historic [re]covery

urban [re]covery

A Cultural Heritage and Mediation Centre at the Old Synagogue in Pretoria
for my dad
1951 - 2010
Historic Recovery, Urban Recovery. 
A cultural Heritage and Mediation Centre at 
the Old Synagogue in Pretoria 
by 
Shershen Naidoo 

Submitted in partial fulfilment of the requirements for the degree Master of Architecture (Professional) 
Department of Architecture, Faculty of Engineering, Built Environment and Information Technology 
University of Pretoria 

Study leader and Course coordinator _ Jacques Laubscher 

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Full dissertation title: Historic Recovery, Urban Recovery. A Cultural Heritage and Mediation Centre at the Old Synagogue in Pretoria

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Project summary
Programme: Cultural Heritage and Mediation Centre
Site Description: The Old Synagogue site on Paul Kruger Street, Pretoria CBD
Client: Joint venture between the Department of Public Works, Department of Public Services and Administration, and Department of Tourism
Users: Government Officials, members of Workers Unions, Corporations, tourists, and the general public

Site location: Erf 103, Pretoria CBD
Address: 73 Paul Kruger Street, Pretoria CBD, South Africa
GPS Coordinates: 25°44'33.19"S, 28°11'17.14"E

Architectural Theoretical Premise: The investigation challenges the mainstream approach of commodification of built heritage in favour of greater public usage and accessibility traits.

Architectural Approach: Developing a contextually generated programme for the Heritage Centre which contributes towards uplifting the sites surrounding urban environment.

Research field: Heritage and Cultural Landscapes
In accordance with Regulation 4(e) of the General Regulations (G.57) for dissertations and theses, I declare that this thesis, which I hereby submit for the degree Master of Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of my thesis has already been, or is currently being, submitted for any such degree, diploma or other qualification.

I further declare that this thesis is substantially my own work. Where reference is made to the works of others, the extent to which that work has been used is indicated and fully acknowledged in the text and list of references.

_____________________________________
Shershen Naidoo
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Abstract

2011 marked the fifty years anniversary of the Treason Trials at the Old Synagogue, in Pretoria, South Africa. The trial was a symbolic victory for the Liberation Movement in their fight against an oppressive apartheid regime. Today, with freedom a reality, Liberation Struggle Heritage Sites have surfaced throughout the country with the purpose of commemorating the multitude of events which occurred on the path to liberation. The purpose of this research is to generate a contextual response to the challenge of commemorating and rejuvenating the currently abandoned Old Synagogue. This study investigates the manner in which Liberation Struggle Heritage Sites are being commemorated. The results will assist heritage practitioners to ascertain whether the current trends in the application of heritage conservation and commemoration strategies make meaningful contributions towards local communities. An empirical research method of visiting Liberation Struggle Heritage Sites in Gauteng was conducted as a means of primary data collection. The findings indicate that these sites display weak accessibility traits, and do not engage with their surrounding context in manner which stimulates socio-economic and political growth. The design project aims to initiate programme as a means of commemorating and rejuvenating the Old Synagogue in a contextually appropriate manner. The prerequisites are that the programme should respect, liberate, and celebrate the history and heritage of the Old Synagogue together with the surrounding buildings of heritage value. The design proposal is a Heritage and Mediation Centre geared towards public utility as a place to gather, learn, and retreat within Pretoria’s historic inner city.
Chapter 01

Fig. 01 Current condition of the Old Synagogue
PREMISE
1.1 Introduction

Even before the doors of the Old Synagogue opened on the morning of 29 March 1961, the day of the long-anticipated verdict in the Treason Trial, a crowd of supporters and press people jostled to get inside. Hundreds were turned away. When the judges brought the court to order, the visitors’ gallery and the press bench were packed. Moments after Justice Rumpff pounded his gavel, the Crown made an extraordinary application to change the indictment. This was the fifty-ninth minute of the eleventh hour, and it was two years too late.


Fifty years after this momentous day, the tension, anticipation, and melancholy of Nelson Mandela’s words are still emotively etched in the landscape of South African History. The Treason Trial ended in victory for the Liberation Movement and enshrined this day at the Old Synagogue in the history books of South Africa. However the legacy of this monument far precedes the 29th March 1961 and it still holds social, contextual, and historic significance today.

The theme of this study is based on uncovering the historic events which occurred in the northern portion of Pretoria’s inner city, and at the Old Jewish Synagogue on Paul Kruger Street in particular. The purpose of which is to establish a means of rejuvenating and commemorating the (currently abandoned) Old Synagogue in a manner which contributes to the uplifting of its urban environment. This will be accomplished primarily in three ways, namely:

- celebrating its significance as the city’s first Synagogue in the Byzantine style,
- revealing the role the building played in South Africa’s liberation struggle, and
- addressing the challenges of incorporating this “National Monument” (Buntman, F. & Buntman, B. 2010:186) into a South African Liberation Struggle Heritage Centre.

Since the inception of South Africa’s democracy in 1994 there has been a growing movement towards commemorating places of historic importance in the liberation struggle. Sabine Marschall, the coordinator of the Cultural and Heritage Tourism Programme at the University of KwaZulu-Natal, states that

*Since the advent of the post-apartheid period, the country has been fascinated – if not obsessed – with the identification, celebration, evaluation, reassessment and not least, commodification of heritage.*

(Marschall, 2005:103)
The mapping exercise conducted indicates the location of heritage sites which commemorate the political history of South Africa. The findings reveal a concentration of heritage sites in the Gauteng region, where a defined “Struggle route” (Mashabane Rose Associates architects and urban designers, 2011) has been established. However, the impending research aims to reveal inconsistencies in conservation strategies and policies implemented at current built heritage sites of political history, thus warranting further investigation into accessibility patterns and mono-functionality of cultural heritage sites.
The purpose of this study is to determine whether current trends in the application of heritage conservation strategies make meaningful contributions towards empowering local communities (socially, economically, and politically) and encouraging human development. The study also seeks to identify an approach that guides the design process towards creating a contextually appropriate proposal for the Old Synagogue as the focal point of a Liberation Struggle Heritage Centre.

More specifically, the study aims to achieve the following specific research objectives:

- To determine whether current trends in the application of heritage conservation strategies make meaningful contributions towards empowering local communities through the analysis of Struggle Route Heritage Sites (see sub-chapter 2.2 / pages 11-14 for more detail).

- To review the most recent literature and case studies to identify an approach that guides the design process towards creating a contextually appropriate commemorative proposal for the Old Synagogue (see sub-chapter 2.3 / pages 15-18, and sub-chapter 5.3 / pages 61-64 for more detail).

- To compile a body of work aimed at revealing the historic layers of the Old Synagouges broader context in an effort to enrich the monuments surrounding urban environment (see sub-chapters 3.2 and 3.3 / pages 25-28 for more detail).
1.3 Research methodology

The research methodologies utilised in this study include a combination of empirical and academic research methods. Contextual data collection based on the current and historic condition of the Old Synagogue was conducted both practically and through the study of literature.

- Context visits were carried out strategically on weekdays during the mid-morning (off-peak) and between 1pm and 5pm (approaching after school towards the end of the working day) to analyse usage and movement patterns around site. Midday weekend visits were also conducted to gather further data.

- Literature studies include library, archive, and University of Pretoria internet based E-Resource searches conducted on a continual basis in an effort to supplement the author’s data collection on the Old Synagogue and its surrounding urban, social, and historic context.

Practical interviews afford the author an opportunity to gain primary data that is potentially completely original to this dissertation. Interviews include:

- A meeting with Rabbi Gideon Fox of the Pretoria Hebrew Congregation [PHC] to research Jewish culture and the spiritual and ritual usage patterns of the Old Synagogue when it was still a house of worship. The meeting included a guided tour of PHC’s Synagogue by Rabbi Fox. Refer to appendix 1 for questionnaire and answers.

The empirical research method of visiting architecture as a means of primary data collection has been conducted by the author. Case studies include visits to the following centres:

- Liliesleaf Liberation Centre, Rivonia, Johannesburg
- Hector Pieterson Memorial Museum, Orlando West, Soweto
- Constitution Court, Constitution Hill, Braamfontein
- Women’s Prison, Constitution Hill, Braamfontein
- The Apartheid Museum, Gold Reef City, Ormonde

Chapter two initiates the implementation and expansion of the aforementioned collected data. The chapter begins with the rationale behind the author’s approach towards realising the design of a commemorative Heritage and Mediation Centre.
CHAPTER 02

Fig. 06_ February 1957 - Treason Trial protests
2.1 Background and rationale

This section is a brief introduction to the three significant stages in the lifespan of the Old Synagogue thus far. The purpose is to establish a primer for the historic building’s proposed fourth and culminating stage as a National Heritage Site. Fran and Barbara Buntman, co-authors of ‘Old Synagogue’ and Apartheid Court: Constructing a South African Heritage Site (2010:183), assert that the Old Synagogue is an emerging heritage site, with the mandate of commemorating and celebrating the history of this National Monument.

For the purposes of this research document the author will work under the assumption that the Old Synagogue has been upgraded to a National Heritage Resource ‘Grade 1’, thereby elevating the building to a National Heritage Site, according to the National Heritage Resources Act of 1999.
The Jewish origins of the Old Synagogue trace back to the first half of the 20th century where the building facilitated the spiritual needs and congregational growth of Pretoria’s Hebrew community for over fifty years. The transition from a religious house of worship to an apartheid court of law was a significant turning point in the history of the building and the political history of South Africa. The historic Treason Trials (to name only one of the important court cases) which took place at the Old Synagogue played a crucial role in the Liberation Struggle. The building has been subsequently abandoned and is currently in a state of disrepair and degradation which one can argue is indicative of the current state of the Old Synagogue’s inner city context.

