design of access roads (including visibility/sight distance restrictions) would create an increased potential for accidents. Local authorities should take account of the likely effect on road safety of any modification, and should require road safety audits where appropriate.

Proposed Development

A detailed description of the proposed use or uses of the site should be provided. This should include as a minimum:

- site plan – provide plans and drawings showing site location and site layout and use;
- describe all the proposed land uses;

- scale of development – such as the number of residential units or gross floor area (GFA) of development – subdivided by land use where appropriate;
- site area in hectares;
- hours of operation – specify a weekly profile, including weekends where appropriate, over a 16 or 24 hour period. If the operation is seasonal, then this also needs to be specified;
- proposed access – describe arrangements, locations and method of linkage to existing transport infrastructure for all modes of travel (private cars, public transport, cycling, walking);
- servicing arrangements – describe routes and facilities for service vehicles;
- the traffic impacts of site construction works, including the requirements of abnormal loads in the construction, use and decommissioning of the present development;
- proposed parking strategy (number of spaces, parking accumulation, parking layout in relation to other site elements, ratio of operational to non-operational spaces, method of car park operation, overspill parking considerations, establishment of/proximity to controlled parking zones, disabled parking, motorcycle parking, cycle parking); and
- development phasing (where applicable) – provide years of first and full occupation, as well as intermediate years if appropriate.

Appraising the Impact of the Proposed Development

The following universally adopted objectives should be met:

- *Environmenta*l impact involves reducing the direct and indirect impacts of transport facilities on the environment of both users and non-users. There are ten sub-objectives, including reducing noise, atmospheric pollution (including that related to climate change and local air quality), impacts on countryside, wildlife, ancient monuments and historic buildings;
- *Safety* is concerned with reducing the loss of life, injuries and damage to property resulting from transport incidents and crime. The two sub-objectives are to reduce accidents and improve security;
- *Economy* is concerned with improving the economic efficiency of transport. The five sub-objectives are to improve economic efficiency for consumers, business users and providers of transport, improve reliability and the wider economic impacts, and get good value for money in relation to impacts on public accounts;
- *Accessibility* is concerned with the ability with which people can reach different locations and facilities by different modes; and
- *Integration* aims to ensure that all decisions are taken in the context of the Government's integrated transport policy.

Environmental Issues

The following environment issues need to be assessed:

- Nuisance to people caused by transport-related noise and vibration generated by the development;
- The emission of greenhouse gases as a result of the transport implications of the development and the impact of changes in local air quality on people;
- The transport-related impacts of the development on areas of designated landscape importance;
- Whether the site is in an air quality management zone or is likely to cause a breach of current legislation;
- The transport-related impact of the development on areas of nature conservation or biodiversity and Earth heritage interests (such as geology) where they interact with roads;
- Heritage of historic resources where they interact with development-generated transport and/or proposed mitigation measures;
- The transport-related impact of the development on the townscape;
- Appraisal of the transport-related impacts of the development on the water environment;
- The impact of the transport implications of the development on physical fitness; and
- Journey ambience.

The potential for environmental impacts that would breach a statutory limit should be addressed. If a development is likely to generate significant vehicle trips on the local highway network or Strategic Road Network, which in turn would be likely to cause a breach of statutory limits, the relevant authority could be held legally responsible if a breach were to occur. In these circumstances, the developer may be required to propose mitigation measures that will avoid such a breach. If a breach remains likely, this could be a material consideration in the assessment of the planning application and may result in the refusal of planning permission.

Therefore, where a development proposal is likely to generate significant traffic-related environmental impacts, the TA should address such matters. Alternatively, if the development requires a formal environmental impact assessment (EIA), which deals with these issues separately, this should be cross-referenced in the TA.

Safety

The safety issues that should be assessed, including and in addition to the highway accident statistics include:

- The potential for development-related or other transport accidents in the vicinity of the site; and
- Perception of personal insecurity in and around the development site.

Economy

The Economy issues that need to be addressed in the TA are:

- Government regeneration objectives (e.g. use of brownfield sites);
- Non-motorised road users' journey time;5
- Motorised road users' journey time reliability;
- User costs;
- The construction, land, preparation, supervision and subsequent maintenance costs of development proposals (including mitigation works).

In addition to public transport and pedestrian/cycle accessibility, accessibility modelling tools may be used to calculate vehicle journey times as an extension to the work undertaken by developers to address accessibility issues in their TA.

Accessibility

Developers or promoters of sites should undertake accessibility modelling to establish the level of accessibility of the site, and the results should be included within the TA. Issues to be assessed from an Accessibility perspective include:

- Access to the transport system – locating access points and links for pedestrians and cyclists to the wider transport network;
- Access to the local area – providing transport nodes or interchanges for the proposed development that will benefit other developments and the local community as a whole; and
- Community severance – ensuring that the development does not create barriers to access within the local community.

Integration

The Integration issues to be assessed include:

- The potential for the development to influence interaction among all transport modes (motorised and non-motorised), either in isolation or in combination with other developments;
- Interaction between the development proposal and wider issues of Government policy such as environmental sustainability and health;
- Integration of the development proposals with local, regional and national land use policies;
- Bringing communities together/social inclusion;
- Separating communities as a result of cutting off existing movement paths – severance/social exclusion.

Assessment Years

The assessment year(s) in respect of capacity analysis for the transport network should be consistent with the size, scale and completion schedule of the proposed development, and that of other major developments in the vicinity of the site, as well as planned improvements to the transport system.

The appropriate horizon assessment year should be agreed with the relevant authorities during pre-application consultations.

In addition to the opening year, one or two further assessment years should be considered. For the local transport network, a development should be assessed with regard to the Local Development Framework, and for a period of no less than five years after the date of registration of a planning application. Should the development take place over a longer period, it would be appropriate to extend the length of the assessment period.

For the Strategic Road Network, the future assessment year should normally be ten years after the date of registration of a planning application for the development. Should the development take place over a longer period than the horizon of the wider planning framework, a longer period of assessment will need to be agreed with the Highway Authority. The development proposal should be supported by an acceptable Transport Assessment.

The assessment years should consider person trips from all committed developments that would impact significantly on the transport network, particularly where they substantially overlap, such as at the same junctions and/or on roads as the proposed development. The committed developments will typically include development sites that have extant planning permission as well as development plan allocations in an adopted or approved plan. Developments that have been completed but not fully occupied should be included in these assessments. The inclusion or exclusion of committed developments in the assessments should be agreed with the relevant authorities at the pre-application stage.

The key issue is the need to ensure that development proposals strive to achieve nil-detriment ('no worse off') to the strategic network, for the Opening Year and appropriate Horizon (Design) Year.

Analysis Period

The analysis period should reflect the person trip generation characteristics of the proposed development, as well as conditions on the adjacent transport system. It should be related to known and anticipated peak patterns of demand both for the transport system and development-generated trips.

The TA should consider the following analysis periods:

- Weekday morning and evening peak period trips for the adjacent transport system, with particular focus on the peak period traffic flows on the road network;
- Weekday morning and evening peak period trips for the proposed development;
- An off-peak period selected to assess level of greatest change resulting from the development;

- Weekend peak period if the development is anticipated to generate significant levels of new trips at weekends or the adjacent transport system suffers from greater levels of congestion than during weekdays.

The analysis period should also include an assessment of the combination of development-related and non-development-related trips. This analysis period should be agreed with the relevant authorities at the pre-application stage.

Development Trip Generation

The first step in quantifying the impact of a proposed development on the transport system is to provide an estimate of the person trips (for all modes) that are likely to be generated by the proposed development.

In preparing trip estimates, the travel characteristics of the proposed development should be established, and this should be based on a multi-modal assessment that identifies the number of person trips by mode and time period.

To arrive at Trip Generation Rates one can use TRICS or GENERATE or TRAVL (UK) or other data such as a traffic survey, where the new development is an expansion of an existing similar use, or a survey of a similar development in the same area. Where you use TRICS or other databases, the sites you choose should be appropriate and relevant to the proposed development, and the transport assessment should clearly demonstrate this.

In all cases, analyses of development-related trips by using an appropriate database or an alternative methodology should be agreed with the relevant authorities, as this will form the major element of the TA.

For retail developments, one should normally split trips by vehicles in to different types such as:

- **New trips** – these do not appear anywhere on the road network before the development is opened
- **Pass-by trips** – these are already on the road network directly next to the proposed development and which will turn into the site
- **Linked trips** – these are trips to several different destinations, which may be within the development site or between the development site and nearby facilities (for example a trip to a supermarket followed by a trip to another shop in a nearby town centre);
- **Diverted trips** – these are trips which are already on the road network but are not currently using the existing lengths of road next to the proposed development; and
- **Transferred trips** – these are trips which are already on the road network and accessing similar developments close by to the proposed development (for example shoppers who switch from an existing supermarket to one that has newly opened).

Sometimes, it is suggested that the level of predicted vehicle trips can be reduced to reflect proposed improvements to public transport and walking and cycling facilities ('sustainable transport'). One should normally only consider a reduction where:

- The development and the transport improvements are to be delivered at the same time;

- There is a realistic prospect of people using 'sustainable transport' to the degree suggested; and
- You can clearly show in the TA that the 'sustainable transport' network will be able to accommodate the increased numbers of trips.

For any committed developments, you should use data from the transport assessment prepared for that development where it is available.

For large developments, the impact of construction traffic will require separate consideration. The assessment of construction traffic should identify the time period(s) during which construction activities will take place, the numbers of trips likely to be generated, the vehicle type and, for heavy construction traffic, an appropriate diversion route or a traffic management plan to minimise local impacts.

Trip Distribution and Assignment

There are various ways or methods that one can determine Trip distribution and Assignment associated with proposed developments and these include:

- Distribution based on existing traffic surveys;
- For expansion of an existing development, distribution based on existing occupier data;
- Distribution based on census data;
- A gravity model; or
- A traffic model.

You need to explain your methodology for distributing and assigning trips to the network. If a developer uses a traffic model, they should set out the basis for the model assignment and include the following information:

- The type of model;
- The type of assignment (that is demand or actual and AM or PM);
- The date of the model validation; and
- The allowance you made for committed development.

It is recommended that the distribution of development-related person trips be based on an appropriate methodology. These include, but are not limited to, the use of Geographical Information Systems (GIS) based census data analysis, a Gravity Model, existing traffic flow patterns, area-wide Transport Models (if available) and, by analogy, travel patterns for similar developments in the vicinity of the site.

Where a manual Gravity Model, the developer should explain the formulae they have used and the assumptions you have built into the model.

The agreed trip distribution should then be used to assign development trips to the transport network, taking due account of the impact of the various trip types.

Capacity Assessments

The highway capacity analysis should normally include at least:

- Assessments of the current road network and existing traffic situation validated against surveyed queues and delays; and
- Assessments of the road network for both base traffic and base traffic plus proposed development traffic at the year the development opens (that is when it is fully completed and occupied), a minimum of 5 years after you have submitted your final planning application, and at any time in between when the traffic situation may be worse.

The site access should normally be of a standard that will safely and satisfactorily accommodate whichever situation above gives the worst traffic impact. Where further highway works are required on the network serving the development, they should normally be to a standard that ensures traffic conditions are no worse at any time during the period than if the development had not taken place.

There may be circumstances where the improvements needed to meet the normal requirement might not be appropriate. Examples might include:

- Where the scale of the improvement would be out of balance with the capacity of the adjacent road network, taking account of any programmed improvements where appropriate;
- Cases in which the improvements would be more extensive than we would promote given local circumstances and in particular taking account of their environmental impact; and
- Cases where improvements affect lower standard roads, for example, an unclassified road.

Travel Plans

A Travel Plan is a package of measures or agreed outcomes aimed at reducing reliance on the private motor vehicle and reducing congestion. It is a process rather than a policy document. Indeed, completing the document itself is only the start of the process. A successful Travel Plan involves continuous monitoring (for example, surveys), review and improvement over time. So it does require a high level of debate about transport problems, options and future action, as well as a high-level management commitment. But where a plan is likely to deliver significant reductions in the use of private cars, this could reduce the scale of highway works required to off-set the development's traffic impacts and could, in certain circumstances, result in the need for less off-street parking.

Travel Plans (TP) form part of Smarter Choices which are techniques for influencing people's travel behaviour towards more sustainable options, such as encouraging school, workplace and individualised travel planning. They also include measures such as individualised marketing, personalised journey plans, public transport information and marketing initiatives, car sharing schemes and car clubs, plus measures that reduce the need to travel, such as video conferencing and teleworking.

TPs are becoming an increasingly important tool in the delivery of sustainable outcomes. They provide, together with transport assessments, the mechanism for assessing and managing access

to sites. In addition, they can help improve accessibility, both to and from the site, and to local amenities and services.

During the pre-application consultations the use of an area travel plan and co-ordination with Travel Plans from adjacent developments should also be considered. The use of area and site-specific Travel Plans is an important mechanism in the underlying aim to manage vehicle trips at source. Whenever a site-specific TP is proposed, the developer should ascertain the existence of an area-wide TP. Where one exists, the site-specific TP should integrate with the area-wide TP.

A Travel Plan should ordinary take into account:

- The plan's intended aims and objectives;
- The need for setting targets and what targets are appropriate;
- The need for imposing an alternative solution to targets or some form of penalty where any targets are not met and what those penalties might be;
- Long term management and co-ordination of the plan, particularly for developments occupied by a number of different organisations or residents;
- Monitoring, including establishing the baseline modal split position and assessing the long-term effectiveness of any measures;
- Establishing the current situation of public transport services (not just frequency of services, but bus-stop locations, route details and whether or not the services operate commercially or receive financial support) and the standard of provision for pedestrians and cyclists;
- The need for or likely nature of any on-site and off-site works and measures required to complement and support the plan. For employment or commercial development, you should consider measures at the pre-opening or staff-recruitment phase;
- The need for or the likely content of employee and resident transport packs (for example, time-limited free bus passes, public-transport timetables and walking and cycling maps indicating local facilities); and
- The need for any on-site or off-site parking management to complement the plan.

Traffic Impacts and Mitigation Measures

Where mitigating works and measures are required (to off-set the impact a development has on highways and transportation), these will normally be secured through planning conditions or appropriate legal agreement when Planning Permission is granted for such development planning applications. The scale and nature of the works and measures will normally determine the appropriate approach.

In the UK for example, where improvements are required to the existing road network, these are normally carried out under a Section 278 agreement of the Highways Act.

Developer Contributions

Planning plays a fundamental role in helping to ensure that the impacts of development are appropriately mitigated and that the right infrastructure is in place to support it. One of the tools used to assess the impact of developments on transport networks and the level of Developer Contributions to transport infrastructure and services is Transport Assessments.

For example in the UK Developer contributions is a collective term mainly used to refer to the Community Infrastructure Levy (CIL) and Planning Obligations (commonly referred to as 'Section 106' or 'S106' obligations after Section 106 of the Planning Act). These are planning tools that can be used to secure financial and non-financial contributions (including affordable housing), or other works, to provide infrastructure to support development and mitigate the impact of development. Section 38 and Section 278 Agreements are legal agreements that are entered into by a developer and the relevant Local Highway Authority:

- A Section 278 Agreement is a section of the Highways Act 1980 that allows developers to enter into a legal agreement with the Local Highway Authority to make alterations or improvements to a public highway.
- A Section 38 Agreement is a section of the Highways Act 1980 that allows developers to enter into a legal agreement with the Local Highway Authority to have new highway infrastructure adopted and maintained at public expense.

1.10.8 Case Study: Orange Farm Shopping Centre Transport Assessment (Johannesburg, South Africa)

Ae study investigated the impact of the additional traffic generated by a proposed shopping center on the immediate surrounding road network in Orange Farm, Johannesburg, and it determined the need for road upgrades to mitigate the anticipated traffic impact.

The proposed development was approximately 1,250 sqm in area, with a permissible height of 2 storeys and a coverage of about 65%. The road network in the immediate vicinity of the site was predominantly class 5 roads. The class 5 roads had very little vehicular traffic. For the traffic impact study, traffic counts were conducted at the neighbouring intersections during the weekday AM and PM peak period, in addition to Saturday midday period.

The expected trip generation from the development was estimated based on the South African Trip Data Manual (Committee of Transport Officials, 2012). Given the socioeconomic of the area and low car ownership, trip generation reduction factors were applied to the traffic impact study. The reduction factors were determined from the Technical Methods for Highways 17 (TMH 17) manual. The TMH 17 manual also allows for further reduction of trips for mixed use developments and transit nodes. However, in the case of this traffic impact study, the reduction factor for mixed use development and transit nodes were not applied.

Assumptions with respect to the expected trip distribution were made based on the location of the site access in relation to the surrounding road network, the existing traffic volumes, travel patterns as well as the land use nature of the proposed development. Based on the assumptions made, the impact of the proposed developmental traffic on the road network was determined. The results of the operational analysis of the intersections were compared across various

scenarios. The Traffic Impact (Transport Assessment) Study found that the impact of vehicular traffic on the road network would be very small and insignificant.

The number of customers using public transport, walking and bicycling was expected to be high. The City of Johannesburg Household Travel Survey (2013) showed that walking and mini-bus taxi are the main modes of transport in the Orange Farm area. The existing public transport stop is about 350m from the entrance of the proposed development. Thus the site is reasonable well located in terms of public transport accessibility. One of the recommendations of the Transport Assessment Study was that a taxi lay-by be implemented adjacent to the entrance of the shopping center. The traffic study also recommended that the sidewalk from the shopping center to the existing public transport stop be upgraded, while meeting the minimum standards.

(Reference: Koleko Transportation Engineering and Planning)

1.10.9 Case Study: Van Riebeeck Residential Development, Ekurhuleni Metropolitan Municipality, South Africa

Van Riebeeck is a residential neighbourhood in Ekurhuleni Metropolitan Municipality that has recently experienced a lot of crime. According to the 2014 crime statistics in Van Riebeeck Park, criminal incidents have increased by 20% as compared to 2013 statistics. In order to address this issue, the residents via the home owners association applied for road closures. A Transport Assessment Study was carried out to evaluate the impact of such road closures.

