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DECEMBER 2025

2025 BEST PROJECTS

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CONTENTS

26
Building Contractors: Transnet SOC Head Office

40
Consulting Engineers: Canelands Pipe and Pedestrian Bridge

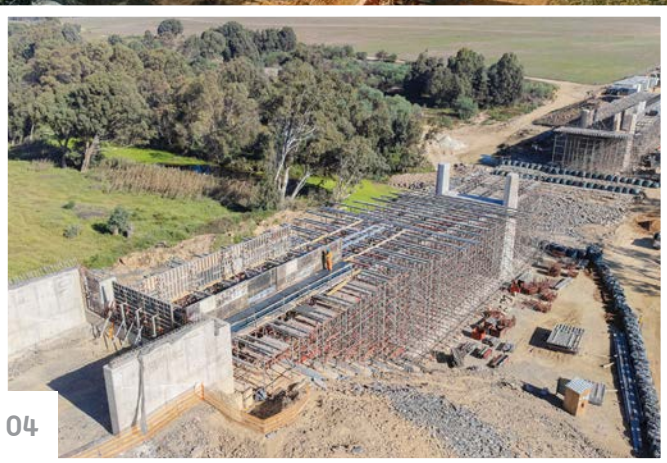
54
Architects: New Educational Dome and Experimental Garden, Greenpoint Park

60
Specialist Suppliers: Blundell Road Bridge

68
Specialist Contractors: Controlled Blasting and Toppling of Compromised Converter Stack

82
Civil Engineering Contractors: Kariba Dam Pool Rehabilitation Project

86
AfriSam Innovation Award for Sustainable Construction: Kariba Dam Pool Rehabilitation Project



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ON THE COVER

The busy N7 highway on the west coast of the Western Cape province will soon be even safer when H&I Construction completes the Van Schoorsdrif interchange about 15 km north of Cape Town's suburb of Milnerton.
This project removes one of the last at-grade intersections on the N7, which have increasingly presented a safety hazard as the fast two-lane highway becomes increasingly well-used by commuters, tourists and industry. Commissioned by the Western Cape Department of Infrastructure, the safety improvement project includes 5 km of greenfields road and six bridge structures, Willem Olivier, Contracts Manager for H&I Construction, explains.
Turn to page 4

18

40

74

Each year, *Construction World's* Best Projects Awards provides an opportunity to pause and reflect on what makes South Africa's construction and engineering sector one of the most dynamic, resilient and innovative in the world. Now firmly established as one of the industry's most respected annual events, the awards not only celebrate excellence but also document the evolution of the built environment, highlighting how far we have come and where we are headed.

In a sector where success is often measured in deadlines met, budgets managed and technical specifications achieved, the Best Projects Awards provide something deeper: recognition of true excellence. They honour the ingenuity, determination and teamwork that lie behind every completed project. Each entry tells a story of challenges overcome, collaboration across disciplines and a shared commitment to quality and innovation. In doing so, the awards have become a trusted benchmark of professionalism, reminding us that exceptional outcomes are possible even in a challenging economic and regulatory environment.

The relevance of Best Projects lies in its role as both a mirror and a motivator for the industry. By shining a light on the best examples of construction practice, the awards encourage companies and professionals to raise their own standards. They promote continuous improvement and highlight how excellence in construction extends far beyond technical execution. The projects recognised here often demonstrate leadership in sustainability, safety, social impact and innovation, which are key areas that define the future of the industry.

South Africa's construction landscape has changed significantly in recent years. Tight margins, fluctuating input costs and a demanding regulatory framework have forced contractors and developers alike to become more resourceful and strategic. Yet, despite these pressures, the sector continues to deliver world-class projects that rival those found anywhere in the world.

Another reason these awards are so relevant is the sense of pride and motivation they foster. For the teams whose work is recognised, a Best Projects award validates months, sometimes years, of commitment, creativity and hard work. It is also an invaluable morale boost, demonstrating to young professionals that excellence is acknowledged and rewarded. In a sector where retaining skilled talent is an ongoing challenge, that recognition matters deeply.

Equally important is the collaborative spirit that underpins the awards.

Construction, perhaps more than any other industry, thrives on partnership. Success depends on the seamless coordination of architects, engineers, contractors, suppliers and clients. The awards acknowledge that synergy and provide a space where the entire value chain can come together, not in competition but in celebration. The awards evening itself has become one of the most anticipated networking events in the industry calendar, fostering relationships that often translate into future opportunities and shared progress.

For *Construction World*, the awards are also a way to fulfil a broader editorial mission: to tell the stories that define the South African built environment. The winning and highly commended projects featured in this issue will form part of a living archive of achievement, a chronicle of how the industry continues to evolve, innovate and build with purpose.

Ultimately, *Construction World's* Best Projects Awards do more than honour great work; they inspire excellence across the sector. They remind us that construction is not just about bricks, steel and concrete, but about vision, perseverance and collaboration.

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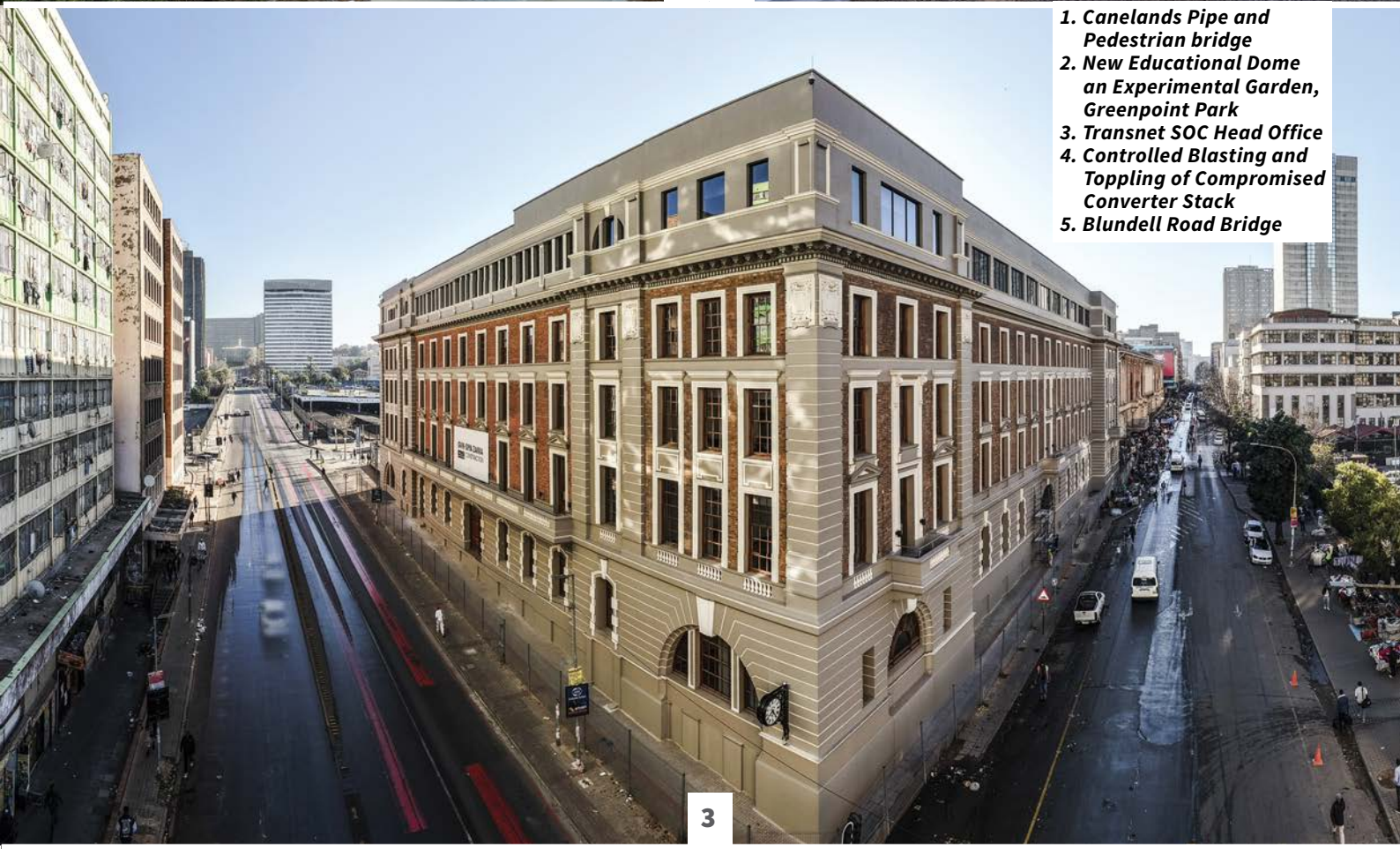
1. Canelands Pipe and Pedestrian bridge
2. New Educational Dome an Experimental Garden, Greenpoint Park
3. Transnet SOC Head Office
4. Controlled Blasting and Toppling of Compromised Converter Stack
5. Blundell Road Bridge



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The B6116 bridge over the Diep River is an in-situ concrete three-span structure supported on 900 mm end-bearing piles at the abutments and 1 200 mm diameter end-bearing piles at the piers.

AFRISAM SUPPORTS H&I TO MAKE WESTERN CAPE'S N7 HIGHWAY SAFER

The busy N7 highway on the west coast of the Western Cape province will soon be even safer when H&I Construction completes the Van Schoorsdrif interchange about 15 km north of Cape Town's suburb of Milnerton.

This project removes one of the last at-grade intersections on the N7, which have increasingly presented a safety hazard as the fast two-lane highway becomes increasingly well-used by commuters, tourists and industry. Commissioned by the Western Cape Department of Infrastructure, the safety improvement project includes 5 km of greenfields road and six bridge structures, Willem Olivier, Contracts Manager for H&I Construction, explains.

The company is partnering with AfriSam for the approximately 10 000 m^3 of 50 MPa readymix concrete required for the bridge builds and ancillary road works such as concrete drains. The 36 month project began in March 2024 and is due for completion in March 2027.

"The new road links Frankdale Road in the west and Vissershok Road in the east," Olivier says. "The interchange also necessitates the construction of a new weighbridge facility 600 m north of its current location."

Importantly, the vertical and horizontal alignment of the new road is designed to be compliant with the latest speed and safety requirements, making for a safer driving experience and more efficient logistics. It is generally a two lane carriageway with lanes of 3,7 m widths and 2 m of surfaced shoulder in each direction.

"The alignment has meant that a significant portion of the road is in fill with over 500 000 m^3 of fill constructed," he explains. "Where the road crosses the Diep River, for instance, high approach fills were required due to the depth of the river valley, combined with the required vertical alignment."

A major focus of the project has been the work on the six bridges, of which the largest were the four span road-over-road bridges spanning the N7 national road and the 156 m long road-over-river bridge crossing the Diep River.

A temporary stressing design allowed for framework to be removed from the first two outer decks and to construct the central deck before stressing the whole deck as one.

AfriSam's laboratory and plant teams coordinated effectively to ensure slump adjustments at short notice were implemented accurately.

AfriSam used 25 to 30% fly-ash mix to help control the heat of hydration and to contribute to durability.

The large concrete pours required a coordinated effort by 60 staff at AfriSam's three batching plants.

Spanning the N7 highway, the B6113 is a four span bridge designed with three piers consisting of trestle beams supported on 750 mm diameter friction-type piles.

According to Lucien Smith, H&I Construction's Project Manager, the bridge consists of 32 prestressed precast U-beams with diaphragms over the piers and abutments. The beams were successfully installed using mobile cranes over a single weekend in April 2025.

"The in-situ deck is supported on permanent shuttering between beams with cantilevers at the edges on conventional shuttering," Smith says. "The in-situ slab was constructed in stages, ensuring that the deck is continuous over the diaphragms, with a sidewalk and balustrades."

AfriSam supplied 870 m^3 of readymix for this bridge from batching plants at its Bellville, Woodstock and Peninsular Quarry sites, and the structure was strengthened with over 210 t of reinforcing bar.

The B6116 bridge over the Diep River is an in-situ concrete three span structure supported on 1 200 mm diameter end-bearing piles. It is underpinned by piers 12 m high and 900 mm diameter end-bearing piles on perched abutments. The deck comprises two spine post-tensioned arched spine beams of 2,6 m to 4,5 m deep. The deck itself varies in depth from 250 mm to 450 mm and has 2,2 m cantilevers supporting the balustrades.

Smith highlights that the risk of flooding required some innovative thinking to ensure a safe and streamlined work programme on the Diep River bridge. While the initial plan was to stress the whole deck as one structure, this would have required the formwork to be erected during two rainy seasons.

"To reduce the risk to the temporary support when the Diep River floods, we opted for a temporary stressing design which allowed us to remove the formwork from the first two outer decks and construct the central deck before stressing the whole deck as one," he says.

AfriSam supplied close to 3 000 m^3 of readymix concrete for the Diep River bridge, which was reinforced by 408 t of rebar and cast using 5 402 m^2 of formwork.

The B6113 is a four span bridge designed with three piers consisting of trestle beams supported on 750 mm diameter friction-type piles.

Shaughn Smit, AfriSam's Regional Sales Manager – Construction Materials Cape, highlights the complex logistics behind the large continuous pours involving a coordinated effort by about 60 staff at AfriSam's three batching plants.

"With the pour ramping up to between 60 to 70 m^3/h during the day, we augmented readymix from our Peninsular Quarry with supply from our Bellville and Woodstock quarries," he explains. "Optimising the cycle times from our different batch plants required intense focus and meticulous systems. Readymix had to arrive exactly on time to keep the two concrete pumps continuously fed with its water-cement ratio actually delivering up to 64 MPa strength."

The concrete's slump was critical and also required adjustment during the pour, notes Douw De Vos, Cluster Manager for AfriSam's Cape-based readymix operations.

"It was vital to achieve a consistent 200 mm slump to prevent excessive pressure on the formwork while maintaining adequate flow," De Vos explains. "Adding to the complexity during the pour, the slump had to be reduced on short notice to 175 mm in areas with less congested reinforcement to prevent the concrete from spreading too rapidly. This would otherwise have increased the exposed plastic surface area, leading to premature drying and potential cold joint formation. AfriSam's laboratory and plant teams coordinated this effectively to ensure these slump adjustments were implemented accurately."

Constant communication with the client was also vital to alert the batching plants and on-site laboratory to change the slump throughout the day, taking into account that about 45 m^3 of concrete was on route to site at any one time. De Vos adds that AfriSam used 25 to 30% fly-ash in the mix to help control the heat of hydration and to contribute to durability.

Another significant bridge is the B6112 road-over-road portal structure that links the two sections of the City of Cape Town landfill site on the western side of the N7 highway. This landfill site will be cut in two by the new Vissershok road. The portal is built with a 1 m deep solid deck spanning 15 m with 1,2 m thick abutments and will be 11 m high, supported on a 1 m thick raft foundation.

"The design of the structure allows for future extension northwards, with the deck being constructed to the current end of the wing walls which are 1,2 m thick," he says. "Due to the high abutment walls, the wing walls to the south are 1,2 m thick up to a height of about 6 m, once the cantilever wing walls are constructed."

This substantial structure consumed 3 336 m^3 of readymix from AfriSam and was supported by 323 t of reinforcing and 3 340 m^2 of formwork.

"AfriSam's strong relationship with H&I Construction dates back to their founding 35 years ago," says Smit, who has been a key link from the start. ■

The in-situ slab was constructed in stages, ensuring that the desk is continuous over diaphragms, with a sidewalk and balustrade.

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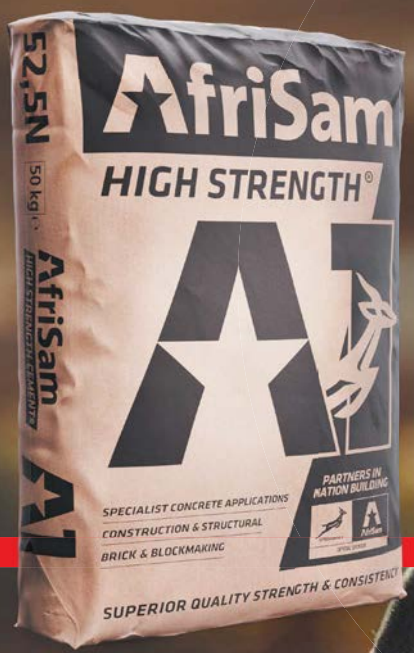

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BEST PROJECTS 2025 WINNERS

Here are the winners of the 24th Best Projects awards. The event was held in Sandton early in November.

Concor won two Highly Commended awards: 'Oxford Parks Block 2A Phase 1' and 'PIC Compensation Fund House' as well as a Special Mention for the AfriSam Innovation Award for Sustainable Construction. From left: Martin Muller (Contracts Manager); Hope Selolo (Commercial Manager); Ignaz Haarhoff (Site Agent); Warren Mills (Contracts Manager) and Yaseen Birch (Senior Foreman) – all from Concor.

AfriSam and Teichmann Structures received a Special Mention Award in the Civil Engineering Contractors category for 'Continuous Concrete Pour on Market Road Bridge'. From left: Kieresh Singh (Contracts Manager – Teichmann Structures); Dave Thurlow (Managing Director – Teichmann Structures); Pravershan Subramoney (Site Agent – Teichmann Structures); Xolani Mbatha (Construction Materials Regional Product Technical Manager – AfriSam); Randal Chetty (Construction Materials Regional Sales Manager – AfriSam) and Colin Merry (Commercial Manager – Teichmann Structures).

