Appendices

Appendix A
Accommodation Schedule:

Gautrain Station, Hatfield, Pretoria

Building can be broken down into the following major elements:

- "Super Basement"
- Superstructure
- Railway cutting and furnishings
- Landscaping

Building Data:

1.) Site Area:	**24 754.56 m²**
2.) Building Footprint (without "super basement")	**11 399.88 m²**
3.) Building Footprint (with "super basement")	**20 117.43 m²**
4.) "Super Basement (13 876.53 m² x 3)	**41 629.59 m²**
5.) Traders Stalls / Taxi Rank	**1 692.31 m²**

1. "Super Basement"

a.) Basement Level One:

• Shopping Mall		6 530.50 m²
• Vertical Circulation Space		1 413.00 m²
• Warehousing		3 265.00 m²
• Vehicular Circulation Space		2 373.21 m²
• Parking Bays	**(172 bays)**	2 373.25 m²

b.) Basement Level Two

• Vertical Circulation Space		1 413.00 m²
• Vehicular Circulation Space		2 492.71m²
• Parking Bays	**(725 bays)**	9 968.75 m²

c.) Basement Level Three

• Vertical Circulation Space		1 413.00 m²
• Vehicular Circulation Space		2 492.71m²
• Parking Bays	**(700 bays)**	9 625.00 m²
• Plant Rooms		***(343.75 m²)***
- Ventilation		171.88 m²
- Water Treatment		85.94 m²
- Electrical		85.94 m²
Total		**41 629.59 m²**

2. Superstructure

a.) ***Cobbled road surface*** (School Lane)	***(1 089.05 m²)***
b.) ***First Floor Executive Offices***	***(457.40 m²)***
- Ablution Facilities (Male & Female)	46.02 m²
- Office Space	343.88 m²
c.) ***First Floor General Works Offices***	***(979.26 m²)***
- Ablution Facilities (Male & Female)	53.60 m²
- Office Space	691.33 m²
d.) ***Vertical Circulation Area***	***(1 226.24 m²)***
e.) ***The Gautrain Restaurant***	***(478.18 m²)***
- Ablution Facilities (Male)	12.29 m²
- Ablution Facilities (Female)	15.97 m²
- Store Rooms & Cold Storage	167.36 m²
- Kitchen	71.73 m²
- Serving Space	210.83 m²
f.) ***Ticketing / Curio / Small Shops***	***(1 956.59 m²)***
g.) ***Escalators and vertical Access ducts***	***(947.87 m²)***
h.) ***Railway Canopy***	***(2 973.47 m²)***
i.) ***Traders Stalls and Taxi Rank***	***(1 692.31 m²)***
Total	**11 399.88 m²**

3. Railway Works

a.) Rail Cutting (up to Grosvenor Street Bridge)	***(3 231.39 m²)***
b.) Catenaries	**13**
c.) Rail Lines (44 549.30 m x 457kg/m Rails)	**178 197.20 m**
d.) Bridge (Vehicular & Pedestrian) over Grosvenor Street	***(480.25 m²)***

4. Landscaping

a.) Indigenous deciduous trees	**63** trees
b.) Shrubbery	**250** scrubs
c.) Topsoil (500 mm deep)***(2 601.32 m³)***	***(5 202.64 m²)***
d.) Ground cover	***(958.35 m²)***
e.) Path ways	***(2 356.28 m²)***
f.) Cobbled areas	***(956.28 m)***
g.) Designed benches and canopies for pedestrians	**56**

Appendix B
Cost Estimate Analysis:

Gautrain Station, Hatfield, Pretoria

Building can be broken down into the following major elements:

- **"Super Basement"**
- **Superstructure**
- **Railway cutting and furnishing**
- **Landscaping**

1.) "Super Basement"

- Ground Floor Level R 500 p/m²
- First Basement Level R 350 p/m²
- Second Basement Level R 350 p/m²
- Third Basement Level R 350 p/m²
- Excavation R 1 500 p/m²

2.) Superstructure

- In-situ cast concrete R 650 p/m²
- Aluminium R4 500p/m²
- Steel Frame R4 000p/m²
- Brickwork R 250 p/m²
- Copper Roofing R1 520p/m²
- Finishes (Artists) R560p/m²

3.) Railway cutting and furnishing

- Earthworks R1 500p/m²
- In-situ cast concrete R 650 p/m²
- Steel Frame R4 000 p/m²
- Brickwork R 250 p/m²
- Finishes R 560 p/m²

4.) Landscaping

- Earthworks R 500p/m²
- In-situ cast concrete R 650 p/m²
- Trees R1 500 per tree
- Scrubs R 300 per unit
- Ground Cover R 150 p/m²
- Topsoil R 350p/m³
- Cobbles R 150p/m²
- Designed Pre-cast Benches R2 350 per unit

Basement Levels		
Ground Floor Level	13 876.53 m² @ R 500 p/m²	R 6 938 265.00
First Basement Level	13 876.53 m² @ R 350 p/m²	R 4 856 785.50
Second Basement Level	13 876.53 m² @ R 350 p/m²	R 4 856 785.50
Third Basement Level	13 876.53 m² @ R 350 p/m²	R 4 856 785.50
Excavation Cost	13 876.53 m² @ R1 500 p/m²	R20 814 795.00
	Total	**R42 323 416.50**
Superstructure		
In-situ cast concrete	11 399.88 m² @ R 650 p/m²	R 7 409 922.00
Aluminium	7850.23 m² @ R2 500 p/m²	R 19 625 575.00
Steel Frame	7850.23 m² @ R4 000 p/m²	R 31 400 920.00
Brickwork	11 399.88 m² @ R 250 p/m²	R 2 849 970.00
Finishes (Artists)	2 500 m² @ R 560 p/m²	R 1 400 000.00
	Total	**R 62 686 387.00**
Railway Cutting and Furnishing	(This item is normally not included in building cost estimates.)	
Earthworks	3 231.39 m² @ R 1 500 p/m²	R 4 847 085.00
In-situ cast concrete	3 231.39 m² @ R 650 p/m²	R 2 100 403.50
Steel Frame	2 350 m @ R1 230 p/m	R 2 890 500.00
Brickwork	350 m @ R 250 p/m²	R 2 849 970.00
Finishes	0 m² @ R 560 p/m²	R 0.00
	Total	**R 12 687 958.50**
Superstructure		
Earthworks	5 202.64 m² @ R 500 p/m²	R2 601 320.00
In-situ cast concrete	35 m² @ R 650 p/m²	R 22 750.00
Indigenous Trees	63 trees @ R1 500 per tree	R 94 500.00
Scrubs	250scrubs @ R 300 per unit	R 75 000.00
Ground Cover	958.35 m² @ R 150 p/m²	R 143 752.50
Topsoil	2 601.32 m³ @ R 350 p/m³	R 910 462.00
Cobbles	956.28 m² @ R 150 p/m²	R 143 442.00
Designer Pre-cast Benches	R 2 350.00 per unit	R 131 600.00
	Total	**R 4 122 826.50**
Estimated Cost of Building Project		**R 121 820 888.50**

Appendix C

Risk Assessment Framework

Summary of Extreme and High Risks Identified

Annexure A – Technical and Planning

Consequence Measure	*Likelihood Measure*	*Risk Result*
Catastrophic	*Likely*	*Extreme*
Major	*Moderate*	*High*
Moderate	*Unlikely*	*Medium*
Minor	*Rare*	*Low*
Insignificant		

Rank	**Description**	**Risk Self Assessment** *(Consequence)*	**Control Self Assessment** *(Likelihood)*	**Assurance Priority** *(Risk)*	**Mitigation Measure***
	Integration with Transnet, Metro,Eskom	Catastrophic	Moderate	Extreme	Increase awareness at Provincial and national level
	Schedule Management	Major	Unlikeky	High	Implement strict adhereance to tracking system and more feedback
	Cost Management	Major	Rare	High	Ensure integration of PM and Financial Systems and appointment of QS.
	Risk Management	Catastrophic	Unlikeky	High	Provincial external oversight.
	Procurement Management	Major	Likely	High	Provide external oversight and revised plan.
	Financial Reporting	Major	Unlikeky	High	Ensure clear ground rules and undertake audit.
	"Visioning" and Conceptional Planning	Major	Unlikeky	High	Provide external oversight
	Inadequate risk analysis	Catastrophic	Unlikeky	High	Provide external oversight

