

# **A VISION FOR TRANSPORTATION SYSTEM PLANNING FOR CENTURION IN THE NEW MILLENNIUM**

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## **1 INTRODUCTION**

Centurion developed mid-way between Pretoria and Johannesburg from a modest agglomeration of a number of peri-urban areas to a proud city with a vision for growth and economic development for the future.

This paper evaluates the dynamics and energies that contributed to the growth of the area and identifies key success factors that could point towards a future vision. It also aims to identify where obstacles stood in the way of development and endeavours to formulate a planning approach and philosophy to avoid a repetition thereof.

Centurion is an example of where stumbling blocks were overcome and even transformed into stepping stones to create opportunities for growth and development. With a strong focus on multidisciplinary forward planning, it has succeeded to stay ahead of development needs and lay to the table for developers and entrepreneurs to participate in the building of the city. The emphasis on addressing the needs of the community, both residents and the business community, has allowed Centurion to create a town where people want to live and where people increasingly prefer to do business.

A number of benchmarks in the development of Centurion and the role played by Transportation Planning to contribute to the process are identified in the paper. The Planning Framework in the area is described with specific emphasis on Transportation Planning, and a Transportation Planning Challenge is formulated. The paper concludes by identifying a number of lessons learnt in Centurion, and recommendations are made on a vision for Transportation System Planning to take Centurion into the new millennium.

## **2 EARLIER MILEPOSTS**

Planning initiatives in Centurion commenced with the proclamation of the town Verwoerdburg in March 1977. A number of peri-urban areas were incorporated into Lyttelton south of Pretoria and a new scale and scope for planning was created for planners to formulate a structure for the vision for the development and growth of the area.

One of the first mileposts in Centurion was the planning document *Development Proposals for Verwoerdburg* that was approved by the Town Council in January 1978. A planning framework was formulated that would form the basis for most of the subsequent development initiatives. It created a successful framework and long term vision for the urban framework that is still relevant, although short term implementation and detail aspects had to be adapted and amended in line with changes in South Africa, new planning legislation, and modern urban design and planning philosophy.

The 1978 proposals already included a proposed interchange on the N1 where the Ultra City was later constructed and where the Samrand Interchange was subsequently built. At the time the proposal met with resistance from roads engineers because design standards could not be fully complied with. In later years the Town Engineers Department played a crucial role in the planning, design, approval, financing and implementation of the Samrand Interchange. This process included detailed negotiations with the Department of Transport and the Gauteng Department of Transport and Public Works (Guatrans) to develop an integrated road network comprising the national road, provincial roads and the planned PWV major road network, metropolitan routes and the Centurion local road network. The Samrand Interchange is today the gateway not only to the Centurion Expressway to the east, but also to the Samrand commercial, industrial and residential area west of the N1 freeway.

The 1978 *Development Proposals* also gave momentum and a formal focus to the process of establishing a new Central Business District that is today Centurion City. It launched an intensive integrated multi disciplinary development planning process that resulted in the Development plan and the establishment of the town Verwoerdburgstad.

Throughout these developments, transportation planning played an integral part in the development framework for Centurion City, which relied on its location which is in close proximity to the John Vorster Interchange on the N1 Pretoria Eastern Bypass. Specific transportation proposals included one-way couplets where major east-west corridors pass through the CBD, proposed major road links and a new proposed interchange on the R28 Ben Schoeman Freeway to Pretoria CBD, as well as adequate provision for parking.

Development proposals were formulated for the Lyttleton Agricultural Holdings north east of the CBD in 1977, which opened this the area for development. This area experienced a slow pace of development until the 1990's when the Town Council offered discount on engineering services that resulted in an explosion of development in the area.

During the late 1970's and early 1980's the planning of the PWV major road network delayed the development of residential development in the southern parts of Centurion. The Rooihuiskraal and The Reeds areas were particularly impacted by the alignment of route K54. A spatial development framework was developed for the area that provided for the following:

- Integration of major arterial routes with K54 to create an acceptable urban structure.
- Rooihuiskraal Road as a north-south arterial parallel to the N1 freeway. This road is today seen as part of a development corridor that stretches to the southern parts of Midrand and has seen the approval of an additional interchange on the R28 Krugersdorp freeway.
- The inception of a growth period in residential township development.