The objective of the study was therefore to evaluate the traffic impact of the proposed road closures. Based on the findings of the investigation, mitigations were proposed to minimise the impact upon the surrounding road network. The study also evaluated the impact of the proposed street closure on pedestrians and public transportation services using the streets.

The study area only comprised of Class 5 access roads. The study area was surrounded by Class 4 roads which provided accessibility to the area. The Class 4 roads had relatively low volumes ranging between 150 and 300 vehicles per hour (vph) in both directions. The proposed road closures affected approximately 45 dwelling units. Although the study area comprised of residential land use rights, educational (a school) and business (medical doctor rooms); only the residential component were affected by the road closure.

Turning movement counts were conducted at several intersections around the study area. The traffic counts were conducted during the AM and PM peak periods. Based on the traffic counts, the peak hour and the existing demand were determined. In order to make the traffic impact study comprehensive, pedestrian and public transportation vehicles (minibus taxis, buses) were also counted along with traffic counts. The geometry of the intersection, including number of lanes, lane configuration, lane widths were recorded, which forms a critical part of a traffic impact study. The intersection control type – signalised, unsignalised were also recorded during the survey.

The traffic model was built using one of the analytical software. The intersections were analysed using the Highway Capacity Manual methodology. Based on the analysis, the Level of Service (LOS) of the intersections under the existing conditions were determined. The traffic from the developments were then re-routed in the traffic model to reflect the expected traffic patterns once the street closures are in place. The Transport Assessment Study compared the intersection operations before and after the street closures. Various indicators such as LOS, volume to

capacity ratio, queues, delays, etc were used to compare the two scenarios. A horizon year scenario (2019) was also developed, based on growth in background traffic. Based on the Transport Assessment, it was found that the proposed road closure had little impact on the intersections and they continued to operate within the Highway Capacity Manual prescribed threshold.

Similarly, the impact of the road closure on pedestrians and public transportation vehicles were evaluated. According to the traffic impact assessment, it was found that the street closure would have no impact on the public transportation system. The Transport Assessment Study also found that the pedestrians were largely unaffected by the proposed road closure. It was found that in certain cases, the walking distance for pedestrians had increased, however, it was well within the National Department of Transport walking distance threshold. In conclusion, the traffic impact study found that proposed road closures would not have a detrimental effect on the road network.

(Reference: Koleko Transportation Engineering and Planning)

Module 3: Use of Transport Models in Developing Transport Infrastructure Projects.

Key Objectives of the Module:

To engage participants in Multi Modal Transport Demand Analysis for Transport Infrastructure Projects.

What is a Transport Model

Transportation modelling and simulation as interface in the planning process plays an important role in enabling spatial development. The models developed by transport planning professionals are simplified representations of reality which can be used to explore the consequences of particular policies, strategies and spatial changes. The models forecast transport demand based on expected spatial development, population and economic growth, which translates in the creation of additional trips on the road network requiring expansion or the provision of infrastructure for a variety of modes.

Transportation modelling is a young and developing science that has generally developed as part of the evolution of advancing computer technology and was originally developed to solve highway capacity problems. Many mistakes have been made in the past where inappropriate solutions were implemented – with hind sight. A classic mistake includes where new infrastructure provision is considered purely on the basis of the "predict and provide" approach resulting in infrastructure being implemented completely surplus to requirements and unnecessary. The consequence is an unpractical and unaffordable cost to government.

Advantages of using Transport Models

Transport modelling is a strong and helpful tool in the Transport Planner's tool kit that supports decisions making. The model is useful in:

- → it estimates likely land use transport interactions more quickly and at lower cost and risk than would be through implementation and monitoring or trial by error;
- → it helps planners optimise the balance between land use provision and appropriate transport infrastructure and relevant modes to enable sustained economic growth;
- → it defines the appropriate level of infrastructure required to support land use and spatial development;
- → it defines the appropriate modes of transport to connect land use;
- → Corridor studies;
- → Supporting development control policy testing;
- → Establishing how to reduce traffic congestion;
- → Establishing how to reduce fuel consumption;
- → Establishing how to improve air quality;
- → it weighs up benefits/dis-benefits of various development scenarios; and
- → it informs investment decisions by providing input into financial, economic, environmental and other relevant forms of appraisal.

Transportation models are used in a sequence of steps to answer a series of questions about future travel patterns that supports forecasting demand and ultimately planning decisions.

The following questions follow a logical sequence and inform the steps in the modelling process:

1. What will our community/city/region look like in the future?
    a. How many people will live there? (Population forecasts)
    b. What will they be doing? (Economic forecasts) c. Where will activities take place? (Land use)
2. What are the travel patterns in the future?
    a. How many trips will be made? (Trip generation)
    b. Where will the trips be? (Trip distribution)
    c. What modes will be used? (Mode split)
    d. What routes will be used? (Traffic assignment)
    e. What will be the effects of this travel? (Impact analysis)

Ultimately transportation models should help the decision maker save money, define the appropriate level of transport investment required in support of spatial changes and implement value for money transport projects, systems and operations. Most modelling work is concerned with appraisal, in the broadest sense of the word, of alternative options or designs.

The importance of transport modelling in designing PPPs

When designing PPP projects within the transport sector, for example, Toll Roads, the Developer/Concessioner should build Base Year and Future Year Transport Models. The latter should be based on an agreed Design/Future Year (normally the end of the Concession Period) to give a representation of how traffic would be in that year. The revenue from the Toll Road is calculated from the quantum of traffic using the concessioned Toll Road and it is quite critical that the Developer gets the traffic flows right since an overestimation of the level of traffic in the Transport Model on particular road links would bring less revenue. Of late there have been some court cases involving the “fitness for purpose” of some of the Transport Models developed for Concession contracts.

Disadvantages of Not Using Transport Models

Lack of the use of appropriate Transport Modelling leads to:

- Misguided investment in transportation systems that prioritize high speed mobility over local accessibility (This places all other modes of travel at a disadvantage);
- Urban sprawl;
- Under provision of Non-Motorised Transport Infrastructure;
- Commuter public transport services focused on operating mainly during the morning and afternoon peak hours, with limited inter peak services;
- High travel cost (private and public transport) – mobility and accessibility is expensive and has a high economic and social cost; and

- Rural communities often isolated and inaccessible, contributing to the inability to access opportunities and jobs resulting in perpetuated poverty.

Goals of Transport Modelling

The following overarching goals must be addressed in developing a Multi Modal Transport Model:

- Improve accessibility and connectivity of all transport modes.
- To ensure the process of regional integration is supported by a robust analysis of issues and impacts leading to reduced cost of trade.
- Ensure sustainable mobility, Improve safety and security of society and the level of service for all modes.
- Provide socially inclusive transport for all to improve the quality of life for Botswana.
- Provide an environmentally sustainable transport system.
- Stimulate competition through utilizing alternative transport modes.
- Provide an enabling environment to encourage private sector investment.
- Promote cross- border economic transactions.
- Work towards trade security.
- Promote the maritime sub sector.
- Maximize utilization of infrastructure.

Steps in Transport Planning

Before exploring what transport modelling is, it is necessary to understand the broad steps involved in transportation planning as to understand how transportation modelling fits into the overall planning process.

Transportation planning goes through a basic sequence of steps. Several can take place simultaneously and it is not unusual to repeat some of the steps (United States Department of Transportation Federal Highway Authority of Transportation. Fig. below illustrates the broad overall planning process.

Problem Definition: What is the key transportation, economic and land use issues and problems facing the community? This step may also involve definition of the size of an area to be studied,

determination of the scope of the study and the establishment of a steering committee structure or forum to oversee the planning process

Goals, Objectives and Criteria: A consensus should be developed by elected officials and citizens about the future of the community and its transportation system. Goals are developed for the quality of transportation service, environmental impacts and costs and are typically in conflict. A good planning effort will identify the trade-offs between these factors among alternatives in a clear, concise way to help make decisions.

Data Collection: Data must be compiled about the present status of the transportation system and its use. This could include traffic data, public transport ridership statistics, census information and interviews of households about their travel patterns. Data are also gathered on land use, development trends, environmental factors, and financial resources. This will help in problem definition and in developing methods to forecast future travel patterns. Good data are essential to the planning process. The statement 'garbage in/garbage out' applies in transportation planning. Without good data, the results of the planning process have little real meaning and can lead to wrong project selection and an inappropriate developmental direction for the region

Forecasting: Data from existing travel is used to make forecasts of future travel using travel demand models. This requires forecasts of future population, land use and economic conditions as well as understanding of how people make travel choices. Forecasting requires large amounts of data and is carried out under many assumptions which is based on benchmarking, sensitivity checks and follow up surveys to identify trends.

Develop Alternatives: Forecasts are used to determine the performance of alternative future land use and transportation systems. Alternatives normally include different land use and transportation patterns with different mixtures of highway and transit services and facilities. Since land use affects travel and travel affects land use, both must be considered.

Evaluation: Results of forecasts are used to compare the performance of alternatives in meeting goals, objectives and criteria. This information may be extensively discussed by interested citizens, elected officials, different government agencies and the private sector. Ultimately decisions are made by appropriate elected or appointed officials and groups.

Implementation: Once decisions are made, plans should be further developed and refined for implementation. This may include more detailed analysis for design and evaluation following a similar process as above

Assess Current Conditions

Multi- Modal Transport Model: Conduct detailed network analysis, inclusive of current and future transportation demand and current capacity of major regional, local and rural roads; domestic and international air transport facilities and connections; current railway and other possible future transport links such as pipelines, riverine and marine. The Transport Demand Model shall use a time horizon of at least 20 years with the option showing growth up to thirty years.

Study the current transport systems to understand their operational environment and suggest the plan that will improve sector performance through improved access to goods, resources and services with reliability, safety and convenience.

Ensure that travel is reliable and cost effective across the transport network and travel modes and enhance international/regional and local integration of the country in general and the economically disadvantaged areas in the country in particular.

Review and analysis of the present situation covering issues, problems, solutions, strategies and policies, for the entire country including extensive data collection on transport infrastructure covering detailed analysis of major regional, local and rural roads domestic and international air transport facilities and rail connectivity, mobility patterns, vehicle population and classifications, transport services and operation/operators and logistics services. The Consultant will be expected to carry out trade and transport facilitation assessment for the country.

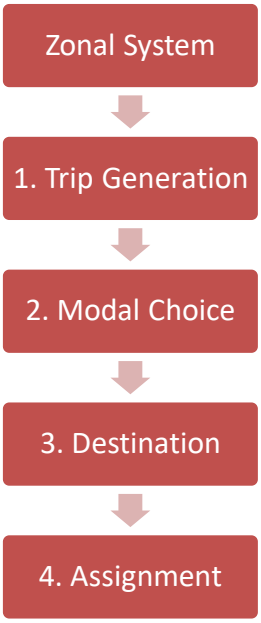
An example of the need to develop an Integrated Multi Modal Transport Model has been developed for the African Development Bank and the Government of Mauritius. It has been proposed that a Consultant be appointed to develop such a model and due to the complexities involved in Transport Model building Capacity Building will form a critical element of the technical assistance.

Transport and land use are inextricably linked. The consultant shall take into account the current and future location of major generators and attractors of transportation. The consultant must make sure that all actions are fully integrated with development planning at national, regional and local level and relate to specific policy issues regarding social development and health.

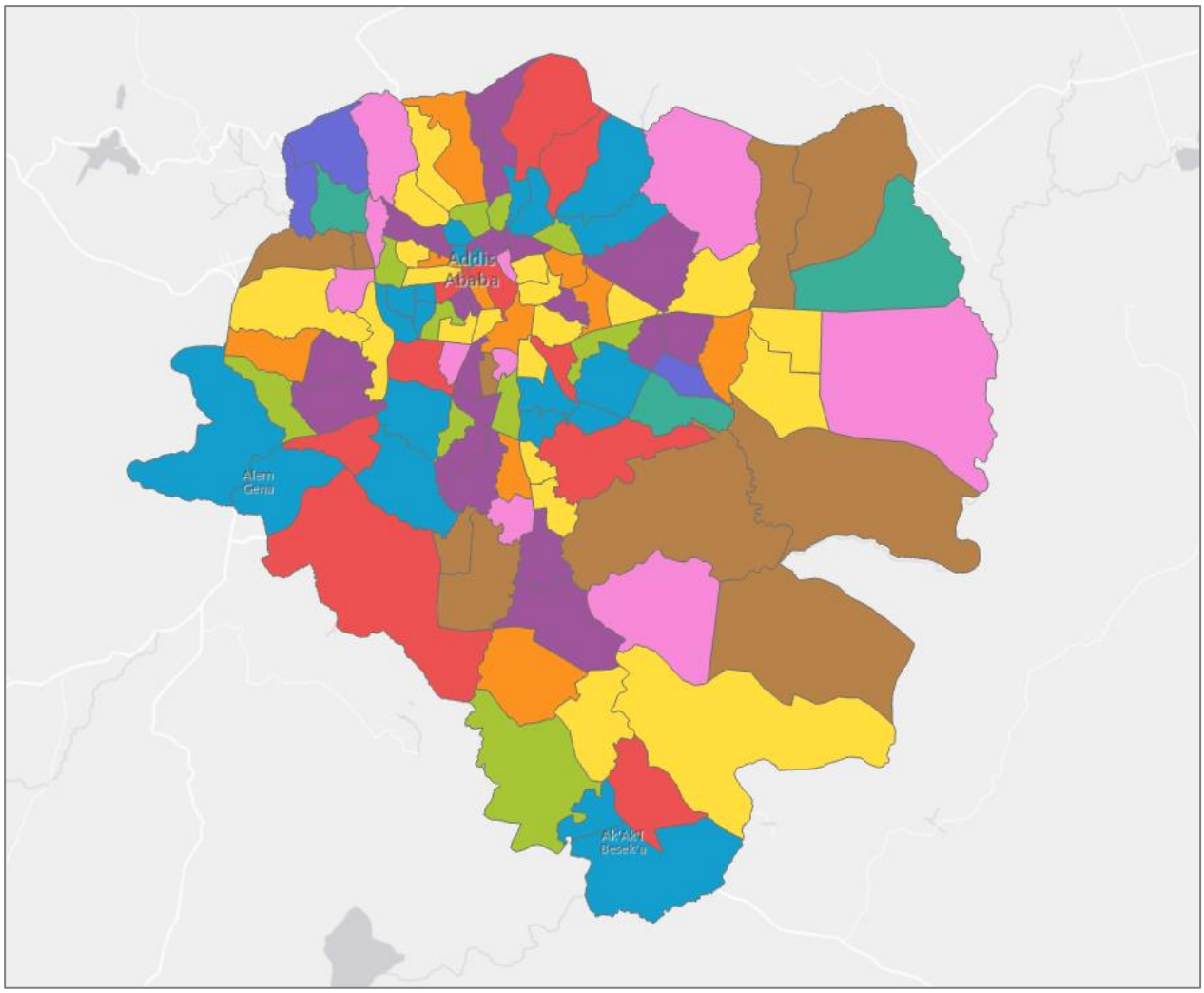
Four Step Modelling

Travel demand modelling was first developed in the late 1950s as a means to assist in highway planning. As the need to look at other problems and issues arose, the transportation modelling process was modified subsequently to add additional techniques to deal with these problems.

Typically Four-Step Transport Model Structure:



Zonal System: Travel simulation require that an urban area or region be represented as a series of small geographic areas referred to as travel analysis zones. Zones are characterized by their population, employment and other factors and are the places where trip making decisions are made (trip producers) and the trip need is met (trip attractors). Trip making is assumed to begin at the centre of activity in a zone (zone centroid). Trips that are very short, that begin and end in a single zone (intrazonal trips) are usually not directly included in the forecasts. This limits the analysis of pedestrian and bicycle trips in the process. Zones can be as small as a single block but typically are 1/4 to one mile square in area. A planning study can easily use 500–2000 zones. A large number of zones will increase the accuracy of the forecasts but require more data and computer processing time.



Woreda Based Zone System in Addis Ababa

Zones tend to be small in areas of high population and larger in areas of low density and population. Internal zones are those within the study area while external zones are those outside of the study area. The study area should be large enough so that nearly all (over 90%) of the trips begin and end within the study area. The trips that do not begin or end within the study area but travel through it is considered to be through traffic.

The areas outside the study area which contribute traffic to the study area is defined as external zones. The zones do not just represent areas adjacent to the study area though they represent the “rest of the world”.

Trip Generation: The first step in travel forecasting is trip generation. In this step information from land use, population and economic forecasts are used to estimate how many trips will be made to and from each zone. This is carried out separately by trip purpose. Some of the trip purposes that could be used are: home based work trips (work trips that begin or end at home), home based shopping trips, home based other trips, school trips, non-home based trips (trips that

neither begin or end at home), truck trips and taxi trips. Trips are calculated based on the characteristics of the zones. Trip productions are based on household characteristics such as the number of people in the household and the number of cars available.

For example, a household with four people and two cars may be assumed to produce 3.00 work trips per day. Trip attractions are typically based on the level of employment in a zone. For example, a zone could be assumed to attract 1.32 home-based work trips for every person employed in that zone. Trip generation uses trip rates that are averages for large segments of the study area. In South Africa, the following sources are used providing empirical estimates of trip generation per trip purpose or land use type:

- South African Trip Generation Rates Manual;
- Technical Methods for Highways (TMH) 17, Trip Data Manual; and
- Institute of Transport Engineers (ITE), Trip Generation Manual.]