*Continuous review and improvement

MATRIX - RISK QUANTIFICATION					
Probability	5 Likely	4 Moderate	3 Unlikely	2 Rare	
Consequence					
5. Catastrophic	25	20	15	10	
4. Major	20	16	12	8	
3. Moderate	15	12	9	6	
2. Minor	10	8	6	4	
1. Insignificant	5	4	3	2	

Key		
	High Risk	15 to 25
	Medium Risk	8 to 14
	Low Risk	2 to 7

Risk Identification and Assessment Form Worksheet

Procedure: - Record risk identified under the description column. Carry out an assessment of the risk using the "Consequence Measure" and "Probability Measure" table set out below. Apply the weighted index number set against the chosen Consequence / Probability measure and apply the Risk Factor formula to get the Risk Factor (RF). (RF = C x P) From the risk factor refer to the Probability – Consequence Matrix and assign the risk category (high, medium, low)

Consequence Measure	C	Probability Measure	P	Risk Category	RF
Catastrophic	5	Likely	5	High	15-25
Major	4	Moderate	4	Medium	7 - 14
Moderate	3	Unlikely	3	Low	2 – 6
Minor	2	Rare	2		
Insignificant	1				

Rank	Description				
	DISCIPLINE: Management	Risk Assessment (Consequence) C	Control Assessment (Probability) P	Risk Factor (RF)	Assurance Priority (Category)
	Key personnel travelling together	**5**	**3**	**15**	**High**

RISK IDENTIFIED BY: Management & Notified by PM
Tabled at Risk Committee Meeting – 20/10/2003 DATE: 20/10/2003

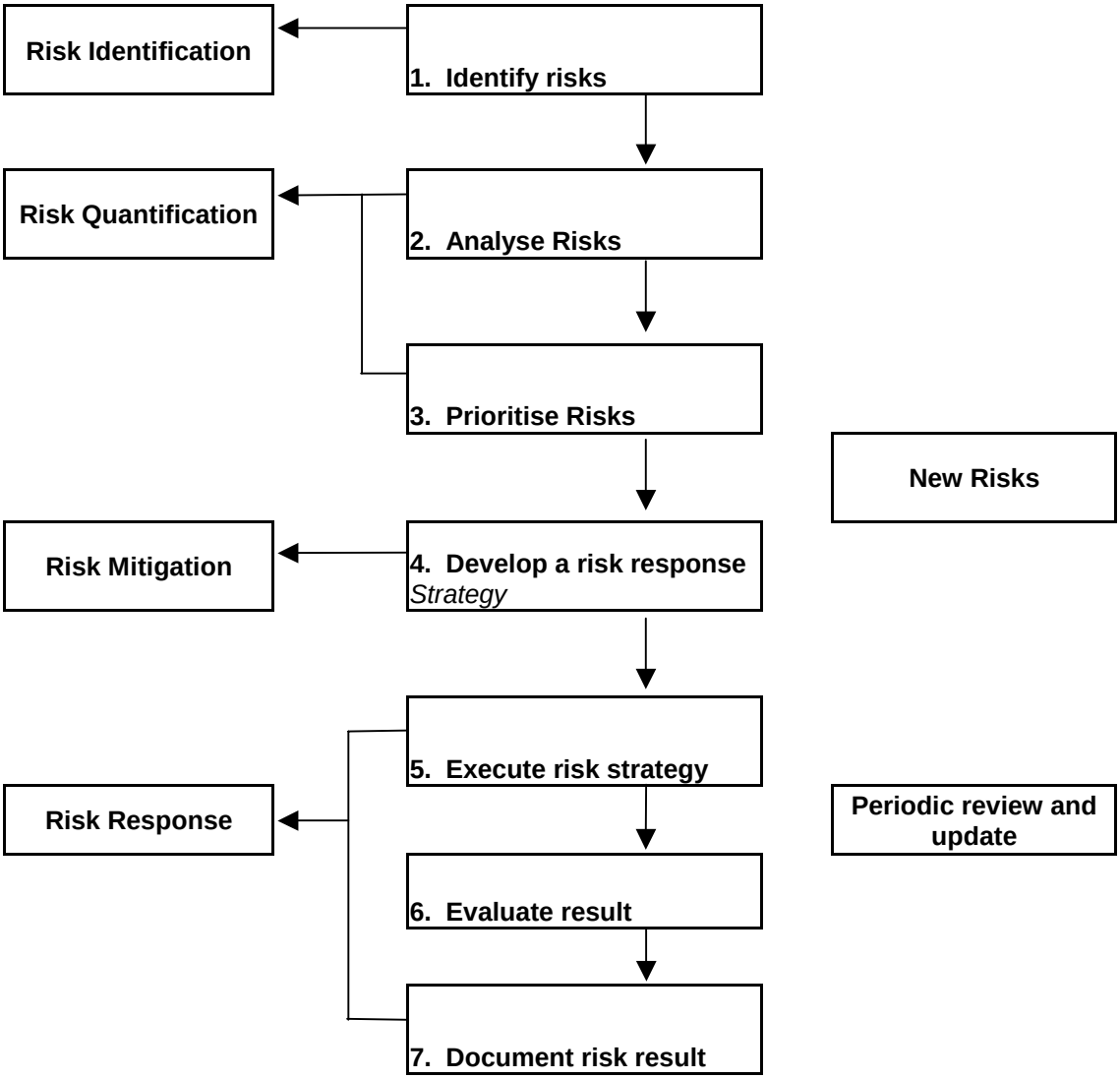
Risk Result Change Notification

Consequence Measure	C	Probability Measure	P	Risk Result	RF
Catastrophic	**5**	Likely	**5**	High	
Major	**4**	Moderate	**4**	Medium	
Moderate	**3**	Unlikely	**3**	Low	
Minor	**2**	Rare	**2**		
Insignificant	**1**				

Rank	Description	Risk Self Assessment (Consequence)	Control Self Assessment (Probability)	Assurance Priority (Risk)

Please note and accept the changes in the status of the above mentioned risks.

Executive manager: -
Risk Officer: -
Date:



Company unaware of rumours

Hettiën Strauss

Bohlweki Environmental is not aware of the recent rumours circulating about tunnelling the Gautrain in Pretoria and the acquisition of properties in the Pretoria area for this purpose - and thus cannot comment on such rumours.

So says Mark Freeman, director of Bohlweki Environmental, the company that handled the Environmental Impact Assessment (EIA) for the Gautrain project.

According to him the addendum to the draft EIA report was submitted to the Gauteng Department of Agriculture, Conservation, Environment and Land Affairs (GDACEL) in late April this year.

GDACEL is busy evaluating the EIA documentation and a Record of Decision (RoD) will be issued once the department's evaluation process is complete."

Process

Mark says the bidding process for the Gautrain project runs in parallel with the EIA process.

"Prospective bidders are working on the recommended route alignment contained in the EIA documentation, but the RoD will need to be issued before the submission and evaluation of the bids can be completed," he says.

Train part of bigger plan

Hettiën Strauss

The proposed Gautrain rapid rail-link project between Pretoria and Johannesburg is one of Gauteng Provincial Government's Blue IQ projects.

With these projects the government intends investing more than R3,5 billion in strategic economic infrastructure to kick-start eleven high profile projects, which will add value to the manufacturing and tourism sector.

President Thabo Mbeki recently said the country's road, air and port facilities are unable to cope with the country's economic growth and successes, which were the results of the country's tight fiscal approach.

In this regard, government committed itself at its recent 'Lekgotla' meeting to pump billions of rands into transport coffers to overhaul the infrastructure to equal the economic growth.

The money would be used to build, upgrade and maintain the country's roads, the lifespan of which is shortened by heavy vehicles transporting cargos in between cities and provinces throughout the country.

The country's railways network will also get a facelift.

Harbour authorities would acquire new cargo handling equipment, the introduction of improved cargo and passenger screening systems, as well as the upgrading of container terminals to ease congestion at the Durban, Cape Town and Port Elizabeth ports.

