Significant designs displaying diversity in architecture by ARC Group

The architects at ARC Group have over the years shown a sensitive and understanding approach to educational and commercial developments on the African continent, keeping the specific needs of the end user in mind. Having obtained expertise in various fields including educational and corporate, the practice takes on different projects of varying complexity and sizes with proven success ~ with numerous awards bearing testimony to this. The multi-faceted architectural firm is currently involved in a number of large and small projects. In this article we examine two of the group's recent projects, Engineering 4.0 at the University of Pretoria and The Ingress in Waterfall Estate.

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Engineering 4.0 at the University of Pretoria

The Ingress in Waterfall Estate

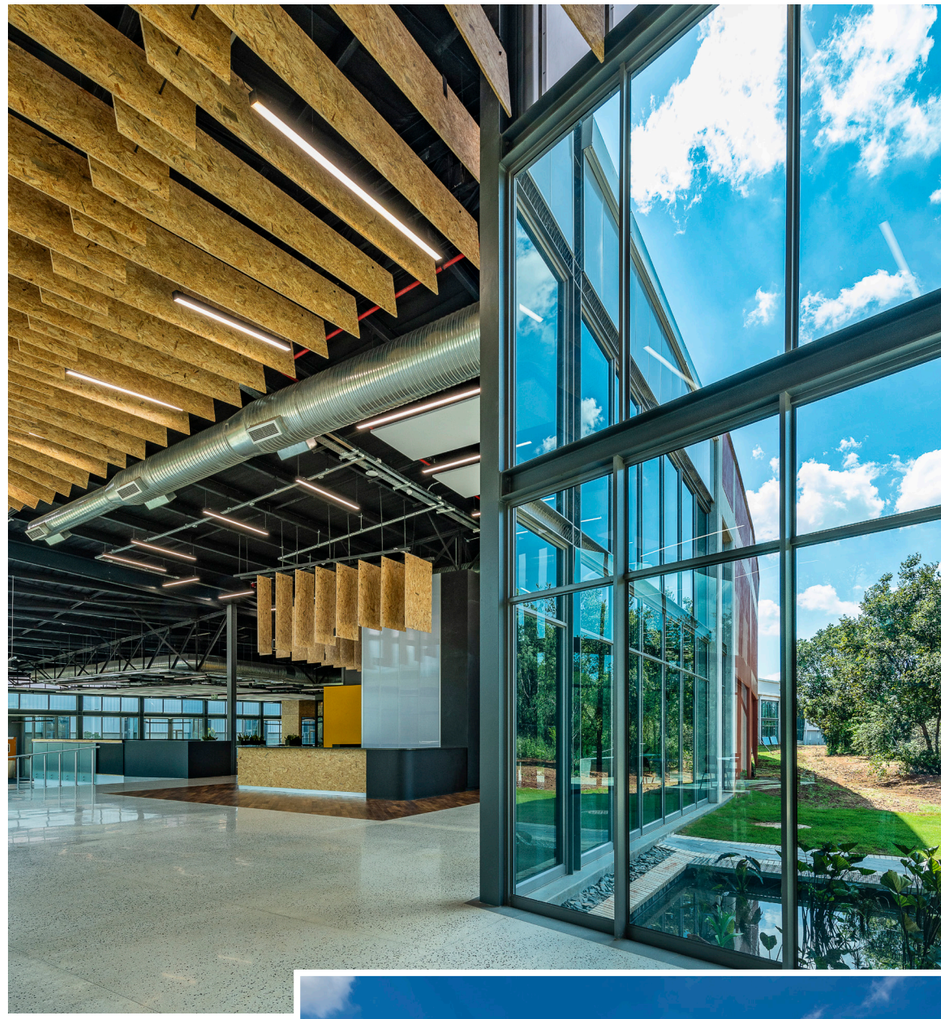
Engineering 4.0 at the University of Pretoria operates as both a learning and testing facility in an all-inclusive design. The building accommodates a civil engineering laboratory with smaller laboratories and brings the outdoor characteristics of civil engineering indoors through an interactive design.

Although the facility requires a large open warehouse-type building, the external design circumvents being just a rectangular structure by incorporating several innovative features whitch address sustainability, energy efficiency and biophilia.

Education and training is supported by open architecture by means of glass-floored sections displaying reinforcing to concrete structures. On the upper level services and open roof structures display trusses, insulation, open HVAC systems with their unique intricacies and co-ordination. Also showcased is the visible ablution services corridor.