During the 1980's, Centurion held the viewpoint that the land reserved for a new alignment for the N1 Pretoria Eastern Bypass (south of the existing alignment of the Bypass) was a serious obstacle in the way of development. The proposed road isolated certain development areas and had serious implications on the planning and construction of the local street system in the area where the Highveld Technopark was proclaimed in 1988. On the positive side, the road reserve for the new N1 and PWV6 freeways created opportunities for the proposed Centurion Expressway and the East-West Development Corridor that today form major strategic initiatives in the development of not only Centurion, but form part of the strategic planning framework for the Greater Pretoria Metropolitan Council Area (GPMC). The formulation of Transportation Proposals forms part of a planning process orchestrated by the Centurion Town Council and the GMPC and is an excellent example where Transportation Planners gave shape to the concepts for development planning conceived by an interdisciplinary planning philosophy.

### **3 RECENT DEVELOPMENTS**

Centurion in 1992 published its 1992 Structure Plan. It was essentially a revision of previous master plans and was aimed at formulation of the ideas of decision-makers in respect of key aspects such as urban form, development nodes, major transportation routes and the creation of an urban open space system. Although the structure plan defined urban form and created a framework for Land Use Management, it did not present an adequate level of detail to be of practical use in the management and application of Traffic Engineering and Transportation Planning issues.

The concept of Integrated Development Plans (IDP's) introduced a new era for Land Use Planning in South Africa and also in Centurion. The first plan, published in March 1997, was primarily GPMC driven with the purpose of integrating Transportation and Land Use Planning on a Metropolitan wide basis. Several detailed investigations in Centurion formed part of the process to develop and formulate the revised IDP. These planning projects included the Samrand Development Corridor (Centurion Expressway) and the Lyttleton Manor Urban Renewal plan.

The Lyttleton Manor Urban Renewal plan included Public Participation, Urban Design, Town Planning, Public Transport Planning, Transportation Demand Modelling, Traffic Calming measures, Access Management plans and Road Design projects. River Road that had been identified as a primary through route is currently under construction and is expected to have a major impact on the spatial development of the area.

Specialist consulting companies in co-operation with the planning departments, the Town Council and the community were actively involved in the development of solutions that satisfied planning needs, met transportation criteria and were acceptable to the community.

## **4 TRANSPORTATION PLANNING FRAMEWORK**

The primary philosophy that underpins previous and current Transportation Planning in Centurion is a delivery based integrated pro-active approach.

It is integrated because it strives to involve and co-operate with a wide spectrum of stakeholders including transportation authorities (SA National Road Agency, Gautrans, GPMC and neighbouring local authorities Midrand and Pretoria), all transportation modes and particularly public transport, other Departments within the Council and particularly the Roads and Stormwater, Town Planning, and the Traffic Department, developers and political decision-makers.

It is pro-active because it includes long term strategic planning, as well as more detailed short-term planning where development trends indicate that transportation infrastructure and services would be required within the next planning and budget cycle.

