CHAPTER 6. Design

Design Problem. Client. User. Accommodation. Concept. Design Development.

Highlights and low points of the design. Late nights, design, coffee, red pencil, programme, urban, sustainability, movement, services, plan, section, fire escape, disabled access, service corridor, structure, materials, heritage, escalator, archive, plant room, scale, volume, user, cinema, views, site, shading, form, existing structure, details, engineer.

Fig. 65

Fig. 66

Design Problem

Theory. Site. Sustainability. Existing Archive

INTRODUCTION

Through persistent research the importance of film as a body of knowledge has been established. The film archive of South Africa (NFVSA) has been visited to gather more information on local film – unfortunately the facility is in a derelict state.

Problems with the establishment
- Inaccessible, no public interface
- Archaic system
- Film medium not celebrated
- No catalogue system available
- No cinemas
- Ineffective staff structures

Quite simply, film is unimportant in this archive. It has subsequently been decided to redesign the South African film archive, using film theory to create a cinematic experience, not only in terms of film but also the physical experience of the spaces.

DESIGN PROBLEM

1. Promote film in South Africa:
- - Through architecture
- - Through the choice of site
- - To open up the archive

The existing archive typology is challenged, the archive (a cold room) is opened up figuratively and literally.

2. Sustainability
- Densify our cities by developing under-utilised, half-empty existing structures.
- Densification has many green advantages, such as proximity of public transport, local labour and materials.
- Inherent limitations of re-using an existing building and its roofscape.
- Structure, heritage and intended use of the existing structure greatly influences design decisions.

3. Application of theory
- To prove film theory as a legitimate architectural discourse.
- Use film theory to guide the design process.

4. Archive
- Storage and preservation of sensitive material.
- Protection from fire.

5. Construction
- Light structural elements to minimise stress on existing structure.
- Materials chosen to announce certain areas of prominence.
- Sustainability.

6. Cinema
- The cinema form is released from the ‘mall box’.
- The form is utilised to create foyer spaces as a transitional space.
- The cinema roof complex is seen as a transport terminal, the dark auditorium space the vehicle to other realms.

Fig. 67

Client. User

Archive. Cinema. Ancillary Clients. User

PRIMARY CLIENT - NATIONAL ARCHIVE

The proposal calls for a major change in the structure of the NFVSA (National Film Video and Sound Archives). Based on international precedents, the Hong Kong Film Archive and the British Film Institute, the South African Archives will be split. Film (in the NFVSA’s definition “video”) and related material (documents, equipment, exhibitions) will now form part of South Africa’s Film Archive.

They will strictly adhere to the International Film Archiving (FIAF) body’s strict policies. A new staffing structure that is based on an amalgamation of worldwide archive precedents is also implemented.

Staff Structure

Admin	- 7 staff members
Research and Study	- 2 staff members
Legal	- 1 staff member
Preservation	- 2 staff members
Information Technology	- 3 staff members
Library	- 3 staff members

SECONDARY CLIENT - CINEMA COMPLEX

In order to showcase the film material, cinemas were added to the programme. A private company will run the cinema complex for two reasons: firstly to ensure effective service related to other cinema chains, and secondly to attract visitors to the complex throughout the year.

A possible client is the extension of Ster-Kinekor’s Cinema Nouveau brand to include vintage/heritage material not only from the South African archive, but historic films from around the world, commonly known as a revival house or repertory cinema.

Staff Structure

Projectionists	- 6ß
Concession Stand	- 3
Cleaners	- 6 shared with archive
Admin	- 3
Box Office	- 4
Security	- shared with archive

ANCILLARY CLIENTS

Programmes that supplement the cinema experience and compete with the cinema mall experience.

Staff Structure

Rooftop Cafe	- 8
Rooftop Bar	- 4
Bookstore	- 3
DVD Store	- 3
Coffee Stand	- 2

USER

- The film addict (eat + film + bookshop)
- The urban dweller (no knowledge of film)
- The film student (research)
- The journalist who needs footage of past events
- The filmmaker (research + obtain footage)
- Business lunch away from the urban chaos
- International tourists (academics and public)
- Companies who hire the facility for an event
- Film premiers (red carpet event)

Fig. 65

Accommodation

Functions. Function Description.

SHARED FUNCTIONS

Some of the functions that will be shared amongst all the clients of the building include:

Information/receptionist - Placed near the entrance to bolster security and to simplify the archive experience.

Restrooms - Three restroom facilities are placed in the building. Firstly a staff changing room, secondly a museum restroom and lastly a restroom for the cinemas, restaurant and rooftop bar.

Building Management - security, maintenance and gardening facilities.

Services - Plant room, chiller, service corridor, refuse and stand alone staff circulation. A delivery depot with basement storage will streamline and hide the frequent delivery requirements of some of the vendors.

PRIMARY FUNCTIONS

The programme requirements of the new South African Film Archive:

Film Archive - Film must be preserved under very strict temperature control: 7ºC, with controlled humidity. Fire protection, with the help of compartments, will stop the spread of fire and also allow each room to be cooled separately. This allows more effective ventilation control and the option of expansion.

Library - The film archive collection contains film related documents, books and posters that must be preserved. Sub-functions include: storage, office, reading area, books, catalogue, special collections, archive, research office

IT/Media Labs - The IT facility will increase the accessibility of the collection. Many films will be available to be seen at the mediateque, a computer facility with comfortable seating and earphones, where films of choice can be enjoyed. The library will also contain a dedicated IT lab for research. To maintain these labs, digitally store converted historic films, as well as maintain the Internet space an IT/Media office and digital archive will be accommodated.

Digitising Facility - A facility that can convert many formats of film and videotapes to digital format, and also retouch and edit these films. These converted films will be stored in the digital archive. The facility will also be open to the public, a conversion and editing service will be provided for home videos. Other functions include: office, film editor, public interface, digitising room and storage.

Exhibitions - The collection boasts a number of historic film memorabilia, cameras and equipment. The limited exhibition space will be split into permanent exhibition areas, temporary spaces and media spaces. The archive will use the temporary spaces for the video art installations and film exhibitions. The media spaces (screens and dark rooms) will be controlled from the IT/Media office.

Offices - The archive staff will be spread in 4 main areas: the IT office, the library, the digitising facility and the office. The office space will be for the admin staff and curator of the exhibition spaces. The office consists of: a waiting area, reception, discussion room, conference room, open plan office space and storage.

Curio Store - The curio store will form part of the street interface on the ground floor. The curio store will generate income for the museum and sell film related items.

SECONDARY FUNCTIONS

The Cinema complex and all functions related to its effective management:

Cinemas and Foyers - Four cinemas can be accommodated on the roof of the building. These cinemas will be lifted to utilise their form and create foyers beneath them. The cinemas are smaller than some of the commercial cinema auditoriums, but this is justified by the smaller target audience.

Concession Stand/ Box Office - Tickets and the control thereof will be handled by the box office. The concession stand is responsible for all movie refreshment requirements.

Projection Rooms - Projection rooms need special consideration in terms of size, fire regulations and projection angles. A special consideration for an archive cinema is the need for more equipment, as a wider range of film formats, from different eras, will be projected.

Office - A small admin office and storage space from where the cinema complex can be managed and operate.

ANCILLARY FUNCTIONS

Supplementary functions to the archive and cinema complex include:

Book store - books, storage, counter.

DVD store + rental - storage, counter.

Coffee stand - a coffee stand on the first floor will compliment the bookshop and the courtyard space.

Courtyard - demolition, to create courtyard.

Rooftop cafe - cold storage, refuse, counter, kitchen, dry storage, dining area.

Rooftop bar - bar, cold storage, dry storage, counter, seating.

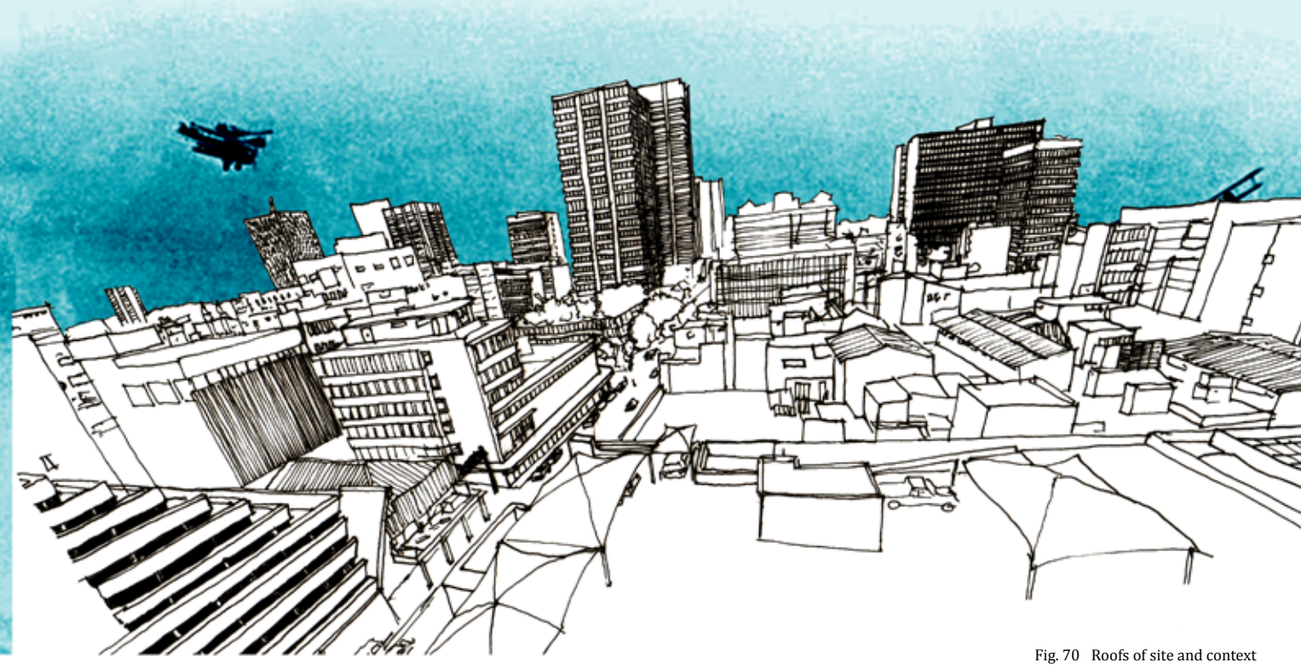


Fig. 70 Roofs of site and context

INTRODUCTION

After much deliberation and thought a concept has been developed that is directly inspired by the theoretical argument. One of the most recognisable characters of film, *King Kong*, inspired the final concept of the design.

In the 1933 version of the film, *King Kong* is captured and taken to a theatre on Broadway in New York to be displayed. He is infuriated by the crowd and with his strength manages to break free from his chains and escape. What King Kong decides to do next is interesting, he climbs the highest landmark in the New York skyline, the Empire State Building. Why did *King Kong* not simply run away? Why did he climb the tower? The film's justification for his action is showed early on in the film, before his capture, in his natural habitat. *King Kong* inhabits the highest point of the island domain; he is the jungle king.

But an alternative motif is suggested by the author. Did *King Kong* try to escape from the commotion on the streets and retreat to the upper storeys, a secret known to New York Penthouse inhabitants? Did *King Kong* climb up the tower to gain perspective to this strange new land? To understand where he is?