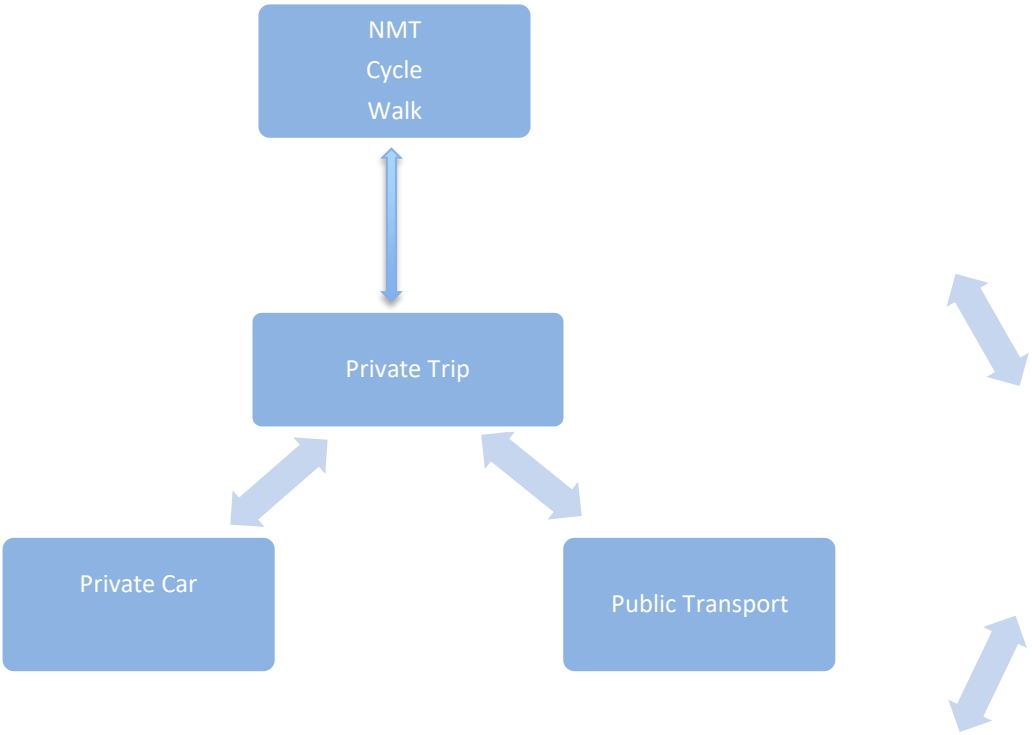
In the UK the TRICS (Trip rate Information Computer System) database is used.

Trip Distribution: Trip generation only finds the number of trips that begin or end at a particular zone. The process of trip distribution links the trip ends to form an origin destination pattern. Trip distribution is used to represent the process of destination choice, e.g. “I need to go shopping but where should I go to meet my shopping needs?” Trip distribution leads to a large increase in the amount of data which needs to be dealt with. Origin–destination tables are very large. For example, a 1200 zone study area would have 1,440,000 possible trip combinations in its O–D table for each trip purpose. The most commonly used procedure for predict trip distribution is gravity modelling. The gravity model takes the trips produced at one zone and distributes to other zones based on the size of the other zones (as measured by their trip attractions) and on the basis of the distance to other zones.

A zone with a large number of trip attractions (say a large shopping centre) will receive a greater number of distributed trips than one with a small trip attraction (a small shopping centre).

Distance to possible destinations is the other factor used in the gravity model. The number of trips to a given destination decreases with the distance to the destination (it is inversely proportional). For example, you would expect more trips to a nearby shopping centre than one further away. The distance effect is found through a calibration process which gives travel times to destinations from the model similar to that found from field data. “Distance” can be measured in several ways. The simplest way this is carried out is to use car travel times between zones is as the measurement of distance.

Modal Choice/Split: Mode split or mode choice is one of the most critical parts of the demand modelling process. It is the step where trips between a given origin and destination are split into trips using public transport, trips by car pool or as car passengers and trips by car drivers.



All proposals to improve public transport or to change the ease of using the cars are passed through the mode split/car occupancy process as part of their assessment and evaluation. It is important to understand what factors are used and how the process is conducted in order to plan, design and implement new systems of transportation. Mode split is carried out by a comparison of the "disutility" of travel between two points for the different modes that are available. Disutility is a term used to represent a combination of the travel time, cost and convenience of a mode between an origin and a destination.

Mode split and car occupancy analysis can be two separate steps or can be combined into a single step, depending on how a forecasting process is set up. In the simplest application, a highway/public transport split is made first which is followed by a split of car trips into car driver and car passenger trips.

Trip Assignment: Once trips have been split into highway and public transport trips, the specific path that they use to travel from their origin to their destination must be found (Chiu et al. These trips are then assigned to that path in the step referred to as traffic assignment. Traffic assignment is the most time consuming and data intensive step in the process and is performed differently for highway trips and public transport trips. The process first involves the calculation of the shortest path from each origin to all destinations (usually the minimum time path is used). Trips for each O–D pair are then assigned to the links in the minimum path and the trips are added up for each link. The assigned trip volume is then compared to the capacity of the link to see if it is congested. If a link is congested the speed on the link needs to be reduced to result in a larger travel time on that link. When speeds and travel times are changed, the shortest path may

change. Hence the whole process must be repeated many times (iterated) until there is an equilibrium between travel demand and travel supply.

Trips on congested links will be shifted to uncongested links until this equilibrium, condition occurs. There are a variety of ways in which the calculations are carried out to reach network equilibrium, in order to keep the computer time to a minimum. One way to get a feel for the accuracy of the models is to look at the resulting speeds on the network. These should be realistic after equilibrium.

Public transport trip assignment is carried out in a similar way except that public transport headways are adjusted rather than travel times. Public transport headways (minutes between consecutive vehicles) affect the capacity of the public transport route. Low headways mean that there is more frequent service and a greater number of vehicles. Public transport supply and demand are also recalculated to reach equilibrium between supply and demand.
Another important step in assignment is the time of day analysis. Daily trip patterns need to be converted to peak time period traffic. A key assumption needed is the portion of daily travel that occurs during the peak period. This is normally used as a constant and conventional travel models have very limited capability to describe how travellers will shift their trips to less congested times of the day. Some of the assumptions in traffic assignment are as follows:

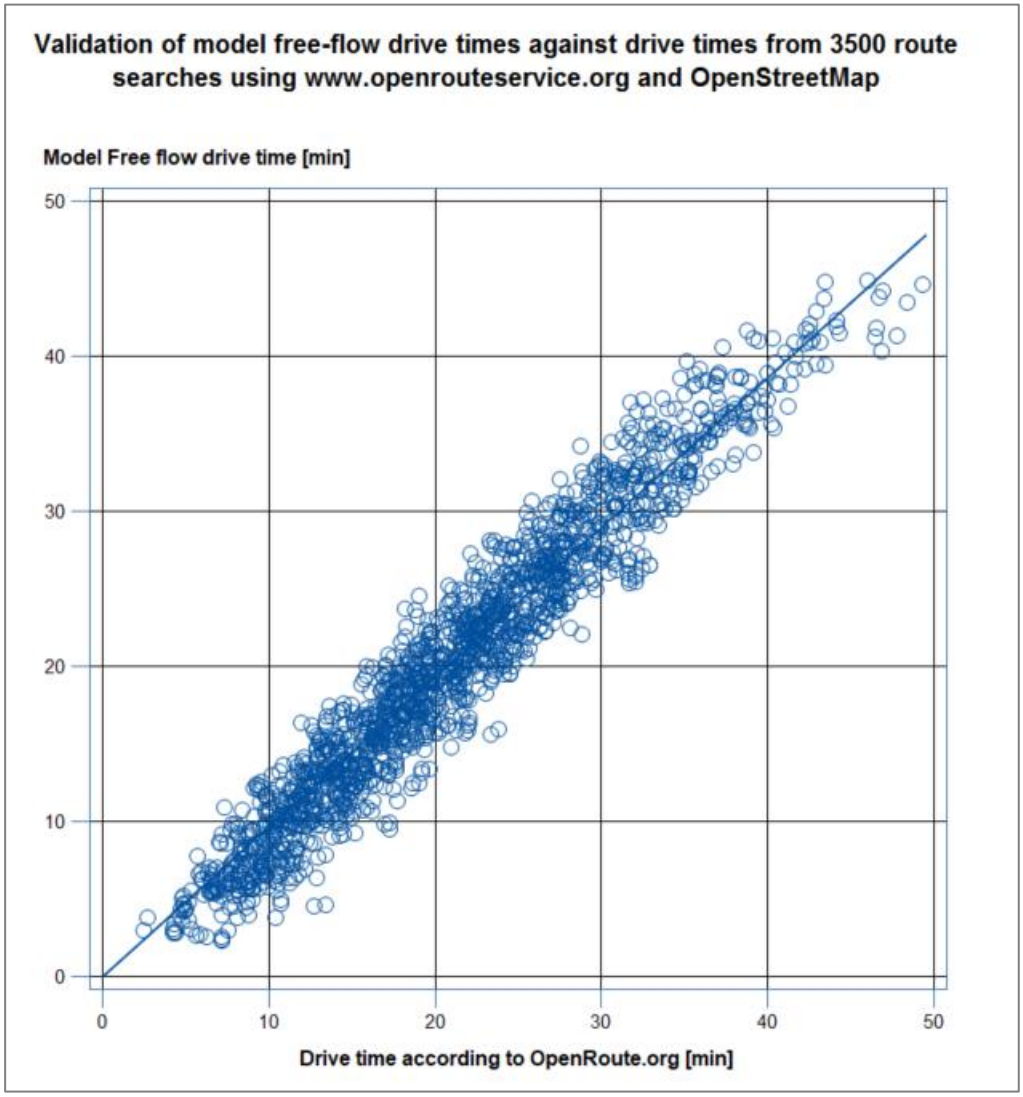
- Delay occurs on links: Most traffic assignment procedures assume that delay occurs on the links rather than at intersections.
- Travel only occurs on the network: It is assumed that all trips begin and end at a single point in a zone (the centroids) and occurs only on the links included in the network. Not all roads streets are included in the network nor all possible trip beginning and end points included. The zone/network system is a simplification of reality.
- Capacities are simplified: To determine the capacity of roads and public transport systems requires a complex process of calculations that consider many factors. In most travel forecasts this is greatly simplified.
- Time of day variations: Traffic varies considerably throughout the day and during the week. The travel demand forecasts are made on a daily basis for a typical weekday and then converted to peak hour conditions. Daily trips are multiplied by a “hour adjustment factor”, for example 10%, to convert them to peak hour trips. The number assumed for this factor is very critical. A small variation, say plus or minus one percent, will make a large difference in the level of congestion that would be forecast on a network. Most models are unable to represent how travellers often cope with congestion by changing the time they make their trips.
- Emphasis on peak hour travel: As described above, forecasts are carried out for the peak hour. A forecast for the peak hour of the day does not provide any information on what is happening the other 23 hours of the day. The duration of congestion beyond the peak hour is not determined. In addition, travel forecasts are made for an “average or typical weekday”. Variations in travel by time of year or day of the week are usually not considered.

Model Calibration and Validation

Model calibration is the adjustment of constants and other model parameters in estimated or asserted models in an effort to make the models replicate observed data for a base year or otherwise produce more reasonable results;

Model validation is the application of the calibrated models and comparison of the results against observed data; ideally, the observed data are not the same data used for model estimation or calibration.

Model calibration and validation generally occur in an iterative fashion. Model validation may reveal the need to return to the model estimation or model calibration steps. The application of the model using future year conditions requires that the model forecasts are reasonable and consistent with expectations and also might reveal a need to return to the model estimation or calibration step.



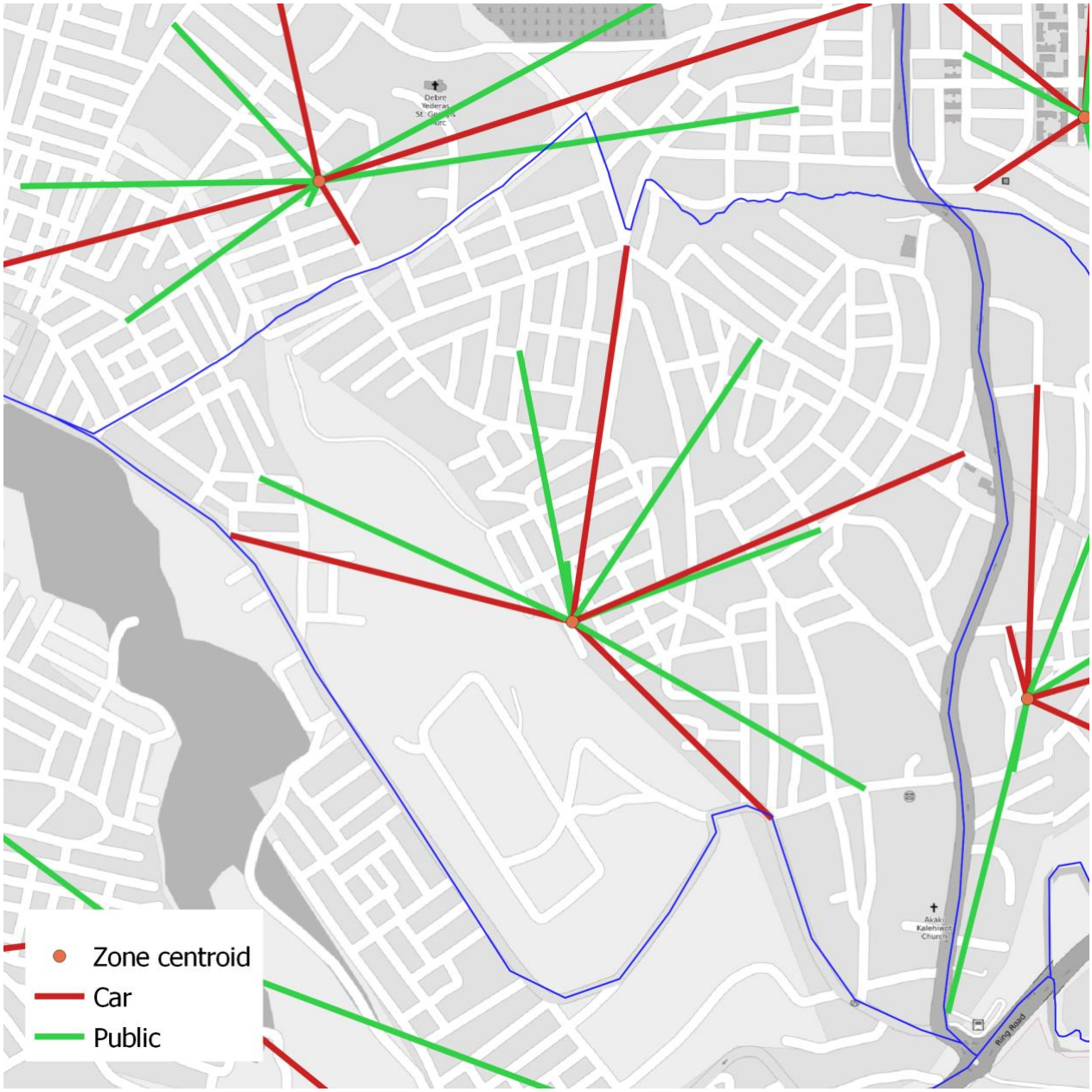
Validation of model free-flow drive times against drive times from OpenRouteservice.org

Main Elements of a Transport Model

The main elements of a transport model are as follows:

- **nodes** – intersections;
- **links** – segments of the road network;
- **transport zones** – sources and goals of correspondence improvement;
- **connectors** – they connect the centers of transport nodes to the individual and public transport network.

In public transport systems, the above elements are supplemented by public transport stops and lines.



Public and Car/Private connectors connecting the network to zone centroid

New data/Traffic Surveys

To develop a Transport Model a set of traffic and socio-economic data is needed:

(a) To assist in the development and calibration of a computerized transport demand model;

(b) To provide up-to-date information so that accurate engineering and planning analysis may proceed;

(c) To document current transport demand among the various transport modes and facilities existing in the area; and

(d) To establish quantitative as well as qualitative interactions among transport, planning, economic, social and environmental sectors.

The surveys typically undertaken are:

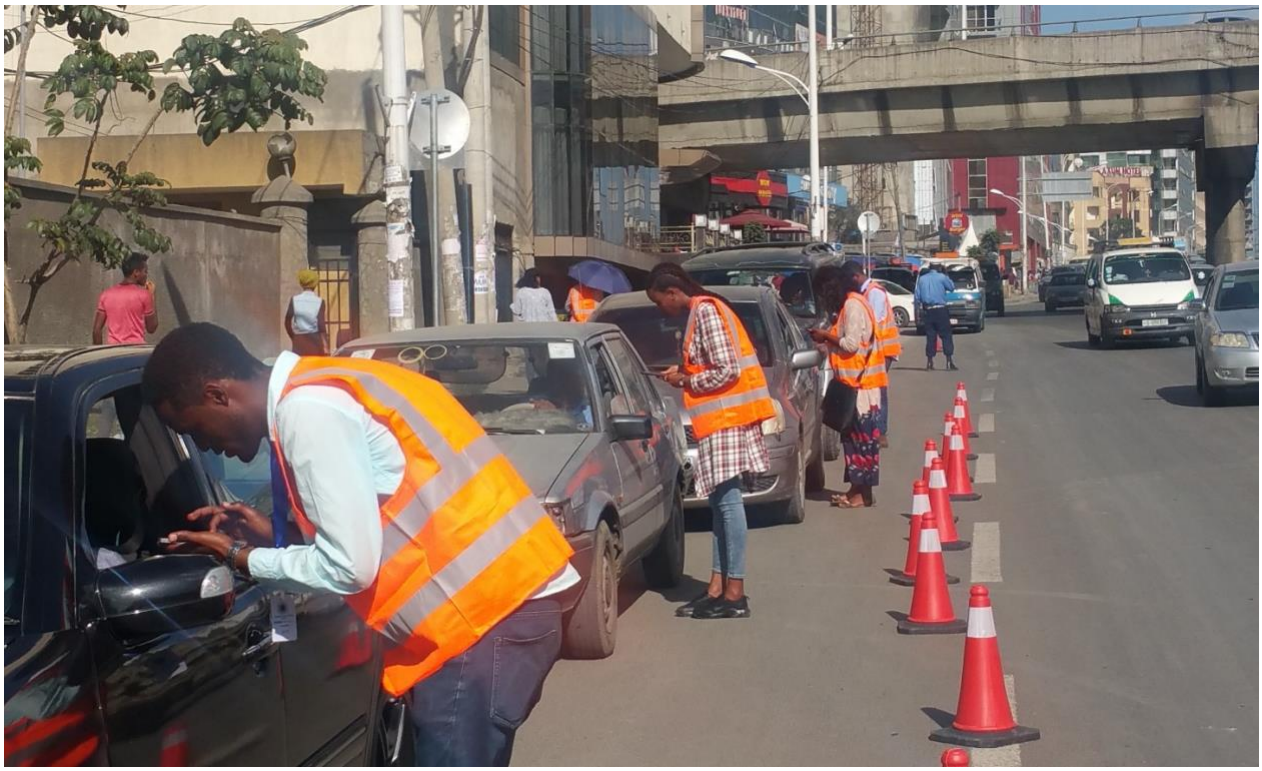
Household Interview Surveys (HIS): he HIS is seen as the "backbone" of model development and consists of interviews involving a number of households at an agreed sample size within the study area. Each member of the household is asked a series of questions relating to household characteristics, persons characteristics and trip characteristics. In addition, subsidiary surveys can be conducted with additional, focused questions relating to trip preferences, environmental concerns and opinions on transportation problems, possible solutions and policies.