Rumdel received a Highly Commended award in the Civil Engineering Contractors category for 'Emergency Slope Repairs on National Route N2 Section 19 and National Route R61 Section 8'. It also received a Special Mention award in the AfriSam Innovation Award for Sustainable Construction. From left: Matthew Stewart; Nathi Myeni; Philip Herrington; Ayabonga Zoko; William Stewart; Alistair De Lacy and David Howell.

Tri-Star got a Special Mention in the Building Contractors category for 'Four Seasons Hotel Johannesburg – Westcliff – Phase 2'. From left: Dawie Stokes (Contracts Manager); Stanley Fakude (General Foreman); Thomas Herholdt (SNR Site Agent); Hendrik Jansen van Vuuren (SNR Contracts Manager) and Louis Opperman (Contracts Director).

Geoquest was Highly Commended for 'Reinforced Earth® TerraTrel® Retaining Walls for emergency slope repairs' in the Specialist Contractors category. From left: Bom Maqude (Geoquest Design Engineer); Shobana Singh (Geoquest Procurement and Logistics Manager) and Darrell Vince (Geoquest Operations Manager).

Boogertman + Partners was Highly Commended in the Architects category for 'The One – Stellenbosch'. From left: Sonja Paul (Project Interior Designer); Christa Burger (Landscape Architect); Marius Badenhorst (Associate) and Caitlin Jones (Interior Designer) and (in the front) Trishal Ramjee (Associate).

GIC was Highly Commended for the AfriSam Innovation Award for Sustainable Construction for 'New Mapulaneng Regional Hospital'. From left: Thabo Mvelase; Stanford Nkuna, Olebogeng Manhe; Sylvia Montwedi; Ian Connelan and Fezile Deli.

dhk Architecs received a Special Mention for 'Longkloof Precinct'. From left: Guy Briggs (Partner + Executive Director, dhk Architects); Martin Lardner-Burke (Partner, dhk Architects); Tim Irvine (Head: Asset Management, Growthpoint Properties) and Peter Fehrsen (Founding Partner, dhk Architects).

GASS won a Highly Commended award in the Architects category for 'Barlow Park Lifestyle Centre (Phase 2)'. From left: Marco Teixeira; Wandile Mntambo; Jennifer Schafer; Eugenie Lombard; Georg van Gass and Lizelle McLean.

GVK-Siya Zama was the winner in the Building Contractor category with 'Transnet SOC Head Office'. From left: Takalani Rambau (Takgalang Consulting); Graham Wilson (Osmond Lange Architects); Jabu Serithi (GVK-Siya Zama); Buhle Mtongana (Transnet); Jessie Verster (Osmond Lange Architects); André Pieterse (GVK-Siya Zama); Jaco Strydom (GVK-Siya Zama); Eben Meyburgh (GVK-Siya Zama) and Mhlengi Madiba (Lodemann).

Draco was the Winner in the Specialist Contractor category for 'Controlled Blasting and Toppling of compromised converter stack'. From left: William Dulabh (WD Consulting), Teddy Habib (Draco Group) and Hannes Louw (Draco Group).

Naidu Consulting was the winner of the Consulting Engineers category for 'Canelands pipe and pedestrian bridge'. Holding the certificate is Josh Padayachee (left) and Kresen Manicum from Naidu Consulting.

AfriSam was Highly Commended in the Civil Engineering category for 'Malmesburg Bypass Western Cape.' From left: Zielas du Preez (AfriSam); Amit Dawneerangen (AfriSam); Wayne Jochems (AfriSam); Glenn Johnson (AfriSam); Douw de Vos (AfriSam) and Joseph Mofokeng (AfriSam).

The big winner of the night was 'Kariba Dam Pool Rehabilitation Project' which won both the Civil Engineering Contracts category as well as the AfriSam Award for Sustainable Construction. Pictured is Martie Coulson from Mart Solutions – distributor of Chryso Southern Africa products.

Chryso was the winner of the Specialist Supplier category for 'Blundell Road Bridge'. From left: Sibusiso Hlatshwayo (Chryso), Richard Long (Afrostructures), Nkosinathi Mnengela (eThekwini); Terry Donaldson (Afrostructures); Sandile Masondo (eThekwini) and right, Viven Pillay (eThekwini)

Chryso was Highly Commended in the Specialist Supplier category for 'Impofu Wind Farm'. From left: Rhino Vermaak, Christo Bosch, Roy Davy, Jacques Swart and Chris Ferreira.

Chryso as the recipient of seven awards at Best Projects. From left: Greyling Jansen, Ruan Vermaak, Sibusiso Hlatshwayo, Keith Hargreaves, Michelle Fick, Vinè Muller, Martie Coulson, Anthony Venier and Hannes Engelbrecht.

GEOCIV Group received a Highly Commended Award in the Specialist Contractors category for 'Devonbosch Block B – Piling, Lateral Support and Sprayed Concrete Works'. From left: Burger Rust; Jean Breedt; Cameron Whittaker; Greg Whittaker; Werner Rix, Dinesh Naidoo and Frans Visser.

CELEBRATE INNOVATION, RESILIENCE AND SUSTAINABLE EXCELLENCE

For more than two decades, Construction World *magazine's Best Projects Awards has been a proud champion of excellence, craftsmanship and innovation in the built environment. Since its inception in 2002, these annual awards have recognised the very best in South Africa's construction, civil engineering, and design industries. Now in its 24th consecutive year, the 2025 edition once again showcased the sector's remarkable resilience, technical brilliance, and commitment to sustainable progress.*

This year's competition drew 65 entries across six categories: Civil Engineering Contractors, Building Contractors, Specialist Contractors, Specialist Suppliers, Consulting Engineers and Architects. In addition, the prestigious AfriSam Innovation Award for Sustainable Construction - one of the first awards of its kind in South Africa - honoured projects that successfully balanced people, planet and performance.

Despite ongoing economic pressures and a decade of industry challenges, the 2025 judges noted a strong sense of optimism running through the entries. "The industry is very much alive and bubbling under," the judging panel concluded, commending the smaller yet highly sophisticated projects that demonstrate world-class innovation and resilience.

The judging panel comprised a team of seasoned professionals: Uwe Putlitz, retired professional architect and project manager; Hanlie Turner, retired business development manager in the cement and concrete sector; Musa Shangase, Immediate Past President of Master Builders South Africa; and Petra Devereux, Executive Director of Master Builders Western Cape and a national board member. Together, they evaluated entries not only for their technical and aesthetic merit but also for their creativity, sustainability, and problem-solving ingenuity.

Engineering excellence and civil innovation

The Civil Engineering Contractors category reflected the diversity and technical depth of South Africa's infrastructure sector. The judges applauded the winning **Kariba Dam Pool Rehabilitation Project**, entered by Chryso South Africa, as an extraordinary example of engineering ingenuity. The project demonstrated how cutting-edge materials and construction expertise can extend the lifespan of major hydroelectric infrastructure - a model for sustainable civil works in the region.

Two projects received Special Mentions: **Continuous Concrete Pour on Market Road Bridge in Pietermaritzburg**

(a collaboration between AfriSam and Teichmann Structures) and the **Malmesbury Bypass** in the Western Cape (with AfriSam and H&I Construction). Both were celebrated for their technical execution and logistical precision. A Highly Commended award went to Rumdel for **Emergency slope repairs on the N2 and R61 routes.**

Building excellence and architectural vision

In the Building Contractors category, the coveted top honour went to GVK-Siya Zama Building Contractors for the **Transnet SOC Head Office**, a project that set new standards for corporate design and project delivery in the public sector. Judges highlighted the project's sophisticated coordination, high-quality finishes, and seamless integration of modern design principles.

The Four Seasons Hotel Johannesburg – Westcliff Phase 2, entered by Tri-Star Construction, received a Special Mention.

Concor was Highly Commended for **Oxford Parks Block 2A Phase 1** - part of Johannesburg's emerging green precinct - and Concor's **PIC Compensation Fund House** earned recognition for its technical excellence and bold urban presence.

The Consulting Engineers category celebrated projects that combine design elegance with technical rigour. Naidu Consulting won for its **Canelands Pipe and Pedestrian Bridge**, praised for marrying community accessibility with structural finesse. The City of Cape Town and PRDW Coastal Engineering received a Special Mention for the **Small Bay Seawall Upgrade,** while AECOM SA was Highly Commended for its improvements to the **N2 Beacon Way Intersection** - a project that successfully eased congestion and improved safety.

Architectural innovation was also in the spotlight. The City of Cape Town's **New Educational Dome and Experimental Garden at Greenpoint Park** emerged as the Architectural Category Winner, symbolising how design can

inspire education, environmental awareness, and urban rejuvenation. dhk Architects were given a Special Mention for the **Longkloof Precinct**, while GASS Architecture Studio and Boogertman + Partners received Highly Commended awards for the **Barlow Park Lifestyle Centre** and **The One – Stellenbosch** respectively - both demonstrating the power of architecture to transform city spaces into sustainable, people-centred environments.

Specialist excellence: precision, safety and material innovation

The Specialist Contractors and Suppliers category was one of the most hotly contested this year, with entries demonstrating innovation across engineering, blasting, and materials technology. In the Specialist Contractors division, Draco Group took top honours for its **Controlled Blasting and Toppling of a Compromised Converter Stack**, a technically complex and high-risk operation that exemplified precision engineering and safety excellence. GEOCIV Group was Highly Commended for its work at **Devonbosch Block B**, and Geoquest earned similar recognition for its **Reinforced Earth® TerraTrel® Retaining Walls on emergency slope repairs**.

The Specialist Supplier awards were dominated by Chryso Southern Africa, whose innovative admixtures and sustainable concrete technologies continue to shape the industry. Its projects - including **Blundell Road Bridge** (Winner), **Impofu Wind Farm**, and **Redstone CSP Tower** - were recognised for showcasing material science at its best, balancing durability with sustainability.

Sustainability at the core

The AfriSam Innovation Award for Sustainable Construction, a flagship honour within the competition, once again underscored the growing importance of responsible building. Chryso South Africa's **Kariba Dam Pool Rehabilitation Project** claimed top honours here as well, setting a benchmark for sustainable infrastructure renewal. Gap Infrastructure Corporation (GIC) was Highly Commended for the **New Mapulaneng Regional Hospital**, while Chryso Southern Africa's **Redstone CSP Tower** also earned a Highly Commended nod for its renewable energy contribution. Special Mentions went to **Blundell Road Bridge** and **Oxford Parks Block 2A Phase 1**, both celebrated for integrating environmental performance into functional design.

Industry support and collaboration

None of this would be possible without the continued partnership of leading industry sponsors. AfriSam once again took the role of Main Sponsor, with ISUZU Motors South Africa joining as Platinum Sponsor, Chryso Southern Africa as Gold Sponsor, and both Sika and a.b.e.® Saint-Gobain as Silver Sponsors. The South African Council for Project and Construction Management Professions (SACPCMP) supported the awards as Associate Sponsor, while GEOCIV Group hosted the welcoming drinks.

Through these partnerships and the collective passion of the industry, the Best Projects Awards 2025 reaffirmed that South Africa's construction sector remains not only resilient but forward-looking - driven by innovation, sustainability, and the shared pursuit of building a better, stronger future. ■

Projects in which Chryso products were used won seven of the evening's awards.

THE JUDGES

Uwe Putlitz

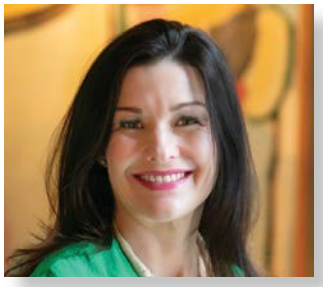
Retired professional Architect and professional Construction Project Manager

Hanlie Turner

Retired Business Development Manager in the cement and concrete environment

Musa Shangase

Immediate Past President of Master Builders South Africa



Petra Devereux

Executive Director of Master Builders Western Cape and Board member of Master Builders South Africa

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CONSTRUCTING NEW PERSPECTIVES

FOUR SEASONS HOTEL, THE WESTCLIFF – PHASE 2 EXPANSION

Rising above the lush canopy of Johannesburg's historic Westcliff ridge, the Four Seasons Hotel, The Westcliff, has long stood as a beacon of luxury and refinement. Its terraced villas, panoramic views, and timeless elegance distinguish it from conventional hotel architecture.

In September 2023, the hotel embarked on an ambitious expansion to meet the growing demand for premium event and guest facilities. Now entering completion in 2025, the project adds two signature landmarks:

- The Grand Ballroom, a 400-seater venue designed to host Johannesburg's most prestigious weddings, conferences, and social occasions.
- The Reception and Deli Destination Lobby Lounge, a new arrival space conceived as both a gateway and a gathering point, where Johannesburg's gold-mining heritage is reinterpreted with contemporary flair.

Delivered by Tri-Star Construction and designed by DSA Architects International and ODCD Interiors, this project exemplifies how global standards and local craftsmanship can converge to create enduring, iconic spaces.

Construction Innovation & Technology

Building on a steep rocky ridge with two separate sites active within a live hotel environment demanded innovation at every turn.

Digital Coordination: Detailed 3D modelling was used to plan the interface between new and existing structures, enabling precise tie-ins and coordination of guest and vehicle flows.

Foundation Solutions: Variable soil and rock conditions required two distinct strategies: pile foundations for the Grand Ballroom, and a raft foundation for The Reception and Deli Destination Lobby Lounge, ensuring long-term stability.

Pre-Cambered Structural Beams: The Grand Ballroom's column-free span was achieved with deep pre-cambered beams, engineered not only to support the roof but also to

serve as integrated gutters. Propping was maintained for months to ensure proper curing and controlled deflection.

Independent Vehicle Ramp: A new ramp was introduced to connect the expansion seamlessly with existing facilities. Independent structural supports carried the load, protecting the original buildings from stress they were never designed to bear.

Cranes & Access: Restricted access required a strategic pivot from mobile cranes to tower cranes, allowing heavy structural elements to be installed safely within tight working zones.

This innovative blend of technology and adaptability ensured that complex structural demands never compromised the hotel's heritage or guest experience.

Corporate Social Investment (CSI)

The project reflects Tri-Star's ethos that construction should deliver value beyond the physical structures.

Local Procurement & Subcontractors: Engagement of local trades and suppliers created job opportunities and supported small and medium businesses.

Neighbourhood Upliftment: Previously neglected land adjacent to the hotel was rejuvenated, improving the character and value of the Westcliff neighbourhood.

The expansion demonstrates how luxury development can serve as a catalyst for economic inclusion and community upliftment.

Design Innovation

The design vision, realised by DSA Architects International and ODCD Interiors, is both ambitious and respectful of The Westcliff's character.

The Grand Ballroom: A French-inspired sanctuary with soft neutral tones, bathed in natural light through a glass façade. Flexible enough to transform into three smaller venues, the Grand Ballroom sets a new benchmark for elegance and versatility in Johannesburg.

The Reception and Deli Destination Lobby Lounge: A reimagined entry sequence inspired by Joburg's layered mining heritage, with textured stone walls, carved timber, and curated art. Skylights animate the interiors, while cascading terraces, water features, and rooftop gardens bring nature into the guest experience.

Harmony & Detail: Both buildings are clad in stone to match the original hotel. Intricate detailing, cascading slab edges, and landscaped planters ensure seamless integration of architecture, landscape, and story.

The design is not simply aesthetic - it is experiential, marrying heritage with innovation.

Environmental Impact Considerations

Though not conceived as a green-rated project, sustainability shaped the construction approach.

Material Reuse: In-situ soil was reused for landscaping and backfilling, reducing transport and waste.

Low-Carbon Concrete: Mixes incorporated 30% Ground Granulated Blast Furnace Slag (GGBS), reducing Portland cement content and embodied carbon.

Energy Efficiency: Optimised glazing, insulation, and lighting support long-term energy savings.

Natural Integration: Rooftop gardens, planters, and water features reduce heat gain while enhancing guest experience.

These measures reflect a responsible approach that aligns environmental performance with luxury standards.

Quantifiable time, cost & quality

- Programme: September 2023 – September 2025 (24 months). Despite steep terrain, multiple sites, and live-hotel logistics, the programme has been maintained.
- Cost: ±R450-million (total project value), managed with disciplined controls and transparent collaboration between contractor, architects, and consultants.
- Quality: From double cantilever slab edges at the *porte cochere* to precision stone cladding and bespoke interiors, the project delivers international hospitality quality grounded in South African craftsmanship.

Risk Management

Risk was carefully managed across technical, operational, and stakeholder domains.

Geotechnical: Steep terrain and variable soils were addressed through tailored foundation systems.

Neighbouring Properties: A 5–6 metre level difference was resolved with integrated retaining and shoring solutions.

Structural Demands: Pre-cambering, propping, and cantilever detailing ensured long-term integrity of complex spans.

Operational Risks: Sequencing work around hotel guests preserved operations and protected revenue streams.

Economic Risks: Volatile material costs were mitigated through procurement strategies and timely decision-making.

The Phase 2 expansion of the Four Seasons Hotel, The Westcliff, is a masterful convergence of tradition and innovation, where global design standards and South African craftsmanship meet.

In mid-August 2025, the Grand Ballroom opened its doors, successfully hosting its first major events with seamless precision. This milestone confirmed the project's ambition: to set a new benchmark for scale, elegance, and functionality in Johannesburg's hospitality landscape.

Meanwhile, The Reception and Deli Destination Lobby Lounge is in its final stages. Soon, guests will enter not just a lobby, but a living narrative of Johannesburg — a sanctuary of texture, light, and story that honours the city's history while embracing its future.

