

GAUTRAIN RAPID RAIL LINK: INTEGRATED TECHNICAL PLANNING, FEASIBILITY AND BUSINESS CASE

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1. INTRODUCTION

This paper gives some of the information on the Gautrain Business Case, particularly on:

- the technical integration aspects
- the Feasibility Analysis and the Economic Evaluation forming part of the Feasibility Analysis
- the Risk Analysis
- the Business Case implementation model.

This paper should be read together with the three other papers on this project that will be presented in the same session at the 2001 SATC. For this reason, aspects such as the motivation for the project are not included here.

2. BACKGROUND

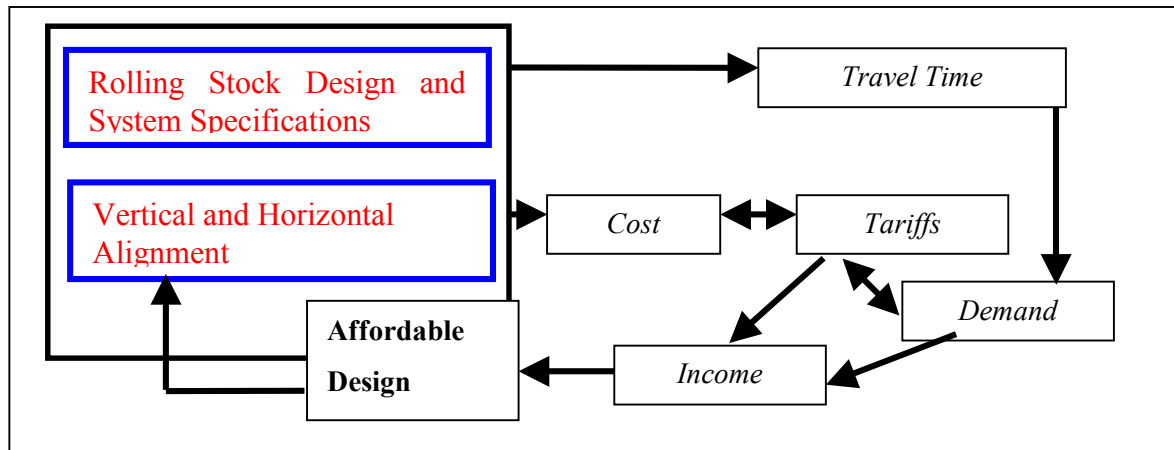
The Gautrain Rapid Rail Link is a new railway system that will use modern, state-of-the-art and tested technology. The Business Case is important as this is the first system of its kind in South Africa, and is one of the first being implemented locally that uses the build-operate-transfer (BOT) and public-private partnership (PPP) approaches. This may provide valuable information on the future management regime and the issues surrounding the concessioning of local commuter rail services.

3. INTEGRATED TECHNICAL PLANNING

Even though a very experienced team of planners did the planning, this project involved a number of unique challenges. The project was divided into 36 separate technical elements, each with an individual appointed as element leader. To facilitate integrated planning, the elements were combined into four separate groups, and for each a group leader was appointed for each group. These groups are: (1) conceptualisation and project leadership, (2) route alignment, (3) technical planning, and (4) the Business Case which included the revenue forecast, integrated costing and the Feasibility Assessment.

One of the difficulties encountered by the Project Management Team was the large number of inter-dependent project elements that had to be addressed simultaneously. International indications are that a typical modern airport link or rapid rail system takes, on average, 14 years to plan and construct, but this was beyond the acceptable time-frames allowed for the Gautrain project. It was therefore necessary to fast-track the project process, which required simultaneous planning for the various multi-disciplinary elements. This, in turn, made project communication even more important than in other, more conventional projects. The stations were used as a convenient starting place for most elements, as it was here that there was most interaction since almost all the elements had some factors in common at

the stations. Another challenge was to optimise the system design. The following figure gives an indication of the optimisation process, which could only be achieved using an iteration approach. During the first phase of the project, a number of adjustments were made to move towards optimisation of the design, but the final optimisation will be the responsibility of the successful bidding consortium which will do the detailed design. The opinion of the Project Team is that there is sufficient evidence to move towards implementation. The next step would be to optimise the life-cycle cost of the project. The challenge will be to optimise the initial construction costs against the ongoing operational and maintenance costs.



4. FEASIBILITY ANALYSIS

Another challenge was to determine the feasibility of the project. Since the project is intended to attract direct foreign investment, this required an “international best practices” approach. In general terms, the type of question one would usually want to answer in a feasibility study are:

- Is the project possible?
- Is it affordable?
- Is it needed?
- Will it be acceptable?
- Is it beneficial?
- Will it be worthwhile?
- Is this project appropriate for funding from Government investment funds?
- What is the best way to implement the project?

