connections and gateways
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I, Gareth Bernard Teague, student number: 500780 am a student registered for the course Master of Architecture [Professional] in the year 2011. I hereby declare the following:

I am aware that plagiarism [the use of someone else’s work without permission and/or without acknowledging the original sources] is wrong. I confirm that the work submitted for assessment for the above course is my own unaided work except where I have stated explicitly otherwise. I have followed the required conventions in referencing thoughts, ideas, and visual materials of others. For this purpose, I have referred to the Graduate School of Engineering and the Built Environment style guide. I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my unaided work or that I have failed to acknowledge the source of the ideas or words in my own work.
This document is submitted in partial fulfilment for the degree: Master of Architecture [Professional] at the University of the Witwatersrand, Johannesburg, South Africa, in the year 2011

Gareth Bernard Teague:
500780
To the creative’s and the thinker’s for their beauty and inspiration,

To Bill Gates and Steve Jobs for spearheading the personal computer,

To the natural world for all its beauty and inspiration,

To anything or anyone that has been there for me throughout these years of academia,

To Professor Paul Kotze for his knowledge, guidance and honesty, without whom this project would have been near impossible and certainly futile.

To you and you and you and whoever, for it takes many to make a world. Especially to you... the collective whole!

To my parents, for their love and support.

To Suzanne, for her love and support.

And to TATA Africa, the corporation who handed me a scholarship in July this year. The financial support has been paramount to the progress of this project...

Thank you and thank you again; it has been the most wonderful journey!

thanks ...
imaginative travel, movement of images and information, virtuality and physical movement are materially reconstructing the 'social as society' into the 'social as mobility'.

John Urry, 2000
The implementation of new public transport networks, such as the Gautrain, present new responsibilities and opportunities for urban development. Mega projects like these are constructed for various economical, social and political reasons. These underlying orders beg a necessary question when defining the architectural program required for the integration of the stations and their relative contexts.

Integration is a key narrative for the exploration and enquiry of this thesis. The new Gautrain system should connect with existing and future transport systems, social systems and other contextual realities. Another question raised throughout the theoretical enquiry of this thesis is; to what extent does this connection and integration occur at the recently completed Gautrain stations?

The idea of creating ‘Gateways’ into a city, rather than mere station ‘posts’ is explored as an architectural narrative. These ‘Gateways’ become the introductory point for commuters and an opportunity to create an experiential dimension relating to ‘the image of a city’ and its ‘zeitgeist’.

Pretoria Station was chosen due to the many layers of integration intrinsic to the site. This opportunity is available due to the existence of neo-classical buildings within the immediate and macro context. Here the application of a contemporary, 21st century piece may create a representation of the progression of architectural and sociological thinking, relating to city building and transportation. This site also offers opportunities for exploring the integration of existing and future transport networks due to the existence of several transport modes. Theories of city building and ‘placemaking’ are explored as a requirement borne out of the neglect for this site as it has developed through the modern era.
1.1 Modern Mobility

Figure 1.1: The Sandton station’s platform; author’s photograph.
Mobility exists when one enters a relationship with a place other than the present one. It could be a futile thought, virtual communication, media representations or as corporeal as train travel. The phenomenon of mobility exists constantly as a reality of modern society. Sociologist John Urry calls this the ‘sociology of mobility’, while other theorists, who will be spoken about shortly, have created the alias; ‘logistic modernity’ pertaining to this phenomenon of modern society.

Paul Virilio, the French military theorist and self proclaimed urbanist, coined the word ‘Dromology’ (from Gr. dromos: race course), which he describes as the study and analysis of the increasing speed of transport and communication on the development of land-use (Virilio, 1997. Translated, 2006). With this definition in mind and the adjoining quote by Benjamin H Bratton: “Dromocracy depends on technologies that in their employment, straddle the pre-political and the hyper-political, working on the bodies of the masses as a practical material that can be strategically designed and deployed”, one starts to inquire about mobility’s relationship with society and the intentions with which such infrastructure it was implemented.

Author, Benjamin H Bratton, who wrote the introduction to the English version of Paul Virilio’s book; ‘Speed and Politics’, suggests in this introduction entitled; ‘Logistics of Habitable Circulation’, that society is deliberately moved between places. This deliberate mass movement is governed by planned largely by the government in power while many infrastructural developments are constructed for the economic gain of the government and their coalition parties (Mulenga, 2001). During the apartheid regime we witnessed the extent of this control, when the oppressive government used urban form and public roads, in many instances, as a form of defence and control against riots (Mulenga, 2001). Bratton refers to this deliberate planning of infrastructure when he claims that; “dromology is the government of differential mobility, of harnessing and mobilizing, incarcerating and accelerating things and people” (Virilio, 2006, p 8). The truly democratic nature of mobility is questioned here which brings me to a quote by Anthony Appiah (a philosophy professor of African descent but operating and working in the USA) where he explains that “[w]e make up ourselves from a tool kit of options made available by our culture and society. We do make choices but we do not determine the options among which we choose” (Noble, 2011: 10). This ‘tool kit’ of options made available to us, consists largely of mobile technologies implemented not by us but by the state that controls these ‘dromologies’, hence guiding our choices. With this in mind coupled to the idea of democratic mobility presenting the us with the freedom to move long distances at will, (a factor of mobility which was pointed out to me by urbanist, Ali Madanipour in a lecture I recently attended, entitled; ‘Spatial Freedom’) we may now assume that due to technologies of mobility we are ‘free’ to travel long distances at will, quicker, but only within a capacity that is planned and governed prior. Considering this we see that, although we are free to use public transport networks we may only do so within the capacity of the network; largely implemented and designed by the state or private agencies connected with the government. Hence it can be said that public transport will; “straddle the pre-political and the hyper-political”. In other words it straddles the free choices of society and the deliberate planning of government and their close affiliates. To elaborate on this point one might say that the freedoms offered to us through technologies of mobility are limited to prior decisions made by such agencies. The reasons for choosing a specific location or a collection of locations might become clearer throughout this research and proposes an interesting question; why does the recently completed Gautrain stop in these specific locations around Gauteng, allowing increased freedom to move between these locations?

To answer this question it is necessary to imagine the relationship shared by time and proximity. Bratton explains that, “modernity is a world in motion, expressed in translations of strategic space into logistical time, and back again” (Virilio, 2006). Furthermore Einstein’s obsession with time, lead him to believe that time and space are not separate from one another, while John Urry interprets time as being almost infinitely divisible into spatial units (Urry, 2000). Here one might suggest that the increasing speed of transport aims to condense regions; “till it shrivels in
Figure 1.2: Technologies of mobility; Various internet sources, unknown
size and becomes not much larger than one immense city” (Urry, 2000: 111). Or one immense fort in the opinion of Virilio when he suggests that, “bourgeois power is military even more than economic but relates most directly to the occult permanence of the state of siege, to the appearance of fortified towns, those ‘great immobile machines’ made in different ways” (Virilio, 2006, p 12). What Virilio is trying to tell us is that economic stability and giant cities are more a symbol of political strength than a statement of life style, imagined by those keeping it alive. This alludes to the opinion that the Gautrain stops at these specific locations, not only for economic growth potential but simultaneously for political stability. The reduction of travel time offered to a society, through the implementation of new technologies is pointed out to us, by John Urry, as a matter of political security as well, when he suggests that countries caught-up in a ‘time-warp’, or behind time are likely to become unsustainable, due to their immobility and repetition in an evolving world (Urry, 2000).

The phenomenon of giant cities, which Virilio speaks about is somewhat illustrated to us here in Gauteng through the ever-closing gap between Johannesburg and Pretoria, initiated with the implementation of the N1 highway, stretching between the two city centers and in a sense, ‘bridging the gap’. Simultaneously it has encouraged further dispersion which can be seen by the multitude of suburbs built after the highways were opened. According to Urry this form of suburbia manifested due to the opportunity to residing in the spacious outskirts of the cities, away from the congestion and pollution. The highway suburbia grew in popularity due to the fact that it only takes fifteen to twenty minutes - on the highway- for people to get from their suburban homes to their inner city jobs (Kunstler, 1993). Again proximity is divisible into units of time while efficiency is the primary objective. The Gautrain will only increase this efficiency between places, consequently adding to the population dispersion and concentration amongst these areas.

Janis Van Der Westhuizen, and her work on political studies published in the journal; Politikon, suggests that infrastructure like the Gautrain or major highways are, “symbols of political prowess, aimed at leaving a legacy” within a means to transporting the masses (Van Der Westhuizen, 2007). Here she is speaking with reference to the Gautrain; a new and important piece of infrastructure which now exists, operating only in the Gauteng Province. It is a High-speed Train network connecting Johannesburg to Pretoria and both cities to the O R Tambo International Airport, via Alexandra. The train stops at several suburbs on the way, thereby further integrating the displaced suburbia and cities. It is a ‘Dromology’ which will influence the socio-economic structure of Gauteng, while the Gautrain was ultimately built to influence socio-economic activity in very specific locations. Hence the stations will have an impact on the physical space around them, alluding to relevant questions, around which this thesis is structured. These questions are listed here:

• Why these locations?
• To what extent might the goals for economic growth and dispersion be met?
• What are the opportunities for urban growth around the stations?
• Is the symbol of ‘state prowess’ met with impressive architecture, especially in the capital city of South Africa, Pretoria, where one would expect this station to be symbolically responsive?
• Are there any new social orders and architectural typologies that accompany this 21st century ‘dromology’?
1.2 Connections: The network

Geographical distance (space) and time share an intricate relationship with one another, this was spoken about earlier. Sociologist John Urry, calls this ‘industrial time’, a form of time that is divisible into spatial units (Urry, 2000). This is a form of time that relates to the movement of physical objects and best describes any mode of public transportation. In this case, proximity can be seen as a factor of time.

The National Highway system, discussed earlier, was the first installation which brought faraway places in unison with one another, by compressing space through a reduced time lapse (Kunstler, 1993). Now, about 30 years later, we can see the weaknesses in this grand utopia of the fast moving privatized car. The Highway System with all its might of multi level, four lane bridges and intricately designed interchanges, on-ramps and off-ramps has proven to be a rather unpredictable transport means, for a number of reasons, all possessing a shared consequence; congestion, which contributes to an

Figure 1.3: Mega transport projects as symbols of state power. Internet source unknown.

Figure 1.4: Point concentration vs. Linear concentration: Author’s diagrams
increase in travel time. This could then be interpreted as further proximity between the proletariat’s ‘suburban home and their inner city job’. Another negative connotation to travelling by private car is the introverted nature inherent to this form of transport which is pointed out by John Urry when he explains that the automobile divides and entraps people in congested roads; “it encapsulates people in a private cocoon” (Urry, 2000). Although it may be said, that when the highways run ‘smoothly’ they are an efficient and comfortable mode of transport but the high-speed train is devoid of congestion obstacles and therefore is a more reliable and often a faster mode of transit, especially when considering the Gautrain’s nominal speed of 160km/h (Van Der Westhuizen, 2007). While it’s public nature allows for the interaction with others and with other activities while in transit or at stops. This increased speed hence decreased ‘spatial distance’ means better accessibility for a place and its people which is likely to amount to renewed investment opportunities of local urban areas (Jaglin, 2001). I feel that this increased access is the starting point for commercial opportunities, especially for the places in a direct relationship with the station, for stations can be seen as a ‘point concentrations’ of activity when compared to the ‘linear concentrations’ of activity along highways (see figure 1.4).

Convenience and reliability can be seen as a strong point of high-speed trains. Also rising petrol prices will mean that using a train, over long distances, will be more cost effective than a private car, this fact was important enough to make headlines in an edition of The Star newspaper (Van Schie, 2011). But, if the train station has enough parking for private cars, which according to Tobie Lochner [one of the Gautrain developmental agents who is associated with the Province Support Team (PST)] is seen as a necessity in the development of the new Gautrain stations, for the parking contributes to the patronage and usage of the train (Lochner, 2011). This then means that the users who have cars can experience the best of both worlds; The convenience of a privately owned vehicle and the reliability of the high-speed train over long distances; allowing such users huge flexibility, freedom and accessibility, therefore further democratizing the nature of transport in Gauteng. To dwell on this point, the integration of the Gautrain and other modes of public transit means similar freedoms for commuters already using the latter, while these other modes of transport will need to be integrated with the Gautrain stations to allow for freedom of use across the spectrum of public transport. All forms of travel, corporeal and virtual, are seen as technologies which democratize a society; they allow people to move more freely between places that might be otherwise inaccessible. In a ‘landscape of transition’ such as ours in South Africa, this further democratization of services is welcomed. Especially in a climate of rapid urban growth the increased accessibility is necessary. (Dewar, 1995). But according to Thomas Cook, the railway stands out in this respect; it is a democratic and progressive force which can unite the humble and the rich and according to him; “...To travel by train is to enjoy republican liberty…” (Urry, 2000: 57). A different view than the one towards a privatized ‘cocoon’ which Urry labels as the car.