Roadside Interview Surveys (RSI): The monitoring of trip demand is an important element of the model building process, thus, a series of interrelated and mutually supportive traffic surveys need to be conducted from identified locations over agreed time frames. The questionnaire for this survey will contain questions about the current trip, questions about the respondents and their households such as income, household structure, car availability, and so on. Some basic trip/journey questions would include: where are you coming from (origin address), what were you doing there (origin purpose); where are you going to (destination address), what will you be doing there (destination purpose).

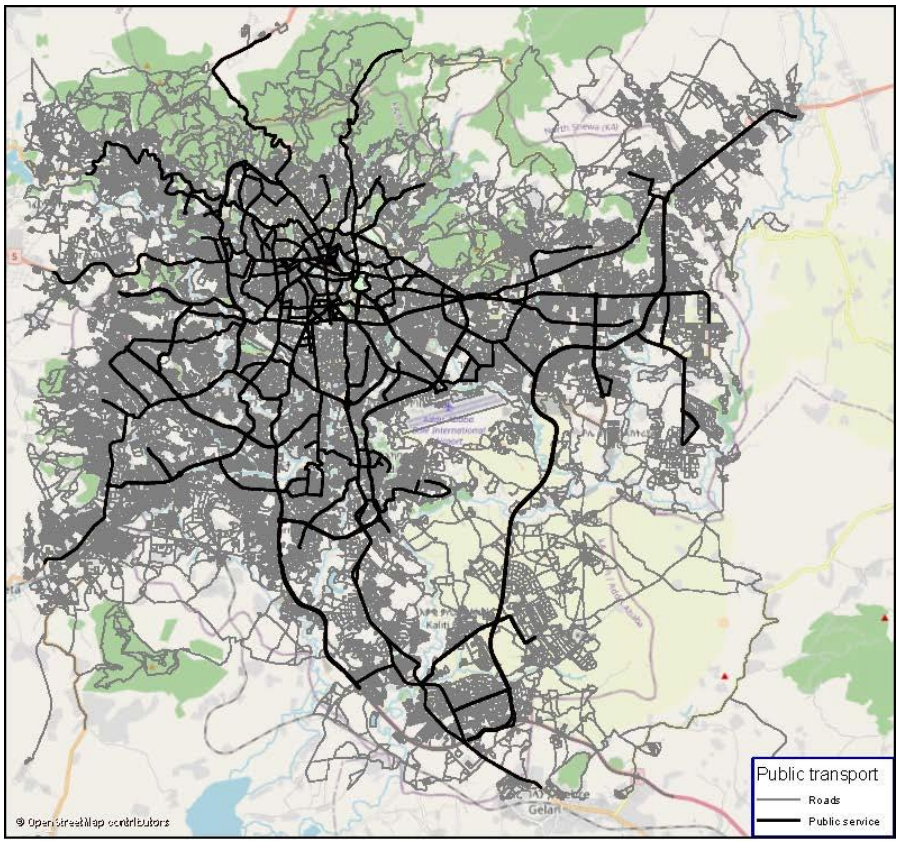
Manual Classified Count Surveys (MCC): This questionnaire will be designed to include all vehicle types (e.g., Motorcycles, Cars, Jeeps & Buses, Luxury Buses, Light trucks; and heavy trucks). Depending on the traffic condition, a survey location may have two or more enumerators counting different type of vehicles. For example, we could have one enumerator counting only cars, and the other counting other vehicles (buses, goods or other vehicles). This means separate forms have to be designed for this purpose.

Automatic Traffic Counts (ATC): This involves counting vehicles automatically at each survey site to enable a full daily profile of traffic to be established. Depending on the resources available the counting can done either manually or using automatic counting equipment. The data will be used to expand the 12 hours traffic to 24 hours and also to account for the variations in traffic across the day. Where resources permit, this survey will be conducted continuously for seven days to also account for variations in traffic across the week.

Personal Interview Survey (PI): This will be similar in content to RSI, except that the respondents will be asked about their reference trip, which is usually the latest trip they have made. It will be conducted at key traffic generators such as schools, hospitals, government departments etc.



Road Side Interviews (RSI): Modal patterns, preferences and trip relationships for public transport users are ascertained via interviews conducted at selected terminals/stations.



Public Transport System-Addis Ababa

Freight Vehicle Surveys: The flow of cargo to/from an area, as well as within an area, is of vital importance to any strategy involving commercial vehicles and the facilities used in cargo processing. Thus, in addition to analysis of available data, interviews were conducted which focus on truck owner characteristics, trip patterns as well as opportunities and constraints.

Vehicle Travel Speed Surveys: A series of arterials or main road links can be identified, and vehicle operating speeds determined. These surveys, conducted during varying periods of the day, measure speeds of vehicles operating in mixed traffic.

Road Condition Surveys: The general content of major roads (such as number of lanes, carriageway width, roadside friction, traffic signal control, etc.) can be ascertained via a review of available records, plus focused field investigations.

Transport Network Surveys: As a sister-survey to the road condition survey, the network survey focuses on public transport systems. Results of both the road condition and transport network surveys provide considerable inputs toward the development of road and public transport networks within the framework of the transport model.

Stated Preference Surveys: This survey will be designed to collect all relevant information that do not exist or are difficult to collect using the above survey methods. Some of this information includes user's perception of toll roads, value of time, willingness to pay, and value of different tolling methods (close or open) and so on.

Selecting a Transport Model

When selecting a model, the user should begin by defining the requirements of the exercise to be undertaken and the resources required. The requirements that should be defined include:

- What input variables are required, and to what level of detail?
- What output variables are required, at what level of detail and in what form (e.g. on screen results or graphics and results to "come alive" where the movement of cars are observed on screen)?
- Geographical coverage (will a single intersection be simulated, a number of intersections or an entire suburb?);
- Constraints of time and money;
- Is it possible to buy new commercially available software or should new software or processes be developed? and
- Determine whether new data can be collected.

Types of Transport Models

Specific types of transport model include:

- Transport models (three or four stage) EMME, TRACKS, VISUM, CUBE, TRANSCAD, TRANSIM;

- Assignment models (single stage) SATURN, CONTRAM, VISSIM, AIMSUN, PARAMICS, SISTM; and
- Operational models (traffic engineering) TRANSYT, SIDRA, LINSIG, OSCADY, ARCADY, PICADY, Operational spreadsheet models.

The main use of 'conventional' transport modelling is in the evaluation of transport network improvement options. However, for some test purposes, especially those involving significant changes to current policies and strategies, transport models are limited and additional techniques, such as simplified modelling, may be required.

Review Intermodal Options to respond to future Transportation demands

Define potential intermodal options to satisfy the generated analysis and undertake an analysis, both financial and economic, showing the benefits of each. Based on this work, recommend the most efficient manner in which to respond to the future demand, including the current infrastructure and identifying, broadly, changes in future land use planning and infrastructure expansion.

2. Enhance integration and improve connections between modes through infrastructural and technological initiatives.

3. Prepare financial cost and cost benefit analysis for the options and for the adopted final alternative, presented in multi-horizons fashion (short, medium and long term) and in unconstrained and constrained budgetary situation, analyse the financial gaps and propose options for their solutions. Special attention will be paid in use of Public Private Partnership (PPP), which options will be also analysed and presented.

4. The consultant will take into account the needs and participation of the private sector as well as the public sector, to accommodate both transport service providers and consumers. The private sector will increasingly become a major source of funding. The consultant should understand that the government role is to leverage private sector investment through judicious sector management and financing as a result the projects and measures funded by the private sector are also to be included.

1.10.10 Case Study: Greater Gaborone Transport Model

Background to the Study

The need for the study was identified by the Greater Gaborone Multi-Modal Transport Study (GGMMTS) which recommended improvements in traffic management; parking; Non-Motorised Transport (NMT) facilities; safety; public transport; inter-modal coordination; urban distribution of freight; international logistics; institutional strengthening; and the creation of a Project Implementation Unit. The Government of Botswana sought to improve the overall management of the transport sector through the Botswana Integrated Transport Project (BITP) that was World Bank funded and, which in turn sought to enhance the integration of transport subsectors with other sectors of the economy and to revamp/modernise the entire transport system.

The Study catchment Area

The area covered by Greater Gaborone is essentially the region within a radius of 80 km around Gaborone City. This area encompasses Lobatse, Kanye, Moshupa, Molepolole and Mochudi, and also includes Tlokweng and Mogoditshane as well as the smaller villages that lie in between.

In addition to the three corridors identified by the GGMMTS, two additional corridors linking the city to its suburbs and surrounding towns and villages have been identified. The five radial corridors are:

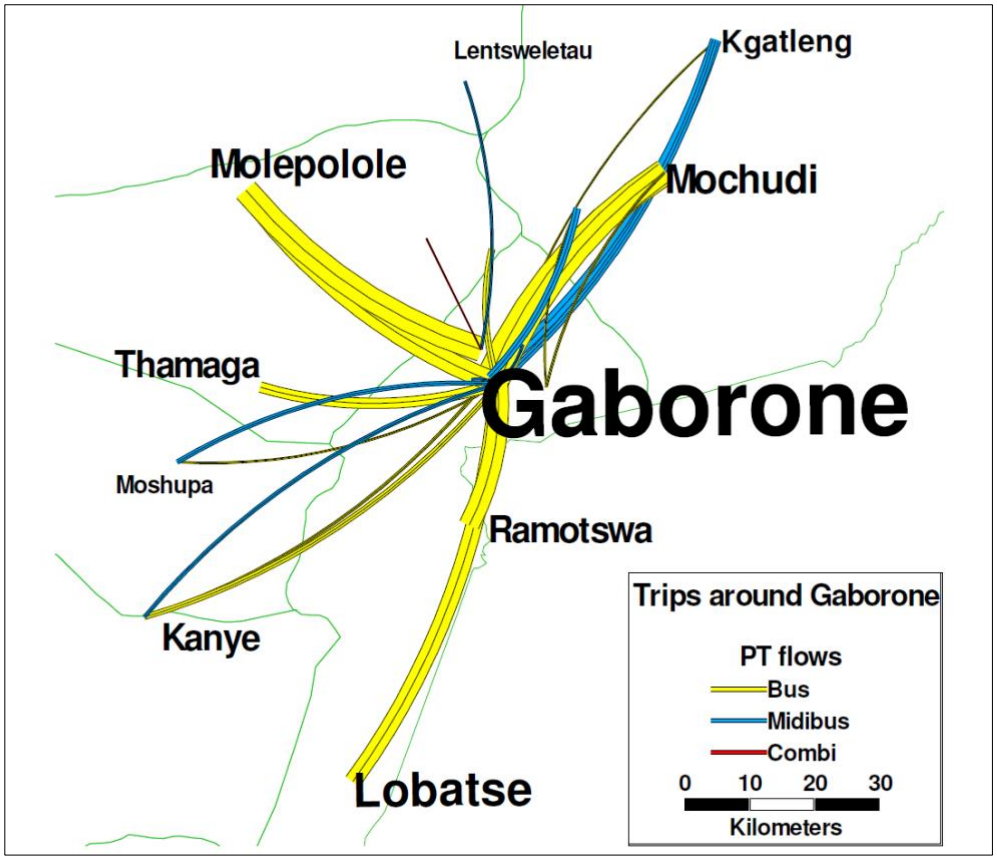
- the northern corridor which serves small towns and villages along the A1, to the north-west of Gaborone, including those in the Mochudi Planning Area[3] (namely Mochudi, Bokaa, Morwa, Pilane, Rasesa and Malotwane villages), and others such as Oodi, Matebeleng, Mmamashia and areas in between;
- the north-western corridor which serves the built-up areas of [4]Mogoditshane, Metsimotlhabe, Mmopane and Ledumadumane to the immediate west and north-west of Gaborone; and extending all the way to Molepolole;
- the western corridor which serves the southern parts of Mogoditshane, Gabane, Kumakwane and extends all the way to Kanye;
- the southern corridor serving the Kgale Hill area, Mmokolodi and Tloaneng to the immediate south-west of Gaborone, and extending south-west along the A1 to Ramotswa, Boatle, Taung then further to Otse and Lobatse; and
- the eastern corridor serving Tlokweng and Modipane.

The main issue associated with travel along these key routes is traffic congestion in the city, mainly occurring during the morning and evening peak periods and is most severe on Willie Seboni Road, Gaborone/Molepolole Road and Gaborone/Kanye Road.

Project Objectives

The primary objective of this Assignment is to develop for Ministry of Transport &Communication concrete interventions and a detailed implementation plan for the proposed bus based transport network in Greater Gaborone. In particular the Study proposes a public transport system that will reduce traffic congestion, delays, accidents, increase reliability and hence improve traffic flows.

[3] Mochudi Planning Area Development Plan (2007-2031), Kgatleng District Council, Botswana, October 2008
[4] Mogoditshane, Gabane, Metsimotlhabe, Mmopane, Mmokolodi and Tloaneng Development Plan (2001-2025), Kweneng District Council, Mogoditshane Sub-land Board, January 2006



Daily Public Transport Passenger Trips around Gaborone and surrounding towns

Source: : ALG, based on ITPS 2009

.Other study objectives include the examination of public transport choices between conventional buses with or without DBLs, BRT, Park and Ride and bus priority schemes, as well as an analysis of the current status of the bus network and recommendation of critical measures for improvement. The study also examines ways of integrating small and medium players in the transport industry and evaluates the risks involved. The critical area of intervention is the Private Sector involvement through PPPs.

Transport Model Development

Traffic Surveys

A survey of public transport bus and passenger movements was carried out in November-December 2014. The traffic surveys focussed mainly on outward movements from Central Gaborone and Game City to other places; it did not consider inward movements, or passengers boarding midway along a route, as well as external movements, i.e. those movements between places outside central Gaborone. Also there are some routes which were not captured in the survey such as Broadhurst Routes 1 and 2 where combi drivers resisted the surveys that were being conducted.

Travel patterns and characteristics have been determined from the results of public transport (bus and taxi) surveys, roadside interview surveys (by car) and journey time surveys (by car). Trips by bus are mainly for travel from home to/from work and for education, and to a lesser extent for shopping and personal business. Cars are mainly used for travel to/from work and for

personal business, and to a lesser extent for shopping and visiting friends and relatives. Taxis are mainly used for work and shopping trips and to a lesser extent for personal business, visiting friends and relatives and for education. As cars are mostly used for work trips, it means they spend most of the day parked at work. This presents a potentially good market for the provision of an attractive bus system together with Park and Ride.

Almost 60% of people travelling by bus boarded two buses to get to their destinations, whilst forty percent caught one bus. A negligible proportion of bus users took three or four buses to reach their destinations. A large majority of travellers would therefore benefit from through routing and ticketing.

Eighty percent of all people travelling either by bus, car or taxi, earn up to P20,000 per month; 20% earn more than that. 15% of bus users, 10% of taxi users and 7% of car users earn P2,000 or less.

The table below shows counts of passengers boarding buses at various interview sites over a 12 hour period. The Molepolole corridor recorded the highest number of bus boardings (17,344) over a twelve-hour period, followed by the A1/Nelson Mandela (north) corridor, Game City, Gabane and Tlokweng corridors.

12-Hour Bus Boarding Count by Corridor (06:00 to 18:00)

Corridor	North	Molepolole	Gabane	Game City	Tlokweng
Totals boarding	15,634	17,344	8,586	10,491	8,090

Source: CPCS

In terms of household vehicle ownership among bus, car and taxi users, more than 40% of bus and taxi users come from households with no vehicles owned. However, for car users, almost 50% of them come from households which own one vehicle; only 11% come from households with no vehicles owned, whilst the remainder come from households with 2 or more vehicles.