The following questions could be posed in response to the current condition of the Old Synagogue: Firstly, why is this important? For example: the Drill Hall in Johannesburg’s inner city was extensively damaged in two fires during 2000 and 2001 (Johannesburg Development Agency, 2011). The Men’s prison, Women’s prison and temporary holding cells on Constitution Hill, Braamfontein, Johannesburg bore the brunt of tremendous neglect. However, both National Heritage Sites have been sufficiently rejuvenated and contribute towards the growth and sustenance of South Africa’s tourism market. According to Marschall (2005:107), heritage tourism contributes towards economic growth, development, and poverty alleviation.

Therefore, naturally the second question would be: Does the Old Synagogue have the potential to do the same, and furthermore, how will the process of commemorating the Old Synagogue as a National Heritage Site make a unique contribution to the heritage landscape of South Africa?

This dissertation aims to respond to these questions, in addition, the current method of capturing and communicating the historic significance of a built heritage site (particularly in the politically historic context of South Africa) is also being questioned. The following analysis of Struggle Route Heritage Sites and the literature study thereafter are centred on developing an approach to heritage initiatives which respond with impetus towards broader contextual issues. Moreover, this investigation challenges the mainstream approach of commodification of built heritage in favour of greater and more diverse public usage and accessibility traits.
2.2 Analysis of Struggle Route Heritage Sites

The primary sources for this section are the Struggle Route Heritage Sites. These commemorative structures have been researched through either/or on-site analysis, journal reviews, and other media reports in which current public and academic debates are tabled. The purpose of this study is to assess the relationship between the Struggle Route Heritage Sites and their immediate context based on the following criteria:

- public accessibility / freedom of access,
- level of engagement with surrounding context, and
- inclusion of multi-functional facilities. If any, are they beneficial to the community?

In order to achieve a broad perspective for this analysis the following four heritage sites were selected:

- Liliesleaf Liberation Centre, Rivonia, Johannesburg,
- Constitutional Court, Constitution Hill, Braamfontein,
- Hector Pieterson Memorial Museum, Orlando West, Soweto, and
- The Apartheid Museum, Gold Reef City, Ormonde.

The two former heritage sites have a chronological association to the Old Synagogue in terms of historic events which occurred at these sites during the Liberation Struggle. The latter heritage sites also contributed to the Liberation Struggle and commemorate its importance,
A common denominator amongst all four heritage sites is the varying degree of introversion. At the Constitutional Court and Hector Pieterson Memorial the buildings themselves form a poorly penetrable barrier between commemorative structure and surrounding context. Both projects are situated in direct correlation with public squares but have a weak and unrealised interface with the public space due to their introverted nature. Liliesleaf Liberation Centre and the Apartheid Museum are nestled within perimeter walls. The dialogue between buildings and defined routes on the site are well articulated, although these heritage sites display a low level of engagement with the surrounding context.

These sites also share a second common attribute, which are internal courtyards and garden/park-like outdoor spaces. After paying an entry fee to gain access to the Constitutional Court and Hector Pieterson Memorial one can browse and interact with exhibits within the confines of the structure. However the internal courtyards remain inaccessible to visitors, thus rendering the spaces underutilised and a missed opportunity for public interaction. Liliesleaf and the Apartheid Museum are organically integrated into their natural landscapes and these have the potential to become successful recreational spaces. This potential is especially applicable to Liliesleaf because of its location within a predominantly residential context. However, because these spaces are not programmed for recreational purposes,
In terms of functionality, the four heritage sites had exhibition based accommodation requirements. Exhibition halls, auditoria, libraries and archives are common in Liberation Struggle commemorative buildings. The functional requirements are mainly focused at meeting these demands and pause spaces are predominantly in the form of coffee shops. The urban context and the collective needs of users and people who live in the vicinity of the heritage site are not addressed. Christa Kuljian in her published article: Reflections on the Walter Sisulu Square of Dedication, states that:

remain underutilised and overprotected – a topic to be discussed further in the literature review.

Fig. 12_ Photo montage of the Hector Pieterson Memorial
Fig. 13_ Context exploration
Development programmes that are informed by the needs of the local residents and local cultural practices have a much better chance of encouraging human development. (Kuljian, 2007:88)

It could be argued that Liberation Struggle Heritage Sites display weak public accessibility traits, and do not engage with their surrounding context in a manner which stimulates socio-economic (and political) growth. The following Literature review presents an argument which motivates for an integration of heritage sites into their broader context, as opposed to a ‘walled-in’ objectification (Collins English Dictionary, n.d.) of historic buildings of cultural heritage value.

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1 From Objectify: to present as an object.
2.3 Literature review

In the previous section Liberation Struggle Heritage Sites were analysed to determine their levels of public accessibility and engagement with their surrounding context. This section focuses on:

- how to re-integrate historic buildings of heritage value into their contemporary urban environments, to successfully contribute to the present spatial, social and administrative context.

- how the process of transforming historic buildings and landscapes into South African Heritage Sites can be implemented through a vantage point of public inclusion.

Gavin McLachlan (2009:76) provides the following definition of public inclusion: “By inclusiveness is meant that in developing a conservation proposal for an urban area a real attempt should be made to include monuments, buildings and neighbourhoods that reflect the history and experience of all communities”.

Within the context of a heritage site the issue of transformation also needs discussion. Transformation could be defined as:

1. (In South Africa) a national strategy aimed at attaining national unity, and promoting reconciliation through negotiated settlement and non-racism (Collins English Dictionary, n.d.).

2. Concerns change in nature, function or condition of things (Porter, 2004:156).

Lastly, the issue of Integration also becomes important. This could be described as:

1. The combination of previously racially segregated social facilities into a non-segregated system (Collins English Dictionary, n.d.).

2. The act of combining or integrating to make a unified whole (Collins English Dictionary, n.d.).

Transformation, in terms of the architectural preservation of built heritage at Liberation Struggle Heritage Sites, focus firstly on connecting with the past. Lipman (2004:45) states that most people in South Africa are dislocated from their immediate pasts, either willfully, reluctantly or through the realities of displacement. Therefore ‘transformation’ must not only be interpreted in post 1994 South Africa as a socio-political change, but in addition an avenue for identity...
building. Paul Meurs, Professor of Architectural Restoration at Delft University of Technology reaffirms this notion in his publication, *Building in the stubborn city* (2008). Meurs (2008:11) argues that cultural history can enrich changes when the symbolic meaning of the existing spatial qualities becomes part of the design for renewal. This sentiment is particularly applicable to the Old Synagogue in terms of developing a conservation strategy - based on engaging with both the building and the site’s past.

If re-integration of the Old Synagogue into its contemporary urban environment is a key proponent in creating a contextually appropriate commemorative centre, one needs to consider the “architectural logic of the location” (Meurs, 2008:11). The contextual forces acting on the site pertains to the climatic and topographic, and specifically the socio-economic and political circumstances of the site and context. Meurs (2008:13) urges built heritage practitioners to not freeze the form of commemorative buildings, but to build in the spirit of the city; strengthening the character of its context. As a result, this approach mitigates the potential of a historic building being reintroduced into its urban environment as an objectified element.

Ana Pereira Roders, the author of *Re-architecture: Lifespan rehabilitation of built heritage* (2007) presents a similar theoretical standpoint, however she warns against the dangers of over-protecting and conversely under-protecting historic buildings. According to Roders (2007:28), over-protected built heritage will result in the protected building becoming “frozen in the golden age” - alluding to the opinion of Meurs. On the other hand, under-protection can lead to different negative outcomes, Roders (2007:23) identifies abandonment and vandalism of historic buildings as a major threat to a city’s built heritage. The current state of the Old Synagogue is indicative of this condition (Buntman, F. & Buntman, B., 2010:186). However, the mere acquisition and implementation of a programme to the Old Synagogue may not necessarily be an adequate solution. Roders (2007:28) pinpoints a second thread to under-protection, namely the re-appropriation of a historic building with an unsuitable programmatic intervention. Interventions of this nature generally require high levels of change to the existing fabric which result in considerable rates of subtractions and additions. The author recognises that such interventions are often required to meet the demands of the modernising city.
However, this should not veto the importance of preserving cultural history. In affirmation of this Meurs states that in the city of the future there is also a need for the past, and cities can be extremely well modernised while still preserving old structures. Furthermore, one could even derive a special quality from their cultural history (Meurs, 2008:23).

In order to achieve a meaningful re-integration of the Old Synagogue into its surrounding context the following imperative conditions must be met:

- Conserving the built heritage environment within a South African context of transformation, and establishing a connection with the past should be realised (Donaldson, 2005:796). Through this connection the symbolic meaning of the Old Synagogue can guide the decision making process towards contextually appropriate re-appropriation and intervention outcomes. This estimation is asserted by Roders in the following statement:

  The built heritage which represents a system of values and the natural and cultural heritage of a community should strive not only to improve the quality of life and habitat within such a community but do so in a sustainable manner. (Roders, 2007:35)

- It could be hypothesised that Liberation Struggle Heritage Sites should be designed to accommodate a variety of contextually generated functions which contribute positively to the heritage sites greater urban environment.

An additional key factor in developing a contextually appropriate commemorative centre at a heritage site is adopting an inclusive approach to conservation. In order to motivate for a publically inclusive heritage site which promotes freedom of use as an accessible public commodity, the current South African trends in built heritage conservation must be investigated. However the dynamics of an inclusive design approach must first be described. This approach takes into account the fundamental attributes of a collective who are forging a new identity in post apartheid South Africa. These attributes are:

- memory
- continuity, and
- identity

Kevin Lynch, the author of *What time is this place?* (1972:130) states that memory is the basis of self identity. In the 1982 publication; *The architecture of the city*, Aldo Rossi (1982:2) substantiates this theoretical
standpoint by writing that the city is the collective memory of the people. Finally, Gavin McLachlan, author of the academic article – *Sustainable urban conservation in the context of South Africa: case studies of Port Elizabeth and Graaff-Reinet* reaffirm this notion within a South African context by stating the following:

*Sustaining old buildings and neighbourhoods is important because it provides continuity with the past and generates a sense of self worth and identity.* (McLachlan, 2009:60)

Inclusive design advocates the importance of continuity in the built environment through sustaining buildings of historic value, but how does this approach address pressing social dynamics? Paul Meurs (2008:39) asserts that the relation with social dynamics is so strong that conservation can no longer turn in on itself. The ‘theme park’ approach to preservation is effective in stimulating economic growth through cultural tourism, whereby cultural heritage has become a commoditised product – preserved, framed, and marketed to ‘consumers’ (Marschall, 2005:104). However a social dynamic – where the way of life of a community is at the heart of conservation strategies (McLachlan, 2009:68) - considers empowering local residence as a market resource for economic growth. Improving the living and working environment of a local community within a conserved physical environment is the core imperative of a publically inclusive heritage conservation approach.