What is significant about the rail system is that it directly connects various localities, thereby braking down the autonomy of the suburbs and creating a more homogeneous network of the various localities, therefore adding to the democratic relationship between them (Urry, 2000). The car fails to do this, with such potency, due to the variety of choice the road system offers, which is often confusing to the naive user. The linking of specific localities means that the transport node, and surrounding precinct, can therefore become a point of social and economic concentration (figure 1.4). It is the element of the network which attracts and disperses people and when considering what was discussed earlier about ‘dromology’, it may be seen as the reason for the existence of the specific network pattern. In this respect the network is seen by promotes, of the Gautrain, as a catalyst for urban growth.

The influence of a transport terminal upon the region it serves is substantial; it becomes a crucial focus when analyzing the impact of a system like this one. Economist Komei Sasaki with others has conducted an impact study of the influences the
Shinkansen (the Japanese high-speed train system) will have an impact on the regions in which it stops. The authors aim to point out what the dispersion factor of attractive investment and production will be for the various regions, they also point out the desirability to create population dispersion, from more dense areas. A reduction in travel time is again seen as a major influence to this dispersion (Sasaki, 1997). The research was conducted as a comparative analysis, between five scenarios; each scenario differs in terms of where the network runs and when the hypothetical network is installed. The study draws conclusions as to the impact of an expanded Shinkansen system; they illustrate how influential the existing lines are to the more developed areas, due to the existence of an already established ‘social overhead capital’, in the form of an exceptional railway system consisting of 2100km of track within a radius of 50km from the city centre. In Tokyo transport is primarily offered by slow moving trains, that travel at approximately 15km/h. the reason for this is that the streets in Tokyo are mostly 4m wide, hardly enough for one car, without street parking (Houben, 2003). The existing Shinkansen line is seen as advantageous social overhead capital to begin with. What they conclude is that the expansion of the high-speed rail network will improve access to the developed areas and therefore lead to higher concentrations in these already developed areas, in the short term (Sasaki, 1997).

The significance of this study, when compared to our situation in Gauteng is that the train connects both remote areas such as, Rhodesfield and Alexandra, and areas which enjoy a substantial degree of development such as, Sandton, Rosebank, Hatfield, Centurion and Johannesburg. If we are to draw from the conclusions developed by Sasaki, then what can be said is that areas which already show signs of economic agglomeration will benefit further from the installation of the Gautrain (Sasaki, 1997: 97). After talking with Tobie Lochner we see that this is true for Sandton and much new development is already occurring in this area. Furthermore the Gautrain Integration Report suggests that by 2015-2020 the CBD’s of Pretoria, Johannesburg and Sandton will be denser than they are now and they will assume even greater hierarchy in the provincial economy (Dobrovolsky, 2009). And
the article by Janis Van der Westhuizen indicates that one of the ‘Transport Portfolio Committee’s (TPC)’ objectives is to promote the advancement of small to medium sized business enterprises and to uplift the Johannesburg and Tshwane (Pretoria) CBDs.

What becomes important from the above is the existence of agglomerate economic activity, sociologist Saskia Sassen explains this phenomenon in her book entitled; ‘Cities in a World Economy’; “Weight (referring to industrial mass) was the constraint which pushed industrial sites towards the accumulation of ‘like-minded precincts’, in the past. Today the acceleration of economic transactions adds to the emphasis on time, which limits the use of widely dispersed cooperation firms hence the agglomeration of specialized firms and the emergence of office complexes”. This is seen by sassen as a trend in global economic activity today (Sassen, 1993). Sassen tells us that the reason for this is that high level professionals, creating complex products, favour face-to-face interaction (Sassen, 1993: 66). Firms dealing at an international level and those in highly competitive world markets are willing to pay the high rent to agglomerate with other international businesses in city precincts (Sassen, 1993). Contrary to this need to agglomerate headquarter operation, such firms may have geographically dispersed, plants, offices and services outlets. This sort of territorial dispersal requires a rise in government services, in the communication and transport sectors (Sassen, 1993). The Gautrain may be such a service which further connects the dispersed operations. Simultaneously, there is a need for firms to outsource specialized services at a global, national and regional scale. This could mean that it is necessary, on the one hand to agglomerate headquarter functions while geographical dispersion of out-sourced services or in-house functions seems likely. The Gautrain network will influence the dispersion of these outsourced services for it stops in precincts that already show signs of Sassen’s theories. These precincts are currently thriving in professional services output or are competitors in the world markets; Johannesburg, Sandton, Hatfield, Rosebank and Centurion are the precincts identified here and most importantly connecting these ‘agglomerating precincts’ to the O R Tambo International airport.

Tobie Lochner explained that one of the reasons for the implementation of the Gautrain in Pretoria, was to fulfill government’s request to integrate the Gautrain stations with the main Metro Rail stations, Pretoria being one of them (see figure 1.7). Pretoria terminal stands-out in the list of stations as a precinct which does not adhere to the ‘financial precinct agglomeration’ phenomenon. It is unlike Hatfield, ‘up-the-road’, in that there has been no signs of urban growth for some time. Hence it does not succumb to what Sasaki illustrates about the improvement of economic growth, offered by high-speed trains, in an area already developing steadily. This might be why I detected an undertone of uncertainty in Lochner’s description of Pretoria station. The challenge here might be to ‘ignite’ growth using architectural mechanisms, fueled by the massive amount of people moving through the precinct, from the two stations.

We may now conclude that the Gautrain firstly helps to reduce traffic congestion on the highways, in doing so it creates a more homogeneous relationship between the suburbs it stop at, and connects to the airport. Direct access will lead to the concentration of economic investment which is already evident around the stations and we see the agglomeration pattern, of economic wealth, fueled by the Gautrain network. The fact that the stations are placed in financial districts points out that the new network connects ‘upmarket’ business minded individuals and tourists. It’s no wonder certain COSATO members have labeled the Gautrain as “elitism at its best” (Van Der Westhuizen, 2007: 341).

The access and geographical integration which the network itself offers is only one side of the equation, what about access to the stations themselves, the integration of pedestrians, other transport services and the activity which happens adjacent to the stations? One needs to look, in detail, at the nodal precincts themselves to find answers as to the optimum integration of access from a variety of sources; private cars, taxis, buses, pedestrians, bicycles and the future BRT (Buss Rapid Transport) system to be implemented in Pretoria. This integration at nodal level could be the architectural mechanism to ‘ignite’ development in Pretoria. This next section deals with the importance of nodal and precinct treatment and its integration with the fabric.
1.3 Gateways: place, purpose and people

"The interrelations and interactions between the parts are far more fundamental than the parts themselves". (Urry, 2000: 119)

Figure 1.8: The transport precinct, a highly populated place for pedestrians
Internet source unknown
Urbanism researchers and designers of architecture and urban environments are taking a critical look at the typically engineering, planning and political domain of mobility. These researchers and designers are asking questioning as to the appearance of mobility, which dominates the visual field of our modern cities. Francine Houben (a director of Mecanoo Architects in Delft) and Luisa Maria Calabrese (Associate professor of urbanism at the Delft University of Technology) have compiled a book entitled; ‘Mobility: A Room with a View’, the literature is accompanied with an undertone of urgency as to the aesthetics of mobility. This aesthetic relates to linear objects, as roads or tracks, and to the stations as points of concentration, all within the visual field of an urban environment (Houben, 2003). In this section I will deal with the issue of the stations and the station precincts, serving as ‘Gateways’ into the adjoining city. In this sense they become a crucial part of this aesthetic of mobility and are seen as the existential dimension of the network. The stations offer an inevitable ‘first impression’ of the city or precinct and should not be treated as typically ‘transport spaces’ but rather as a public domain, a place to wait and a place for social interaction. The questions raised here are firstly; what level of convenience does a transport precinct, like the one in Pretoria, offer and to what extent does the integration of station and place benefit both precinct and transport network? The ‘aesthetics of mobility’ and the portrayed image of a city, at its ‘Gateway’ are spoken about too.

Convenience can be seen as another dimension to the spatial proximity between localities. If, for example; a commuter is to take the train to a city then walk for three minutes to a bus stop, then catch a five minute bus trip, after the bus another five minute walk to the final destination…this becomes an undesirable commuter scenario compared to a user who is destined for the building adjacent to the station. From this hypothetical example one can imagine the importance of convenient access from the stations to the outskirts of a precinct. What the Gautrain corporation has done to improve movement form the station is implement ‘feeder and distribution’ bus routes, which travel up to 15Km from the station itself, the tariff for the ‘feeder and distribution’ service is included in the train tariffs (Lochner, 2011) (Van Schie, 2011). This is a unique service to the South African Rapid-rail system and is necessary when considering the particular geography of Gauteng’s displaced cities. For example the Randburg CBD is a substantial commercial district and is approximately 15km away from its nearest Gautrain station, in Sandton. To accumulate higher usage or patronage the Gautrain Corporation has found it necessary to implement this ‘feeder and distribution’ network aimed at accumulating additional passengers. This is a generic solution applicable to all the stations; a solution to the intensely dispersed suburbia of Gauteng. (Point of mention; the busses are always empty and I hope this will change in the near future!) Lochner points out the desirability of a direct link to the stations and the land value of the adjacent precincts; “the immediate area around the new stations are developing at an alarming rate and the properties around Sandton station (the flagship station) in particular now holds one of highest commercial land values in Africa.” Furthermore Lochner explains how the land adjacent to this station was sold to developers on condition that they integrate with the station, by means of a public pedestrian connections. (Lochner, 2011)

To further argue this point on the importance of integration with the stations it will be useful to point out that the Gautrain Corporation had commissioned ‘Arup (Pty) Ltd’, a British based multi-disciplinary firm, to draft a ‘Gautrain Integration Report’ (GIR), which was presented to government in December 2005. As the name suggests; the report deals with issues of integrating the Gautrain stations with their urban surroundings and with other transport services. The authors conclude several points as to the recommended implementation of future development and station design. However, the most provocative statement made in the report is said upfront; “...transport initiatives will depend as much on the extent to which the station/interchange nodes are integrated with their surrounding urban environment and culture, as on any intrinsic efficiency in the transport mode.” (Dobrovolsky, 2009). The GIR stresses great emphasis on the physical integration of the stations, with their urban environment. In so doing it was envisaged that the nodes will realize a wide range of opportunities for urban development. But the further consolidation of development, it was said,
would only likely occur in a situation where consolidation was already present. This relates to the earlier discussion on agglomeration precincts. This report also points out the lack of such integration at existing transport nodes around South Africa; “...public transport in South Africa has traditionally been regarded as, at best, rather austere and merely functional facilities and, at worst, as dangerous locations with negative impacts on urban quality.” (Dobrovolsky, 2009). Quite different from what author Kenneth Powell suggests in his publication; ‘The Jubilee Line Extension’, about Grand Central Station in Manhattan; “... [it’s] a meeting place and an urban forum as well as a transportation hub...” (Powell, 2000). To add to this point, the National Land Transport Transition Act of 2000 suggests that; “a more holistic approach to South African public transport planning remains elusive” and the need to create Transport Authorities is emphasized (Van Der Westhuizen, 2007).

The important issue here is that such technologies must connect with the existing environment and services. This will ensure efficiency and popularity in the way the public view and use the new technology and in the near future such integration will promote activities of various kinds in its vicinity. The ‘free- standing specialized services’ sector (Sassen, 1993), for example will benefit from this reduced proximity to the stations; the scenario Sassen uses is the production of a financial instrument; “it requires face-to-face input from legal services, design, economic consultants, accounting, public relations, and printing” (Sassen, 1993). The production of such a product may now be more efficient over distant geographical locations. Moreover, economic concentration through recreational activity can also arise out of the needs and expectations of these medium to highly skilled people who will make use of the life-style amenities in surrounding areas, such as; restaurants, hotels, shops, etc. (Sassen, 1993). With this in mind it may be said that the node precinct, especially in expanding business districts, will be a favorable site for administration, planning and coordinating of a firm’s activities. The company located near a station will find that access will be enriched and further integrated. Ironically the symbiosis which occurs, is that the stations will inevitably invite activity and this future activity will, inevitably create a higher concentration of life with-in the precinct and higher patronage of the network.

