

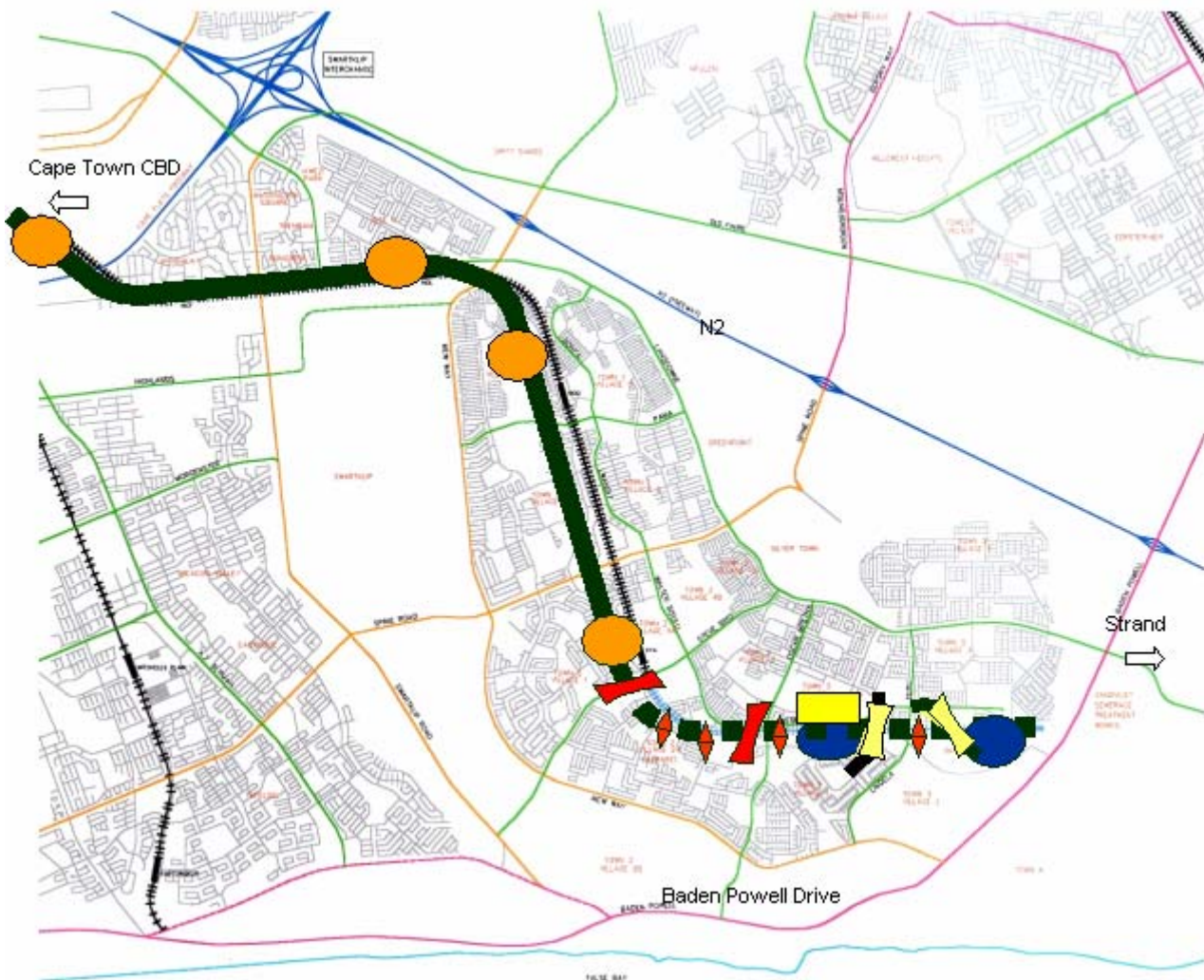
# IMPROVING ACCESSIBILITY TO COMMUTER RAIL SERVICES CASE STUDY: KHAYELITSHA RAIL LINE EXTENSION

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## ABSTRACT

The provision of Commuter Rail Services is the responsibility of the SA Rail Commuter Corporation as mandated by Government. The paper provides an overview of the various planning aspects that are required for the successful implementation of the multimillion rand Khayelitsha Rail Extension Project for the improvement of the commuter rail services in South Africa. The project is driven by good planning, having effective project structures in place and by following a sound project management philosophy.



