

# INTEGRATED PUBLIC TRANSPORT NETWORK FRAMEWORK FOR CAPE WINELANDS DISTRICT MUNICIPALITY

BEVAN KURTZ, LEE VAN DEN BERG and YULETIDE NKUNA\*

Cape Winelands District Municipality, P O Box 100, Stellenbosch, 7599  
Tel: 021 - 888 5210; Email: bevan@capewinelands.gov.za  
Khuthele Projects, Unit GF 02, First Floor, Rostra Block, The Forum Building,  
North Bank Lane, Century City, Cape Town\*  
Tel: 021 – 551 8572; Email: leevdb@khuthele.co.za and yuletiden@khuthele.co.za

## ABSTRACT

The intention of the Cape Winelands District Municipality (CWDM) is to establish an efficiently operated and integrated public transport system for its area. The first step in this process is the preparation of an efficient and basic Integrated Public Transport Network (IPTN) Framework for the district that will endeavour to integrate all modes of transport such as rail, bus, midi and minibus. This framework will then assist and guide the local municipalities within the Cape Winelands District Municipality in designing, implementing and managing their local public transport operations.

The development of the IPTN for the CWDM area is in line with Government's overall objective as reflected in Public Transport Strategy and Action Plan (2007) and the 2011 – 12 guidelines and requirements for the application of Public Transport Infrastructure and systems (PTIS) grants, dated 27 June 2011 namely to transform the public transport sector in the region into a safe, secure, and high-quality experience for the passenger. The National Land Transport Act and the approved National Public Transport Strategy and Action Plan are used as the guiding principles for the development of the CWDM IPTN framework.

The IPTN is still a work in progress and will be rolled out over a number of years. This paper will briefly deal with the different elements of the completed IPTN Framework (First phase in a series of five phases) and the proposed implementation plan – forming part of this framework - in terms of the future phases.

## 1 BACKGROUND

According to the District Integrated Transport Plan (DITP) Cape Winelands District Municipality (CWDM) is one of the five District Municipalities (DM) in the Western Cape Province – Please refer to Figure 7.1 on page 6. CWDM is almost centrally located in the province with the West Coast and Cape Town to the west, Central Karoo and Eden to the east and Overberg to the south. The CWDM is comprised of five Local Municipalities (LMs), i.e. Breede Valley, Drakenstein, Langeberg, Stellenbosch and Witzenberg. The Breede Valley LM is centrally located along the major N1 corridor and is the second largest LM. Drakenstein and Stellenbosch LMs are located in the western part of the CWDM and are mostly urban LMs which contribute significantly to the economic growth of the CWDM. Langeberg LM, on the other hand, is mostly rural and is located in the southern part of the CWDM. Langeberg is the second least populated LM and has the highest levels of unemployment and poverty. Witzenberg LM is located on the northern side of the CWDM and is also very rural in nature.

The CWDM's total population is approximately 712,413 and is the second highest in the Western Cape Province. The CWDM is also the second most densely populated DM in the Western Cape Province with a population density of 61.7 people per km<sup>2</sup>.

The bulk of the population of the CWDM lives in and around the more urban LMs of Drakenstein and Stellenbosch. The largest concentration of people is in the main urban hubs of Stellenbosch, Paarl, Worcester, Ceres, Robertson and Ashton. There are also a large number of people living on farms and in the rural hinterlands of the DM. Most of the CWDM has very low population density levels. Distances between towns are also quite long which further increases the reliance on motorised modes.

The N1 rail and road corridor and the Breede River Valley corridor are two major strategic corridors in the CWDM and they are major distributors of people, goods and services from the CWDM to other LMs within the Western Cape and to other provinces. These major corridors are supported by other major roads (R45, R47, R318, R303, R60, and R62) which distribute goods and services to the people within the DM. The N1 corridor is the primary investment route through the CWDM and is the major connector to investment nodes such as Worcester and Paarl. The R60, linking the N1 and N2 via Worcester, Robertson and Ashton, is also a significant connector and development node in the CWDM. The Breede River valley corridor, on the other hand, is the major connector to economic activities such as agriculture, particularly viticulture. The corridor is closely allied to the wine industries and has the advantage of the often spectacular scenic and cultural heritage of the area. Rail forms a significant part of the corridor and is mostly used to promote tourism, as well as potential rail freight routes.

