

Close out Report

of the New Universities Project Management Team on the

Development of New Universities in
Mpumalanga and the Northern Cape

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Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

Chapter 13

Architecture and buildings at University of Mpumalanga



13. Architecture and Buildings at University of Mpumalanga

13.1. CAMPUS BUILDING L001 – STUDENT RESIDENCE

The University of Mpumalanga in Mbombela (Nelspruit) opened towards the end of 2013. The design presented a unique set of challenges to consider tertiary education in post-apartheid South Africa.

The proposal for the residential buildings aimed to reflect the aspirations of this new university. Providing context-sensitive, high quality facilities was of primary concern. The predominant design objective was to create a secure living space for students that would be conducive to learning and enable positive social interaction.

The main east-west street formalises the axis on which the two residential blocks, the main university square and the library facility lie. The main entrance to the residential complex is on this street. The existing residential block north of the new building is incorporated into the new complex.

Architects:	Cohen and Garson Architects
Project Team:	Fiona Garson, Nina Cohen, Deborah Kirkman, Lwandile Maki, Yvonne Brecher, Valerie Lehabe, Similo Ndima, Nqobile Lombo, Claudia Bozzonetti
Structural Engineers:	SKC Masakhizwe
Mechanical Engineers:	Aurecon
Electrical Engineers:	PLP Consulting
Landscape Architects:	Insite Landscape Architects
Quantity Surveyor:	Siyakha
Civil Engineer:	Delta Built Environmental
Wet Services:	Delca Systems
Fire Engineer:	Aurecon
Environmental :	PJCarew Consulting
Audio-Visual:	Digital Fabric
Contractor:	Norse Projects
Photographer:	Richard Wilson
Text:	Fiona Garson, Jonathan Melamdowitz

Structured as a series of 'apartment blocks' with internal courtyards, the modular block is repeated and modified according to programmatic requirements. These blocks are arranged along an internal street, creating intimate public and social spaces.

There is a sense of permeability on the street level, encouraging interaction and encounters. The street widens to form a gathering space from which there is access to seminar rooms, parent meeting space and the student centre.

Each room has natural cross-ventilation and the façade pulls in and out to create deep inhabitable reveals that provide the needed shading. Each apartment consists of a common room from which one single and four double bedrooms are accessed. Entrance to four separate ablution facilities is via a discreet passage from the common room.

The courtyard typology was appropriate for the residential blocks in that it creates common public and private outdoor spaces. It is also climatically appropriate. The courtyards facilitate moments of calm in the university environment while providing social gathering spaces.

The intention was that the residences would create village-like social spaces, both inside the buildings and within the external spaces held by the modular blocks.