FORMALISING THE CONCEPT

The rooftops of our cities are full of potential. This unexplored realm can in many cases easily be utilised and developed to maximise floor area. On the chosen site the existing building has merely three above-ground storeys with planned vertical expansion construction details.

Why the rooftop?

- Vantage point (linked to views in theory chapter)
- Escape from urban chaos
- Movement (not only in the building, but the rooftop cinemas will be seen from around the city and that will generate urban movement)
- Contributes to the legibility of the inner-city (a visual landmark)

VISION

A cinema complex where one is directed towards views of the complex, views of the city and also from the interior - towards views of itself.

The complex will lure pedestrians from the street and introduce them to their city, from a vantage point at a remove. This Camera Obscura effect, (from theory chapter) Camera means room, but as Guliano Bruno states, is "*a room with a view*" (Bruno, 2007: 416

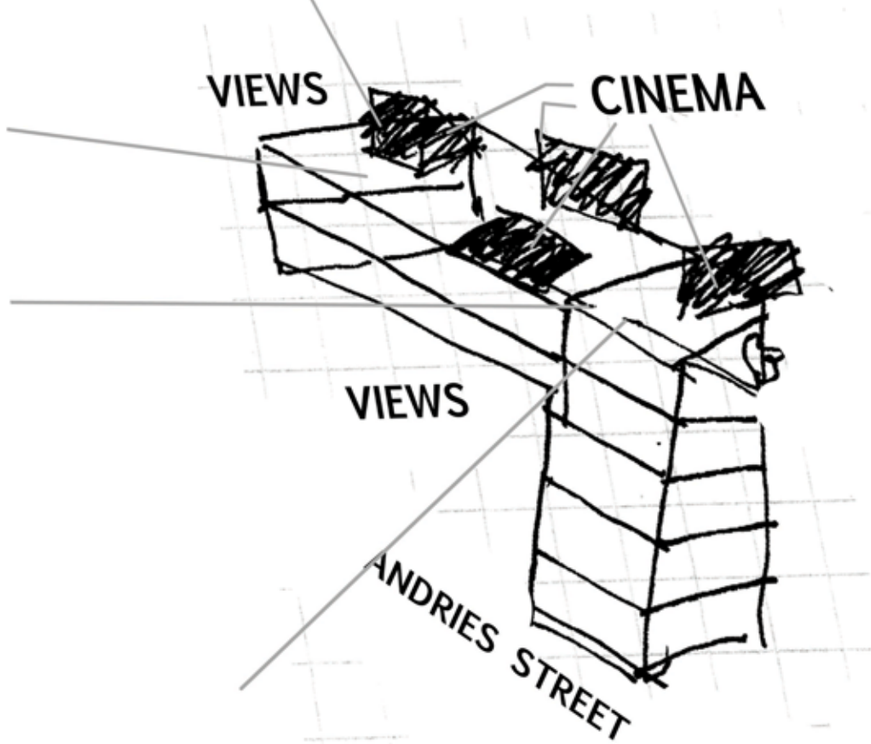


Fig. 71 Concept sketch

CONCEPT SUMMARY

ROOF

To generate views of the city the roof is utilised. Cinemas are allocated to this realm; they act as an advertisement for the building program. Between this realm and the street level is the journey that must be undertaken.

BUILDING

These four floors are where the user is led on a cinematic journey, and arrives at the destination with knowledge of film. Devices such as movement, viewing vistas, mental montage and memory are utilised to instil a cinematic awareness on the user.

Fig. 72

Design Development

Time line. Process. Problems. Solutions

INTRODUCTION

The design approach relies on a good understanding of the existing structure and context. The existing structure has been modelled physically and virtually and visited frequently in the early stages of design.

Certain problem areas are highlighted in the site analysis and new ones brought about with the concept. Theoretical arguments like montage, views, memory and movement guided the process until completion.

INITIAL PROPOSALS

The site analysis guided many of the initial design proposals. The development of a strategy of re-use was formed that would dictate the extent of demolition and new build.

Factors that informed these decisions include vertical circulation, natural light, public space requirements and natural ventilation.

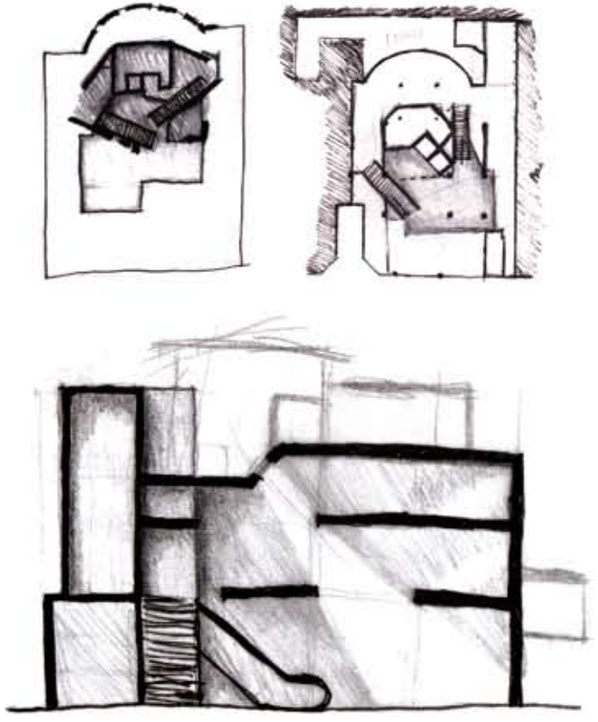


Fig. 73 Initial concepts

Fig. 74 Programmatic cores

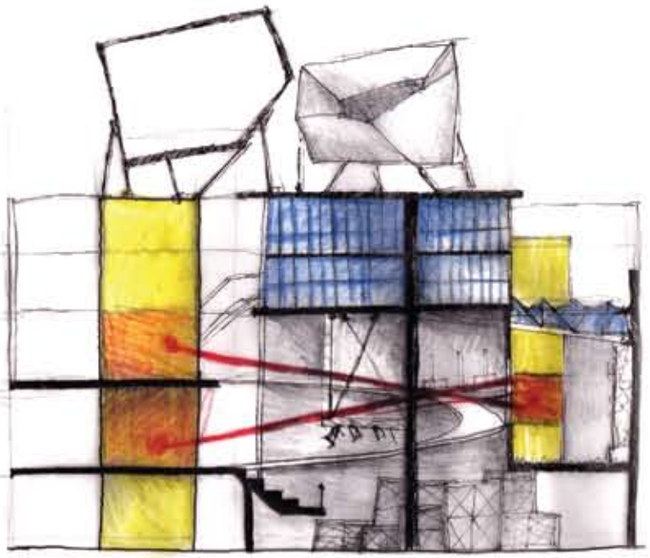
INFILTRATING THE INTERIOR

The needs of the proposed building had to be understood and a diagram produced to solve the placement of the programme. Theoretical concepts such as memory and movement are tested in these drawings. Would one be able to navigate an undiscovered floor if the trace of the previous one was still imprinted on the mind?

CORE - PROGRAMME AND MOVEMENT

The diagram utilises the idea of splitting the different programmes vertically instead of a horizontal placement. This arrangement generates movement throughout the building, increasing the opportunities for discovery, incidental engagements and a cross breeding of knowledge.

Little bits of information will be dispersed on the routes and with mental montage and memory, a person will be able to construct a complete image.



MOVEMENT

Vertical circulation is of utmost importance, but this vertical engagement with the building must be utilised. A spiralling movement increases opportunities for interaction with the programme, hence knowledge of film.

COMBINING IT ALL

Important design parameters

- Movement
- Light
- Views
- Programme
- New and old
- Link roof realm with street, spill out on roof.

After an investigation of the cinema form, these factors have been combined to form one architectural element.

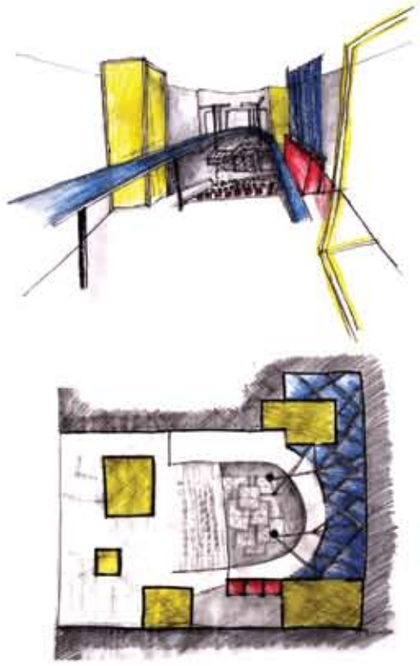
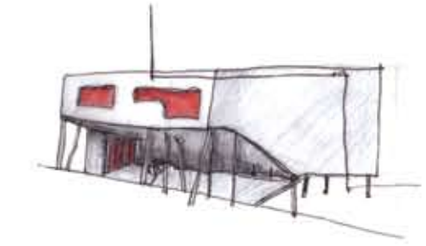