## **2 LEGAL AND PLANNING FRAMEWORK**

The CWDM IPTN is in itself a product of a remedial initiative that seeks to lay a better foundation on which reliable, integrated public transport can be developed as public transport currently is fragmented and unreliable. The IPTN is thus developed within a South African legislative network and given policy framework. All applicable National and Provincial policy documents and legislation that may have an impact on or give form to the proposed IPTN have been considered.

The IPTN Framework will give overall direction and guidance to all local authorities within the CWDM area of jurisdiction on the preparation of IPTN's for their specific municipality. This area of jurisdiction covers all the three types of planning authority and as such, separate parameters were developed for each of the three types of the planning authorities (Type 1 consist of any one of the 12 cities identified by NDoT; Type 2 is made up by all district municipalities and Type 3 comprising all local municipalities). As such, separate parameters were developed for each of the three types of the planning authorities.

## **3 SPATIAL PLANNING**

In terms of the spatial development framework, the CWDM's potential growth and development opportunities have been identified as being in the fields of agriculture, heritage, biodiversity, and the tourism industry. These industries require good access to transport and to service centres as well as to employment opportunities to ensure the successful growth of the CWDM economy.

Fundamentally there are two aspects to be considered:

1. Guidelines are needed to direct spatial planning in order to support integrated transport planning. These include the promotion of public transport and the co-ordination of transport modes and services; and,
2. Guidelines should outline the spatial planning information and interventions required for integrated public transport planning. These will result in the realising the goals and objectives of the CWDM IPTN.

The following spatial planning guidelines, developed alongside with the Spatial Development Framework (SDF) as reference, should be seen as a conceptual outline to guide the process of developing and implementing the CWDM IPTN which is solidified by appropriate spatial planning principles. These guidelines will make provision for various types of activities in the overall spatial structure of the CWDM. The guidelines were divided into the following:

- Nodal Development;
- Corridor Development;
- Land Use; and,
- Transport.

#### **4 TRANSPORT STATUS QUO**

The public transport services in the CWDM allow people to access destinations in their local area or other settlements to which they regularly travel, but which cannot be reached on foot or by other means of NMT modes. These destinations include essential services or activities accessed on a frequent basis, such as places of employment, shops, government services and schools. According to the DITP, public transport holds approximately 14% of the transport modal share, NMT 48% while 26% of people use private vehicles to reach their destinations in the CWDM.

Minibus-Taxi (MBT) is the dominant public transport mode providing both commuter and long-distance services. Fare collection takes place inside the vehicle and payment is only accepted in cash. MBT services operate predominantly out of the urban centres located within each LM. Generally, it is these urban centres which are responsible for the majority of MBT passenger movements throughout the week. The Breede Valley and Drakenstein LMs account for over 75% of total passenger demand in the CWDM.

Rail services within the CWDM are available in 4 LMs, namely Drakenstein, Witzenberg, Breede Valley and Stellenbosch LMs, and stop at 24 stations serving the CWDM. The Passenger Rail Association of South Africa (PRASA) provides 3 daily return services to commuters in the CWDM: the first being the service between Wellington and Cape Town; the second between Cape Town and Worcester; and, the third between Stellenbosch and Cape Town. The Wellington rail line has 22 trains per day. The Worcester rail line has a single train set in the morning and afternoon. Long-distance rail services operate between Cape Town and the cities of Johannesburg, Durban and East London. These services cover the Breede Valley and Drakenstein LMs while the service to East London covers only Langeberg LM.

Commercial long-distance bus services that operate through the CWDM are those of InterCape, Greyhound, SA Road Link, and TransLux. The services operate daily with 4 buses per day between Cape Town and Johannesburg. Services operate on a daily basis

in the Drakenstein, Stellenbosch, Langeberg and Breede Valley LMs and stop in the towns of Paarl, Worcester, Touwsrivier, Stellenbosch, Ashton and Robertson.

Public transport infrastructure in the CWDM consists of 42 formal and 21 informal MBT and bus facilities. Roughly half of the formal MBT rank facilities are off-street facilities, designed for MBT operations, with demarcated lanes and bays according to destinations. There are shelters and mostly some amenity facilities for passengers, but there is a need for both the construction of additional facilities as well as for the upgrade of the inadequate facilities in the DM.

## **5 VISION, OBJECTIVES AND SALIENT FEATURES**

The vision statement, goals and objectives developed for the IPTN ensured that the 'golden thread', going through and keeping together all the different processes and elements of the IPTN Framework, was maintained at all times.

The goals and objectives followed from the vision statement which served as a guide for developing the different elements of the IPTN Framework. Furthermore, the vision statement directs the identification of the design principles or salient features of the IPTN.