As many role-players will be involved in this project and many stakeholders will be affected, the Feasibility Analysis had to be considered from a number of perspectives, namely:

- (1) The users (passengers on this system once commissioned)
- (2) Other passengers travelling in the corridor
- (3) The broad community, i.e. residents of the Province of Gauteng (South Africa)
- (4) Government (broadly speaking but, more specifically, all three spheres of Government)
- (5) The private sector and, more specifically, the successful bidding company or consortium
- (6) The requirements of the PPP Unit of the National Treasury for the acceptance of PPPs.

In the *final* instance, the project must be acceptable to the Provincial Cabinet in its capacity as the owner of the project.

Feasibility was also one of the important goals for the planning of the project. This is important for the following reasons:

- (1) To ensure the interest of the private sector, business entrepreneurs, funding institutions, financiers and bankers
- (2) To ensure that competitive tenders, and hence financial implications acceptable to Government, are achieved with the role-players being well informed about the potential benefits, costs and risks involved
- (3) To ensure that the project does not fail after construction has commenced, and especially after operations have commenced (the implications may be difficult to handle).

The criteria had to take into account the main goals of the Gautrain project. These goals include:

- Stimulating development, growing the economy and creating job opportunities
- Changing the urban structure
- Bringing about socio-economic improvements for the population of the Province
- Changing the economic base of Gauteng
- Focusing on public rather than private transport
- Stimulating tourism development and assisting the promotion of tourism
- Assisting the development of Small and Medium Enterprises (SMEs)
- Contributing towards black economic empowerment.

What Constitutes Feasibility?

Feasibility can be considered firstly as the general factors that should be present to make the project *possible* (in terms of the broad description of feasibility) and, secondly, as those criteria that have to be met for Government to *accept* the project as feasible. For a PPP-type project of this nature, it also includes those preconditions that should apply in order to interest the private sector in investing in this project, as well as those that the PPP Unit of the National Treasury may lay down.

Two groups of aspects were therefore considered in the Feasibility Analysis, namely:

- (1) Is it possible to implement the project in a sustainable manner?
- (2) Is it worthwhile to do this?

On the basis of the guidelines of the PPP Unit of the National Treasury, the two main questions were:
(a) Affordability and (b) Value for Money.

Broad Description of Feasibility

(a) Technical Feasibility

Technical feasibility means that all the criteria are met that will indicate that it is technically possible to implement the project. These are mainly the physical elements, but also include the use of appropriate technology, acceptable reliability and technical risks, the possibility of maintaining or replacing parts and components, etc. From an early stage it was clear that this project *was* technically feasible. The simulations, international benchmarking and the international interest confirmed this.

(b) Economic Feasibility

A project is considered economically feasible when the benefits that will accrue to the broad community are greater than the cost of undertaking the project. This, in other words, implies that consideration be given to whether “it is worth it” The benefits concern the welfare of a defined group of people, in this case the residents of the Province of Gauteng. A macro-economic perspective is therefore used. Taxes

and subsidies are ignored (as these entail considering cross-allocations *within* the community which are not applicable to economic feasibility assessments). The results of the Economic Evaluation are provided below.

(c) Financial Viability

Financial analysis concerns the financial position of a person or organisation, so that both costs and benefits are measured in terms of money spent or received by that party, regardless of whether the prices are a good reflection of true value. Financial analyses include taxes and subsidies. Independent financial consultants were appointed to develop a financial model that analyses actual cash flows and the financial commitments of all the role-players, with the emphasis on affordability and bankability. The issue of whether the system would be affordable for use by passengers was addressed in the Demand and Modal Choice Model. The Financial Analysis is currently being finalised.

(d) Socio-political Acceptability

This measure of feasibility considers the acceptability of whatever the project entails to the communities affected by the project. It also includes aspects such as whether or not the project meets Government objectives and goals such as job creation, transformation and creating opportunities for SMEs. This analysis also considered the legal and institutional frameworks. The assessment found the project to be feasible.

(e) Environmental Impact

One of the interesting challenges for the Project Team was to handle environmental feasibility. International research found rapid rail systems to be a superior form of transportation from an environmental impact perspective. In terms of current environmental legislation, a project of this nature requires a comprehensive Environmental Impact Analysis (EIA) undertaken by independent consultants. Despite the official appointment of such consultants, the Planning Team could not ignore this issue and undertook an Environmental Feasibility Analysis. The aims were to identify sensitive areas and to investigate possible fatal flaws. No evidence of fatal flaws was found. However, this project will be subjected to a full EIA during the coming year.