Public inclusiveness in a conservation based development hinges on an understanding of the dynamics which impact on a heritage site and its broader context. The purpose behind developing a contextually appropriate heritage site is that of ultimately telling a unified story which is in harmony with social reality (Meurs, 2008:25). To conclude, the author maintains that to effectively transform heritage buildings and landscapes into South African heritage sites one must entrench the constructs of memory, continuity, and identity into the conservation strategy, and furthermore react to the current social reality of the heritage sites broader context.

- Therefore it is further hypothesised that by adopting the aforementioned approach to developing a Liberation Struggle Heritage Centre; in particular at the Old Synagogue, there lies the potential to catalytically rekindle economic growth and social interest in the perceived northern portion of Pretoria’s inner city. This will be achieved through socio-economic and political empowerment of the local community and users of this historic inner city environment.
Fig. 16. Aalto’s relationship nature and the man-made
3.1 Introduction

The Old Synagogue is located within the inner city of Pretoria: two city blocks north of Church Square along Paul Kruger Street. An important symbolic junction exists at the intersection of Paul Kruger Street and Struben Street: the north-south axis of the inner-city meets the east-west visual link to the Union Buildings. Struben Street is also known as the ‘Government Boulevard’ due to this visual link. The Old Synagogue and study area are on the southeast quadrant of this symbolic junction. The Old Synagogue brings a historic character to the northern portion of the inner city, and this character is strengthened by the presence of other buildings of heritage value within its surrounding environment. This chapter explores the historic character of this built environment, and identifies the present-day contributors to the urban fabric within the larger context of the Old Synagogue.
In 1989 South African periodical, ‘Architecture S.A’ published an article by Gerrit J. Jordaan entitled ‘Pretoria as Urbs Quadrata’ in which a historic account of the town planning decision pertaining to the layout of Pretoria is provided. Jordaan (1989:26) attributes the layout of Pretoria’s inner city blocks to the implementation of a rigid Cartesian grid which resulted in a traditional Grid-iron street arrangement. The axes are ordered to correspond with the openings in the surrounding mountain ranges. The north-south (Cardu) axis of Paul Kruger Street terminates in the Daspoort mountain range to the north and the Schurweberge mountains to the south. The east-west (Decumanus) axis of Church Street terminates at the crossing of the Apies River to the east and the Steenhoven-Spruit to the west.

Water from the Steenhoven-Spruit and Apies River were reticulated into open ducts and by 1860 a water furrow system was implemented to serve the grid with fresh water from the Fountains Valley. Traditionally buildings were positioned on the street edge of the property with the front facade interacting with the street. In 1888 the first Jacaranda trees were planted. As a result the sidewalks were lined by a row of trees creating a threshold between
the street and sidewalk. The street edge was further defined by the water furrow. Steam-rollers were first used between 1892 and 1894 to compact streets, and during this period the first electric street lights were installed.

Further historic thresholds were created over time. Older buildings such as the Panagos Building are set back five meters from the street edge, whereas newer buildings such as the Masada Building and Princess Park College are set back nine meters from the street edge creating a wider and more varied sidewalk along the length of the street. Tram lines were introduced into the urban fabric in 1936 with their tracks running down the centre of the street. Even though Trams are no longer used as a mode of transport within the inner city their historic layer still remains. The tracks were never removed; rather they have been subsequently covered when the streets were re-tarred. In 1860, the water furrows were originally designed as 600mm wide by 800mm deep ‘channels’. In 1885 they were covered with slate, later earth and then paving. From the 1910’s to the 1940’s they served the purpose of conveying stormwater and is a testimony to further evidence of historic layering within the inner city of Pretoria.

When considering the above, a proposed intervention should not only be sensitive to the historic fabric of the Old Synagogue, but also dignify the significance of the historic urban elements that contributed to the cityscape of yesteryear. The Old Synagogue and the historic buildings within its vicinity are highlighted in the next section.
3.3 Historic fabric

The Old Synagogue contributes significantly to the heritage value of the study area. It acts as a chronological landmark in the urban context of Pretoria. Other buildings contributing to the historic fabric of the study area are:

The Panagos Building; dating back to the 1880’s and bearing the title of one of the earliest ‘mixed use’ buildings in the city. It consists of retail spaces at ground level while having residential apartments on the upper level. Jansen House, which is now incorporated into the Department of Basic Education headquarters, dating from 1888, and the Old Victorian Boarding House; incorporated into the National Library are also buildings of heritage value. The Old German Club on the southeastern corner of the Paul Kruger/Proes Street intersection dates back to the 1930’s. The building has been sub-divided and appropriated as fast food and small retail outlets.
The Koopkrag Building together with its neighbours; 215 Proes Street and the Hallmark Building signify a few Modernist contributions to the inner city. The red brick Koopkrag Building was completed in 1954. The ground floor is currently occupied by retail outlets whilst the upper seven levels comprises of residential accommodation. The 1961 Woltemade building is evidence of South American influence on the ‘Pretoria International Style’. Ground floor office space was altered to accommodate retail outlets. The first floor is predominantly attorneys offices and the upper levels sectional title flats.
3.4 Present-day fabric

The deteriorated condition of the Old Synagogue is a far cry from its period as a House of Worship and Supreme Court. Today the building is abandoned and void of any public interaction due to a three meter high barbed wire fence on its perimeter. The security fence may hinder further deterioration and abuse, but the monument is at great risk of losing its significance to younger generations. Whilst the Old Synagogue remains a non-contributor to its socio-economic context, other buildings within the study area continue to adapt and function.

Directly opposite the Old Synagogue, on the western side of Paul Kruger Street, is Princess Park College. The school accommodates learners from grade 0 to grade 12, with limited teaching and recreational space. The building is in a poor condition. The privately owned Masada Building dates back to the 1970’s with its characteristic lightweight aluminium shading devices on all four facades. The ground floor is subdivided into retail and restaurant outlets whilst the upper levels are rented out to the Government Printers and the Department of Correctional Services.
Other Government Departments such as the Department of Transport, Department of Basic Education, and Department of Health line Struben Street (Government Boulevard) to the north of the Old Synagogue. Functions pertaining to the law fraternity cluster to the south of the Old Synagogue. The contemporary Law Chambers is found on the southwest corner of the Paul Kruger / Proes Street intersection. Neighbouring further south is the Law Society of Northern Provinces, High Court, and Palace of Justice heritage landmarks.

The National Library was completed in 2009 and displays a regional response to Pretoria’s climate. The facility has significant educational value since it houses all books published in the country.
3.5 Historic significance of the Old Synagogue

It was on 28 July 1890, some 120 years ago that the Jewish congregation of Pretoria formed. Five years later, on the 11th December 1895, after holding services in private houses and hotels, erf 103 at 74 Market Street (Paul Kruger Street today) was purchased from Thomas Patterson for the sum of 1500 pounds for the purpose of erecting an appropriate place of worship to serve the growing Jewish community. Millionaire and charitable donor Sammy Marks contributed more than 1500 pounds towards buying bricks and materials. On the 8th August 1897 it was unanimously resolved that the Synagogue should have seating capacity for just over 500 individuals, with the total cost of the building, excluding the site to not exceed 6500 pounds (Vos, 1995:1).

The Old Synagogue, being the first example of Byzantine architecture in Pretoria was designed by architects Ibler and Beardwood (Vos, 1995:2). However the elaborate Byzantine manner had only been applied on the street facade, while the rest of the building was of a very rational and economical design (Vos, 1995:3). After the plans were submitted and approved Mr. Krockel was appointed as the contractor and building operations commenced on the 1st October 1897. Construction approached completion during the course of 1898.

After over 50 years of serving the Jewish community, the Synagogue eventually could not comfortably accommodate the ever-growing congregation, and in 1952 the Great Synagogue in Pretorius Street was built. In the same year the Department of Public Works purchased the entire city block on which the Synagogue is situated with the intention of demolishing the Synagogue to clear the way for the construction of a new Supreme Court (Vos, 1995:3). Plans for the construction of the Supreme Court were stopped after the proposed design was deemed unethical and unconstitutional (Vos, 1995:10).

In 1956 the Treason trials started at the Drill Hall in Johannesburg, and were then moved to the Old Synagogue in Pretoria. During that time the building was converted into a “special Supreme Court” (Vos, 1995:10) catering specifically for cases related to the security situation, the activities of the black opposition movements, and the Communist alliances. The colourful surface decorations of red and ochre stripes on the eastern facade of the Old Synagogue were painted over in white and the rose window was removed. Additional cells and administration offices where also built on the site which was part of a programme of changes to transform the building into a proper, functioning Supreme Court.
From the 1st August 1958 to the 29th March 1961, the treason trials of Nelson Mandela, Walter Sisulu, Oliver Tambo, Dr. Albert Luthuli and many other political activists were held at the Old Synagogue. The accused were acquitted on the 29th March 1961 and the charges against the 92 accused freedom fighters were dropped (Vos, 1995:13). Following the Treason Trial the State successfully prosecuted Nelson Mandela at the Old Synagogue in 1962. He was charged with ‘inciting African workers to strike’ and leaving the country without valid travel documents (Buntman, F. & Buntman, B., 2010:189).