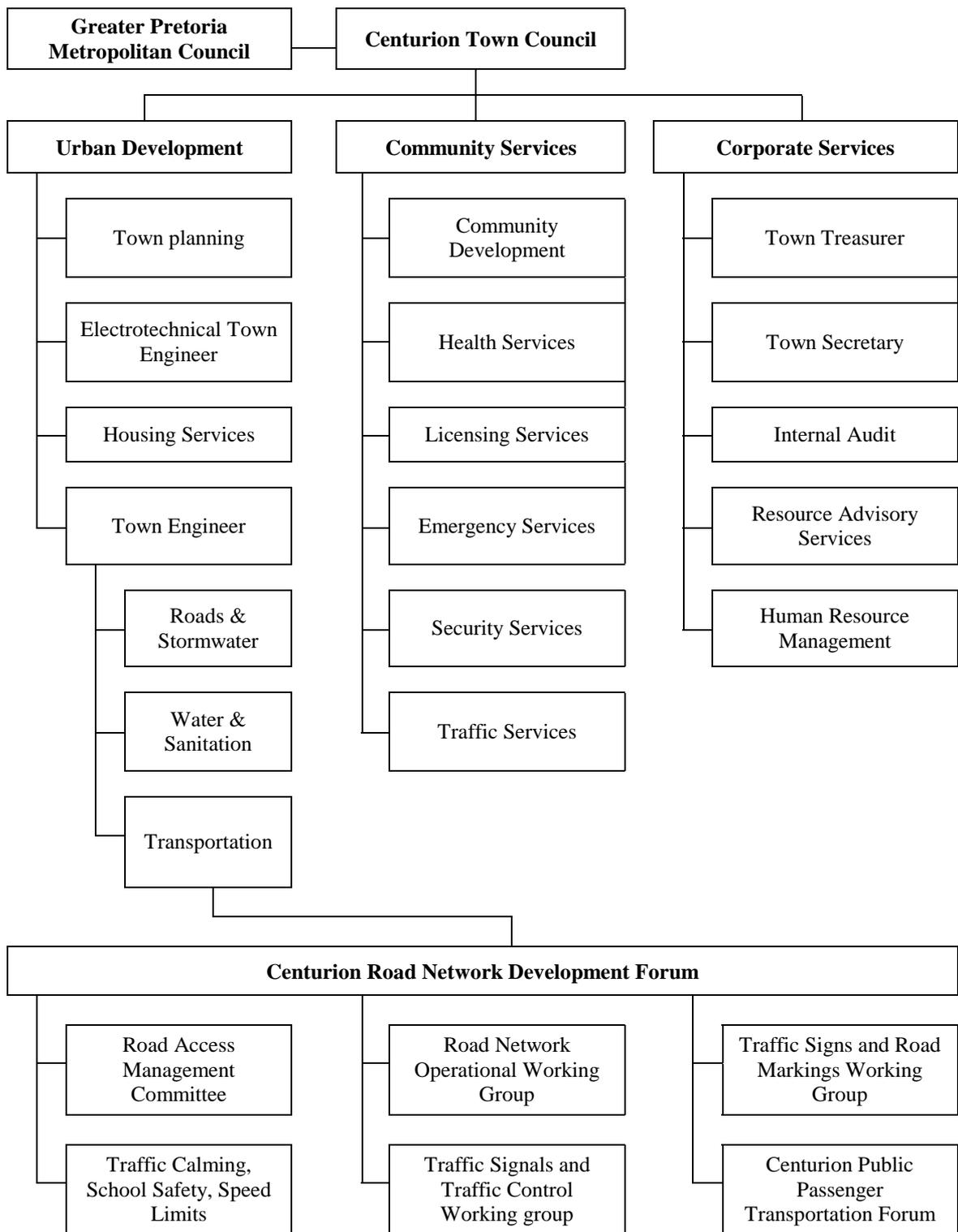
A Transportation planning framework has been developed during the past five years and is supported by a formal process of structured meetings to ensure that the diverse aspects of Transportation Planning and Traffic Engineering are addressed on a continuous basis. An organogram of the Centurion Town Council is shown on Diagram 1. It also shows the Centurion Road Network Development Forum and its various committees tasked with specific focus areas. The composition and major functions and activities of the various committees are summarised in Table 1.

Centurion is a substructure of the Greater Pretoria Metropolitan Area and therefore an overlap exists at the interface of bulk services that are primarily the function of the Metropolitan Council and the delivery of services at the local council level.

The Road Network Development Forum has proven to be a most successful mechanism for conflict resolution and problem solving. It also created a formal structure to address issues that have an impact on the PWV major road network or where provincial roads are affected. A number of case studies are briefly discussed below:

### **1. Centurion Expressway**

During the preparation of the Pierre van Rhyneveld South Structure plan, the planning of the road network in the area was referred to the Road Network Development Forum. This process resulted in the identification of the eastern extension of Olievenhoutbosch Drive to the Rietvlei Interchange on the R21-(JIA-Pretoria) freeway, which in turn provided the impetus for the creation of a development corridor concept along the N1 freeway that links five interchanges on the freeway system.