## 1. BACKGROUND

Khayelitsha is a typical dormitory town, consisting of formal and informal settlements, situated in the south-eastern corner of the continuously developed metropolitan area of Cape Town. It houses  $\pm$  450 000 people. It is estimated that  $\pm$  120 000 people of the community work outside of Khayelitsha and  $\pm$  60 000 travel by train on a daily basis, thus approximately 100 train trips per weekday. The existing railway line effectively caters for only 50% of the community and as a result, the remainder rely heavily on taxis and busses for transport. In response to the communities need for affordable mass transport the SARCC decided to expand and improve the rail commuter service in Khayelitsha.

The Khayelitsha Rail Extension Project (*KREP*) forms part of a public transport planning process which already started in 1984. The first phase of this initiative, the construction of a rail line to the centre of Khayelitsha, was completed and the service commissioned in 1987. Due to cost and low commuter volumes at the time, the second phase of the planned project, the extension of the line by  $\pm$  4,2 km, was never implemented.

Since 1987, and primarily as a result of the greater-than-expected rate of population growth, several initiatives aiming at the provision of the Khayelitsha rail extension were lodged. However, these endeavours were largely unsuccessful, primarily due to the dynamic and almost volatile political and institutional situation of the nineties. While a shortage of interested and affected parties existed, the respective roles and responsibilities were undefined and undetermined, resulting in very few decisions forthcoming.

All along, pressure was mounting from the community, who insisted on safe and affordable public transport, amidst periodic outbursts of violence in the taxi industry. They also regarded a construction project of this magnitude as a massive socio-economic boost to an area deprived of work opportunities. As a consequence, a first attempt to commence with the detail design of the rail extension took place in 1994. Lack of funding for the project resulted in its temporary cancellation. In 2001 the SARCC embarked on a renewed attempt to plan and provide the long awaited and desired rail extension. This happened after our President announced it to be a "Presidential Project". Detail designs of the various project elements are at present nearing completion, with the implementation (construction) thereof programmed for August 2005 to December 2006.

## 2. PROJECT STRUCTURE

The Project is Managed Essentially at Three Levels:

**Project Steering Committee**, with members the Department of Transport, SARCC, City of Cape Town and the Provincial Authority;

**Project Co-ordination Committee**, with members the SARCC, Metrorail, Intersite, City of Cape Town, Provincial Authority and the project manager (and other ad hoc attendees, e.g. Eskom)

**Technical Co-ordination Committee**, with members SARCC, Intersite, Metrorail, City of Cape Town and technical consultants.

Other smaller committees or working groups are on occasion set up to evaluate certain specific issues, e.g. procurement, legal, fare evasion, user requirements, etc. Also, internal teams within the various stakeholder organisations exist to consider and agree on, mainly, technical matters.

Due to the history, nature and location of the project, it was considered essential to acquire the services of a local, experienced project manager. He would play a pivotal role during the initial phase(s) of the project not only to facilitate and integrate roles and responsibilities of the various role-players, but also to assist with setting up project structures and administrative and configuration systems.

### **3. SCOPE OF WORK/PROJECT DEFINITION**

The KREP in some regards can be considered as a developmental project. It has been many years since a new rail line was designed and built in South Africa and many changes have occurred in legislation, technology, user requirements and stakeholders' organisations. Hence, while main project elements were known at the start of the project, the final scope of work is really the end result of interactive and interdependent processes. This is particularly true for the stations, where the accommodation of special needs passengers impacts substantially on functional elements and costs.

Infrastructural elements which will be provided through the KREP are:

- 4,2 km of double electrified rail line
- 4 road over rail bridges
- 4 pedestrian bridges
- 2 stations
- 2 transport interchanges
- amendments to existing road infrastructure

The nature, extent and functionality of these final products are/were very much influenced/determined by the following focus areas:

- Stakeholders and their respective roles and responsibilities;
- User requirements;
- Technical requirements;
- Environmental impact requirements;
- Health and safety matters;
- Public liaison; and
- Land acquisition.

Each one of these focus areas, in turn, influences the other to a lesser or larger degree, resulting in an almost iterative process, spiralling to the eventual product.

### **4. STAKEHOLDERS AND THEIR ROLES AND RESPONSIBILITIES**

#### **4.1 Roles and Responsibilities**

##### *4.1.1 National Department of Transport*

- Funding agency
- National Transportation Policy and Implementation
- Approval of projects within policy framework and affordability levels

##### *4.1.2 South African Rail Commuter Corporation*

- Compliance with Legislation
- Government Policy implementation w.r.t. public transportation
- Project Identification and motivation
- Project leader and implementation agent
- Establish stakeholder user requirements and set design criteria.