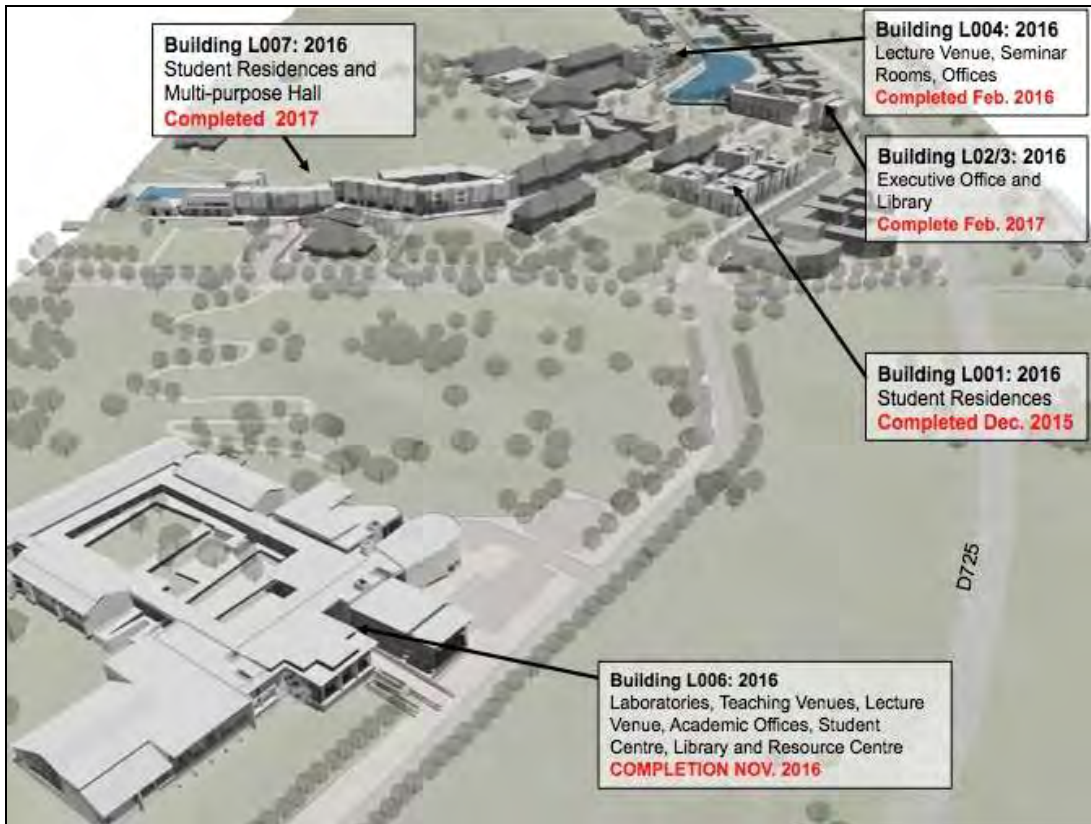
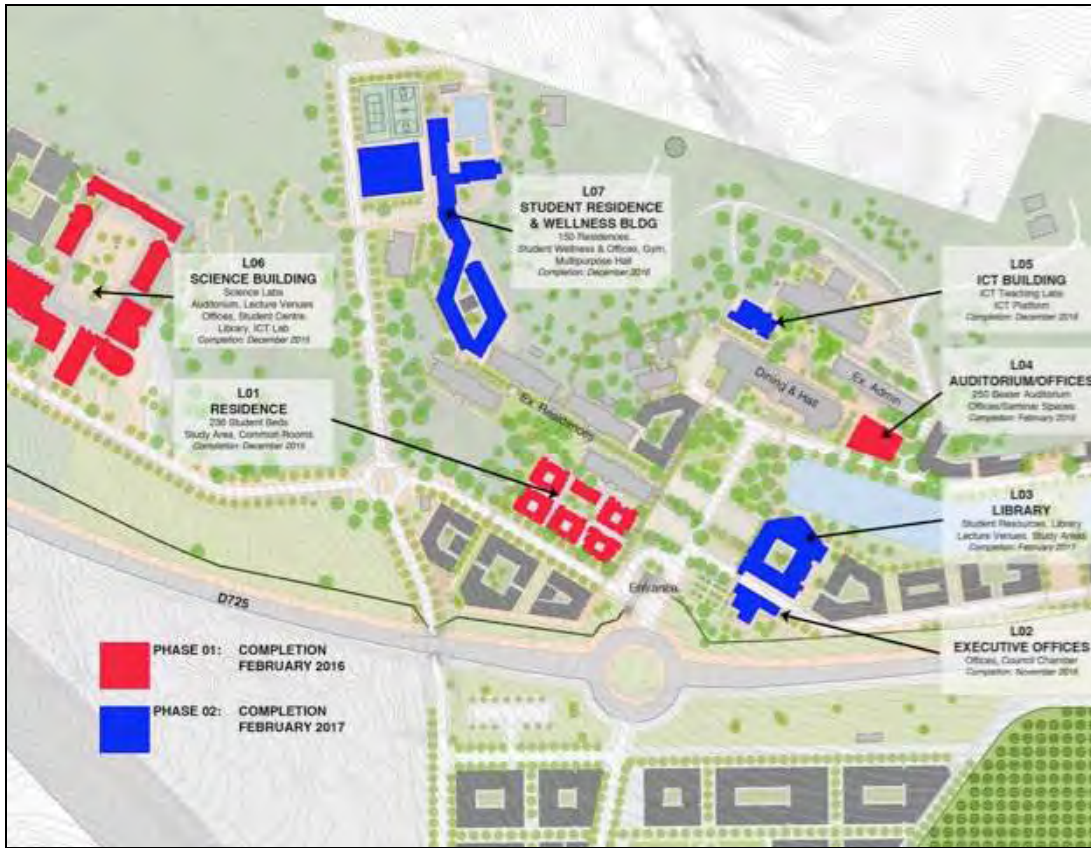