Fig. 75 Movement investigations



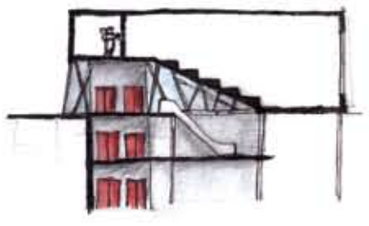


Fig. 76 Cinema form

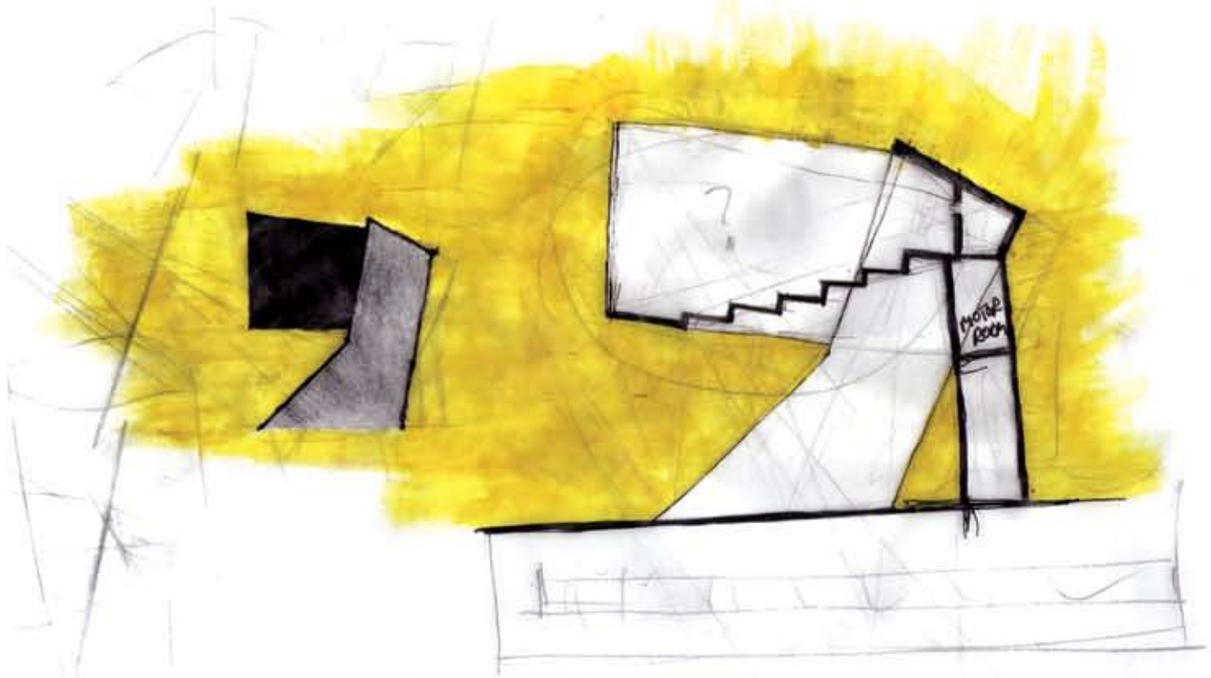


Fig. 77 Cinema tower Parti diagram

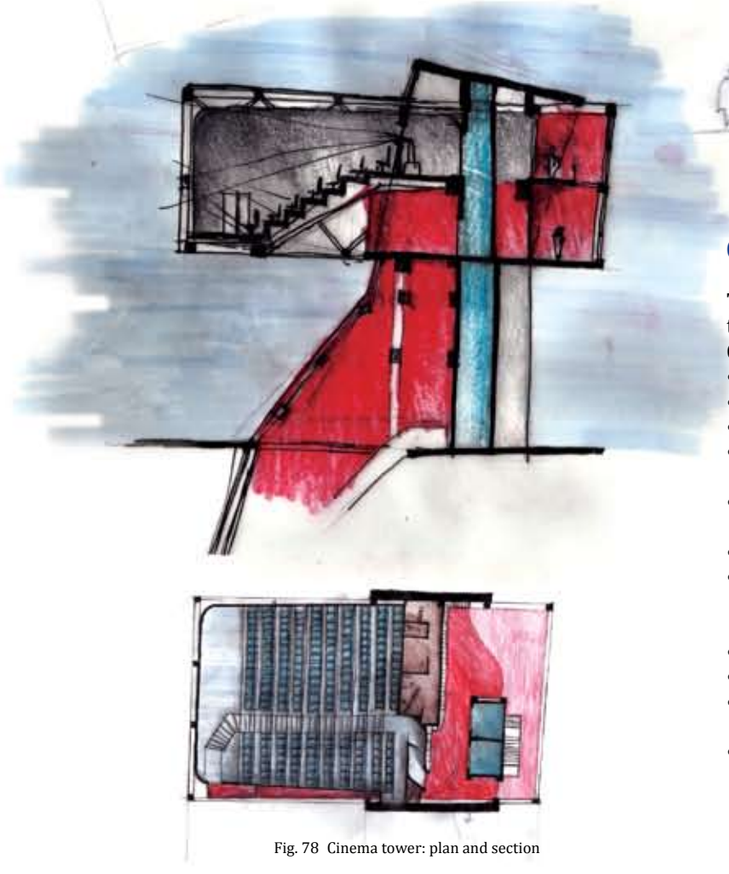


Fig. 78 Cinema tower: plan and section

CINEMA TOWER - VIEWS

The result of these requirements is the cinema tower.

Characteristics

- celebrate cinema form.
- creating a viewing platform to the city.
- visual landmark.
- visible from inside the building, magnet for movement.
- articulates the vertical movement of the building.
- night films are visible from the outside.
- the cantilever articulates that which is underneath, the space becomes the invisible structure.
- light into building.
- cuts through whole building.
- frames city, glass facade little or no direct sunlight.
- stack effect - increase ventilation efficiency.

Fig. 79 Cinema tower model

STRUCTURE

Bracing form is dictated by the requirements of the engineer, but relies on a network structure that would also effectively screen out the western sun.

PLAN GENERATOR

The cinema tower is tilted at a 50º angle.

Reasons for the tilted axis of the tower:

- new order, clearly distinguishable from the existing fabric.
- responds to the context.
- important viewing vista from Bureau Street, the tower is tilted to acknowledge this vista and from Choisy and Sergei's analysis of the Acropolis create an oblique viewing angle that is preferable.

In conjunction with this tilted axis the northern cinema, cinema D, is tilted to respond to the pedestrianised Church Street.

The programme is extrapolated from the cinema tower. Movement corridor, in red, connects the different foyers and cinemas on the roof level.

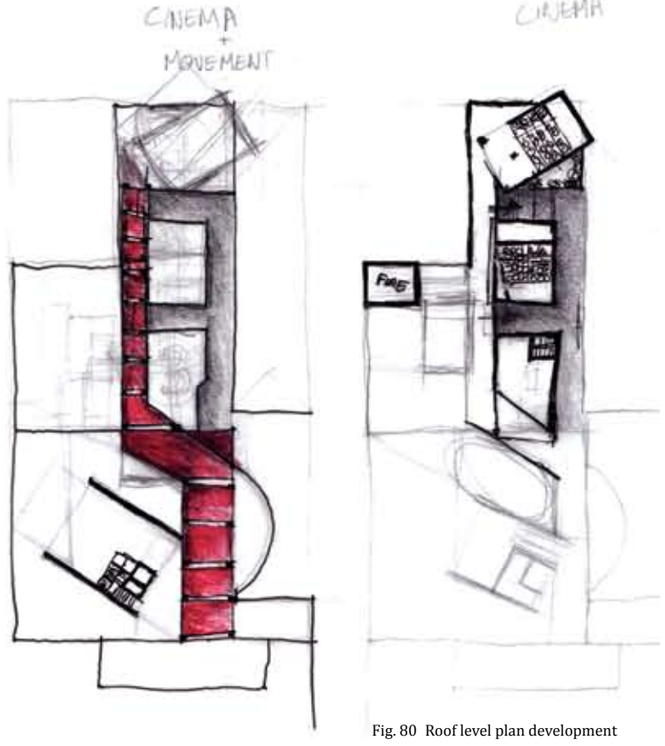
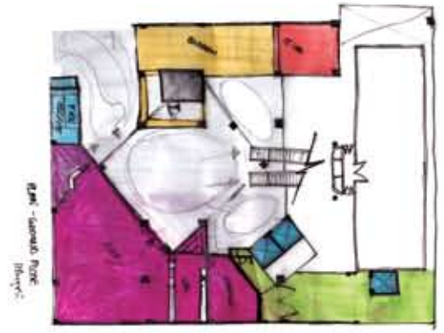
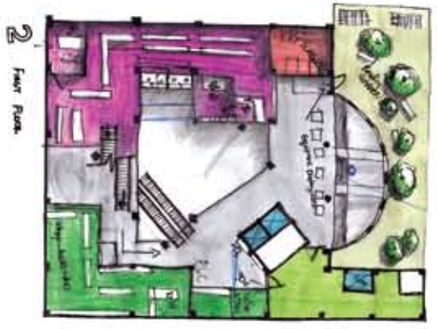


Fig. 80 Roof level plan development





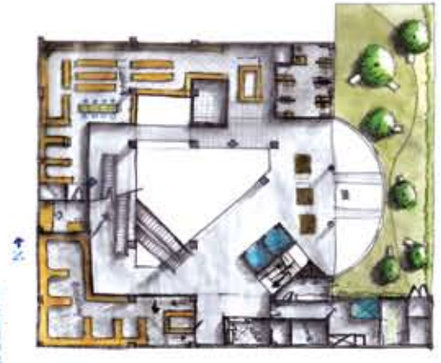
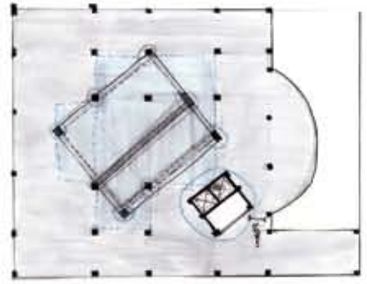


Fig. 81 Plan development

Fig. 82 Programme model



PLAN

The cinema tower and its grid is imposed onto the plan. The new order of the cinema complex is contrasted with the existing structure and grid. The influence of the new grid becomes more apparent with vertical progression through the building.

The programme has been grouped and then vertically separated into programmatic cores to stimulate movement. In many instances views have been created to encourage movement.

Views TO Site

THEORY

The experience of arriving at the rooftop cinemas is a choreographed experience, designed according to the key theoretical concepts outlined in the theory chapter. This journey employs the following theoretical aspects:

Montage and memory
The programme is divided amongst the vertical floor levels. To navigate the building, these concepts are relied on to create a legible, easily understandable distribution of activities. A memory of the preceding floor is imprinted on the mind and traversed on the succeeding floor. The effect is cumulative, bits and pieces stitched together as mental montage.

Movement and views
The movement created between the opposing energy poles (archive and digitising facility, street level and cinema tower as examples) create an architectural promenade. These circulation routes in themselves become a spectacle.
From the rooftop cinema many views of the street is offered to the user. These views plays on the idea of spectatorship and escapism.