The transport hub, enriched by the presence of a station (two stations in the case of Pretoria) is where high concentrations of people will occur, both foreign and familiar. It is for this reason that the place should acquire the concepts of city image. Pretoria based urban designer, Gerrit Jordaan from ‘Holm Jordaan Architects and Urban designers’, explains that places such as Pretoria station are in a sense ‘foyers’ in the city. It is the first and last ‘room’ experienced by a commuter or tourist and for this reason is the most important public space a city has to offer. He also points out that Park Station in Johannesburg once had large paintings, of South African landscapes done by the well known artist, Jacob Hendrik Pierneef. In Jordaan’s opinion these portraits provided tourists with a ‘taste’ of the South African wilderness (a place they were likely to visit while in South Africa) as they entered the Johannesburg ‘Gateway’. He also points out the significance of sculpture at a transport hub (the city’s ‘foyer’), when he mentioned that the Paul Kruger (former president of Pretoria) statue which now stands in Church Square once stood in the public space at Pretoria Station. Its function was to provide visitors with a sense of civic presence in the capital city of Pretoria (Jordaan, 2011). Public art like this is considered a landmark especially when situated in a grand public space, similar to the one at Pretoria Station.

Public space also creates definition in the city and entertains a sense of legibility in the cityscape. Indeed transport precincts should provide for this urban need especially at main stations like Pretoria. A recurrent provision for this in stations around the world is usually a clock tower which fulfills the need to provide time and legibility. The site in question does however provide for this, where Herbert Baker (architect of the Old Pretoria Station) implemented a central clock tower made of stone. This clock tower rises above the surrounding buildings and is highly visible from relatively far down Paul Kruger Street, which the building faces (see figure 1.10).

Landmarks and public space help contribute towards the physical integration between station and city. Social
integration is another key factor in successful station building. It’s obvious that when a passenger leaves the train he/she then becomes a pedestrian again, engaging in social activities, therefore leaving the domain of engineering and entering the domain of architecture and urbanism. Calabrese, who was introduced earlier, explains that; “the physical construction of spaces of mobility asks for a quantitative and at the same time qualitative approach” (Houben, 2003: 79).

Here the idea of ‘the appearance of mobility’ is important for the social integration of transport in society. Houben and Calabrese’s book tells us of the need to create a coherence between engineered transport technologies and there visual component, which is an experiential dimension. This can be accomplished through the creation of a transportation hub which consists of: restaurants, bars, hotels, shops of various sizes, even concert halls as in the case of St. Pancras Station in London or Grand Central in Manhattan. Without such facilities the station will become austere, for people will merely move through it. Furthermore social integration is important for the stations to sustain patronage.

The issue with the Gautrain is that the stations are an accumulation of self standing podiums; in some cases well juxtaposed to the urban context, thereby creating opportunity. Sandton and Rosebank are referenced here, these precincts have already seen new developments in the commercial and recreational genre. The reason Gautrain stations have denied internal activity is that the consortium firm, Bombela, requested that the design of the stations be pragmatic for travel only. According to Lochner they are only interested in the regulation and accumulation of capital through the Gautrain network, not through other means such as restaurants. Consequently the consortium firm only builds or accommodates for the primary functions and the state has intervened by means of the GIR, which merely sets outs guidelines for the adequate integration of supplementary functions.

Activity, social functions and other transport services must be adequately provided for and integrated with the new stations, for they fail to do so within themselves. If this is achieved then we will witness more dispersion of people between stations, which means more economic revenue for the stations and thier precincts. To substantiate the economic potential intrinsic to the immediate area around the stations I would like to point out that in Tokyo almost half the railway lines are privately owned and these private companies also develop the suburbs and the supermarkets linking to the stations (Houben, 2003). Figure 1.11 shows similar activity occurring at the new Rosebank Station. To what extent the network in South Africa can influence people’s life through dispersion and activity remains unknown. In the following chapter such impacts will be dealt with, hopefully possible outcomes will be concluded.

The many stories from the world cities... tell us that mobility is no longer a problem of pure geography, pure strategy or pure design. It is something that is rather hard to grasp on a global scale.

(Luisa Maria Calabrese)
1.4 High modernism: the sociology of mobility

The Gautrain network has been weighed-up against similar systems globally, not only in this research but in other literature pertaining to high-speed train networks. What is always constant in the analysis is that the implementation of a rapid-rail system like ours is regarded as a technology of ‘high modernism’ (Sassen, 1993) (Van Der Westhuizen, 2007) (Sasaki, 1997). Apparently, without it a country is caught-up in regressive orders; and this infrastructure is the bearer of high modernism to the ‘underprivileged’ African continent. This comes to mind when considering that expensive, high modern technologies are key figures in the investment arena of global cities (Sassen, 1993), and when politicians like Ignatius Jacobs, (Gauteng’s provincial minister for public transport, roads and works) explained that the Gautrain will be; “Africa’s first high-speed train” (Van Der Westhuizen, 2007: 346). And they are sometimes seen as massive visual legacies to the states’ prowess, hence become political symbols: Minister of transport, Jeff Radebe says; “it will bring a world class rapid rail system, to South Africa for the first time” (Van Der Westhuizen, 2007: 345). Therefore it may be said that these bureaucratic symbols are held in high regard by the government in power, this issue relates to what was discussed in the first section of this chapter.

Researchers and the Gautrain Corporation alike believe this is good news for foreign and domestic investment into Gauteng; we already witness large property investments in Sandton, Rosebank and Hatfield. It might lead to the urban regeneration of certain areas, which is anticipated in Pretoria and Johannesburg (Transport Portfolio Committee, 2005); likewise community upliftment in the case of Alexandra-Marlboro Station- (Lochner, 2011). Foreign investment is a predetermination of the new Gautrain, especially the line which connects Sandton to the airport. The latter was ready in time for the tourists and fans of the FIFA world cup 2010 (Van Der Westhuizen, 2007). But in utilitarian terms, this is a 1.4 High modernism: dedicated line which connects passengers to the world from Sandton and according to Mbhazima Shilowa, the Premier of the Gauteng province; “… the price of an air ticket may include a train trip to and from Sandton, and passengers will be able to weigh in baggage at Sandton”. The ideology to the sociology of mobility arise out of this is; … Town.” This is said to be common practice for many major cities around the world, which are geographically displaced from an international airport (Van Der Westhuizen, 2007). Interestingly, the Radisson Hotel opposite the Gautrain Station in Sandton does not only bear the alias of ‘Gautrain Hotel’ but is fitted with a large screen facing the station which projects images of other cities around the world, these cities now have a reinforced link to Sandton through the Gautrain’s airport link and it is imagined that the Radisson’s corporate image, as a globally operating hotel, is embellished (see figure 1.12). No mention of a similar, airport link, system was found for the other stations but it is logical that a tourist using the Gautrain to get to Sandton will be familiar with the network and that person will be comfortable using the network to get to other destinations such as Pretoria or Johannesburg. The sort of tourist that the Gautrain will accommodate is likely to be commercially orientated; we assume this by what was discussed earlier with regards to globally operating financial institutes (Sassen, 1993).

It has thus become clear that the Gautrain’s primary function is to disperse corporate and work related people; further proof of this is one of the Gautrain’s slogans: “Bringing jobs to the people and people to jobs”. I noticed this slogan when visiting the Gautrain’s headquarters in Linbro Park. Moving
to and from work will be the case for a regular commuter; they will make use of the service as long as their patience allows them. Once this commuter creates a stronger sense of belonging to a place to, the commute might end and the individual will experience further migrations due to the additional connection between Johannesburg and Pretoria.

The most intriguing sociological conclusion that can be drawn from the migration and commuting patterns is beautifully stated by Urry: "...a heightened temporariness of products, jobs, careers, nature, values and personal relationships" (Urry, 2000: 129). He speaks of this with reference to an "instantaneous time" which is a consequence of "virtuality", during the information age. Of course the temporariness of corporeal things such as, careers and personal relationships requires movement of the physical body. This temporariness is seen by Favell as likely to occur between the more "culturally open-minded" people. It is here that we must consider the reality of a substantial class differentiation that exists in Gauteng. Favell says it is the more open-minded who migrate; the reality in Gauteng is that it is the more open-minded, bourgeois who are likely to settle permanently as a result of commuting using the Gautrain. A likely consequence, in some areas, is that the poor will be displaced due to the migration has already happened. Since the inauguration of the National Highway

till the present, a vast migration of city inhabitants occurred to the far reaches of Johannesburg and Pretoria. This is not only true for South Africa, which went through a major political shift at this time. Sassen points out to us that that vast migrations happened in the 60's and 70's, where most of the Europe's larger cities saw a decline in population and in economic growth. Surely the infrastructure which had allowed this to happen in the past was the National Highway system, which is now consequently congested. We might experience further migrations due to the additional connection between Johannesburg and Pretoria.

Patterns of migration, economic concentration and dispersion are all a consequence of this era labeled 'high modernism'. The extent of these occurrences remains elusive, but architectural function can be associated with these patterns of social engagement. Functions, other than what was mentioned previously, may now include residential and leisure activities, creating a vastly mixed use environment in the vicinity of the new stations. Certainly this illustrates that new, mega scale; services like the Gautrain lend themselves to new social structures. These new social structures include various consequences as a result of the key narratives; Integration, Accessibility and Dispersion. Firstly, the ‘Gateways’ fueled by urban integration will create new opportunities for local entrepreneurs (Moffett, 2001). The reinforced connection of various places, especially across cultural boarders such as Johannesburg and Pretoria, means a deeper ‘cross pollination’ of cultures. While integrating the bourgeois users of the Gautrain with the, lower income commuters, using the Metro Rail means a healthy interaction between these class groups. Furthermore the ‘stitching’ together of geographically dispersed, ‘likeminded’ precincts will mean better working relationships between them, therefore reinforcing commercial opportunities and creating a stronger economic stance for Gauteng, globally. Lastly, a change among the bourgeois society in Gauteng from the ‘introverted’ car user to a public transport user is on the horizon.
Year 2020 - somewhere in Gauteng.

“Hey, hey, Dwain you should take the train. I mean it’s only two minutes walk from the station and you can do your printing there”...“There’s a print shop right at their offices,”...“I’ll give you a lift to the station quick!” Karin explained to Dwain as he was chasing along the building to reach his car in a hurry for a meeting in forty minutes...

“Ye that’s right their office is in that new business development close to the station. “Thanks man!”

4 hours later:

“Howzit, ‘man’ thanks for giving me a ride, hey”. Dwain acknowledged to Karin as he was getting into the car. “So, news dude, did you come right”. Asked Karin. “Ye, no problems at all”...“More, than right actually, it was potentially the most insanely crazy, cool day of my life”. Dwain said to Karin, ecstatically. He then went on to explain how he met the “sweetest” girl in Gauteng at a coffee shop, near the station. “She comes from Jo’burg too man, and she says her folks stay here”...“She’s gonna meet me for coffee, this weekend, in Sandton, before going to her folks.” Dwain said with a smile.

Karin then followed; “...ok, ok, I’m coming with”...“there are a few things I need to buy there”. Then we can meet for beers after your ‘romance’.

“Alright”, Dwain agreed; “The train leaves at 10:17... We’re going!”
“It will bring a world class rapid rail system, to South Africa for the first time”… These become powerful words alongside mammoth projects, which soar over highways and suburbs (See figure 1.14), serving the ruling government well as marketing devices of political power, when they claim it as legacies of good governance (Van Der Westhuizen, 2007).

These ‘dromological technologies’ come with equally as monumental sociological and economical consequences. They create vast concentrations of activity, profit and people. This however is an intricate issue, consisting of infinite factors. What was touched on here was the sort of people who are likely to use the system, namely; business orientated citizens and tourists. Through commuting for business opportunities, these people might find an interest in a place beyond work related activity and could consequently find homage in a different region. This will add to population dispersion and concentration, simultaneously the agglomeration pattern is enriched through new commercial development in the vicinity of the stations. We find opportunity out of the latter, opportunities for poorer areas which could arise from the increased land value or new commercial opportunities. From this perspective it seems plausible that the new stations, if well integrated across various fields namely; transport, social structures, city structure even symbolic structures, will create wealth and commercial opportunity for those living and working in the vicinity of the stations.

The important issue here is ultimately the ‘Gateway’, (a word used to summarize the transport place with all its qualities, orders and social structures) that is responsible for the successful usage of this new network. If station and context fail to form a positive relationship with one another the stations might become “rather austere and isolated”, these words stolen from Dobrovolsky. Such a scenario will lead to an underused link, this will not be held in good position with the private investors who are expecting to make large profits of this mega-project. Furthermore an underused network will mean inadequate relationships between the suburbs which now share a more homogeneous relationship with one another. This won’t help the Gautrain’s anticipated highway congestion relief and might lead to an ominous ‘white-elephant’ as the network subsides into disuse.