Fig 13.1 & 13.2: University of Mpumalanga 1st two phases of implementation. Phase completed during the 1st Quarter of 2016. The Wits PMT oversaw the development of the designs for structures completed in 2017.

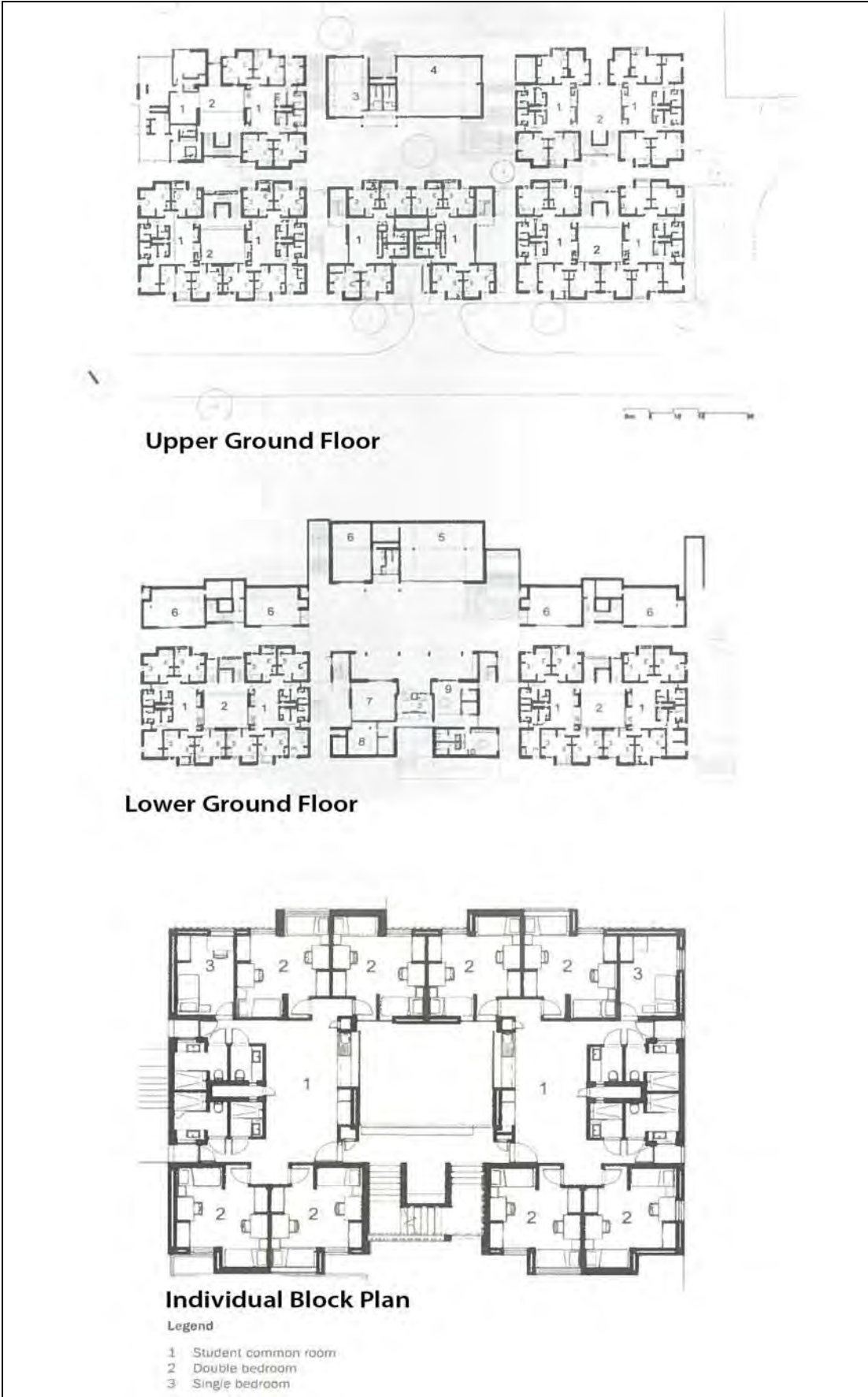


Fig 13.3: University of Mpumalanga Campus Building L001 – Student Residence.



Fig 13.4: University of Mpumalanga Campus Building L001 – Student Residence. Building accommodates 238 students, Game Rooms, Laundry, study spaces and seminar rooms. View of Residence Courtyards



Fig 13.5: University of Mpumalanga Campus Building L001 – Southern façade facing the campus entrance gate.

13.2. CAMPUS BUILDING L006 – SCIENCE LABORATORIES & FACULTY LIBRARY

This project consists of the conversion, renovation and new additions to the existing ‘workshop’ buildings on the University of Mpumalanga Campus in Mbombela (Nelspruit).

The site occupies a semi-isolated position on the western edge of the Lower Campus boundary and was intended to serve as a connector between the Lower Campus and the Orchards Campus. The existing buildings were previously used as workshops, agricultural sheds, academic facilities and for support services. In the

north were warehouses and workshops overlooking a central courtyard; in the west, buildings that had been used for agricultural training purposes; and in the east, buildings that had been used as small teaching spaces, with ablution facilities.

The site sits within a rock formation pocket with sensitive vegetation. As a result, the footprints of the existing buildings predetermined a ‘build to’ line. The existing buildings were generally located on three distinct platforms at varied levels.

The general key directives were as follows:

- Universal access for students with disabilities;
- Circulation to be viewed as an extension to academic/student space;
- Connection of all buildings into a cohesive whole;
- Retention of existing established trees;
- Variation of built format strategic intervals;
- Axis and landmark through the centre of the existing courtyard;
- Service and delivery access away from the active public edges;
- Provision of 15-20 parking bays.

The existing hard-surface courtyard space was to be reinvented and energised as an intermingling device associated with the vibrancy of campus life and a buffer space during interludes.

The general design approach was one of rejuvenation, reclamation, environmental cueing, soft intervention and visual connection, and re-establishing roots within the landscape. The new building components were inserted as a ‘plug’ into the southernmost end of the existing courtyard to bring cohesion to the existing and new building masses and to create conducive conditions for zones of hierarchy and buffer space, as well as landmarks for orientation and connection.

Architects:	Conco Bryan Architects
Structural Engineers:	Aurecon
Mechanical Engineers:	Aurecon
Electrical Engineers:	Delta Built Environmental
Landscape Architects:	Insite Landscape Architects
Quantity Surveyor:	SBDS Quantity Surveyors
Contractor:	Trencon Construction
Photographer:	Llewellyn Bryan
Text:	Conco Bryan Architects