Summary

In summary, the feasibility information required by the public and private sectors is as follows (on the understanding that all parties need to be satisfied that the needs of the other role-players have been met before they can enter into a public-private partnership):

FEASIBILITY ELEMENT	PRIVATE SECTOR	PUBLIC SECTOR
Bankability	X	
Financial viability	X	X
Technical feasibility	X	X
Political will	X	X
Environmental feasibility	X	X
Social acceptance (project not opposed)	X	
Commercial risks	X	
Socio-political acceptance		X
Economic feasibility (cost vs benefits)		X

By proving Technical Feasibility, Economic Feasibility, Socio-political Feasibility, Financial Feasibility and Bankability, Environmental Feasibility and the specific requirements of the PPP Unit of the National Treasury, this project was proved to be feasible.

5. ECONOMIC EVALUATION

The main result of a cost-benefit analysis (CBA) is a *Benefit to Cost Ratio*, or an *Internal Rate of Return (IRR)*. To determine an IRR, it is necessary to quantify all direct and indirect community benefits in monetary terms so that they can be compared with the monetary costs of the project. The most important purpose of CBA is that it should provide a single figure on the basis of which a project can be assessed against the government criteria, to see whether it can be considered as “worthwhile”. The intention is for Government to be able to compare different projects so as to assist it in prioritising its investment / funding decisions, as well as to allow alternative solutions within one project to be compared in order to find the most suitable solution. Recent international thinking indicates that it is not always an acceptable approach to compare different types of projects. The CBA approach is mainly used where a funding agency such as the European Union wants to decide on the selection of projects using a single, well-understood system with acceptable and transparent criteria. For such an analysis, it is essential to quantify all benefits in monetary terms, which are often highly controversial, particularly where this is done for the life-cycle of a project. Government agencies using this as a basis for decision-making usually prepare a set of common values and norms to quantify the qualitative benefits in order to compare alternative projects (i.e. a uniform system for all projects). In the Gautrain Economic Evaluation, the latest international trend was used, namely not to estimate and quantify *all* direct and indirect benefits in monetary terms, but to quantify only direct monetary benefits, to list the qualitative benefits and to compare the combination with the project costs.

In terms of the *Guidelines for Conducting the Economic Evaluation of Urban Transport Projects, 1995*, an Economic Evaluation is defined as follows:

The conceptual framework for the assessment of all gains (benefits) and losses (costs) of investment projects, regardless of to whom they accrue within a country. A *benefit* is regarded as any gain in utility emanating from the operation and use of a facility. A *cost* is any loss of utility associated with the implementation of a project. *Utility* is measured in terms of opportunity cost, and therefore does not include financial and social evaluation. The primary purpose of the economic evaluation of urban transport projects based on economic efficiency and the implementation of subsequent recommendations is to minimise total transport cost, provided transport needs are met.

The Economic Evaluation involved the following steps:

Step 1: Define the “base case” (i.e. with no Gautrain Rapid Rail Link, using only road-based transport).

This can be viewed as the “*Do Nothing Alternative*”.

Step 2: Describe the Preferred Option for the Gautrain Rapid Rail Link.

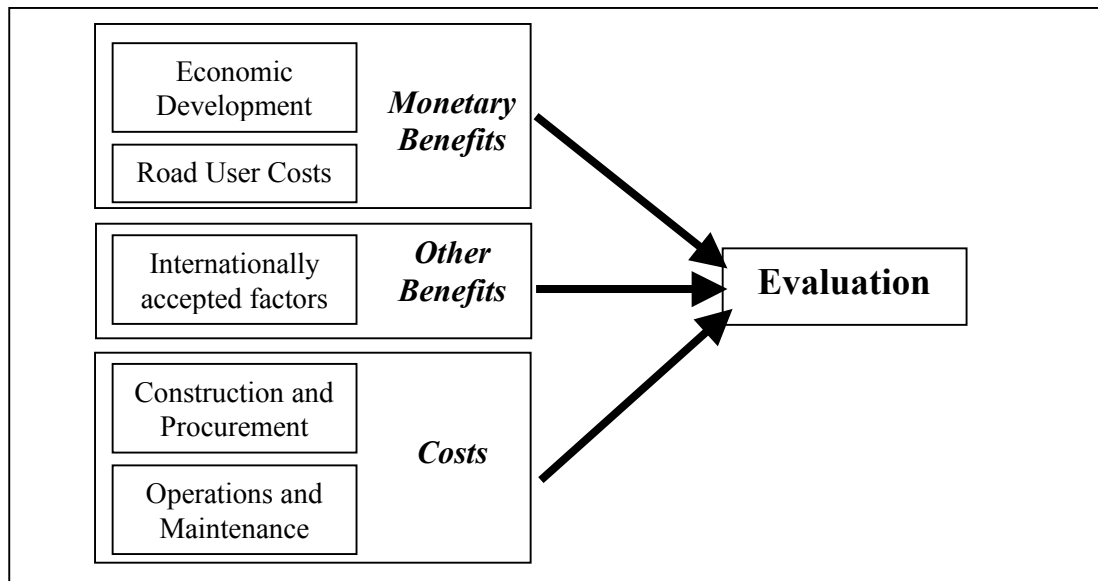
Step 3: List and – where possible – quantify the identified Monetary Benefits of the project, i.e. those benefits that can easily be quantified in monetary terms. These include: (a) Economic Impacts on the whole community (the Province)

