

A structuring public transport project for Cape Town Inner City

Dave EADIE

Transport, Roads & Storm Water Directorate / City of Cape Town – South Africa

Pierre LABORDE

Thales Engineering & Consulting – France

ABSTRACT : A structuring public transport project is considered for the Inner City of Cape Town, with a fixed track system (as an LRT), street – running and linking along 2.5 km: the Historical centre, the Central Business District (CBD) to the V & A Waterfront, where offices, retails and entertainment installations are currently under development. It will be a vital trunk line for the CBD activities, coherent with the « Moving South Africa » recommendations, elaborated at the national, regional and local level. It may be the first stage of a the main Inner City public transport network, extending services particularly to new housing zones as District Six and Culemborg. This new LRT line will complement the metropolitan network (railways, buses and minibuses) offering good transboarding conditions at Cape Town Central Station. The lay-out, the stations' location and the served areas give to the project a great number of transport functionalities interesting a wide range of potential users: commuters mainly during peak hours, employees and business men near mid-day, tourists and conference delegates all along the day. Considering the commercial and operational perspectives, it seems convenient to implement the project in a Triple P scheme.

RESUME : Un Transport Collectif structurant de surface est envisagé pour la Ville - Centre du Cap (Afrique du Sud). En site propre sur 2.5 km, il reliera le centre historique, le Central Business District (CBD) au V & A Waterfront, zone de bureaux, commerces, restaurants et point fort d'attraction touristique en front de mer. En accord avec les orientations « Moving South Africa », élaborées au niveau national, régional et local, il trace un axe vital pour les activités du CBD. Il constituera le premier maillon d'un réseau principal de transport de la Ville Centre du Cap qui permettrait à terme d'atteindre de nouveaux quartiers d'habitat (District Six et Culemborg). Cette ligne nouvelle assurera de plus un relais local pour le réseau métropolitain (Chemin de fer, Bus et Minibus) qui aboutit au pôle intermodal « Central Station ». Le tracé, les stations, et les secteurs desservis apportent à la ligne de nombreuses fonctionnalités transport intéressant un grand éventail d'usagers: "commuters" voyageant aux pointes, hommes d'affaires et employés en mi-journée, touristes et congressistes à tout moment. Vu les perspectives commerciales d'exploitation, le projet peut s'envisager dans le cadre d'un Partenariat – Public – Privé.

1 FRAMEWORK OF THE PROJECT

The Inner City of Cape Town represents 10% of the Cape Metropolitan territory, 3% of its population, and 20% of total job opportunities are located here leading to large daily flows of commuters.

About 92 000 inhabitants currently live in the Inner City of Cape Town that provides more than 200 000 jobs. The Central Business District is only dedicated to offices and commercial areas; it concentrates almost half of the employment opportunities of the Inner City.

Cape Town Inner City: from Sea to Mountain



- *Along seaside: Harbour, V & A Waterfront, Green Point and Sea Point*
- *In Mountain side: Woodstock, District Six, Central Business District (CBD) and City Bowl*

For the short term, numerous urban development operations will be realised within the Inner City, bringing a total of 245 000 sq. meters of floor area for offices and retails activities, 100 new accommodation rooms and more than 1 600 residential units.

New developments between CBD & Waterfront



- 1 Clock Tower
- 2 V&A Waterfront new area
- 3 Roggebaai Canal, 4 Convention Centre
- 5 Power Station, 6 Naspers

The medium term planned developments are mainly localised on the east side of the Inner City, at District Six and Woodstock (Culemborg), with a foreseen housing program that will deeply impact the urban structure. About 300 000 sq. meters are considered for the year 2015 including residential units, offices, retails and public facilities.