Construction starts in June

Hettiën Strauss

Everybody is holding their breath for the feedback on the Environmental Impact Assessment (EIA) for the proposed Gautrain rapid rail-link project.

The EIA is still being looked at by the Gauteng Department of Agriculture, Conservation, Environment and Land affairs.

In the meantime, it has been announced that construction of the Gautrain route - which will link Pretoria and Johannesburg - is due to start in June next year.

The winning bid for the project will be announced by early January next year.

Gauteng Finance and Economic Affairs Member of the Executive Committee (MEC), Jabu Moleketi says the winning bidder is expected to begin building the twelve-station track a few months later.

However, it will be up to the constructor to decide which route would be "rolled out "first.

The state-of-the-art train is likely to be in motion within five years to link Johannesburg and Pretoria in less than 35 minutes and at speeds of 160km/h or higher.

It is expected that about 43 000 jobs would be created during the construction phase, while security would be tight with closed-circuit cameras keeping an eagle's eye on the railway against criminals.

The economic activities related to construction are estimated at around R3,6-billion per year, resulting in an increase of between 0,7% and 1% of the province's economic growth during the implementation phase.

The minimum frequency between Johannesburg and Pretoria will initially be six trains per hour per direction and more trains will be operated as the number of passengers using the system increases, according to the Gautrain document.

Gauteng, the country's economic hub, is currently experiencing road congestion especially between Pretoria and Johannesburg.

Jabu says the train would not only clear the road congestion but would go a long way in cutting down on air pollution as many motorists would opt for the train.

It is believed that three million cars use the M1 freeway between Johannesburg south and Pretoria east during peak hours, while about 400 000 cars pass along this freeway each hou at very low speeds.

Metro se hulp vir tonnel gevra

Hettiën Strauss

Die Tshwane-metro moet die moontlikheid ondersoek om wel 'n finansiële bydrae vir die beoogde Gautrain te maak sodat die trein deur Muckleneuk getonnel kan word.

So sê Peter Kaufman, adjunk-uitvoerende beampte van die Pretoriase Kamer vir Handel en Nywerheid.

Want, sê Peter, indien dié beoogde treintonnel nie gebou word nie, sal die voorgestelde hoë mure wat gebou word om die treingeraas uit te hou, 'n tweede Berlynse muur in Pretoria wees.

"Die metro moet aan die toekoms van Pretoria en sy inwoners dink. Hoe gaan die onooglike mure vir ons nageslagte lyk?"

Peter sê hulle is nie teen die Gautrain nie, maar wil hê die trein moet ook in Pretoria getonnel word.

Belegging

"Die projek moet nie hier 'afgeskeep' word nie. Gautrain is 'n belegging vir die toekoms," sê Peter.

Felecia Fourie, sameroeper van die Gautrain-taakspan van die Muckleneuk Lukasrand Eiendoms- en Inwonersvereniging (Mlpora) sê Jack van der Merwe, hoof van die Gautengse Departement van Vervoer skep verwarring deur te sê die roete van die Gautrain is bepaal.

"Tans is die aanbevelings van die omgewingsimpakstudie by die hoof van die Gautengse Departement van Omgewingsake vir oorweging. Die uitslag word eersdaags verwag," sê Felecia.

Werklike probleem

Sy meen dat die aankondiging dat daar nou slegs 19 huise in Muckleneuk geraak sal word in plaas van die aanvanklike 119, nie die werklike probleem van die inwoners oplos nie.

"Die kern is nie die aantal huise nie, maar die totale impak wat die voorgestelde Gautrain op Pretoria sal hê."

Volgens haar raak dié trein die lewens van gemeenskappe in Bereapark, die suidelike gedeelte van Sunnyside, Unisa se Sunnyside-kampus, Muckleneuk, die drie hoërskole langs Universiteitsweg, Hatfield en die Universiteit van Pretoria (UP).

Raadslid Karen Meyer sê enige huise wat geraak word, is onaanvaarbaar.

Volgens haar sal die Gautrain Muckleneuk in twee skeur. "Die argument staan steeds vas. Hoekom kan Pretoria nie 'n tonnel kry as Johannesburg dit kry nie? "Tot dusver kon niemand nog met 'n rasionele, bevredigende antwoord vorendag kom nie."

Rdl Meyer meen vader Smangaliso Mkhatshwa, burgemeester van die metro, moet die belange van die inwoners op sy hart dra en sterk standpunt oor die beoogde Gautrain inneem om inwoners se saak te stel.

Super highway project speeds off its tracks

Elmarie Linde

The Super Highways project has come to a dead end.

This after the Gauteng Department of Transport (Gautrans) recently announced that there would be no super highway between Pretoria and Johannesburg.

"However, the Gautrain project is continuing and construction will start early next year," says Jack van der Merwe, head of Gautrans.

It appears as if the real reasons for the cancellation of this project are being withheld, although rumours are that the proje would not have been finan cially viable.

The Super Highway was supposed to connect Pretoria and Johannesburg with an extra lane in each direction along the N1 freeway.

Two of the north- and southbound lanes would have been tolled and motorists could choose whether they want to use the high-speed tolled lanes or not.

According to the initial plans the highway would have been completed in 2006 after spending an estimated R1,5 billion.

"I am surprised at the sudden decision to stop the unsolicited tender to toll the highway," says Manny de Freitas, spokesperson on transport at the Gauteng Provincial Legislature.

"However, there is still confusion whether the project is only postponed."

Councillor Philip Gohl says the Super Highway project was flawed right from the very start.

"At time of completion the freeway would have been just as congested as today.

"Two of the lanes would have been tolled and it would have put more pressure on the other lanes, causing more traffic back-ups and frustration.

"It is clear that this project has been used as a smokescreen to justify the viability of the Gautrain."

He says further he is not sure that the estimated 60 000 commuters will indeed use the train daily.

"In that case the train will become a white elephant just as the N1 toll road north of Pretoria."

Appendix D
Gautrain Station, Hatfield

Sustainable Building Assessment Tool (SBAT)

1 Contents

Introduction

Non-renewable resources are being depleted and there is increasing environmental damage as a result of human activities. It is therefore increasingly important that this is addressed, and sustainability becomes a key issue in the way we live and work. Buildings can play an important role in supporting sustainability. This is done through careful planning in which design decisions, material specifications and so on are carefully evaluated in terms of their long term impact on the economic, social and environmental sustainability of a society and the natural environment.

The Sustainable Building Assessment Tool (SBAT) assesses the performance of a building in relation to a number of economic, social and environmental criteria. The tool has been designed to be particularly appropriate for use in developing countries and therefore includes aspects such as the impact of the building on the local economy, as economic issues are often a priority.

The tool can be used in design stages of a new building, or for the refurbishment of an existing building. It is designed to encourage the development of more sustainable buildings by enabling different options to be evaluated rapidly and compared. The tool also enables a building to be rated in terms of its sustainability. This enables buildings to be compared to each other and to benchmarks.

The design of the Gautrain Station in Hatfield followed the requirements as set out by this document very closely and where possible implemented aspects into the finished product. It is however important to note that full compliance with the lofty ideals as set out in this document cannot be attained. Design in architecture as any creative enterprise, but certainly more pronounced, has the unenviable drawbacks as the need to compromise with reality is a constant. For this reason certain elements enjoy more prominence over others, and because of the building type (a Station), greater accent needed to be put on those elements that would aid in the ultimate full functioning of the building.

As stated early in the design of the building, the premise were accepted early on that the building must be; first and foremost, seen as a machine of the efficient engorging and disgorging of train passengers on and off the train – and further to and from their automobiles.

The tool is designed to be easy to use and generates graphical reports, which enable performance to be easily read. The tool is also not building type-specific and can be used on a variety of buildings such as offices, factories, schools, clinics and housing.

The SBAT provides a way of making a basic assessment of the sustainability of a building. It can be used alongside more complex assessment tool and can save time and expense by identifying the main problem areas, before these are used.

2 Social Issues

2.1 Occupant Comfort

The quality of environments in and around buildings has been shown to have a direct impact on health, happiness and productivity of people. Healthier, happier, more effective and people contribute to sustainability by being more efficient and therefore reducing resource consumption and waste. However the quality of this environment needs to be achieved with minimal cost to the environment.