- Project evaluation, economic viability, affordability and fund motivation.
- Undertake technical and operational conceptual and detailed design and ensuring compliance with technical standards.
- Establishment of rolling stock operational requirements.
- Undertake the acquisition of additional land requirements
- Approval of all plans associated with the project

#### 4.1.3 *Metrorail*

- Train Operations and Maintenance management.
- Input on safety and security measures
- Input on rail infrastructure design and maintenance practices
- Input to station site development and design.
- Detailed evaluation of for rolling stock and operational requirements
- Consideration and application of hawker policy requirements.
- Motivation and consideration of measures to combat fare evasion
- Interaction with suppliers eg. Eskom, on electricity supply requirements
- Consideration of and comment on all plans prepared for the project

#### 4.1.4 *Provincial Government of the Western Cape (PGWC)*

- Transport Authority
- Development partner
- Ensure compliance with and impact on provincial transportation policy framework and network.
- Ensure Public Transport integration i.e modal integration. Facilitate involvement of bus and taxi industry, operators and community
- Establish fare rationalization and subsidy policy
- Obtain political support at provincial level
- Consider: economic viability, environmental impact, station and inter modal site development, road and pedestrian bridge requirements.
- Approval of the project in the Public Transport Plan and Integrated Transport Plan
- Provision of funding of modal transfer facilities undertaken in partnership with the City of Cape town

#### 4.1.5 *City of Cape Town*

- Planning Authority
- Development partner (motivation of funding contribution from PAWC)
- Provision of modal transfer facilities for buses and minibus taxis and provision of road over rail and pedestrian bridges.
- Economic and physical evaluation of the impact on the local transport network of the project.
- Evaluate and provide input on station site development, spatial impact of alignment and design plans.
- Provide input on impact on ancillary service requirements and comment on Environmental Impact Assessment. (EIA);
- Preparation of the Metropolitan Transport Plan (including the Public Transport Plan)

#### 4.1.6 *Intersite (Agent of SARCC)*

- Property Management
  - Facilities Management
  - Development/Project Management (private and public sector funding).
- Land acquisition, where required at the request of the SARCC

- Consideration of the station site development plans and design at the request of the SARCC;
- Property management administration of station related commercial activity at the request of the SARCC
- Consideration of optimal use of land/property for transport in liaison with PGWC

## **5. USER REQUIREMENTS**

The rendering of an efficient public commuting service can only be achieved by means of functional and well functioning infrastructure. It is therefore imperative that both service and infrastructure be designed to optimally take the users requirements into consideration.

### 5.1 Service Design

The cornerstone of the operational service design is a passenger patronage evaluation. This patronage, in turn, is largely governed by the demographic data, including the catchment area with its current/potential population and the current/potential travellers with destinations.

The determination of the service design, for which an evaluation period of 20 years was used, impacts on a number of elements, including:

- Quantification of (additional) rolling stock;
- Infrastructure requirements (perway, signals, electrical and telecomm.)
- Station requirements (also at other stations, e.g. Cape Town);
- Staging requirements; and
- Existing network and service.

### 5.2 Infrastructure Design

A major requirement, particularly in respect of the design of the stations, is that special needs passengers (SNP) be accommodated therein. The importance of meeting this requirement is accentuated by the fact that it is governed by legislation and aimed at a large portion (34%) of the user population which, by definition, are defined as SNP's (physically and mentally disabled, the aged and the very young).

## **6. TECHNICAL REQUIREMENTS**

While *minimum* technical specifications are not negotiable, the applied specifications might vary and are influenced by the other focus areas, such as environmental requirements.

In addition to certain standard technical requirements, much effort was put into assessing and applying new technology. This specifically relates to aspects such as safety and security, automatic fare collection, ballastless track and energy absorbing systems at the terminal station.

## **7. ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**

The history of the KREP, with the rail corridor having been planned and provided (protected) as part of the development of Khayelitsha, reduced the need for a fully fledged EIA. The Department of Environmental Affairs and Development Planning (DEA & DP) agreed that a Scoping Report would suffice.