It is therefore proposed that all the stations become ‘Gateways’ to the communities they serve; elitist or otherwise. The primary spacial necessity pointed out in this research is integration. The network itself is an integrating technology promoting movement and homogeneity between distant places. These ‘Gateways’ are the component of the network which fall within the interests of architecture and urbanism. This crucial part of the network must integrate at a micro-context, with the social structures applicable to a specific place. It is at the moment where one disembarks the engineering (train) and embraces the place. It is the crucial connection of engineering and placefullness. Houben points out that this is the relationship between aesthetics and movement. The next chapter deals with the ‘placefullness’ of the stations referring to context, station and social function.
Gautrain Stations:

A visual analysis of the stations and their context
Proceeding from what was discussed in the previous chapter, the section entitled 'Gateways', this analysis serves to illustrate the context with which the stations form a Gateway, or what the reason for going to a place would be.

How do the stations invite activity and how do the buildings respond in return? As discussed previously, the integration of the stations and the contextual activity is important for the patronage of the new network.

Private development must occur or exist around the stations, which don’t accommodate for much needed social activities within themselves. This is due to a request by the consortium firm, ‘Bombela’, who is responsible for the construction and 15 year operation of the project. The firm’s brief was to develop stations that are pragmatic only to the operation of the Gautrain’s interests, namely; parking, ticketing, payment control, feeder buses and boarding. Due to the monofunctional nature of the stations we find that the integration with privately invested, social activity becomes an important issue.

The drawing below illustrates the generic, internal zoning of the stations and the area of concern, for this analysis, is the public domain. It is hoped that the analysis will generate a better understanding of what sort of architectural functions suit the immediate context and form a symbiotic relationship with the stations. Over and above from the functions discussed in the chapter prior, this analysis looks at the scenarios as they exist or as they appear to be developing.

Only four stations are mentioned here, two of which have similar functions in their immediate context; namely Sandton and Rosebank. The other two stand out from the rest, in terms of their contextual realities. The first two are used to illustrate the projected ideologies of the Gautrain network as a bourgeois, working class service, while the others illustrate opportunities for future development.
Nelson Mandela Square. Connecting to the Gautrain station via a pedestrian link.

The Flagship station. Flanked by a public plaza which aims to integrate the station with its urban context.


'Sandton to the World'

The Radisson hotel opposite the station. Reflecting images of other ‘world-class’ cities around the world.
High-rise buildings

Existing buildings

Under construction or recently complete buildings

Gautrain station and parking
2.2 Johannesburg region: Rosebank station

The Zone, shopping complex, adjacent to the Gautrain entrance.

The Rosebank Station. Positioned on an enlarged sidewalk. The Parking opposite the road is linked to this entrance via an underground walkway.

A new high-rise office complex, 500m away from the station entrance.

A public plaza, enclosed by restaurants. This is the nature of the outdoor shopping experience in this ‘shopping precinct’.

OXFORD STREET
Street side terminals creating an active urban edge, beneficial to the adjacent shops, see also figure 1.11. Author's photograph
2.3 Johannesburg region - Marlboro station

no perimeter wall

integration = opportunity

with perimeter wall
1. The RDP development which surrounds the station. The juxtaposition of the station the the existing housing development is somewhat ironic, due to its lack of integration, this is shown in the image on the left.

2. The station becomes detached from the new RDP development (1) adjacent to it. The multi level parking lot is not an adequate transition gateway, nor is the fence.

3. The elevated Gautrain track creates a massive barrier in the landscape. It separates the adjacent township of Alexandra from the prominent road, Marlboro Drive.
2.4 Pretoria station

Sir Herbert Baker's 1909 Pretoria Station.

The Pretoria Gautrain Station tucked away in the corner of this transport precinct.

Old train shed. Built around 1905.


The Victorian Hotel. Built around 1895. Victorian style.

City Hall. Political sculptures.

Transvaal Museum.

Church Square.
Paul Kruger St - An axial link which has existed since the early beginnings of Pretoria
2.5 In conclusion

The executive committee of COSATU labelled this project as ‘elitism at its best’; this was brought forward by Janis Van Der Westhuizen in her article entitled; ‘Glitz, Glamour and the Gautrain. We see the corporeal nature of this statement manifest as the new stations were strategically positioned adjacent to some of Johannesburg’s most exclusive shopping complexes, namely; Sandton City and The Zone in Rosebank. The large capital investment happening in the vicinity of these stations indicates to us the predicted success of commuting in these areas. There, the stations themselves offer an inviting platform from which people can move comfortably between station and activities common to a particular ‘Gateway’ (The Gateway consists of activities explained earlier). In Sandton this is allowed for by means of a plaza while the Rosebank Station respects the nature of ‘shopping streets’ in the area.

On the other side of the scale we notice how introverted the station in Alexandra has been treated, which in comparison to Sandton, is seen as a ‘poverty ridden’ area. It is noted here that such an environment as the RDP housing adjacent to the new Marlboro Station can benefit from a more integrated station interface. While Tobie Lochner from the Gautrain corporation was not hesitant to tell me the reason for building a perimeter wall around the parking lot was that it is the cheapest method of obtaining the degree of security that is necessary for the commuters. A more integrated intervention might become a reality in the future through the rethinking of security perimeters, one which allows more access with equal security. The drawing provided is an illustration of such an intervention.

The last scenario that is pointed out in this visual research is Pretoria Station. Here we find that the new Gautrain station is positioned adjacent to the 1909 Herbert Baker station, therefore forming part of an important, axial relationship with the city of Tshwane. This is due to a request by the GIR (Gautrain Integration Report) for the new stations to integrate with the existing Metro Rail system. It is clear from the photographs that the intention of this ‘axial relationship’ was to be a prominent public link between the inner city - Church Square- and the Pretoria Station.

The question raised here is whether the new Gautrain Station
is living up to this long-standing relationship of public space vs. transport networks, and what does the station contribute to the well kept heritage of this precinct? How does it represent itself as a technology of the 21st century, with-in the strong Neo-Classical context of Paul Kruger Street?

The challenge which emerges out of the latter is how one can create a stronger sense diachronic development, as these two technologies present themselves to the city and the public through the inherent didactic nature of architecture. The zeitgeist of the late industrial age vs. the zeitgeist of the early information age; this is an important and interesting challenge which the Pretoria station allows us to explore.

The next chapter deals with this site in more detail and creates a broader understanding of the contextual relationships.
Figure 3.1: Gauteng Source: Google Maps and edited by author

PRETORIA STATION...
3.1 the broader context: why Pretoria?
Pretoria station was chosen due to the primary concern of the theoretical research which was based on; integration, opportunity, accessibility, State and development. Here we witness a long standing axial relationship the city has with the Pretoria station and as we will see throughout this chapter the new Gautrain terminal seems to neglect this powerful and direct expression of city making. By selecting this site I have the opportunity to experiment with various forms of integration, namely; with the existing city fabric, with historical buildings, with existing transport networks and with public urban space. The challenge is vast and existing and I hope to produce a reasonable solution to these issues.

In a sense this axial relationship spoken about here is similar to what we see in Washington D.C, the capital city of the United States of America. The irony of the South African capital city’s, beaux art link, when compared to America’s is that there exists a variety of social functions along it. These functions are not only bureaucratic in nature but also relating to legacy (Freedom Park), education (National Zoo and Transvaal Museum), social interaction (Church Square), transport (Pretoria station) and further north along Paul Kruger Street is an old residential suburb called Capital Park (where I once lived). While the presence of bureaucracy is presented by the City Hall, a number of important courts (at Church Square) and other government department buildings along this street.

This fantastic relationship gives this site substantial significance over the other Gautrain stations, which are mostly in newer areas and suburbs. The images to follow are in sequence form 4 to 1 on the map adjacent and are all photographs by author. The aim of the following photographic representation is to show how the Pretoria Station is a ‘weak’ culmination to this street and its important activity.
3.2 the macro context

1: The site, Pretoria station and the transport precinct
2: N14 freeway ending on the west side of Pretoria CBD.
3: Metro Rail train tracks
4: R21 freeway, culminating at the Fountains valley circle, thereafter becoming Nelson Mandela road
5: Church street, the main East-West axis running through Pretoria
6: Nelson Mandela road
7: Paul Kruger Street, the main North-South axis through Pretoria
8: The Western precincts, predominantly industrial
9: Pretoria CBD, Bureaucratic and commercial uses
10: The Eastern precincts, predominantly residential.
11: Salvakop hill, where the new Freedom Park complex is built.
12: The Northern Precincts, predominantly residential

This map serves to illustrate Pretoria’s broader context so that we can better understand Pretoria Station’s relationship to the city.

The first point I would like to mention here is the fact that the freeways; R21 and N14, do not have a direct influence on the station precinct. This fact allows us to understand the nature of the station as a pedestrian and public transport zone, while the outskirts of the CBD is for fast moving traffic and heavy vehicles.

The zoning of the city allows for a clear distinction between city functions, such as industrial vs. residential. This fact might become significant when reorganizing the transport precinct in chapter 6, as a place which is sensitive to the growth of Pretoria.
Figure 3.5: The Transport Precinct
Source: Tshwane Metropolitan Council and edited by author
“Streets and squares in the traditional sense are no longer found and the general result is a scattered assembly of units” Christian Norberg-Shultz. (Trancik, 1986: 22)

The area (shown in orange) has been defined by the Tshwane Metropolitan City Council as land reserved for transport and related functions. This aerial photograph was issued to me by the municipality. In a sense this entire area is the site and locality for the execution of this thesis.

It is clear that the site has developed haphazardly over the years, with no proper urban framework from which to build. The place is loosely organized with vast pockets of land in-between, which contributes to the feeling of insecurity in the precinct. Therefore part of the project will be to set-up an urban framework into which new buildings will fit and create outdoor rooms. The issue of public space and urban framework will be dealt with in more detail in chapter 6.
3.4 local mapping: Activity and Movement

This section serves as the mapping of the immediate context around the site, as described prior. Before moving into a discussion about this immediate environment, I would like to discuss figure 3.3 on the left of this spread. This map clearly indicates what was discussed earlier about Pretoria Station been the main access point into the Tshwane metropolitan area (Pretoria CDB). Also on this map we can see how the Gautrain and Metro Rail services culminate here before moving out to other parts of the city. This illustrates to us the importance of this transport node; geographically, socially and symbolically, hence the need to upgrade the place so it will become a more significant place as it is the most important passenger rail station in Pretoria.

The local mapping to follow is focused on creating a clear picture in terms of the activity in the vicinity of this site, with particular reference to street activity and primary building functions above street level, indeed in many cases these functions differs.

Thereafter I will illustrate the movement patterns common to the site focusing on vehicular movement and pedestrian movement separately.
Figure 3.3: Metro Rail and Gautrain lines all lead to Pretoria station. Author's diagram
These maps show us that the city block within the immediate proximity of the station’s square consists of entirely commercial functions. The commercial functions on street level starts to dwindle as the city progresses to the east of Paul Kruger Street. The sort of commercial functions found here are retail shops ranging from; electronic repairs and sales, supermarkets, doctor’s rooms, fashion accessories, pubs or bars, butchers, fast food franchise, internet café’s, cellular shops, hair salons and luggage shops while informal markets are found arbitrarily inbetween.

With three police stations in this precinct, security has become an important issue but the precinct remains predominantly a transport hub, from which the commercial functions obtain patronage. This is evident through the train stations to the South and the bus depot to the West and the taxi rank to the North West (corner of Bosman Street and Jacob Mare Street).

The nature of this precinct, as a mixed-use one, becomes evident as we witness the retail functions on ground level change into residential or leisure functions on the upper floors while many of the retail buildings are only one story high and have been indicated as retail again on the map depicting the upper levels. This mixed-use nature is more prominent around the station; we can see how the buildings become more mono-functional as they move further from the vicinity of the station, indicating to us that the opportunities for retail are greater where there is a larger concentration of pedestrians.

The presence of education facilities, both private and government institutions, seems substantial here. These education facilities range from primary schools to tertiary education, the latter is closer to the taxi rank on the North West. These facilities indicate how diverse the precinct is and I am confident to say that this diversity is due to the presence of the various transport networks here.
Figure 3.5: Above street
The vehicular map illustrates how the roads in this vicinity are mostly one-ways. This allows for the efficient flow of heavy vehicles in the vicinity, particularly busses. The movement of busses through the site respects this one way traffic as they enter from the top and exit onto Bosman where they will later chose a direction on Skinner Street. Cars are allowed to park here, within the square and a bypass is offered to them. But the place is governed by the presence of public transport facilities and this creates a platform for high pedestrian traffic.

The map to the right illustrates the importance of this pedestrian traffic. The thicker lines represent high traffic of pedestrians. We see that most pedestrians move along the main routes to the North and West. While the high traffic to the East, the residential precincts, is split due to the fenced off area on the eastern perimeter of the site. A substantial amount of pedestrians enter the site from Salvakop to the South, via a ramp provided.