Both the objectives and the design principles then steered the broad Network and System design process which in turn informed the IPTN Framework chapters and implementation strategy.

## **6 INSTITUTIONAL AND ORGANISATIONAL MODEL**

Owing to a general lack of capacity at the municipal sphere in the CWDM as far as public transport operations, management and planning are concerned, a model whereby most of the IPTN functions would be outsourced was considered. Probably the most important function to be performed by the district municipality would be to ensure that the outsourced functions performed by the private sector are co-ordinated and that the contracted delivery standards would be met at all times.

Given the fact that the CWDM is made up of a number of LMs, some of which are very small and have limited capacity, and in order to co-ordinate the services to be rendered through the IPTN most effectively, it thus makes sense to establish a single Management Office or Body (a multi-jurisdictional service utility) with authority to manage all the IPTN services for the entire district

Key to the employment aspect of the IPTN will be the involvement of the MBT industry in the CWDM IPTN to ensure no loss of employment in the sector and, ideally, actually to increase employment. Therefore a transition strategy for the participation of the minibus-taxi industry in the CWDM IPTN will be essential. This will have to be developed and finalised in close co-operation with the industry itself. This also relates to the payment of so-called "industry compensation" which has proved to be a very contentious issue in all the other areas in South Africa where the implementation of IPTNs has made substantial progress;

An effective stakeholder engagement process must be developed with all stakeholders, but specifically the taxi industry, from the start. In addition, consideration should be given to appoint technical advisors for the industry who will assist the industry in interrogating and giving comments on all technical work, focusing specifically on the operational plan and the financial plan.

## 7 BROAD NETWORK AND SYSTEM DESIGN

A broad network of public transport services was developed taking into account the public transport status quo (Existing Current Public Transport Record (CPTR) information), spatial framework and the IPTN description, design principles and salient features.

The following main criteria were used in determining the extent of the network:

- Regional mobility between towns in the district and major attractions outside the district;
- Integration with existing interchange facilities,
- Local access to town centres, employment and residential areas;
- Routes that grant access of between 400 and 500 meters distance to most residences in the urban areas;
- Access to significant trip generators in the rural areas;
- Take into account the existing travel patterns across different categories of passengers and days of the week;
- Cater for the travel needs of commuters, learners, those making social trips, and farm workers;
- The continuity of the network should facilitate easier access and inter-town travel;
- Operations should include existing public transport operators; and
- The proposed network to consist of three major types of services namely:
  - Passenger rail;
  - Regional services (trunk routes); and
  - Local routes (feeder and shuttle services).

According to the design principles regional services will:

- Link the different towns in the district;
- Operate between formal interchanges and stops at established bus stops along the route;
- Operate 7 days a week on a fixed schedule;
- Have a schedule based on demand but have a minimum of 3 trips per day to, from or through each hub; and,
- Operate appropriate vehicles for longer distance travel, e.g. midibuses or larger buses with luggage facilities.