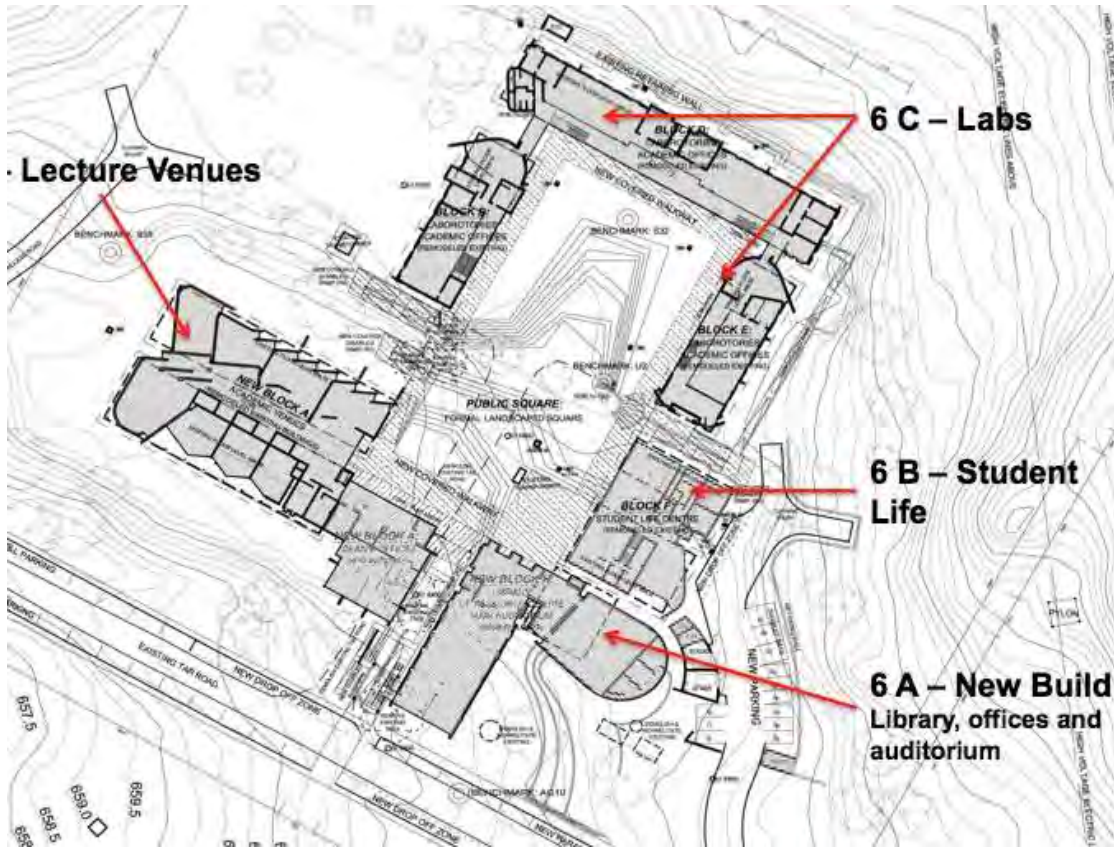


Fig 13.6: University of Mpumalanga Campus Building L006 – Science Laboratory Building. Function floor Plan



Fig. 13.7: University of Mpumalanga Campus Building L006 – Science Laboratory Building. The building accommodates a variety of laboratories, lecture venues for 750 students, a raked auditorium, offices, an ICT Centre and student centre.



Fig 13.8: University of Mpumalanga Campus Building L006 – Science Laboratory Building. 250 seat raked Auditorium



Fig 13.9: University of Mpumalanga Campus Building L006 – Science Laboratory Building.

13.3. CAMPUS BUILDING L004 – MAIN AUDITORIUM AND ACADEMIC OFFICE BLOCK

Building LP004 on the Lower Campus of the Mbombela Campus contains the Main Auditorium for purpose of public lectures, a number of teaching spaces, academic offices and meeting rooms. It is located adjacent the existing university hall and administration building. The building is located along the University Walk which links all the existing residences, the new Student Wellness Centre and Multi-purpose Hall, the dining hall. The ground floor comprises the most accessed spaces, being a 250-seat raked lecture theatre and seminar rooms. A conceptual open circulation system has been implemented, cutting through the building in a north south direction. The main lecture theatre will open onto a new landscaped pedestrian “walk” to the west.

Architects:	TC Design Architects
Structural Engineers:	Aurecon
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Electrical Engineers:	Delta Built Environmental
Fire Engineer:	Aurecon
Environmental :	PJCarew Consulting
Landscape Architects:	Insite Landscape Architects
Quantity Surveyor:	SBDS Quantity Surveyors
Contractor:	Trencon Construction

First and second floors comprise a combination of smaller interactive teaching spaces and offices. The configuration allows for outward facing rooms that can be naturally ventilated by simple opening window sections, in addition to air conditioning. The design proposes using open bonded honeycomb. An internal courtyard provides for circulation, balanced lighting and cross ventilation. Courtyards have proven to be problematic as driving rain enters, causing flooding of passages and some of the offices. Courtyards have since been closed with lightweight translucent roof to shield from rain.