The facility provides for six major testing areas. The first being a SANRAL training laboratory with 20 dedicated stations for the training of civil engineering geotechnical laboratory technicians. The layout allows for each technician to independently conduct testing and certification. This practical operation is a culmination of prior distance training via virtual reality.

The second facility hosts the SANRAL National Road Materials Reference laboratory. This facility is unique in that it will conduct duplicate testing of road building materials for



South Africa, but also serves as a proficiency testing laboratory to conduct comparative testing between south, southern and African laboratories, as well as selected international laboratories.

The third facility is a large concrete research laboratory. It provides for dedicated materials preparation areas, and unique curing rooms where large ranges of temperatures and humidity levels can be manipulated for treating concrete samples. It also facilitates a 300m^2 strong floor that consists of 900mm deep reinforced concrete with a compressive strength of 80+MPa. This floor is used to conduct various types of large-scale tests on structural elements to determine characteristics and failure criteria.

The creativity of the design lies in its functionality with an impressive external envelope and meticulously designed flow patterns reminiscent of a machine. The design solution departs radically from the typical civil engineering laboratory with limited light and views. Intrinsic to the design are shaded glass façades, providing views and interaction with the natural forest surroundings.

This aspect subscribes to the principles of biophilia which enhances the wellness of the users.

All external concrete walls are of tilt-up design that involves the casting of wall elements in stacks and lifting them into position on pad foundations. This approach made sense due to the weak soil conditions and extensive foundations that would have been required if normal brick-type walls were used. This relevance also allows for another educational opportunity for students to see the result of such tilt-up construction at close range.

Being a phased development, the foyer area is central and situated between a longitudinal spine and intersecting main radial communication concourse. Accommodating the main reception, it serves the training, reference and concrete laboratories. Through this approach the reference laboratory can also be operated as a sterile area where only dedicated staff and materials can enter without any influences from students. The foyer accommodates a collaborative working space and auditorium area.

The design is supported by external landscaping with several water features and garden seating options conforming to the natural and established greenery. The main entrance of the building allows for an informal and friendly reception and easy access to the outdoors through large framed glass tilt-up doors.

A stormwater retention model was followed during the design, allowing for all stormwater generated on the development to be managed. A primary attenuation and secondary retention pond was constructed. The lined primary pond allows for stormwater attenuation for a 1:50 year flood and serves as a sediment trap with water plants acting as treatment of the water to enhance water quality. The unlined secondary pond, is mostly covered by natural grass and serves to lessen the effect of overflow from the primary pond in flood conditions, preventing erosion and enhancing the replenishment of the natural ground water table.

The facility makes a significant impact as it provides for a reference testing laboratory of all national roads in South Africa and the certification of technicians responsible for laboratory data for most roads in Southern Africa.