**Diagram 1: Centurion Town Council Organisational Structure**

**Table 1: Composition and major functions and activities of various committees**

<b>Committee</b>	<b>Composition</b>	<b>Functions and Activities</b>
Road Network Development Forum	Traffic & Transportation Stormwater and Roads Traffic officials and consultants responsible for various committees GPMC land use and planning GPMC Infrastructure and Roads GPMC Emergency Services	Co-ordinate Transport Planning Initiatives Integrate input from committees into projects Integrate Transport Planning with Road and Stormwater Projects Integrate road network proposals at all levels Liaison with Gautrans Arrange ad hoc initiatives where integrated approval is required
Road Access Management Committee	Transport Traffic Roads and Stormwater Town Planning Drawing office	Revise Access Management policy Develop Access Management Plans Integrate Access management with Town Planning, urban design and Road design
Road Network Operational Working Group	Traffic Engineering Transportation Planning Roads and Stormwater Traffic Services Consultants	Co-ordinate and manage operational matters, i.e. CTO, road capacity, modelling, traffic control, road safety, etc.
Traffic Signs and Road Markings Working Group	Traffic Engineering Transportation Planning Roads and Stormwater Traffic Services Consultants	Planning, design, co-ordination, integration, implementation, assessment
Traffic Calming, School Safety and Speed Limits Working Group	Traffic Engineering Roads and Stormwater Consultants	Planning, design, co-ordination, integration, implementation, assessment
Traffic Signals and Traffic Control Working Group	Traffic Engineering Roads and Stormwater Electro technical T.E. Traffic Services Consultants	Planning, design, co-ordination, integration, implementation, assessment
Centurion Public Passenger Transportation Forum (CPPTF)	Transportation Planning Traffic Services Town Planning Security Services Health Services Town Secretary Bus Operators Taxi Operators Other PPT operators GPMC SAPS Consultants	Overarching co-ordination and management

The above successful end product was achieved by the synergy of an integrated approach and the combined innovation and insights of a multi disciplinary team. Although Olievenhoutbosch Drive had been part of the road network and spatial framework for many years, it was the eastern extension of the route to the R21 freeway that transformed this corridor to a major initiative and development opportunity, which is today referred to as the Centurion Expressway.

## **2. PWV6 / K105 / Centurion Expressway**

Rapid development and a number of Township applications along the R21 freeway south of the Pierrie van Rhyneveld area required urgent planning decisions and road planning projects. Questions that had to be answered included:

- (a) Is the PWV6 freeway really necessary?
- (b) Should there be an access interchange on PWV6 between N1 and R21 albeit at a substandard spacing?
- (c) Can an at grade intersection be provided at the intersection of K105 and Centurion Expressway?
- (d) What should the local road network look like?
- (e) How will access be provided to a proposed modal transfer station?

The key to these problems was once again a multi disciplinary brain storm where a revised alignment for K105 was identified that would simplify the configuration of the N1 / PWV6 / K105 interchange system. Consensus was reached within a period of three months and the planning of the amendment of the various road elements are currently underway.

## **3. K71 / K73 Alignment**

Provincial road P66-1 (Route K71) provides the only existing north-south corridor in the eastern part of Centurion. Route K73 has been planned and earmarked as a mass transport corridor. Immediate local planning needs also prompted Centurion to plan an additional parallel accessibility corridor along Baard Street.

A yet unresolved issue was the major road network at the intersection of K103 (east west) with K71 and K73 (both north-south) respectively. After debate at the Centurion Road Network Development Forum, Centurion and Gautrans undertook planning projects on their respective networks and an innovative solution that adequately satisfied all needs was developed.

## **5 TRANSPORTATION DEMAND MODELLING**

Centurion has over the years made extensive use of a number of traffic demand models, such as EMME/2 and Saturn, to assess the impact of future land use planning on the road network. This information was furthermore used to determine the roads master planning needs regarding future road infrastructure.

A concern that was identified during the early 1990's was the tremendous pressure of east-west movements to the Centurion CBD. The traffic demand modeling indicated that in the future scenarios all planned east-west corridors would not be sufficient to accommodate the traffic that would be generated by the employment opportunities in the east of the Ben Schoeman/N1 freeway. At that early stage recommendations were made to the land use planners to encourage employment opportunities to the west of Centurion to utilize the present and planned road network more effectively.

During 1992, an intensive process was launched to assess the traffic impact of the 1992 Structure Plan. Following this process the information gleaned regarding present and future road infrastructure needs was used to develop a road hierarchy for the Centurion area. Since then this hierarchy has become pivotal in all aspect of planning, from policies regarding parking and access management and the determination of public passenger transport routes to operational aspects such as the location of traffic calming schemes to emergency routes for the Ambulance and Fire services.