The importance of these maps will later become clear, when the project starts to take form, from these preexisting conditions. The movement of busses and pedestrians are paramount to the execution of the project and one might need to refer back to these maps for clarity on the issues raised later in the document.
conclusion

The maps used here give us a clearer picture of the existing, contextual conditions. The first two show us what sort of social functions may form a symbiosis with the transport terminals present here, while the latter two are representative of movement common to this place. The importance of these maps will later become clear, when the project starts to take form, from these preexisting conditions. The movement of busses and pedestrians are paramount to the execution of the project and one might need to refer back to these maps for clarity on the issues raised in the document.

The next chapter deals with the importance of the architectural typology to be proposed on this site and the accommodation that is subsequent to this proposal, which is borne out of a need to re-accommodate the existing transport networks here and to implement future modes. Thereafter I will propose a new urban framework for this site which is directly linked to this mapping section, therefore cross referencing to this chapter might become necessary. The framework to be proposed will be largely a mixed-use environment, which will become an extension of the current social realm common to this site, as seen through this mapping.
Figure 4.1: Transport modes.
Internet sources unknown
A transport interchange can be seen as a linking device which ideally serves as an almost ‘seamless’ transition space between different transport modes. While a transport mode can be described as any mode of transport, namely; busses, trains, cars, taxies, bicycles and walking is considered a mode, there are many others which aren’t applicable to this site. It becomes necessary when there is no one direct mode between two or more locations. A practical example of this would be when disembarking a long distance train and embarking a taxi, which may fulfil the rest of the required journey. In this sense it can be seen as the “physical space between two or more transport services”. Indeed it only becomes a necessity when there is an array of different transport modes, operated by different transport node. This is certainly the case at the Pretoria ‘Gateway’ for now that the Gautrain is present at this node there exists several transport modes, operated by different companies.

Author, Sabine Timpf suggests a distinction between people when they are on-board a public transport vehicle and when they disembark the vehicle to become pedestrians again. Sabine calls these two characteristics either passive or active, passive been on-board a vehicle while active is considered walking between modes. With this in mind one can say that commuters are active while moving between modes with-in the interchange. We can now further categorize the active commuters into two main types; those who are moving swiftly between modes and those who have time to wait and linger in and around the interchange. Considering the latter such a commuter is undergoing certain activities namely; waiting, way-finding information, meeting, using amenities, shopping, etc. The significance of this point is to illustrate how an interchange can be a lucrative investment, when sufficient space is allocated as leasable property for such amenities. An important issue with such leasable space is that it does not obscure the efficient movement of fast moving pedestrians.

Over and above been a capital investment, transport interchanges, if properly organized and managed, are necessary in developing a more positive attitude towards public transport, hence helping towards a new culture of public transport amongst the private car users of South Africa. This point was raised earlier, in the chapter 1. To achieve this, the interchange must provide a quick, easy, secure and pleasant experience for commuters. One of the most important factors in providing the latter is information. The dispersion of information can be provided for in a number of different ways; first and most popular is provision of active staff, that lingers around the interchange providing information and help to the naive commuter (Intermodal transport, 2001). Secondly, information kiosks can be strategically placed around the interchange where people can digitally obtain information pertaining to the location of modes, time and travel. A more recent technology illustrated by Timpf is a way-finding collage which is available on mobile devices and can be used by commuters whilst in a passive state. The Gautrain has released such a mobile application for their service and to my knowledge they have also implemented a collage consisting of different services on their web site (www.gautrain.co.za). Other information can be offered by the clear and logical spatial organization of the interchange itself, coupled with distinct signage which portrays the corporate branding of a service. This form of providing information is possibly the most important one.

To summarize, ‘what is a transport interchange’? One can say that it is, primarily, the physical space between modes of transport. Indeed it is specifically for the movement of people while accommodating much needed ancillary, commercial functions within it. It should also be seen as a waiting space, a sort of concourse space and it must accommodate for information dispersion. Socially speaking it is the ‘knot’ which might tie South Africans to a culture of public transport.

“Mobility presupposes a structured image of the environment, an existential space which contains generalized as well as particular orientations.” Christian Norberg-Schultz
If the interchange serves to connect different transport services which are operated by different companies, private or state owned, then it is in a sense a neutral ground between them and might be profitable to none or all. This raises the question, who is responsible for its implementation and operation? An issue that is important to how the interchange will work; for it will define who the common agent is that will ultimately regulate the different companies; transport and ancillary.

This ‘common agent’ will be responsible for regulating the efficient movement of people, the profitability of the new infrastructure; through leasable space and the communication between various transport agencies. These functions are likely to be over and above the interests of transport companies such as the Gautrain, this was pointed out in the first chapter of this book. Considering the latter the interchange becomes part shopping complex, part conference facility, part management facility and part movement zone. To my knowledge PRASA, the Passenger Rail Agency of South Africa, is the most likely candidate for such a task, however they might not be interested in the business of lettable space but an expensive infrastructure like this will certainly need this level of feasibility.

The sort of ancillary function mentioned here are likely to be a wide array of social facilities, from sweet shops to cinemas but functions that are important in ensuring the comfort of commuters, using the interchange are; book shops, travel agents, coffee and food outlets, cash machines, banks, public seating- outdoor and indoor, curio shops and galleries. These facilities will allow commuters to make productive use of their time while waiting for a train or bus to arrive and are most likely to be in the form of lettable space.

These ancillary functions are not to disturb the primary movement of people, between transport modes and should hence be organized in a fashion that is respectful of this, indeed the movement corridor(s) should be empty vessels devoid of obstructive furniture or columns, where possible. These corridors can be colour coded in their architectural finishing or lighting improving legibility between the various modes, for example, the Gautrain corridor could be blue while the BRT corridor could have a red under tone, however one would need to apply these colours sensitively to avoid an architecture that is akin to some sort of circus aesthetic. The same colour application can be used outside the interchange or in the car park so that people arriving by car would know which parking area is adjacent or under the respective transport mode. Here I would like to stress the importance of signage once more.

Although it has become obvious that different modes of transport will exist in the interchange, which might be at completely different ends of the facility hence creating a spatial distinction within the facility that is unavoidable, indeed necessary to create legibility and hierarchy. More subtle distinctions of users must too exist within the spatial organization of the interchange. Firstly we need to understand that different users will have different expectations and needs in the facility. A person might use the interchange in a hurry one day, while the next day that person might be a lingering commuter. This practical example alludes towards the need to distinguish between fast pace commuters and lingering commuters; the latter might become an obstacle to the former; however the lingering commuter is likely to browse the shops in the facility. With this in mind it can be said that shopping corridors should be separated from the primary movement zone.

Another distinction that I would like to mention here is between those carrying heavy luggage and those with hand luggage or none at all, the first been tourists or holiday makers while those with hand luggage are everyday commuters and business related users. This distinction is likely to differ between modes of transport, for example BRT users are less likely to be carrying luggage while the Shosoloza Meyl users will and Gautrain users may or may not. This starts to suggest that it would be preferable to locate ‘luggage carrying modes’ in closest proximity to one another. It is plausible to suggest that luggage carrying commuters are likely to linger or wait in a coffee shop while waiting for the train, which comes perhaps twice a day. With the latter in mind it would be wise to exaggerate these corridors in width, to better serve the lingering commuters, this will make provision for comfortable movement with heavy luggage, on this point it is also necessary to keep these corridors or vertical circulation zones free from steps, as far as possible.

Although secondary, these distinctions will ensure the swift and comfortable functioning of the facility and starts to set-up a more finite spatial hierarchy which is most often desirable in an architectural composition. While the need for ancillary functions starts to define a large repertoire architectural programming, coupled with what was spoken about at the start of this section. This place will also need to function as the neutral ground between the different transport agencies therefore providing for conferencing and debating rooms that can allow for communication between the agencies.
4.3 Requirements for the Pretoria Interchange

Table 4.1: A graphical representation of the architectural program requirements.

- **mini-bus taxis** - not existing - 300 needed, will be provided for by means of a basement
- **transnational busses** - 9 companies exist, maximum of 5 parked at a time
- **cross-national passanger rail** - existing booking and admin building 400m2 over two stories. Using metro rail platforms
- **provincial passanger rail** - existing building and platforms, no addtional requirements.
- **high-speed train** - existing platforms, busses (4) and car park for approximately 250 cars to be redesigned
- **buss rapid transit** - future service opporating on the perimeter roads, two terminals required.

Parking for private and hired cars - this facility does not exist to the extent required and will be provided for by means of a basement parking lot

Figure 4.1: Sunken bus lane, increased security. Author’s diagram
100 people per minute, through Metro Rail entrance at 16:00
The primary architectural resolution required is to accommodate the various transport modes on this site. This resolution must be organised with respect to the movement of pedestrians between modes. As discussed prior this will be done according to the various commuter attitudes, i.e. with or without luggage.

The first mode spoken about here will be taxis, illustrated at the top of the page. I have specified provision for approximately 300 taxis, underground. This figure is taken as half that of Metro Mall, spoken about in chapter 5. The reason only half the number is required is due to the provision of an existing taxi rank on Bosman Street, illustrated in the ‘local mapping’ section of the previous chapter. Furthermore this is the same number of taxis provided for in a taxi rank on Proes Street, just north of Church Square. Next, and the first of the heavy luggage requirements, is the transnational bus which is an existing service on the site, but there is no relationship between the Old Station or Gautrain entrances and the bus parking area and no provision was ever made for the commuters changing modes in bad weather. Overall the connection and integration between the bus depot and the Gautrain or Metro Rail service is nonexistent. Therefore the circulation and experience between these two services will need to be reconsidered. However the amount of busses provided for will not change, this is as illustrated on table 4.1 (9 companies and 5 parked busses). The Shosoloza Meyl service is placed adjacent to the busses and will have a reinforced link with the Metro Rail platforms used by this service. What will need to be provided for here is a new ticketing area on ground floor and administrative functions on the upper levels. Next is the existing Metro rail service, no new provision is required here, except for the adequate integration with other services. The Gautrain platforms, parking and busses exist but a new basement parking lot is proposed and reorganising the busses will be necessary in terms of the hierarchical function; movement of people. This concludes the requirement of placing the ‘heavy luggage’ functions in closest proximity to one another. Next Provision for a future BRT system will be made on the fast moving perimeter roads, due to the necessity for ‘place making’ in this precinct, vehicles are kept out as far as possible. Furthermore it is a pragmatic requirement of BRT systems to stop as few times as possible and to move on rapid transit roads. This information was made clear to me by a Johannesburg town planner involved in BRT planning (Meicher, 2011), hence the terminals will be most effective on Scheilding Road and Railway road (see mapping, chapter 3). The last mode mentioned here is private car and taxi users. Provision for this will be made in a single story, ‘mega basement’ parking lot, which can be designed according to the optimum position of vertical circulation points, refer to chapter 8.

Once the best movement pattern is established between the modes the remaining space can provide the necessary ancillary functions in terms of what was discussed in this chapter. The extent of this provision is illustrated in chapter 8 but as suggested here it will likely fill the remaining space between modes with coffee shops, book shops, travel agents, info desks, ect.

“We can improve the overall journey experience by reducing inconvenience, complexity, and uncertainty for passengers transferring between different modes of transport.”
Intermodal Transport, 2001
Figure 4.2: Gautrian busses
Author’s photograph
Chapter 5

Case Studies
5.1
Federation Square: Melbourne, Australia

- A highly accessible public space - creates popularity among its users
Comparative analysis of the public spaces:

Urbanists such as Rob Krier and Kevin Lynch speak of successful public spaces as those which have dense edges, that enclose and define the spatial void.

Federation Square’s built space is four times greater than that of the open space. This is taken at a three story average building height. While at Pretoria Station the average building height is taken at two stories which will produce a built space equal to that of the open space. It is also noted here that the buildings around the space do not adequately enclose the space, hence creating a feeling of ambiguity and an unsafe environment.

From this simple comparative study between these two spaces we can conclude that the built edge, surrounding the Pretoria Station’s public space is inadequate and needs to firstly, do more to create a better sense of enclosure and secondly, create a more dense built fabric which can help to animate the space through out the day.

Charles Rice: “Interactivity is found in the way in which Federation Square links to and engages with the existing fabric of the city…” Its design was crystallised from a close mapping of the way in which such a rigid order also includes the seeds of its own tactical appropriation by the everyday users of the city, “…allows one to form a kind of temporal picture of Melbourne based on connectivity and movement. With the complex functioning directly as a part of the city fabric, one is instantly caught up in the daily life of the city, and the multiple trajectories of its inhabitants.” (Pg 107)
5.2
Metro Mall: Newtown, Johannesburg

Movement diagrams:
The diagrams below illustrate the movement of vehicles through the ranking area and how it allows for the efficient usage of ranking space.