Proposed City Views

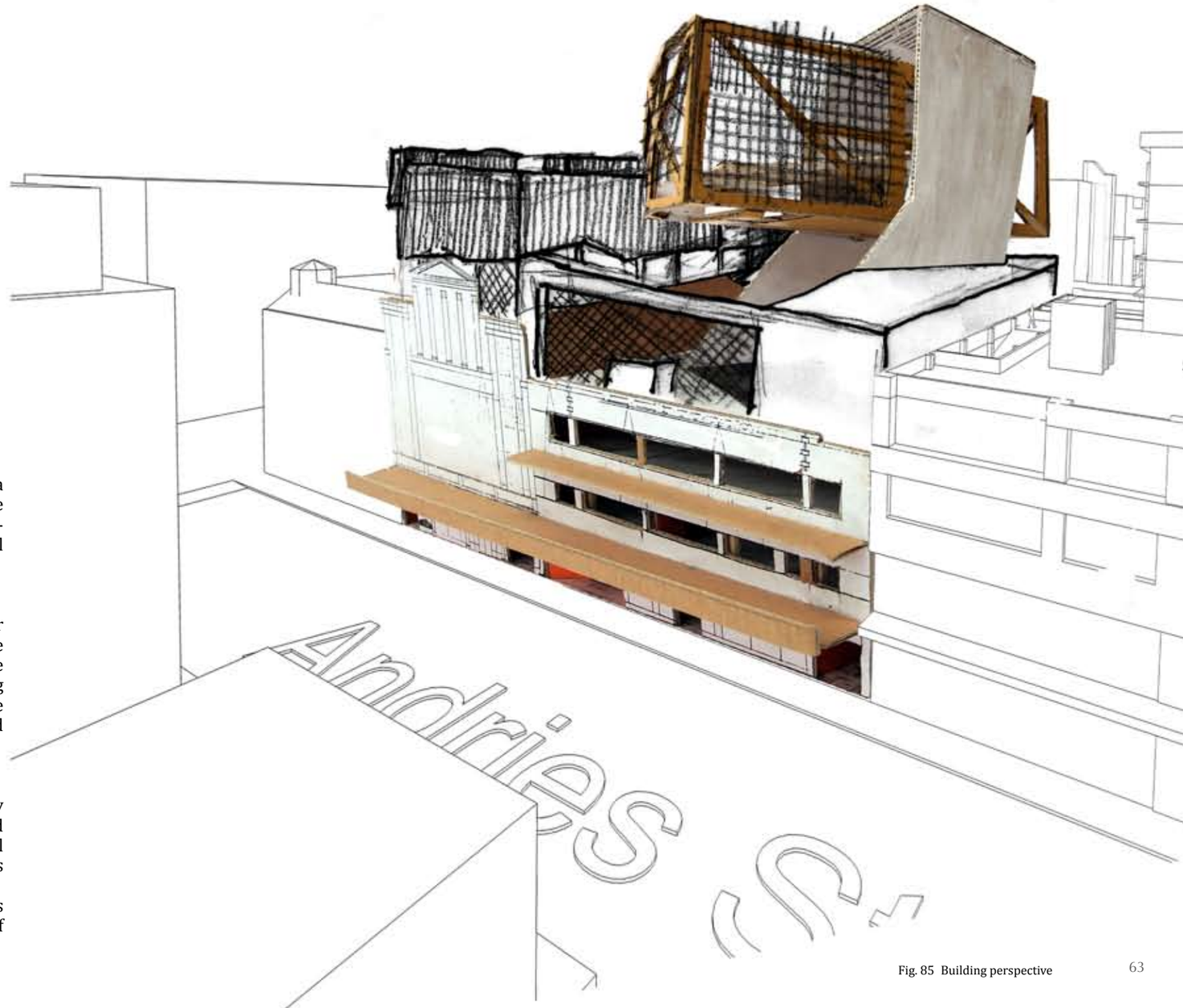


Fig. 85 Building perspective

Experience

Views. Perspective. Escape. Movement

Scene 1 : Approaching the entrance of the Archive Cinema Complex

THE EXPERIENCE

Archive Cinema Complex

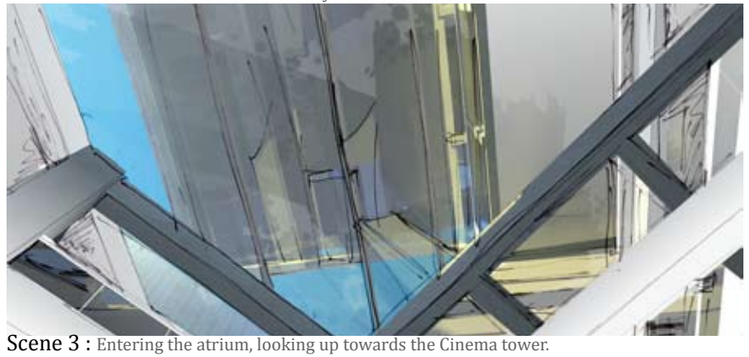
The experience through the building is a carefully choreographed journey. The programme and views (from the city, to the city and on to the building itslef) are set up along the circulation route to stimulate movement and create a montage of views for the users of the building.

The circulation route leads from the entrance to the cinema tower viewing platform, where views of the urban condition can be experienced, but like the camera obscura at a remove.

Some important scenes on the journey

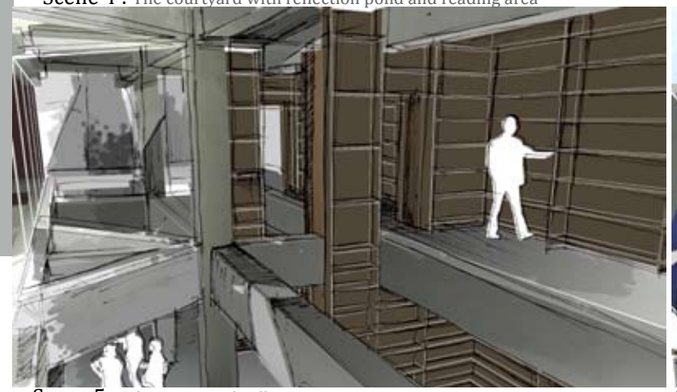
- The atrium on the ground floor with light filtering in, views of the destination, the cinema tower is also visible.
- Articulated views of Bureau street from every level throughout the building
- Travelling up, the courtyard becomes a focal point.
- From the increased vantage point users also observe other users and activities (exposing the programme)
- Reaching the cinema level another destination is the northern most point, where a framed view towards the Paul Kruger statue and Church square is visible.

Scene 2 : Entering the building, seeing the atrium void and film archive, obstructed views of the cou rtyard are also visible.



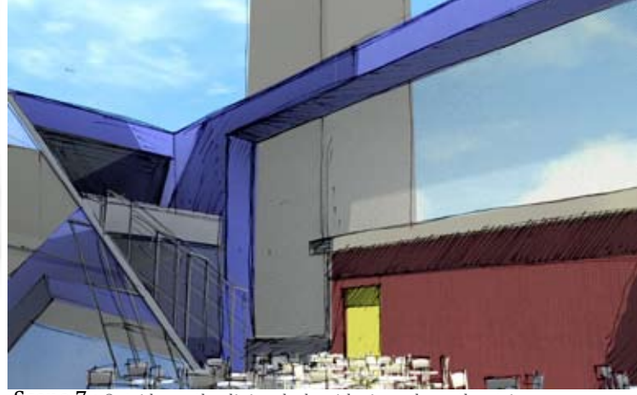
Scene 3 : Entering the atrium, looking up towards the Cinema tower.

Scene 4 : The courtyard with reflection pond and reading area

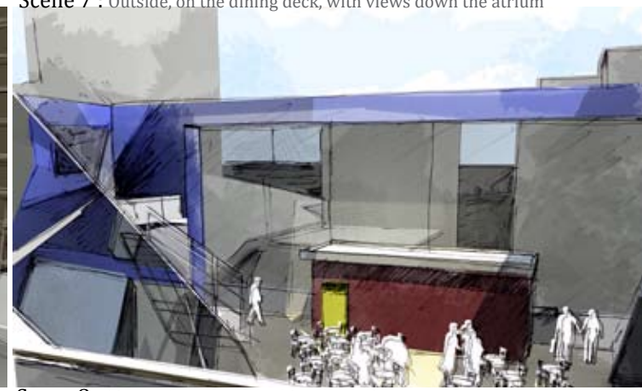


Scene 5 : Library special collections

Scene 6 : On the circualtion route, loking down to the glass bridge



Scene 7 : Outside, on the dining deck, with views down the atrium



Scene 8 : Cinema foyer level, looking down Bureau street

Scene 9 : In the Cinema tower, on the viewing platform, looking down Bureau street towards Church Square

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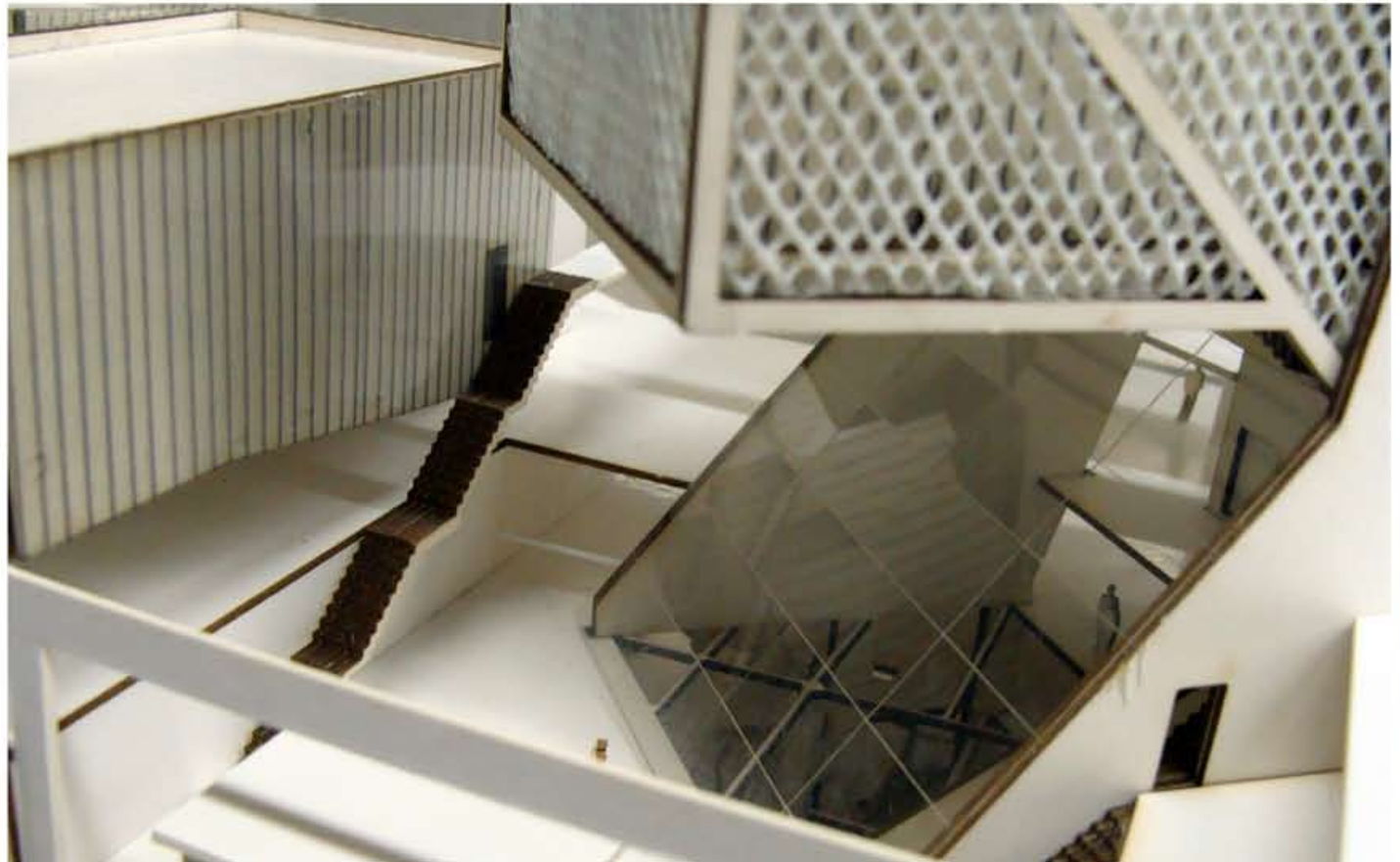
Model

Context. Framework



CHAPTER 7. Technical

Plans. Sections. Elevations. Details. Perspectives. Materials. Structure. Services. Sustainability. Programme. Circulation