2.1.1 Lighting

- All work and living environments are well day lit. Day lighting control and glare minimised. No spaces require constant electrical lighting.

In the proposed Gautrain Station building, extensive use has been made of diffused light at night, but the predominant lighting method during the day is by means of diffused sunlight brought into the building via adjustable louvers.

The louvers also serve the building in that they reduce the amount of uv-light damage to interior finishes.

2.1.2 Ventilation

- Required ventilation provided by natural means. No mechanical ventilation used in building other than in toilets and kitchens.

The building in areas such as the Office Spaces have natural ventilation with the added feature of small Boardroom spaces that is air-conditioned by means of small capacity split-units only serving those areas.

The rest of the office spaces have been designed to be open plan with extremely oversized headroom to facilitate an air cushion over the space that acts as a insulator to the spaces.

2.1.3 Noise

- Noise levels limited in work and living environments to acceptable levels.

The working areas in the building consist of offices, supermarket spaces, small shops and restaurant areas. In all of these spaces the efficient use of sound absorbent floor and wall surfaces would ensure that the ambient sound levels would be kept well below the acceptable 65 dB sound pressure level as stipulated in the National Codes.

The noise from arriving and departing trains would be dealt with by the screening doors to the platform, which also serve as safety barriers between the passengers and the oncoming train.

2.1.4 Views

- Work areas have access to a view out. All users located in 6m or less from a window.

The offices on the first floor comply with this stipulation with every occupant on these wings having a superb view of the whole station precinct.

2.1.5 Access to green outside

- Access to green outside spaces

The design of the building is such in its conception that the urbanity of the building would be mitigated by the extensive use of nature. The building is set in a park atmosphere and the boundaries between inside and out have been consciously blurred in order to bring humanity back into this building type.

The passenger waiting for the next train to arrive or the tourist traveller can now be in nature as opposed to the norm in Europe and elsewhere where the quest to get to nature would only start at the train station.

2.2 Inclusive Environments

Buildings can be designed to accommodate everyone, or specially designed buildings need to be provided. Ensuring that buildings are inclusive supports sustainability as replications is avoided and change of use supported.

2.2.1 Public Transport

- Building is located 100, or fewer metres to disabled accessible public transport

From the start the building had to cater for the disabled in this manner as it became law to do so and the use of all of the building is an important design premise. The creation of a design that is monumental needs the support from every person liable to use the building in the future. When certain sectors of the population feels disenfranchised by the building by for instance not being accessible to disabled people, it would have a negative effect on the image of the building, and ultimately the patronage of that sector of society.

2.2.2 Routes

- All routes between and within buildings of a smooth and even surface (i.e. easily navigable by wheelchair)

This aspect received great attention in that the design of the building had as one of the major concepts the elimination of level differences from motor vehicle to platform. This had been achieved by means of the of situating the major drop-off points for platform passengers and vehicular passengers on the same level, but divorcing the two from that point as to maintain safety. People now either step from their vehicles, or in the case of disabled people, lowered to the road surface via their mechanical apparatus – and from that point there would not be steps or even major inclines to contend with until they step onto the train. The whole departure and arrival interchange occurs on basement level one.

People wishing to move to the ground level would also not find themselves cut off as the use of “Stramps” (stairs with ramps incorporated in them) makes the upper areas accessible.

2.2.3 Changes in level

- No changes in level between or within buildings or,
- All changes in level catered for with appropriate ramps of 1:12 fall, or lifts

2.2.4 Edges

- All edges i.e. between walls and floor s and stair nosings clearly distinguished through the use of contrasting colour (For visually impaired)

2.2.5 Toilets

- Required number of disabled toilets provided

Ablution facilities designed for the projected load of passengers served in an hour period between 08:00 to 09:00 in the mornings and 16:00 to 17:00 in the afternoons with a over-design factor of 40% worked into the equation.

Gautrain envisages a passenger load of 800 people per hour i.e. 14 400 per working cycle which would be over an 18 hour period. If then we use the 40% over-design it would equal 1 120 people using ablution per hour. Divided 50/50 it would come to 560 male and 560 female passengers using ablution per hour.

According to the SABS 0400 – 1990: table 7,

Facilities subject to peak demand 1500 max population:

Male			Female	
WC pans	Urinals	Washbasins	WC pans	Washbasins
4	15	5	20	8

These facilities need to be properly policed and maintained. Access to the facilities need to be from every level of the station compound.
Provision for disabled persons needs to be achieved with three disabled toilets for every set of ablution facilities. The disabled toilets need to be placed away from the main pedestrian traffic stream to ease access to the less mobile.

2.3 Access to Facilities

Convention living and working patterns requires regular access to a range of services. Ensuring that these services can be accessed easily and in environmentally friendly ways supports sustainability by increasing efficiency and reducing environmental impact.

2.3.1 Childcare

- Childcare provided in building or close by (within 3km)

This aspect needn't be catered for, as the building is a station where people come to board or depart from trains.

The facilities need to be present on the periphery of the site, but due to the high demand on premium space on the station precinct it cannot be possible to cater for the demand of outdoor circulatory space necessary for toddlers and young children in a safe manner.

2.3.2 Banking

- Banking services (i.e. ATM) provided in building or close by (within 3km)

Banking facilities have been catered for in the building with major banking chains having machines at a central distribution point, close to the Travel Agencies that were designed to cater for the tourist traveller in mind.
The idea that a traveller would start his journey at the station is very important. It is thus important to note that one may arrive at the station and have one's whole journey to an overseas destination planned and booked at the central booking terminal in the station. This facility is situated in the main vertical route leading form the basement levels to the platform area.

2.3.3 Retail

- Grocery, items required on a day to day basis available in building or close by (within 3km)

The building in the escalator spaces a shopping mall where numerous shops are situated to cater for this need. In addition there is a supermarket on the ground floor level that would stock whatever isn't available on the basement shopping mall.

2.3.4 Communication

- Postal, telephone or email facilities provided in the building or close by (within 3km)

The proximity of numerous services both governmental and private in the Hatfield shopping precinct caters for these.
The inclusion of readily accessed post-boxes from both the governmental and private concerns can be catered for as the need to do so have been established by means of passenger surveys as the service comes into operation.

2.3.5 Residential

- Home, for occupants of the building is within 12km.

Occupants of the building live in a radius of 1.5km of the building.
With the densification of the Hatfield area the goals of residential occupation would be achieved.
Densities of 25du/ha are called for. This entails the addition of 2500 dwelling units created additionally of 60m².if it is accepted that there are 472 units in the 100ha area an additional 2028 units will be required.
A 45% coverage can thus be attained in Hatfield in available vacant land. Hatfield Village near Hartebeesspruit station is one area identified as being of high value.

At present the residential coverage is: 200 m²/unit with 472 units in the node.

The desired coverage would be 50% with a height of no more than four storeys for residential buildings – it would thus be unwise to make the proposed new building higher as this would adversely affect the urban character of the neighbourhood.

2.4 Participation & Control

Ensuring that users participate in decisions about their environment helps ensure that they care for and manage this properly. Control over aspects of their local environment enables personal satisfaction and comfort. Both of these support sustainability by promoting proper management of buildings and increasing productivity

2.4.1 Environmental control

- Users of building have reasonable control over their environmental conditions; this should include opening windows and adjustable blinds.

Office workers have the ability to open windows and doors leading to a green balcony area surrounding the offices. It is possible for the people to even step out and be in sunshine, an important design aspect in the building.

2.4.2 User adaptation

- Furniture and fittings i.e. tables, chairs, internal partitions designed or specified allow arrangement/rearrangement by user. Provision made for personalisation of spaces if desired. This may include provision for pin boards, choice of colours, places for plants and personal storage.

The office spaces have been designed to be open plan, and user alterable.
Layout of the interiors has been designed to be changeable as tenants and styles change. The envelope of the building caters for the ease of change by not having set partition walling in place. All division is by means of dry walling.

2.4.3 Social spaces

- Design for easy informal / formal social interaction. This could involve a tearoom with comfortable seating. Seating provided along regularly used routes. Spaces shared between occupants/users (i.e. photocopying rooms etc) large enough to allow for comfortable social interaction.