On 12 June 1964 the Rivonia trial drew to a close at the Palace of Justice in Pretoria. Nelson Mandela and nine other Operation ‘Mayibuye’ (meaning ‘comeback’) masterminds were tried for 221 acts of sabotage designed to overthrow the Apartheid system. Mandela was sentenced to life imprisonment with hard labour on which marked another momentous day in South African history. The inquest into the death of Steve Biko, the founder of the Black Consciousness Movement was held at the Old Synagogue on the 14th November 1977. No one was charged after the court ruled that there was not enough evidence to support the accusation that Biko had been tortured (Vos, 1995:16).
3.6 Site selection

The site for the architectural intervention is a proposed consolidation of the following plots:

The entire city block on which the Old Synagogue is sited is owned by the Department of Public Works (DPW). Struben Street Motors to the north of the Old Synagogue and the makeshift car park to the south are renting their respective premises from DPW on a monthly lease agreement basis. Therefore these two sites could be effectively consolidated with that of the Old Synagogue. The SITA Building is a Government owned agency. The reappropriation of its premises is critical to the development of a Heritage Centre at the Old Synagogue, together with the creation of a public open space in the northern portion of the inner city. Therefore the intervention proposes the demolition of the SITA Building and the consolidation of this plot into the Old Synagogue Heritage Site.
3.7 Site analysis
Fig 46. Context photo montage - eastern side of Paul Kruger Street.

3.8 Site views
3.9 Proposal

3.9.1 Programme
On an urban scale, the project aims to initiate programme as a means of rejuvenating the Old Synagogue. The intended programme should respect, liberate, and celebrate the history and heritage of the Old Synagogue together with the surrounding buildings of heritage value. The design scheme is based on the premise that an opportunity to commemorate the history of the Old Synagogue has been identified. The programme is made up of three built components which in unison constitute a Government founded Heritage and Mediation Centre rooted in community based utility.

The first component of the proposal is a restorative and adaptive reuse programme for the Old Synagogue. The intention is to re-appropriate the building along adaptive reuse principles such as the ‘sharing of facilities’ and ‘adaptability through flexibility’ of space in an effort to make the Old Synagogue a functional and relevant contributor to the built environment. The objective is to adopt an approach to conservation that will result in the Old Synagogue being memorialised and reused as a community hall cum gallery. The intention is to pay homage to, and create awareness of the historic events which occurred at this site.

The second component is a Political History Learning Centre which commemorates the history of the Old Synagogue whilst educating individuals on its role in the Liberation Struggle. The Learning Centre takes the form of an exhibition route. The route chronologically exhibits historic images, text, video footage, and personal accounts by liberation activists regarding the Liberation Struggle.

The third component is a Mediation Centre. The programme has both historic and present day relevance within this context. Historically, the Supreme Court incarnation of the Old Synagogue used Litigation as the structure for legal proceedings. The legal structure was used as a means of stifling the advancement of the Liberation Movement. In today’s democratic society, mediation facilitates fair, equal, and non-violent dispute resolution in a neutral environment. Through the contextual investigations the author found that the Old Synagogue site mediates between the law fraternity precinct around the High Court, and the Government Department precinct along Struben Street.

The key factor in this form of Alternative Dispute Resolution is effective communication. The intention is to introduce an impartial third party to mediate on a private scale dealing with family matters, and on a public scale between National Government, unions, and corporations. Public scale mediation has the potential to mitigate the negative impact of prolonged strike action. The programme welcomes civic action, since it is at the core of South Africa’s political history. The proposal seeks to create an appropriate platform through which such action can take place.
A public square forms the binding constituent of the three components and adopts the role of unifying the old and new. The square also gives the Old Synagogue ‘breathing space’ within the proposed changes and additions to its surroundings. The purpose of the public square is to be a place of gathering for civic functions, recreation, or celebration. In addition is a public voicing platform, in reverence to the multitude of inspirational speeches delivered by opposition leaders. The intention of the public square is to create a platform which facilitates user interaction on social, educational, and functional levels.

3.9.2 Client
The programme is a Department of Public Works (DPW), Department of Public Services and Administration (DPSA), Department of Tourism (DoT), and City of Tshwane Metropolitan Municipality (CTMM) initiated venture mandated by the South African Government. The intervention aims to reveal the South African cultural heritage embedded in the landscape of the Old Synagogue. This could be achieved through promoting heritage tourism at the Old Synagogue thereby stimulating economic growth and investment in the historic icon.

Public Private Partnership funding, paired with National Government Department investment is crucial to the success of the proposal and its potential to foster public ownership of Government initiatives. The ideal outcome would be that of continued Government investment in the northern portion of the inner city; thus stimulating further private sector investment and the creation of opportunities for growth.

The Heritage and Mediation Centre is geared towards public utility as a place to gather, learn, and retreat within the inner city. The programme encourages urban schools in the vicinity of the centre to utilise the Old Synagogue and proposed public space for school functions and gatherings since space for such events are limited within the inner city. The Mediation Centre, Synagogue space, and exhibition route are accessible to tourists and the general public alike which creates a platform for interaction and dialogue.
Fig. 49, Figure-ground of Pretoria
URBAN FRAMEWORK
4.1 Theoretical approach towards architecture

This section explores the author’s theoretical approach to the creation of a Heritage and Mediation Centre at the Old Synagogue within a context in need of rejuvenation. Case studies of selected commemorative Heritage Centres will be analysed to develop a line of conceptual thinking and a suitable course of action towards realising the design.

According to Jan Gehl, in his publication: *Life between buildings* (1987:33), just as it is possible through the choice of materials and colours to create a certain palette in the city, it is equally possible through planning decisions to influence patterns of activities, to create better conditions for outdoor events, and to create lively cities. It is therefore the architect’s duty to make informed planning decisions with a knowledge and understanding of the principles that shape good architecture which in turn create practical and highly useable public space.

The principles alluded to above are what Thomas L. Schumacher refers to as traditional city values in the theory of Contextualism from his contribution to *Theorising a new agenda for architecture, an anthology of architectural theory 1965-1995* (1996:294). The author is aligned to the theoretical standpoint of Schumacher who draws a contrast between the traditional city and modern theories of urbanism (the modern city) arguing that the modern city is compositionally the reverse of the traditional city.

*Composed of isolated buildings set in a park-like landscape, the city-in-a-park (modern city) presents an experience which emphasises the building volume and not the space which the buildings define or imply.*

(Nesbitt, 1996:296)

Thus instead of finding a middle-ground or transitional approach, the modern city ideal has consumed traditional urbanism and its inherent values in the name of progress. The lack of evident transition or *progression over time* in the built environment has therefore been influential in the apparent fragmentation of built form and urban landscape.

From this standpoint one can argue for a return to traditional city ideals, but this alone won’t solve the current real world problems that Pretoria’s inner city are confronted with. However through the implementation of key quality principles, for instance those devised by Gehl, such as his investigations into the theoretical constructs of *protection, comfort, and enjoyment*, one could theoretically initiate a process of urban renewal one intervention at a time.
However, urban renewal realistically poses a threat to the historic urban fabric of the Old Synagogue and its context if not approached with conservation as a key proponent (as deliberated upon in the literature review). James Strike, the author of *Architecture in conservation: managing development at historic sites* (1994:3), asserts that the reality of new architecture built at historic sites and the question of successfully interfacing with historic buildings is an issue that stirs up much debate. The author intends on confronting this debate by developing a clear understanding of the specific problems of the Old Synagogue and its historic context. This approach entails investigating concepts such as (Strike, 1994:25-27):

- **Layering of meaning**: when more than one reference is stated on the same building,
- **Association**: a new piece of architecture designed to remind the observer of another building,
- **The role of perception**: the idea of forming an association between a piece of new architecture and a historic site, and
- **Symbolism**: the simplest starting point is the idea of building as a symbol.

The theoretical position of Contextualism impacts the research investigations on an urban scale, and poses an important question which will need to be tangibly addressed through the design development. In closing, that question is: how can urban renewal be approached within the broader context of the Old Synagogue without losing the history and heritage of this urban fabric?
4.2 Urban design

4.2.1 Introduction
This section unpacks the urban framework proposal which is a response to the findings of the context analysis, specifically those pertaining to the historic character of the inner city. Paul Kruger Street is one of two major axes defining the original layout of Pretoria. It is an important structuring element within the urban fabric and runs through the heart of the inner city. There are many important historic buildings and spaces along its axis such as:

- Pretoria Station – the most southern focal point
- City Hall and Pretorius Park
- the ‘Raadsaal’ and Palace of Justice framing Church Square,
- the High Court
- the Old Synagogue
- Panagos Building
- Aspasia Building, and
- the National Zoological Gardens to the north.

The street also retains some traditional street elements such as Jacaranda trees, granite curbs, and façade typologies. The historic buildings and remnants of late 19th, early 20th century urban elements contribute to the inner city’s historic quality. Open spaces also form an important element of Pretoria’s inner city. They provide a platform for a variety of activities including:

- trading
- socialising
- resting
- educating, and
- entertaining.

However, too often open spaces are neglected and do not form a coherent part of the urban fabric resulting in lost, underutilised space which is perceived as dangerous (Paul Kruger Street Spine Urban design framework, 2000). The current situation within the northern portion of the inner city, specifically at the Old Synagogue and environs, is the neglect of historic buildings with heritage value. The Department of Basic Education, and the National Library made a concerted effort to restore and re-appropriate the Jansen House and Old Victorian Boarding House respectively, yet built heritage such as the Old Synagogue, Old German Club, Koopkrag Building, and Woltemade Building remain in a poor condition. The Tshwane Inner City Spatial Development Framework attributes this neglect to a lack of private investment in the northern portion of the inner city and a negative perception of the area (Re-Kgabisa Tshwane Project, 2006).