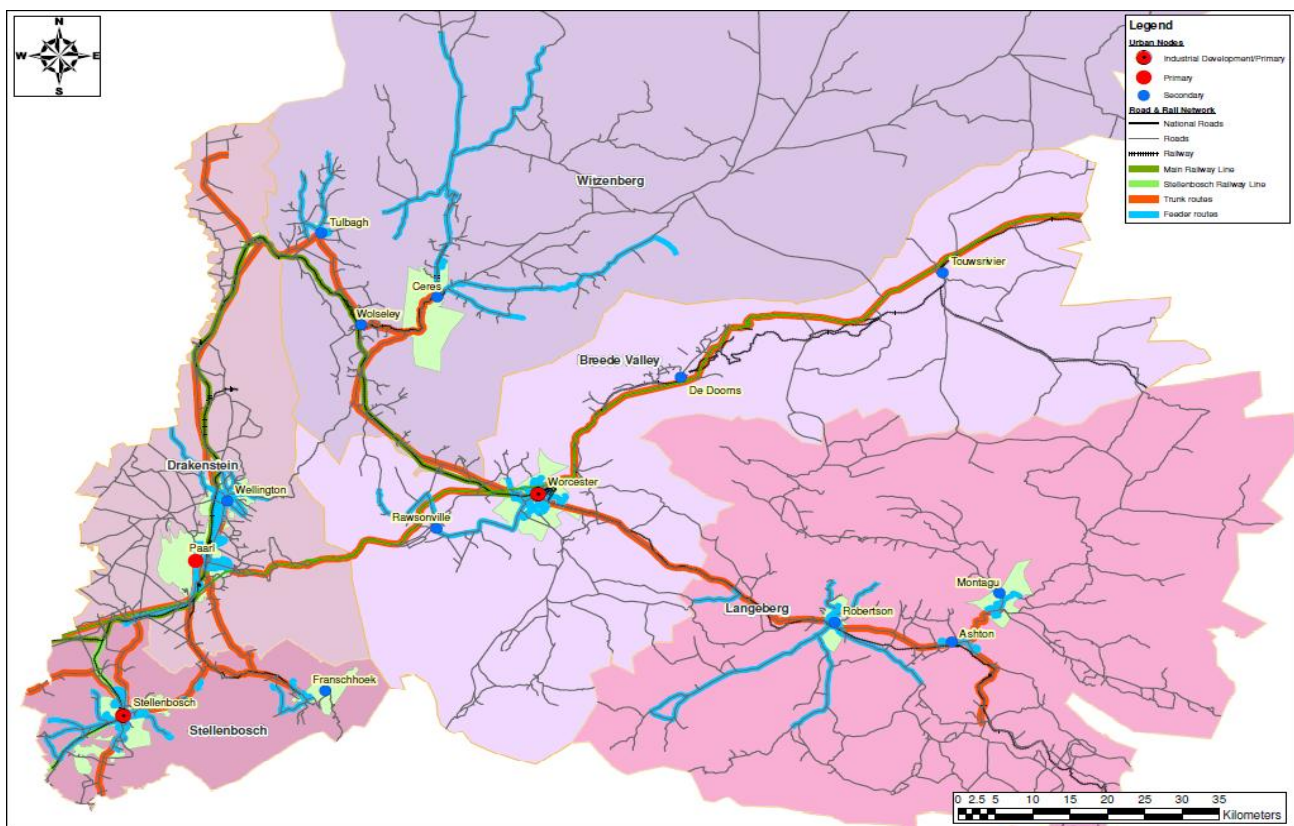
According to the design principles local routes will:

- Provide access to hubs within towns from residential and farming areas;
- Operate between formal interchanges and termini with formal stops along the routes;
- Have days of operation which vary per route according to demand and have much lower frequencies than the trunk routes (possibly no service on Sundays);
- A schedule based on demand but as a minimum consisting of:
  - 6 trips per day (even on a Saturday) in the urban or town areas; and,
  - 3 trips per weekday, but more on Saturdays, on the rural routes;
- Operate appropriate vehicles for shorter distance travel, e.g. minibuses or midibuses; and,
- Need to serve the major attractors in the areas, for example industrial areas, hospitals, commercial and civic centres.

The indicative network statistics are shown in Table 7.1 and the proposed broad public transport network is shown in Figure 7.1 below.

**Table 7.1 – Network Statistics**

Total No. of Public Transport Routes	95
Local Routes (blue)	78
Regional Routes (orange)	17
Network Kilometres (coverage)	1,360
Estimated Monthly Passengers	645,000
Estimated Monthly Kilometres	893,000
Total No. of Vehicles Required	589
Minibuses	357
Midibuses	227
Semi-luxury buses	5



**Figure 7.1 – Proposed broad public transport network**

## 8 VEHICLE SPECIFICATION

The proposed broad public transport network will be serviced by numerous types of buses. Minibuses (9-16 seats) be utilised on most local routes. Midibuses (approx. 30 seats) be utilised on most regional routes; and standard buses (approx. 60 seats) will be utilised on local and regional routes where the passenger demand will make the use of such vehicles viable.

All vehicles are to comply with current South African legislation, regulations and standards. In addition, all new vehicles purchased are specified to comply with Class 2 accessibility (interventions that improve the accessibility for all passengers including those with visual impairments, deafness, learning disabilities and who use wheelchairs) and as a minimum comply are to the EURO 3 emission standards although EURO 4 would be preferred. In all new vehicles specified, the vehicle manufacture will include the power supply wiring for all

necessary Intelligent Transport Systems (ITS) and Automatic Fare Collection (AFC) equipment required.

Furthermore, all new vehicles are to be delivered with the vehicle manufacturer's engine/vehicle management systems; and the vehicles should be owned by the contracted operator, although for expediency the vehicles could be ordered by the authority on their behalf.