(b) Transportation benefits for (i) the potential users of the system and (ii) the other travellers in the corridor.

Step 4: List the identified Non-monetary Benefits of the project and discuss briefly.

Step 5: Compare the Direct and Indirect Benefits with the Costs.

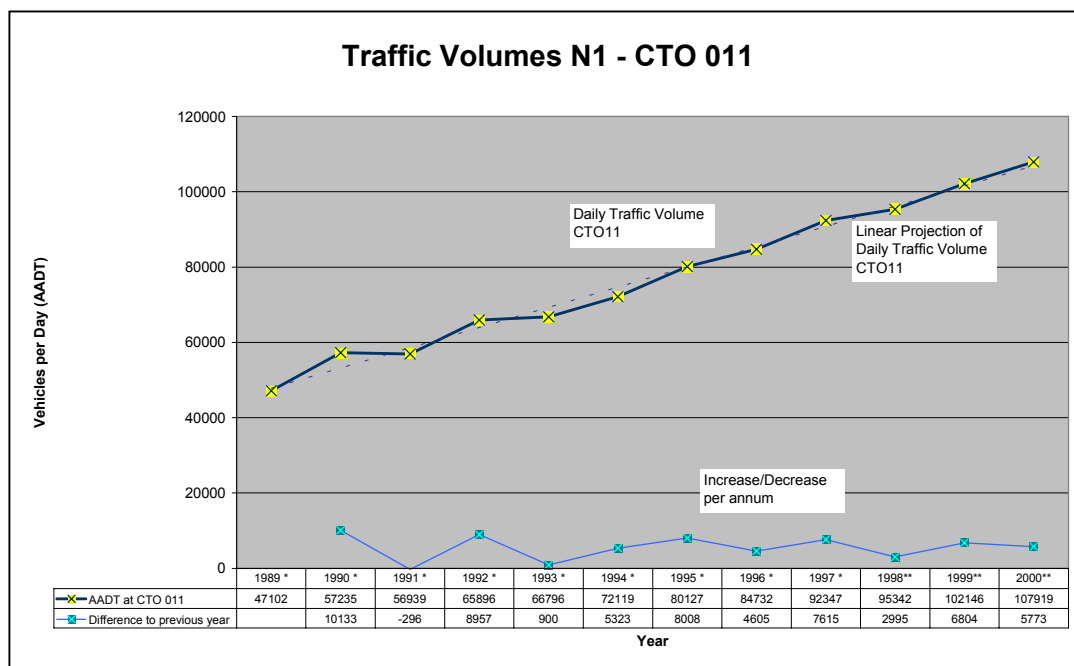
As a separate step, the various route and service options of the Gautrain Rapid Rail Link were evaluated by comparing the net present cost of these options.



Base Case (Do Nothing Alternative)

It is expected that retaining the current network situation will have the following effects:

- The limitations of the existing transport system in this corridor will strangle the economic growth that is vital for Gauteng.
- Continued use of the existing road system will lead to a rapid increase in road user costs (direct and externality costs).
- Urban sprawl will not be curtailed unless the efforts to do so are underpinned by mass transport.
- It will be difficult to provide visual proof of Government policy to actively promote attractive public transport services in the Province.
- It will be increasingly difficult to fully satisfy the mobility and accessibility needs of all commuters in this corridor.
- The lack of user satisfaction on the part of travellers may escalate.