The Struben Street / Government Boulevard corridor represents an important threshold at its intersection with Paul Kruger Street. The whole length of Paul Kruger Street is well used although large sections north of Struben Street remain under-developed. This could be attributed to a lack of pedestrian movement which stimulates passing trade (Paul Kruger Street Spine Urban design framework, 2000). Essentially, Paul Kruger Street requires a binding and strategic development which encourages pedestrian activity along its entire length within the inner city.
Fig 52_ Problems within study area

1. **Old commercial buildings**_ properties are undeveloped and in a poor condition

2. **Historic buildings**_ historic significance of these buildings are not celebrated

3. **SITA Building**_ building is too low for an inner city environment and has a dull urban edge

4. **Corner of Paul Kruger and Proes Street**_ undeveloped lots

5. **Struben Street Motors**_ inappropriate function for sites at a symbolic intersection
4.2.2 Historic [re]discovery

The framework proposal deals with the redevelopment of Paul Kruger Street into a pedestrian friendly boulevard. A dedicated tram public transport system is proposed as a link for the various activities, precincts, points of interest, and transportation nodes along the Paul Kruger Street axis. The objective is to create a vibrant, healthy and safe pedestrian oriented environment. ‘Historic [re] discovery’ aims to implement lessons from the past to tackle the challenges of a present-day inner city environment, whilst paying homage to, restoring, and creating awareness of the historic fabric of Paul Kruger Street. The development should act as an infrastructure spine within the inner city; stimulating existing development, attracting new ones, and strengthening the public space network.

The urban framework consists of three major components:

- a central public spine which accommodates a public boulevard and tram stops
- the introduction of a public square and green space into the northern portion of the inner city, and
- a northern gateway tram station which signifies the entry and exit of the inner city from the National Zoological Gardens.

The boulevard is a secondary circulation space to that of the existing sidewalks and is lined by an additional row of Jacarandas. The tram stops are located in the centre of the boulevard with the tram lines to the sides. The principle behind reprioritising the vehicular and pedestrian movement patterns on Paul Kruger Street is to create meaningful public open spaces for visitors, users and inhabitants of the city. The layer of memory as a design informant connects the urban community to the past.

4.2.3 Objectives

The objective of the urban framework is to create a mixed traffic environment that is pedestrian friendly but does not unduly impair traffic flow and on-street parking. A pedestrian orientated Paul Kruger Street allows the city user to engage with the urban fabric and amenities on offer at a slower pace, thus stimulating the street with activity and encouraging exploration. The concept aspires to:

- connecting dissociated elements along Paul Kruger Street
- making the different precincts and activities along its length easily accessible, and
- unifying historic buildings with the contemporary direction the urban environment is heading in.
The tram public transport system can create an opportunity to treat the inner city’s public spaces as a system or network of spaces bound to a central spine, as opposed to individual unrelated spaces. The tram corridor can unify the northern, central, and southern precincts of the inner city along Paul Kruger Street creating a special visual identity.
4.2.4 Contextual opportunities and interventions

1. Location of the Heritage and Mediation Centre which surrounds a proposed civic square
2. Proposed public green space that forms a part of the central infrastructure and green spine
3. Relationship between the Heritage Site and historic buildings
4. Development of a Tram public transport system and green corridor which can strengthen the connection between the different precincts and built heritage on the ‘decumanus’ axis of the inner city
5. Establish a prominent connection with the secondary east-west arteries
6. Densification of the area by replacing existing low-rise buildings with mixed-use/Government Department based buildings
Fig. 54: Opportunities within study area
1. Heritage and Mediation Centre footprint sits back respectfully from the Old Synagogue whilst creating an active urban edge along Struben Street and Proes Street.

2. Proposed civic square footprint gives the Old Synagogue ‘breathing space’ and allows the heritage building to be appreciated as an element in the landscape.

3. Proposed green space serves the surrounding community.

4. Footprint to recognise and respond to surrounding historic buildings.

5. Proposed tram line.

6. Proposed new mixed-use / Government Department building footprints.

7. Proposed tram circle within Church Square in recognition of historic trams.
4.2.6 Pragmatic influences on mass development

**Edges**

Ground level with active urban edges. Edges frame and define sidewalk and square.

**Access**

Surrounding historic buildings are design generators. Creating unobstructed views to these buildings addressed the issue of permeability and access to the square.
Climate

Taller masses are located on the southern edge of the site to reduce shadowing of the square. The increased height to the south also creates a buffer against south westerly prevailing rain and south easterly winter wind.

Route

The Heritage Route is established towards the inside of the U-shaped layout thereby activating and addressing the square. The street facing facades are thresholds which absorb the vehicular and passing pedestrian energy.
4.2.7 Massing

1. Heritage and Mediation Centre (design project)
2. Exhibition and Community hall (framework)
3. Visitors welcome centre and restaurant (framework)
4. Civic square
5. Public park
6. Jacaranda lined tram and pedestrian corridor
7. Mixed-use/Government Department buildings
Fig. 57_ Urban design massing
Fig. 58. The significance of movement through the Old Synagogue
CONCEPT
The concept behind design development is based on understanding the significance of the Old Synagogue in relation to Space and Time. The Synagogue was designed spatially as a house of worship, reflecting Jewish religious traditions regarding movement and hierarchy of spiritual spaces. Important spiritual thresholds were entrenched into the design of the Synagogue and were inspired by the most holy of Jewish religious structures - the Tabernacle. Crossing tangible spatial thresholds symbolised crossing intangible spiritual thresholds.

This historic building played a crucial role in the Liberation Struggle as a Supreme Court during the apathied era. This period of the Old Synagogue’s lifespan resulted in the building being chronologically linked to South Africa’s liberation. Each uprising, campaign, and trial during apartheid are symbolic events which occurred over a period of forty years. The Old Synagogue made its contribution to that historic timeline.

Fig. 59_ The Old Synagogue in 1958 and today
Fig. 60_ Parti diagram development
5.2 THE SIGNIFICANCE OF ROUTE

Fig. 61: Nelson Mandela leaving out of the Old Synagogue triumphantly after the Treason Trials.

Fig. 62: Investigations into movement patterns in and around the Old Synagogue.

HOUSE OF WORSHIP
In order to commemorate the Old Synagogue and reveal its significance, it is important to understand how the building was used during its two historic incarnations. As a house of worship the buildings function was predominantly internalised, whereas the Supreme Court programme required greater diversity of site usage. Access to the holding cell and office outbuildings were critical for the controlled movement of the Defendants; and their separation from the general public/courthouse visitors.

Historically, the building was not the focal point, instead played host to a greater purpose. As a house of worship, the building housed scrolls of the Torah (Jewish Holy Book). It is regarded as the ‘Holiest of Holy’ and was the focal point of the worshipping congregation. Later, the Defendants within the Supreme Court were the focal point around which activity and public attention revolved.

In both instances ‘route’ gave significance to the elaborate structure, therefore the rediscovery of route in the buildings forth incarnation as a Heritage Centre is crucial to its narrative.
5.3 Case study  
**Liliesleaf Liberation Centre [2008]**  
Mashabane Rose Associates architects and urban designers  
Rivonia, Johannesburg

This centre was analysed with the purpose of understanding how to implement a sensitive approach towards designing commemorative structures on a heritage site. The patterns and sequences of usage on this site are investigated to guide the authors decision-making process.

Liliesleaf farm - the birthplace of the MK (former military wing of the ANC), and secret headquarters of the ANC’s armed wing Umkhonto we sizwe (spear of the nation) – was raided on 11 July 1963 by apartheid government security police. The raid led to the uncovering of Operation Mayibuye (meaning ‘comeback’) which detailed how the resistance movement intended to overthrow the apartheid regime. Many of the senior ANC leaders who were arrested in the raid went on to be part of the ‘Rivonia 12’ - accused and incarcerated for Treason (Low, 2008:42).

Nestled unassumingly within the leafy suburb of Rivonia, Liliesleaf Liberation Centre follows the grade of the land on stepped terraces for minimal contextual impact. On entering the site, visitors are received by an exposed concrete and face brick Resource Centre, only dematerialised by a subtle manipulation of light.

One soon discovers that the resource centre is not the starting point of the route through the site, and redirects course towards an inconspicuous pathway, were the dubious start of the journey is redeemed by a slowly revealing sunken view of the historic Manner house. The Visitors Centre stands respectfully in juxtaposition with the Manor house reflecting the image of the historic building back towards the observer as one passes between old and new. The visual silence of the new is immediately apparent (Low, 2008:42).

Continuing on route to the outdoor reception foyer, out of natural curiosity one progresses un-deviated towards the rooftop viewing terrace. The overall view of the historic buildings affords the visitor an opportunity to pause and orient oneself with the site. Within the Manor house visitors are confronted with interactive exhibits and displays with progression through the different rooms. Finally visitors exit through the back door free to explore the centrally located and sensitively restored outbuildings.

Terraced steps mediate between the natural landscape and restored outbuildings. Gentle risers encourage those journeying through the site to sit, reflect, and absorb the history of this environment. Furthermore, low walls that are conducive to sitting are evident throughout the site. Stopping and experiencing the exhibit route at one’s own pace is a distinct attribute of Liliesleaf, and allowed the author the opportunity to examine the interfaces between old built fabric and restorative additions. Clear separation of materials ensured a clear distinction between old and new. Un-restored facebrick largely constitutes old, and off-shutter concrete and bronze anodised aluminium framed glass distinguished the new. This material palette was applied to the new structures to seek a silent repose in the historic landscape (Low, 2008:42).