Building L004 is also part of an attempt to create an identity for the university, so transforming a small rural facility into an expansive educational campus. The building is by far the smallest of the new campus buildings, and conforms to a material palette agreed upon for all of the new campus additions. The challenge was to create a sense of belonging for its permanent occupants while also accommodating the daily thoroughfare of students occupying the auditorium and seminar spaces

A sculpted brick façade wraps the structure and filters light ingress, provides security and access control and encloses the compact footprint and form. While the vertical spatial hierarchy seemingly reserves the upper levels for academics and support staff and creates access control points in its vertical circulation, the interspersing of various informal lecture facilities and unprogrammed social spaces throughout the upper levels underpins the multi-functional, non-hierarchical nature of the project.

As an environmentally sensitive response to the local climate, the masonry and concrete structure provides considerable thermal mass while the façade is selectively opened to enable natural ventilation. In consultation with the mechanical engineers and environmental consultants the architects developed a holistic ventilation strategy by shading the structure to limit heat gain, using the central courtyard as exhaust, allowing large openings for natural ventilation and limiting air-conditioning to the offices and seminar spaces.



Fig 13.10: University of Mpumalanga Campus Building L04 – Administration Building Plans



Fig 13.11: University of Mpumalanga Campus Building L04 – Administration Building with Public Lecture Venue, seminar spaces and offices.



Fig 13.12: University of Mpumalanga Campus Building L04 – Administration Building 300 seat public lecture auditorium.



Fig 13.13: University of Mpumalanga Campus Building L04 – Administration Building.

13.4. CAMPUS BUILDING L002 – EXECUTIVE OFFICE BUILDING

(Designed under NUPMT to Stage 6 and taken forward by UMP)

Originally Building LP002 was conceptualised as a Faculty Office building linked to the Lower Campus. Discussion with the newly appointed executive team and Vice Chancellor of the university, highlighted the need to change the building into an Executive Office. The accommodation of the building was extended to include offices for the Senior Executive management team including the Chancellor, Vice Chancellor, four Deputy Vice Chancellors all with individual PAs, and additional executive offices, a Council Chamber for 34 people, and Council meeting room. Three boardrooms and three seminar rooms are also provided. An entrance foyer, exhibition area and necessary ablutions and kitchenettes were designed on ground floor to host visitors and guests to the university.

The Executive Office building is accessed through the memorial garden, established at the launch of the university in 2013. An interactive connecting reception foyer space, shaded and screened, connects to the upper floor office wings.

The plan of the building is derived from efficient office planning, a central passage with spaces on either side. The form consists of a long rectangular brick strip with brick breezeblock screens at each of the short ends and deep slot windows on the north façade, which allow and control the entry of north light into the building. On both the north and south sides, rectangular screens project from this central brick strip. These projections are faced with a combination of Winblock, terracotta tiles and brickwork panels creating interesting patterning. The south projecting element is entirely glazed on the south side affording the occupant soft south light and beautiful views over Mbombela. This glazing opens onto narrow balconies, accessed from the offices. The Council Chamber, located on the top floor is articulated with sheer frameless glass panels overlooking the city.

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Fire Engineer:	Aurecon
Environmental :	PJCarew Consulting
Audio-Visual:	Digital Fabric
Contractor:	Norse Projects



Fig 13.14: University of Mpumalanga Campus Building L02 – Executive Office Building. Building accommodates the university executive, boardrooms, dining amenities and council chamber. The NU PMT oversaw the design of the building, and UMP its construction.



Fig 13.15: University of Mpumalanga Campus Building L02 – Executive Office Building. University Council Chamber.

13.5. CAMPUS BUILDING L003 - LIBRARY

(Designed under NUPMT to Stage 6 and taken forward by UMP)

Building LP003 is the Library and IT Student Resource Centre of the Lower Campus of the Mbombela Campus. The Library includes a foyer and exhibition area, helpdesk, open loan area, reference area, on-line reference and research area, archive gantry, research commons, general study areas, supporting offices including book storage and processing, and necessary ablutions. A 90-seater cinema style teaching lecture venue and IT teaching facilities and seminar rooms are located adjacent to the library. The building accommodation is positioned around a secure courtyard with rich planting and outside study areas.