Following the increasing pressure on Centurion for land use development and the concern of the Town Engineers Department regarding the cost of providing an adequate road network system, the traffic demand model was further used to develop a cost apportionment model for the Council. The objective of the cost apportionment model is to assists the officials in determining the bulk contributions to be made by a prospective developer.

In the more recent past the need for integrated transportation planning with neighboring local authorities was identified. This was especially critical on the southern boundary of Centurion with Midrand, as Midrand was also experiencing a high demand for development. For this purpose a traffic demand model was developed for the Centurion/Midrand area. This model will assist Centurion in more effectively assess the influence of future developments on its boundary. It is also envisaged that in future bulk contributions could be paid to neighboring local councils, should a planned development impact on the respective road infrastructure.

## **6 PUBLIC PASSENGER TRANSPORT PLANNING**

The need for effective planning for public passenger transport services was identified as early as the late 1980's. Centurion has to date no internal road based public passenger transport system – save the mini-bus taxi services operated in their jurisdictional area and a number of bus operators that transport commuters to Centurion in the morning and out again in the afternoon. Centurion Town Council benefits significantly from the Pretorias-Germiston-Johannesburg railway line that runs north-south through its area. An integrated modal transfer facility is planned adjacent to the Centurion Expressway to expand the utilisation of this important asset.

In the late 1980's – and again in the mid-1990's - the Council undertook feasibility studies to determine the need for an effective public passenger transport service within its boundaries. Both studies indicated, that although there was/is a need for public passenger transport, the latent demand was so low that any service would be operated at an enormous cost to the Council. Furthermore, the studies indicated that approximately 35% of all employed and scholars from Centurion travelled to Pretoria.

Following the initial study, the Council took the bold decision to instead of developing a public passenger transport service for Centurion; it would put all efforts into the development of the mini-bus taxi industry. Thus, in 1990 the first taxi forum was initiated. The aim of the forum was to have a platform where any issues regarding taxi matters could be addressed. Further to the above, training programs were developed for the industry to address issues such as business and meeting practices. The result of these communication structures and efforts was that to date, no violence within the taxi industry was recorded in Centurion. Any potential flash-points were identified at an early stage and addressed when needed.

Over the years, from the initial Taxi Forum a number of other forums were initiated. Today Centurion has a multi modal Public Passenger Transport Forum (CPPTF) with a number of sub-committees, such as the Taxi Forum (CTF), the Bus Operators Forum (CBOF), a Facilities Planning Forum and a Facilities Management Forum. All committees aim to enhance the public transport services in the town.

Regarding public passenger transport facilities, Centurion during 1995 developed a hierarchy of facilities. The objective of the facilities hierarchy was to address the differing needs of the operators, passengers and the residents of Centurion. So, for example, would the needs of the operators to have an area where the vehicles can be serviced be located in an area that was not sensitive to such a practice (industrial areas). In contrast, facilities located in residential areas would be planned taking the environmental impact on the adjacent area into account; while the needs of the passengers with regard to ablutions and recreational facilities would be accommodated closer to their employment places.

Following the determination of a facilities hierarchy, Centurion developed a facilities master plan, which is being used for the implementation of the facilities. Once implemented, the Council has developed a facilities management system to ensure that the infrastructure investments are managed and operated effectively. This management plan is being implemented together with the public passenger transport operators and also the hawkers at the facility.

## **7 TRANSPORTATION PLANNING CHALLENGE**

A number of conclusions regarding integrated development planning can be made based on the historical review of the major planning benchmarks in Centurion:

1. A long-term strategy is not required but imperative, even if some of the long-term visions may turn out to be insufficient in their scope and extent.
2. An integrated planning approach is required where various disciplines co-operate and join forces in an integrated and cohesive manner.

3. The support of decision-makers is and the community is essential.
4. A supporting arterial road network is important to complement the major freeway network. Accessibility and mobility are key factors considered by investors, developers and business enterprises.
5. Financial implications play a very important role, in both smaller and larger development projects.
6. Transportation infrastructure is fundamental to support development, economic growth and an attractive living environment.