This is done by creating one-way vehicular movement and by stacking the taxis in a single line formation. As a taxi is fulfilled it will move forward, allowing empty taxis to enter the ranking area from behind.
5.3 A normative approach
Steel construction has long been the norm for train stations, we witness this at St Pancras and many others, industrial age stations around the world. At Pretoria station we see steel construction juxtaposed with stone, similarly at St Pancras. More recent stations, those of the modern era till now, we may observe the extensive use of glass and steel construction. In chapter 7 I will discuss the significance of glass in more detail.

This collective case study demonstrates the following; expression of structure, expression of movement, extensive roof glazing, the extension of the architecture into the domain of the platforms and a hierarchical presence within the urbanscape. These qualities of successful station buildings are spoken about in order to recreate this at the Pretoria Interchange.

An ‘expression of structure’ is seen in the majority of stations shown here but I would like to point out the elaboration of the structural elements in Calatrava’s work. Secondly the expression of movement is almost intrinsic to larger station buildings, like the Berlin Main Station where it acquires a linear state through the very nature of the linearity of the platforms, while Zaha Hadid’s Napoli-Afragola Station assumes a strong linear form through the moulding of the built mass in this direction. Possibly the most important point I would like to illustrate, using these pictures, is the presence of a glazed roof in all the projects shown. I know that in St. Pancras this was done as a pragmatic approach to acquire natural light in an otherwise dark deep space (Lansley, 2008). In the chapter prior to this I made reference to the ‘Transport for London (2001) document, where they explain that it is ‘good practice’ to have well lit interior spaces for transport
Left and top right: Berlin Main Station
source: Van Uffelen, 2010

Bottom left and right:
Train Station Napoli-Afragola
source: Van Uffelen, 2010
related buildings. I believe that the application of glazed roofs, although aesthetically pleasant, is a pragmatic decision to get natural light into the deep spaces often required for the physical dimensions of a train station. The extension of the architectural language into the domain of the train is a useful idea in creating a sense of integration between the domain of architecture and the domain of engineering. At St. Pancras this is beautifully illustrated through the extension of the finishes into the platform area, while at Berlin Main Station the platforms are raised for functional reasons but this offers a existential dimension to the station which seems to celebrate the presence of these engineering marvels. Indeed by simply placing ‘human functions’, such as restaurants, adjacent to or within the vicinity of the platforms we start to allow people to develop a relationship with the technology. The last point illustrated in this study is the definite presence of the stations in their respective urban landscapes. I believe that this is done as a form of legibility, where a station is required to stand out in the environment, this issue was discussed in chapter 1. Even the smaller stations, which find it difficult to assume a hierarchical presence, become icons in the context by nature of their architectural composition as one reminiscent of ‘sculptural iconography’. We see the latter at the WTC Transport Hub and at Napoli-Afragola, while the Berlin Main station assumes its presence due to its sheer scale, similarly for St. Pancras (see Figure 6.4 on pg 075).

In conclusion to the architectural devices pointed out here I would like to mention that all of these will become deciding factors in the generating of the Pretoria Interchange, as will be witnessed throughout the remaining discussions and in the final design.
Figure 6.4
A google earth aerial photograph of St. Pancras and its immediate context. Illustrating a highly dense urban environment.

Figure 6.5:
A public square in Istanbul
Photograph by R. Van Hussteen
6.1 Public Space

FIGURE 6.6: ‘public space; a place for all’
Author’s diagram

FIGURE 6.7: Pretoria Station’s public space around the year 1909:
Source:

FIGURE 6.8: Pretoria Station’s public space around the year 2000:
Courtesy of ‘Holm Jodaarn’ Architects
Public space is one of the oldest urban forms known; indeed urbanity cannot exist without spatial voids, which is ultimately the public space, created by building mass (Trancik, 1986). Post modern urbanism theorists like Rob Krier (author of ‘Urban Space’) and Kevin Lynch (author of A Theory of Good City Form) have attempted to regain the order of public space, through their literature. They (and many others) believe that modernism detached urban form from the importance of public space and they point out to us the essential elements needed to recreate this urban form.

To a degree this is the case for the Pretoria Station public space frontage, for it has dwindled in character over the years as it has developed through the modernist era. Figure 6.7 illustrates this public space as it was, when first implemented in 1909, while figure 6.8 illustrates the same space as it is presently. One can see that the ad hoc nature of its development over the last century has caused the space to become lost and futile; Roger Trancik (author of ‘Finding Lost Space’) refers to this sort of development as ‘anti-space’. In this publication he illustrates to us that pre-industrial development was primarily concerned with public space, from which architecture could develop, the result been well enclosed urban forms. While twentieth century development seems more concerned with individual buildings manifested as icons in space, figure 6.9 is an abstract representation of this duality.

The key narrative of this thesis ‘Integration’, as an abstract and adaptable one. It is applicable to the first part of this intervention, that of regaining the public space frontage of Pretoria Station. Indeed one cannot expect to embark on a project on this site without first considering this public space as the element of the place which binds the urban fabric together. As suggested earlier, it is the negative space between buildings that embodies urbanity and for most architectural projects this negative space presents itself as a road or street, here it is a vast urban void. In order for this project to become entirely ‘integrated’, with itself and with

“The distinctive quality of any man made place is enclosure and its character and spatial properties are determined by how it is enclosed. Enclosure primarily means a distinct area which is separated from the surroundings by means of a built boundary.” Christian Norberg-Schultz (Trancik, 1986: 66)
the broader context of the city, it needs to propose a sense of cohesion (integration) between the existing city and the station[s] and one way of doing so is by first addressing the issue of this public space.

In an attempt to regain Pretoria Station’s public space several theories are adopted, these been; density, enclosure, access, activity, linkage and figure-ground theories. High density and an adequately enclosed space is the basic ‘recipe’ in creating a reasonably well used and respected public space. To dwell on the idea of enclosure, Rob Krier points out that if a public space is not well enclosed, relative to the size or scale of the space, then it becomes too vast and can be ominous (see figure 6.10). I believe that the latter is precisely the case at Pretoria Station, while considering the issue of density all we need to do is compare Church Square, on the opposite end of Paul Kruger Street, to that of Pretoria Station. This comparison is conducted through the use of a figure-ground diagram seen in figure 6.11 and 6.12 respectfully. Here we see that the edges of Church Square form a reasonable enclosure of building mass, represented in grey, while on the other end, at Pretoria Station the gray blocks, representing building mass, are loosely placed and fail to create and adequate enclosure.

A more recent theorist, Ali Madanipour and his 2010 publication; ‘Who’s Public Space?’, is concerned with the extent to which public space is democratic, especially when considering the gentrification of public spaces. Three factors, Madanipour points out, is that a public space should be highly accessible, have a public or state agency that implements and manages it and interest in the space important too, i.e. who would be interested in using the space. Figure 6.13 shows how the degree of access into a space can produce a more public environment the first diagram here been a private domain, the third is an almost ideal public space, in terms of access and enclosure, while the last one (4) starts to lose its edges, hence its sense of enclosure. Ali also stresses the importance of access by implying that, the degree of access is equal to the degree of ‘publicness’ (Madanipour, 2010). Inaccessibility to the public realm is seen by Trancik as a consequence of modern development, he suggests that the modern city has become a collection of private icons, for the showcase
of private ego. Furthermore I had the pleasure of discussing this issue with Madanipour in August this year, he mentioned here that public space and parks are sometimes owned by private organisations but are still well used by the public and private spaces will exist in cities as a consequence of private development. The reality for Pretoria Station however is not a private matter at all, in this respect the public space frontage should be treated ‘as public as possible’. To achieve the degree of ‘publicness’ required; enclosure, density and linkage (spoken about in the next section) will not suffice what is necessary over and above these qualities is activity. Trancik speaks of activity as an opportunity to animate the public space with displays of social and cultural significance. These can be in the form of games for children, sculptures, monuments, fountains, restaurants, the list is almost infinite. The sort of activity I feel is relevant, for the space in question, could be sculptures depicting the vast progression of mobility and its meaning to modernity. In figure 6.14 I have illustrated the kind of sculpture that might suggest this progression.

Public space, if adequately composed using the tools mentioned above, can become beautiful and memorable places. Certainly some of the most important places in a city are the public spaces, they provide a sense of legibility and identity for the city dwellers and have the intrinsic quality of giving structure to an urban environment, in the words of Norberg-Schultz; “...the main urban elements are centres and paths...” (Trancik, 1986, p. 66). They become meeting places for people, especially when considering the space in question which is a transport node as well. To regain this ‘lost space’ one needs to create an urban framework that firstly respects the historically significant buildings on the site and starts to define the edges of the space in terms of what was mentioned here. The next section proposes an intervention towards regaining this space, so it may eventually become a substantial and well respected culmination to Paul Kruger Street.
Pretoria’s Gateway

The port coche’re that was implemented by Herbert Baker in 1909 has since been the threshold between Pretoria and places far away. In this sense it has been the gateway to Pretoria since it was implemented. However the only connection that it creates with the city is along Paul Kruger Street but now that the city has grown in other directions this unilateral connection seems to neglect the east and west ends of the city. Therefore it is proposed that this idea of Herbert Baker’s be extended to incorporate a direct eastern and western link from the port coche’re. This is done by organizing new built fabric which creates new streets along these axes. Now, one can reinforce Baker’s idea and at the same time start to create a sense of city cohesion with the introduction of new buildings along these streets. This idea can be strengthened by articulating movement paths along these routes while maintaining the hierarchy of the original axis.
6.2 - continued

To draw on Madanipour’s theory about access to a public space been democratic, a new urban framework is proposed which allows for access in to the public space from all directions; north, east, west and south to Salvakop, over the railway lines. These access lines are represented in figure 6.17 in orange and follow what was discussed prior about Pretoria’s Gateway. They create a new urban fabric with buildings that live out onto these new streets, most of which will have a view towards the Pretoria Station’s port coche’r. This new built fabric will start to create a sense of enclosure for the public space. In blue I have illustrated the buildings of significance; Pretoria Station, PRASA head quarters, the Victorian Hotel and the Old train shed. In an attempt to illustrate progression through time, lines have been established to allow for views towards these buildings from most vantage points within the public space. In so doing the place becomes didactic in the way it presents the old building adjacent to the new fabric, as it develops over time. Other important lines of sight that are preserved here are those which allow Baker’s building in full view from the Victorian hotel at end of Paul Kruger Street, as it has always being (these are represented as thin orange lines).

The realization that this place is predominantly for pedestrians, due the high traffic roads fed by the freeways being excluded from the site (see chapter 3 - maps), leads to the idea that this place should be free from private car users and other vehicles, as far as possible. This is not entirely true though for a transport interchange which incorporates busses as a mode of transport, for the busses need to get into the passenger zone. This is why it was decided that private vehicles and taxis can enter an underground network of roads and parking (details of this to follow), while the western part of the site allows busses into it, for the convenience of commuters. This access will also allow for deliveries and other related vehicles to enter (shown as; ‘New St’ on drawing). A vehicular connection is created to connect to the Salvakop development on the western periphery and this connection will allow the existing city to connect to Salvakop via Bosman Street.
6.3 street character

Any good mixed use environment is sensitive to the need for public facilities on street level. It is thus proposed that all the buildings in this new transport precinct have public functions, such as shops or restaurants, on ground level while the upper levels can sustain a multitude of commercial and residential uses, also living out into the street, in the form of balconies and roof gardens.

The street sections shown in figure 6.20, 21 and 22 illustrate how the street life might evolve over time, while the photograph (figure 6.3) show how similar streets in other parts of the world are managed. These sections indicate a 3 story average building height. This is true for the buildings adjacent to the public space, while thereafter the buildings will be allowed to reach 4 or 5 stories. The reason for maintaining these limits is to ensure that Baker’s building remains the hierarchical facade along the perimeter of the park. Figure 6.19 is a photograph of a pedestrian street at Church Square, this forms part of Church Street which otherwise allows for heavy traffic movement. Church Street’s pedestrian link is used as a local precedent.

When considering how transport related functions fit into this utopia one can simply suggest that ticketing and booking facilities are in the form of shops, available to the public. Indeed other amenities, such as toilets and restaurants will need to be provided.
7.4 the underground network

An underground network of parking is proposed for the new precinct due to the necessity for keeping cars out of the public space, as far as possible, and to accommodate a large amount of taxis as part of the transport interchange requirements. Other benefits are offered through this proposal, one being that the underground parking can link directly with the interchange or any other functions on the site, through the provision of vertical circulation zone that are ideally located.