The brief evolved through engagement with the client and university library experts. The mixed-use nature of this building is an interesting model for a resource centre.

Although its main function is a library, it also includes an auditorium with associated breakaway, seminar/learning rooms and an IT learning centre. All accommodation is accessed through the secure internal courtyard, which acts as outdoor foyer.

Although books have been catered for, the Library and IT Student Resource Centre are integral elements of this digitised library for a 21st Century university.

The design intent was to create a strong edge to the square and give iconic presence to the Library, the 'knowledge centre' for the university. The library is a two-storey double volume 'container' that appears suspended over the colonnade that edges the square. Environmental comfort and long-term sustainability underpinned many of the design decisions. The heavily massed wall of the library responds to both climate and functional needs. The shaped brickwork screen wall, with texture reminiscent of African basket weaving, provides a protective climatic skin externally, shielding the building from the harsh west sun and allowing for the play of light on the surface.

Internally, the wall is recessed to accommodate bookshelves, with a 'screen of books' running one metre from the external wall following its profile. At roof level the wall is raised to allow diffused east light into the building. The ribbon of double volume bookshelves is integrated with a 'displacement ventilation' cooling system. Windows can be opened to provide natural cross ventilation when weather permits. During hot weather, occupants can choose to switch on individual air-conditioning units, activating the library displacement ventilation system, which delivers cost efficient cool air directly to the occupant at low level via the library shelving system and, at mezzanine level, via the balustrade. The cost of imported ventilation outlets has been saved and life-cycle costs have been reduced.

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Landscape Architects:	Insite Landscape Architects
Quantity Surveyor:	Siyakha
Civil Engineer:	Delta Built Environmental
Wet Services:	Delca Systems
Fire Engineer:	Aurecon
Environmental :	PJCarew Consulting
Contractor:	Norse Projects



Fig 13.16: University of Mpumalanga Campus Building L03 – Library and Student Resource Centre. Building sits behind the Executive Office. The NU PMT oversaw the design of the building, and UMP its construction.



Fig 13.17: University of Mpumalanga Campus Building L03 – Library and Student Resource Centre. 1st floor library area with shelving and study areas.

13.6. CAMPUS BUILDING L005 – ICT ACADEMIC BUILDING

(Designed under NUPMT to Stage 6 and taken forward by UMP)

Building LP005 on the Lower Campus of the Mbombela Campus contains the ICT Academic Teaching Block. It is located within the courtyard of the existing dining hall and administration office building and defines its western edge. The main function of the building will be to house the ICT teaching spaces required by the university. In addition, the building will contain a number of academic staff offices and associated functions.

Architects:	TC Design Architects
Structural Engineers:	Aurecon
Mechanical Engineers:	Aurecon
Electrical Engineers:	Delta Built Environmental
Fire Engineer:	Aurecon
Environmental :	PJCarew Consulting
Landscape Architects:	Insite Landscape Architects
Quantity Surveyor:	SBDS Quantity Surveyors
Contractor:	Trencon Construction

The brief originally called for the inclusion of the central server room and campus BMI office. Additional support spaces such as a backup generator and ICT workshop space were also proposed for inclusion. Following consultation with the university the server room, BMI, backup generator and workshop spaces were omitted from the brief in favour of additional academic staff office space. These facilities will be accommodated elsewhere.

The main accommodation of the building consists of two large teaching venues on the ground and first floors. Each venue can accommodate 120 students and is designed to be as flexible as possible. The ground floor teaching space is a permanently dedicated space for 120 students whilst the first floor teaching space is designed with a stacking acoustic wall providing for the potential division of the space into two venues.

The second floor contains 13 offices, a meeting room and associated staff kitchenette and WC facilities. The plant room, housing the environmental control equipment serving the building, is also situated on this level. Ancillary spaces attached to the building include the building refuse store, incorporating the both recyclable and non-recyclable bin storage; and a fire water tank enclosure, to serve this section of the campus.