One might argue that the potential of the natural landscape has not been fully realised due to its disconnection from the Resource and Visitors centre. Moreover the weak interface between heritage site and residential context does not aid the process of strengthening community relations, as alluded to by Christa Kuljian (2007:88) in chapter 1. However it is difficult to question the sensitivity with which the historic buildings were treated in terms of response and restoration. In the authors opinion the architectural interventions implemented at this Heritage Centre are successful in highlighting the historic significance of the original buildings and intangible history of the site.
A. Exposed concrete and facebrick Resource Centre inspired by restored outbuildings

B. Start of exhibit route - flanked by permanent exhibits and historic Manner House

C. Glazed facade of Visitors Centre offers visual permeability and a reflective quality of the historic surroundings

D. View from rooftop terrace - the begin of the sites specific narrative

E. Gentle stepped terraces sensitively respond to the natural slope of the site

Fig. 63, Site views
Fig. 64, Site layout with route of exploration
5.4 Case study

Hector Pieterson Memorial Museum [2002]
Mashabane Rose Associates architects and urban designers
Orlando West, Soweto

The purpose of analysing this building was to discover its contextual, formal, and functional response to a site of historic importance.

The Hector Pieterson Memorial Museum commemorates the 1976 Soweto uprising of black youth against Bantu education. The museum is a tribute to the 12 year old Hector Pieterson who was the first of hundreds of students to be killed by the police in the uprising (Joubert, 2009:130).

Irrespective of the direction of approach, visitors to the museum are immediately greeted by a stark cubic mass that is the Hector Pieterson Memorial Museum. The simple yet un-dismissable use of red brick echoes a deep relationship with the surrounding context of predominantly red brick houses. The manner in which the building has aged - evident in the appearance of the red brick facades - strengthens that relationship. Furthermore the scale and placement of the building reflect a sensitivity and respect for its physical context.

On navigating ones way from the designated parking and drop-off area towards the commemorative square, the sterile facades that lead one around the building are interrupted by a fragmented square. Paving bricks, patches of grassland, and the precast concrete floor slabs that constitute the public square are bisected by a line of tall indigenous grass which connects the site where Hector Pieterson was shot to the entrance of the museum. The entrance stands at the highest point of the site and is identifiable by a concrete ramp that stretches into the square.

Before entering the museum, one intuitively becomes aware that the building displays a lack of vernacular tradition, other than the use of contextually appropriate red brick. Less noticeable is the fact that the visitor, by just being in the commemorative square is engaging with the exhibit route, which is only revealed once inside the museum. Within the building the exhibit route follows a ramping loop around a central memorial courtyard.

The exhibit route comprises of a series of inter-leading exhibition spaces where the walls contain text, images, and video footage documenting the 1976 uprising amongst other related historic occasions. The crux of the exhibits - amidst relatively un-engaging information mediums - are strategically placed windows which frame views of township houses, the commemorative square, and other places relating to the uprising such as; the spot where Hector Pieterson was shot, the police station, and Orlando Stadium - the rally point for students (Joubert, 2009:130). Immediately one is able to decipher the formal rationale of the building. The building does not demonstrate a profound awareness of vernacular tradition because the vernacular tradition of the surrounding context is on exhibition from within the building. The significance of the historic surroundings is elevated in contrast to the starkness of the museum.

On exiting the museum one is guided along the edge of the commemorative square by undulating dry-packed stone walls. One side forming the backdrop to informal street trade, the other leading to a commemorative plaque dedicated to the students who lost their lives in the uprising. Finally culminating with the iconic photograph by journalist Sam Nzima of the then lifeless, now immortalised, Hector Pieterson.
Line of indigenous grass linking the site where Hector Pieterson was shot with the entrance to the museum

Symbolic red brick applied to sterile facades lead visitors around the building

Strategically placed windows are view portals which form part of the exhibition route narrative

Windows capture significant views
CONCEPTUAL DEVELOPMENT
Fig. 68

PRAGMATIC SITE LAYOUT

- Old Victorian Boarding House
- Inner City Park
- Old Synagogue
- Heritage and Mediation Centre
- Exhibition and Community Hall
- Visitors Centre
- Coffee Shop
movement: movement through a progression of spiritual spaces

time: movement through time during the apartheid era and the historic uprisings and campaigns during that period

symbolic thresholds

house of worship - 4 stages of significance

synagogue - 4 stages of significance
RELATIONSHIP BETWEEN CONCEPT AND SITE

1. entering the synagogue
2. 'the defendants courtyard'
3. entering the heritage and mediation centre
4. transitional courtyard
5. exit vista towards synagogue
6. reflection space

symbolic spaces, thresholds, and intersections

Fig. 70
SPATIAL THRESHOLDS

The fluidity of movement in part diagram interpreted as an evaporative cooling pond.
SPATIAL STRUCTURING

engaging with nature

the mediation structures (upper level)

stagger forward and set-back allowing

programme to 'mediate' between the
street and built envelope

relationship with existing

the man-made
an interspace - a space that is neither inside nor outside - is one of the ways the building creates a dialogue with its surroundings.

Minimal artificial barriers between spaces and programme leave the user at liberty to choose between varied possibilities. The plan becomes ephemeral and the interspace between programmes defines space and allows them to co-exist.
space is the field of human functions, man physically occupies the space, he communicates within the space. In creating a form we express the physical functions but we also give it a symbolic value. The symbolic value of the exhibition spaces is that of ‘mediator’ between nature and the man-made
Lightweight steel, symbolic of resistance and the pursuit of freedom, punches through the restrictive monolithic concrete frame which represents the oppressive grip of apartheid. The juxtaposition between light and heavy; solid and void; grounded and floating, and the omnipresent tension between stereotomic and tectonic facilitate a material representation of concept.
light is symbolic of nature, therefore the penetration of light into the structure; and the manipulation of light by the structure plays a crucial role in tracking the path of the sun and animating the building.
VENTILATION STRATEGY

naturally induced air movement through the 'stack effect'

airflow

evaporative cooling pond
CHAPTER 06
DESIGN
The existing site layout illustrates the land usage and current condition of the Old Synagogue’s immediate context.

Existing site layout n.t.s
The proposed site layout illustrates the introduction of new buildings into the Old Synagogue’s context and the creation of ‘Synagogue Square’.

Fig 81
Proposed site layout
6.1 Form development and spatial structure

Apart from the elaborate Byzantine street facade, the Old Synagogue is constructed with an economical and efficient structural solution. The stereotomic of the sacred hall space comprises of a column and beam system on a regular grid which supports the roof and facilitates enclosure. The proposed building pays homage to this simple and effective age old building tradition.
The tectonic (the dynamic); specifically the infill of the load bearing structure is in contrast to the stereotomic (the static). The lightweight steel mediating structure, similar to the non-load bearing brick infill of the Old Synagogue allows for the animation of the building. All that is fluid flows through them, i.e.: water, air, light, and views.
In order for the Old Synagogue to function as a Supreme Court additional infrastructure had to be built. These servant spaces were peripheral yet integral. This servant space consideration was carried through by the Heritage and Mediation Centre as a solution to not compromising the formal purity of the mass concrete stereotomic.
A sub-structure of permeable concrete skins polarise the space and establishes a hierarchy of privacy and a series of spatial thresholds. The first threshold is the interspace; as alluded to earlier, it is neither inside nor outside and can be simply described as a modern interpretation of the verandah typology. The second threshold of permeable concrete skins form the plane upon which inside can be distinctly separated from outside by means of doors, windows, screens and detachable/moveable lightweight structures.
Fig. 89
Site layout plan

- Rabbit's House
- Welcome Centre and Coffee shop
- Exhibition and community hall
- Old Synagogue
- Civic Square
- Inner city park
- Heritage and Mediation Centre

N
PAUL KRUGER STREET
Ground floor plan
plan configuration A
Plan configuration ‘B’ illustrates how a division between the Mediation Centre and Exhibition Route can be achieved by positioning the moveable exhibits along the threshold of the two spaces, thus creating a distinct separation. Plan configuration ‘C’ liberates the entire ground floor, allowing the space to function as a single entity. Large mediation gatherings or exhibits could call for such a configuration. The strategic placement of the assessment interview rooms restricts access to the upper levels; therefore security is not compromised by a high degree of public accessibility. This configuration could be desirable if either function requires an uninterrupted flow of movement or a greater level of privacy.
First floor plan
Second floor plan
Fig. 05 Structural concept
7.1 Materials and building composition

Fig. 96. Exploded and assembled views of the concrete structure

ASSEMBLY A

- Precast concrete fins.
- Interlocking concrete beams.
- Monolithic concrete framework.
The design concept is realised through the interweaving, overlapping, and layering of structural and infill components. The structural matrix consists of several parts: a primary concrete structure with a series of permeable concrete fin-like screens, a mild steel system of beams which accommodate floor plates and facilitate enclosure, a louvered roof, mild steel roof, and glazing systems. These components combine to form the superstructure of the building.

The large reinforced concrete columns and beams are cast on site as a monolithic component, whereas the thinner structural concrete fins and interlocking beams are pre-manufactured off site in quantity to ensure structural integrity. These components are then transported to site, assembled, and fitted to their parent concrete structure. After casting and assembly are complete, the concrete stereotomic forms the framework support structure for the lighter mild steel components to follow.
A vierendeel girder truss and cantilevered howe truss are combined to form a moment frame truss structure. The structure is constructed using I Profile Extrusions (I.P.E’s) to form a fabricated lightweight mild steel beam when the 2 parallel truss structures are joined. The joined structure is commonly known as two-way vierendeel truss.

Steel fabricated beams interlock to increase rigidity and stability.

Howe truss configuration facilitates diagonal bracing of the cantilevered vierendeel truss ends.

Fig. 98 - Exploded and assembled views of the mild steel structures
The purpose of the lightweight mild steel structure is to manifest the concept through materiality and construction. The proposed protruding steel structures represents resistant in the face of oppression - characterised by the rigidity of the monolithic concrete. Lights, services, and piping are fixed to the fine grain steel structure, enabling ease of access and adaptability of these systems. Steel components and fabrications are factory welded and galvanised before on site assembly for quality control and corrosion protection.