Person Trips by Mode

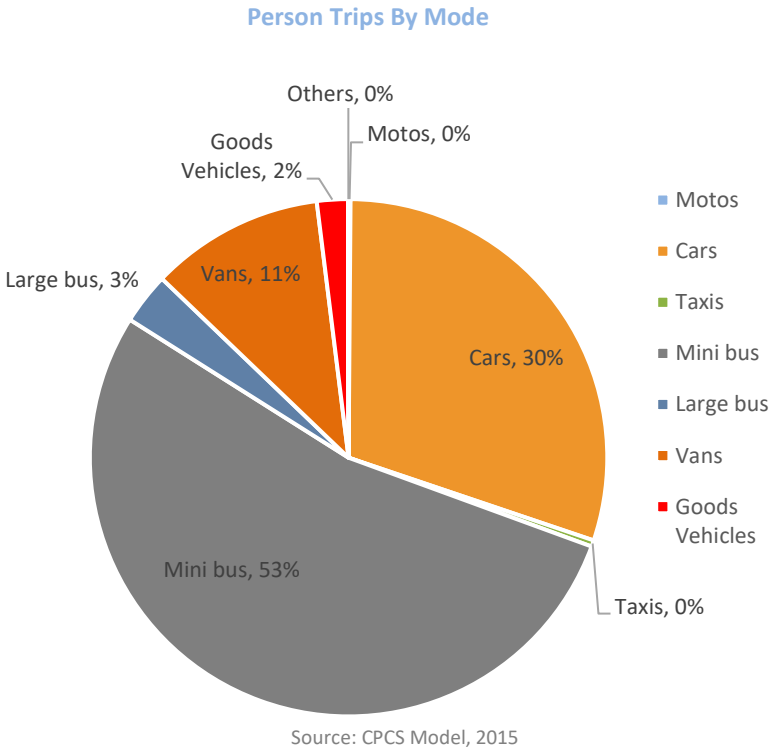
Assumed vehicle occupancies are shown below and these are used to derive the person trips split by vehicle type from the manual classified counts:

Assumed Occupancy Rates for Various Modes

Vehicles	Average Occupancy
Motorbikes	1
Taxis	1
Car	1.2
Goods	1

Minibus	16
Large Bus	20

Source: CPCS Model, 2015



Source: CPCS Model, 2015

The chart above shows that the minibus carries more than half (53%) of the passengers encountered on the roads, whilst larger buses carry 3% of the passengers, assuming the occupancy factors given above. Although minibuses constitute a small proportion of traffic on the roads (8%) they contribute substantially to the movement of people in and around Gaborone.

The Transport Demand Forecast Model

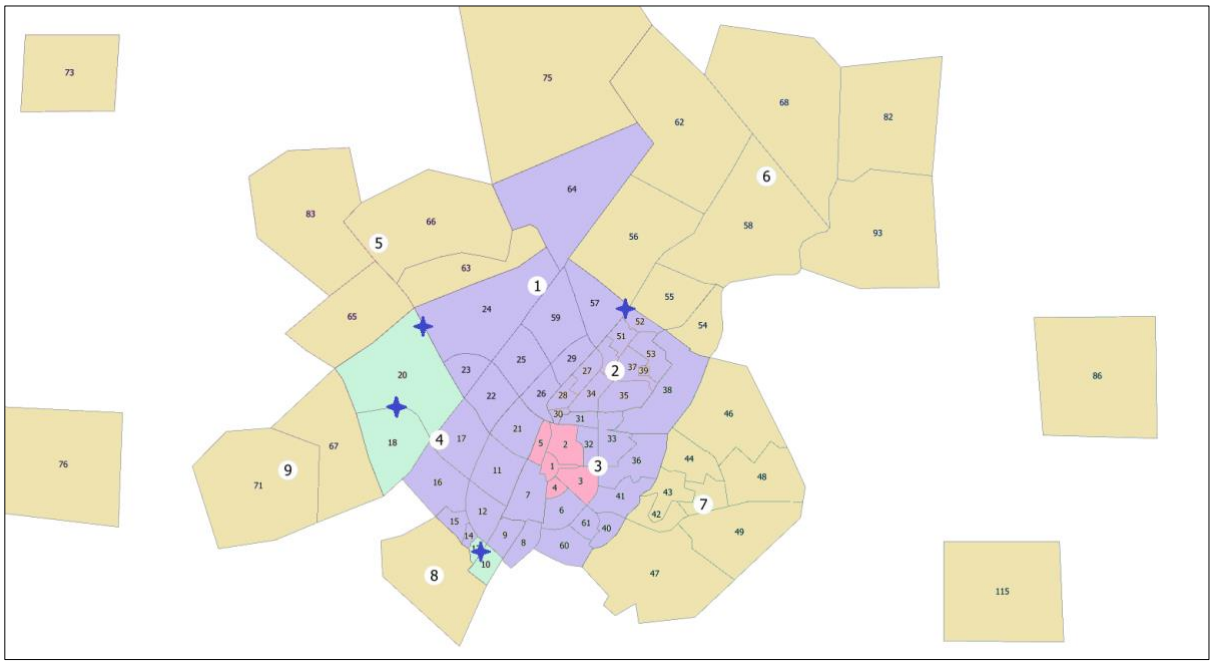
Origin-destination (O-D) bus surveys were undertaken in November 20145 [5] and were used to develop trip matrices to model public transport patronage on the existing combi routes within Gaborone and the long distance routes. A TransCAD transport model of Gaborone which had been developed prior to the current study, was interrogated but could not be run. However, the TransCAD network was transferred to a Visual-tm modelling platform for the current study. The Visual-tm modelling platform was developed by Peter Davidson Consultancy of the UK who were sub consultants to this project and provided all the transport modelling work.

Bus routes that have been proposed in this study, were coded into the Visual-tm model to replace the current services and the current demand matrix was assigned to the network. The proposed bus service consists of a set of Frequent Core routes and Frequent Local routes to absorb a significant proportion of the total travel demand, plus "Coverage" routes to fill in the gaps.

The figure below shows the Zoning system that was developed as part of the Transport Model.

[5] 12324 Study for the Implementation of an Improved Metropolitan Public Transport System for the Greater Gaborone Area, Field Traffic Surveys Report, by CPCS, November 24, 2014.

Zones and Sectors Used in the Gaborone Transport Model



Notes:

The blue stars indicate tentative sites for Park and Ride carparks.

Zones are represented by small numbers; sectors are represented by large numbers.

Zones have been coloured as follows:

Pink : car drivers cannot use PnR, parking charges apply;

Purple : car drivers cannot use PnR;

Brown : car users can use PnR if travelling to pink zones;

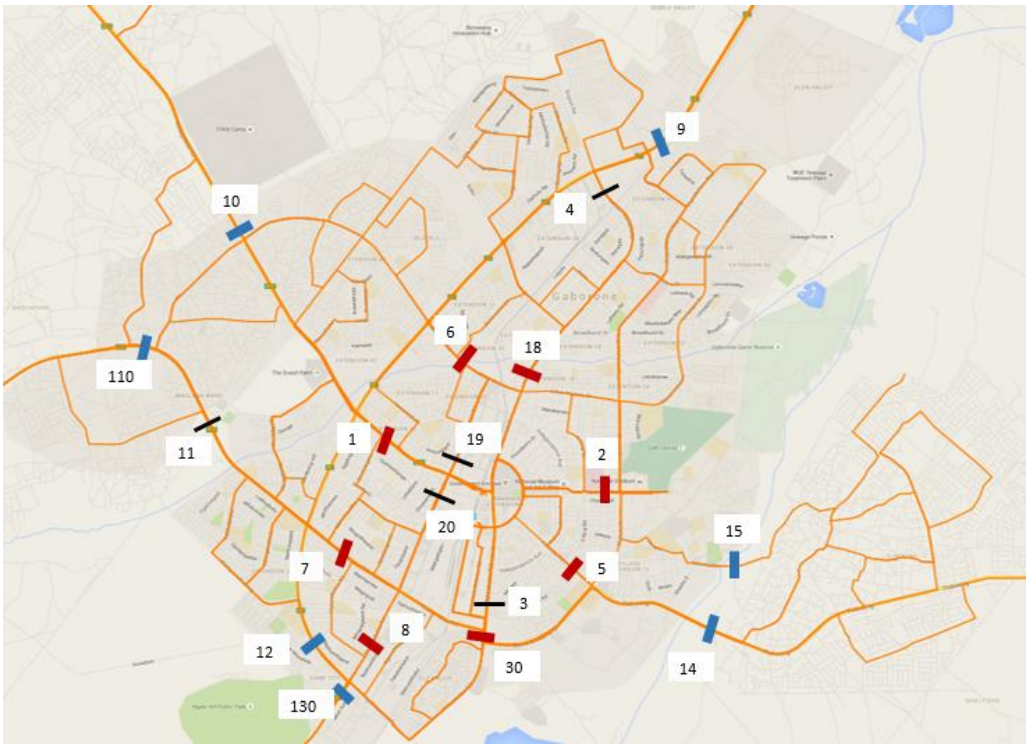
Green : additional zones where car users can use PnR if travelling to pink zones

Source: CPCS Model, 2015

Modelling work was carried out initially on the assumption that no parking restraint was in place in the city centre, but with Park and Ride provided at the periphery of the city's built-up area. Four Park and Ride sites were modelled with unlimited capacity and no parking charges at the edge of the city. The model ensured that passengers using Park and Ride could only board the buses at the designated sites. Before running the choice model, it was adjusted to only allow for journeys from sectors 5 – 9 to zones 1 – 5. This was to prevent unrealistic journeys, i.e. outbound journeys from the centre.

The map presented below shows outer cordon sites (9, 10, 12, 14, 15, 110 and 130) as well as inner cordon sites (1, 2, 5, 6, 7, 18 and 30) where Park and Ride flows were modelled.

Outer and Inner Cordons where Park and Ride Flows were observed



Source: CPCS Model, 2015

A model of the existing minibus routes was developed, onto which the proposed bus routes were superimposed as shown in the above map. It was then run to reproduce bus flows to match existing minibus passenger flows, together with potential Park and Ride passengers. The figures for Park and Ride are a result of the availability and attractiveness of a faster high quality bus service as well as the Park and Ride facility.

Park and Ride Forecasts with Parking Charges in the City Centre

The transport model was run taking into account parking restraint in the city centre, the restraint being in the form of parking charges. Sensitivity tests were undertaken for various levels of parking charges and for different Mode Perception Penalty (MPP) values (in minutes). A third variable that was used was catchment area. Three scenarios were considered:

- Scenario 1: only travellers from sectors 5 to 9 would consider to either use Park and Ride or not;
- Scenario 2: travellers from sectors 5 to 9 plus those from zones 10, 13, 18 and 20 would consider using Park and Ride;
- Scenario 3: all travellers with a destination in the city could consider using Park and Ride.

Model results for Park and Ride with parking charges at different levels of MPP and catchment areas are presented in the table below. Results in the table show that as MPP increases the number of car drivers opting to use Park and Ride decreases. However, for each MPP value, as the parking charge in the city centre increases, the number of car drivers opting to use the Park and Ride also increases. Also, with an increase in the size of the catchment area, the number of potential Park and Ride users increases.

Park and Ride Estimates for 2015 with Parking Charges in the City

	SCENARIO 1			SCENARIO 2	SCENARIO 3		
Parking	PnR MPP			PnR MPP	PnR MPP		
Charge	20	10	0	20	20	10	0
P0	104	154	218	126	1206	1874	2830
P8	142	204	280	176	1308	2010	3000
P20	218	294	374	272	1510	2264	3286
P30	294	374	450	370	1726	2506	3530
P40	374	450	514	474	1968	2750	3752
P50	450	514	562	572	2210	2970	3932
P70	562	596	620	724	2614	3288	4166
P100	634	644	650	822	2910	3490	4298

P150	658	658	658	854	3012	3554	4336

Source: CPCS 2015

Notes:

- *Scenario 1 catchment area Sectors 5 to 9 (see above)*
- *Scenario 2 catchment area Sectors 5 to 9 plus zones 10, 13, 18 and 20.*
- *Scenario 3 has no defined catchment area.*

It is unlikely that Scenario 3 would be achieved in any case, as some of the origin zones are so close to the city centre that drivers would not consider driving out to the Park and Ride sites for parking only. They would most likely consider walking to intermediate bus stops to catch a bus. Likewise it is unlikely that Scenario 1 would obtain as the origin zones seem to be too limited. The scenario that probably represents what would happen on the ground lies somewhere between Scenario 2 and Scenario 3. A parking study is required to establish the optimal parking charge and MPP value, and to lay down a strategy for parking in the city centre, that would support Park and Ride.

This case study has only given the public transport element of the model. There is a Network Traffic Model that forms part of this Transport Model as well.

Module 4: Procurement and Management of PPP Infrastructure Projects

Key Objectives of the Module:

- To engage participants in the structuring of the procurement process and management of PPP Transport Infrastructure Projects.

Structuring the Procurement process

Before the PPP transaction can be implemented, the tender documents and the draft PPP contract needs to be prepared.
Tender Documents: Should include the evaluation criteria and proposal requirements (as well as information on the project.
Contract: Should fully define the outputs, responsibilities, and risk allocation.

All significant risks should be identified and allocated to the most appropriate party

- The success of a PPP lies in how well risks have been allocated; and
- If risks are not allocated appropriately, the project will cost more than necessary.

The framework should ensure that appropriate risk management plans can be developed:

- For those risks allocated to the public sector (example: ensuring the project site or right of way is available), appropriate plans need to be in place that both minimize the likelihood of the risk occurring and the impact in case the risk does occur.

The Framework is designed by Governments (and their Advisors) and in the case of Botswana it is part of the 2009 PPP Policy as the Implementation Framework.

The Framework should specify:
Approaches to risk allocation, risk management plans and draft contracts
Some governments have standardized rules about risk allocation, others look at each project on a case-by-case basis

✓ Drafting contracts requires the expertise of experienced PPP lawyers Agencies without this experience in-house will need to secure it by using outside counsel

➢ For example, British Columbia brought in lawyers and technical advisors from Australia and the UK, jurisdictions with established PPP frameworks.

➢ Countries like Botswana would be encouraged to procure expert legal services from outside the country if none are locally available.

- **Guidelines for procurement**
  - ✓ Document the standard PPP procurement process
  - ✓ This will signal to prospective partners how they can be involved and reduce the likelihood of disputes
  - ✓ "Model" and "Standard" contracts can ensure consistency in the design of PPP contracts, while sending clear messages to the market

- How to gain **approval for proceeding** to the next phase (the tender process).

Standard and Model Contracts

Table below summarizes the advantages and disadvantages when examining transport projects for standard and model contracts.

Table 1: Advantages and Disadvantgaes of Standard and Model Contracts

Standard Contract	Model Contract
A contract that public agencies are required to use (or at least required to document and justify any deviations from it). May not be a full set of all provisions in the contract, but rather a set of recommendations (including alternative approaches for some issues) in the form of guidelines	An example contract that embodies good practice and is available for agencies to use.
Advantages	**Disadvantages**
Reduce the risk of the contract being wrong (for example, poorly drafted or with an inappropriate risk allocation). Save time and money for the bidders by reducing the time required to understand each contract. Enable the project team to focus their work on developing and tailoring existing processes and legal documentation, rather than drafting contracts from scratch.	It is hard to write one contract that will apply to a wide range of different deals. Therefore, using standard contracts **may reduce the quality of contracts** compared to having experienced advisors develop a specific contract for each project.

Standard Contract	Model Contract
Reducing the time required for case-by-case negotiations as both parties have an expectation of what is acceptable.	

Structuring

Jurisdictions should strike the right balance between standardization and customization

- If most of the projects will be fairly similar (for example, all government-pays contracts for social infrastructure) then a single standard contract may make sense;
- If there are various categories of projects envisaged, standard contracts for each category may be warranted; and
- If a wide range of different deals are expected, one or two model contracts, coupled with some standard for contract drafting, may be best.

  ✓ Standards for contract drafting could include preferred risks allocations, a list of topics that should be addressed in all contracts, and sample provisions for some topics that are likely to be similar across multiple contract types (such as extraordinary adjustments, force majeure, dispute resolution, and termination provisions).

Tendering and Award

- A well designed and implemented procurement is central to achieving Value for Money from the PPP.
- The process will include (and the guidelines to be developed in a proper framework may cover these aspects):

  ✓ marketing the PPP;

  ✓ checking the qualifications of bidders;

  ✓ inviting and evaluating proposals;

  ✓ interacting with bidders during the process;

  ✓ selecting the preferred bidder; and

  ✓ concluding the contract.

Stakeholder engagement is essential to this and all other stages. This section of the module explains some key aspects

Stakeholder Engagement

Risks of inadequate stakeholder consultation:

- ✓ The contract may not be acceptable to the private sector and its lenders, resulting in no bids;
- ✓ Lack of public support for the project may result in it being cancelled by the next elected government; and
- ✓ Public demonstrations, labour union action, or public boycotts may result in delayed implementation or reduced profitability.

The PPP Framework can include a policy on stakeholder engagement, addressing concepts like:

I. Stakeholder identification and analysis
II. Information disclosure
III. Stakeholder consultation
IV. Negotiation and partnerships
V. Grievance management
VI. Stakeholder involvement in project monitoring
VII. Reporting to stakeholders
VIII. Management functions

Tender and Award

Only at the end of the tender process, the government will **finally know the cost of the PPP project** and other terms:

- At this point there may be a final check to ensure the project still meets the PPP criteria; and
- However cancelling a project (e.g. because it is not expected to offer VFM, or is not affordable) at this point is undesirable and can damage the jurisdiction's reputation in the market.
  - ✓ Unless the market has confidence that the project will proceed, the private sector will be unlikely to spend money preparing a bid
- So the PPP framework should set out in advance the circumstances under which a project will not proceed.
- **Example**: in some jurisdictions (such as British Columbia, Canada, or commonly in the EU), "affordability ceilings" are revealed to ensure the market knows the maximum that the public sector is willing to pay.

Tender and Award-Decision Criteria

To **test if the procurement was appropriate**, the following criteria are helpful:

- Was the procurement competitive?

  ✓ For example, have most qualified private partners heard about the opportunity? The competition will only be as good as those competing; and

  ✓ Have qualified private partners been given ample opportunity to express their interest and develop proposals? If timelines are too short, or processes too onerous, private partners will avoid becoming involved.

- Has the process been transparent and conducted with integrity and fairness?

  ✓ The way that the award process is administered should be clearly communicated and responsibilities clearly allocated;

  ✓ The criteria for award should be transparent, with well-defined and objective, qualification criteria, technical specifications, and bidding requirements; and

  ✓ The tender process should ensure that all bidders are treated fairly.