Due to the social nature of the building it is very geared for interaction. All spaces force people to intermingle.

In office spaces, due to the open plan nature of the building the interaction is ensured.

In the park like areas surrounding the building, designed seating benches and canopies have been created to ensure interaction spaces for not only the passenger, but also for the local residents.

The use of trees in these areas enhances the shade and hence the social gathering spaces of the building.

2.4.4 Amenity

- Easy access to refreshment facilities (tea point, kitchen, vending machines) and WCs for all users of the building

Amenities in the building due to the nature of the building would have to cater for the wims of the business traveller and discerning tourist.
For this reason the cafeterias and restaurant spaces would have to contend with vending machines placed in close proximity for those not inclined to have a sit-down dinner.
This competition can only be described as healthy.

2.4.5 Community involvement

- Spaces or services shared or made available to local community. This could include access to computers, teaching learning spaces, leisure facilities, and crèche.

The local community intrinsically shares in the ultimate success of the building, by means of the shared nature of the urban park surrounding the building, as well as the community forum spaces created for members of the community to express themselves through art in spaces provided for this function. Graffiti walls and community art mosaic panels throughout the building.

2.5 Education, Health and Safety

Buildings need to cater for the well being, development and safety of the people that use them. Awareness, and environments that promote health can help reduce the incidence of diseases such as AIDS. Safe environments and first aid can help limit the incidence of accidents and where these occur, reduce the effect. Learning and access to information is increasingly seen as a requirement of a competitive work force. All of these factors contribute to sustainability by helping ensure that people remain healthy and economically active, thus reducing the 'costs' (to society, the environment and the economy) of unemployment and ill health.

2.5.1 Education

- Access to support for learning provided. This can be in the form of Internet access, structured courses, or the provision of learning material such as books, journals and newspapers.

The building through the sub-terrainean mall and the commercial shops it would house will have due to its user profile have Internet Cafes. These could easily serve the local community in the training of computer literacy. The advantage of having these functions as private sector entities is that the operator can make profit from the venture ensuring growth if possible and prolonged use. If the market exists it would evolve naturally.

2.5.2 Security

- Measures taken to ensure that areas of the buildings and routes to and from the building are safe, and feel safe. Measures taken could include well lit routes, routes and spaces overlooked by occupied areas, clear visual links between spaces to ensure security measures can be effective.
- As seen in European examples the constant monitoring of the environment greatly cuts down on the petty crime aspect, which in turn leads to more serious crime.
- As seen in the example set by Mayor Rudolph Gullianni in New York, the clamping down on petty offenders eliminates the environment for serious crime. It would thus follow that in the proposed new Gautrain station the occurance of "Squeegee Men" (lapswaaiers) would have to be eliminated to create a safe station environment for the proposed end user.

As was shown by the esteemed ex-major of New York, simple measures such as these have even had an affect on the number of serious crime such as murders and rapes.

The security of the station precinct would be handled in conjunction with the SANPS and a concessionaire tasked with the security on the platforms.

The Policing Service would have a presence on the station with a satellite station on-site. The station would also comprise a holding area to confine offenders for

processing.

Passenger Safety

On-site police station ensures continuous monitoring of all passengers and people entering the building and station precinct. The police station also have holding cells in the event of an arrest in order to maintain a presence on site, and not to have personnel transport dangerous suspects to neighbouring police stations.

The monitoring of all people would be by means of close circuit television cameras places throughout the building and monitored in the police station in a dedicated monitoring facility. Added to this is the design of clear, unobstructed views in and around the building. Blind allies and corridors are eliminated.

2.5.3 Health

- First aid kit provided in a central location. Policy to ensure that this can be used effectively. Information readily available on health, education, and career development issues. This could be in the form of a well serviced notice boards located in a central position.

2.5.4 Smoking

- No smoking in public spaces, Space allocated for smoking where it will not affect other users, i.e. away from air intakes etc.

2.5.5 Safety

- Building complies with all health and safety requirements. Policy/regular checks in place to ensure that these are complied with.

The building, because it is a public transit building need to adhere to numerous important aspects as laid out in the SABS 0400, deem to satisfy regulations.

Fire safety

Materials used in the building should be fire retardant and have a fire rating of no less than 2.5hours in an event of a fire to ensure structural integrity and stability. This is to ensure maximum survivability in the event of a fire of as many individuals as possible.

Clear legibility – as were learnt from the Kings Cross Subway Fire in 1988, on the London Underground. People need to be aware of escape routes and alternative routes in and around the building.

Circulation in and around the building has been designed with the design guidelines of minimum 1.8m corridors being far exceeded – to some areas as much as 6.5m to 7.5m.

The structural material in the building is predominantly re-inforced concrete in the superstructure and structural steel members in the roofing elements.
The weaker of the two (structural steel) have been confined to the office areas and train canopy where it would not be a hazard to passengers in the event of a fire.
The main concourse areas have re-inforced concrete as its structural element – greatly increasing the survivability factor of the building in relation to its occupants.

Water sprinkler valves throughout the building.

People are given longer time to escape shorter distances over even terrain and wide corridors to safety.

Platform Safety

Passengers would be protected from malicious bumps by means of not only around the clock cctv but also platform screen doors that only opens simultaneous with the train doors to ensure nobody is shoved underneath moving trains.

3 Economic Issues

3.1 Local Economy

The construction and management of buildings can have a major impact on the economy of an area. The economy of an area can be stimulated and sustained by buildings that make use and develop local skills and resources.

3.1.1 Local contractors

- 80% of the construction has been carried out by contractors based within 40km of the building/refurbishment

This aspect was addressed in the use of both local artisans in the building of the structure as well as in the use of artists in the laying of the mosaic tile indigenous artworks. The use of varying levels of accomplishment in the artists used ensures that the procession of space from less to more important space is emphasised. The natural evolution of this would be that on the approaches of the station, less well-known artists' work are utilised and in more defined, important spaces the more prominent ones have their forum.

3.1.2 Local building material supply

- 80% of construction materials: cement, sand, bricks etc produced within 200km of site

Building material supplied to the site have been carefully looked at to comprise of materials that are indigenous to the area, and not as is the norm in other high ranking projects, the importation of exorbitant building materials such as marble to emphasise the importance of spaces.

3.1.3 Local component manufacturer (Furniture?)

- 80% of building components i.e. windows and doors produced locally (within 200km)

Construction and supply of the furnishings in the building closely follows these norms. The pedestrian benches in the public forum park are would consist of a composite of materials with the parts in direct abrasive contact with the public being concrete, and the less exposed materials in the smaller canopy structures having hardwood elements incorporated in it.

The hardwood areas have however the exclusive predominance in the tourist information centre and surrounds, while the less prestigious areas surrounding the

traders area where more wear and tear is expected the canopies would consist of steel section elements.

3.1.4 Outsource opportunities

- Opportunities created and provision provided for small emerging businesses. This includes outsourcing catering, cleaning services and security as well as making space and equipment available for businesses to use for retail, education etc.

The outsourcing of certain elements in the station design would mainly be in the every day running of the enterprise. Where the building is a joint venture between the Provincial Government and the Municipality of Tshwane, these decisions would be the domain of the chosen concessionaires operating the structure. Elements have however been put in place to ensure that the building lend itself to such outsourcing.

Elements such as cleaning and security would be major outsourcing elements in the design.

3.1.5 Repairs and maintenance

- All repairs and maintenance required by the building (including servicing of mechanical plant) can be carried out by contractors within 200km of site.

Due to the proprietary nature of the switchgear involved in the high-speed train layout the servicing of local contractors would for the foreseeable future of at least 15 years remain proprietary, before the technologies in place may be outsourced. This complication is however a function of modern day technological transfer, where the developing firm would have the right to protect its investment in the long term, by servicing the machinery in the short term.

3.2 Efficiency of Use

Buildings cost money and make use of resources whether they are used or not. Effective and efficient use of buildings supports sustainability by reducing waste and the need for additional buildings.

3.2.1 Useable space

- Non-useable space such plant, WCs and circulation does not make up more than 20% of total area.