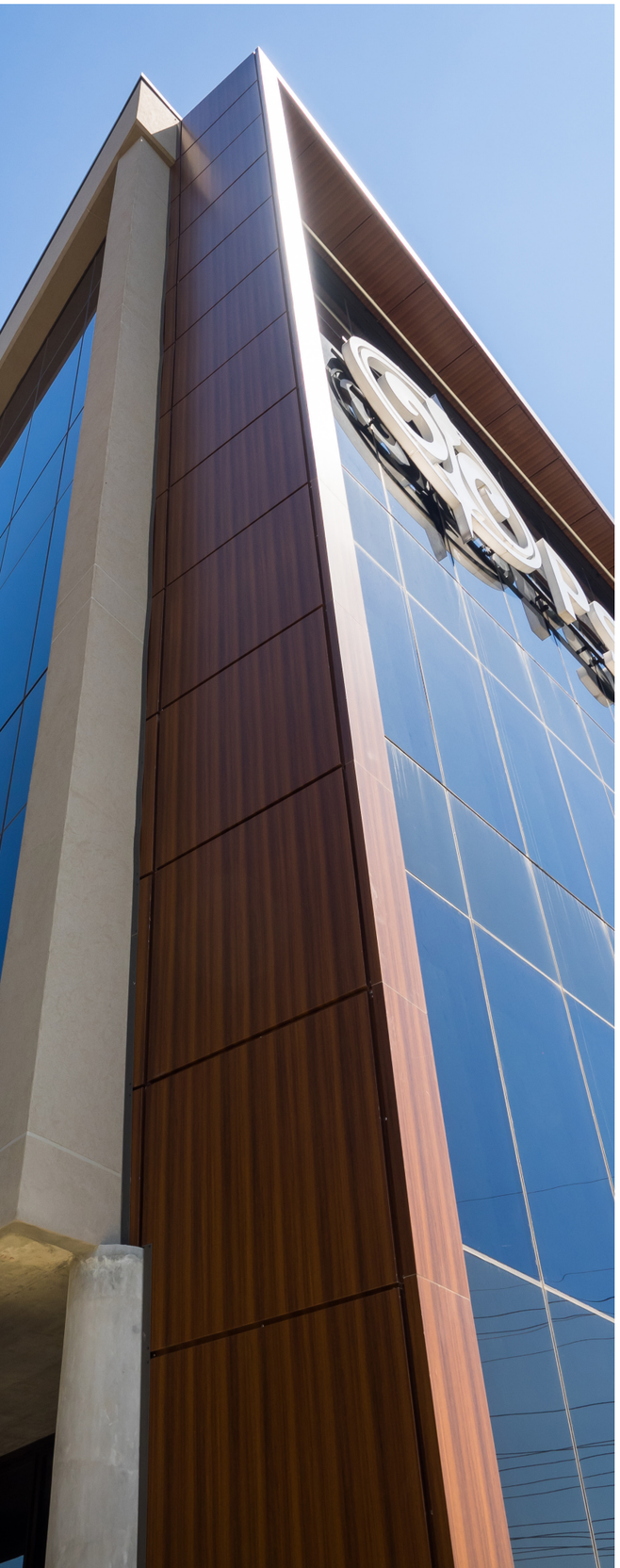
This project is a world-class facility for the training and education of future civil engineers and aims to change their perceptions of creative solutions in their work.

The Ingress is a commercial office precinct, consisting of five buildings of 3,500m² – 4,500m² and is located in Waterfall Estate, at the main entry road to the Mall of Africa. Buildings 1, 2 and 3 are located on the eastern periphery of the central landscaped podium to form the first phase of the development with ample parking decks below. The building design accommodates both individual tenants per buildings, or multi-tenanting across four levels.

With PSG Consult as tenant of the entire first building, the four-storey design offers a vibrant and fully integrated work environment which represents the ethos of the wealth management group.

The building is defined by clean structural lines and clear views of the city. In comparison to all developments in Waterfall City and in line with highest environmental standards, The Ingress prioritizes sustainability and green design as is evident in the façade design.

Alternative façade solutions were developed to address the different thermal and glare conditions each façade faced as was analyzed by 3D modelling and thermal design software. These include unitised systems with the incorporation of both horizontal and vertical louvres, dependent on the sun angles. The harsher western-facing conditions were addressed by deep-set windows and large balconies with magnificent views over Kyalami.



As the north-eastern corner has visibility from the N1 highway of over 3km away, the façade was kept clean, but framed by a timber-look aluminium cladded frame.

To sustain thermal comfort, darker shaded double glazing was used in these areas. This focal point on the buildings further offers the tenant prime signage opportunities. The rest of the façades consist of cavity brick walls cladded with Equitone cladding to further contribute to the comfort conditions internally. These components work collectively to ensure all buildings within the office park will perform to the highest environmental standards.

The second phase of the development sees the inclusion of two more buildings towards the west which will bring the development to approximately 22,000m² of GLA. All five buildings within The Ingress are designed to link and spill out into private social spaces for each tenant to contribute to better WELL-design, which rates the user experience of a building.

This is enhanced with views over landscaped areas as well as a central water feature for both visual and audible stimulation, to reduce the noise of the corporate world. The central podium is covered with landscaped planter pockets and paved walkways around a shared coffee shop facility.

The facility operates from two refurbished containers with deck seating covered by timber and steel pergolas to eventually host creeper planting. The facility further provides bicycle parking and shower facilities to accommodate pre-or post-work training sessions.

The character of Waterfall Estate living is of a relaxed nature with many shared social areas and the buildings within this office park complement this through bespoke design, display of clean lines and the warm tones of its glass façade and finishes. The Ingress, as a bespoke office park with its own unique identity set within a greater lifestyle park, offers access to these endless facilities right at the precinct's doorstep for that ultimate live-work-play (shop) balance. **A+**

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