Table 2: Procedures and Institutional Responsibilties

Process	Procedures	Institutional Responsibilities
PPP marketing. Evaluation of qualifications (and short-listing if that occurs). Evaluation of proposals.	The framework should provide guidance on how to ensure the process is smoothly delivered and that common pitfalls are avoided, without being prescriptive.	The framework should state who evaluates, who makes the selection decision, and who approves the contract.
Reaching commercial close.	The framework should give guidance on the extent of negotiations permitted to reach commercial close.	As above, the framework should state who approves the contract.
Reaching financial close.	The framework should address the risk of delays and contractual changes in getting to financial close.	The framework should state: •who manages this process for government; and •who approves any changes to the contract necessary to reach financial close.

- This is the longest phase of the project; and
- The challenge is to ensure the PPP provides Value for Money throughout the contract, both construction and operations.

Manage the PPP Contract-Decision Criteria

- The PPP framework should:
  - Ensure that issues during construction and service delivery are **communicated** by the concessionaire to the implementing agency, and, if required, to **relevant central government agencies;**
  - Require appointment of a strong **operations team and include governance mecha**nisms for reviewing performance and escalating issues to better equip the government to manage the PPP and make hard decisions; and
  - Include governance mechanisms to help the government agency to be a **good working partner i**n which private parties can have confidence.
- The Framework should help to **deal with unexpected events** after contract execution, **without a need for contract renegotiation**.
- Sometimes renegotiation may be required.

Manage the Contract-Renegotiate

In circumstances where **renegotiation** may be required, the PPP framework should:

- Ensure the renegotiation process is carefully managed by the government, with proper resources and a proper governance structure. The objective of renegotiation should be to secure an outcome that meets the objectives of the public sector better than would adherence to the original contract terms;
- Allow for changes in the risk allocation if this is necessary and offers a net benefit when compared to alternatives such as cancellation of the contract; and
- Recognise that advisors may need to be re-engaged at this stage.

Manage the Contract-Procedures and Institutional Responsibility

- PPP contracts are typically managed by the relevant **line agency;**
- **Central agencies** will also need to be informed of emerging issues and risks;
- The PPP framework should set out how the line agency and relevant central agencies should communicate; and
- The framework should also specify how contracts should be **completed or terminated.**

Unsolicited Bids

Some governments accept unsolicited or privately-initiated PPP projects:

- Governments can harness information and ideas that private firms have about how to provide services, but allowing firms to promote their own project ideas is tricky

✓ If the idea is then put out to competitive tender, firms may not volunteer good ideas since they cannot benefit from doing so; and

✓ Not putting the idea out to competitive tender could allow a firm to charge more than the cost for a service, leading to allegations of favouritism.

PPP framework needs to strike the right balance between:

- providing incentives to private proponents to submit high-quality project ideas;
- deterring poor quality proposals;
- ensuring competitive tension, and

demonstrating transparency.

Table 3: Benefits and Disbenefits of Unsolicited Bids

Advantages	Disadvantages
•Allow governments to benefit from the knowledge and ideas of the private sector. •A significant advantage where limited government capacity means the private sector is better able to identify infrastructure bottlenecks and innovative solutions. •Provides government with information about where commercial opportunities and market interest lie.	•Government must devote resources to assessing and procuring unsolicited proposals. •Resources might be better allocated to projects known to be in line with government plans and priorities. •Negotiating on an unsolicited proposal –with no transparent or competitive procurement process –can create problems. •May result in poor Value for Money, due to lack of competitive tension. •May provide opportunities for corruption and give rise to complaints about the fairness of the process, especially if there is no competitive process. •For these reasons, some countries prohibit the use of unsolicited proposals for PPPs

Unsolicited Bids-Creating Competitive Tension

Some jurisdictions have developed mechanisms to take advantage of unsolicited proposals, while also introducing competitive tension.

Approaches include:

- **Swiss challenge** –an open bidding process is conducted. If the proponent does not win, it is invited to match the winning bid and win the contract;
- **Bid bonu**s–the proponent receives a scoring advantage typically defined as an additional percentage added to its evaluation score in an open bidding process;
- Inclusion in **best and final offer round** –a two-stage bid process, with short-listing, is used. The proponen**t of the unsolicited proposal is automatically included in the second stage**; and
- **Developer's fee** –the proponent is paid a fee by the government or the winning bidder. The fee may reimburse some project development costs, or provide a return on developing the project concept.

Unsolicited Bids-Dealing with Intellectual Property

To encourage unsolicited proposals, the government needs to commit to protecting intellectual property: Otherwise, there is little incentive for the private party to invest in any new or innovative ideas-approaches:

✓ Competitively tender the project by specifying required outputs, and not the required technology to deliver those outputs. This approach is consistent with good practice in defining output-based performance requirements for PPPs

✓ If the intellectual property is crucial to the project, such that it could not be implemented otherwise, direct negotiation may be warranted, along with procedures to benchmark project costs

Unsolicited Bids-Clear Process

- Clear processes for handling unsolicited proposals (USPs) are important for transparency and achieving Value for Money
- Clear processes:
  - Assist the government in managing such a proposal;
  - Incentivize private developers to invest resources in developing good quality project proposals; and
  - Encourage competitors to engage in the bidding process.
- It is worth considering specifying time periods within which each step in the process will be taken:

- Specific deadlines for government actions can provide assurance to the private sector that their proposal will not languish in the process; and

However tight limits on the time allowed for competing proposals can deter competition.

1.10.11 Case Study: Unsolicited Bid- Zimbabwe: Beitbridge- Harare Road

The Beitbridge - Harare Road is the main route for trade between ports in South Africa and Zimbabwe, and countries north of Zimbabwe. It is located along the North - South Corridor and is an important trade route for the SADC region. The road serves as an international route for cargo and persons travelling between Tanzania, DRC, Zambia, Malawi, Mozambique and South Africa.
The road was built over five decades ago and has long been due for rehabilitation and widening. In 2018, Zimbabwe recorded an increase in road traffic deaths from 1,828 in 2017 to 1,986 in 2018. Of the 1,986 deaths recorded in 2018, more than 600 perished along the Beitbridge - Harare highway (Bhoroma, 2019).
Dualization of the Beitbridge - Harare - Chirundu highway was first planned in the late 1980s, but the design and construction tender was only awarded to ZimHighways, a consortium of local construction companies, in 2002. The company failed to implement the project for over a decade after hyperinflation rendered the Zimbabwean dollar quotations valueless and the tender was cancelled.
In 2019, Zimbabwe decided to develop the project using its own public funds. According to the national newspaper, the Herald, the Zimbabwe National Road Administration (ZINARA) intends on channelling a large chunk of the funds it collects from toll gates into the rehabilitation of the Beitbridge – Harare road (The Herald, 2020). So far Zimbabwe has made progress and constructed a total of 132km out of 600km as of end of 2020 (Ntali, 2020).
Key lessons:

- Creating a stable and enabling economic environment is important for infrastructure development. GoZ's previous attempts to develop the Beitbridge - Harare road were hampered by inflation and an instable currency.
- Governments should look internally. When the GoZ decided to undertake the Beitbridge Harare Road project using its own funds (toll funds), not only did it make progress (a total of 132km has been completed as of end year 2020 (Ntali, 2020)) but it realised that it will require US$650 million to undertake the project, implying savings of US$1,3 billion from what other project developers had indicated it would take. It is possible for governments to fund their own projects and although it may take longer, they could save money in the long run.
- By working with local contractors, the country has also been able to save foreign currency and according to the Ministry of Transport and Infrastructure Development in Zimbabwe, the foreign currency savings were about 60% (Sunday Mail, 2020).
- Using local companies and resources creates local employment and spurs local production and expertise.
- Unsolicited bids need to be carefully examined and benchmarked. In this case the Zimbabwe Government had accepted an Austrian company's unsolicited bid to dualize the Beitbridge Harare Road at a cost of US$ 1.3 Billion and signed the contract. With time the company did not produce the funing and the government was forced to look into internal funding and the use of local firms to carry out this development and the project is currently being executed successfully.

Module 5: Role of Transaction Advisor

Key Objectives of the Module:

- For participants to appreciate the role of Transaction Advisors in involving the private sector in the provision of goods and services in partnership with Governments.

Phase 1: Feasibility Study

The Transaction Advisor will be required to produce comprehensive feasibility analysis for all components of the Project, including assessment of alternate methods of project delivery and operation. This must enable the Government to determine:

- Full project cycle costs
- Affordability limits
- Risks and their costs
- Optimal value-for-money (VfM) methods of procurement and delivery.

The transaction advisor will also conduct market sounding of potential developers and/or operators of the Project, so as to inform the relevant sections of the feasibility study. The Phase 1 deliverables required of the Transaction Advisor are set out in detail in Section 2 below.

Phase 2: PPP Procurement

If, on the basis of the feasibility study, a PPP solution is chosen, and if the Government requires it, the transaction advisor will provide the necessary technical, legal and financial advisory support for the procurement of a private partner. This must be in compliance with applicable law in the country.

The Phase 2 deliverables are set out in the section below.

PPP feasibility Study Deliverables

The Transaction Advisor is required to produce, in close liaison with the Government, a comprehensive feasibility study for the Project. The feasibility study needs to clearly demonstrate affordability for the full project cycle and propose the optimal VfM solution for the Government to achieve its desired outcomes.

The Transaction Advisor will have to become familiar with all background documentation and preparatory work conducted to date and shall be responsible for carrying out initial technical, financial and legal framework reviews that are deemed necessary for a successful completion of the transactions, including, but not limited to:

- Relevant existing reports, studies, audits, etc. necessary to become familiar with the Project sector in the country

- Existing analysis prepared for proposed similar projects in the country, including pre-feasibility studies, feasibility studies, scoping studies, market studies, etc.
- Existing and proposed laws and regulations relating to the sector and to PPPs
- Responsibilities and relationships of government entities at different levels.

2.1 Components of the Feasibility Study

The feasibility study must include the following:

Introduction

- Covering letter from the accounting officer/authority
- Executive summary
- Introduction
- Project background
- Approach and methodology to the feasibility study.

Section 1-Needs analysis, including

- Government's strategic objectives
- Available public budget
- Institutional analysis
- Output specifications
- Scope of the Project.

Section 2 -Technical and commercial options analysis, consisting primarily of two to three alternative scenarios for development of project facilities in the country. Each scenario should focus on:

- Which facilities should be developed
- The sequence of development of such facilities
- The business case for developing the specified combination of facilities in the specified sequence.

The business case will entail describing the current and forecast market for the Project in the country for the useful life of the Project (minimum ?? years), and supply options the country has in terms of its own or alternative options to meet the projected demand. The transaction advisor will meet with major users of project services in the country (current and prospective) to inform and verify this market analysis. This sub-section should refer to (but not necessarily be limited to) the market opportunities already identified on other relevant studies.

The transaction advisor will undertake a SWOT (Strengths Weaknesses Opportunities Threats) analysis on all identified technical scenarios. Taking into account all considered factors, the transaction advisor will recommend a preferred scenario (the Preferred Technical & Commercial Option). The transaction advisor will produce all Front-end Engineering and Design (FEED), cost

estimates and drawings for the Preferred Technical & Commercial Option, to the extent that they are not already available and adequate or being prepared by other parties.

Section 3 -Delivery and O&M options analysis, covering, for each technical and commercial scenario discussed in the prior section, consideration of alternative modalities of delivering the Project and operating and maintaining it over time, including in particular:

- Conventional public procurement
- Public-private partnership (PPP)
  For this purpose, a PPP is considered to be any contractual arrangement in which substantial risk for project delivery, operation and maintenance is transferred to a private party. The Transaction Advisor will delineate those variants of PPP (for example, build operate-transfer (BOT)) that would be feasible for the Project;
- Hybrid solutions (e.g. PPP for some facilities and public procurement for others)
- Integrated operation and maintenance of all or some combination of facilities.

This section should compare alternatives in terms of:

- Expected interest from potential developers, operators, lenders and/or other required parties;
- Risk allocation;
- Financing;
- Tax treatment;
- Government role;
- Legal architecture of transaction and confirmation of legality in the country; and
- Other contractual and commercial relationships in the sector or related to the sector and how those relationships will interface with the PPP project.

This section should conclude by recommending a preferred method of delivering each of the technical and commercial scenarios discussed in the prior section. The preferred method of delivering the Preferred Technical & Commercial Option will be known as the Preferred Project Option.

Section 4 -Due diligence in connection with the Preferred Project Option, including:

- Legal aspects, including Use rights, Regulatory matters, Approvals required.
- Identify licensing, permitting and other legal risks that need to be addressed and allocated under the chosen approach.
- For PPP options, ensuring all necessary approvals and permissions are obtained before commencement of tender process, in particular to allow the relevant Government entity to sign the tender documents and the PPP contract.
- Site enablement.
- Socio-economic and environmental.
- Revenue sources and demand analysis.
- Tax and accounting issues.

- Financing issues.
- Investor analysis.

Section 5 -Financial Model for the Preferred Project Option

- Production of a base financial model that can serve as the basis for the affordability analysis (Section 6) and value assessment (Section 7).

All variables are to be clearly identified and evidence for assumptions given. Key functional relationships should be discussed, and the main variables to be stressed for sensitivity analysis should be identified.

Section 6 -Affordability Analysis in connection with the Preferred Project Option

- Determination that under the assumptions used in the base financial model, the Preferred Project Option is affordable for the Government and for the end user.

Section 7 -Value assessment in connection with the Preferred Project Option. At a minimum, this will include a comprehensive assessment of project risks and how they may be allocated among the project participants. Such risk assessment will include:

Comprehensive risk matrix for all project risks, including at least the following: construction, operation, market/demand, political, macroeconomic, regulatory, environmental, force majeure

- Identify the risks that the Project would face, including probability of materialization and magnitude if materialized.
- Who among the stakeholders (Government, investors, IFIs and other financiers) would be negatively affected.
- Summary of the institution's retained and transferable risks in the Preferred Project Option and alternatives.
- Recommended mitigation mechanisms for each of the identified risks to be implemented by the party identified to bear that risk.

  This should include assessment and applicability and economy of various risk mitigation mechanisms such as full and partial guarantees. The value assessment may also include preparation of discrete risk-adjusted financial models for alternate delivery scenarios (e.g. a public sector comparator [PSC] model and a PPP reference case), if the transaction advisor is of the opinion that such an analysis can fairly capture the relative value of the alternate scenarios.

Section 8 -Economic valuation

- Introduction and evaluation approach.
- Assumptions.
- Valuation results.
- Macroeconomic Impact.

This should analyze the: (a) revenues that would accrue to the Government through (i) value added taxes; (ii) other taxes and levies as contributions to specific funds; (iii) corporate taxes; (iv) municipal taxes; (v) customs duties and excise levies on equipment and services imported/ purchased; (vi) guarantee/onlending margins charged by Government; (b) impact on the Government's overall positions of debt, debt service and contingent liability; and (c) employment generation, regional development, betterment of people directly effected, etc.

- Project Level Analysis Project cost benefit analysis, including net present value (NPV), financial internal rate of return (FIRR) and economic internal rate of return (EIRR).

Section 9 -Procurement plan

Annexures

- Annexure 1: Statements for information verification and sign off from each advisor to the Project.
- Annexure 2: Base Financial Model.
- Annexure 3: PSC model and PPP reference model (if applicable).
- Annexure 4: Risk assessment and comprehensive risk matrix.
- Annexure 5: Document list (list of all documents related to the Project, where they are kept, and who is responsible for ensuring that they are updated).
- Annexure 6: Attach as annexure all other documents that have informed the feasibility study and that are of decision-making relevance to the Project.

2.2 Market Sounding

The Transaction Advisor will sound the market for potential developers and/or operators for the Project. This will entail at least the following:

- Identification of firms potentially interested in serving as developer and/or operator of the Project;
- Preparation of a Project Concept Note describing possible configurations of the Project to an appropriate level of detail;
- Preparation of a Project Interest Inquiry designed to gauge the interest and preferred terms of potential developers and/or operators;
- Distribution of the Project Concept Note and Project Interest Inquiry to the identified potential developers and/or operators;
- Telephone interviews (or where feasible and cost-effective, face-to-face meetings) with potential developers and/or operators to discuss their reactions to the Project Concept Note and their responses to the Project Interest Inquiry; and
- Preparation of a short report summarizing these responses (written and oral) for the Government. The transaction advisor will use the results of this market sounding to inform the relevant sections of the feasibility study, including in particular Sections 3, 7 and 9.

2.3 Presentation of the Feasibility Study

The feasibility study, comprising all the above deliverables, must be compiled in a single report in Word format (with relevant annexures), and delivered as both electronic and hard copy documents. All financial models must be in Excel format, and must clearly set out all assumptions made, sensitivity analyses carried out, and model outputs. The financial models must be sufficiently adaptable for use by others at later stages. The feasibility study must be presented with a thorough executive summary and must be accompanied by a PowerPoint presentation that encapsulates all the key features of the study. The executive summary and PowerPoint presentation must be compiled in such a manner that they can be used by the Government's management for decision-making purposes. The transaction advisor will subsequently conduct a 1-day workshop for the Government and other Government stakeholders to present and discuss the findings and recommendations of the feasibility study.

2.4 Submission Requirements for the Feasibility Study Report

If the Government decides to pursue a PPP solution for the Project, the feasibility study must be of a standard that will be accepted by relevant authorities for all necessary approvals. The transaction advisor is therefore advised to be fully familiar with the requirements of the relevant authorities.

3 PPP procurement deliverables (if applicable)

Based on the feasibility study, the Government will choose a technical & commercial option as well as a delivery option for the Project. If the Government decides on a PPP procurement solution for the Project, the transaction advisor will work with the Government to manage the procurement process for securing contracts with a private party, all in accordance with the systems and standards set out for PPPs in relevant laws and regulations.