## **9 INFRASTRUCTURE**

Detailed guidelines for the design of bus/midibus/minibus-taxi, as well as Non-Motorised Transport (NMT) facilities are available from numerous international as well as local sources. For that reason, an in depth discussion will not be necessary. Some of the CWDM IPTN supporting infrastructure will include components such as bus/midibus/minibus-taxi termini. It further deals with transfer facilities, depots, bus stops, midibus and minibus-taxi stops, other transfer facilities, NMT facilities and preferential treatment for buses/midibus/ minibus-taxis in the form of preferential lanes and priority treatment at traffic signals.

## **10 MODAL INTEGRATION**

The major transfer locations in the proposed system will be the bus/minibus-taxi termini where interaction between the regional and local services will take place. There is already one such a modal transfer location between road and rail at the Huguenot station in Paarl. Other locations with similar potential are Wellington, Stellenbosch and Paarl stations.

An essential component of modal integration is that of fare integration which means that the passenger pays no premium for moving from one mode to another and can do so without any physical difficulty.

## **11 SAFETY AND SECURITY**

Public perception about safety and security issues arising from the usage of public transport system is important and therefore a dedicated safety and security plan should be developed for the CWDM IPTN.

Given the fact that the CWDM is made out of a number of local municipalities, some of which are more rural with limited infrastructure, and in order to enhance safety and security on the IPTN system, individual studies on safety and security measures will be considered to meet the unique needs of each of the local municipalities.

## **12 ITS and AFC**

The ITS applications for the CWDM IPTN will consist of various components namely AFC, Advanced Public Transport Management Systems (APTMS), Close Circuit Television CCTV Surveillance, Advanced Traveller Information Systems (ATIS) for the passenger, public transport priority, communication and the establishment of a Transportation Management Centre (TMC). It is important that a detailed Concept of Operations (ConOps) document be developed in the future phases for the CWDM IPTN which deals with the following:

- Overall principles of how the ITS system will function;

- Detailing the various components involved and how they fit together and integrate with each other and other systems;
- Physical infrastructure and specific technology to be applied;
- Management and Operational Structure;
- Roles and Responsibilities;
- Monitoring and Maintenance; and,
- Service Level Agreements (SLA).

### **13 OPERATIONAL CONTRACTS AND MONITORING**

The CWDM IPTN is to be established in accordance with the National Land Transport Act (NLTA) (Act 5 of 2009) and the national Public Transport Strategy (PTS) and Public Transport Action Plan (PTAP) that was approved by Cabinet in March 2007. The National Department of Transport (NDoT) has established the Public Transport Intergovernmental Co-ordinating Forum (PTICF). The PTICF has in turn established a working group which is developing a Performance-Based Model Contracts Document. This document is intended as a guide for Contracting Authorities (CAs) in developing contracting documents that would deal with the specific conditions that are prevalent in their areas.

The PTS recommends that the services intended to operate in the IPTNs should be “gross” cost contracts which are negotiated with the current incumbent operators whose operating rights will be affected by the introduction of the IPTN services. Performance Based Contracting (PBC) is centred on a contract instrument that defines performance expectations in terms of outcomes or results as opposed to methods, processes, systems or broad categories of work activity and have the following features:

- Emphasizes results related to output, quality, and outcomes rather than how the work is performed;
- Has an outcome orientation and clearly defined objectives and timeframes;
- Uses measurable performance standards and quality assurance plans; and,
- Provides performance incentives and ties payment to outcomes

Standard operating procedures, systems and reports will need to be implemented to electronically monitor the services. In addition, inspectors will need to be employed who will manually monitor aspects, such as vehicle condition and cleanliness, which cannot be done electronically.

### **14 COMMUNICATION, MARKETING AND BRANDING**

As a new service, the IPTN is without precedent and will need to attract new users from scratch. It needs to be recognised that communication, marketing and branding are integral to the overall process and should be an integrated element from the start of the process, and not added on at a later stage starting with the publicity plan and supporting the public participation process.

It will have to design, develop and establish a new brand and create customer loyalty as well as educate the new users on the operations and procedures of the new service. This must be done by developing brand architecture, brand values and a draft short list of slogans and design public participation into the process. In addition, it needs to create awareness of the IPTN project, its processes, procedures and expected timelines to demonstrate inclusivity and transparency, identify stakeholders, including relevant media, and developing the stakeholder database.