Together, these additions elevate The Westcliff's international standing and redefine the experience of luxury in South Africa. For Tri-Star Construction, they stand as a proud legacy: proof of what is possible when vision, innovation, and relentless attention to detail come together. ■

PROJECT INFORMATION

- **Main Contractor:** Tri-Star Construction
- **Client:** ASB Investment (Dubai) and HPL (Singapore)
- **Architect:** DSA Architects
- **Principal Agent:** 80 Westcliff
- **Quantity Surveyors:** Theba Consultants and QS cc
- **Consulting Engineer:** WSP Group Africa

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Building Stronger Communities in South Africa
With a highly experienced team and a collaborative approach, we deliver safe, high-quality solutions across residential, commercial, industrial, and specialized projects. From initial concept to final handover, our integrated approach ensures timely delivery, superior quality, and lasting value — building a resilient South Africa, one project at a time.

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- Traditional Building Contracts
- Full Turnkey (Design and Build) Solutions
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- Client Partnerships, including Public-Private Partnerships (PPP)

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OXFORD PARKS BLOCK 2A PHASE 1

At the prestigious Oxford Parks Precinct in Rosebank, Johannesburg, Concor has successfully completed the 10 Parks Boulevard and 55 Eastwood Road developments - delivered as a single project known as Oxford Parks Block 2A Phase 1. These buildings mark Concor's eighth and ninth successful completions at Oxford Parks for client Intaprop, underpinned by a trusted relationship with the client, architect and project engineers built over seven years.

A key feature of this development is the shared three level 'super-basement' beneath the two buildings which required the excavation and removal of 146 000 m^3 of earth. Given the scale and depth of the excavation, robust lateral support was essential to maintain wall stability with 3 500 m^2 of lateral support systems installed.

Situated near the Gautrain tunnel servitude, the project required careful consideration of foundation design, incorporating raft foundations in conjunction with piling. To fast track construction, Concor implemented several innovations.

The development covers a gross building area (GBA) of 15 712 m^2. The 10 Parks Boulevard building comprises five office floors and a retail level, providing a total gross lettable area (GLA) of 8 643 m^2. The 55 Eastwood Road building features three office floors and one retail level, with a GLA of 5 910 m^2.

Construction demanded significant material inputs, including 18 000 m^3 of readymix concrete, 1 745 tonnes of reinforcing steel, 1 000 m^2 of tile cladding, and 5 500 m^2 of glass façade for the curtain walling.

Construction innovation technology

Given the proximity of the Gautrain tunnel - situated approximately 30 metres below ground - Concor was required to adapt its foundation methods in the affected servitude area. While conventional piling could be used on parts of the site, sections closest to the tunnel necessitated the use of raft slab foundations across an area of 3 500 m^2.

The raft foundation itself consisted of a substantial grid of concrete beams, each measuring 1 metre wide and 1,15 metres deep. This design resulted in large volumes of concrete being placed below the three basement levels, ensuring a robust

structural base at depths of between 12 and 15 metres below ground.

Innovation also extended to the piling operations. A total of 107 piles - with diameters ranging from 450 mm to 1,2 metres and averaging 17 metres in depth - were installed by a specialist piling contractor.

To accelerate the construction timeline, Concor implemented a time saving strategy by commencing foundation preparations early. This included installing the starter bars for the building's vertical columns during the piling process, rather than waiting for piling work to be completed.

As the Oxford Parks precinct has grown, several large buildings have been developed in close proximity, directly impacting this project's expansive super-basement. The presence of an adjacent structure posed challenges for the planning and execution of bulk earthworks and foundation work. To ensure the stability of the basement excavation walls, Concor installed lateral support systems across a surface area of 3 500 m^2, along with technically complex transfer beams and interface structures.

Innovation also extended to the unitised curtain wall system used to clad the buildings. In a departure from the conventional approach - where panel dimensions are typically confirmed after structural completion - the panel sizes were finalised during the design phase.

Corporate Social Investment

A cornerstone of Concor's ongoing success at Oxford Parks is its dedicated support for small, medium and micro enterprises (SMMEs).

This approach not only equips SMMEs with valuable experience but also contributes to the development of a skilled and sustainable subcontracting base - strengthening the construction sector and promoting greater inclusivity.

Concor is also deeply committed to nurturing talent in the building and construction industry through its Graduate Development Programme.

Furthering its community engagement, Concor plays a role in keeping the Oxford Park area clean and safe, contributing to local clean-up efforts as part of its broader corporate social responsibility.

Design innovation

The design of Oxford Parks Block 2A Phase 1 incorporated several key innovations that delivered significant efficiencies during construction. One of the most notable was the creation of a single super-basement shared by both buildings, combined with the concurrent construction of the above-ground structures.

This approach allowed for optimised resource utilisation, streamlined workflows and considerable time and cost savings. With a total footprint of 21 035 m^2 spread across four levels, the basement required 15 350 m^3 of concrete and 1 620 tonnes of reinforcing steel - a testament to its scale and structural integrity.

A critical engineering challenge was ensuring the stability of the super-basement walls during excavation, particularly given the proximity of an adjacent existing building.

Architecturally, both buildings feature curtain wall façades - non-load-bearing glass and aluminium cladding that spans approximately 5 500 m^2.

The 10 Parks Boulevard building further enhances its exterior with a mechanically fixed tile façade, adding texture and visual interest.

Environmental Impact Consideration

The Oxford Parks Block 2A Phase 1 project is targeting a Green Star V2 certification, reflecting the shared commitment of Intaprop and Concor to sustainable, environmentally responsible construction. The certification recognises the project's energy and resource efficiency, aligned with global green building standards.

A major contributor to lowering the project's carbon footprint was the use of a Green Star-compliant 30 MPa concrete mix with AfriSam's High Strength cement. By incorporating 11 to 12% fly ash, the mix reduced clinker content - the most carbon-intensive element - without compromising performance.

Energy efficiency is further enhanced by rooftop solar systems on both buildings, with a combined 300 kW capacity. These installations reduce reliance on grid electricity and support long term sustainability.

Local sourcing was another key strategy, with most materials and equipment procured within 40 km of the site. This reduced transport-related emissions and supported nearby suppliers.

Notably, high performance glass was selected for the curtain wall façades, improving both aesthetics and energy performance.

Waste management was carefully executed in line with Concor's environmental policy. Steel, wood, and concrete were separated on site and removed by certified contractors, ensuring recyclable materials were responsibly processed and diverted from landfill - supporting circular economy objectives.

Health & Safety

Concor's unwavering commitment to health and safety was a cornerstone of the Oxford Parks Block 2A Phase 1 project, with stringent safety protocols implemented from the outset and maintained throughout all stages of construction. This disciplined approach enabled the project to be completed without a single lost-time injury (LTI), a remarkable achievement given the scale and complexity of the work and the fact that over 250 workers were active on site at peak periods.

Quantifiable time, cost and quality

Concor's seven years of continuous work at Oxford Parks has been marked by close daily collaboration with engineers and the client. This partnership has refined their processes to the point where each development can be fast-tracked without compromising on construction quality or finishes.

A key time saving innovation on the Oxford Parks Block 2A Phase 1 project was Concor's approach to column construction. By installing starter bars while piling was still underway, the team began work on the concrete columns - the building's main vertical supports - before the piling contractor left site. This overlap significantly accelerated progress, saving an estimated

PROJECT INFORMATION

- **Main Contractor:** Concor
- **Client:** Intaprop
- **Architect:** GLH
- **Project Manager:** Duncan Clark
- **Quantity Surveyor:** Agora
- **Consulting Engineer:** Pure Consulting

two to three weeks on the schedule. The benefit was especially notable given the 107 piles installed.

Another major factor in the project's efficiency was the use of in-situ reinforced concrete for the shared super-basement. Compared to steel frameworks or precast and pre-stressed systems, in-situ construction was both faster and more cost-effective. It offered the flexibility needed for a complex basement while ensuring structural integrity. The scale of the work is reflected in the 51 000 m^2 of formwork used.

Further gains were made through Concor's early implementation of a unitised curtain wall façade system. Instead of waiting for the structural frame to be completed to take final measurements, panel dimensions were finalised during detailed design.

Risk management

Delays in commercial developments can significantly impact tenant occupation dates and undermine the client's return on investment. In contrast, early or on-time occupation benefits both tenants and the client by enabling earlier operations and revenue generation. Concor recognised this risk and implemented a disciplined approach, combining stringent quality management with ongoing schedule monitoring to prevent costly rework and keep the project on track.

Concor introduced targeted construction innovations to accelerate progress. These included the early placement of starter bars for concrete columns - even during piling - and the upfront design and manufacture of unitised curtain wall panels, enabling progressive façade installation as each level was completed.

Maintaining momentum also depended on strong subcontractor supervision, particularly for the small, medium and micro enterprises (SMMEs) involved.

Attention to detail is central to Concor's construction philosophy. Every activity was subject to rigorous quality control and regular inspections, ensuring timelines were met, workmanship remained high, and the end result met all client and tenant expectations. ■

Progress on façade works included the installation of unitised panels and exterior tiling to enhance the building's aesthetic and thermal performance.

PIC COMPENSATION FUND HOUSE, TSHWANE

Compensation Fund House in Tshwane (Pretoria), historically the headquarters of the Department of Labour's Compensation Fund. The building was flagged four years ago as non-compliant with building and safety regulations, alongside concerns over its structural integrity. The project required Concor to demonstrate both flexibility in adapting to evolving requirements and the expertise to address each new challenge with the most effective solution.

A major challenge on the project was the absence of physical plans or design documentation for the building, which demanded innovative approaches to both assessment and remediation. To address this, Concor initiated a series of detailed studies and investigations before starting the agreed scope of work, enabling a clearer understanding of the building's condition and informing the most appropriate course of action.

Over a six-month period preceding the start of construction, Concor and its subcontractors conducted in-depth investigations into the building's compliance shortfalls and formulated appropriate response strategies. This process involved a range of investigative techniques including extracting core samples from columns and slabs to assess concrete strength, using 3D scanning to determine rebar spacing within slabs and physically breaking open sections of concrete to expose and examine the embedded rebar.

Construction innovation technology

The refurbishment of Compensation Fund House presented numerous technical challenges, each addressed by Concor through a combination of innovative thinking and close collaboration with project engineers.

One of the early concerns was the presence of concrete cracking and spalling at various points throughout the structure. Detailed investigations helped determine where these issues posed a risk to structural integrity and where targeted remedial action was necessary.

On the east and west wings, the fire escapes were identified as too narrow to comply with current safety standards. While widening a fire escape typically involves demolishing the upstand, bending down the existing rebar and reconstructing

Façade works at an advanced stage with the installation of unitised panels nearing completion.

the staircase to the required width, this project revealed a further complication: the existing concrete cover - the depth of concrete over the rebar - was below the minimum required by modern codes.

To resolve this, Concor applied several remedial strategies. These included increasing the concrete cover by thickening the new concrete layer or using specialised chemical treatments such as waterproofing agents and rust inhibitors to protect the exposed rebar.

Structural elements such as concrete columns were also carefully tested. While these were expected to meet a strength of around 25 MPa, some were found to register as low as 5 MPa. In addition, scanning of concrete slabs revealed significant inconsistencies in rebar spacing.

Corporate Social Investment

Concor optimised the socio-economic impact of the Compensation Fund House refurbishment project by prioritising local procurement and community upliftment, while aligning its corporate social investment (CSI) efforts with the client's objectives. A key project target was to source at least 30% of the total project value - across subcontracting, supply and labour - from businesses and individuals within the local ward.

Achieving this required a coordinated process of SME screening, selection and incubation, carried out in collaboration with the ward councillor, the Public Steering Committee (PSC), and the client-appointed Community Participation Consultant (CPC).

PROJECT INFORMATION

- **Main Contractor:** Concor
- **Client:** Public Investment Corporation
- **Architect:** ARC
- **Principal Agent:** Triviron
- **Quantity Surveyor:** Nonku Ntshona & Associates Quantity Surveyors
- **Consulting Engineer:** Nyeleti Consulting

Additions to the existing structure underway to accommodate upgraded building services infrastructure.

Local labour formed a significant portion of the workforce, with between 150 and 350 people on site at any given time. Concor ensured that all local workers received training and mentorship, contributing not only to the success of the project but also to longer term skills development within the community. Safety training was a core part of the onboarding process, equipping workers to operate productively and safely - both on this site and in future construction opportunities.

As part of its broader CSI efforts, Concor also contributed to the Bramley Children's Home in Pretoria, a care facility for vulnerable children. The company supported facility upgrades at the home including work undertaken on Mandela Day, further reinforcing its commitment to making a meaningful difference in the communities where it operates.

Design innovation

A standout feature of the refurbished Compensation Fund House will be its striking new façade, which incorporates a modern curtain walling system for a sleek contemporary look. However, once the original precast façade was demolished, Concor encountered a significant challenge: the building's structural levels varied considerably.

To overcome this, Concor facilitated a comprehensive three-dimensional survey of the slab edges, enabling consultants to generate an accurate model from which custom manufacturing dimensions for each panel could be derived. While 3D scanning is a common practice in curtain walling applications, the real challenge in this case was not the measurement itself but the extent and unpredictability of the structural inconsistencies - making the interfacing of elements a highly technical task.

Further complexity arose from the variation in façade finishes across each elevation of the building. As many as three or four different façade systems, including unitised panels and precast ventilated cladding, were used on a single elevation, each requiring different demolition scopes and construction detailing.

Another noteworthy addition by Concor was a spiral staircase constructed in the building's core. This design feature required the demolition of an existing concrete wall façade from top to bottom through the lobby areas.

Environmental Impact Consideration

The redesign and reconstruction of Compensation Fund House incorporated a strong focus on sustainability and energy efficiency. Key features include enhanced natural lighting throughout the building and the use of energy-efficient LED lighting.

A critical element of the upgrade was the comprehensive inspection for asbestos-containing materials, followed by their safe and compliant removal.

All Concor projects are governed by stringent environmental protocols covering water conservation, waste management, recycling and biodiversity protection. Given the significant volume of concrete debris generated during demolition, the team used bucket chutes to safely transfer this material from upper levels to the ground.

To reduce transport-related emissions and support the local economy, Concor prioritised sourcing materials from suppliers within close proximity to the site. This approach contributed to lowering the project's overall carbon footprint.

In line with the company's environmental policy, waste separation and recycling were rigorously enforced on site. All subcontractors were required to comply with these practices, with Concor's site team monitoring adherence to ensure consistency and accountability across the board.

Health & Safety

Central to Concor's culture is its unwavering commitment to health and safety, with a strong emphasis on achieving Zero Harm across all projects. This philosophy is not simply a compliance exercise but a deeply embedded part of how Concor operates - ensuring that every employee, subcontractor and stakeholder returns home safely at the end of each day.

At the Compensation Fund House site, dedicated safety officers formed an integral part of the project team, playing a

hands-on role in maintaining the highest standards of safety throughout all phases of work.

A no-tolerance approach to unsafe practices was enforced, supported by continuous safety training, toolbox talks, and regular audits to identify and mitigate potential hazards. Every new worker on site underwent a structured induction process that covered project-specific risks and reinforced safe work behaviours.

Concor promoted a culture of proactive safety reporting, where workers were encouraged to report near-misses and potential risks without fear of reprisal.

Quantifiable time, cost and quality

One of the persistent structural challenges encountered at Compensation Fund House was the insufficient concrete cover over rebar in slabs and other structural elements - a non-compliance issue that could compromise durability and lifespan. Concor addressed this effectively through a combination of cost conscious and technically sound solutions. In many instances, the problem was resolved by thickening the concrete in the newly constructed sections, providing the necessary cover without excessive cost implications.

Where conditions did not allow for this approach - such as in areas where structural or design constraints limited the ability to add concrete depth - Concor applied specialised chemical products.

A particularly laborious aspect of the project involved the physical exposure of rebar in existing concrete slabs, especially in cases where rebar spacing did not align with the design model. This work required careful and time-intensive demolition to expose the reinforcement for inspection.

A standout feature of the refurbished Compensation Fund House will be its striking new façade which incorporates a modern curtain walling system for a sleek contemporary look.

As highlighted under CSI efforts, Concor's facilitation of SMME access and participation on this project was a significant achievement. However, such developmental initiatives are only viable if they can be executed within the strict financial and scheduling parameters set by the client..

Risk management

To comprehensively address any potential structural or geotechnical risks, Concor commissioned geotechnical engineers to assess the ground conditions beneath and surrounding Compensation Fund House.

Given the absence of original building plans or design data, Concor also undertook extensive structural investigations across all critical elements of the building, including slabs, walls, columns and other load-bearing components. This in-depth process was essential to confirming the structural integrity of the building and mitigating one of the most significant risks to the refurbishment.

To prepare the building for its new architectural finishes, including the installation of windows and a curtain wall façade, Concor implemented a range of structural repair techniques using approved products.

In areas where brackets were to be fixed to existing structural elements for façade installation, Concor conducted post-repair mechanical pull-out tests. ■

Structural remedial works and partial demolition underway at Compensation Fund House as part of the building's refurbishment programme.

REFURBISHMENT OF 96 RISSIK STREET FOR TRANSNET SOC LTD

The revival of Johannesburg as Africa's economic powerhouse is underway. The refurbished 96 Rissik Street, now Transnet's headquarters, embodies this bold vision for the Johannesburg CBD. Years of planning and dedication have brought this landmark project to life, reinforcing the city's status as a dynamic hub for business and innovation.

Construction Innovation Technology

Renovating and upgrading a heritage building from the early 20th century requires a careful balance of modern technology and the preservation of heritage elements. Integrating contemporary design solutions while retaining historical features, was both challenging and rewarding. Existing plans were outdated and did not reflect the construction detailing uncovered during the works.