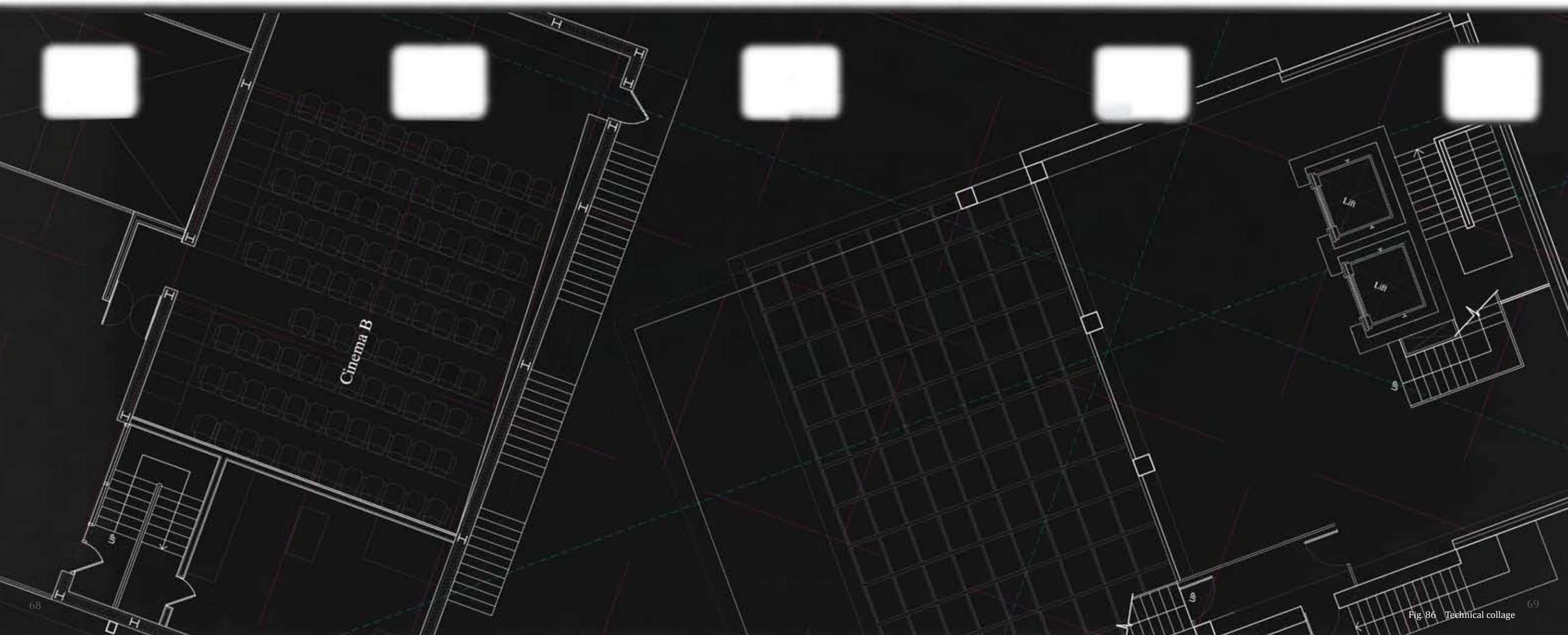
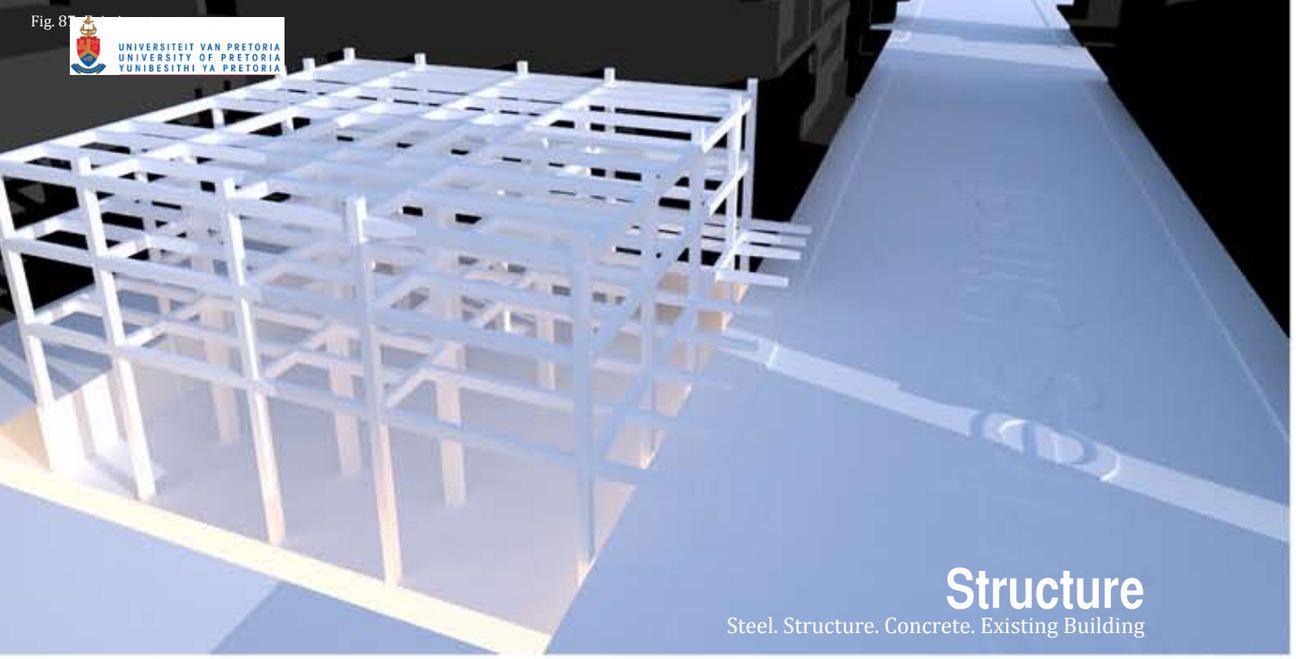


Fig. 86 Technical collage

Fig. 87



INTRODUCTION

Introducttradatory sentence. two parts of building. The existing structure is less stocky on the roof extension (northern of the project. Combined with a chaotic column grid this brings about a number of challenges.

EXISTING STRUCTURE

The size and spacing of the concrete structural members in the problem area were discussed with an engineer.
The structural system was informed by these conclusions:

- A part of the existing roof load was removed, and rooftop structures demolished.
- The existing structure was deemed strong enough for proposed programme.
- Small cinema auditoria are proposed (less than 50 seats).
- The proposed structure will be lightweight.

CONCRETE

Three new shafts cut through the existing building structure - the atrium void, the fire escape and the lift shaft. In conjunction with these elements, 4 new concrete columns carry the weight of the cinema tower extension.

The new vertical elements could compromise the integrity of the existing structure, especially since part of the existing floor slabs and beams will be removed. The solution is to support the existing structure; keep as many of the existing beams as possible; and add beams to the existing structural grid.

CINEMA

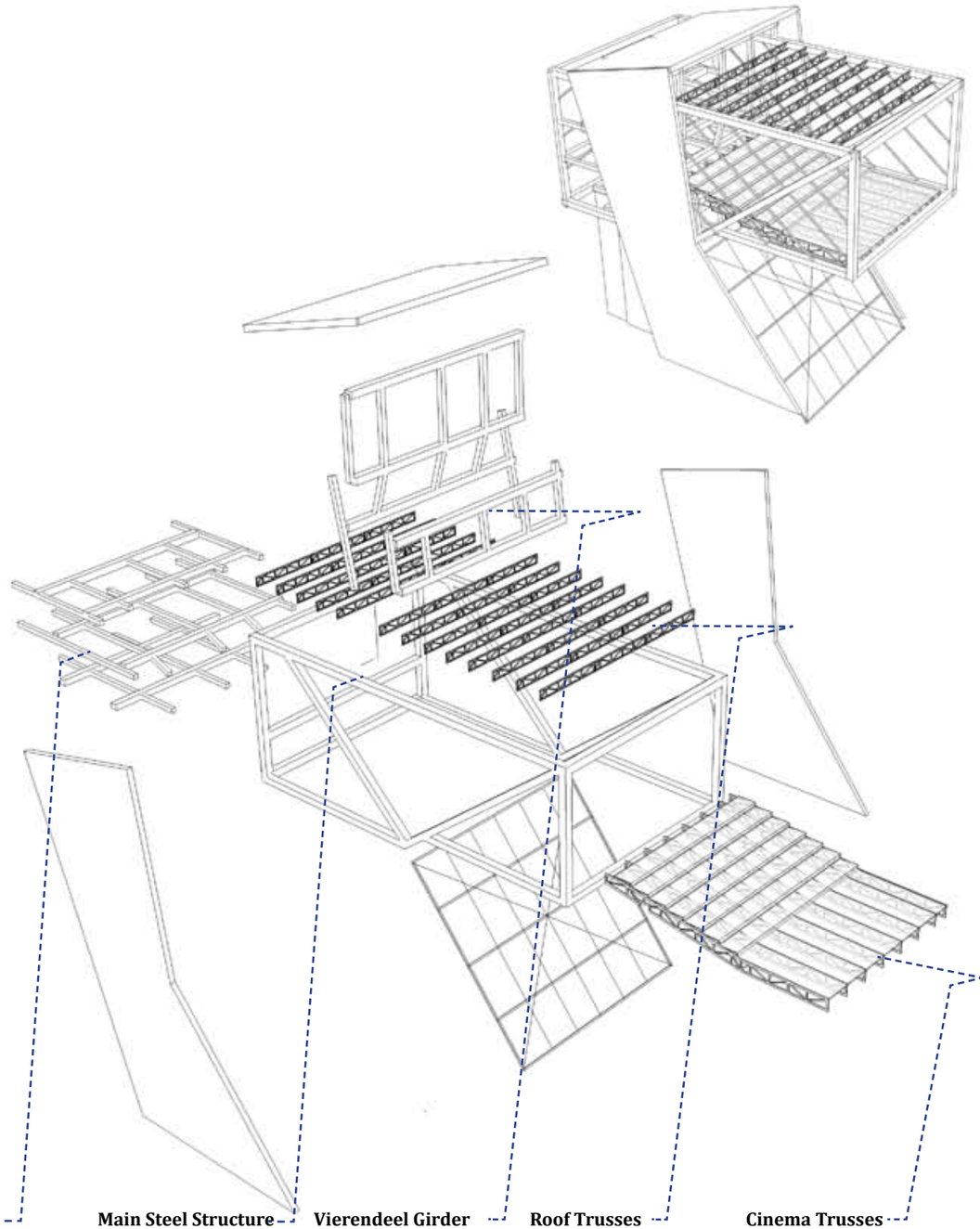
The cinemas are designed as lightweight structures, supported by the existing concrete columns. These existing columns are extended with H-columns to clearly distinguish between old and new. These slender elements create the illusion of floating cinema forms on the roofscape.

This idea is further exploited by the choice of materials - the cinemas are cladded in translucent polycarbonate sheeting with LED backlights. A lightweight steel frame, offset from the cinema wall to create a thermal cavity, is clearly defined at night time.

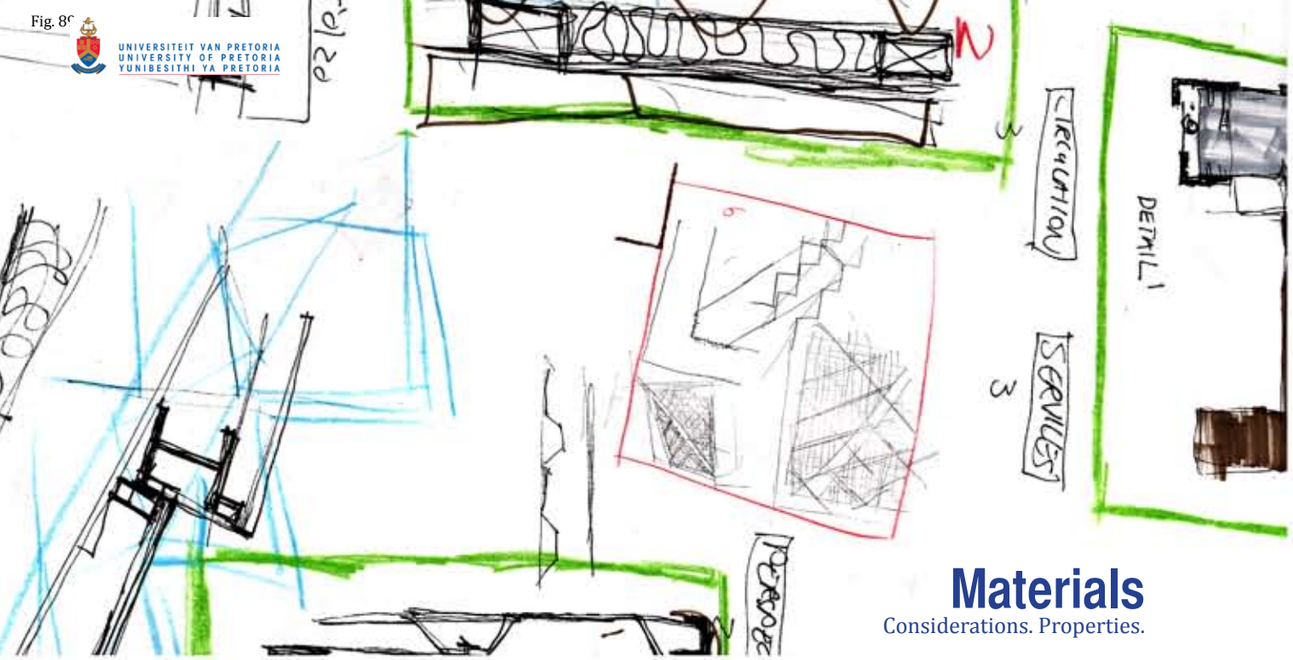
CINEMA TOWER

The cinema tower consists of three main structural elements:
Concrete form : 4 existing columns and 4 new columns support the cinema tower walls. These two elements receive their lateral structural support from the steel box truss. A concrete lift shaft acts as a counter balance to the moment loads induced by the cantilever.
Steel box truss : The element that supports the cinema and makes the cantilever possible. The system consists of a big truss supported by a network of smaller elements and metal mesh.
Cinema: As mentoined above.