In addition to providing flexibility, the two-way vierendeel truss creates a complete, self contained structural system independent of the building enclosure and interior walls. All gravity and sheer forces are resisted by the moment-frame truss structure and no shear walls are required (Living Steel, 2012). This attribute provides flexibility in the window placement, positioning and later modification of the mediation suites.
The Old Synagogue, being over a century old, is the foremost symbol of permanence within its context. Therefore it is essential to recognise this historic milestone and respond in a manner which respects its significance. Thus the proposed buildings material composition and construction technology is one of adaptability, lightness, ease of assembly, and conversely, disassembly. The purpose of which is to accentuate the juxtaposition between, old and new, permanence and temporality, and heavy and light, in an effort to re-appropriate and activate the Old Synagogue’s historic context.
In the event of the centre's disassembly, only the concrete frame and service tower will remain. The skeleton can therefore be re-appropriated and infilled in a manner which suits future interventions. Bearing in mind these design considerations, and attempting to communicate ‘temporality’ through the decision making process, a precast hollow core flooring typology was selected for the construction of floors. The inherent qualities of this technology are lightweight construction, fine grain servicing (through the hollow cores), and re-appropriation in the event of the building being disassembled (figure 103).
RHEINZINK facade cladding panels wrap the protruding ends of the steel structure, thus enclosing the space and creating Mediation suites.
15mm thick strand woven bamboo strip flooring glued directly onto levelled concrete screed using a low volatile organic compound adhesive.

Prepainted graphite-grey 0.8mm thick ‘Brownbuilt’ deep profile concealed fix roof sheeting fixed to prefabricated mild steel purlins.

25mm thick Isoboard insulation sandwiched between roof sheeting and purlins.

125 X 75m thick mild steel rectangular hollow section purlins at 1400mm centres made to slot into purpose fabricated mild steel truss with a cross lap joint.

Purpose made prefabricated mild steel roof trusses fixed to slotted ring-beam with M16 expansion bolts. Mild steel washers at all connections.

12mm seam width vertically orientated RHEINZINK - Angled Standing Seam concealed fix facade cladding mounted onto a 9mm thick pine plywood sub-structure. Facade cladding to be finished in RHEINZINK - ‘preweathered graphite-grey’.

9mm thick pine plywood sub-structure fixed to light gauge steel skeleton frame using 5.5mm countersunk head selftapping screws.

100mm thick Isover ‘Cavitybatt’ glasswool thermal and acoustic self-supporting insulation installed within steel frame cavity.

1200 x 100 x 15mm thick strand woven bamboo wall paneling planks fixed to 9mm thick pine plywood sub-structure, laid with staggered half lap joints. 4mm countersunk head woodscrews to be concealed with the exposed end of the half lap joint.
Bamboo is used at the Heritage and Mediation Centre for flooring, vertical cladding, and ceiling panels. The material is chosen due to its sustainable characteristics. Moso bamboo stems take approximately 4 years to reach hardness as opposed to solid timbers such as cherry, teak, and oak which require up to 50 years to reach harvestable maturity. Furthermore, bamboo plantations require no pesticides or fertilizers.

Although strand woven bamboo panels are more expensive than solid bamboo panels, the product has a darker finish, softer grain, and is more hardwearing. These characteristics pay homage to the existing timber flooring within the Old Synagogue in terms of colour and longevity.

The principle behind glazing in this design is to let in as much natural light as possible, but without solar heat gain. In order to achieve this in a sustainable and cost effective manner, the glazing type is paired with an exterior louvered shading system which simultaneously reduces solar heat gain, and reflects and dapples direct sunlight.

The shading system allows the author the latitude to select a clear laminate glass, as opposed to a tinted high performance glazing type which hinders solar heat gain in winter. A suitable clear glass for this application is Smart Glass Coolvue. According to the manufacturer Coolvue clear will transmit 70% of visible light into the building whilst absorbing 37% of the solar energy (PG Group, 2011).

Fig. 106_ Rheinzink applications (top to bottom): Perth Convention Centre, Australia. Zinkhaus, Copenhagen, Denmark. Prefab Villa by Daniel Libeskind.
RHEINZINK – Angled Standing Seam panels were chosen for the cladding of the protruding mediation structures as a means of recognising the fifth façade of the Old Synagogue and its servant buildings. The materials capacity to naturally weather and the manufacturer’s claim of a maintenance free lifespan mimics the condition of the historic buildings roofing and creates an association between old and new. Furthermore, the effects of time and climate are allowed to age the proposed centre, strengthening the association between new architecture and old architecture through materiality.

The product is in keeping with the concept of ‘temporality’ since the panels durability promotes reuse and the concealed fix technology prevents surface penetration. In the event of disassembly or replacement, over ninety five percent of an individual panel can be recycled (RHEINZINK, 2011).

The purpose of glass wool insulation is to reduce solar heat gain and minimise the effect of the inner city noise factor in relation to the private mediation spaces. With regards to sustainability, Isover glass wool insulation is manufactured from a combination of sand and up to eighty percent recycled post-consumed glass that would otherwise go to a landfill site.

According to the manufacturer, a typical Isover glass wool insulation product saves more than one hundred times the energy consumed and Carbon Dioxide emitted in its manufacture, transport, and disposal over a period of fifty years (Isover, 2011).
A premanufactured, made to specification, aluminium framed, glazed and motor operable louvered roof system is proposed for the main atrium volume of the Centre (figure 110). The aluminium frame of any given louver interlocks with its neighbouring louver when closed creating a weatherproof roof. Neoprene strips are specified at overlaps to ensure an airtight seal. Rainwater is channelled to gutters designed into the unit and released at regular outlets.
The aluminium frames house panes of Smartglass Coolvue heat reflecting laminated safety glass with a Polyvinyl Butyral Interlayer (additional solar energy reflecting layer), which is coupled with a U.V activated self cleaning film on the exterior side. The louvers pivot action is managed through a hidden tubular motor within the perimeter aluminium mounting frame. This motor will be connected to a sun and rain sensor and will be fully automated (LouvreTec, 2011). The lightweight glazed aluminium louvers resist heat gain, whilst facilitating natural ventilation and airflow.
Circulation refers to the manner in which people and services move through and engage with a building. The services for the Heritage and Mediation Centre are broken up into its functional requirements. These include the introduction and manipulation of ventilation, light, thermal comfort, water management and vertical movement. Movement of people within the building and across the site differs depending on the reason for entering the centre.

The north-south axis of the building defines a major public thoroughfare, creating a distinct visual and physical linkage between street and square (figure 111). The gentle slope of the ramp manipulates the landscape forming a transitional plane. This plane extends across the evaporative cooling pond, Mediation centre, Heritage route, and public square, whilst framing a vista of the Old Synagogue. The east-west axis guides visitors on a journey through the Heritage route, and parallels the Mediation centre. The Mediation centre is in constant dialogue with the Heritage route, but is positioned deliberately off the major axis. This is essential since programatically the mediation process is semi-public in nature.

The service core to the east pays homage to the servant spaces flanking the Old Synagogue. They are detached yet were integral to the functional requirements of the Supreme Court incarnation of the Old Synagogue. The service core adopts a similar detached character, housing wet spaces and facilitating the vertical reticulation of HVAC ducting and telecommunications. The space can be accessed independently via Proes Street (figure 112).
The Heritage and Mediation Centre’s seven hundred and fifty square meter roof area has the runoff capacity to meet the building's un-supplement water consumption requirements for eight months out of a year. The total harvestable rainwater from the main roof structure is 455,000 litres per annum. From this total, 360,000 litres will be stored in six 5000 litre tanks over the course of a year. According to the rainwater harvesting calculations provided in Appendix 2, with the proposed storage capacity there will only be five months of the year were the centre will have to make use of municipal water to supplement the system.
The natural lighting strategy for the Heritage and Mediation Centre is a combination of sidelighting and toplighting passive systems. In terms of sidelighting, the same windows which provide a visual connection to the outside allow daylight in to the building. Direct heat gain is managed and manipulated with deeply recessed windows. Interior spaces are therefore shaded in summer, however the passive solar design allows for solar gains in winter (figure 115).

Toplighting liberates the walls of a space. Daylight from above allows for greater latitude in how the walls of a space are used. In this instance walls could be ephemeral and their implied threshold transversal, thus toplighting has contributed to the realisation of the concept. Since natural lighting is not limited to the walls, the buildings twenty two and a half metre plan depth could be achieved in a sustainable manner. Chapter 7.1.9 details the proposed louvered roof which will facilitate toplighting.
A closed loop Geothermal Exchange System uses water with a glycol freeze protection solution that circulates inside sealed high-density polyethylene (HDPE) pipes. These pipes are buried at approximately two metres below the earth’s surface to draw heat from the earth which remains at a constant temperature of 8-12°C Celsius all year round. The water and glycol solution then enters the building and is pumped to the individual water source heat pumps on each floor. Air delivery is facilitated through ducts which deliver the tempered air from the heat pump to the interior spaces of the building. Finally, the water and glycol solution returns back to the HDPE ground loop outside and the cycle is repeated (figure 117).

The heat pump extracts the heat from the earth in a three part process (figure 116):

- There is a compressor which compresses the refrigerant,
- an air-to-refrigerant heat exchanger,
- and finally, an evaporator where the circulating refrigerant and the ground loop pass in close proximity, and exchange heat.

The heat cycle begins at the compressor. Refrigerant in a vapour form is pressurised at the compressor which raises its temperature. The hot gaseous refrigerant leaves the compressor and flows to the heat exchanger where incoming room air passes over the heat exchanger’s warm coils. The heat from the refrigerant is exchanged to the air flowing in the room. The refrigerant having now given up its heat is condensed into a cool liquid. It must be re-heated to a gaseous state before it can go back the compressor. The evaporator facilitates this process. The cool liquid refrigerant passes in close proximity to the water and glycol solution from the ground loop. Here the heat from the water and glycol solution transfers to the cooler refrigerant causing it to evaporate and turn back into a gas. Once a gas, the refrigerant returns to the compressor to repeat the cycle.