A Record of Decision (RoD), issued by DEA & DP and in response to the Scoping Report, will govern the Client's responsibilities and obligations in respect of environmental matters during the construction phase. An Environmental Control Officer (ECO) will to be employed to ensure adherence to legislation.

## **8. HEALTH AND SAFETY**

The Construction Regulations charge a client involved in construction work with certain responsibilities in order to ensure that the provisions of the Occupational and Safety Act are complied with. To ensure that these requirements are met, a Health and Safety Agent (H &SA) must be appointed by the client(s) involved in the KREP.

To co-ordinate and integrate the various contracts from a health and safety perspective, a single H&SA will be appointed for the whole project. With different clients requiring the same service, a uniform approach will be followed through the involvement of the same agent.

## **9. PUBLIC LIAISON**

Wide spread public support for the project has been voiced at various forums. As intimated previously, the KREP is considered by the community as long overdue and much needed also from a socio-economic perspective. Apart from a recent invasion of a part of the planned rail reserve, this corridor has been "protected" by the community for almost 20 years.

Well organised and functioning community structures exist in Khayelitsha. Also, the local and provincial authorities are considered legitimate and representative of communities. Formal channels and mechanisms exist whereby public consultation and communication can occur. Development forums, sub-councils and the Cape Town City Council have been part of the planning process right from the start.

Consultation as part of the environmental scoping study (refer to paragraph 7.1) was conducted in terms legal requirements. All the major role players and interested and affected parties were consulted, their inputs obtained and incorporated in the final Scoping Report.

## **10. LAND ACQUISITION**

Land required for the KREP comprises approximately 22 hectares of primarily City (of Cape Town) owned land. Current zonings are mainly "open" space or "undetermined".

A detail property register has been compiled which provides information on ownership, general plan and title deed numbers. A re-zoning and sub-division application has also been lodged with the Local Authority.

## **11. CHALLENGES**

### 11.1 Roles and Responsibilities (Refer to Paragraph 4)

With the involvement of at least three major clients, namely SARCC, Intersite and City of Cape Town, as well as important role-players such as Metrorail and the Provincial Authority, agreement on and acceptance of the respective parties roles and responsibilities constitute(d) a huge challenge, especially during the initial stages of the project.

## 11.2 Multiple Funding Sources

The City of Cape Town contributes funding towards certain specific elements, namely, two road-over-rail bridges, the two transport interchanges and some roadworks. These works are governed by separate appointments (by the City), requiring careful co-ordination and management regarding the interface with and integration of other project elements. There are work, however, which are of a common nature to virtually all elements, for example, geotechnical, health and safety, environmental, re-zoning applications, land surveying, etc. It therefore makes logic that the same service providers be appointed to attend to aspects common to all elements. Huge challenges were encountered during the process of reaching agreement (between the different client bodies) on which service provider to appoint, proportional scope of work, compensation (quantum and process), management and control requirements, reporting channels, etc.

## 11.3 Approval Processes

It was intimated previously that the KREP constituted a “first” to many role-players. Even within approving authorities’ organisations, a degree of uncertainty exist with regards to mandates to approve or advise on technical and other matters. This might be attributed to a lack of experience/expertise or institutional procedures and processes not being formalised/finalised.

A further complication is caused by the fact that different approving authorities, in a number of instances, have to endorse the same drawing/design/document. All revisions proposed by any one of these authorities have to be relayed to the other, for their endorsement of the revisions. While this is not uncommon to a project of this nature, the challenge lies therein to make the process as effective and expeditious as possible.

## 11.4 Design Criteria (SNP)

The provision of accessible transport is controlled by several institutional policies and legislation at a National level in SA. Foremost to these are “The Constitution of the RSA: Act 108 of 1996, “National Land Transport Transition Act 2000”, “Moving SA –Action Agenda- 1999”,the “Integrated National Disability Strategic White Paper-1997” and the Employment Equity Act.

The accommodation of Special Needs Passengers (SNP) in the design of the stations however posed a particular challenge. No standard set of design criteria existed and the technical and professional team, in conjunction with the SARCC, Metrorail and Intersite, had to develop user requirements and design standards in line with international norms, which is almost unique to the two new stations.

## 11.5 Scope Change Management

Scope development is accepted as essential to a project of this nature. Project elements were defined at the start of the planning phase, but only at macro level. Information obtained through subsequent studies (e.g.. passenger patronage) and conceptual planning (e.g.. stations) inevitably resulted in the revisions to the initially defined scope of work. Another impact, which could not have been clearly defined and quantified at the start, is that of the rail line on the existing road infrastructure. A transportation study, which evaluated commuting patterns and desire lines, had to be conducted to determine changes to the road network.