The building being designed to be an efficient machine for the loading and unloading of passengers, the amount of space utilised to perform this function enjoyed a premium, with the result that the wasted space in the building not dedicated to circulation or retail have been kept to a minimum.

3.2.2 Occupancy

- Building and all working/living spaces are occupied for an average equivalent minimum of 30 hours per week.

Due to the office nature of the building this point would be dealt with in that the working time allowed for office workers is 410 hours per week, falling well within the confines set.

The continuous use of the building after hours to ensure safety and vandal prevention is by means of the situation of after work activities in the building – restaurants, this aspect provides vibrancy the project.

3.2.3 Space use

- Use of space intensified through space management approach and policy such as shared workspaces i.e. 'hot-desking'.

3.2.4 Use of technology

- Communications and information technologies used to reduce space requirements i.e. videoconference, teleworking etc.

The Proposed new Gautrain Station in Hatfield would in its essence be a highly technological building – showcasing the prowess of the South African building and engineering community. Seen in this light it would be unthinkable not to have Internet connectivity in the building as well as "Blue Tooth" technology where the wireless future of technology would be utilised.

The passenger / user profile of the high-speed train service would also have it that the provision of these and other cutting edge technologies would be inescapable. The business traveller using the service must use the 35 minutes it would take to commute from one station to the next to keep up to speed.

3.2.5 Space management

- Policy to ensure that space is well used. This may include regular audits, or space management system that charges space to cost centres.

3.3 Adaptability and Flexibility

Most buildings can have a life span of at least 50 years. It is likely that within this time that the use of the building will change, or that the feasibility of this will be investigated. Buildings, which can accommodate change easily supports sustainability by reducing the requirement for change (energy, costs etc) and the need for new buildings.

3.3.1 Vertical dimension

- Structural dimension (Floor to underside of roof, or slab of the floor above) minimum of 3m

The design of the Floor-to-ceiling heights in the built envelope called for the high provision of service space left open for future expansion upwards.
The plan would be to include in future, an Office Block over the Public Forum Park, and an Hotel of international Standard in the Station precinct catering for the International Business Traveller.

For this reason a space of 4.25m have been designed.

3.3.2 Internal partitions

- Internal partitions between living/work spaces are non-load bearing (ie non-load bearing brick / block or plasterboard partitions) and can be ‘knocked-out’ relatively easily.

3.3.3 Services

- Easy access provided electrical, communication and (and HVAC, where appropriate) in each useable space. Provision made for enabling easy modification of system (i.e. addition subtraction of outlets)

3.4 Ongoing Costs

3.4.1 Maintenance

- Specification and material specification for low maintenance and or low cost maintenance. All plant and fabric have a maintenance cycle of at least 2 years. Low or no maintenance components (i.e. windows, doors, plant, ironmongery etc) selected. Maintenance can be carried out cost effectively (i.e. replaceable items such as light bulbs can be easily reached and replaced).

3.4.2 Cleaning

- Measures taken to limit requirement for cleaning. Hard wearing solid flooring (limited or no carpeting) specified. Windows easily accessible for cleaning.

Extensive thought were given to this aspect of the building's design in that private firms creating job opportunities would be tasked with the cleaning of the building and surrounds.

3.4.3 Security / care taking

- Measures taken to limit the requirement and costs of security. This should include mixed-use development (area is always occupied), buildings and spaces overlooked by occupied neighbouring buildings.

3.4.4 Insurance / water / energy / sewerage

- Costs of insurance, water, energy and sewerage monitored. Consumption and costs regularly reported to management and users. Policy and management to reduce consumption (i.e. switching off lights on leaving building spaces) implemented.

3.4.5 Disruption and 'downtime'

- Electrical and communication services, HVAC and plant located where they can be easily accessed with a minimum of disruption to occupants of building. This should maximising access to this from circulation areas (rather than work/living areas) and lift off panels at regular intervals to vertical and horizontal ducting.

3.5 Capital Costs

Buildings are generally one of the most valuable assets that people, and often organisations and governments own. Money spent on buildings is not available for other uses such as health and education. Often too, the high cost of buildings results in the services (i.e. health and education) and the accommodation (for work and living) is beyond the reach of people with the lowest incomes. Buildings that are cost effective support sustainability by helping provide access to accommodation and services for low-income areas and by enabling money to be spent on other areas that support sustainability.

3.5.1 Consultant fees

- Consultant fees not just calculated on total project cost basis. Incentives provided to consultants to reduce capital cost and ongoing costs.

3.5.2 Build-ability

- Building designed to be easily and cheaply built. Building form simple. Replication of elements and components.
- For this reason re-inforced concrete were decided upon, as it is well known in this country and craftsmen readily adapt to the constraints thereof.
- In other countries it is more expensive to use concrete – but in South Africa it is deemed as a sustainable building method.

3.5.3 Construction

- Construction approach designed to reduce initial capital cost of building. Building undertaken in a series of phases. Building built as shell first with finishes to be added later.
- Phase building as understood in general cannot apply to this building, as the essence of the building would be its service to the community. As such it would have to be relatively finished to fulfil this function. Halfway-completed station does not function to full capacity – as this building is a machine it would have to be complete.
- What can well be attained is the phasing of larger expansionary elements, such as the before mentioned Hotel and Office Tower projects, which would be entities in themselves.

3.5.4 Shared costs

- Cost of building shared with other users
- The building costs would be effectively shared as it is a joint venture between the Government, Provincial Government and the City of Tshwane.
- The enormous costs involved in the creation of the building and Gautrain concept cannot be brought to fruition by a single role player bearing the financial cost of the project. For this reason, even the day-to-day running of the building would have to be shared financially in the interim period of 15-30 years planned.

3.5.5 Sharing arrangements

- Size and quantity of buildings reduced through arrangements to use existing spaces and buildings.

4 Environmental Issues

4.1 Water

Water is required for many activities. However the large-scale provision of conventional water supply has many environmental implications. Water needs to be stored (sometimes taking up large areas of valuable land and disturbing natural drainage patterns with associated problems from erosion etc), it also needs to be pumped (using energy) through a large network of pipes (that need to be maintained and repaired). Having delivered the water, a parallel efforts is then required to dispose of this after it is used, i.e. sewerage systems. Reducing water consumption supports sustainability by reducing the environmental impact required to deliver water, and dispose of this after use in a conventional system.

4.1.1 Rainwater

- Rainwater is harvested, stored and used.

4.1.2 Water use

- Water efficient devices

4.1.3 Grey water

- Grey water (water from washing etc) recycled (to flush toilets or water plants)

4.1.4 Runoff

- Run off reduced by using pervious or absorbent surfaces. Hard landscaping minimised, previous surfaces specified for car parking and paths.

4.1.5 Planting

- Planting has low water requirement (indigenous species)

4.2 Energy

Buildings consume about 50% of all energy produced. Conventional energy production is responsible for making a large contribution to environmental damage and non-renewable resource depletion. Using less energy or using renewable energy in buildings therefore can make a substantial contribution to sustainability.

4.2.1 Location

- Building located within 400m of public transport
- Very important as the building is a station.
- The interconnected-ness of the different modes and sixes of transport needs to be stimulated in the positioning of these aspects of the design
- Care needs to be taken not to cross-vulnerable pedestrian traffic flow with vehicular traffic such as busses or cars. For this reasons the step-over spaces need to be designed to facilitate the inter-flow.

4.2.2 Ventilation System

- The building can have areas such as in the Office Wings where passive ventilation can be utilised effectively, in the rest of the building the combined air-pressure created by the incoming and exiting trains, and mechanical ventilation systems would ventilate the basement areas.

Ventilation Requirements for the different activity functions

Toilets	10 l/s per m²
Offices	15 l/s per m²
Arrival and departure area	20 l/s per m²
Shops	10 l/s per m²
Platforms	20 l/s per m²
Stairwells (Fire Escapes)	Pressurized as per the Fire Regulations
Equipment Rooms	As per specifications lain down by manufacturer

Above table as per SABS 0400 - 1990

4.2.3 Heating and Cooling System

- The extensive use of mass in the walls of the above ground spaces combined with the use of insulated metal roof sheeting, creates effective thermal performance to the building.
- By using louvers the heat build-up can be minimised and encouraged in the colder months.