The Transaction Advisor will then have to deliver the following:

3.1 Approval and Administration of the Bidding Process

The transaction advisor must prepare a complete set of procurement documents, complying with applicable law and other relevant policies and guidelines, and in accordance with the tendering systems of the Government. The documentation must be consistent with the results of the feasibility study and enable the Government to obtain relevant approvals. The following steps and deliverables are envisioned, subject to the transaction advisor's recommendations in the feasibility study and the requirements of applicable law and related regulations in the country. Bidders are encouraged to suggest possible modifications to this procurement plan in their proposals, together with clear arguments and available evidence for any such modifications. The transaction advisor must also give the Government all the necessary drafting, bidder communication and administrative support necessary for the entire procurement process to be conducted in accordance with law and policy, and to the highest standards of efficiency, quality and integrity.

(a) Detailed Procurement Plan

The transaction adviser will design a complete procurement plan and process, based on applicable procurement requirements, including:

- Advice on mechanisms to maximize competition while avoiding unrealistic bids and project vulnerability from overly aggressive bidding
- Review of information to be provided by the Government to bidders to manage liabilities
- Design of pre-qualification and bidding procedures
- Design of key aspects of the tender procedure

For example deciding whether and to what extent to accept variant bids and non-conforming bids, how many bidders must bid before the process is valid, what rules to set in relation to the assessment of bids (scoring regimes, timing of bids and rejecting of excessively low bids) and how to maximize competition without sacrificing quality of bids

- Outline of tender documentation
- Outline of the PPP contract (including all annexes) that implements the chosen PPP approach:
    - applying the risk matrix developed during the feasibility study, but updated to address all project issues and market context
    - developing and implementing a detailed financial model and developing the contract to fit the requirements of the model
    - explaining to the Government whether and to what extent certain provisions could be amended without disturbing the key risk allocation goals of the Government
- All advice compliant with applicable law and considering any constraints or opportunities associated with applicable law.

The transaction advisor will prepare and deliver a draft procurement plan to the Government, and subsequently a final procurement plan. The transaction advisor will conduct a l-day workshop with the Government and other Government stakeholders to discuss the procurement plan and the roles and responsibilities of all actors.

(b) Pre-qualification

The transaction advisor will design and administer a pre-qualification (request for qualification (RFQ)) process with the intention of:

- Ensuring that the Government's exact interest is communicated clearly to the market
- Determining the extent and nature of interest in the private sector
- Pre-qualifying a competitive number of competent consortia in an equitable and transparent way.

The desired result is that every pre-qualified bidder is capable of providing the facilities and services required by the Government. The transaction advisor must:

- Prepare all the necessary RFQ documentation, including advertising material;

- Set up and administer the process by which the Government can pre-qualify the parties, including responding to questions and interfacing with bidders; and
- Help the Government evaluate and pre-qualify bidders.

As part of this process, the transaction advisor shall develop a tightly focused promotional campaign for the Project, which may include short press briefings, advertisement inserts to be published in international trade publications and business newspapers, followed up by the targeted marketing of identified companies through organizing road shows and seminars for potential investors as well as initiating direct communications with them.

The authorised staff of the Government, assisted by the transaction advisor, will evaluate submissions and pre-qualify bidders.

(c) Bid evaluation criteria and bid process design

The Transaction Advisor must:

- Set up a bid evaluation system and criteria
- Design a suitable bid process that will ensure comparable bids
- Devise effective systems for communicating with bidders
- Inspire market confidence.

If appropriate, a system that allows for variant bids and a best and final offer (BAFO) may be designed.

(d) Request for Proposals (RfP)

The transaction advisor must prepare an RfP document in accordance with best industry practice and applicable laws and regulations, consistent with the results of the feasibility study. The RfP must concisely set out:

- The output specifications of the Government
- Requirements for compliant bids
- A risk profile as established in the feasibility study
- The payment mechanism
- The bid process
- Evaluation criteria
- Bidder communication systems.

(e) A draft PPP agreement

The transaction advisor must prepare a draft PPP agreement, in close liaison with the Government and relevant Government stakeholders, implementing the risk allocation regime and using best practice to maximize competition and minimize project costs, while protecting the

Government's interests, particularly regarding project implementation and manageability over the term of the Project. The agreement will include all necessary annexes and subsidiary documentation, such as performance specification, project scope, client's requirements, technical specification, Project performance monitoring regime, code of construction practice, requirements for network integration, etc.

(f) Government Approval

The transaction advisor must compile all the documentation necessary for the Government to obtain necessary approvals to enable the procurement process to begin.

(g) Administration of the bidding process

The transaction advisor is to provide all necessary administrative support to the Government for the efficient and professional management of the bidding process. This includes managing a data room, facilitating structured engagement between the Government and bidders, helping the Government communicate effectively with bidders, including responding to bidder queries, managing bidder conferences and responding to communications with bidders to manage Government liabilities, and receiving bids.

3.2 Evaluation of Bids, Demonstrating Value for Money

(a) Evaluation of bids

The authorised staff of the Government, assisted by the transaction advisor, will evaluate bids.

(b) The value-for-money report and approval

Value for money must be demonstrated with reference to the net present value (NPV) of the bids received using the relevant models from the feasibility study (particularly Section 7). The results of the bidding and evaluation of bids must be presented in a single value-for-money report (with relevant annexures) that demonstrates clearly how value for money will be achieved with the preferred bidder. The report must clearly indicate the preferred and second-ranked bidders and provide motivations.

3.3 PPP Agreement Negotiations, PPP Agreement Management Plan

The transaction advisor must assist the Government in final negotiations with the preferred bidder. This will involve:

- Preparing suitable negotiations teams
- Categorizing issues appropriately, developing timelines for completion
- Planning negotiation tactics
- Reviewing proposed sub-contracts, in particular with construction contractors and operators, to the extent forms of these contracts have not been included in the PPP contract or the tender documents
- Advising on proposed changes to the agreed form sub-contracts

- Review of preferred bidder satisfaction of the conditions precedent to the PPP contract, often including the validity of licenses and permissions obtained by the preferred bidder, formation of corporate vehicles in the form required, financial close of the project financing, and implementation of the commercial requirements for performance of the Project

- Relationship with second and third place bidders, including managing bid bonds and on-going discussions to prepare for the eventual withdrawal of the preferred bidder

- Processes for reaching agreement

- The above will normally involve a second set of negotiations with the lenders arguing similar points as those raised by the preferred bidder during the tender process and new issues often focused on financial covenants and protections.

This may involve extended discussions of Government financial participation to protect the lenders from specific risks. The legal service providers should be involved in these discussions.

- Review and negotiation of the financial documentation which will often have a direct effect on the rights and obligations of the Government

- Legal opinion that transaction is binding on its terms

- Legal opinion on security and financial management structure

- Legal opinion on revenue structure and current regulatory mechanism.

The transaction advisor must ensure that all agreements reached are incorporated into all the financial, commercial and legal documentation, and must assist with drafting the necessary and related correspondence.

The final terms of the agreement, each as negotiated with the preferred bidder, along with the PPP agreement management plan for the Project, must be approved by the relevant authorities in the country. The transaction advisor is responsible for compiling the necessary submissions for the Government to reach this approval. The transaction advisor must, in close liaison with the Government, draft a comprehensive PPP agreement management plan for the Government. This will be in accordance with the provisions of the PPP agreement.

The transaction advisor must ensure that a comprehensive legal due diligence of the accounting officer/authority has been completed. This will relate to legal compliance, competence and capacity to enter into the PPP agreement.

3.4 PPP Agreement Signature, Close-Out Report and Case Study, and Financial Closure

The transaction advisor must help the Government with all functions related to signing the final agreement through to financial close. The transaction advisor must also compile a comprehensive close-out report and case study, and must incorporate any additional factors that may be required by the Government. The close-out report will be a confidential document of the Government. The case study will become a public document, made available on various government websites.

The transaction adviser will provide a guidance note on the Government's rights and obligations under the final PPP agreement, and will conduct one 2-day workshop with the Government and

other Government stakeholders to discuss project implementation and management of Government rights and obligations over the term of the Project.

Financial closure will signify that all the procurement deliverables have been successfully completed.

4 Transaction advisor skill, experience, remuneration and management by the Government

4.1 Necessary Transaction Advisor Skills and Experience

The transaction advisor will comprise a team, managed by a single lead advisor. The members of the team will have both the skill and experience necessary to undertake the range of tasks set out in these terms of reference. Each individual on the team must be personally available to do the work as and when required. The lead advisor will be held accountable, in terms of the transaction advisor contract, for ensuring project deliverables and for the professional conduct and integrity of the team.

The skills and experience required in the transaction advisor are as follows:

- Financial analysis, with relevant PPP and project finance experience through to financial close
- PPP procurement and structuring
- Legal, with relevant law and experience in the drafting and negotiating of PPP agreements in East Africa or other countries with similar characteristics
- Technical due diligence and advice on PPP structuring and contracts
- Project planning management
- Project facilities management
- Relevant sector expertise

Module 6: Structure financial agreements for PPPs and Commercial Agreements involving infrastructure development through PPP

Key Objectives of the Module:

For participants to be acquainted with the structuring and drafting of tender and contract stages within the PPP process.

Key Stages in PPP Process

The following key stages are form the PPP process:

- **Identifying projects and screening as PPP projects**-this includes pre-financial assessment and economic viability of projects as well as screening projects as PPP;
- **Appraising and preparing the project contract**-this will include refining project scope, refining socio-economic assessment/feasibility, assess PPP commercial feasibility and market sounding etc.
- **Structuring and drafting tender and contract**-define final structure of project contract (financial risk and payment mechanism), finalise due diligence and preparation, if needed reassess analysis of economic, financial/commercial and affordability etc.
- **Tender award**-launching the tender, qualifying bidders, issue clarifications, evaluate proposals, award contract, financial closure.
- **Managing Contract (Developing and Commissioning)**-set up contract management team and strategy, oversight and approval of design, site set up and permits, construction monitoring, commissioning/acceptance.
- **Managing Contract (Operating, Maintaining and Handing back)**-monitoring performance, managing changes, claims and disputes, prepare for handback. Handback and finalisation

Structuring Financial and Commercial Agreements

The overarching objective is to define and develop a PPP contract solution and tender process that best fits with the specific features of the project contract so as to protect and, if possible, optimize Value for Money (VfM).

This part of the PPP process has the following tasks:

- Define the final structure of the project contract (financial structuring, risk allocation and structuring, payment mechanism definition) and outline the contract;
- Finalise due diligence and preparation (finalizing the preparation tasks started in the Appraisal Phase);

- Re-assess or confirm previous analysis if needed (economic, financial, commercial – potentially including new market testing, and updating the PSC and affordability analysis);
- Finalize the reference design, technical requirements and output specifications;
- Define other business terms and contract structure matters (especially implementing contract management strategy and tools);
- Structure and draft the RFQ: defining the qualification criteria;
- Structure and draft the RFP: defining the proposal requirements and evaluation criteria (and regulations for the dialogue or interactive phase, when the tender process is of this type, or negotiation procedures when negotiations are allowed); and
- Finalise the draft contract for issuing with the RFP.

The main work in this phase corresponds to two main tasks:

1. The structuring and drafting of the project contract; and

2. The structuring and drafting of an enforceable package of procurement documentation, including the RFQ and RFP.

Structuring the Contract: The structure that was developed at a preliminary level in the previous phase must now be refined (especially with respect to the financial structure, payment mechanism and risk allocation, as it is usually in this phase that the risk analysis is developed in substantial and greater detail). The rest of the business terms should also be developed before starting to draft the contract.

Structuring the RFQ and RFP: It is not only the contract that has to be designed during this phase. The tender process must also be structured and designed because it should be tailor-made to fit the characteristics of the project. The tender process will have been selected at the end of the Appraisal Phase, but many details will now be defined according to the project specifics. These include the bar for pass/fail qualification criteria and the specific evaluation criteria. They also include some relevant features of the tender process, such as bid bond requirements, time to submit, and detailed regulations for dialogue or interaction in these type of tender processes.

Drafting is the process of effectively developing all the contents and provisions of the tender package, including the RFQ, RFP, and contract. Drafting should occur only after the main characteristics of each document have been outlined, discussed and approved. The timing of the drafting of the documents may vary depending on the tender process selected. In an open tender, the qualification conditions are included in the same document and form part of the RFP. In these processes, the tender is one single package covering qualifications and selection requirements, requirements to submit proposals, evaluation criteria, and contract regulations.

In two-stage processes, it may not be necessary to finalize the RFP at the same time as the RFQ. However, the foundations of the proposal requirements and evaluation criteria, and especially those of the contract, should be defined before the launch of the qualification process. The period between launch of the qualification process and receiving submissions is the time available to refine and finalize the RFP and.

The structuring and drafting process is a highly iterative task. The contract structure is linked to the resolution of risk matters, financial and commercial feasibility, and therefore affordability. These will all still be assessed during this phase, and they depend on the final definition of the technical requirements and output specifications.

Once all assessments are finalized in parallel and iteratively with contract structure refinements, the drafts are closed and submitted for internal approvals, so as to obtain the green light for launching the tender process.

The Tender Documents should include the evaluation criteria and proposal requirements (as well as information on the project. On the other hand the Contract should fully define the outputs, responsibilities, and risk allocation.

- All significant risks should be identified and allocated to the most appropriate party.
    - The success of a PPP lies in how well risks have been allocated:
    - If risks are not allocated appropriately, the project will cost more than necessary.
- The framework should ensure that appropriate risk management plans can be developed.
    - For those risks allocated to the public sector (example: ensuring the project site or right of way is available), appropriate plans need to be in place that both minimize the likelihood of the risk occurring and the impact in case the risk does occur.

The following should be specified:

- **Approaches to risk** allocation, risk management plans and draft contracts:
    - Some governments have **standardized rules about risk allocation**, others look at each project on a **case-by-case basis; and**
    - Drafting contracts requires the expertise of experienced PPP lawyers Agencies without this experience in-house will need to secure it by using **outside counsel**.
- Risk allocation underlies most of the PPP's potential advantages.
- Define which party will suffer the financial consequences of risk events (and reflect these changes in values within the business case).
- Risks should be allocated to the party that is "best able to manage" them.
- Mechanisms to allocate risks: (i) revenue / payment mechanism; (ii) specific contract provisions (compensations and "re-equilibrium").

Technical Risks associated with Infrastructure Projects

- Significant technical risks are found in the following circumstances:
- Projects with technological complexities, such as novel technology that has not been significantly tested, or that will adapt technology that is not fully operational in the same conditions as the project under analysis;

- Projects requiring difficult engineering innovations, such as complex transport structures (tunnels or bridges);
- Projects built in particularly uncertain geo-technical conditions with consequences for a major part of the project costs (that is, a tunnel project or a large sea bridge);
- Projects in areas with extraordinary natural risks in terms of weather or earthquakes; and
- Projects with other complexities and uncertainties concerning the reliability of costs and time of construction, such as unknown or very old utility locations.

- **Guidelines for procurement**
  - Document the **standard PPP procurement process;**
  - This will signal to prospective partners how they can be involved and reduce the likelihood of disputes; and
  - **"Model" and "Standard" contracts can ensure consistency** in the design of PPP contracts, while sending clear messages to the market.
- How to gain **approval for proceeding** to the next phase (the tender process).

Assessing Commercial Feasibility

- A project is considered commercially feasible if: expected revenues (inflows) under a reasonable scenario are sufficient to cover all expected costs (outflows) and pay back invested equity with a reasonable return
- In user-pays projects, the focus of the exercise is on:
  - The project's capability to raise funds; and
  - The capability of free cash flow to service debt and equity.
- If the project is "over feasible", an output of the analysis is the ability of SPV to pay a concession fee and an estimate of the size of such fee.
- If the project is not financially self-sustainable, an output of the analysis is the size of public resources required to make project commercially feasible (Viability Gap Funding).
- If there are no user charges, the focus is on directly estimating government contributions (the price to be paid).

Measuring Commercial Feasibility (Lenders Perspective)

- Debt Service Coverage Ratio (DSCR)
  - Indicates the extent to which a project's operating profits cover debt service obligations in each year;
  - Helps potential lenders determine the credit risk associated with the project;

- A higher DSCR means there is more operating surplus to cover debt, therefore less risk; and
- Lenders stipulate a “lock-up” value and a “default” value for the DSCR.

- Loan Life Coverage Ratio (LLCR)
  - The Net Present Value of Cash Flows Available for Debt Service (CFADS) divided by the Outstanding Debt over the loan period;
  - CFADS is only measured up to the maturity of the debt; and
  - This ratio provides an estimate of the project’s credit quality from the lenders’ perspective.
- Project Life Coverage Ratio (PLCR)
  - The Net Present Value of the Cash Flows Available for Debt Service (CFADS), available over the project’s remaining life, divided by the Outstanding Debt balance in the period.

Measuring Commercial Feasibility (Investors Perspective)

- The project must be bankable and provide an acceptable return for the risk [risk/return ratio]; and
- There are two techniques for assessing the return from an investor’s perspective:-
  - Net Present Value (NPV) of the equity cash flow, based on discounted cash flow (has to be > 0); and
  - Internal Rate of Return (IRR) of the equity cash flow (has to be > than the hurdle rate or minimum equity IRR required).
- The investment must provide a return over time that is equal to or higher than the return on an alternative and comparable investment.
- Investors will also take into consideration the following:
  - Project IRR.
    - The project IRR considers the return of the Project Cash Flow, as opposed-
  - Payback period (nominal or discounted).
    - The payback period represents the period required before the accumulated cash flow equals zero, in either nominal or discounted terms to the equity IRR which considers Equity Cash Flow.
  - Absolute size of the investment.