Fig. 88 Structural model of the cinema tower



(Slenderness ratios from A. Orton's book: *The way we build*)



Materials

Considerations. Properties.


Fig. 90 OSB Board


Fig. 91 Laminated glass with digital media


Fig. 92 GKD mesh


Fig. 93 Translucent IBR sheeting

OSB BOARD

Sustainable: OSB board is constructed from fast growing trees, leaving almost no excess.
Properties (PG Bison, 2006): Aesthetic quality, moisture resistance, good thermal and acoustic isolation, strength.
Use: The exterior and interior panels of the cinemas are clad with OSB board. The cavity is filled with mineral glass wool insulation. An 18mm thick OSB board is also used for the flooring of the cinema.
Why: A suitable lightweight method of construction, it minimises the stress on the existing structure. The aesthetic quality of the board, combined with the IBR sun and rain protection, means the board can be left untreated.
Manufacturer: PG Bison, Johannesburg.

GLAZING

Exterior: Glazing is the thermal weak spot of a building. Limiting exposure to the sun is essential. The Archive Cinema Complex minimises exposure to the northern sun, and sun shading devices are employed on all western facades. In conjunction with sun protection these exterior glazed units are double glazed to comply with new standards imposed on South African building standards.

Interior: A frameless, laminated system is employed to take advantage of the existing exposed concrete beams. Two 4mm floating glass units are laminated with a digitally printed PVB interlayer (Fraser, 2009). This configuration according to Smartglass provides good sound insulation properties and safety.
The laminated glazing unit separates the programmed spaces from the circulation areas while still providing views of the activity inside.
Properties (Smartglass, 2009):
- Sound: STC value: 33
- Thickness: 9.52mm

The interior sealed double glazed units for the archive is described in the Archive section.

Flooring: Glass flooring is required in two key areas of the building. Firstly, as a method of pronouncing and separating the archive from the existing building envelope. Secondly, the glass flooring is used to bridge across the atrium space. These light bridges do not compromise the spatial integrity of the atrium.
Why: A translucent light box is created with visible structural steel elements to affirm the user. The box is lit from within at night to articulate these important circulation routes.
How: 25mm laminated translucent glass fixed to steel substructure, recommended size 1 000mm x 1 000mm (SpecialistGlass, 2009).

Manufacturer: Smartglass Service Centres in Pretoria and Johannesburg.

TRANSLUCENT IBR SHEETING

Polycarbonate IBR sheeting will be used to protect the OSB clad cinemas from sun and rain. The sheets are fixed to a substructure of steel. A ventilated cavity is formed between the IBR sheeting and OSB board that increases the thermal properties of the cinema wall.
Properties (Modek, 2009):
- 1.25 mm nominal thickness
- A layer of UV protection PC is co-extruded on the weathering side of all MODEK PC roof sheets.
- OPAL 50 IBR profile has a 0.68 shading coefficient compared to a 4mm clear float glass.
- Clear IBR sheeting will be implemented in the cinema tower, where the sun is blocked by mesh.

(Modek, 2009)
Why: The sheeting protects the cinema and also provides a screen for the cinema illusion. Two cinema projections are visible from outside through these screens at night time. They also house lighting equipment that emanates light, advertising the cinema's presence.
Manufacturer: Modek, Johannesburg.

MESH

Western and northern facades are protected from the sun with external metal mesh screens. These screens make it possible to have large glazed units on the western facade, which is the side with the best views. The mesh further enforces the idea of opening the cinema box, perforating the wall to make the form visible. The Baltic mesh screen has been selected from the GKD mesh catalogue.
Properties (GKD Mesh, 2009) :
- Shading, open area is 43%.
- Views are permitted whilst blocking the western sun.
- Size 6 000 mm x 8 000mm x 5.5mm.

OTHER MATERIALS

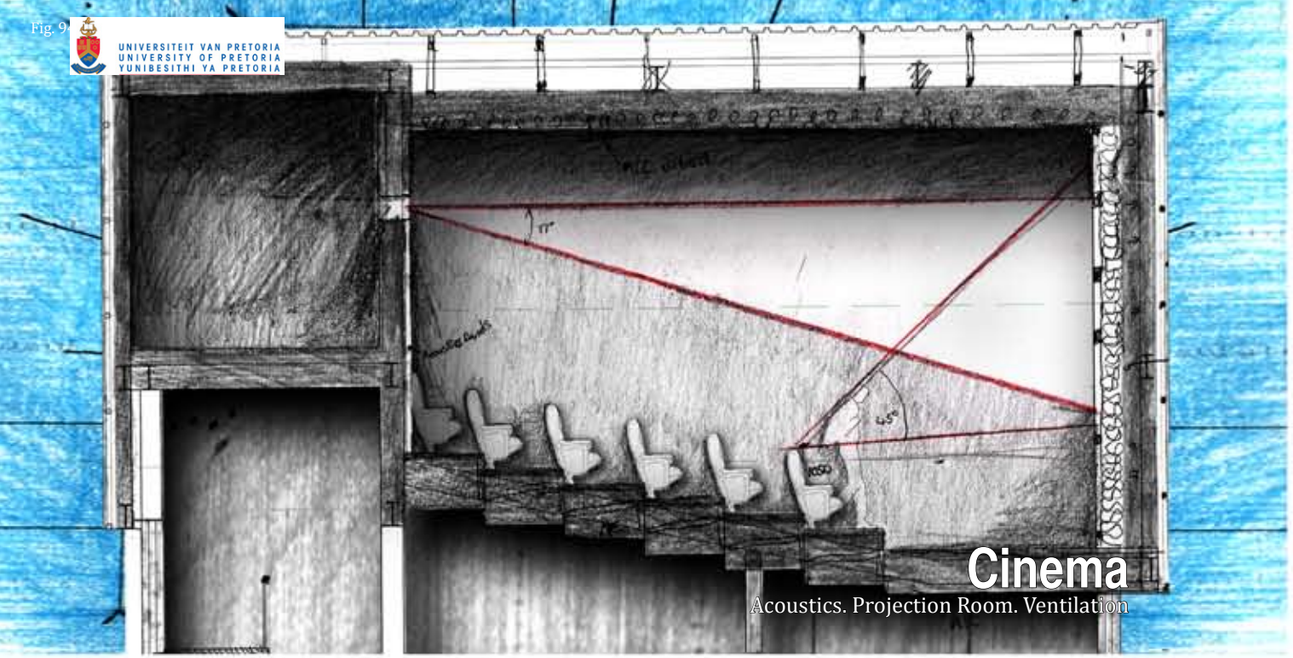
Drywall
Gypsum drywall will cover the periphery walls and have pipes and electrical services running behind them.
Manufacturer: Lafarge Gypsum

Concrete
The new cinema tower is supported by four existing columns and four new concrete columns.
Manufacturer: Pretoria Portland Cement.

Masonry
Masonry walls are constructed in the basement and archive where thermal mass and structure is required.
Manufacturer: Corobricks.

Steel
The cinemas are built with the use of steel, creating lightweight structures. The cinema tower is built up with steel trusses and secondary network lighter elements. The film archive is cladded with stainless steel floor and wall sheets.
Manufacturer: Highveld Steel, Witbank

Fig. 94



Cinema

Acoustics. Projection Room. Ventilation

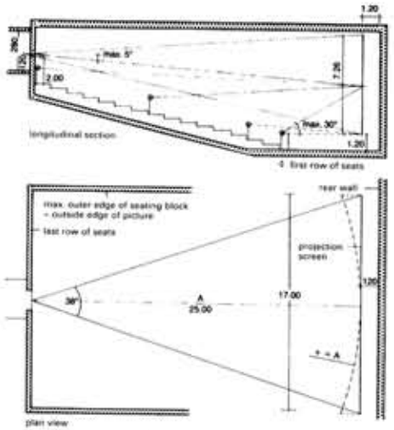


Fig. 95 Cinema Design, Neufert p: 489

Fig. 96 Projection room

INTRODUCTION

A revival house (repertory cinema) specialises in old films, but is also capable of projecting new releases. The range of film material extends to the equipment of the projection room. As an important in-house safety regulation no nitrate based (highly flammable) films will be projected; instead these films will be converted in-house to a safer polyester based film stock.

ACOUSTICS

Two problems exist: unwanted city sound (exterior) and film sound reverberation (interior). Sound from the city is removed from the interior cinema space with the help of composite wall structures consisting of a cavity, rock mineral wool insulation and a patented vinyl sound barrier.

Dolby Surround Sound relies on the multiple placement of speakers. A typical installation consists of two rear channels, two mid channels and two front channels with a subwoofer. The sound generated by these systems must be absorbed as quickly as possible. No reverberation is desired in a cinema. Absorbent acoustic panels are used in the wall and ceiling construction.

To prevent a standing sound wave one wall of the cinema is slanted.

VIEW/PROJECTION ANGLES

The projection port must be at least 2.1m higher than the seating auditoria. The central projection axis cannot slope more than 5° in either the horizontal or vertical plane.

Viewing angles are calculated in sections with a seated eye height of 1.12m from the floor level.

VENTILATION

The cinema is cooled from the floor level and warm air extracted from the ceiling. Ducts in the floor structure also service the foyer spaces below. The heat generated by the projector must also be extracted to protect the film stock and improve working conditions for the projectionist.

ACCESS

To utilise the form of the cinema auditorium, conventional cinema access is abandoned. The cinema is lifted from the floor level to create foyer spaces and a staircase promenade leads the viewer into the dark space.

A second cinema floor, serviced by a lift, caters for the elderly and differently-abled viewers of the cinema. This level is also used by projectionists.

PROJECTION ROOM

Controls the sound, lighting and masking of the cinema. Three optical glass ports, sound insulated, must be provided for the two projectors and the projectionist.

Equipment in a projection room:

- Projector - 8mm, 16mm, 35mm and 70mm formats must be supported. A 3D projector will adhere to the latest technological advancements in film. These projectors will be split between the cinemas; rather than having all of the formats supported in one cinema.
- Music table: Latest Dolby technologies, but also support for magnetic formats. Amplifier and music system for intermission music.
- Rewind bench.
- Switchboard.
- Storage (spares, films, light bulbs).
- Fire extinguishers.