As construction commenced, the four wings of the complex revealed the different phases of their original construction. Structural steel components, previously concealed under plaster applied to expanded metal mesh, were found to mimic concrete columns and slabs. Valuable façade details were discovered where extensions of newer wings joined the older sections. Areas of loose plaster, that required replacement, revealed the craftsmanship of the masonry units, neatly constructed up to the keystone of the arched windows. Sandstone slabs were used to distribute loads within portions of the brickwork.

Railway artefacts, including historic building plans, artwork, and others, were relocated prior to construction. Boardrooms with original timber cladding, parquet flooring, and decorative ceilings were preserved, along with a rare railway planning 'curved board' of both heritage and sentimental value. Restoring the sandstone, timber, and other elements required highly skilled craftsmanship to maintain their integrity.

The building foundations were strengthened with 320 micro-piles and concrete pile caps. The column foundations of each wing reflected their construction periods. Sandstone foundations for the first wings (North and East), granite foundations for the second addition (West wing), and concrete foundations and columns for the latest addition (South wing). Piles were anchored into the rock bed, while the old two-storey parking structure and a lift shaft that cut into the courtyard façade were carefully removed.

The original intention to reinstate the façade was revised, and a more practical approach was adopted: rather than erasing previous interventions, the design embraces them, showcasing the "layers of previous wounds" left by earlier, insensitive alterations as part of the building's unique story.

Site access constraints required structural design modifications, such as revising the underground water tank installation when precast slabs could not be delivered through the limited entrance height.

Decorative concrete mouldings on the façade of the building required scaffolding so that skilled artisans could access, clean and carefully repair these heritage

BUILDING **STRENGTH**

GVK-SIYA ZAMA
CONSTRUCTION

elements. Striking timber windows, the likes of which are these days only seen in well-preserved heritage buildings, required skilled artisans to restore their original detail.

Corporate Social Investment

The project provided fertile learning ground to students requiring practical and hands-on experience in the built environment. They gained valuable exposure and experience during all phases of the project.

The team participated in a blanket drive during a particularly harsh Johannesburg winter while involvement with a local school delivered school uniforms at the start of a school year.

Design Innovation

A striking central design feature of the project incorporates the celebration and reinstatement of the courtyard. A transparent roof structure spans the entire courtyard, contained within the four wings of the building, and covers approximately 1 000 m^2.

A steel bridge connecting the north, south and west wings of the building was introduced alongside a set of glass lifts for vertical circulation. The bridge ties seamlessly into the building and creates a contrast between new and old structures.

The skylight roof allows for natural light in the courtyard while affording users of the building protection from the

EST. 2015

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- *Bulk Water Reticulation and Water Retaining Structures*
- *Building Services: Architecture and Engineering Services, Schools, Office Buildings*
- *Rail Infrastructure: Staging and Maintenance Yards, Train Stations, etc*
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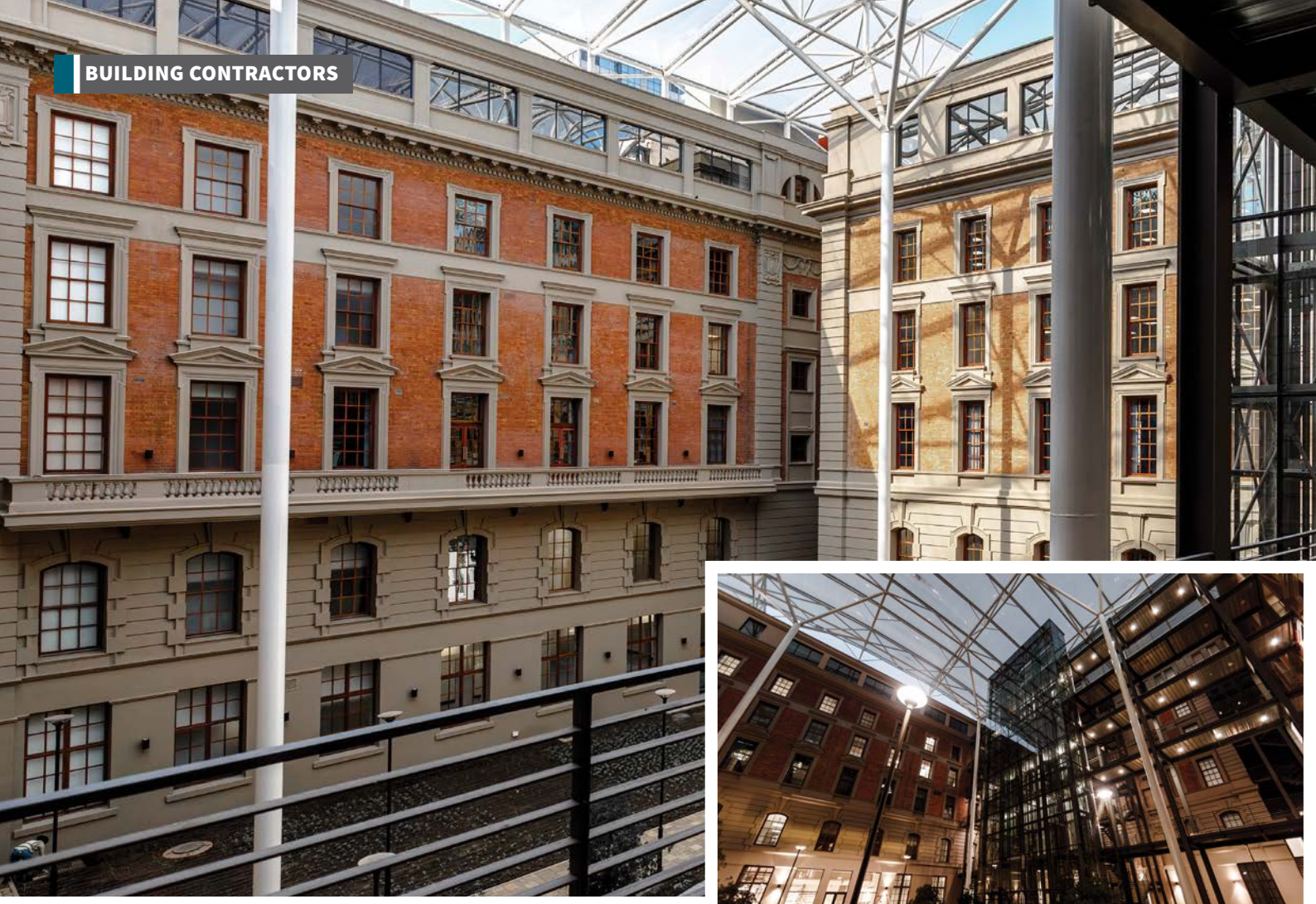


elements. The light-weight design makes use of ETFE pillows filled with air. The pillows are connected to electric pumps to ensure they remain inflated and constantly pressured yet preventing over-inflation and damage.

The building makes use of an integrated Building Management System (BMS) which comprises central control of all functions in the building (mechanical, electrical, fire, access, security/CCTV, HVAC, domestic water supply, and lift operations) together with detection systems that trigger alarms to the control room when a service or supply is compromised.

Irregular power supply caused by load shedding or unforeseen circumstances such as cable theft in the area, is mitigated by a 40KVA standby generator which kicks in automatically within a few seconds. This generator has sufficient power to run the building in its entirety efficiently, without compromising the systems in the building that depend on the supply of electricity.

Environmental Impact Consideration

The fully integrated Building Management System (BMS) provides centralised control of lighting from the control room and generates detailed consumption reports to support the efficient operation and energy management of the facility.

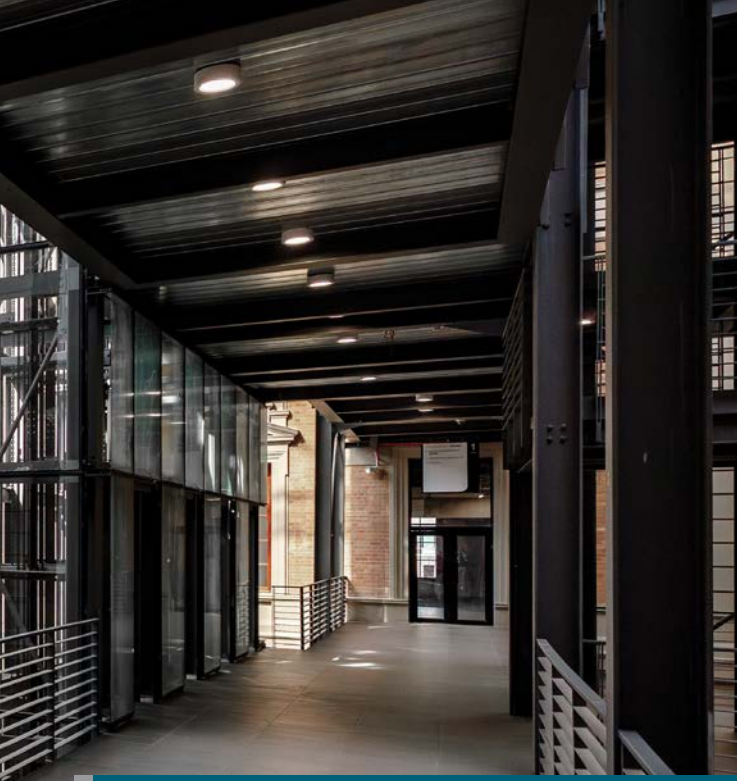
The architectural design approach prioritised sustainability by maximizing the reuse of existing building materials, thereby reducing construction waste and the overall carbon footprint. This is complemented by the preservation of the building's heritage aesthetic, achieved through the retention of the existing façade and internal elements such as door frames, doors, skirtings, and other original and historic fittings.

In addition, the electrical installation has been designed

to accommodate future integration of solar photovoltaic systems throughout the building, facilitating a streamlined and efficient upgrade to renewable energy sources, when required. A concealed underground water tank with a capacity of some 500 000 litres is divided into different sections for firefighting and domestic supply, in case of a water crisis in the city.

Health and Safety

The most significant health and safety initiative on this site was the installation of a custom-designed bird cage scaffold platform covering the full length and width of the central



PROJECT INFORMATION

- **Main Contractor:** GVK-Siya Zama Building Contractors
- **Client:** Transnet SOC
- **Architect:** Osmond Lange Architects
- **Principal Agent:** Lodemann
- **Quantity Surveyor:** Takgalang Consulting
- **Consulting Engineer:** Lodemann

courtyard area, covering some 1 000 m².

Quantifiable Time, Cost and Quantity

Originally conceived as a 12-month project, 96 Rissik Street was completed in 30 months. The time overrun was caused by multiple unforeseen discoveries, many of them hidden and unseen, in keeping with the age of the building and the construction methods employed when the Noord and Joubert Street wing of the building was first built in 1907, and in subsequent sections completed in 1914 (Rissik Street wing) and 1939 (De Villiers Street wing).

Risk Management

This project presented a complex set of risks commensurate with work on a heritage structure in a safety compromised downtown environment. Regulatory issues due to the building's proximity to protected heritage sites and structural deterioration common in ageing infrastructure, along with security threats from unauthorised occupation of neighbouring buildings and theft, added to the risk matrix.

Additionally, the involvement of multiple stakeholders introduced institutional misalignment, which influenced project coordination and the decision-making process. Successful project outcomes were achieved through early risk identification, timely engagement with heritage authorities, and effective collaboration among all stakeholders to ensure compliance, sustainability, and respect for the historical context of the site. ■

SMALL BAY SEAWALL UPGRADE

At the direction of the CoCT's civil engineering experts, the Small Bay Seawall Upgrade project was delivered, a landmark in contractor innovation and coastal protection. By integrating the latest construction technology, measurable performance standards, and strong community relationships, the COCT developed a seawall that can not only survive today's storms but also evolve with the uncertainties of tomorrow's climate.

The primary goals of the project were threefold: first, to rehabilitate the coastline along Pelegrini and De Mist streets in Small Bay, Blouberg, restoring its environmental integrity and resilience; second, to construct a new seawall that safeguards existing infrastructure and essential services from coastal erosion and storm damage and third, to preserve and enhance the recreational and amenity facilities along the Small Bay shoreline.

Construction Innovation Technology

The approach to reconstructing the 190-metre seawall began with an in-depth subsurface investigation using geotechnical boreholes, cone penetration tests and bathymetric surveys. By incorporating all this information into a 3D BIM model, the reinforced concrete modules of the seawall, the realigned sewer mains and the stormwater drains were all easily coordinated without intersecting each other. To properly install off-site factory-manufactured precast interlocking seawall panels, we used crawler cranes equipped with GPS-guided positioning equipment on location. Jet-grouting rigs were used to stabilise loose sands beneath the low-tide terrace and specially designed dredger barges installed marine-rated rock-armour mattresses to absorb wave energy.

Corporate Social Investment

The City of Cape Town has traditionally placed a strong focus on talent development and within the Bloubergstrand community outreach, by creating a local labour recruitment centre, we were able to source young, underemployed individuals and equip them with certified training in site supervision, construction health and safety and traffic management. Its dedication to local economic development is best portrayed by the fact that more than 60% of on-site staff were hired locally. In addition to building direct jobs, it collaborated with the City's Coastal Management Department in planning monthly clean-up activities along the beaches and dune restoration workshops, enabling locals to assist in keeping their coastline clean.

Disability advocacy groups attended its design improvement sessions since it appreciated the importance of universal access. With careful consideration beach ramps were redesigned with reduced grades, non-slip tread and integrated railings to enable wheelchair accessibility as well as family accessibility for young children and elders.

Design Innovation

Coastal engineers, hydrodynamic modellers, architects and specialist subcontractors were all involved in a sequence of value-engineering workshops that lay at the heart of the design approach. These workshops included the cross-section of the seawall being optimised to minimise material volumes and maximise the wave overtopping reduction.

The CoCT suggested pre-dressed concrete mattresses with interconnecting joints and geotextile underlay instead of loose rock armouring due to being stronger against scouring and faster to install from floating barges. Ground-penetrating radar was utilised in subsurface utility engineering (SUE) examinations to maintain new sewer alignment free from unforeseen obstructions and prevent rework costs. In-house constructability studies comprised logistical consideration of tidal windows and barge schedules against architectural finish constraints, such as the ±5 mm alignment of the textured face of the seawall.

The utilisation of precast concrete units produced within a 40-kilometre radius of the site was advocated to expedite delivery and reduce environmental impact, reducing transport emissions by 30%. Non-destructive testing was

conducted on each unit before shipping, including ultrasonic pulse velocity testing and Schmidt hammer testing.

Environmental Impact Consideration

Every aspect of the execution plans included protecting the environment. An exhaustive Environmental Management Plan (EMP) was prepared during the planning phase that was in accordance with the City of Cape Town's Integrated Coastal Management Policy. The EMP recommended a spill-response mechanism graded for Class B hydrocarbons, silt curtains surrounding marine-installation points, and progressive excavation bans.

Inside the closest residential boundary, mobile acoustic screens reduced pile-driving and concreting noise to under 65 dB, and water-cannon trucks were used on site to smother dust in dry weather. To reduce landfill waste by some 1,200 m^3, rock excavated and concrete rubble were separated, crushed in a closed-circuit crusher on site, and reused as backfill in rip-rap areas. By preventing surface runoff from allowing sediments into Table Bay, stormwater control techniques such as oil separators and temporary bunds maintained the water quality and vegetation of the bay coastline.

Aware of the significance of public facilities, the CoCT installed temporary boardwalks and signs to redirect tourists away from live activities to preserve unobstructed beach access wherever possible.

Health and Safety

Highest priority was accorded to the safety performance for 19 months with no compromise. By having a comprehensive Health and Safety Management System that was compliant with the South African OHS Act, our project was ISO 45001 certified from the very start. Red colour was employed for high-risk sea operations, amber colour for heavy plant operation, and green colour for pedestrian and non-technical zones on site.

Daily pre-start inspections, risk reports, and near misses were recorded with electronic checklists on rugged tablets.

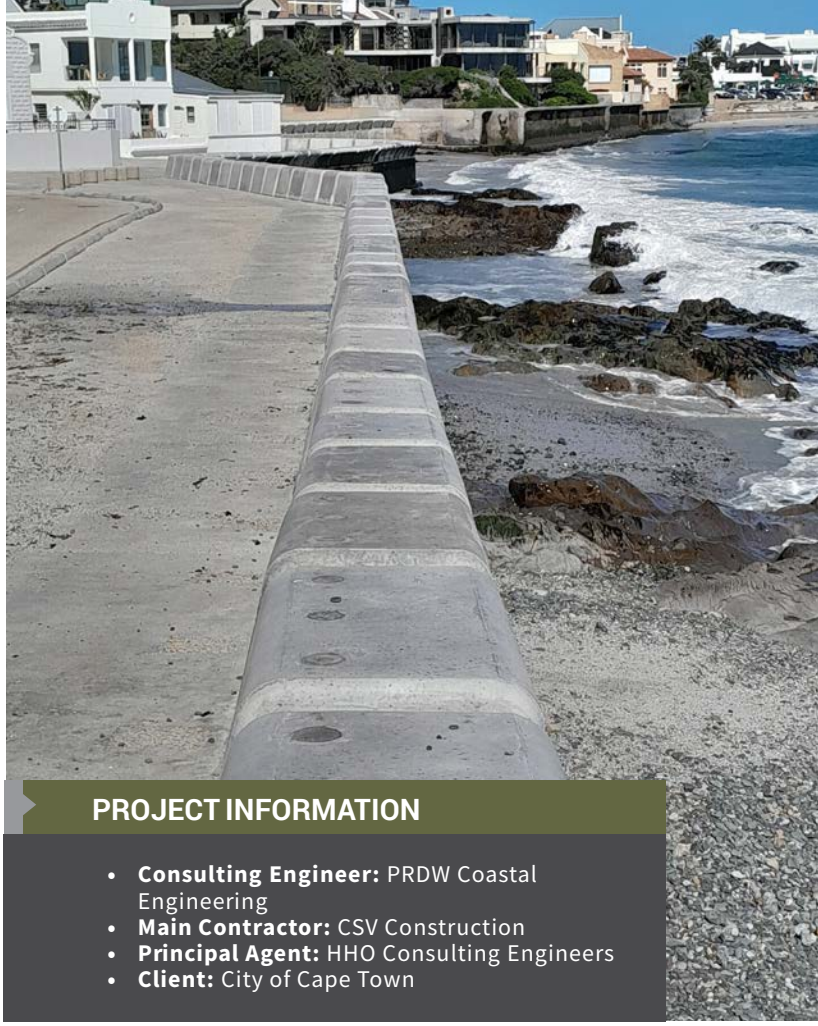
The stepped profile of the seawall was planned to be used as an emergency exit for beachgoers at high tide, minimising the risk of entrapment and slipping, and protecting against structural failure.