Firstly this underground parking network will need to be accessed from the perimeter roads, Railway Rd. and Scheilding St. These access points will need to be cognitive of the legibility require within the underground network of roads. This will be done by placing the access points in a straight line opposite the main vertical circulation points, into the interchange. The access into the parking lot will need to be designed in such a way so as not to hamper traffic flow, on these main roads and as few points as possible will be provided, for the same reason. These issues will be dealt with in more detail later. Figure 6.23 shows the most likely access points along the periphery, which are almost equidistant from one another.

The next decision is to create a square grid that is in a constant direction. It was decided that the grid should run parallel to Baker’s building and to Scheilding St. this will create easier movement for vehicales. A 5.5 x 5.5 meter grid was decided upon, this is a square grid that offers enough space for two cars to past each other in the movement corridors and it is adequate for parking two cars in each grid space, see figure 6.24 and 25. A 2.75m parking space per car will allow for a wider turning circle when reversing out of the parking space and by offsetting the columns inward from the grid we may establish a road width of 6.5m, which is sufficient for cars to reverse out of the parking spaces.
Now a system or roads can be implemented with the demarcation of parking areas, either Gautrain, Shosoloza Meyl, taxies, car rentals, commercial users, etc. To further create legibility one could create areas of parking which are distinct in colour from one another while through roads will be necessary to maintain connectivity within the parking lot. This is done so that if a user enters the parking lot from the wrong end he may still get to the required place without existing first. Signage can be used to navigate the drive through the parking lot, see figure 6.26.

As mentioned earlier a direct visual link will need to be maintained between the point of entry and the vertical circulation zones. This can be done by placing the entry roads in such a manner so that a driver will need to pass the entry point before finding a parking space or at least a driver will need to be aware of the entry point at all times. To further highlight these vertical circulation points they will be placed next to light wells, which serve as tree containers for the spaces above, illustrated in figure 6.26 and 6.27. These light wells will be used as staircases into the public space above as well. This approach to vertical circulation firstly provides a sense of legibility and gives natural light and ventilation to the basement while bringing vegetation into an otherwise austere space. The last point about bringing the vegetation from above into the basement is the creation of ramps up, into the park area, at the entrance of Baker’s Pretoria station. In doing so we can bring the life of the park into the basement space and vice versa, this idea is illustrated in figure 6.27 and 29 and in green in figure 6.26.
FIGURE 6.26: The underground network

- Additional parking
- Security
- 5.5m grid
- Metro Rail Platforms
- Trade stalls
- Ramp to park
- Refuse and deliveries
- Taxi rank 310 taxis
- Gautrain parking
- Shosholoza Meyl parking
- 6m grid
- 100m
- 10m
- 20m
- 40m
FIGURE 6.27: 
Tree and basement relationship

FIGURE 6.29: 
Ramps to the stations entrance, from the basement
Rendering 1

North-eastern view of the new transport precinct
Figure 6.1:
New Trade Fair, Milan, Italy: Massimiliano Fuksas
Source: Molinari, 2005
For several centuries France contrived to steal glass-making secrets and artisans from the Italians, granting immigrating glass-makers special noble status, although exposing them to risk of punishment by death if found out by the Italian authorities” (Annette Fierro: 9)
7.1
the phenomenology of glass

This chapter deals firstly with the relationship between glass and modernity; thereafter it will equate this relationship to the project, as described prior. Much of its content is owed to Annette Fierro and her in depth publication to do with glass and architecture. This literature entitled; The Glass State: the Technology of the Spectral. Paris, 1981-1998, stands out from others used in this document, relating to glass, in the way that it addresses the phenomenology of glass as a symbol of modernity. Certainly all the literature used here agrees that modern life and modern environments cannot exist without this fascinating material but more specifically the advent of ‘Float Glass’ technology. This was developed by Alastair Pilkington in 1952, when he started to experiment with the idea of using molten metal as a casting bed for the liquid glass (Wigginton, 1996). In Fierro’s word; “[glass]... is wedded in a far more complicated way to a contemporary international material zeitgeist” (Fierro, 2003: 7). This has been the case of the material since the early beginnings of modern architecture, the proof lies in a statement made by ‘The Ring’ (a group of early modernists around 1924, consisting of Mies van der Rohe, Bruno Taut and Paul Scheerbart), when they “called for a spiritual renewal of architecture all choosing glass as a medium expressing new values in architecture, all taking a decided stance on the relationship of technology to architecture, and to human production in general” (Fierro, 2003: 196). This is largely the reason for using glass and steel as the primary architectural tectonic in the Pretoria interchange, which becomes a symbol of modernity as it celebrates movement, mobility and the present.

The first chapter of this document deals with the political stance that mobility has in a contemporary city. It concludes that the implementation of transport mega-structures, implemented by the state are by and large symbols of political prowess. Furthermore Fierro tells us of the inherent political stance which glass and steel structures hold in modern life. She speaks with particular reference to this phenomenon in Paris, where François Mitterrand (president of France between 1981 and 1998) commissioned a series of buildings, primarily made of glass and steel, which became known as the ‘Grand Projects’. These projects include Dominique Perrault’s, Bibliothe’que Nationale de France, work by Jean Nouvel and I.M. Pei’s, Grande Pyramide du Louvre. Perhaps the most important statements made in Fierro’s book which encompasses the political monumentality inherent in glass buildings, is when she points out that “Mitterrand understood the physical construction of the pyramid (at the Louvre) as one which would ‘enshrine’ his administration” (Fierro, 2003: 162). Or when she speaks of; “glass acquiring a significance that was increasingly deployed to prompt a particular political signification”. From the above one begins to understand glass and its political significance as an architectural tectonic, one might even suggest that if stone was the monumental material of the past then glass is the same material of the present. South African politics are not far detached from this stereotype; one just needs to look at the South African Reserve Bank in Pretoria, soaring into the Pretoria skyline as a highly distinguished, shimmering black
tower of glass and granite (see figure 6.5). Glass structures may be seen as symbols of power in a built environment and the same was pointed out for mega projects of mobility earlier in this research. By combining these two factors of into a corporeal manifestation, in the form of a transport interchange we could start to create a public and pragmatic symbol of state control (see figure 6.3).

Glass clad structures, being that which belongs to modernity, holds within them the potential to create diachronic relationships between ‘the old’ and ‘the new’. I.M. Pei’s Grande Pyramide du Louvre, built in 1989 (see figure 6.2), offers a substantial insight into the relationship between glass and steel structures and older, more formal buildings prior to the 20th century, the Pretoria station building by Herbert Baker been a quintessential example. The statement made when juxtaposing new glass and steel structures against older stone buildings is for I.M. Pei a symbol of neutrality, reflection and transparency (Fierro, 2003). Neutrality been the more important issue here for a development at the Louvre, which is a well respected 17th century building and I.M. Pei explained to his French audience that through the use of glass and minimal steel supports he will achieve a subservient addition. At St Pancras the use of glass and steel construction on the new roof was deliberate to create a contrast between the new structure and the old Barlow shed of the 1860’s (Lansley, 2008) In the words of a St Pancras designers; “the best way to join something is to separate it” (Lansley, 2008: 83). Here at the St Pancras station refurbishment the decision to use glazing on the original arched roof of wrought iron was almost inevitable. The need was to allow daylight into the undercroft, which was once used as a gloomy storage basement, now it’s a vibrant retail space, underneath the platforms (Lansley, 2008) (see figure 6.4).

The most important intrinsic quality glass has is its transparency; this quality is of huge importance when considering that now we can allow foliage to grow within a weather tight enclosure for the vegetation still receives an adequate amount of solar radiation through the glass. At Parc de la Villette of 1987-1991 by Bernard Tschumi and the glazed follies by Adrien Fainsilber of 1986 and Christian de Portzamparc of 1992-1994, glass was essential to allow park foliage to enter the interior of the museum, providing both a buffer and a solar energy store. These museum follies successfully provide foliage to the interior year round. For Paul Scheerbart this was about combining the crystalline with natural utopian settings in his words; “the transmutation of the natural world through subjective imagery; glass would essentially reveal nature” (Fierro, 2003: 195). This sort of poetic relationship between modern (or contemporary) architecture and the natural world, made possible through the technological feat of glass production, is a narrative in the design of the Pretoria Interchange. This will be illustrated clearly in chapter 9. The discussion here alludes to the symbolic references in glass and steel construction while the next section of this chapter will discuss the application of a structural system at the Pretoria Interchange; later construction details from the buildings spoken about here will create a platform from which to develop the glass detailing for this specific project.
7.2
A structural pattern

Figure 6.6:
Mall and Casino extension,
by Massimiliano Fuksas
Source: Molinari, 2005
This section deals with both the cultural significance of the ‘Crystal Boulevard’ (the name coined for the glass corridors, used in this project) and the application of such a boulevard. It draws from the social background of the ‘Perspectival Boulevards’ in Paris which have become a distinctive pattern in Paris (Fierro, 2003). In short these boulevards are existing or new streets covered by a glass roof; they became significant monuments to the city of Paris rather than mere buildings meant for the passage of vehicles and people. With the facing buildings having deliberately neutral facades, the focus is on the idea of the boulevard as a connecting devise, rather than the functions inside. Fierro makes particular reference to the idea of these glass boulevards creating connections to the city, across various social and pragmatic scales. On the one hand they physically connect different parts of the city while a second intention is to connect different class groups to one another (Fierro, 2003).

The chapter prior to this one makes reference to the work of Ali Madanipour and his quest to define public space for all. The research indicates that accessibility is a key facet to creating truly public spaces (Madanipour, 2010). These ‘Perspectival Boulevards’ perform a similar function, connecting the lower class of Paris to the cities major thoroughfares and according to Fierro; “…the boulevards provide an arena for the display of the bourgeois not only to each other, but to a wide demographic mix of economic classes and nationalities” (Fierro, 2003: 24).

Although this research makes particular reference to ‘Perspectival Boulevards’ in Paris, this form of urban intervention is by no means unique to Paris. Massimiliano Fuxkas has also indulged in this ingenious typology of creating reinforced connections to various places in a city. Here I refer to his project in Eindhoven in the Netherlands, the objective of this intervention was to create a commercial axes at the same time function as a link between the built-up areas of this commercial district (Molinari, 2005), see figure 6.6. These glazed shopping streets have proven to be highly effective as social connecting devices within a city, coupled to the need for a transport interchange to be naturally lit throughout this architectural device seems quintessential for the requirements as set out in chapter 4.

For reasons mentioned throughout this chapter, glass is the primary ‘archi-tectonic’ to be used as a skin for the construction of the interchange corridor or the ‘Crystal Boulevard’. Another important facet of glass construction is its ability to truly allow for the ‘expression of structure’. In this regard, Fierro points out that “transparency also assumed a central metaphorical role for modernists, serving as the guiding principle for generating the building form out of the expression of its structure” (Fierro, 2003: IX). This expression of the structure itself can become an image of the zeitgeist, for modernists it was orthogonal geometries that defined their time while in contemporary architecture more fluid geometries are experimented with (see figure 6.1). Fierro agrees that new systems of glass and steel construction should represent their technical inventiveness rather than conforming to homogeneity. In this sense architecture assumes the role of cultural didacticism, portraying images of contemporary culture and life. With this in mind, Fierro makes reference to the work of Kenneth Frampton who explains that; “…the tectonic can- indeed must- incorporate rather than exclude the present” (Fierro, 2003: 285).

This discussion encompasses the cultural underpinning of the structure employed for the construction of the Pretoria Interchange. The workings of this structure can be seen in the exploded diagram; figure 6.8. It can be defined as ‘fluid’ architecture which addresses the complex program over the entire site, as described in chapter 5 and 6. Structures like these have also become known as parametric designs, named after the type of computer programs used to create them. Mike Eekhout; a contributor towards the publication; Crossover. Architecture, Urbanism and Technology, describes the process leading up to a final, built project of this nature. He explains that there are three main factors necessary in building such a project, namely; constant coordination between the architect and the engineer, accurate 3D-modelling of all the components on a computer program and accurate coordination of the final design on the site, again computer modelling is paramount (Graafland, 2006). One of the most complicated factors in developing a ‘fluid’ architecture is that almost every member of the structural and cladding system is unique. This requires a highly advanced system for the scheduling of the various components, only possible to execute with the help of a computer model. Computer software is available which is used by engineers for this purpose. Eekhout points out that one of the programs used by engineers for this purpose is 3D AutoCAD/Inventor. One can imagine that the shop drawings used to manufacture a complex structure like the one used in this thesis would firstly be a very tedious process and secondly be subject to very many, expensive mistakes. Due the advancement of computer generated models and CNC manufacturing it is now possible to achieve 100% accuracy of all the components (Graafland, 2006). Eekhout makes reference to a project in the Netherland called the Provincial Floriade Paviljoen in Hoofddorp, by Kas Oosterhuuis Architects. This pavilion is a relatively small building when compared to the Pretoria Interchange but its complexity and ingenuity is largely owed to the analytical capabilities of 3D computer modelling. Eekhout points out that the accuracy offered through collaboration between the engineers and the architects, coupled to the analytical power of computers allowed them to achieve a final built product with zero percent wastage.