(Metric Handbook)

SEATING

- Arranged according to horizontal viewing angles of 30º (Metric Handbook).
- Space between rows: minimum of 300mm required by SABS 0400.
- Vertical viewing lines determined in section.

FIRE

- SABS 0400 fire regulations:
- A maximum of 21m from seats to escape route.
- The composite wall structure must have structural stability of 120min.
- Smoke detectors.
- Minimum aisle width of 1.1m.
- Sprinkler system.

CITY CINEMA

Two of the cinema screens will be visible from the city at night. It will also allow the viewers inside the cinema a view of the city before the screening. This will be made possible by lifting the screen and retracting sun-blocking curtains.

In conjunction with LED backlights between the translucent skin and cinema wall the cinemas will, with the help of architecture become light emitting structures. This allows the urban city dweller to still proclaim his urban presence even though he is removed from the street.

Fig. 97

Film Archive

Temperature. Preservation. Digitising

Fig. 98 ArriScan, digitising equipment

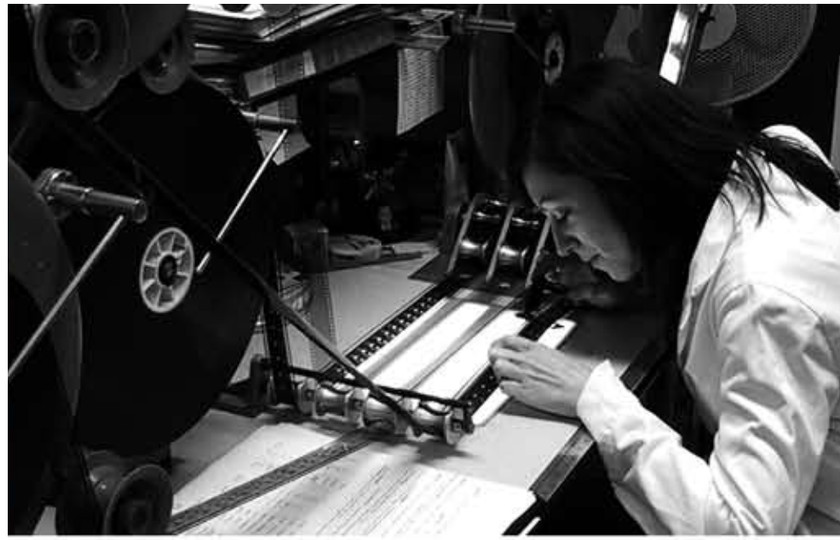


Fig. 99 Preservation at the BFI

INTRODUCTION

The film archive is an important time capsule and must hence be protected. Guidelines applied by famous archives, including the BFI, New Zealand Film Archive, UCLA Film Archive, Harvard and Hong Kong have been researched to formulate an ideal South African Film Archive.

NITRATE FILM

The film vault will store material ranging from as early as 1930 and will include recent South African releases. The only exception is Nitrate based film, which is an extremely volatile, toxic film stock especially vulnerable to temperature fluctuations, Kodak warns against temperatures as low as 41º (Kodak, 2009).

Nitrate film will be stored off-site, as does the New Zealand Film Archive, which uses an abandoned ammunitions bunker. The only exception is when an important piece must be preserved and digitised. This operation will be closely monitored and the material will be stored in small quantities in a well ventilated strong room. If a screening of a nitrate film is scheduled, the nitrate film will be duplicated on a Polyester film stock by the Arri Laser equipment in the Digitising Lab.

ARCHIVE

Historic and sensitive material is kept at 7ºC to prolong their life. The temperature control is separated from the building ventilation system, but can link to the system in case of a system failure. A generator also forms part of this safety net. Less sensitive material will be archived in the glazed viewing platform on the ground floor. Typical temperature for these materials is 18ºC.

INSULATION

Panels: The archive is clad in an insulated panel consisting of a stainless steel finish with a 32kg fire retardant polystyrene core. These panels come in widths of 1 170mm, are glued together and joined to the masonry structure with a patented sealed screw.
The local manufacturer (Panelworld) does not provide a U-value but an international manufacturer, Coldstream guarantees a value of 0.184 watts / m2 Kelvin on a 125mm thick panel (Coldstream, 2009).

Glazing: On the ground floor the archive wall is punctured by existing window openings to make the collection visible to the public. These openings are a potential thermal weakness of the system. A sealed double glazed unit, with low emissivity coating (8mm glass with 16mm cavity filled with argon gas) can achieve a U-value of 1.6 watts / m2 Kelvin (Airproducts.co.uk, 2009).
To minimise the thermal loss through the glazing material, less sensitive material will be stored on these floors, with higher temperatures.

Fig. 100 Proposed archive diagram

COMPARTMENTS

The archive is compartmentalised for a number of reasons:

- To contain the spread of fire.
- Effectively control temperature.
- Expansion – empty compartments can be locked and cut off from the ventilation system until they are required.

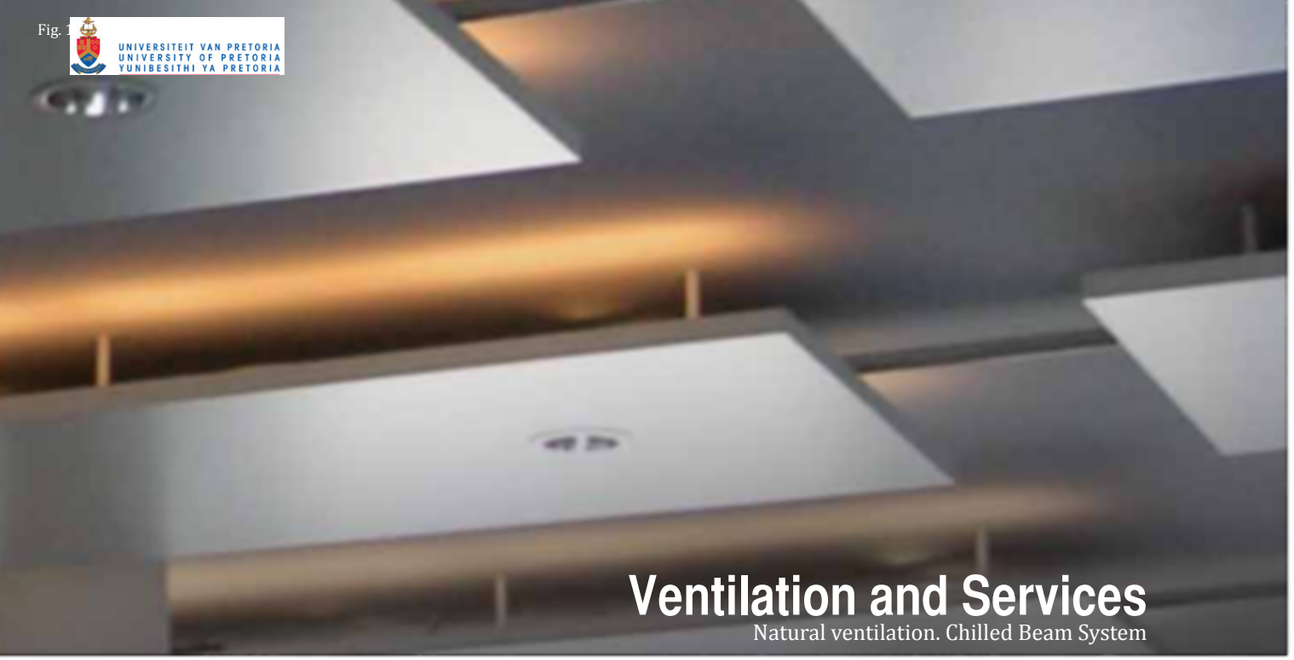
DIGITISING LAB

The digitisng lab offers the opportunity to convert old film stock to the digital archive. It also allows the duplication of sensitive material to be used for projection.

A film archive company, Arri provides the following equipment:
Arriscan - scan each frame of the film stock to a digital format
Wet gate system - cleans the film stock before scan procedure. Dust and scratches are removed in this process. The Arri system uses a less toxic liquid that does not require strict storage and security regulations like the old industry standard Tetrachlorethylene.
Arrilaser : a film stock recording device

Other facilities:
Light Table, Computer with video editing capabilities, other format video converters, work surface.

Fig. 1



Ventilation and Services

Natural ventilation. Chilled Beam System

INTRODUCTION

The fitment of a new air-conditioning system in the existing building envelope is difficult to achieve. Low ceiling heights and limited space means that suspended ceilings with overhead ductwork would not be possible. A hybrid active/passive system that eliminates the need for this configuration has been designed.

VENTILATION

The new atrium space cuts through all floors of the building and is roofed by the cinema tower floor. The basement is connected via an offset double storey.

This new system relies on natural ventilation, the stack effect to create a slow draft throughout the building. The hot, stale air is extracted at fourth floor ceiling level. Fresh air is introduced on the north and south walls of every floor.

COOLING

A cooled water pipe network with overhead suspended 'radiators' cools the air. A patented system, called the Thermasail is a thin profile suspended aluminium sheet. Copper coils with cooled water conducts the temperature to the aluminium sheet which in turn cools a larger area:

Properties (SPC, 2009):

- Lightweight.
- Slim profile, just 25mm.
- High water temperatures (16 – 18º) allows for efficient chiller operation.
- Lighting and other services can be accommodated into the sail.

MECHANICAL VENTILATION

With this system the plant room size is considerably smaller. Only the minimum allowed fresh air, according to SABS 0400 is necessary. The air is no longer cooled before it is introduced to the floors, instead it is mixed with the colder air in the spaces. The plant room is now merely an air handling unit.

Another important piece of equipment is the chiller. A chiller system by Voltas Technologies utilises the sun's energy to cool the water (Voltas Technologies, 2009).

Extractor fans, located close to the highest point of the atrium space, will control the air flow and temperature of the building.

SPECIAL REQUIREMENTS

Areas with special ventilation requirements are needed:

Projection room, the projectors generate vast amounts of heat and must be directly linked to a cooling unit.

- **Server room**: the digital computer database generates heat
- **Archive**: needs specified in archive section.