Scope change management is challenging particularly from a budgeting perspective. This is complicated further by requirements put by the operational and maintenance agent, for example Metrorail (i.r.o. the stations) and the City of Cape Town (i.r.o. the bridges) which, on occasion, appeared to be excessive.

### 11.6 Procurement

The KREP presents a tremendous opportunity for the empowerment of the historically disadvantaged individual and enterprise. However, while job creation, training, skills development and involvement of Affirmable Business Enterprises need to be maximised, it also need to be optimised within procurement policies. Work must be made accessible to a broader market while clients' interests are still protected and quality of work ensured.

Although it is not possible in all instances to accommodate the smaller or inexperienced contractor, all endeavours are made to structure tender documents in such a manner as to encourage the larger contractors/tenderers to involve, train and empower the HDI's, ABE's and SMME's.

### 11.7 Land Invasion

The invasion of a section of the rail reserve by approximately 3000 families threatened to pose a serious risk to the project. Negotiations resulted in these invaders, who are in actual fact in favour of the project, agreeing to relocate to alternative land. The City of Cape Town, who has assumed responsibility for these actions, has already identified an appropriate area to relocate these families to. The remaining challenge is the co-ordination and integration of this relocation with the implementation programme of the rail extension: the vacated area can not be left open for too long as it might be invaded by another group. Protection of land is considered best through construction activities soon after vacating thereof.

### 11.8 Liaison with the Taxi and Bus Industry

Liaison with especially the taxi industry has been unsatisfactory, if not non existing. This is due almost exclusively to the volatility within the industry as well as uncertainty with regards to the application of governmental regulations. Although the taxi industry is officially informed about the project, their participation in planning matters is lacking.

We are preparing ourselves to face a vast amount of new challenges when the project implementation commences.

## **12. PROGRAMME**

The nature of the KREP makes it almost inevitable that the project programme be a dynamic instrument (rather than a fixed baseline) whereby the project is managed.

Reasons for this are, inter alia:

- Scope development and changes adding activities and time to the programme
- Approval processes which are mostly undefined and uncontrollable
- Uncertain budget requirements, availability and constraints
- Procurement requirements, which impact also on the number of contracts to be entered into.



The project programme is being set up, managed and evaluated in two phases. This is primarily done as the initial project brief only called for detail design and documentation.

**Phase 1:** Contractors' Appointment Schedule, which includes all actions and activities up to the start of construction. Typical activities scheduled therein include the various design stages and approval processes. A spreadsheet is used to create linkages between activities and to identify delays and float.

**Phase 2:** Construction Programme using MS Projects, which schedules the construction activities of the various contracts.

The construction of the various project elements, for example the stations and transport interchanges, need to be scheduled carefully to ensure that all are commissioned at the same time. Completed elements can hardly be left unused for a period of time, for fear of vandalism and general deterioration. The programme, therefore, is not used only to manage the critical path, but also to schedule the relative contracts' activities, for example, start date, lead time of imported items, etcetera.

### **13. FINANCIAL**

The project is funded primarily by the Department of Transport through SARCC and the City of Cape Town. The latter is also contributing funds from other sources. At present the total project cost (excluding provision for rolling stock) is estimated at R230 million.

A life cycle cost model has been developed to assess the financial viability of the rail extension and to serve as a decision tool for alternatives.

In this regard, a few important considerations/observations are noteworthy:

- An evaluation period of 20 years is used;
- Scope changes require that information are regularly /continuously revised;
- A cost benefit analysis has not been done, that is, socio-economic benefits have not been considered; and
- The financial feasibility of the project depends largely on the extent of fare collection

### **14. CONCLUSION**

In conclusion it is important to highlight the Key Success factors which have and still will contributed to the effective management of the project.

- The primary factor was government's acknowledgement of the community's needs and the commitment to the funding of the project.
- The project viability in terms of its contribution towards the social and economical impact on the community in providing public transport.
- Project structures and sound project management processes and procedures.
- Stakeholder and public involvement and commitment at all levels.
- Competent and skilled multi-disciplinary professional team
- Efficient procurement processes and procedures.
- Life Cycle Model development and assessment.
- Good project finance management.
- On time delivery of all decisions and instructions.