A sculpted brick façade wraps the northern and western side of the structure and filters light ingress, provides security and access control and encloses the compact footprint and form, while the southern and eastern facades, which overlook the central courtyard and dining facilities, open up by way of a generous verandah on the upper levels.

Vertical spatial hierarchy reserves the upper levels for academics and support staff and creates access control points in its vertical circulation. Access control and securing of the expensive equipment were an important design driver, and were resolved through a combination of control gates and vertical separation.

In consultation with the mechanical engineers and environmental consultants, the architects developed a holistic ventilation strategy by shading the internal facades to limit heat gain. The large overhang also prevents direct sunlight onto the wall and glass surfaces of the building.



Fig 13.18: University of Mpumalanga Campus Building L005 – ICT Academic Building. The building accommodates ICT Workstation for 240 students, with offices on the upper floor. The NU PMT oversaw the design of the building, and UMP its construction.



Fig. 13.19: University of Mpumalanga Campus Building L005 – ICT Academic Building. View of construction June 2017.

13.7. CAMPUS BUILDING L007 – RESIDENCE, MULTI-PURPOSE & WELLNESS CENTRE

(Designed under NUPMT to Stage 6 and taken forward by UMP)

Building LP007 is a complex, multifaceted and multi-use building designed to be phased over three stages. It comprises a new Student Life Centre, Student Union and Clubs, Student Recreational and Sports Facilities, Student Health and Wellness Centre and a 150 bed Student Residence.

A student promenade and terraced connection zone has been introduced to link the new and existing facilities, extending and reinforcing the pedestrian route that connects the new library

facilities, existing student residences and existing sports facilities. The design responds to the levels of the site, and the placement of buildings maximises the views over the city. The design proposal also allows for the provision of a sports hall facility, which is currently being planned.

Student accommodation is grouped into apartments of eight bedrooms sharing a central living space and kitchenette that are structured around a courtyard. The material palette for the new development reflects the natural colours found in the Mpumalanga landscape. The core material for the buildings is face brick. The residential component conveys a solid external appearance with punched windows. At lower level is an internal courtyard framed by steelwork balustrades, planting and splashes of colour. The public areas that slip below the student apartments have a lighter quality, with screened glazing ensuring a visual connection to the promenade.

The second part of the building complex is the Student Wellness Centre, which is placed behind the residence component and faces onto the existing swimming pools. It accommodates a gym, medical facilities, ablution and shower amenities linked to the swimming pool and student union offices and seminar spaces.

A multi-purpose Hall was always planned as a later extension to the project, as the university has no large venue to host graduations, or large festivities. The multi-purpose Hall has a capacity of 1000 people. The hall can also be used for indoor sport events, cultural festivities, movies, as well as a large exam hall. The hall is also served by a catering kitchen, ablution and a number of seminar and office spaces.

Environmental Comfort: Shutters over the residential windows shield the building from the east-west sun, controlling glare and heat gain. Patterned brickwork screens wrap around the public spaces. The screens allow for cross ventilation whilst maintaining privacy and security and are an expressive means of exploring texture and the filtering of light. The east west orientation of the building plus other adverse site conditions, have added substantial costs to this building.

Architects:	GAPP Architects and Urban Designers
Structural Engineers:	Aurecon
Mechanical Engineers:	Aurecon
Electrical Engineers:	Delta Built Environmental
Fire Engineer:	Aurecon
Environmental :	PJCarew Consulting
Landscape Architects:	Insite Landscape Architects
Quantity Surveyor:	SBDS Quantity Surveyors
Contractor:	Trencon Construction



Fig 13.20: University of Mpumalanga Campus Building L07 – Residence, Student Wellness and Multi-purpose Hall Project. The building planned over two phases accommodates 140 student beds, a student wellness centre, gym and student union offices as well as a multi-purpose hall for 1000 people.



Fig 13.21: University of Mpumalanga Campus Building L07. The NU PMT oversaw the design of the building, and UMP its construction.