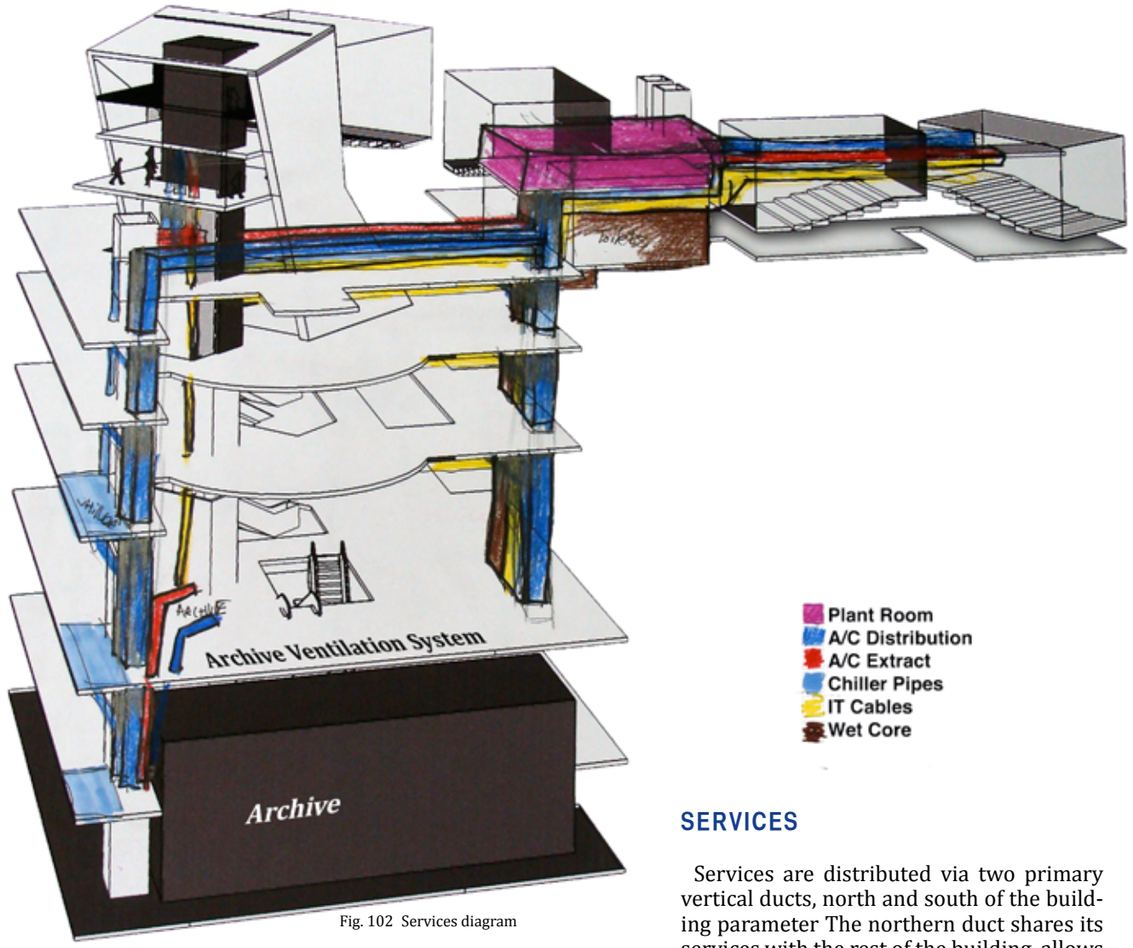


Fig. 102 Services diagram

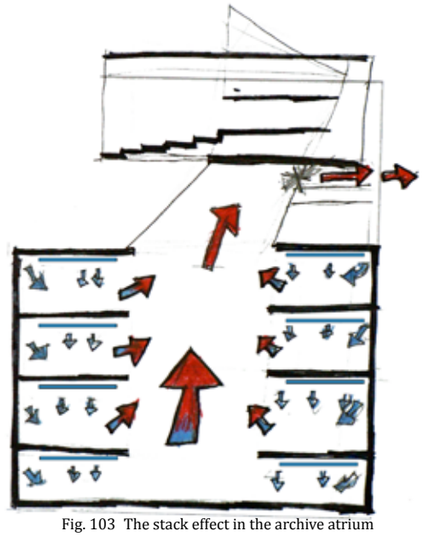


Fig. 103 The stack effect in the archive atrium

SERVICES

Services are distributed via two primary vertical ducts, north and south of the building parameter The northern duct shares its services with the rest of the building, allows for the possibility of an expansion of the air conditioning system throughout the site.

This northern duct also houses electrical conduits, IT cables and the piping required for the restrooms, all three of which are located on this vertical axis.

The second, southern duct delivers air conditioning ductwork, the chiller pipe network and also minor wet services, catering to the needs of a coffee shop and office kitchen.

The two ducts allow the building to be relieved of serviceable suspended ceilings, a commodity not available due to low floor to ceiling heights on some existing floors. Instead a periphery system delivers services to all the serviced areas with only limited use of suspended ceilings.

New rainwater pipes are also installed into these two ducts, the existing system in dire need of replacement.

Programme

Diagram illustrating the placement of the programme

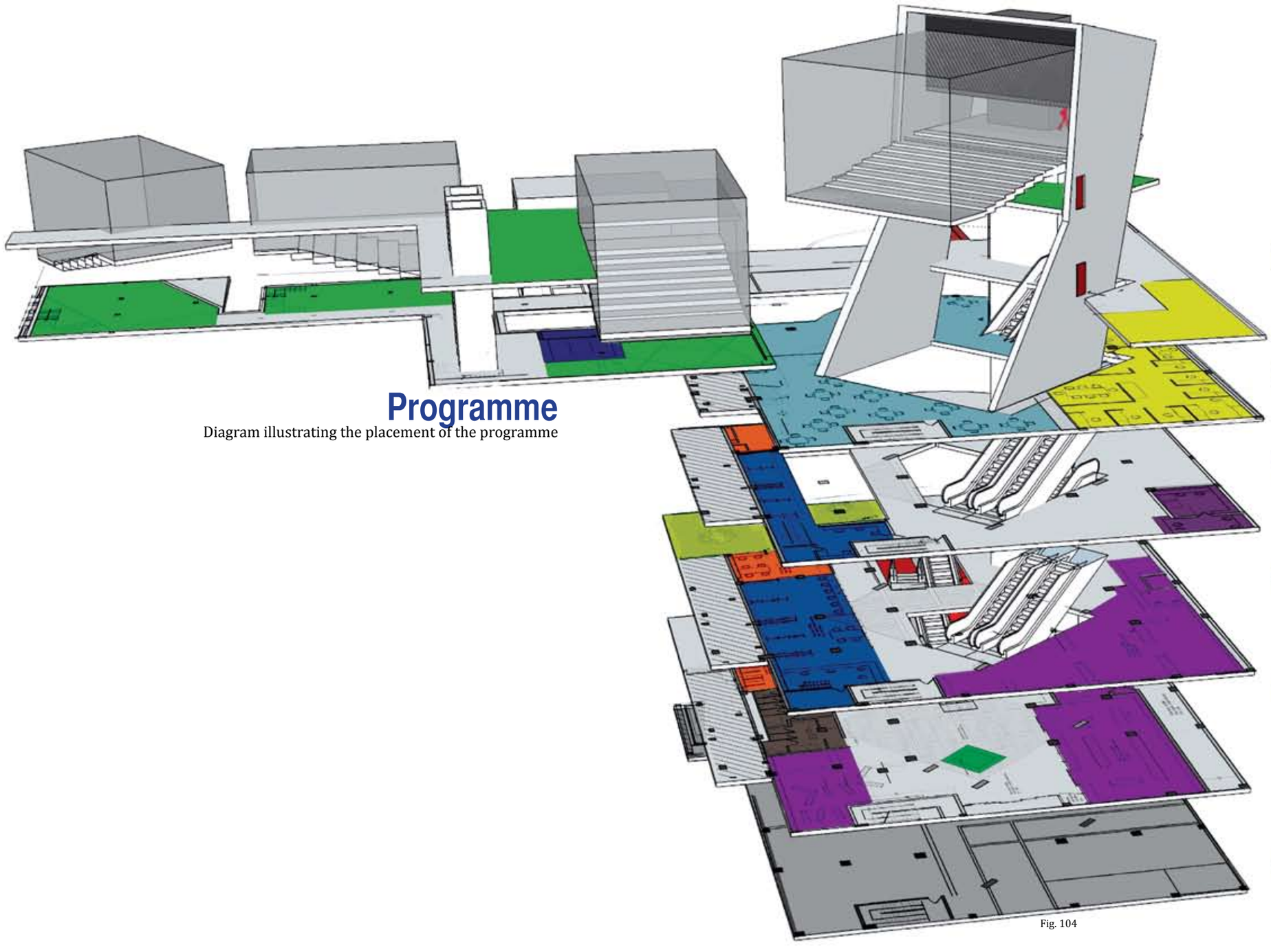


Fig. 104

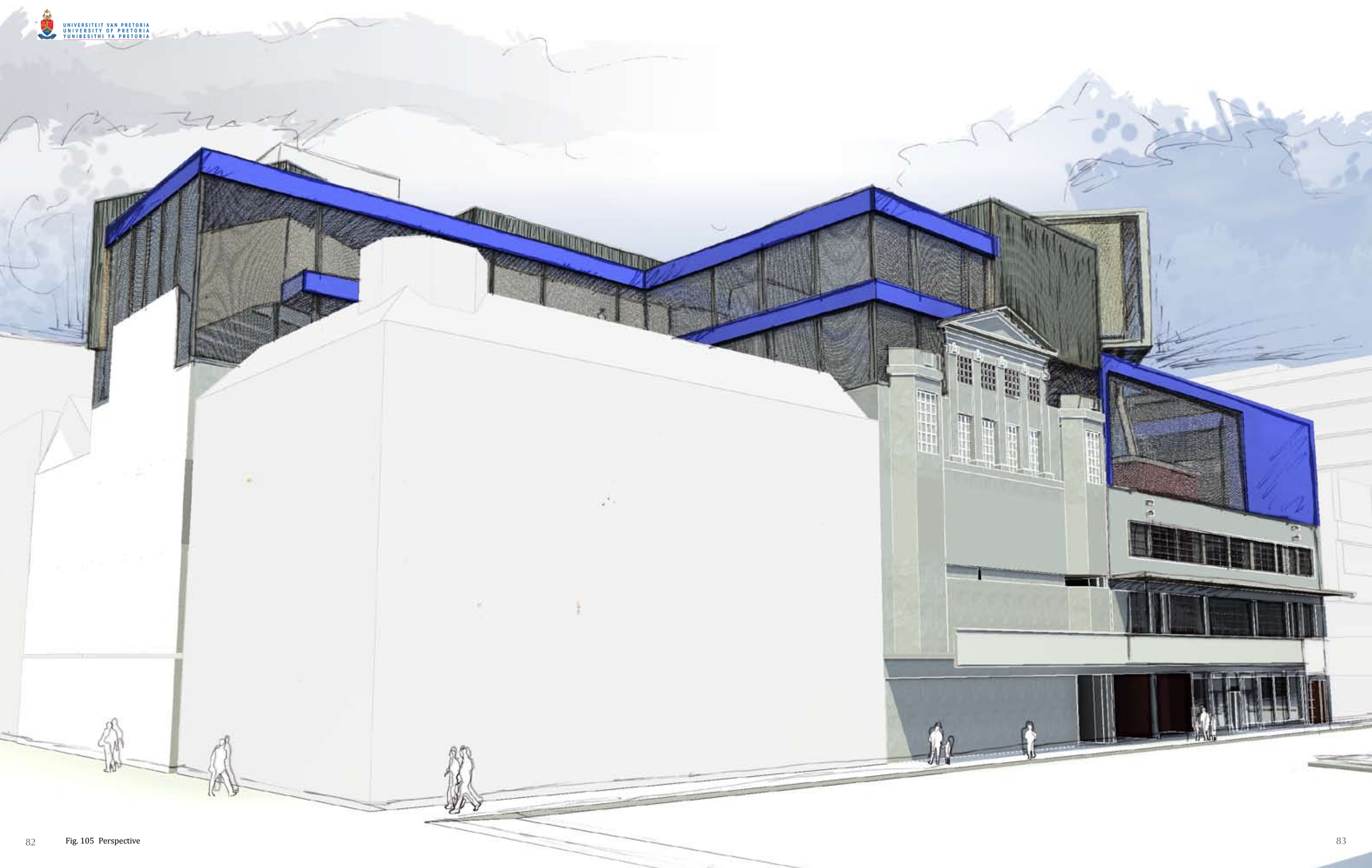


Fig. 105 Perspective