Quantifiable time, cost and quality

Despite the winter swells in Cape Town and supply-chain interruptions, the Small Bay Seawall Upgrade was delivered over a 19-month period between February 2023 and April 2025.

The budgetary control was managed by a control system that monitored commitments, variations, and cost-to-complete estimates in real-time for a R55-million contract.

An exclusive Coastal Engineering QA Lead oversaw quality assurance and instituted a test-witness regime for all critical activities. A centralised QA database receives data from maturity-curve monitoring, compressive strength sampling, and non-destructive testing of concrete panels.



PROJECT INFORMATION

- **Consulting Engineer:** PRDW Coastal Engineering
- **Main Contractor:** CSV Construction
- **Principal Agent:** HHO Consulting Engineers
- **Client:** City of Cape Town

Risk Management

The Small Bay Seawall Upgrade Project incorporated several risk management measures to ensure the safety of infrastructure, the environment, and the public throughout its construction. These measures were aligned with the City of Cape Town's broader Integrated Coastal Management Policy and project-specific planning.

Infrastructure risk mitigation: The rerouting of the vulnerable sewer line inland was a proactive measure to prevent collapse due to coastal erosion and wave action.

Phased construction approach: The project was executed in phases, allowing for better control of risks related to traffic, access, and environmental disruption. This approach also helped manage unforeseen delays and weather-related risks.

Access control and public safety: Road closures and restricted pedestrian access were enforced in high-risk zones, with on-site supervision to ensure public safety.

Environmental risk management: The project adhered to coastal protection principles outlined in the City's Integrated Coastal Management Policy.

Regulatory compliance and oversight: The City's Coastal Management Branch ensured compliance with municipal and environmental regulations, including risk indemnities and coastal safety standards. ■

SMALL BAY SEAWALL UPGRADE

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

HIGHLY COMMENDED

PROJECT INFORMATION

- **Consulting Engineer:** AECOM SA
- **Main Contractor:** Martin & East
- **Client:** SANRAL
- **Principal Manager:** AECOM SA
- **Civil Engineering Contractors:** UDS Africa

IMPROVEMENT OF N2 BEACON WAY INTERSECTION ON NATIONAL ROUTE 2 SECTION 8

The Beacon Way upgrade exemplifies how engineering can transform urban infrastructure into resilient, efficient, and community-enhancing assets. Completed on 18 February 2025, this R97,78-million investment reimagined the N2 intersection at Plettenberg Bay's entrance, improving mobility, safety and flood resilience in one of South Africa's most cherished coastal towns.

Previously plagued by congestion and vulnerability, the site required a bold, multidisciplinary approach. Through integrated design and infrastructure solutions – including road rehabilitation and advanced stormwater systems – the project has delivered a safer, more efficient transport corridor that enhances regional connectivity and supports long-term economic growth.

Construction innovation and technology

Faced with complex site conditions and environmental sensitivities, the team employed innovative, cost-effective engineering solutions. A key advancement was the rehabilitation of existing concrete pavement using glass grid reinforcement, reducing material use and mitigating reflective cracking without full-depth replacement.

Structural integrity was further improved through advanced stormwater systems and rock grid subgrade layers, ensuring long-term performance. Environmental care was central, with the relocation of protected yellowwood trees and the safeguarding of nearby facilities, including a local primary school. This blend of innovation and stewardship enabled timely delivery within budget and with minimal community disruption.

Consulting engineering impact

AECOM's role as consulting engineer was pivotal in translating technical ambition into practical delivery. From planning to execution, constructability, programme efficiency and stakeholder coordination were prioritised to ensure seamless implementation within a live traffic environment.

Fast-curing materials enabled swift completion of critical works, including pavement rehabilitation and slip lane construction, maintaining uninterrupted traffic flow - essential for Plettenberg Bay's tourism-driven economy. AECOM also coordinated complex underground service relocations, working closely with SANRAL and the contractor to integrate these without delay.

A phased delivery strategy reimagined the intersection as a dual-lane elliptical roundabout with bypass lanes, designed to accommodate future traffic growth while ensuring operational continuity.

Design innovation

The upgrade sets a new benchmark for sustainable, high-performance road infrastructure. Advanced materials and methodologies balanced durability, functionality and environmental responsibility.

Key innovations included Bitumen-Treated Base (BTB) layers and glass grid reinforcement, enhancing fatigue resistance and pavement integrity while avoiding full-depth reconstruction. This approach reduced costs and extended service life.

The intersection was reconfigured as a rural elliptical roundabout - an uncommon but effective geometry for managing complex turning movements and future traffic volumes.

Intelligent drainage systems were integrated to mitigate flood risk and enhance climate resilience. Advanced modelling tools, including SIDRA traffic simulations and pavement lifecycle analysis, supported performance optimisation.

Aesthetic integration and place-making

Beacon Way demonstrates that infrastructure can enhance the visual and experiential quality of its surroundings. Aesthetic considerations were embedded to reflect Plettenberg Bay's coastal character and create a welcoming gateway.

Retaining walls were designed as structural and visual elements, aligned with road geometry to create cohesion and soften transitions between built and natural environments.

These choices reinforce the role of civil infrastructure in place-making—creating a gateway that is both functional and visually engaging.

Complexity and sophistication in delivery

Situated within a constrained urban corridor bordered

by a school, fuel station and commercial precinct, the project demanded precision engineering and strategic planning. Continuous traffic management, utility relocations and public safety considerations added complexity. Sophistication in design was achieved through advanced simulation tools, enabling the team to translate technical requirements into a seamless, user-friendly solution.

Challenges overcome

The team navigated unforeseen challenges - including geotechnical constraints and service conflicts - through real-time design adaptations and close coordination with utility providers. This agile approach minimised disruption and maintained programme integrity.

Despite budget constraints, the project met ambitious standards, complying with safety and environmental requirements. The upgrade stands as a testament to AECOM's technical excellence and problem-solving capabilities.

Environmental impact

Environmental stewardship was integral throughout the project. Rehabilitating existing infrastructure reduced carbon emissions, while durable pavement materials minimised future maintenance and environmental impact.

Intelligent stormwater systems mitigated flood risk, particularly near the adjacent school, protecting both the community and ecosystems. Protected yellowwood trees were carefully relocated, reflecting a commitment to biodiversity.

This sustainability-led approach ensured regulatory compliance and set a benchmark for future infrastructure delivery.

Health and safety

Health and safety were upheld as core principles. Operating within a live traffic corridor adjacent to a school and commercial precinct, the team achieved zero lost-time incidents, reflecting a strong safety culture.

Phased construction sequencing, comprehensive traffic management and clearly defined pedestrian routes ensured safety for all users. Daily toolbox talks, compliance monitoring and regular risk assessments maintained ambitious standards across the workforce and subcontractors.

Quantifiable time, cost and quality

The upgrade was delivered ahead of schedule, within 5% of budget and with zero lost-time incidents - demonstrating disciplined programme management and engineering excellence.

AECOM led a robust planning and design strategy, ensuring continuity from concept to final design. Traffic modelling, geotechnical investigations, and community context shaped a technically sound solution.

Comprehensive documentation enabled efficient procurement and mobilisation. Strong coordination with SANRAL, the contractor and stakeholders ensured alignment and momentum.

Client responsiveness

AECOM's commitment to SANRAL's objectives - enhanced traffic flow, community safety and engineering excellence - was evident throughout. Design solutions met strategic goals, including compliance with quality standards, environmental regulations and Contractor Participation Goals (CPG). Rapid responses to technical queries and early risk mitigation supported agile decision-making, keeping the project on track despite site constraints.

Budget discipline

Delivered within 5% of the approved budget, the project exemplifies strategic cost management. Retaining and rehabilitating existing infrastructure - such as reinforcing in-situ concrete slabs with glass grid technology - reduced costs and time on site without compromising performance.

Scope adjustments were managed precisely. The removal of the Ultra-Thin Friction Course (UTFC) and simplified slab treatments were balanced against critical safety enhancements, including pedestrian guardrails and increased stormwater capacity.

Risk management

The upgrade exemplifies AECOM's ability to manage risk with precision. Challenges - including geotechnical conditions and service conflicts - were addressed through strategic, real-time design adaptations. Stakeholder engagement ensured seamless coordination with utility providers, minimising disruption.

Operating within a live urban environment, the team balanced technical, environmental and stakeholder considerations to ensure safe, efficient delivery. Traffic disruption was mitigated through adaptive design and phased sequencing. Environmental sensitivities were addressed through meticulous planning.

Close coordination with SANRAL, the contractor and local stakeholders ensured evolving needs were met without compromising quality. Early permitting, responsive design revisions and coordinated utility relocations reduced engineering risks.

Corporate Social Investment (CSI)

The upgrade delivered socio-economic and environmental benefits beyond its engineering achievements. Improved mobility, reduced travel times and enhanced accessibility supported local businesses and improved the quality of life.

Local employment and subcontractor participation promoted skills development and economic inclusion. Sustainable practices, including recycled materials and sensitive construction methods, reduced the ecological footprint.

Safety measures - such as fencing, signage and coordination with the adjacent school - ensured public safety. Post-completion, the intersection now serves as a civic asset, improving access and instilling local pride.

Inclusive design features, such as safe crossings and enhanced drainage, created a more resilient public space. Training and job creation initiatives amplified long-term social value.

The Beacon Way Intersection upgrade stands as a benchmark of civil engineering excellence - combining technical rigour, innovative design and community responsiveness. Delivered under challenging conditions, it reflects AECOM's commitment to safety, sustainability and public value. ■

CANELANDS PIPE AND PEDESTRIAN BRIDGE

The newly constructed 'Canelands Pipe and Pedestrian Bridge' is a 165-metre-long prestressed concrete structure that spans the Mdloti River in the Canelands area of Verulam, KwaZulu-Natal. This project involved dismantling the century-old South African Railway Structural Steel Bridge and replacing it with a modern, post-tensioned pipe and pedestrian bridge.

The bridge was originally designed and used as a railway bridge in its early years but was later repurposed by eThekwini to carry a 400 mm sewer pipe, a 350 mm and a 400 mm water pipe as well as electrical and fibre optic cables across the Mdloti River in a north to south direction over the bridge deck. Earlier studies indicated that rehabilitation of the existing structure would not be cost effective.

Recognizing the historical significance of the original bridge, which had surpassed its 100-year lifespan and was designated as a national heritage site, Naidu Consulting prioritized the preservation of its historical character. To honour the legacy of the old structure, the design of the new bridge incorporated balustrading that closely mirrors the steel truss superstructure of its predecessor, offering a tribute to the original design.

Design innovation

The phrase "constructing a bridge within a bridge" aptly captures the innovative construction methodology employed. The new post-tensioned bridge deck was built within the envelope of the deteriorated steel superstructure. This approach offered distinct benefits - chiefly, the avoidance of temporary works within the river channel, thereby minimising environmental disruption. Crucially, pedestrian movement and essential services remained uninterrupted throughout construction.

The structure comprised a continuous composite prestressed beam and reinforced concrete slab deck, consisting of adapted U-beams and a 350 mm thick reinforced concrete top slab.

The continuous U-beams encase the gravity sewer line, comprising a structured wall HDPE pipe. The selection of the HDPE pipe was based on its reduced weight which was vital in reducing the loading on the existing bridge substructure.

In using the prestressed beam, which was cast within the existing steel truss option for the bridge deck, staging for the bridge deck over the river floodplain was completely eliminated in addition to the ease and speed of construction.

The concept of the glow in the dark/photo-luminescent concrete polymers stemmed from a simple brainstorming session that took into account the lack of electrical infrastructure in rural towns and the related high costs.

Given the high costs of electrical lighting, load shedding and the issue of theft, an innovative solution was proposed to illuminate the bridge by means of "Glow in the Dark Concrete" in the architectural balustrades. This feature enhances safety by enabling

the balustrades to glow in the dark, improving visibility for pedestrians at night.

By combining historical preservation with community-focused design, environmental sensitivity, and technological innovation, Naidu Consulting has delivered a bridge that not only addresses contemporary needs but also honours the past while ensuring a sustainable and efficient future for the local community. This project exemplifies how technical ingenuity, environmental responsibility, and community-focused design can converge to deliver infrastructure that is forward-looking and respectful of the past.

Budgetary compliance

Upon site establishment, the Contractor identified opportunities for improved efficiency. A proposal was submitted to cast the deck in-situ using custom formwork, due to limitations in the condition of the existing structure and logistical constraints associated with the precast deck beams. Naidu Consulting rigorously evaluated the revised proposal and approved it, as it adhered to the original intent with minor geometric modifications to the deck.

Further cost savings were achieved by repurposing the existing substructures, including piers and abutments.

One of the project's key technical challenges was

the retention and upgrade of essential utilities during construction, all major services that included MV electrical, fibre optics, sewer, and water infrastructure remained live and in service to avoid disrupting local service delivery to the surrounding communities and adjacent industrial zones.

The pre-stressed concrete beams used in the deck, allowed for the construction of the long spans of approximately 33 m.

Laminated rubber bearing pads were used for the bridge bearings. These bearings were specific to their position in order to accommodate the thermal movement of the bridge adequately.

Risk management and safety

A baseline risk assessment was conducted during the preliminary design stage to ensure that the various risks associated with a project of this nature and technical requirements were identified, considered and, where possible, mitigated through appropriate engineering design, detailing and specification.

Some of the risks identified were:

- Fractured and variable founding materials
- Flash flooding during construction
- Working at heights during construction
- Effluent leaking into the river
- Safe maintenance of the structure after construction

The Engineer supervised the contract and provided relevant information, details and the oversight to ensure the impartial appropriation of risk. He ensured the Contractor followed all necessary procedures where risk was involved.

The Engineer also reviewed and provided comment on the Contractor's temporary works designs, method statements, quality control as well as health and safety plans to ensure statutory and contractual compliance.

Quality inspections and review of quality records were undertaken by the Engineer at each stage of the construction process.

Monthly site audits were undertaken during the construction period. Through the implementation of effective safety measures and a safe working culture, the project ensued without any significant health and safety incidents despite the challenges of working at heights up to 10 metres above the ground.

Sustainability considerations

The design and construction methodology utilised the existing bridge substructure thus ensuring that the new bridge deck and demolition sequence did not trigger environmental requirements.

PROJECT INFORMATION

- **Consulting Engineer:** Naidu Consulting
- **Main Contractor:** Afrostructures

From inception, Naidu Consulting embedded sustainability into every aspect of the project. This included repurposing as much of the existing infrastructure as possible, particularly concrete substructures, thereby reducing the demand for new materials and lowering the project's carbon footprint. Key sustainability measures included:

Infrastructure reuse: Existing piers and abutments were retained, repaired, and treated to extend their lifespan and reduce future maintenance requirements.

Aesthetic integration: Planter boxes were incorporated into the retrofitted pier extensions, enhancing both environmental value and visual harmony with the surrounding landscape.

Energy efficiency: The use of photo-luminescent materials reduced reliance on conventional lighting for night-time visibility.

Low-maintenance design: Durable materials and vandal-resistant finishes were specified to ensure long-term structural performance with minimal upkeep.

Corporate social investment

Part of the Client's social responsibility was developing small and emerging contractors from the community without any hindrances and work stoppages. This was accomplished with a social facilitation programme in place, through an Institutional and Social Development (ISD) Process. Through the ISD, there was a smooth management of local labour and small business enterprises which incorporated MK veterans.

The project enabled the employment of thirty local labourers in total. Through a learnership and training programme, the Contractor provided in-service mentorship to two local students. The Contractor also provided mentorship to local Contractors via the contract. In addition, the local labour employed, were trained in steel fixing and gabion basket construction.

The expansion of residential and industrial areas in the surrounding region has made the Canelands Bridge a critical pedestrian access route. Prior to its reconstruction, pedestrians - many of whom crossed the bridge daily were faced with a narrow and hazardous walkway.

Recognising the need for improved pedestrian infrastructure, the team prioritized enhancing the walkway's design. The new bridge provides a safer, more dignified route for daily commuters, schoolchildren, and workers - many of whom previously avoided the crossing altogether.

Quantifiable time, cost and quality

Seamless collaboration between Naidu Consulting, the Contractor (Afrostructures), and the Client (eThekwini Municipality W&S) ensured that construction progressed with exceptional attention to quality, financial discipline, and schedule adherence and is now fully operational, providing a safe, more resilient and reliable pedestrian and utility crossing to the community it serves.