International Evidence of Benefits

Since the oil crisis in the 1970s, the sustainability of conventional road transport as the main mode of transport has been continuously questioned. Alternatives to road transport have been promoted around the world, especially in urban areas where space is limited and where the negative impacts of road traffic such as traffic congestion, noise, air pollution and accidents have become most obvious. Most countries, even the United States of America where there is “a love affair with the automobile”, have accepted policies and have taken steps to promote public transport. Rapidly developing regions often have a backlog in implementing alternatives to private vehicle transport as the latter grows easily and extensions to the road network are usually provided on a continuous basis. This makes it extremely difficult to promote public transport successfully and this is what makes it so important to utilise the opportunities that do appear from time to time.

A considerable problem for transport projects is that costs and benefits are usually not allocated to the same body. This is coupled with the fact that road transport as a whole has not yet adopted the “user pays” principle. Whereas the costs beyond those covered by revenues are often allocated to Government, the benefits – beyond the immediate transport service to the passenger – go to the community as a whole. International research over the last two decades has tried to determine the *externality costs of transport*, which are borne by the community. The *internalisation of externality costs* then offers the possibility of gaining a true picture of the costs and benefits of the various transport options. (In South Africa, a first attempt in this regard was made with “Moving South Africa”.) International research has found that the externality costs are far lower for rail transport than for road transport. Although the findings on the exact ratio of the externality costs of road to those of rail vary, the general conclusions are quite convincingly in favour of rail transport. Among the insights gained from the various sources consulted, the following should be quoted:

“The report estimates costs per 1 000 passenger kilometres for cars and passenger rail that illustrate the potential benefits of public transport. These are general estimates and need to be applied more specifically. The results are:

Accidents	Car - 33 Euro	Rail – 3 Euro
Noise	Car - 3 Euro	Rail – 4 Euro
Air pollution	Car - 5-7 Euro	Rail – 2 Euro
Climate impact	Car - 6 Euro	Rail – 3 Euro

William J. Tyson (Director of Planning and Promotion): WHO CAN PAY AND SHOULD PAY FOR PUBLIC TRANSPORT INVESTMENT? INDIRECT USERS AND BENEFICIARIES

6. QUANTIFIED MONETARY IMPACTS OF THE GAUTRAIN RAPID RAIL LINK PROJECT

Economic Impact

An Economic Impact Study was done for this project. Perhaps the most significant economic finding is that the development and construction of the Gautrain Rapid Rail Link would directly create or sustain about 43 000 *job opportunities*. The operation and maintenance of the service would create or sustain about 1 220 *job opportunities*, which would escalate throughout the life of the project as ridership increased. The estimated impact of the service on the economy has the potential to create or sustain a *further 39 500 job opportunities*. These impacts are detailed in the following table.

CUMULATIVE ECONOMIC IMPACT OF GAUTRAIN RAPID RAIL LINK

ITEM		ECONOMIC IMPACT
Estimated additional business sales		R3 615 million
Estimated additional employment opportunities		43 800
Estimated additional income		R2 230 million
Impact of personal expenditure on additional business sales		R7 636 million
Estimated additional GGP		R1 880 million
Additional business sales		R510 million p.a.
Annual job creation		1 210
Income arising		R95 million p.a.
Impact of income expenditure on business sales		R325 million p.a.
GGP arising		R37 million p.a.
EMPLOYMENT	1 km radius	2 km radius
Potential employment (urban capacity) for development	840 200	2 077 000
Growth scenario (average growth p.a.)	3,3%	3,7%
Jobs created/sustained per annum	15 500	39 400
Annual additional business sales	R1 340 mil.	R3 390 mil.
Annual additional GGP (R m)	R 780 mil.	R1 980 mil.
POPULATION	1 km radius	2 km radius
Potential population increase (densification)	129 800	537 300
Growth scenario (average growth p.a.)	4,3%	3,4%

All amounts indicated are in 2000 rand.

Monetary Transport System Benefits

An estimate was also made of the monetary benefits to the Gauteng economy with regard to the direct benefits accruing to the transport system users. This was done using the internationally accepted benefits to the existing road users, based mainly on the savings in travel time due to the decrease in congestion levels. A conservative approach of a general growth rate of 2,25% p.a. was used to determine future costs and revenues. This should be compared with traffic growth on the parallel road system of almost 7% per year over the past decade. The EMME/2 Passenger Demand Model constructed for this project was used to determine total travel time improvements and the congestion cost improvements on the network. The cost calculation was done by applying factors given in a document used by Railtrack in the United Kingdom, entitled: *Rail Track Enhancement Schemes Description: Notes on Social and Environmental Benefit Appraisal*, by Kirsty Powell and Ian Marlee, June 2000.