Designing a Preliminary Financial Structure

- A preliminary structure of the agreement must be defined, in terms of the financial structure (from public perspective –revenue regime, contract term, co-financing etc.) and risk allocation;
- The preliminary structure influences several feasibility exercises: commercial feasibility, value for money and affordability; and

Financial structure from the government perspective:

- This is the definition of the means of public compensation or payments to be granted to the private partner in the contract and its conditions
- It includes:
    - Other potential public party participation in the provision of financing; and
    - The resulting profile of payments in terms of net present value and yearly public expenditure.
- The revenue regime is the source of revenues collected by the project company:
    - User-charges (user-pays PPPs);
    - Neutral in budgetary terms;
    - Typical in economic infrastructure (but not always). Examples: toll roads; user-fees in metro/light rail;
    - There should be economic sense for requiring users to pay; and
    - In over-feasible projects there may be payments to the Procuring Authority.
- **Government service payments (government-pays PPPs)**
    - Social infrastructure (e.g. hospitals, schools, prisons etc.); and
    - Also used in some economic infrastructure projects.
        - To solve viability gaps.
        - To remove / retain demand risk.
- **Co-financing and mixed revenue regimes –Two forms:**
    - Grants (co-financing) made [or committed/earned] during the construction phase; and
    - Complementary service payments (hybrid payment mechanism) made over the operational phase.

Module 7: Managing long term PPP contracts ensuring service delivery, price regulation and dispute resolution.

Key Objectives of the Module:

To acquaint participants with the PPP contract management that includes price regulation and dispute resolutions.

Key Stages

One of the key objectives of this stage is to proactively manage the contract so as to avoid or minimize the impact of risks and threats (in this case, during the Construction Phase) associated with changes, claims and disputes. In this phase, it is especially important to monitor compliance with construction requirements.

The major tasks associated with this stage include:

- Establishing governance and a contract management team;
- Establishing and executing contract administration — including the development of a contract management manual (initially focused on the Construction Phase);
- Oversight and managing site handover, permits and design;
- Monitoring private party's compliance and performance during construction;
- Managing delays;
- Managing communication and stakeholders;
- Managing changes (due to change orders proposed by government or suggested by the private partner), claims (due to retained or shared risk events), and disputes;
- Administrating payments during construction in co-financed projects; and
- Commissioning/acceptance and start of operations.

The foundations of the contract management strategy include a range of tools that are included in the contract itself. These include:

- The financial model and reporting;
- Mechanisms to remedy faults and missed performance such as penalties, Liquidated Damages (LDs), deductions, or even early termination; and
- The basic procedures to deal with risks, claims, changes and disputes.

However, it is good practice to develop a contract management manual in “common language” as a more friendly management tool. The manual should not be a substitute for the contract as a “reference” document, but should help the contract management team to develop their management task. The manual may serve to clarify ambiguities or further develop management procedures that are outlined in the contract. It may even serve to reach a consensus regarding potential ambiguities.

The very first task within the Contract Management Phase is to develop the manual, establish the contract management team, and establish the management decision governance (decision flows). Preparation for this task should commence before contract signature.

For PPP projects Contract Management includes many different activities, which include:

- Monitoring performance;
- Managing other threats and risks that may affect the project outcome and therefore the VfM;
- Managing changes in the contract, risk allocation, disputes, and many other events including early termination;
- Administering the obligations and responsibilities of the procuring authority;
- Providing authorizations;
- Calculating and liquidating payments;
- Analysing claims; and
- Managing information and communications.

Some of the tasks listed above are continuing tasks (monitoring, administering payments). Others are discrete and respond to episodes of risks occurring. The episodic processes primarily relate to the following situations or types of events.

- Claims for compensation or financial adjustments (typically referred to as rebalancing in civil law countries), especially those due to project contract risk events that have been retained by the procuring authority or shared;
- Changes in contract service requirements or “change orders”, which may be especially relevant during the Construction Phase; and
- Disputes resulting from the former and other changes.

The Construction Phase is completed with the commissioning of the asset and the authorization and order to commence the service or operations period, which is by itself a relevant milestone to be carefully managed.

The next stage is to proactively manage the contract so as to avoid or minimize the impact of risks and threats (in this case, during the Operations Phase) associated with changes, claims and

disputes. This is especially true of monitoring the performance, and controlling the hand-back of the asset at the contract expiration date.

The main tasks for this stage include:

- Monitoring performance;
- Managing changes, claims and disputes;
- Preparing for hand-back; and
- Hand-back and finalisation.

During this phase of the contract life, the foundations of Contract Management are naturally the same as during construction. However, some situations and risks are specific to the Operations Phase.

It is good practice for the Contract Management manual to include specific sections dedicated to each of the phases.

During the Operations Phase, the proper monitoring of contract performance starts (as the essence of PPPs is to pay for the service rendered and only when and to the extent the service is provided), as does the administration of the payment mechanism.

This is the phase in which the procuring authority commonly has to deal with the following:

- Non-compliance and under-performance of the private partner in executing specification outputs under the contract;
- Changes in ownership and/or transfer shares;
- Refinancing (which is a change in the financial plan, usually with impacts in the contract financial architecture, as long as refinancing gains are shared); and
- Oversight of the renewal plan, renewal investments and renewal fund management.

This phase also includes the contract expiration and the handback of the asset to the procuring authority. The contract should include specific provisions for the hand-back, as well as technical specifications for the required condition of the infrastructure at this point in time. To meet this condition, the private party may have to make material investments before turning the asset over to the authority.

Adjustment Factors or Deductions

- Adjustments depend on the seriousness of the unavailability – i.e. seriousness of the condition criteria being breached
- Other factors
    - The area (or section in a road) that is unavailable, as some areas or sections will have higher weightings than others;
    - The length of time for which the area or section is unavailable;

- Potentially, the specific time of the day and year (month or day of the week), especially in transport projects (i.e. time weighting factors);
- Potentially, the persistence or repetition of the breach –ratchet mechanisms; and
- Whether the asset (or the area affected) is effectively being used despite the unavailability –especially in road projects.

- Payments are usually calculated from bottom to top (summing up payments earned per unit of time, duly adjusted by the adjusting factor).
- Deductions / adjustments may be larger than the value of the payment in a specific time period, but the actual overall deduction is limited to 100% for payment calculations (e.g. when calculating the monthly payment),

Rectification Period

- A rectification period is a period of time to remedy a breach so that it is not taken into account for the purpose of deductions.
- The rectification period starts from the moment the breach is detected.
- If the breach is rectified within the specified period, there is no deduction for unavailability.
- If the breach is not rectified within the specified period, the deduction is calculated from the moment breach detected.
- Not every breach should have a rectification period.
- Critical criteria should not have rectification periods.
- Unavailability starts when the event is detected (through monitoring and scheduled inspections) or reported (by the procuring authority [through direct inspections] or an interested party –e.g. a teacher in a school).
- Temporary fixes: some unavailability events require an immediate response regardless of the rectification period (e.g. if a window is broken in a school, the private partner must immediately put in place a temporary fix with boards, before replacing these with glass before the rectification period ends).

First Payment and Early Completion

- Availability is about paying for the ability to use the asset.
- Payments during construction should be avoided.
- Exceptions:
  - Parts or areas of the infrastructure that can be effectively used (certain stretches in a road, multi-facility projects); and

- O&M costs of existing infrastructure.

- Early completion:
  - The contract should regulate this situation;
  - The procuring authority should have no obligation to pay for the asset if availability starts before the target date;
  - Early availability is usually in the interest of the procuring authority, but it may not be ready to make payments –the solution may be to establish an early completion floor; and
  - If construction is completed ahead of schedule it is customary to establish at least a 'cut' payment to cover O&M costs.

Frequency and Payment Calculation Process

- The contract must clearly state when payments will be made and the process to calculate the payment earned.
- Monitoring and calculations are complex –usually payments are made no more frequently than quarterly.
- Avoid requiring the private partner to finance significant working capital: calculate deductions each month and make payments monthly in arrears or
- Middle path solution –determine deductions on a quarterly basis but with monthly "advanced payments" based on a notional deduction.
- Delays in payment should be subject to interest rates consistent with that of the private partner under its financial agreements.

Termination of Services

There are a variety of reasons why a PPP contract can have early termination and these include:

- Termination for convenience or "unilateral termination" and termination for fault by the public partner-
  - Grants the private partner rights to full compensation;
  - Recover all funds invested;
  - Costs of breaking its contracts with third parties; and
  - Opportunity costs of the equity investment.
- Termination for force majeure-
  - Grants the private partner rights to recover all investments in full; and

- Some countries/contracts also recognize the right to a positive equity IRR at a pre-agreed rate, usually to obtain a close to 0% equity IRR in real terms.

- Termination for default of the private partner-
  - Grants the private partner (or lenders) rights to receive a compensation sum;
  - Different approaches: Book value; Debt-based compensation; Market value/market sale; and
  - The procuring authority agrees a replacement partner with lenders (prohibited in some jurisdictions).

Dispute Resolution

When reviewing or drafting a PPP Agreement, it is important to take a careful look at the dispute resolution clause. This will determine where and how disputes will be heard and it is important to ensure that the provisions are appropriate and enforceable in the relevant jurisdiction by checking with local lawyers. Dispute resolution mechanisms vary dramatically, and are key to how the careful drafting you use in the agreement will be interpreted, and whether it will be enforceable. It is hard to overstate the importance of such provisions.

Listed below are some of the key questions that should be considered when reviewing or drafting a dispute resolution clause:

1. Is any form of jurisdiction for dispute resolution specified?

- Do not confuse governing law clauses with jurisdiction clauses as the law of the agreement may differ from the country within which disputes are to be heard. A governing law clause is worded as follows: - *"This agreement is governed by and shall be construed in accordance with [Country] law*". For more information on Governing Law clauses, see the Checklist on boilerplate clauses.
- If no dispute resolution is specified, it is likely that the host country courts will have jurisdiction by default – but this is not always the case and should be checked with local counsel.
- Even if this is the case, and the parties are happy to be subject to jurisdiction of the local courts, it is better to include a jurisdiction clause specifying the jurisdiction, because the parties have the ability to bind themselves (subject to local law provisions) to one specified jurisdiction (see jurisdiction clauses below).

2. Interim dispute resolution.

It may be appropriate to include mechanisms in the agreement that may help the parties to come to a mutual resolution of a dispute before it is escalated to litigation or arbitration, such as:

- A requirement that issues are raised to senior management of each party for negotiation;

- Mediation (where a neutral third party facilitates the parties to reach a negotiated settlement); and

- Expert determination (where all/ specific technical/ financial disputes are referred to an independent expert for determination). Should the determination be binding or nonbinding? (Even if the contract states that it is to be binding, it may be difficult to enforce as it is a strictly contractual arrangement that may not be recognized by the relevant courts). Some mechanisms may be able to be enforced in a similar way to arbitration, depending on the relevant laws.

In drafting interim dispute resolution provisions thought should be to imposing strict timeframes within which each stage is to be completed, with the opportunity for a party to move to the next stage of dispute resolution if the timeframes are not respected, so as to avoid wasting time at a juncture that may be critical to the PPP project.

3. Is there a court system which is appropriate and the parties are willing to submit to?

Local advice should be taken on the local court system, length of time for processing claims, objectivity of judiciary, quality of the judiciary and whether it has had experience of similar contractual arrangements, whether the procedures of the court are clear and are followed, the cost of litigation and the time and cost involved in enforcing judgments.

A government party is likely to want to be subject to its court system but an operator, particularly a foreign one, may be unwilling to subject itself to an unfamiliar system and the potential that local courts will be loath to rule against government interests. Where foreign lenders are involved they may also be anxious to avoid local courts. The compromise is usually to follow an interim dispute resolution procedure and then proceed to arbitration (see 5 below).

4. If the parties are willing to submit to courts in a specific jurisdiction:

- The contract should specify this. They may also wish to identify particular courts within the country's court system, for example commercial courts or an arbitration mechanism administered by the courts. The laws determining what jurisdiction applies to a particular situation can be confusing and sometimes conflicting, particularly where a transaction involves different nationals or services being provided in a third country, with several courts being able to claim jurisdiction.

- To avoid or limit this possibility, the jurisdiction clause could be worded as follows: *"The parties irrevocably submit to the exclusive jurisdiction of [ ] Courts for the determination of disputes arising under this contract"*. This provision is called an "exclusive jurisdiction clause" and goes as far as possible to prevent disputes being heard in other jurisdictions. How these clauses are interpreted in practice may vary and so local counsel should be consulted.

- There may be instances where the parties wish to have flexibility as to jurisdiction or where one party with greater negotiating power wishes the other party to be bound as to jurisdiction, whilst wanting to maintain flexibility of jurisdiction for itself. In such cases a non-exclusive jurisdiction clause may be appropriate, such as, *'The parties submit to the jurisdiction of [ ] Courts'.* A variation would be *"For the benefit of Party B, Party A submits to the exclusive jurisdiction of [ ] courts".* This may be of interest where enforcement of

awards may occur abroad, and where such courts view an exclusive jurisdiction clause as restrictive of their ability to enforce award (in particular arbitration awards). The law around non-exclusive jurisdiction clauses is complex and local advice should be sought.

- Sovereign immunity to jurisdiction and execution: A state's immunity to jurisdiction results from the belief that it would be inappropriate for one state's courts to call another state under its jurisdiction. Therefore, state entities are immune from the jurisdiction of the courts of another state. This immunity can generally be waived by the state entity. A state will also have **immunity from execution**, as it is deemed to be improper for the courts of one state to seize the property of another state. Immunity from execution may also generally be waived.

5. The parties may prefer to submit disputes to arbitration:

- What is arbitration? – it is a legal technique for the resolution of disputes outside the courts, wherein the parties to a dispute refer it to one or more persons (the "arbitrators" or "arbitral tribunal"), by whose decision (the "award") they agree to be bound.

Some factors to be considered when evaluating whether arbitration is appropriate include:

- Arbitrability of issues (some issues cannot by law be arbitrated, such as maritime law in US – local law should be checked);
- Execution of awards (arbitration is just a contractual mechanism, but most countries have arbitration laws that will allow the awards to be recognized by the courts and enforced);
- Local arbitration courts? The local party may have a preference for local arbitration (see 6 below); and
- Sovereign immunity to jurisdiction often waived automatically if arbitration is chosen, but this needs to be verified with local lawyers.

6. If the parties choose arbitration, parties will need to consider and state in their agreements:-

- Whether to include a formal interim procedure, e.g., negotiation/ mediation;
- Whether some or all disputes should be submitted to an independent expert, whose decision is binding, unless disputed by a party, and to what extent such a contractual decision will be enforced by local courts, or do they need to be formalized by an arbitrator;
- Whether domestic or international arbitration is appropriate. If domestic arbitration is being considered, the parties should consult local counsel – asking similar questions to those for the court system. It will also be important to understand whether an arbitral award in the local country can be overturned by the courts;

- If an international arbitration is chosen, whether institutional or ad hoc arbitration is appropriate. An agreement specifying institutional arbitration will incorporate the rules of one of the recognized arbitral institutions and will be conducted under the aegis of that arbitral institution to assist the parties with appointment of arbitrators, their removal and other administrative tasks (excluding UNCITRAL which has no administrative body and therefore some other institution can be named for these purposes). For an ad hoc arbitration, the arbitration agreement may specify its own rules, or adopt the arbitration rules of a trade or industry association or, for international arbitrations, the UNCITRAL rules. (For a summary of each of the main international arbitral courts and the pros and cons of institutional and ad hoc arbitration, the international law firm, Lovells, has produced an online guide - http://www.lovells.com/Arbitration/Introduction.aspx).

  For more on ICSID, the International Center for Settlement of Investment Disputes, go to:

  http://icsid.worldbank.org/ICSID/FrontServlet

- The "seat" or formal place of arbitration (this may end up being a hot topic). The potential cost of holding the arbitration in a third party country (and having to fly parties and witnesses there), such as Singapore or London, will need to be outweighed against the risk of non-objective decisions and/or lack of competent arbitrators to chose from (this can be overcome to some extent by specifying that arbitrators are not from either party's country). The seat of arbitration can also be key to accessing enforcement of awards under one of the international treaties such as the UN Convention on the Recognition Enforcement of Foreign Arbitral Awards 1958 (the "New York Convention) discussed below.

- Number of arbitrators – it is advisable to specify an odd number to avoid stalemate.

- Type of arbitrators – are specific attributes or qualifications going to be required (avoid making them too restrictive as this could make it difficult or impossible to appoint suitable arbitrators)?

- Manner of appointment of arbitrators, and if it is an ad hoc arbitration, an appointing authority.

- Nature of arbitrators – exclude certain nationalities for third arbitrator?

- The language of the arbitration.

- The scope of the agreement to arbitrate – should it cover all matters, or should some issues be first referred to an independent expert?

- Specify the governing law of the arbitration.

- Advice should be sought as to whether a foreign arbitral award will be recognized in a country where a party is seeking to enforce the award. If the Country is a

signatory to the New York Convention, or where there is a reciprocal enforcement of judgments treaty, then this should be the case. A waiver of appeal of decisions of the tribunal should be drafted in consultation with local lawyers.

- Consider joinder or consolidation of disputes if it is a multi-party or multi-contract situation (so that the same issues do not have to be heard in different fora, etc.)
- Consider a waiver of sovereign immunity (jurisdiction and execution) if a sovereign state or agency is involved.

The parties should not:

- Assume that arbitration is the best option for all disputes.
- Assume all jurisdictions are supportive of arbitration.
- Blindly adopt an arbitration clause without examining the rest of the agreement(s).
- Combine a jurisdiction clause with an arbitration clause.
- Choose more than one governing law or seat.
- Choose arbitration rules that are inconsistent with the arbitration clause without specifying that such rules are being amended, by agreement.
- Assume that "split clauses" allowing one party to have option to arbitrate or litigate while the other party can only litigate are valid in all jurisdictions – they can lead to confusion and in most cases should be avoided.
- Name individuals as arbitrators in the agreement (at least without a default mechanism) in case they are unwilling or unable to act.
- Assume arbitration will be confidential. If parties want confidentiality, provide for it expressly.
- Agree to arbitrate in a country which is not a party to the New York Convention.
- Agree to an ICSID arbitration clause without taking specialist legal advice – the mechanism is limited to disputes between contracting states and nationals of other contracting states.