The advancement of computer modelling certainly allows us to create more interesting and exiting geometries in architecture and even though glass technology has advanced to the point where it is possible to bend it through cold or hot bending processes (Molter, 2011) these radiuses and complexities are still rather limited. When considering curved surfaces it is better to employ a triangle method, where each piece of glass is flat but in a triangular shape put collectively to form complex geometries, that appear to curve (see figure 6.7). The glazed roof over Massimiliano Fuxkas’ Trade Fair in Milan (figure 6.1) employs such a system for the areas of the roof that appears to be curved. The benefit of this system is that the triangular pieces only need to be used in areas where the geometry appears to be curved, while in flat areas of the roof, rectilinear pieces of glass can still be employed.
Figure 6.7: Exploded diagram of triangular glass tiles, used in the formation of complex geometries
Author's diagram

- Geometry defining members
- Secondary structural members
- Intermediate glass supports
- Triangular glass tiles
Structure and movement exploded perspective

- shading layer
- horizontal glass layer
- intermediate glass supports
- secondary structural members
- primary structural members
- geometry defining members
- 3.6m grid (the old Pretoria station's grid)
- mixed use zone
- basement parking on 5.5m grid
- interchange zone
- vertical glass layer

Figure 6.8
Figure 8.1 A painting on the wall of 'Station Place' (one of the residential blocks) opposite the Pretoria Station. Author's photograph
8.1 design concept

“We can improve the overall journey experience by reducing inconvenience, complexity, and uncertainty for passengers transferring between different modes of transport”

Figure 8.2: The initial concept sketch depicting the corridor, going through the Old Pretoria Station. Author’s diagram
A transport interchange is conducive to becoming an extremely busy and seemingly confusing place, a place where the naive user will become lost and frustrated. As the following quote suggests; “We can improve the overall journey experience by reducing inconvenience, complexity, and uncertainty for passengers transferring between different modes of transport” (Transport for London, 2001)...

The challenge in creating a successful interchange is reducing this natural complexity.

The design concept for the Pretoria interchange is organized around the idea of reducing confusion, hence a straight line is formed which connects the various transport modes in a clear and easy to understand manner. This line is taken through Baker’s building, connecting the eastern and western ends of the site, which by nature of the Urban Framework and the position of the existing platforms seems to be the most logical position to place the interchange corridor. Stretched between the transnational bus service, to the west and the future BRT (Rea Vaya) service, to the east. This concept is illustrated in figure 8.5.

The BRT service is kept out of the new precinct due to its nature as a rapid movement service, it will not be able to move swiftly through the slow traffic roads proposed by the urban framework. While on the western end of Baker’s building, the corridor is allowed to split at an acute angle, where users will find it easy to notice where the vertical circulation point for the taxis is situated or where the busses are parked, to the left. At the point where one must choose between busses or taxi, we find the Shosoloza Meyl ticketing office, adjacent to the Metro Rail building, for these two services use the same set of platforms. The modes which are likely to have passengers carrying heavy luggage are placed at closest proximity to one another because of the difficulties associated with carrying the extra luggage.

These modes include; the Shosoloza Meyl, the Metro Rail, the Gautrain and the trans-national busses.

Next I would like to point out the need for creating a single architectural language throughout the interchange corridor which is very well lit and free of obstacles. The conceptual section below (figure 8.3) shows how one can accommodate for this requirement by introducing a glazed roof system that is volumetrically generous and strategically shaded to allow for adequate ventilation, light and legibility. This architectural order is in a sense a normative approach to transport related buildings as we saw in the chapter 5. By introducing a high, volumetric, glazed roof system one can start to place trees and vegetation within the corridors, creating a pleasant and comfortable environment, also as seen in this section the buildings are allowed to live out into the corridor on all levels, creating a weather tight environment that is still perceived as an outdoor street (see figure 8.3 and 8.6). Indeed this, coupled with pockets of truly outdoor space, sometimes used as vertical circulation zones- again seen in the section- will create an ambiguity between what’s inside and out, perhaps the only sense of ambiguity acceptable at a transport interchange!
8.1 continue

Figure 8.4: The initial concept model illustrating the corridor and public space. Author's photograph

Figure 8.5: The interchange corridor Author's diagram
An initial concept section illustrating the ramp and roof garden.
Author's diagram
8.2
a tectonic of movement

Figure 8.7:
Plan of staircase.
Author’s diagram

Figure 8.8:
Ramp through a rigid grid.
Author’s diagram

Figure 8.9:
Plan of western interchange ramp.
The aesthetics of movement is a narrative that was raised by Francine Houben and company in the book entitled “Mobility: A Room with a View”. Here the authors speak about mobility with reference to the aesthetics of roads and highways, which have dominated the visual perception of urban environments for decades (Houben, 2003). The very praxis of this infrastructure defines its aesthetic value. This comes from the nature of roads as linking devices often connecting complex relationships.

When considering the vast, complex appearance of massive highway interchanges one wonders how they might appeal if drastically reduced in scale, to that of a pedestrian. I have come to notice that this interesting infrastructure obtains its appeal from the way it is layered as the various bridges ‘fly’ over one another. One can’t help admiring these brilliant feats of engineering (and politics, refer to chapter 1). Indeed there scale has a profound influence on this appeal.

The curve linear geometry of roadways is a mere definition of its praxis. However in few cases I have come to admire the aesthetic value of this infrastructure, largely because of this geometry. An architectural function that would suit these layered, curve linear forms is anything to do with movement both horizontal and vertical. For this reason I have chosen to create much needed ramps, staircases and corridors that resemble the curves of roads and highways. The pragmatic reality of human movement vs. cars moving at 100km/h is that the curves and bends used in making buildings need not be as gentle. Figure 8.8 is one of the first drawings that were composed with this narrative in mind. Here we see an abstract representation of a ‘free formed’ ramp climbing between a rigid order of vertical columns. This pragmatic form is useful for a number of requirements other than the need to facilitate people with walking impediments. By introducing ramps into the building program, adjacent the public space, we may start to create interesting movement patterns between the ground plane and an elevated part of the park, in the form of a roof garden (see sections).

When considering movement within the interchange itself, A ramp serves a purpose over and above a movement channel, now it becomes an object within a space which becomes an important element of the visual field experienced by the users of the space. Now that movement in the form of a ramp has been defined one can combine this to the need for a staircase. When physically uniting these two movement devices, they collectively start to create a continuous object, with different curves as it changes from a ramp to a walkway then into a freeform staircase, creating layers of a single object. (se figure 8.9).

This narrative has been a design driver since the early stages of the project. It has been refined into what I have coined the ‘movement tectonic’. As described in the discussion above it takes its form from the praxis of movement, inherent layering and a unified aesthetic language, just as the highways do on an urban scale. The interpretation of this metaphor is illustrated by means of conceptual drawings and models, later this concept will take form as the one of the main aesthetic form givers in the interchange design. This will be shown as a holistic view through the use of computer generated renderings.
8.3: primary and secondary functions

As discussed previously in the chapter 4, besides an interchange being the ‘vessel’ between modes it is also a waiting, meeting and social facility, that offers huge commercial opportunities due to the amount of people moving through it on an hourly basis. The interchange should, rather must, accommodate for these social and commercial opportunities, if so it will become a vibrant place where people will go to, even if not using the transport facilities available, Federation Square is precisely this kind of place, ‘a vibrant Gateway into a vibrant city’.

The floor plan to the right shows, in deep blue, the area needed for primary transport related functions, such as ticketing and ablution facilities, while the vertical circulation areas are highlighted in grey and the movement corridors are hatched in a square pattern. The remaining, lettable space on ground floor is reserved for other functions such as shops and restaurants. Of course this is not only true for the ground floor of the interchange, which is why ramps and clear circulation to the upper floor has been provided for, so that similar, lively functions can be freely accessed from the ground floor of the interchange, this was discussed in the section prior.

This floor plan also shows the accommodation of busses to the west and how the busses will move into the parking spaces provided. are illustrated in more detail, notice how the vertical circulation zones are adjacent to open pockets and tree housings, offering a sense of legibility and foliage to the basement parking. On the periphery of the interchange, BRT terminals are provided for on the northern and western ends.
1: seating and internal planting
2: internal gardens
3: lift shafts
4: escalators
5: stairs
6: general circulation ramps
7: information desk
8: ablutions
9: paraplegic ablutions
10: volumetric expression and ventilation into basement
11: Shosoloza Meyl ticketing - using Metrorail platforms
12: shops
13: Lettable space for transnational bus companies
14: ramp from basement to park
15: restaurants
16: service lifts
1: seating and internal planting
5: stairs
6: general circulation ramps
8: ablutions
9: paraplegic ablutions
12: shops
15: restaurants

sunken restaurant
eastern interchange
*Metrorail platforms
administration

gautrain parking

5m 10m 50m
1: seating and internal planting
3: lift shafts
4: escalators
5: stairs
6: general circulation ramps
7: information desk
8: ablutions
10: volumetric expression and ventilation into basement
12: shops

shading devices
gallery of the city of pretoria
roof garden
taxi zone of the western interchange

additional parking

taxi rank 310 taxies
1: seating and internal planting
3: lift shafts
4: escalators
5: stairs
6: general circulation ramps
7: information desk
8: ablutions
10: volumetric expression and ventilation into basement
12: shops

*new boulavard on perimeter road*
1: seating and internal planting
3: lift shafts
4: escalators
5: stairs
6: general circulation ramps
7: information desk
8: ablutions
10: volumetric expression and ventilation into basement
12: shops
15: restaurants
16: service lift
Eastern Interchange

1: seating and internal planting
3: lift shafts
4: escalators
5: stairs
6: general circulation ramps
7: information desk
8: ablutions
10: volumetric expression and ventilation into basement
12: shops
15: restaurants
16: service lift
View of the Eastern Interchange (Gautrain) entrance from the public space.
Rendering 3

View of the Eastern Interchange with the Gautrain in the background
Western Interchange

1: seating and internal planting
2: internal gardens
3: lift shafts
4: escalators
5: stairs
6: general circulation ramps
7: information desk
8: ablutions
9: paraplegic ablutions
10: volumetric expression and ventilation into basement
11: Shosoloza Meyl ticketing - using Metrorail platforms
12: shops
13: Lettable space for transnational bus companies
14: ramp from basement to park
15: restaurants
16: service lifts
View of the Western Interchange with the trans-national busses to the left and the lifts to the taxi rank to the right
1) 300Ø x 10mm thick structural steel tubing, primed and cladded with 0.8mm stainless steel veneer.

2) 2mm thick stainless steel fixing plate, welded to substrate

3) Aluminum glazing beads to manufacturer's specification. Fixed to fixing plate with screws and with an anti-corrosive plastic membrane in-between

4) Fixing rivet to manufacturer's specification.

5) Mastic expansion joints

6) 0.8mm thick stainless steel flashing cold-rolled in-situ fixed to glazing beads as shown and welded to shading device support structure where applicable.

7) Aluminum clamp bar to manufacturer's specification with an anti-corrosive plastic membrane between flashing and clamp bar.

8) 100Ø x 4mm thick stainless steel tubing welded to the stainless steel veneer of the main structure.

9) 6mm toughened float glass + 12mm cavity + laminated safety glass consisting of 2x 5mm toughened float glass.

10) 0.8mm thick galvanized flashing fixed to glazing beads as shown, to overlap waterproofing by 150mm minimum.

11) 320 x 90mm mild steel support plate, custom extrusion to shop drawing.
12) Plastic slip joint membrane.
13) 25mm thick high-density Styrofoam insulation membrane.
14) Bitumen torch-on water proofing.
15) 25mm screed to fall min. 1:40.
16) 90 x 25mm Meranti floor boards on 38 x 38 S.A Pine battens fixed to concrete floors.
17) Canvas shading devices fixed to stainless steel tubing supports according to detail.
18) 50mmØ stainless steel tubing handrail. Fixed to concrete balustrade according to detail.
19) 85mm thick cast in-situ reinforced concrete lintol.
20) Reinforced concrete waffle slab with min. 170mm thick surface and 500mm deep waffle beams.
21) Reinforced concrete beam acc. to dimensions with a chamfered shear edge as illustrated.
22) 125Ø x 10mm thick structural steel tubing, primed and cladded with 0.8mm stainless steel veneer.
Final Model
BOOKS:


**ARTICLES AND ESSAYS:**


**INTERNET:**


**INTERVIEWS:**


Meicher, Heinrich. (2011). Interview by Gareth Teague, 12 August 2011, Johannesburg