Similarly, a calculation of the accident costs was made using the norms of the European Union, with rail accident costs being approximately 1/6 of road accident costs (*Towards a Fair and Efficient Pricing in Transport*, European Commission, 1995). These norms are conservative when compared with other literature showing that high-speed rail in Europe has an accident rate of 1/24 of that of road transportation. The summarised results for 2000 base year are as follows:

- In terms of time costs, the Gautrain would result in savings of R456,7 million p.a.
- In terms of congestion costs, the Gautrain would result in savings of R283,8 million p.a.
- In terms of local CO₂ emissions, the Gautrain would result in a reduction of 70 tons of CO₂ p.a. from road traffic and decrease air pollution from toxic substances such as NO_x.
- In terms of accident costs, the Gautrain would result in savings of R15,3 million p.a.

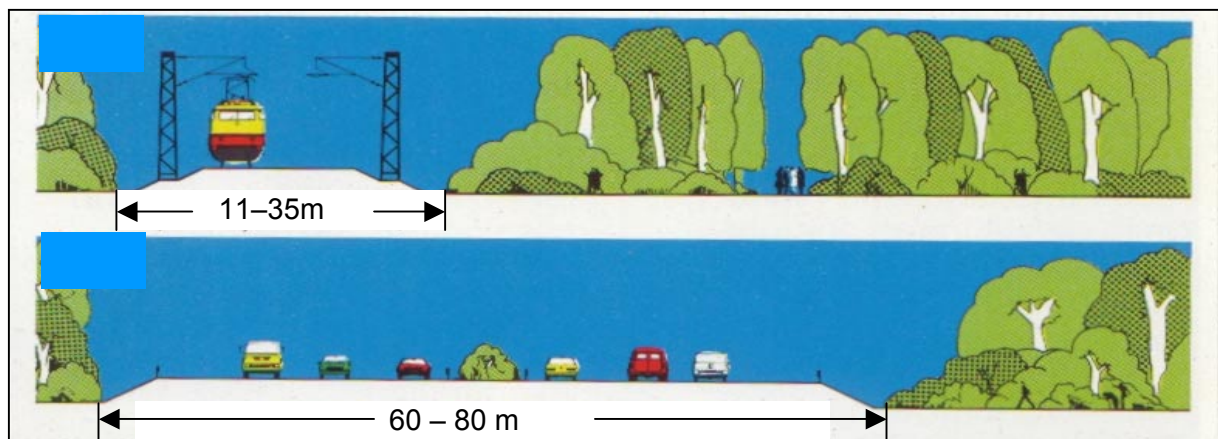
The total cost saving of the direct quantified monetary values of the Gautrain alternative is R755,8 million for 2000, and this saving would grow substantially in future, unless additional road capacity were to be provided. If such additional road capacity was provided, the land and construction cost of the capacity, as well as the maintenance cost, would have to be added.

7. QUALITATIVE ANALYSIS

The following impact criteria as suggested in the British guidelines for project appraisal were used:

Environment	<ul style="list-style-type: none"> Noise and vibration Local air quality Land and water pollution Biodiversity 	<ul style="list-style-type: none"> Global atmospheric emissions Landscape Heritage
Safety	<ul style="list-style-type: none"> Accidents 	<ul style="list-style-type: none"> Personal security
Economy	<ul style="list-style-type: none"> Journey times Train frequency Reliability and punctuality Crowding Station facilities and rolling stock quality 	<ul style="list-style-type: none"> Financial costs and revenue Transitional costs of change Ticketing and information facilities Economic and regeneration impacts
Accessibility	<ul style="list-style-type: none"> Reduction of barriers Disabled access Pedestrian access 	<ul style="list-style-type: none"> Access for cyclists Interchange requirements Severance Option values
Integration	<ul style="list-style-type: none"> Policies and proposals concerning other modes Wider Government policy 	<ul style="list-style-type: none"> Land-use policy and proposals

The increasing traffic demand will soon call for an extension of the road network. Current traffic volumes on the road network are already above design capacities, with levels of service (LOS) measured as LOS=F already three years ago. Peak-hour volumes on the N1 are in the order of 8 500 vehicles per direction. Assuming a constant trend of the growth rate, traffic volume will double within the next ten years. This would require another three-lane dual-carriageway freeway within ten years. The Gautrain will have a design capacity of 16 000 passengers per hour per direction. This is roughly double the volume of the present N1.