The project was completed within 18 months, without experiencing any delays and all within budget. ■

LONGKLOOF PRECINCT

Designed by dhk Architects, the Longkloof Precinct project was a complex multidisciplinary adaptive reuse and new build design challenge that creates a meaningful dialogue between heritage and contemporary design in a sensitive and respectful combination.

The precinct is in a transitional location at the south-western fringe of the Cape Town CBD. It is bounded by Kloof Street to the east, Park Street to the south and New Church Street to the west. Jameson Street extends through the precinct.

The precinct incorporates six adjoining erven, acquired by Growthpoint Properties between 2010 and 2024, with an accumulated site area of 16 500 m^2. It was previously landlocked with minimal street frontages and restricted public access to commercial buildings. It was fragmented, lacking spatial cohesion and connectivity. Growthpoint envisioned Longkloof as one of the most important creative hubs within the city; an attractive address for innovative businesses within a vibrant mixed-use precinct.

Five original historic buildings of various scales, were subject to heritage protections in terms of height, building mass, protected view corridors, façade articulation and materiality. These were sensitively restored. A new four-star hotel was constructed and a new interconnected landscaped public realm was developed, enhancing the street frontage and introducing a new publicly accessible external space at the heart of the precinct.

Construction innovation technology

The new hotel building is primarily a conventional reinforced concrete structure with steel portals for the fourth floor and roof structure.

External face brick cavity walls were used on the lower third floors. Lighter perforated brickwork was used on internal demise and partition walls. This reduced carbon content and transportation energy costs while maintaining compliance with fire and acoustic requirements. The red brick and materials were selected to reference, without mimicking the heritage buildings.

A contemporary Mansard roof covers the hotel's third and fourth floors using TradZinc standing seam cladding, supplied and installed by the Durban-based MRC Group. This was a more budget-friendly alternative to the originally proposed Rheinzink.

Double-glazing throughout all hotel guest rooms ensures optimal acoustic and thermal performance. The outer glass skin is an NC45 performance glass that mitigates excessive heat gains. A flush glazed profile was implemented across most windows to achieve a clean, seamless aesthetic, creating the appearance of floating glass panes.

A primary focus of the development was to enhance the public realm, with a large central square and series of courtyards and external spaces to complete the precinct.

Design innovation

dhk's adaptive reuse design revitalises, restores and adds contemporary elements to the existing heritage buildings, and introduces a new hotel building to fully activate the site. The precinct encompasses 32 on Kloof, dhk's award-winning catalyst adaptive reuse project completed in 2019; the former Longkloof Studios office complex, now named Darters + Threshers; the Refinery Building

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designed by Sir Herbert Baker's studio, now housing commercial offices; and the renovation of the Victorian villa restaurant at 2 Park Street.

The hotel design was developed through extensive consultation with the City of Cape Town heritage and Heritage Western Cape to accommodate significant urban design and heritage indicators. New buildings had to respect and not detract from the historic structures.

The new hotel sits alongside the historical buildings, and incorporates 2 Park Road into the precinct. This resulted in an extremely irregular site with complex geometry unusual for a hotel. The hotel was designed as two adjacent buildings, separated by a pedestrian retail walkway. A glazed bridge on the bedroom levels above connects the two buildings, maintaining the view corridor to the Refinery building within the precinct. The eastern façade of the historical demolished MLT House, one of the United Tobacco Company buildings, was retained and incorporated into the hotel.

dhk developed an urban precinct plan and associated vision document to create, activate and enhance public spaces around the existing buildings and improve precinct access. The urban design response strategically introduces a more accessible urban language, while fragmenting building forms to reduce bulk and maintain reference to historical buildings.

Environmental impact consideration

The project is currently pursuing a 4 Star Green Star rating from the Green Building Council South Africa (GBCSA), signifying best practice in environmentally sustainable design and construction. The comprehensive sustainability strategy incorporates multiple integrated interventions to target significant reductions in energy

PROJECT INFORMATION

- **Architect:** dhk Architects
- **Client:** Growthpoint Properties
- **Main Contractor:** Isipani Construction
- **Quantity Surveyor:** MLC Construction Cost Consultants
- **Consulting Engineer:** LH Consulting Engineers

consumption, water usage and overall carbon footprint.

Health and safety

The first phase of construction coincided with the 2020 Covid-19 pandemic. This required new systems and procedures to ensure regulatory compliance while implementing practical measures to promote employee and visitor safety.

To ensure compliance, health and safety consultants Safetycon introduced various safety measures, including a comprehensive tag system to screen and record every person entering the site. Work schedules were also adjusted to accommodate Covid-19 regulations while maintaining production schedules.

Hard rock breaking during the piling and bulk excavation phases generated substantial noise disturbance for existing offices within the precinct. Sound barriers on window openings were implemented in affected offices to minimise disturbance to an acceptable degree. In severe cases, the client moved tenants to alternative locations.

Quantifiable time, cost and quantity

dhk's involvement in the precinct was incremental, starting in 2009 with an initial briefing for the design of an office proposal on the larger open site containing the MLT House building and extensive surface parking. The brief expanded to multiple briefs for six separate buildings on adjoining erven, implemented over 15 years.

The original proposal, conceived in 2010, was for two separate office buildings positioned above a retail floor, with three basement levels and one level of structured parking.

Heritage and Site Development Plans (SDP) approvals were first granted for the hotel site between 2015 after a stringent approval and subsequent appeals process.

Risk management

Comprehensive risk assessments were conducted throughout the project phases, identifying potential impacts to programme, budget and stakeholder operations. Key risks included construction delays due to Covid-19 restrictions, noise and dust impacts on operational tenants, damage to adjacent heritage buildings and logistical constraints from narrow site access.

Risk mitigation strategies included contingency planning for regulatory changes, alternative construction methodologies to minimise tenant disruption and regular stakeholder communication protocols. Emerging risks were proactively managed and adjusted to mitigate risks as conditions evolved, which required effective project management.

Corporate social investment

Growthpoint's investment has resulted in new commercial and retail spaces, a world-class hotel and secure pedestrian routes linking busy Kloof Street to the Cape Town CBD, bringing to life a new community-oriented commercial space. The square is available for events, film shoots, year-end functions and community activations.

Although the Longkloof Canopy by Hilton project did not have a formal CSI criterion, the development aligned with Growthpoint's strong ESG strategy and excellent BBBEE rating. This guided a socially responsible approach throughout the project. ■

BARLOW PARK LIFESTYLE CENTRE (PHASE 2)

Barlow Park is a multi-billion-rand mixed-use precinct in Sandton, Johannesburg, between the M1 highway and Katherine Street, alongside Innisfree Park. The Barlow Park lifestyle precinct, previously headquarters of industrial brand management company Barloworld Limited, has been redeveloped as a high-quality, high-density affordable mixed-use residential precinct. The multi-phase development also includes retail shops and restaurants, a school, business centre, gym and other supporting amenities within an open-air precinct.

Its close proximity to the economic hub of Sandton Central aims to establish an inclusive, empowering, sustainable community with access to economic opportunity and green spaces, counteracting the urban sprawl and spatial segregation that historically has characterised Johannesburg.

Phase 2 consists of two residential blocks, a total of 846 rental units, offering best-in-class accommodation above the retail component. Similar to phase 1, phase 2 is an extension of this brilliant offering. A sweeping stair leads to the podium level, which accommodates the school the recreation centre, lounge/clubhouse, pool, business centre and gym.

The residential buildings are set back from the shopping level, which not only establishes a layered transition from public to full private spaces (and ensures the best views of the surrounding areas), but also positions them so they remain unimposing from the street and maintain a sense of open, naturally lit space at ground level.

Corporate Social Investment

Barlow Park Lifestyle precinct represents a significant stride in addressing the spatial segregation issues that have long plagued South Africa's urban landscapes. Historically, apartheid policies entrenched deep socio-economic and spatial divides, creating fragmented communities with limited access to quality amenities and services for marginalised populations. In contrast, Barlow Park embodies a commitment to inclusivity and integration by strategically blending residential, commercial, and recreational spaces in a cohesive environment. This design approach fosters a sense of unity and encourages diverse social interactions, breaking down the barriers that once segregated communities.

Design Innovation

While the use of durable, low-maintenance face brick forms the foundation of the building's façade, GASS Architecture Studios elevates this material through a thoughtful interplay of pattern and texture. By incorporating a range of bricklaying techniques, the architects achieve a layered and visually engaging surface that transcends the utilitarian origins of the material.

Generous, recessed balconies not only articulate the façade with rhythm and depth but also extend the living spaces outward, offering residents private outdoor areas. These elements foster a sense of community by enhancing both vertical and horizontal visual connections across the development.

Internally, the residential blocks are organised around courtyards that open to the north – an intentional move to maximise solar access and natural ventilation. The parking decks are designed as open structures, allowing for passive ventilation of the basements.

The façade's composition celebrates material authenticity and architectural clarity. Textural contrasts between face brick, painted flush-jointed brickwork, and off-shutter concrete coalesce into a cohesive and expressive architectural language.

Environmental Impact Consideration

GASS Architecture Studios' approach to the development was intentionally understated, creating enduring "background buildings" that would be contextually responsive and respect the overall character of the area rather than seeking to erect an architectural landmark. The precinct plan places significant emphasis on the space between buildings and the quality of the shared spaces as much as on the buildings themselves.

By activating "in-between spaces" in this manner, the precinct masterplan actively encourages community life. The open spaces throughout the development become an extension of the residents' living spaces and are incorporated into their day-to-day lives, contributing to their general quality of life and fostering social cohesion.

Barlow Park has been designed and built in accordance with EDGE Certification requirements. Water is sourced, treated and stored on site, thus not unnecessarily burdening the city's infrastructure.

Health & Safety

Barlow Park prioritises health and safety as a cornerstone of its operational strategy, ensuring the well-being of all workers, stakeholders, and the surrounding community. The project team recognises that maintaining a safe work environment is essential not only for compliance with regulations but also for enhancing productivity and morale.

A comprehensive health and safety plan outlines procedures designed to identify, mitigate, and monitor potential hazards at every construction phase. Regular safety training sessions are conducted for all personnel, equipping them with essential skills to identify unsafe conditions and implement best practices.

Through a steadfast commitment to health and safety, Barlow aims to create a secure work environment. This dedication not only protects workers but also fosters a culture of safety that resonates throughout the community, ensuring a successful and responsible construction endeavour.

Quantifiable time, cost and quality

Barlow Park exemplifies the integration of time, cost, and quality management to achieve successful project outcomes. Each component is meticulously quantified to ensure alignment with project goals and community expectations.

Time Management: A detailed project schedule outlines each phase of construction, with specific milestones and deadlines. Utilising project management software, the team tracks progress allowing for prompt identification and resolution of potential delays.

Cost Management: A comprehensive budget is developed based on accurate estimates for materials, labour, and overhead. Regular financial audits and variance analysis ensure that spending remains within budget, facilitating transparency and accountability. Contingency funds are allocated to address unforeseen expenses.

Quality Management: Quality assurance protocols are established to ensure that all construction meets the highest standards. Regular inspections and adherence

PROFESSIONAL TEAM

- **Architect:** GASS Architecture Studios
- **Main Contractor:** WBHO and Trencon
- **Client:** Divercity Urban Property Group
- **Project Manager:** IBP Central Project Managers
- **Quantity Surveyor:** RLB Pentad Quantity Surveyors
- **Consulting Engineer:** Gelderblom Consulting Engineers

to building codes and environmental regulations are conducted throughout the project lifecycle, ensuring that quality is not compromised for cost or speed.

Risk Management

Barlow Park is a significant urban development initiative that aims to create a sustainable and vibrant community space. With any large-scale construction project comes a variety of risks, ranging from financial and operational to environmental and safety related. Effective risk management is crucial for the successful delivery of a project such as Barlow Park, ensuring that potential challenges are identified, assessed, and mitigated early in the planning and execution phases.

The most important element for risk management at Barlow Park was thorough risk identification. This involved deconstructing all aspects of the project, including schedule, budget, resources, and stakeholder engagement. Key risks identified include:

Financial Risks: Fluctuations in material costs, changes in labour rates, and potential changes to funding sources can significantly impact on the project budget.

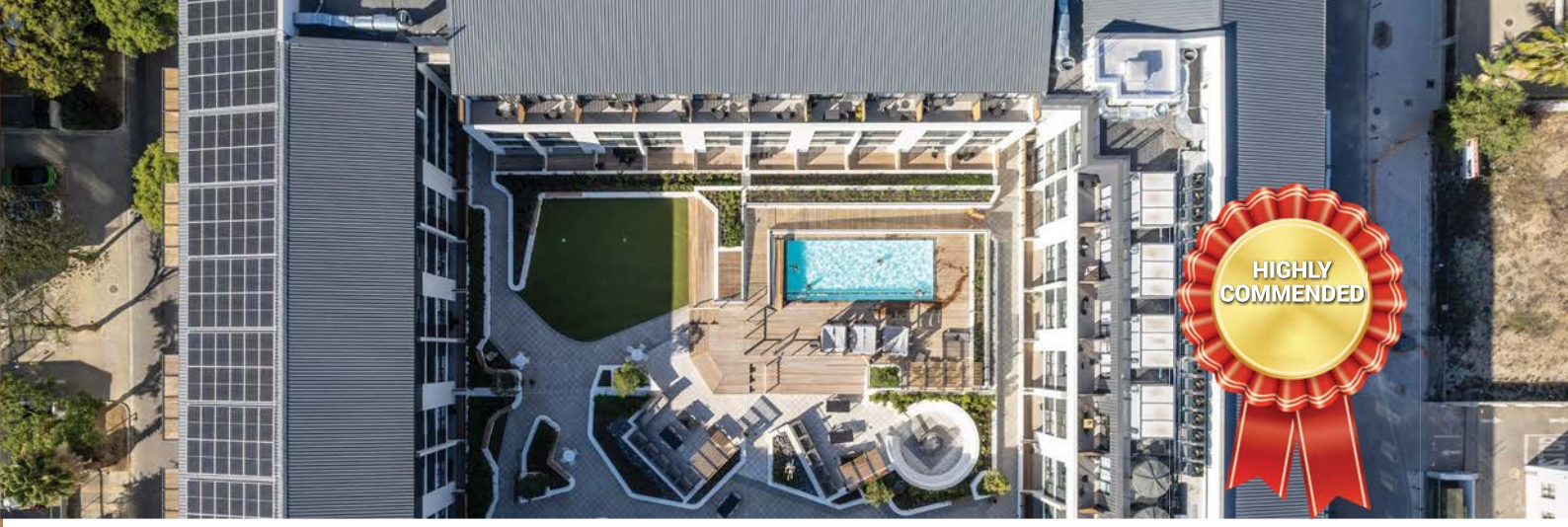
Operational Risks: Delays in project timelines due to unforeseen site conditions or issues with subcontractor performance can impede overall progress.

Safety Risks: Construction sites can be hazardous locations. Identifying potential safety risks and ensuring compliance with occupational safety regulations is necessary to protect workers and the public.

Environmental Risks: The project considered the environmental impact. Risks related to pollution, waste management, and ecological considerations was evaluated.

Regulatory Risks: Changes in zoning, building codes, or other regulatory requirements can pose challenges that might delay project progress.

Risk management is an ongoing process. We aim to conduct regular reviews and updates of the risk management plan to accommodate new risks that may arise during the construction phase. Consistent monitoring of identified risks will involve checking in with project teams, reviewing safety records, and evaluating budget performance against predictions. With this proactive approach to risk, Barlow Park can set a benchmark for future construction projects, balancing growth with sustainability and safety. ■

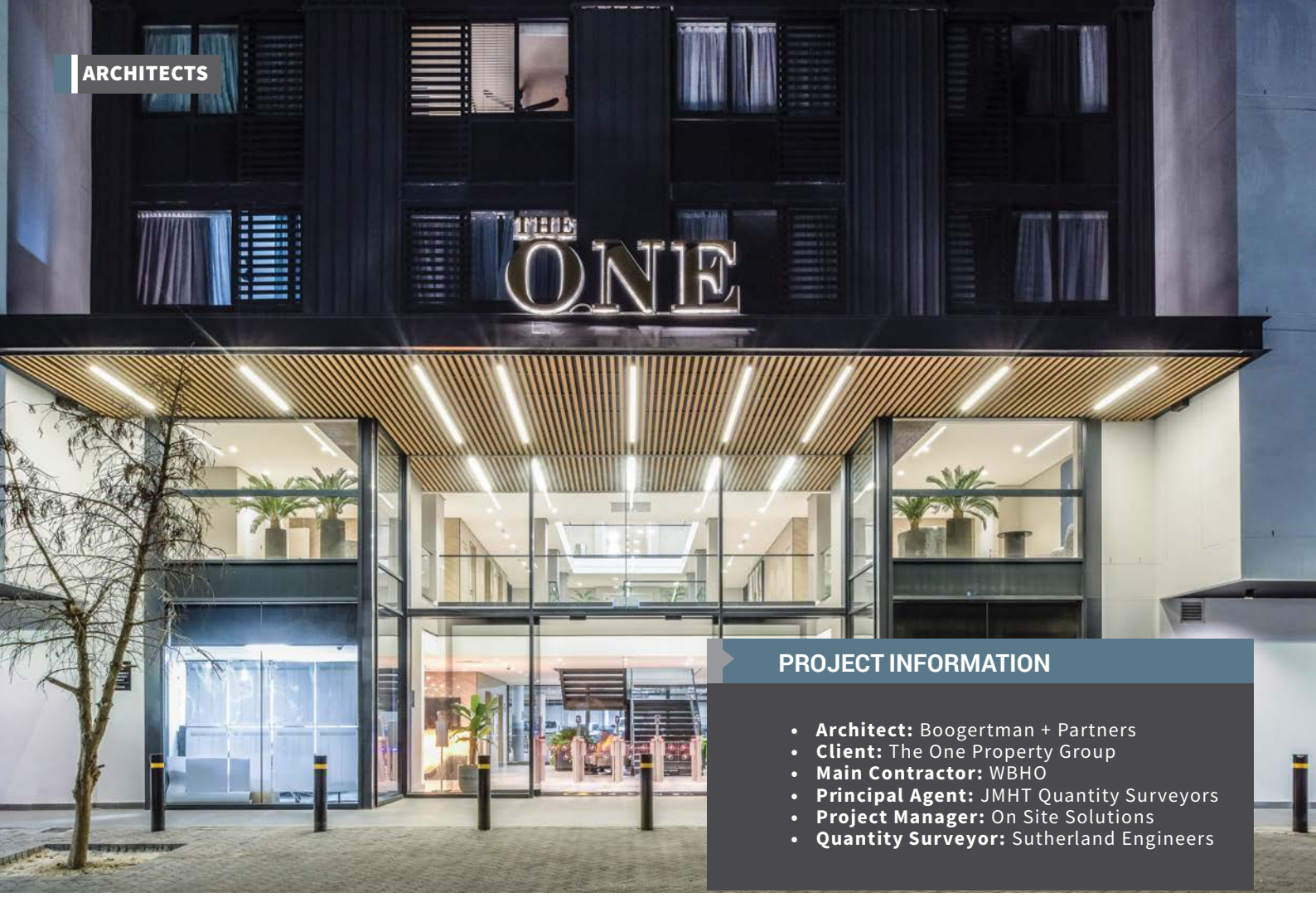


THE ONE, STELLENBOSCH

Located just 750 metres from Stellenbosch University, The One is a premium, mixed-use student development that redefines student accommodation in South Africa. Comprising 508 secure residential units – including studios, one- and two-bedroom apartments – the complex places a strong emphasis on community, comfort and convenience.