## **15 ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACT CONSIDERATIONS**

Ensuring sustainability (in design and capital construction, operations and maintenance, encouraging land use and transit-oriented development, limit waste and emissions and minimize the consumption of fossil fuels) remains a cornerstone of the CWDM IPTN and need to be strengthened continually. Environmental management responsibilities must thus be embedded and clearly defined in the institutional model and performance of the IPTN system needs to be monitored and evaluated against sustainability parameters, objectives, targets and performance indicators as part of the monitoring and evaluation programme. There must be an on-going assessment of the IPTN using a sustainability framework such as a Strategic Environmental Assessment (SEA) through all the planning and design phases.

Green building principles should be adopted as the benchmark for all facilities and the use of renewable energy (e.g. solar, wind) should be provided for wherever practical. All areas where vehicles will stand and where refuelling will take place must be designed to prevent pollution from fuel spills and leaks and all bus stops, taxi stops, bus depots and the like should be provided with adequate waste collection facilities promoting recycling of waste. Notwithstanding the fact that the potential for loss of or damage to natural systems is considered to be low, reference must be made to the Environmental Management Frameworks (EMFs) (where available) or to fine-scale plans when planning the location of new infrastructure such as bus stops, termini and NMT facilities to ensure that locations where there is important biodiversity are avoided. In addition, landscaping at IPTN facilities must be based on local indigenous species, with the emphasis on those that are water wise.

The potential for the use of biofuels in the public transport vehicles should be investigated as a possibility given that the CWDM has a strong agricultural sector with opportunities to establish biofuel production facilities using organic waste and/or from landfill and Waste Water Treatment Works (WWTW). Sustainability initiatives such as these should form part of its branding and be incorporated into the marketing strategy and the fare collection system. Electronic or paper-based fare collection should be used to communicate important information to passengers.

## **16 PROCUREMENT**

Given the limited capacity at the municipal level in the CWDM as far as public transport planning and management is concerned, it is bound to use a largely outsourced model (a multi-jurisdictional service utility) for the management and administration of the proposed IPTN system. The most important function to be performed by government or the municipality is to ensure that outsourced functions performed by the private sector are co-ordinated and that the contracted delivery standards are met.

Because of the complexities inherent to the ITS systems required for the operation of the IPTN, other tender options than the normal open tender process should be considered. A Design Build Operate and Manage (DBOM) contract type could have certain advantages given the general lack in capacity at the municipal level in this regard. The option of one single contract for the entire ITS system and all its components is also evaluated against the option of separate contracts for each ITS component.

The contract with the vehicle operators for the operation of the IPTN should be in the form of a negotiated contract for a period of between 7 to 12 years.

A Service Level Agreement (SLA) with the DTPW of the PGWC and with SANRAL will be required for the delivery of maintenance work to IPTN facilities and other functions on behalf of the Municipality, where such is located within road reserves of either of the 2 road authorities.

## **17 FINANCIAL MODEL**

The CWDM IPTN financial model will have to be developed at 2 levels, namely at the IPTN Management Entity level and the IPTN Operator level.

The model will *inter alia* calculate depreciation and amortization (at both of the abovementioned levels), capital structure, operating costs, debt funding costs; net profit and tax, returns on equity and working capital.

The outputs of the Financial Model will include determination of the Operating Grant (subsidy), annual and monthly financial statements, key financial ratios and indicators, scenario and sensitivity analysis and operating ratios (revenue, cost, subsidy/passenger/km, etc.).

## **18 IMPLEMENTATION STRATEGY**

The proposed IPTN Framework for the CWDM, as developed and outlined above needs to be developed further by the IPTN Management Committee and an IPTN Management Entity. The initial focus will have to be on the detailed planning and design phases, which will take a number of years to execute. Simultaneously an extensive marketing campaign will have to be launched to sell the framework to stakeholders and interested parties in the CWDM area.

Three key planning and design phases following the framework development phase are envisaged. This is to be followed by the implementation and procurement phase.

The 5 project phases are:

- Phase 0: Development of IPTN Framework;
- Phase 1: Initial detailed planning activities;
- Phase 2: Industry negotiations and Business Plan;
- Phase 3: Detail design and development of specifications and tender documentation; and,
- Phase 4: Implementation and procurement.

## **19 CONCLUSION**

Considering the various elements of the CWDM IPTN Framework – very briefly dealt with above - it is clear that a solid foundation to build on and expand from is provided to assist and guide the local municipalities within the Cape Winelands District Municipality in designing, implementing and managing efficient integrated local public transport systems.

## **REFERENCES**

1. Khuthele Projects for Cape Winelands District Municipality, 2011 – Cape Winelands District Municipality Integrated Public Transport Network Framework.