4.2.4 Appliances and Fittings

- Energy efficient fittings and devices specified. 80% of light fittings are fluorescent/low energy consumption

4.3 Recycling and Reuse

Raw materials and new components used in buildings consume resources and energy in their manufacture and processes. Buildings accommodate activities that consume large amounts of resources and products and produce large amounts of waste. Reducing the use of new materials and components in buildings and in the activities accommodated and reducing waste by recycling and reuse supports sustainability by reducing the energy consumption and resource consumption.

4.3.1 Inorganic waste

- Arrangements for sorting, storage and pick up of recyclable waste.
- The kitchen waste generated by the restaurant areas needs to be catered for here. Facilities were added to store and distribute waste to central collection points inside the basement, from where the contractors disposing of the waste would come and pick it up.
- Careful thought and planning needed to be handed into the local authority to prove that provision had been made for this.

4.3.2 Organic waste

- Recycled on site i.e. compost

4.3.3 Construction waste:

- Construction waste minimised through design careful management of construction practices. Design limits wastage by designing to comply with modular dimensions of materials etc

4.4 Site

Buildings have a footprint and a size that take up space that could otherwise be occupied by natural ecosystems which contribute to sustainability by helping create and maintain an environment that supports life. (By, for instance controlling the carbon dioxide and oxygen balance and maintaining temperatures within a limited range). Buildings can support sustainability by, limiting development to sites that have already been disturbed, and working with nature by including aspects of natural ecosystems within the development.

4.4.1 Brownfield site

- Building constructed on a site already previously built on.
- The selection of the site to place the main station complex closely followed the premise that previously disturbed ground must be used.

4.4.2 Neighbouring buildings

- Building does not have harmful affect on neighbouring buildings i.e. over shading, where access to sunlight is important.

4.4.3 Vegetation

- Site has extensive vegetation. Opportunities have been taken to plant in car parking areas, and in and around buildings i.e. atriums, window boxes and roof gardens.
- The concept of the Public Forum Park situated to the east of the station building were expressly due to the realization that vegetation needed to be brought into the design of the building.
- No clear demarcation between interior and exterior were made and as far as possible the design emphasizes the close co-operation between nature and this otherwise urban building type. Living in Africa one cannot follow the stodgy thoughts lain down dictating that urbanity must constitute concrete and steel without vegetation.
- With the use of grown trees transplanted onto site uniformity is created and an instant sense of permanence can be created.

4.4.4 Habitat

- Site has provided habitats for animals. This includes a coordinated landscaping strategy that takes into account planting, water and habitat etc.

4.5 Materials and Components

The construction of buildings usually requires large quantities of materials and components. These may require large amounts of energy to produce. Their development may also require process that are harmful to the environment and consume non-renewable resources.

4.5.1 Embodied energy

- 80% of the building materials and components made from materials and components with low embodied energy. Low embodied energy materials include locally (within country) made and sourced timber, concrete, concrete block timber windows and doors.

4.5.2 Material / component sources

- 90% of materials and resources from renewable resources

4.5.3 Manufacturing processes

- Environmental damage limited during product component development. No green house gases released, no pollution caused.

For this reason extensive use was made of concrete as a building element as the embodied energy of the material is low which means the amount of energy consumed in the manufacturing process, is mitigated by the volume of useful material created. The construction process in South Africa, with the extensive use of cheap un-schooled labour lends it to the use of this material in minimizing cost while maximizing the built dividend.

In manufacture of the aluminium elements of the building cladding elements and the louvered systems the argument can well be made that the elements consumed vast amounts of electrical energy. The flip side is the truth we should however pursue as the eventual re-use of those building element would in infinity be cheaper than the use of a more deteriorating element such as steel which cannot be re-used as it in some instances disintegrates due to corrosion. Steel if not treated must be re-smelted and can only then be re-constituted. This entails a further use of damaging green house gasses.

The steel in the building has been used in a protected environment predominantly, and where exposed to the elements due care has been taken in the specification

process to ensure protection to corrosion.

4.5.4 Recycled / reused materials and components

- 10% of building materials and components are reused or from recycled sources.

The building being a re-inforced concrete building in its superstructure lends itself perfectly to the utilization of reclaimed aggregate in the concrete. Concrete is one of the most recyclable products in the building industry, with an embodied energy that supports the goals of job creation crucial in third world countries such as South Africa.

The copper roofing material can if need be, be reclaimed at a later stage as was done by the Welkom Municipality in order to obtain crucially needed funds for redevelopment. The cost of removal and replacement with more conventional metal cladding would not be overshadowed by the dividends obtained from the selling of the product. This course of action is not advised however as the roofing material does not merely serve a aesthetic appeal, but it plays an integral part in the water harvesting system of the building.

4.5.5 Construction processes

- Building and construction process designed to minimally impact the environment. Requirement for large-scale vegetation clearing and earth movement minimised.

This point is impossible when it comes to the building as it entails the construction of vast basement areas. Due to the high water table in Hatfield the ensuing difficulty in disposing of the excess water without adversely affecting the water table in adjacent properties and in the surrounding ecosystem.

The impact of this should however be weighed against the advantages foreseen for the project for the community.

Building Sustainability **Outline SBAT Evaluation** **Student Design Scheme**

Project: Gautrain Station, Hatfield By: André du Plessis Date: 06 June 2003

1 Performance Prioritisation

Refer to site analysis, brief & client / building user priorities

	Criteria	No Requirement 1	Low Requirement 2	Medium Requirement 3	High Requirement 4	Essential 5
SO	**Social**					
SO1	Occupant Comfort					•
SO2	Inclusive Environments					•
SO3	Access to Facilities					•
SO4	Participation and Control	•				
SO5	Education Health and Safety			•		
EC	**Economic**					
EC1	Local Economy					•
EC2	Efficiency of Use			•		
EC3	Adaptability and Flexibility	•				
EC4	Ongoing Costs					•
EC5	Capital Costs		•			
EN	**Environmental**					
EN1	Water			•		
EN2	Energy	•				
EN3	Waste		•			
EN4	Site				•	
EN5	Materials and Components					•

2 Target Setting & Assessment

Refer to site analysis, brief & client / building user priorities, and benchmarks for building type

	Criteria	Target Set	Building Performance	Reference	Achieved? Y / N	Comment
S0.1	*Occupant Comfort*					
S0.1.1	Ventilation	Essential Requirement (5)	Essential Requirement (5)		Y	
S0.1.2	Thermal comfort	Medium Requirement (3)	Medium Requirement (3)		Y	
S0.1.3	Views	High Requirement (4)	High Requirement (4)		Y	
S0.1.4	Noise	Essential Requirement (5)	Essential Requirement (5)		Y	
S0.1.5	Indoor / Outdoor connection	Essential Requirement (5)	Essential Requirement (5)		Y	
S0.2	*Inclusive Environments*					
SO.2.1	Transport	Essential Requirement (5)	Essential Requirement (5)		Y	
SO.2.2	Entrance	Essential Requirement (5)	Essential Requirement (5)		Y	
S0.2.3	Circulation	High Requirement (4)	High Requirement (4)		Y	
S0.2.4	Furniture & Fittings	Medium Requirement (3)	High Requirement (4)		Y	
S0.2.5	Toilets & Kitchens	Essential Requirement (5)	High Requirement (4)		N	
S0.3	*Access to Facilities*					
S0.3.1	Childcare	Low Requirement (2)	Low Requirement (2)		Y	
S0.3.2	Banking	Medium Requirement (3)	Medium Requirement (3)		Y	
S0.3.3	Retail	High Requirement (4)	High Requirement (4)		Y	
S0.3.4	Communications	High Requirement (4)	High Requirement (4)		Y	
S0.3.5	Work / Residential	Low Requirement (2)	Low Requirement (2)		Y	
S0.4	*Participation & Control*					
S0.4.1	Environmental control	Low Requirement (2)	Low Requirement (2)		Y	