Two large landscaped courtyards form the heart of the development, surrounded by high-quality indoor and outdoor amenities that support both social interaction and personal well-being.

Ground-floor retail and café-style activation mirror Stellenbosch's characteristic street rhythm, creating a lively, integrated interface with the surrounding neighbourhood. Communal facilities include a study centre, gym, e-gaming lounge, cinema, games room, pause areas, laundry, and fully equipped kitchens. Outdoor features include leisure zones, shaded study spots, braai areas, and a swimming pool—all designed to support a well-balanced, modern student lifestyle.



PROJECT INFORMATION

- **Architect:** Boogertman + Partners
- **Client:** The One Property Group
- **Main Contractor:** WBHO
- **Principal Agent:** JMHT Quantity Surveyors
- **Project Manager:** On Site Solutions
- **Quantity Surveyor:** Sutherland Engineers

Design innovation

The One occupies an entire city block, referencing Stellenbosch's original rectangular grid and "werf" typology, and reinterpreting local heritage through a contemporary lens. The building's perimeter layout encloses two landscaped courtyards, fostering a sense of community while optimising light and airflow.

To remain sensitive to surrounding historical buildings – such as the nearby 1771 Catholic Church, one of the oldest Cape Dutch buildings in the region – the design intentionally breaks down the building's massing through a hierarchy of scale. The elevation is articulated in three sections: a recessed glazed base, a boldly expressed central body, and a lighter cap. Full-height glazing and recessed planes add visual lightness, while Juliette balconies in vertical cladded bands further break the structure's length.

The roofscape alternates between barn-style pitched roofs and flat-roofed interventions at the knuckles between the wings and roof plant areas, wrapped in agricultural-style sheeting to evoke the architecture of Cape wine farms. These variations help the single building read as a collection of structures, reinforcing its village-like identity.

The development also adopts zero building lines along Hofman Road with a slight setback along Dennesig Street, enabling the structure to connect directly with the street edge and enhancing public engagement with the ground floor's commercial component – an innovative approach for this part of Stellenbosch.

Construction innovation and technology

A refined yet durable material palette supports ease of maintenance while maintaining a high standard of aesthetic quality. Every design decision reflects a focus on safety, sustainability, liveability, and long-term community impact. Special attention was paid to the detailing and durability of common areas and amenities. This is particularly evident in the courtyards, circulation areas, and shared facilities, where careful material choices and robust construction ensure sustained performance.

Side cladding was used as an extension of the roof sheeting creating cavities for a ventilated façade. Composite timber slats with an aluminium internalised structure were used not only for sun screening, but to also create privacy. Each of the 508 residential units, a mix of mainly studios, 1-beds and 2-bed typologies, is designed with functionality and comfort in mind, featuring high-end fixtures and finishes, such as engineered stone countertops, built-in cupboards, desks, and shelves. The units are designed to cater to the needs of a diverse range of residents, ensuring a premium living experience.

Corporate social investment

While privately developed, The One delivers meaningful social and economic impact for the broader community through:

- R35-million in privately raised funding directed towards public infrastructure upgrades and enhanced precinct security.
- Significant job creation during both construction and operational phases.
- A vibrant mixed-use ground floor that enhances the public realm and catalyses economic activity in the surrounding precinct.

- Seamless integration with local urban renewal strategies, particularly through improved street connectivity and pedestrian-first design principles.

Environmental impact consideration

Sustainability is woven into every aspect of The One's design, from site selection to material specification, reflecting a commitment to environmental responsibility and long-term resilience.

Key features include:

- Walkability and urban integration: Proximity to campus and town centre promotes walking and cycling. Semi-pedestrianised streets, concealed parking, and cycle infrastructure reduce car dependence and contribute to a healthier, more sustainable precinct.
- Energy efficiency: Rooftop solar panels assist with water heating, reducing energy consumption and operational costs.
- Landscaping strategy: A robust water-wise landscaping plan features mostly indigenous, hardy species chosen for their shade/sun tolerance. Strategic courtyard planning and drainage systems manage runoff and mitigate flooding risks.
- Indoor environmental quality: The building's internal courtyards and natural ventilation strategies promote thermal comfort and daylight access, enhancing the quality of life for residents.

Health and safety

Fully compliant with all national health and safety regulations and building codes. Robust construction methods, secure access control, and thoughtful spatial planning ensure the safety and well-being of all residents. Construction in the midst of a well-established residential neighbourhood was carefully managed with time and sound restrictions implemented during certain hours.

Quantifiable time, cost, and quality outcomes

The project faced the extraordinary challenge of tight timelines with the necessity of making units available for the start of the academic year. Despite its scale and complexity, the project was completed on time and within budget. All 508 units were pre-let before completion, demonstrating strong market demand and validating the project's financial and design approach. WBHO, a trusted contractor with extensive experience in large-scale developments, ensured that The One met high construction standards, on time for the January 2025 student intake.

Risk management

The One addresses a long-standing shortage of quality student housing in Stellenbosch. By offering a differentiated product that blends affordability, functionality, and design excellence, the development de-risks long-term vacancy and contributes to a sustainable rental ecosystem. The pre-letting of all units prior to handover speaks to the success of the market positioning and risk mitigation strategy.

The One sets a new benchmark for integrated student living in South Africa. It proves that high-density development can be both heritage-sensitive and future-facing, and that student housing can play a leading role in urban renewal.

Key achievements include:

- Blending contemporary living with heritage-inspired design.
- Reinvigorating a previously degraded area of Stellenbosch.
- Promoting sustainability through walkability and density.
- Elevating the student experience through community-focused amenities.
- Acting as a catalyst for precinct-wide development, with several adjacent sites now earmarked for future projects.

By prioritising design, community, and contextual sensitivity, The One delivers more than accommodation – it contributes to a holistic urban lifestyle and a sustainable future for the town of Stellenbosch. ■

PROJECT INFORMATION

- **Architect:** DK & Associates Architects
- **Main Contractor:** ENSTSHA Construction
- **Client:** City of Cape Town
- **Principal Agent:** DK & Associates Architects
- **Project Manager:** City of Cape Town
- **Quantity Surveyor:** Senekal Allen & Partners
- **Consulting Engineer:** HHO Engineers

NEW EDUCATION DOME AND EXPERIMENTAL EDUCATION GARDEN: GREEN POINT PARK

The Green Point Educational Dome, the country's first fully three-dimensional mass timber dome and a trailblazing example of ecological design excellence, is a significant accomplishment in South African sustainable architecture. Its construction represents a major advancement in material innovation, timber engineering and the empowering of local industry.

The dome's geometry and structural logic, developed by the innovative team at MEWA, demonstrate a sophisticated fusion of form and function.

The superstructure consists of:

Twenty large curved timber beams, precision-engineered to follow the dome's complex curvature.

Detailed mechanical joints, that enable smooth load transfer through interlocking geometry, eliminating the need for adhesives and providing strong shear resistance.

A cross-laminated timber (CLT) compression ring, stabilising the beams and ensuring even distribution of structural forces.

Strategically placed galvanised steel brackets, enhancing lateral stability and supporting dynamic loads.

This hybrid system blends the natural warmth of timber with the tensile strength of steel, producing a robust and visually striking architectural form.

Innovative 3D plywood fabrication - used for the first time in South African timber manufacturing - enabled the production of complex curved components. Specialised CNC machining and laminating processes were required to accommodate non-linear geometries.

Sustainability guided all design and procurement decisions. Key elements included:

Locally sourced South African poplar from the Karoo, valued for its renewability, low embodied energy and compatibility with engineered timber systems.

A reduced transport footprint, lowering carbon emissions and strengthening regional supply chains.

Waste-conscious fabrication,with offcuts repurposed for educational installations and landscaping features.

By prioritising indigenous materials and low-impact processes, the dome reinforces South Africa's commitment to green-building principles and circular-economy values.

Corporate Social Investment

Embedded within the Experiential Education Garden,

the dome provides a freely accessible, immersive educational space that empowers urban youth and communities to engage with indigenous heritage and nature. The project promotes inclusivity, social cohesion, and community upliftment, opening green space for public use. It also generated local jobs and shaped artisanal skill development during its fabrication and assembly.

Design innovation

Inspired by traditional Khoi San dwellings, the dome pays a modern tribute to First Nations architecture, honouring heritage through thoughtful design. Officially opened on 20 November 2024, the “Khoi Dome” serves as an educational centrepiece within the Experiential Education Garden (EEG), hosting a permanent Khoi exhibition and immersive learning programmes that connect visitors, especially children, with cultural history and environmental awareness.

Environmental Impact Consideration

Framework for Environmental and Heritage Compliance the creation of the dome, which is situated within Green Point Urban Park's urban landscape, was carefully coordinated with environmental and heritage standards to ensure complete statutory compliance and no biological disturbance.

Health and Safety

Safety was integral to every stage of the dome’s design and construction, with engineering solutions developed to accommodate its complex curvature and specialised materials. The approach balanced legislative compliance, ergonomic foresight and structural innovation.

Safe access across the dome was ensured through perimeter guardrails, harness-compatible anchor points and modular scaffolding with anti-slip platforms. These systems were designed for rapid deployment and reconfiguration during construction and future maintenance.

Risk was further reduced through extensive off-site prefabrication. Curved panels and bracket assemblies were manufactured under controlled conditions, enabling precise fabrication and comprehensive safety checks.

Structural integrity was strengthened through dovetail joints and galvanised steel brackets designed for dynamic loads and thermal movement, supported by finite element analysis. All measures complied with the OHS Act, COIDA and relevant SANS codes.

Quantifiable Time, Cost and Quality

Following a seven-year planning phase led by the City’s Environmental Management Department, prefabrication at MEWA’s Darling facility enabled streamlined installation and helped mitigate COVID-19 delays. Delivered within a R9-million budget, the project combined local material sourcing with efficient engineering to ensure financial prudence and community benefit.

This landmark dome showcases strategic foresight, sustainable engineering and collaborative governance. Prefabrication accelerated delivery, while advanced timber testing and local sourcing ensured durability, cost-efficiency and community upliftment - all achieved within budget.

Risk Management

Governance and oversight were led by the Environmental Management Department and the Strategic Assets Department, ensuring strong accountability and transparency throughout the project. An ethical framework grounded in accessibility, integrity, trust and accountability helped mitigate reputational and operational risks. Proactive risk management centred on rigorous safety protocols and extensive prefabrication, which significantly reduced on-site hazards.

Skilled MEWA craftsmen applied specialised construction techniques safely and precisely, supported by continuous legal and environmental compliance monitoring by the Environmental Management Department..

This integrated approach ensured a safe, compliant and ethically governed project that met stakeholder expectations and upheld the City’s operational standards.

The dome’s design is rooted in a powerful cultural vision - to honour and preserve Khoi First Nations heritage through contemporary architecture. Led by Lindie Burskie, the design team envisioned an experiential outdoor classroom that fosters environmental awareness and cultural pride among learners. The structure was also conceived to revitalise an underutilised area of Green Point Park, transforming it into an accessible, vibrant and meaningful civic space.

Professional Service Providers were appointed through a framework contract for design under the Construction Industry Development Board (CIDB) Standard Professional Services Contract. The contractor was procured via a bespoke open-bid process using the Joint Building Contracts Committee (JBCC) suite. The project adhered to the South African Council for the Project and Construction Management Professions (SACPCMP) lifecycle - Inception, Concept and Viability, Design Development, Documentation and Procurement, Construction, and Project Close-Out. ■

MANUFACTURE OF PRECAST CONCRETE KEYSTONES FOR IMPOFU WIND FARM

The Impofu Wind Farm is a large-scale renewable energy project located in the Eastern Cape province and will supply 330 MW of renewable energy to Sasol's Secunda site, where French-based industrial gas supplier, Air Liquide, operates the largest oxygen production site globally.

There are 57 concrete wind turbine towers - each reaching a height of 120 m. A single concrete tower comprises 25 individual keystones. Keystones are precast concrete segments - specifically, they are wedge-shaped segments that make up the circular tower structure.

Design and construction innovation

This specialised precast solution demanded the rapid development of an entirely new manufacturing facility.

Within six months, L&R Civils (Cape Concrete/Empa JV) constructed and commissioned a purpose-built precast factory with four 64 Ton gantry cranes, eight custom-designed moulds (supplied by Nordex), two 2 m^3 Liebherr batch plants, 10 000 m^2 Roofed structure and covered aggregate storage bays.

This custom-built factory was located 52 kilometres from the wind farm site.

Keystones

Most concrete wind turbine towers are constructed with precast concrete C Sections. These are C-shaped segments reaching a maximum of five metres in height, resembling half circle sections, that are designed to interlock.

The heaviest keystone in each concrete tower weighs over 57 tonnes, measuring 20 metres in length and over five metres in width. This keystone and four other keystones of varying sizes are assembled together on site to form a cylindrical shape and are grouted together on the vertical joints to form the T-1 section of the wind tower. A

Concrete design requirements

Casting was carried out using specially designed top-and-bottom moulds to form the curved segments. Because of the geometry, the concrete was poured from the side rather than the top. This unconventional approach was

made possible by the use of self-compacting concrete (SCC), which requires no vibration and can flow uniformly into complex shapes.

The SCC mix was highly specialised: it had to achieve 80 MPa compressive strength in 28 days while maintaining a deliberately low elastic modulus to improve flexibility and minimise the risk of cracking from wind-induced cyclic loading.

CHRYSO Premia 550 was selected as the superplasticiser for its superior rheology, segregation control and strength development. It enabled high flowability for the side-pour technique while maintaining long-term workability. Rebar remained an essential structural component, carrying tensile forces that concrete alone cannot resist.

Curing

When in full production, Cape Concrete/Empa JV had to produce two towers per week. This required casting approximately ten keystones daily. With the limited number of moulds, some moulds were turned more than once every 24 hours. To meet these cycle times, Cape Concrete/Empa JV implemented thermal curing by placing insulated tarpaulin covers over the concrete moulds and using heat blowers to raise curing temperatures to 60 °C.

Planning and logistics

Despite significant space constraints, the team managed to produce the required number of keystones at pace, while simultaneously accommodating the storage of up to 18 wind towers' worth of segments a logistical feat that speaks to careful planning, coordination, and execution.

Corporate social investment

The concrete towers (as opposed to steel towers) contributed towards the local element of the project in terms of using local materials (steel rebar, concrete, and aggregate) and labour.

Environmental impact consideration

A comprehensive Environmental Impact Assessment (EIA) was carried out before construction commenced, involving contributions from more than ten environmental and social specialists alongside the project's engineering team. The assessment process also created space for meaningful input from long-standing interest groups active in the area.

Environmental performance during construction was further enhanced through the use of CHRYSO®Dem Bio 10 mould oil, which is approved by Nordex for environmentally sensitive projects. CHRYSO®Dem Bio 10 is a vegetable-based, biodegradable, and non-toxic release agent that eliminates the risk of environmental contamination.

Dust generation on internal roads was proactively managed with CHRYSO®EcoDust. This product is formulated for environmental sustainability, offering low volatile organic compound (VOC) emissions and UV resistance. In addition, CHRYSO®EcoDust contributes to improved overall safety by reducing visibility and respiratory hazards associated with dusty construction environments.

Health and safety

Health and safety was a daily priority, beginning every production meeting and formally monitored through separate health and safety reporting lines. Despite handling massive precast segments weighing up to 60 tonnes, Cape Concrete completed the entire production phase with a zero-incident record.