8. EVALUATION OF THE COSTS VS THE BENEFITS

The results from the Financial Analysis indicate that the net cost gap for Government may be lower than the total cost of the fixed infrastructure investment. (This implies that the farebox revenue covers more than the operating and maintenance costs plus the cost of leasing the rolling stock.) The amount required to cover and pay back a loan at appropriate interest rates would be far less than the savings in road user costs (about R755 million p.a. for year 2000 travel conditions) combined with the economic impact of job creation. This implies that the benefits that can easily be calculated in monetary terms already substantially cover the monetary costs, without even considering the long list of non-monetary benefits identified. All indications are that the benefits of the Gautrain project far outweigh the costs, and that the project can therefore be justified from an economic (or cost vs benefit) point of view.

On the basis of the cost model, the monetary benefits were added to a new model representing the monetary impacts of the Do Nothing Alternative vs the Gautrain Alternative. The costs of capital investment, interest, operational costs and fare revenue were calculated for the base year model 2000. Time costs, accident costs and congestion costs were also calculated. Two options for the growth rates were considered for the combined impact of the economic development (GGP growth, traffic volume growth and growth of related items). These options were 2,25% per annum, as the most conservative approach to calculating fare revenues, and 3%, still as a conservative approach instead of a trend scenario growth (7% p.a. on selected roads).

The obvious benefits of the Gautrain Alternative to the economy, i.e. those benefits that could be quantified and converted into monetary values, consist of three components, namely savings in time, accidents and congestion. The total values over the appraisal period (based on conservative assumptions), in real terms, are:

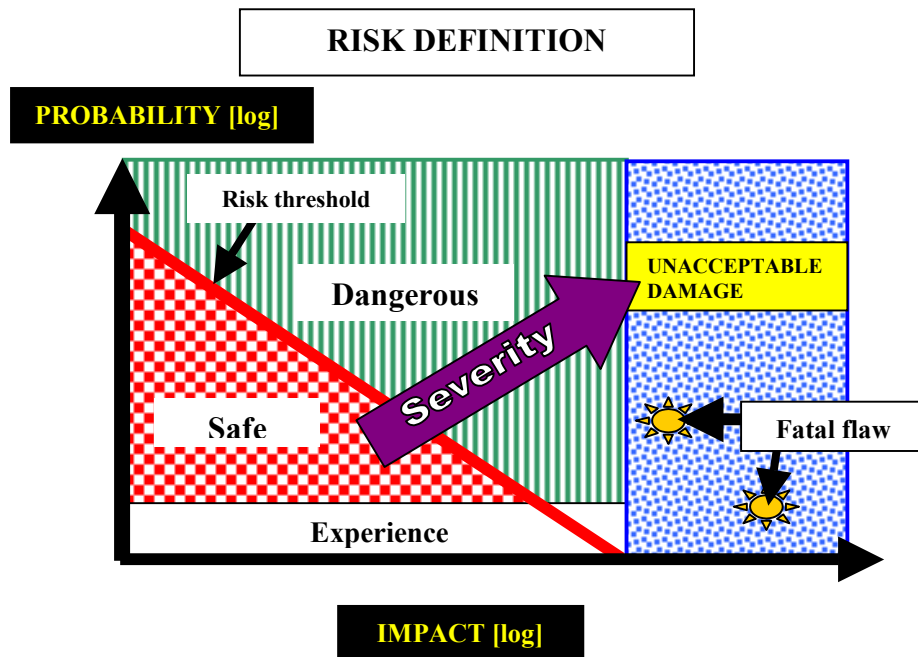
- R19 000 million for time costs saved
- R640 million for accident costs saved
- R12 000 million for congestion costs saved.

In conclusion, regarding the Gautrain as a project with costs and benefits to the greater economy, as from 2007 the benefits will outweigh the costs, making the Gautrain a positive contribution to the economic development of Gauteng.

9. RISK ANALYSIS

A comprehensive Risk Analysis was done for the Gautrain Project. This was done firstly to guide the planning of the project, but also to mitigate the risks in the design of the Business Case. International best practices, local knowledge and the requirements of the PPP Unit of the National Treasury were combined to identify the risks and to assess them in terms of impact and probability.

The severity of the risks was determined, and this was used for Sensitivity Analyses and to design the Business Case. The Risk Analysis identified and assessed a wide range of risks during the initial stages of the project. Those risks that could not be avoided in the project planning process will be addressed by specific mitigating measures. Sensitivity Analyses, particularly by means of the Demand Estimation and Financial Analysis, will be completed prior to the tender process. No fatal flaws were identified during this process, and all indications are that the risks can be mitigated where required.