S0.4.2	User manual/training	Medium Requirement (3)	High Requirement (4)		Y	
S0.4.3	Social spaces	Essential Requirement (5)	Essential Requirement (5)		Y	
S0.4.4	Amenity	Essential Requirement (5)	Essential Requirement (5)		Y	
S0.4.5	Local community	Medium Requirement (3)	Medium Requirement (3)		Y	
S0.5	*Education, Health & Safety*					
S0.5.1	Education	Low Requirement (2)	Low Requirement (2)		Y	
S0.5.2	Safety & security	Essential Requirement (5)	Medium Requirement (3)		N	
S0.5.3	Smoking	High Requirement (4)	Medium Requirement (3)		N	
S0.5.4	Indoor air quality	Essential Requirement (5)	High Requirement (4)		N	
S0.5.5	Exercise & recreation	Low Requirement (2)	Low Requirement (2)		Y	
EC.1	*Local Economy*					
EC.1.1	Local contractors	Essential Requirement (5)	High Requirement (4)		N	
EC.1.2	Local building material supply	High Requirement (4)	Medium Requirement (3)		N	
EC.1.3	Local components	High Requirement (4)	Medium Requirement (3)		N	
EC.1.4	Repairs and maintenance	Medium Requirement (3)	Medium Requirement (3)		Y	
EC.1.5	SMME support	Essential Requirement (5)	Medium Requirement (3)		N	
EC.2	*Efficiency of Use*					
EC.2.1	Space Use	High Requirement (4)	Medium Requirement (3)		N	
EC.2.2	Occupancy schedule	Medium Requirement (3)	Low Requirement (2)		N	
EC.2.3	Management of space	High requirement (4)	Medium Requirement (3)		N	
EC.2.4	Use of technology	Essential Requirement (5)	Essential Requirement (5)		Y	
EC.2.5	Disruption & downtime	Essential Requirement (5)	Medium Requirement (3)		N	
EC.3	*Adaptability & Flexibility*					

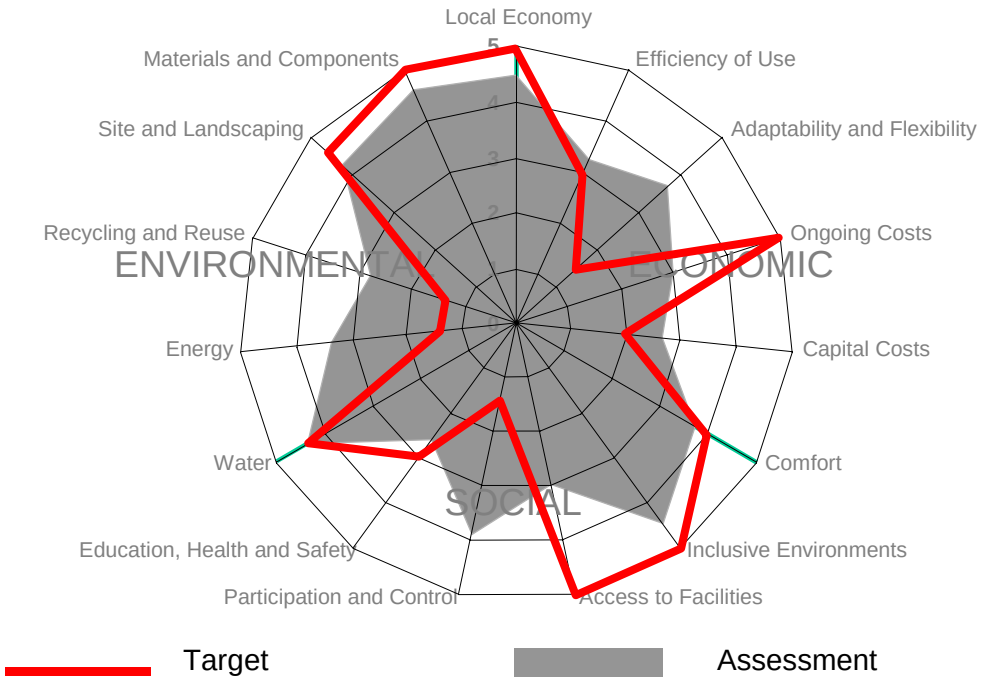
EC.3.1	Vertical dimension	Essential Requirement (5)	Essential Requirement (5)		Y	
EC.3.2	Internal partitions	Essential Requirement (5)	Essential Requirement (5)		Y	
EC.3.3	M&E Services	Essential Requirement (5)	Medium Requirement (3)		N	
EC.3.4	Structure	Low Requirement (2)	Low Requirement (2)		Y	
EC.3.5	Circulation & service spaces	High Requirement (4)	High Requirement (4)		Y	
EC.4	*Ongoing Costs*					
EC.4.1	Maintenance	High Requirement (4)	High Requirement (4)		Y	
EC.4.2	Cleaning	Medium Requirement (3)	Low Requirement (2)		N	
EC.4.3	Security / care taking	Essential Requirement (5)	Medium Requirement (3)		N	
EC.4.4	Shared costs	Medium Requirement (3)	Medium Requirement (3)		Y	
EC.4.5	Cost monitoring	High Requirement (4)	Medium Requirement (3)		N	
EC.5	*Capital Costs*					
EC.5.1	Use of existing	Low Requirement (2)	Low Requirement (2)		Y	
EC.5.2	Shared cost	Medium Requirement (3)	Low Requirement (2)		N	
EC.5.3	Plate efficiency	Essential Requirement (5)	Medium Requirement (3)		N	
EC.5.4	Ratio of capital to ongoing costs	Medium Requirement (3)	Medium Requirement (3)		Y	
EC.5.5	Proportions of cost / building size	Medium Requirement (3)	Low Requirement (2)		N	
EN.1	*Water*					
EN.1.1	Rainwater	Essential Requirement (5)	Essential Requirement (5)		Y	
EN.1.2	Water Use	Essential Requirement (5)	Essential Requirement (5)		Y	
EN.1.3	Grey water	Essential Requirement (5)	Essential Requirement (5)		Y	
EN.1.4	Runoff	Essential Requirement (5)	Low Requirement (2)		N	
EN.1.5	Planting	Essential Requirement (5)	High Requirement (4)		N	

EN.2	*Energy*					
EN.2.1	Transport	Essential Requirement (5)	High Requirement (4)		N	
EN.2.2	Ventilation	Essential Requirement (5)	High Requirement (4)		N	
EN.2.3	Environmental control	Essential Requirement (5)	Medium Requirement (3)		N	
EN.2.4	Appliances & fittings	Essential Requirement (5)	Medium Requirement (3)		N	
EN.2.5	Energy sources, Renewable energy	Essential Requirement (5)	Medium Requirement (3)		N	
EN.3	*Waste*					
EN.3.1	Organic waste	Low Requirement (2)	Low Requirement (2)		Y	
EN.3.2	Inorganic waste	High Requirement (4)	Medium Requirement (3)		N	
EN.3.3	Toxic waste	High Requirement (4)	Medium Requirement (3)		N	
EN.3.4	Sewerage	High Requirement (4)	Medium Requirement (3)		N	
EN.3.5	Construction waste	Medium Requirement (3)	Medium Requirement (3)		Y	
EN.4	*Site*					
EN.4.1	Brownfield site	Essential Requirement (5)	Essential Requirement (5)		Y	
EN.4.2	Neighbouring buildings	Medium Requirement (3)	Medium Requirement (3)		Y	
EN.4.3	Ecosystems	Low Requirement (2)	Low Requirement (2)		Y	
EN.4.4	Landscape inputs	High Requirement (4)	High Requirement (4)		Y	
EN.4.5	Construction processes	High Requirement (4)	Medium Requirement (3)		N	
EN.5	*Materials & Components*					
EN.5.1	Material / Component Sources	Low Requirement (2)	Low Requirement (2)		Y	
EN.5.2	Embodied energy	Medium Requirement (3)	Medium Requirement (3)		Y	
EN.5.3	Manufacturing processes	Low Requirement (2)	Low Requirement (2)		Y	

EN.5.4	Recycled & reuse of materials & components	Essential Requirement (5)	Medium Requirement (3)		N	
EN.5.5	Modular coordination	Essential Requirement (5)	High Requirement Requirement (4)		N	

3 SBAT Report

Develop with reference to 1. Performance Prioritisation and 2. Target Setting and Assessment (above)



Comments

SO: Social

EC: Economic

EN: Environmental