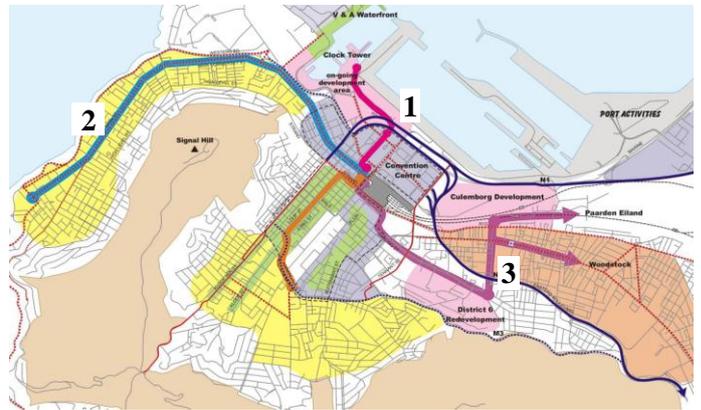
It is assumed that by the year 2015 the Inner City will have a population of 150 000 inhabitants and will provide more than 260 000 jobs.

Studies carried out on behalf of the City of Cape Town have indicated that there is a need to improve the public transport system within the Central Business District (CBD). The Inner City Transport Study, commissioned in 1996, recommended the installation of a high-quality bus system or a light rail transport system. It also recommended that the public transport system should provide a link between the CBD and the V&A Waterfront.

In 2001 – 2002 a feasibility and preliminary design study led to define a priority public transport route serving the CBD and the V&A Waterfront, and secondly allowed to prepare the major basic specifications of the transport system and infrastructure which would serve such a public transport route:

This project is in concordance with a wider transport plan for the whole area and is conceived in relation to those services that link the CBD to the outer regions. It is forming part of a global scheme that will take in private vehicles, all forms of public transport and parking (a global transport plan with an associated traffic management plan).

Inner City Public Transport network Medium term scheme



- 1 – CBD – V & A Waterfront link
- 2 – Sea Point – CBD Corridor
- 3 – Culemborg & District Six Corridor

This project will serve as the embryo of a public transport program for the City. The potential need to expand the system in order to serve districts adjacent to the CBD, bearing in mind the increasing flow of traffic to and from the CBD, has been borne in mind when designing the system.

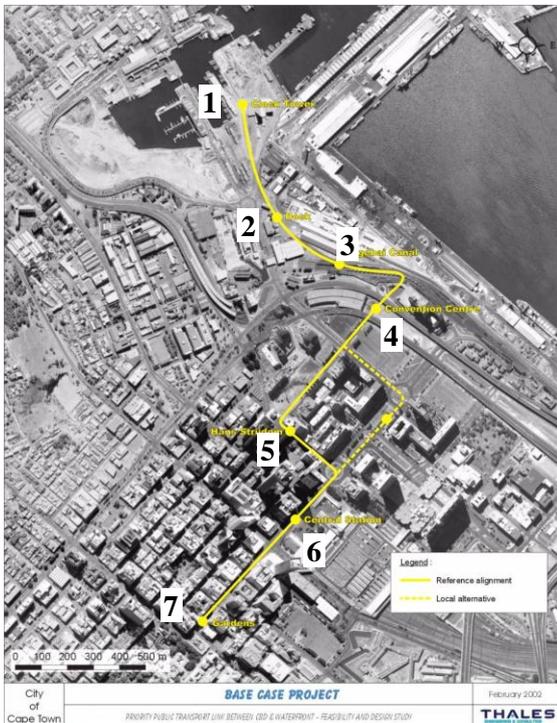
2 PROJECT DESCRIPTION

The Priority Public Transport Project will provide a structured transport system that improves travel within the CBD.

The project has been defined in the context of a general consideration of travel needs in the short and medium-terms (transfers between transport systems and the traffic management plan associated with the project). After a multi – criteria evaluation a provisional reference route has been selected, including some possible options of itinerary and terminal points.

- It is envisaged that the priority public transport route will run from the Cape Town historical centre (Gardens station) to the Clock Tower precinct in the Waterfront, via Central railway station in the CBD and the International Convention Centre to be established on Cape Town's Foreshore.
- The new system will need to be affordable and will need to meet the specific requirements of the site. The route will serve the needs of workers, the general public, business people, tourists and conference delegates.