10. SOME GUIDELINES ON THE BUSINESS CASE

As stated earlier, the full details of the Gautrain Business Case have not yet been finalised, and may only be finally agreed on during the final negotiations with the preferred bidder. The guidelines below are based on the current thinking of the Project Team with regard to the broad principles to be accepted in the agreement.

The Gautrain Project will be implemented by means of a single public-private partnership contract. This PPP will involve a consortium of companies tendering for and negotiating a single contract. The contract will entail the following:

- Detailed planning and design of the system
- Construction of the fixed infrastructure and procurement of the rolling stock and equipment
- Operation and maintenance of the system for a period of 20 to 30 years
- At the end of the concession period, either giving the initial consortium an opportunity to lengthen the contract, or transferring the system back to the government. In the latter event, Government may put it out on tender again or elect to operate the services itself.

Government would not dictate the composition of the consortium, nor would it dictate what type of company should be leading the consortium. However, it will be essential for the consortium to have either in-house capabilities, or the support of at least the following types of members in the consortium, or to have these available from sub-contractors:

- Total rail system suppliers / rolling stock manufacturers
- Civil construction contractors
- Banks / financial houses
- Rail operating companies
- Professional consulting companies
- Black economic empowerment groups.

11. CONCLUSIONS

The Project Team made significant efforts in deciding on the feasibility criteria as this was a unique project requiring an international best practices approach. Although some of the feasibility aspects (such as financial affordability and environmental impact) are still being confirmed, the Project Team is satisfied that all indications are that this project is indeed feasible. The benefits of the project far outweigh the costs, and the project will have a significant impact in terms of job creation, land-use densification, urban restructuring, promotion of SMEs and black economic empowerment. The main impact, however, will be in bringing Gauteng up to speed with transport in the rest of the world, and in facilitating economic growth, with a positive impact on the Gauteng GGP and facilitating the development of value-added tourism.

12. REFERENCES

Most of the information contained in this paper was obtained from the Gautrain Technical Documents, particularly the Economic Evaluation Report, the Risk Analysis Report, the Integrated Costing Report and the Feasibility Criteria Report. These reports were compiled by a consortium under the Gauteng Department of Transport and Public Works, consisting of Khuthule Projects, Arcus Gibb and Lebone Engineering. A number of documents were used as input and reference to this study, many of which were mentioned in the Gautrain documents themselves. The following additional documents were specifically of importance or have been quoted from:

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JOHAN VENTER is a Civil Engineer and Transportation Economist, working for Khuthele Projects as a Transport Division Director. He qualified himself academically as a civil engineer, with post graduate qualifications in project management and transport economics in the process studying at three universities.

His fields of **specialisation are** Transport Planning, Transportation System Analysis, Economics, Strategy and Policy Formulation, Physical Distribution, Economic Evaluation, Project Management.

He has developed himself into a specialist public transport planner who focuses on the integration between economic development, land-use development and transport systems development. All these are related to community development, and Mr. Venter prides himself on his involvement with community-based projects, where aspects of social development are included.

Mr Venter started his professional career with the South African Transport Services (now Transnet Ltd and South African Rail Commuter Corporation) where he did transport planning, design, construction and maintenance work. As District Engineer he spent some time in the Contract Disputes and Arbitration Division. He was promoted to the Planning Department where he concentrated on commuter rail and light rail transport planning and analysis.

Mr Venter was co-creator of the Spoorplan Consortium which assisted with the commercialisation of the SA Transport Services and the establishment of the SA Rail Commuter Corporation at joining BKS Incorporated in 1989, where he was in charge of all technical and planning aspects related to rail transport for the national Department of Transport.

He concentrated on strategy and policy formulation, and has been involved to a large extent with the functions of the Metropolitan Councils and District Councils, as well as the preparation of provincial, metropolitan and local passenger transport plans.

Most of his work was done on public transport analysis, economics, policy and strategy formulation and planning. He also participated in the Gauteng (PWV) Public Transport Study and supported the Gauteng Strategic Management Team on Public Transport and Roads, inter alia with the drafting of the Gauteng White Paper on Transport Policy.

He also acted as Project Manager for a number of community upliftment projects.

In July 1998, Mr Venter joined the Khuthele Projects Team as Transport Director. He found the new environment at this truly New South Africa emerging company, very exiting. The most prominent and interesting of his projects at Khuthele was the:

- (1) Tswane Ring Rail Development Strategy;
- (2) Gauteng Rail Development Strategy;
- (3) Coega Integrated Transport and Development Plan; and
- (4) Gautrain Rapid Rail Link Project.