Technological change, innovation and improved communication and information technology during the past decade are a clear indication of the challenge that lies ahead in Transportation Planning. A revolution more far reaching than the replacement of animal drawn vehicles by the internal combustion engine is on our doorstep – the only problem is that we can not conceptualise its nature or its impact on society, human behaviour and transportation needs. Although it is often hypothesised that the need for travel can be dramatically reduced by improved communication technology, experience has shown that the desire to travel and personal contact may in fact increase as a result of access to information and marketing as well as economic growth.

The challenge to Transportation Planners, we believe lies in an understanding of the impact of these developments and innovation on the urban structure. The fundamental principle that Transportation is a derived need that is determined by town planning and urban form, and that Transportation Planning is essentially demand driven rather than supply driven is particularly relevant. Transportation Planners should anticipate the way in which society would respond to technological change and how human behaviour would influence the demand for travel.

We believe that futures research should be promoted as an important input into the planning process, and particularly in the field of transportation planning. This may include issues such as the impact of the HIV/AIDS epidemic on social structures, travel demand, economic development and the budget allocation for transport infrastructure and services.

## **8 RECOMMENDATIONS**

During the past two decades, the Centurion Town Council has developed a focused delivery driven multidisciplinary and integrated planning philosophy. A number of important lessons have been learnt during this process that could assist towards the challenges of the era of technological change and development anticipated at the beginning of the new millennium. It is suggested that the insights gained may also be of value to act as guiding signs along the route of development of other organisations.

### **1 Development planning philosophy**

It is essential that an ultra long-term vision should be formulated to guide development. The provision for adequate corridors for future mobility should be a central and integral part of this vision.

The vision should be achieved through consultation and co-operation of a wide spectrum of stakeholders and should be complemented by a Development Management Process to ensure delivery and to ensure that stated goals are achieved.

## **2 Adaptability**

Cities undergo continuous change and it is essential that planning is adaptable to changing needs and technology, and that mechanisms are created to facilitate monitoring and review.

## **3 Co-operative Governance**

Planning should strike a balance between local, regional and national needs and it is therefore essential that they are embraced within the planning framework.

## **4 Implementation Strategy**

There is a serious concern about the interference of the development process that can be caused by a lack of implementation of transportation projects. Financial implications of transport projects often act against the desired planning concepts and urban design. Planning must therefore be done within budget and resource constraints, and financial structures of cost apportionment should form an integral part of the planning process.

## **5 Environmental Management**

The full life cycle impacts of transportation projects are not yet fully understood and quantified. Increase attention should therefore be given to integrated environmental management.

## **6 Technology**

South Africa has lagged behind some technological developments, and specifically in the mass transport field. Mass transport systems form an integral part of major urban conurbations throughout the world. For South African cities to be competitive in the global arena, they will require functional and viable mass transport systems. Transportation planners should take part in the process of Futures Research to gain an understanding of the implications of future scenarios.

## **7 Land-use and Transportation integration**

The most fundamental ingredient of successful cities is the integration of land use and the transportation system. Transportation possibilities create development opportunities and these two elements should be in constant interaction. It is important to give attention to the impact of transportation corridors, development nodes and urban open spaces on urban form throughout the transportation planning process.

We believe that all participants in the development and transportation planning process in Centurion have been enriched by the integrated and multi disciplinary approach and that it has contributed to create the framework to meet the challenges of the new millennium.

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## **CURRICULUM VITAE : DR HERMAN JOUBERT**

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After graduating at Pretoria University in 1975 Herman Joubert started his career as design engineer on projects that ranged from urban streets and stormwater to runways, provincial roads and a section of the N1 national freeway. He returned to Pretoria University for a research and teaching career of 17 years with specialisation in Economic Evaluation, Traffic Engineering and Road Network Planning and Design.

In 1983 he was a founder member of the firm Jordaan & Joubert and has since been involved in the Consulting Engineering field where his main interests are Traffic Safety, Traffic Engineering and Transportation System Development. He is a director of ARCUS GIBB and is the National Leader in the Transportation Discipline.

He has a keen interest in Local Government issues and was a member of the Negotiating Committee for the Transformation of Pretoria and was a council member of the Greater Pretoria Transitional Metropolitan Council where he was chairman of the Transportation and Land Use Standing Committee.