The lay - out of the LRT Project



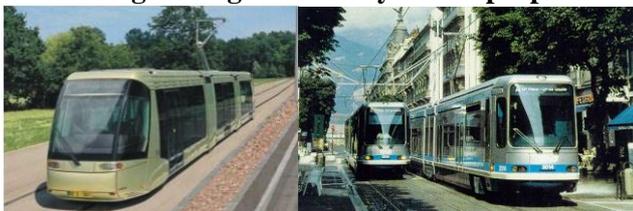
- 1 – Clock Tower, 2 – Dock
- 3 – Roggebaai Canal, 4 – Convention Centre
- 5 – Hans Strijdom, 6 – Central Station
- 7 – Gardens Station

The pre-selection of the appropriate transport system range has been done comparing:

- ❑ No-guided Transit systems,
- ❑ Light Rail Transit systems
- ❑ Rubber-tyred and Guided Transit systems
- ❑ Fully segregated Transit systems

Due to the traffic demand level, the necessary accessibility and availability of the vehicle at stations, and the economical constraints for the profitability of the investment, the selected system has been an at-grade “light transit system”.

An at - grade light transit system is proposed



with fixed track and electrical power supply

A fixed track transport system, electrically propelled, which may be on rails or with rubber-tyred vehicle, results to be the appropriate solution along the corridor. This proposal, based on a preliminary design of all the components of the project, is coherent with the main issues of the transport system:

- ❑ Potential trip demand along the corridor,
- ❑ Attractiveness of the feasible route and stations location,
- ❑ Accessibility for users (including for park & ride or kiss & ride),
- ❑ Quality of service, in terms of commercial speed, punctuality, comfort
- ❑ Interconnection possibilities (existing or future) for passengers riding in all the public transport routes running in the Inner City and stopping at the terminals,
- ❑ Impacts along the transport corridor to be served (buildings and constructions), traffic management plan, road intersections, townscaping,
- ❑ System performance, concerning Safety, Maintainability, Availability, Reliability, Testability (SMART)
- ❑ Investment per kilometre and operating cost per passenger transported

The “Base Case Project” will run, with priority on traffic, on 2.5 km between the City centre and Clock Tower precinct. It will offer:

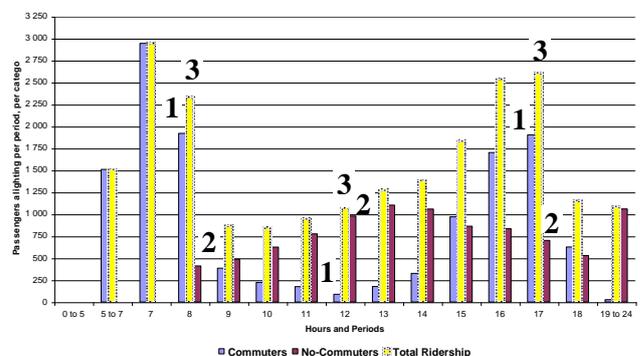
- ❑ a great accessibility, at-grade with an average interstation distance of 420 m approximately,
- ❑ a short headway (5 minutes between two successive vehicles)
- ❑ a very efficient and attractive commercial speed (estimated at 21 kph).

3 SPECIFICITY OF THE LRT LINE

The priority public link between the CBD and the Waterfront area will serve the needs of workers, the general public, business people, tourists and conference delegates. In that way it will be a very multi-functional and structuring public transport route.

During a weekday: Commuters and No - Commuters

LRT Ridership along the day: Base Case Project, Central prediction - 2004



will use the future LRT line

- 1: Commuters
- 2: No-commuters
- 3: Total ridership

3.1 A feeder line for many commuters

During peak hours, many commuters living in peripheral areas out of the Inner City and working in the CBD need connection with a local public transport network. The light rail line, with one of its stations close to Cape Town Central railway station, will offer good possibilities of connection.

Most of the commuters interested by the project will be those travelling from (or to) zones located out of the CBD, and in many cases out of the Inner City: they will travel either in trains, or in buses and minibuses, paying for that a specific long distance fare.