For air conditioning in the summer months the cycle is reversed, absorbing the heat from the air in the rooms, transferring it to the ground loop which gives of the heat to the cooler earth below. According to the manufacturer, Geothermal Exchange heating and cooling operates more efficiently than conventional HVAC systems, saving up to sixty percent on energy costs (Water Furnace International, 2012). Water Furnace International claims the system emits no Carbon Dioxide, Carbon Monoxide, or other greenhouse gases.
Fresh air is natural tempered when passing over the evaporative cooling pond before entering the building. Hot air is expelled upward through the atrium's louvered roof in summer. The geothermal system uses sealed high-density polyethylene pipes in a vertical loop configuration.
Fig. 122. Restored impression of the Old Synagogue
8.1 References


University of Pretoria, 2000. Paul Kruger Street Spine: Urban design framework for the improvement of environmental conditions on Paul Kruger Street. Sourced from the Department of Architecture archive, UP.

CHAPTER 09

fig. 123. Restored impression of the Old Synagogue
9.1 Appendix 1

Visit to the Pretoria Hebrew Congregation (PHC) to conduct an Interview with:

Rabbi Gideon Fox
246 Schroder Street, Groenkloof
Wednesday, 11 May 2011
2pm – 3pm

Background:
Architecture: Creation of Cultural Heritage Sites S.A + How to develop an approach to commemorating the Old Synagogue as a South African Heritage Site.

Fran and Barbara Buntman – Old Synagogue and apartheid court – Constructing a South African Heritage Site_ interviewed Derek Ossip (Pretoria Hebrew Congregation).

Can you please give me a brief background of PHC, and explain the differences between a Progressive and Traditional congregation?

Interview:
Words in Jewish Culture are very significant – 1 word has different interpretations, and one must understand the context the word was said in, and what was said before, and what will be said after. Therefore it is crucial to understand the Hebrew concept of time.

Time is understood as linear – a Greek concept, but the Hebrew concept is circular… Can you comment on that?

The Torah is God’s word, and is all that is of value. It is the intangible essence of Judaism, Am I fair in saying that?

History: Historically there was no Synagogue as such; there was the Tabernacle (still representing the intangible), which was a lightweight, moveable, adaptable structure that contained the Torah. There wasn’t a house of worship – the focus was placed completely on the worship of God. Is this correct?

My historic facts here are sketchy. Israel wanted a king, and the king needed a place of worship - which resulted in a tangible place of worship. The ancient temple layout was used.

In Babylon, the immaterial lead to a specific typology – this is the Synagogue typology, but the furniture etc. was still moveable, the rituals were most important. Can you comment on this, and perhaps explain some of the rituals. I understand that there is a particular importance in Ritual cleansing, and the association to water (living water).

Another ritual is that of walking to the Synagogue, not driving, but actually walking. This played a major role in the location of the Synagogue and the proximity from where the congregation lived in relation to the Synagogue. I understand that historically the majority of the Jewish congregation lived in Pretoria’s historic inner city; therefore this determined the location of the Old Synagogue. Is the ritual of walking still practiced and can you give more insight into this ritual?

So the procession to the Synagogue was a ritual, and when you reached the Synagogue there were washbasins for the purpose of cleansing oneself before entering the main hall of the Synagogue.

I want to speak about the significance of Movement inside the Synagogue:
My understanding of how the Old Synagogue was used is that men sat on ground level and women upstairs in a gallery, not facing the Ark, but facing the a central aisle where the Torah was carried from the back of the main hall to the Ark or most holy. Therefore the act of moving the Torah was of utmost significance. Am I correct in saying that and can you explain the significance of this ritual?
Can you enlighten me on how a service would have been conducted then and how it is conducted today?
Finally, can you give me your opinion on the Old Synagogue?
Notes from meeting with Rabbi Gideon Fox of P.H.C

- There is not progressive Judaism in South Africa.
- Stems from a difference in belief and ideology.
- Traditional: Books from Moses — given by God (5 books of Moses).
- Reform small in S.A — does not believe that the 5 books of Moses are divine, therefore they are much more malleable to fit the norms of society.
- Orientation: Front towards Israel -Israel towards Jerusalem - Temple Mound.
- Wherever they are in the world, Jews face Israel when they pray.
- Rituals – Cleansing – water.
- Life and death, water in 3 parts to it in heaven (HOH).
- Walking: The significance of walking to the Synagogue is on the Sabbath - It is a symbiotic relationship.
- Where people lived, you need a Synagogue because of the Sabbath.
- Within the Synagogue: The congregation faced the central aisle where the scrolls would be moved to the arc. The significance of the scrolls is such that one would not turn their back to it (out of respect) and if one could touch or kiss it, one is further blessed.
- The Tabernacle: means the “tent”; “place of dwelling” or “sanctuary”. (It is the sacred place where God chose to meet his people, The Israelites during the 40 years they wondered in the desert under Moses’ leadership. It was the place where the Leaders and the people came together to worship and offer sacrifices.
- 30m x 10m x 5m high dismantle holy structure which contained 2 stone tablets on which the Ten Commandments were written - The Arc of covenant.
- The Tabernacle could be dismantled and was a moveable structure, but by no means was it lightweight or adaptable.
9.2 Appendix 2

Rainwater harvesting calculations:

Area of roof x Annual rainfall = Harvest capacity of roof

750 m² x 674 mm = 505 500 L

505 500 L - 10% (losses from evaporation) = 454 950 L per annum

Water consumption calculations:

<table>
<thead>
<tr>
<th>Water consumption device:</th>
<th>No. of devices:</th>
<th>Water consumption per device:</th>
<th>No. of uses per day:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flush toilets</td>
<td>18</td>
<td>7 L</td>
<td>8</td>
</tr>
<tr>
<td>Urinals</td>
<td>6</td>
<td>1 L</td>
<td>16</td>
</tr>
</tbody>
</table>

Water consumption for total number of devices per day = **1104 L per day**

Water consumption per month (23.5 active days per month average for building) = **25 944 L per month**

Sizing of rainwater harvesting system:

<table>
<thead>
<tr>
<th>Months with low or no rainfall:</th>
<th>Consumption:</th>
<th>Required capacity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>26 000 L</td>
<td>104 000 L</td>
</tr>
</tbody>
</table>

Therefore, (5000 L tank) x 6 = **30 000 L capacity per month**

Contribution of rainwater harvesting system:

<table>
<thead>
<tr>
<th>Month:</th>
<th>Rainfall (mm):</th>
<th>Harvestable rainfall:</th>
<th>Monthly consumption:</th>
<th>Additional municipal water required:</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>136</td>
<td>102 000</td>
<td>26 000</td>
<td>0</td>
</tr>
<tr>
<td>February</td>
<td>75</td>
<td>56 250</td>
<td>26 000</td>
<td>0</td>
</tr>
<tr>
<td>March</td>
<td>82</td>
<td>61 500</td>
<td>26 000</td>
<td>0</td>
</tr>
<tr>
<td>Month</td>
<td>Rainfall (mm)</td>
<td>Harvestable rainfall:</td>
<td>Monthly consumption:</td>
<td>Additional municipal water required:</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>------------------------</td>
<td>----------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>April</td>
<td>51</td>
<td>38 250</td>
<td>26 000</td>
<td>0</td>
</tr>
<tr>
<td>May</td>
<td>13</td>
<td>9 750</td>
<td>26 000</td>
<td>16 250</td>
</tr>
<tr>
<td>June</td>
<td>7</td>
<td>5 250</td>
<td>26 000</td>
<td>20 750</td>
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<td>July</td>
<td>3</td>
<td>2 250</td>
<td>26 000</td>
<td>23 750</td>
</tr>
<tr>
<td>August</td>
<td>6</td>
<td>4 500</td>
<td>26 000</td>
<td>21 500</td>
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<td>September</td>
<td>22</td>
<td>16 500</td>
<td>26 000</td>
<td>9 500</td>
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<tr>
<td>October</td>
<td>71</td>
<td>53 250</td>
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<td>November</td>
<td>98</td>
<td>73 500</td>
<td>26 000</td>
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<tr>
<td>December</td>
<td>110</td>
<td>82 500</td>
<td>26 000</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>674mm</strong></td>
<td><strong>413 700 L</strong></td>
<td><strong>312 000 L</strong></td>
<td><strong>91 750 L</strong></td>
</tr>
</tbody>
</table>
9.4 Appendix 4: Construction presentation drawings
Rainwater harvesting calculations:
Area of roof x Annual rainfall x Harvest capacity of roof
7500 m² x 670 mm = 505 500 L
505 500 L - 10% losses from evaporated = 454 550 L per annum

Water consumption calculations:
Water consumption for total number of devices per day = 700 L per day
Water consumption per month (21.5 active days per month average for building) = 25 964 L per month
Months with low or no rainfall: 4
Consumption: 70 000 L
Required capacity: 30 000 L

Sizing of rainwater harvesting system
(5000 L tank) x 6 = 30 000 L capacity per month
The natural lighting strategy for the Heritage and Meatpacking Centre is a combination of skylights and controlled passive systems. In terms of strategies, the northern facades provide a visual connection to the outside while daylight to the building. Glazed areas are minimised and fenestration with double glazed windows. Limited access and balconies are maintained to optimise controlled natural light. 

Daylight from above allows for gradual exposure to the site, while an external wall is used in the entrance walls. The northern facade is maintained to optimise controlled natural light. 

The design allows for controlled natural light to be achieved in a sustainable manner.
The Geothermal system uses high-density polyethylene pipes in a vertical loop configuration.

Fresh air is naturally tempered when passing over the evaporative cooling pond before entering the building.

Water source heat pump

Exhaust air extraction

Heating and cooling system

Fresh air

Hot air is expelled upward through the atriums louvered roof in summer.