The service quality of the LRT line with exclusive priority all along the route will be very above the service quality of the current bus line between Waterfront and Central station.

During peak hours, many commuters



will use the future LRT line

Paying additionally an average fare estimated at R2.50 per trip (in January 2002, 1 Euro = 10 rands), it will be possible for many of the commuters to board on the light rail vehicle and go on that future feeding line. This may be the opportunity for the public transport network to start the development of a fare integration system: at present there is not any policy allowing such the implementation of such integration.

Currently very important pedestrian flows are observed on the morning and at afternoon peak hours between Central Railway station and the Dock and Waterfront areas. A lot of commuting passengers are also boarding during the same periods the bus line and the minibus services linking Waterfront to CBD: the fare paid by one commuter is varying between R1.80 per trip (Golden Arrows bus line) and R2.5 per trip (minibus fare for short distance).

3.2 A structuring line for local transport flows

The priority public transport link between the CBD and the Waterfront has a lot of winning cards for attracting a maximum of users all along the day:

- It will serve different points of the City centre and CBD with four stations (including the International Convention Centre station) and link them to the new Waterfront developments with the Roggebaai canal area and finally the Clock Tower precinct;
- The route is offering also many possibilities of connection with public transport terminals, routes and also with a great number of car parking areas or buildings;
- It will run, in the CBD, along major streets and avenues where there are a lot of points of interest generating pedestrian flows all the day,

Many other users will board the LRT line,



as business people, tourists and conference delegates

After the morning peak hour, and until the evening hours, the no-commuting users will be interested by the LRT service for “secondary” trips. The price paid will be associated to shopping, business, tourism and entertainment. The no-commuters will use the LRT in place of walking, riding on metered taxi, or using their private car for very short distance.

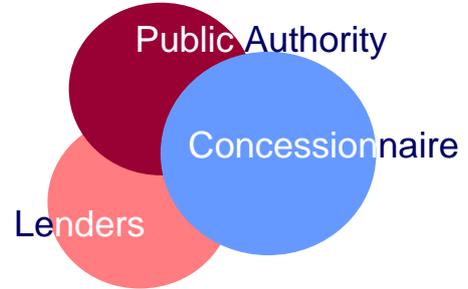
Government avenue



Gardens Station will be at 100 m

4 IMPLEMENTATION SCHEME

The characteristics of the project, particularly the commercial viability of the LRT operation on this corridor, make it possible to develop it via a Public – Private - Partnership: this will be probably a “Triple P project”.



These trips will be occasional trips for which the trip time value is similar to time value of private car users. Considering these characteristics and the performances of the LRT line, an average price between R5.00 and R6.00 per trip is considered as very acceptable for these users.

By using the LRT line, some private car users that want to go at midday from the CBD to the Clock Tower precinct and to Waterfront area will have the opportunity to save time and energies.

3.3 Public Transport for Saturdays and Sundays

The service will be operated on Saturdays and Sundays, all the stations along the route offering during these days a lot of attractive activities for all type of people. The ridership estimated for the line has been estimated conservatively at 67% of a weekday ridership for Saturday and at 51% for Sunday.

Two main indicators may resume the commercial viability:

- ❑ The forecasted rate of passengers alighting per LRT – km. is 21.4: this high level is corresponding to the location of the route in the centre of the Inner City, and to the intense trips demand market between the Historical Centre, the CBD, the Foreshore and the Waterfront area.
- ❑ The estimated relation between the annual income and a weekday income (Monday to Friday) is a rate of 330. This elevated rate is explained by the fact that during Saturdays and Sundays the proportion of no – commuters is high and there is a lot of activities for shopping, entertainment in the Waterfront and Foreshore areas.

Ridership (2004)	Monday – Friday	Saturday	Sunday
Commuters	12 979	3 245	1 622
No-commuters	9 425	11 782	9 897
Ridership	22 404	15 027	11 519

**Adderley Street in the City Centre of Cape
Town: before 1940 and in 2002**