Quantifiable time and quality

Cape Concrete/Empa JV executed its scope in two phases: six months to design and construct the manufacturing facility, followed by nine months of production to cast 1 425 precast keystones.

The project required significant resources, including more than 30 000 m^3 of SCC, 13 500 tonnes of cement and 135 000 litres of Chryso Premier 550. Around 50 keystones were produced weekly, with on-site storage maintained for 18 towers (450 units).

Risk management

While the manufacturing facility was being built, extensive laboratory trials were conducted to develop a concrete mix that met performance criteria in both fresh and hardened states. Numerous mix iterations were tested under tight time constraints.

Two admixture companies took part in these trials. After comparing the two mix designs and evaluating their performance against a long list of criteria, we decided that the CHRYSO®Premia 550 provided the best results.

As discussed in the quality section above, a lot of controls were put in place to manage the supply chain and quality of goods received.

Each of the 25 keystones comprising a wind tower (1 425 keystones in total) was unique in terms of the required different cast-in components like anchors, type of steel reinforcing, earthing connections, ducts ,sleeves etc. ■

PROJECT INFORMATION

- **Client:** Nordex
- **Main Contractor:** Cape Concrete/Empa JV
- **Keystone Manufacturer:** L&R Civils Cape Concrete/Empa JV
- **Environmental Impact Assessment:** Habitat Link Consulting
- **Cement and laboratory:** PPC
- **Admixture Supplier:** CHRYSO

REDSTONE CONCENTRATED SOLAR THERMAL POWER PLANT

The Redstone Concentrated Solar Thermal Power Plant is a global first in renewable energy development, featuring a 250 m reinforced concrete solar tower - the second tallest structure in South Africa. A heliostat field of thousands of mirrors tracks the sun and reflects solar radiation onto a central receiver, producing high-temperature steam to drive a turbine and generate electricity.

A key innovation is the integration of molten salt thermal energy storage with a 12-hour capacity, allowing the plant to operate through the night as well as during daylight hours. With an installed capacity of 100 MW, Redstone will generate more than 480 000 MWh per year - over twice the output per MW of many other renewable technologies - supplying clean electricity to approximately 200 000 people.

The tower's construction used slip form technology, a continuous, joint-free vertical pour method. This required uninterrupted supply and precise coordination between concrete production, transport, placement, and setting. Three mobile batching plants were established onsite to produce concrete continuously, supported by 24 readymix trucks and three boom pumps (one on standby).

Maintaining workability and setting times over long vertical lifts was critical. Specially formulated admixtures - CHRYSO®Tard CE-R and CHRYSO®Optima 1340 - were developed specifically for Redstone to achieve an unprecedented 18-hour open time for a high-cement-content mix.

Real-time adjustments to the mix were made based on readings from an onsite weather station monitoring temperature, wind, and humidity at both ground and platform height. Every 5°C change triggered recalibration of admixture dosage.

Aggregates from local sources were elongated and flaky, reducing workability. CHRYSO®ZA1522 improved flow properties and compensated for the high water demand of the region's sands. Sand and aggregates were delivered just in time due to limited storage and tested for moisture content on arrival and again before batching, as dew in the mornings and afternoon heat could significantly alter water content.

Slipform equipment incorporated a roof-like protective cover to shield green concrete from wind and direct sun. Perimeter access decks allowed teams to address blemishes immediately. Planning extended beyond construction activities: workers on the platform were supplied with appropriate PPE for temperature extremes, hydration provisions, and integrated sanitation facilities to reduce downtime from travel between levels.

Design innovation

The tower was designed to withstand extreme Northern Cape weather, with recorded temperatures from –14°C to 48°C, high winds, and minimal annual rainfall. Its height demanded precise tolerance for the placement of the receiver to ensure accurate heliostat alignment.

The foundation, 3 m high and 42 m in diameter, was cast in a single continuous pour of 24 800 m^3 over 48 hours, divided into three pumping zones. Fly ash replaced a portion of cement to reduce the heat of hydration, extend setting time, improve durability, and lower embodied carbon.

Slipforming allowed continuous vertical progress without joints, improving durability. The slip rate was matched to the concrete's setting rate, requiring close monitoring to prevent deformation or tearing against steel shutters. Shutter temperatures were managed to avoid freezing or overheating of the concrete surface.

Corporate social investment

At its peak construction phase, the project supported over 2 500 direct jobs, with around 650 jobs filled by local community members. Long-term operations will support around 60–100 permanent jobs.

The project generated substantial socio-economic benefits in the Northern Cape, one of South Africa's least industrialised regions. Employment was prioritised for local communities, and on-the-job training was provided in construction skills such as concrete production, quality control, and safety at height.

Local procurement formed a major component of the project's investment in the regional economy.

Environmental impact consideration

The Redstone Concentrated Solar Thermal Power Project followed a rigorous Environmental Management Programme (EMPr) to limit its ecological footprint during construction and operation.

Health and safety

Slipforming at extreme heights required rigorous safety protocols and specialised equipment to protect workers and prevent falling-object incidents. In addition to fall risks, any dropped item - such as a spanner or concrete - could cause serious injury to those below, so construction at the base stopped whenever the slipform moved upward. Access to the tower was strictly controlled via four card-operated points, and lifts transported personnel to the work platform.

Weather conditions were closely monitored. Mist and rain reduced visibility, putting pressure on crane operators lifting concrete buckets, while lightning in the vicinity triggered immediate work stoppage.

Quantifiable time cost and quality

At R11,6-billion, Redstone CSP is the largest renewable energy investment in South Africa. Despite the remote location and extreme weather, the project progressed within schedule. Early works construction began in February 2021.

Concrete quality was closely controlled. Slump tests were performed on each truckload, and loads older than three hours were rejected. A concrete technologist was present during the foundation pour and key slipforming operations.

It was important to factor in the time it took for the concrete to travel up the tower (via a bucket), while making sure that the concrete in the readymix truck did not dry out.

For aesthetic purposes, several measures were taken to maintain a uniform colour.

Risk management

The remote site location created logistical challenges. Most materials were transported from Bloemfontein, a six to seven-hour drive. With minimal onsite storage, deliveries were scheduled to align with batching requirements.

Temperature extremes required ongoing mix adjustments to maintain workability and strength.

Wind presented safety and structural risks. The concrete's modulus of elasticity was specified to allow limited flexibility at height while meeting strength requirements.

Steel shutters were used and the concrete could not be dry as it would likely hook onto the shutters and could tear during slips. If the steel shutters were too cold, the water in the concrete could freeze.

Redundancy in equipment was part of the risk strategy. Three boom pumps were onsite, with one as standby, and spare slipform components were available to avoid long delays if breakdowns occurred.

As the slip form structure reached greater heights, planning and organisation became increasingly important. If the construction team on the platform forgot something, it could take up to an hour for the platform to travel down, and an hour for the platform to travel upwards, negatively impacting on productivity. ■

PROJECT INFORMATION

- **Specialist Supplier:** Chryso Southern Africa
- **Client:** Department of Energy
- **Project Manager:** ACWA Power and Solar Reserve Consortium
- **Subcontractor:** Unik Construction
- **Cement Subcontractor:** Scibante Concrete

BLUNDELL ROAD BRIDGE

Repeatedly destroyed by flooding, the original Blundell Road Bridge was undersized and unsafe, with narrow lanes and sharp curves. Major failures in 2019 and again during the April 2022 floods - when debris blocked flow and the river washed away its approach embankments - highlighted the urgent need for a more resilient structure.

Design innovation

Fully integral concrete bridge

The Blundell Road Bridge stands as South Africa's first long, fully integral and curved design concrete bridge. An integral bridge has no joints or bearings -its deck, abutments and piers form a single, monolithic structure. This reduces maintenance and improves durability.

Integral concrete bridges are increasingly favoured for their superior resilience in flood-prone environments. Their monolithic design - without joints or bearings - enhances structural stability and redundancy, making them better equipped to withstand unusual loading conditions.

Significant design challenges

In the case of the Blundell Road Bridge, the fully integral design is especially remarkable - and unusually complex - because it combines three factors that would each pose a significant design challenge on their own.

The bridge is 90 m in length, with approximately half of this being on a curve, and the other half straight. Integral bridges are seldom longer than 70 metres - and almost never as long as 90 metres - because their design presents increasing structural challenges as length increases.

The curved alignment of the Blundell Road Bridge introduced significant design complexity by causing asymmetric thermal movement across the deck - where the longer outer edge expands more than the inner edge - leading to twisting forces that are difficult to accommodate in a fully integral structure.

Integral bridge abutments are usually founded on a row of piles, which significantly increases the flexibility of the abutment while maintaining stability. However, the bridge's abutments and piers rest on pad footings founded directly on hard sandstone rock.

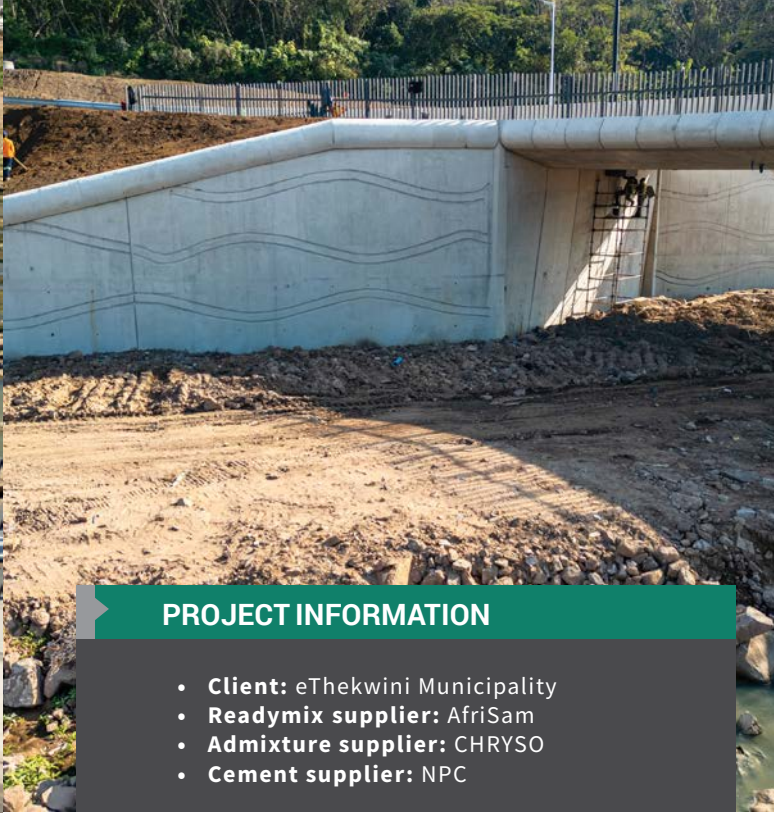
Solutions

The design and construction of the Blundell Road Bridge combined a variety of different solutions to reduce and absorb the thermal strains created by the unconventional geometry. Some of these solutions are highly innovative, others fall within conventional 'best practise'. They include:

- The curved abutment at one end of the bridge uses five vertical contiguous columns (separated by full-height joints) instead of a solid abutment wall.
- Using haunches, thickened areas in the deck that taper in multiple different planes, to minimise stress concentrations
- Installing an innovative, layered approach-slab behind the abutments, to distribute strains through mats of glass fibre geotextiles
- The ground/rock level of the water course was highly variable, so large quantities of fractured rock were chipped out.

Construction innovation technology

The boundary-pushing design of the bridge required extra work and attention from the construction team. The basic requirements were intended to be relatively simple and accessible for emerging contractors, but some of the details were still very challenging, particularly the formwork for the complex three-dimensional deck support haunches,



PROJECT INFORMATION

- **Client:** eThekwini Municipality
- **Readymix supplier:** AfriSam
- **Admixture supplier:** CHRYSO
- **Cement supplier:** NPC

which had to intersect with a curved, angled deck soffit.

Concrete

Concrete was essential to both the form and function of the Blundell Road Bridge, enabling the construction of complex shapes like the curved deck and sculpted haunches while delivering the strength needed for flood resilience. Managing thermal effects was a significant challenge due to thick sections and high restraint.

The mix was optimised with Ground Granulated Blast-furnace Slag (GGBS) to delay strength gain and reduce the risk of cracking, reaching full strength only at 56 days. Collaboration between the design team, contractor, AfriSam and site supervisors led to multiple trials and real-time adjustments. Night pours were scheduled to limit heat of hydration, and the entire 90 m of falsework was installed early to fast-track progress. Slump was carefully managed across zones of dense reinforcement.

The mix included CHRYSO®CWA 10, a self-healing admixture that seals micro-cracks, improving long-term durability. CHRYSO®Quad 753 allowed for efficient dispersion of GGBS in the concrete mix design, increasing workability retention.

Smart bridge

Real-time structural monitoring is enabled by a sophisticated sensor array embedded throughout the bridge.

Smart sensors are embedded throughout - including thermistors, strain gauges, and shape accel array. These transform the bridge into a data-rich testbed.

Environmental impact consideration

The project prioritised environmental sensitivity and climate resilience. The new bridge, located within a nature reserve, was elevated by 4,5 m to withstand 1:100-year floods and avoid floodplain disruption. GGBS was used to reduce carbon emissions and limit thermal cracking. The design blended into the landscape, and the alignment avoided unnecessary excavation.

Health and safety

Health and safety were prioritised throughout construction, with a full-time safety officer, daily toolbox talks, and rigorous inductions for all workers. Key risks such as working over water, night pours, and dense reinforcement were mitigated through thorough risk assessments, fall protection plans, and strategic falsework and propping.

Quantifiable time, cost and quality

The contract duration was 14 months, but it was completed in June 2025 due to rain delays. Despite its complexity, the Blundell Bridge was delivered within its R85-million budget and on schedule.

Risk management

Risk was actively managed at every stage - from concept design to material selection and construction logistics.

Recognising the unpredictable interaction between complex geometry and stiff foundations, the team invested in premium materials (such as CHRYSO self-healing concrete) and cutting-edge monitoring. They accepted a 30% concrete cost premium for this added security, and deployed sensors that will help flag potential concerns long before they become service-affecting.

Designers used 3D modelling, restraint analysis, and staged construction planning to identify and mitigate construction-phase risks. ■

PROJECT INFORMATION

- **Specialist Contractor:** Geoquest
- **Main Contractor:** Rumdel
- **Client:** Rumdel
- **Consulting Engineer:** Zutari

REINFORCED EARTH® TERRATREL® RETAINING WALLS FOR EMERGENCY SLOPE REPAIRS

Geoquest South Africa was awarded a contract for the design, supply of associated materials & Technical Assistance the for construction of a tiered Reinforced Earth® retaining wall on the project. This was done for the emergency slope repairs on National Route N2, Section 19 and National Route R61, Section 8, near Port St. Johns in the Eastern Cape province of South Africa.

The project is located in the Eastern Cape province of South Africa on the National R61 section 8 road between Mthatha and Port St. Johns.

The South African National Roads Authority (SANRAL) launched a tender for the emergency slope repairs on National Route 2 Section 19 and R61 Section 8. The contract consists of three areas where the N2/R61 road was damaged by stormwater. An additional failure on Second Beach Road of Port St Johns was included as part of the repair works required to be completed by the Main Contractor. In addition to the four failures above, work also had to be carried out on two district roads, namely the Gomolo alternative route and the Ladume alternative route.

Geoquest were contacted by Main Contractor Rumdel to assist with the design and supply of material in relation to the emergency slope repairs required at Site 1: Xezi N2 Section 19 km 57.4.

The Client's envisaged plan for the repair at this specific location was as follows:

- Additional geotechnical investigations (drilling five (5No.) rotary core boreholes)
- Construction of a temporary diversion by widening the road to the cut face between approx. km 57.360 to km 57.660.
- Installation of the Temporary Lateral Support to secure the cut excavation.
- Construct a Mechanically Stabilised Earth (MSE) Wall as per designer's specification.
- Backfill and process fill behind the MSE wall, inclusive of installation of nonperforated horizontal and vertical drainage collector pipes, as indicated on drawings.
- Construct the parapet on top of the MSE wall.
- Construct road pavement layers and roadworks.
- Construct erosion protection measures at the base of MSE wall.
- Re-construct the gabion wall, inclusive of backfill between the gabion wall and the cut slope.
- Complete all roadworks ancillaries as shown in tender drawings.

Construction Innovation Technology

Reinforced Earth® is a composite material comprising frictional backfill, reinforcements and facing elements and was invented by French architect and engineer, Henri Vidal, in 1964. This invention was one of the most important civil engineering innovations of the twentieth century. Geoquest introduced Reinforced Earth® to South Africa in 1975 and 2025 marks the 50th anniversary of this innovation in the country. Ongoing innovation has enabled the material to offer state-of-the-art solutions tailored specifically to meet the requirements of each structure.

The constituent materials for the construction of the Emergency Slope Repair walls on the N2 Section 19 and the R61 Section 8 walls comprised of:

- Backfill: Coarse backfill
- Reinforcements: 50 mm x 4 mm high adherence, medium tensile steel, hot dip galvanized to ISO 1461: 2009 specifications.
- Facing: TerraTrel® manufactured from 12 mm, 10 mm and 8 mm hard drawn wire, welded into a grid with 100 mm x 100 mm apertures. The grid is shaped, and hot dip galvanized to ISO 1461: 2009 specifications.

Corporate Social Investment

The construction of Reinforced Earth® with TerraTrel® facing is a labour intensive technique which allowed the Contractor, Rumdel, to sub-contract the construction of the Geoquest structures to Small, Medium and Micro Enterprises in line with the project's Contract Participation Goals (SMME/CPG).

Design Innovation

The TerraTrel® facing allows for internal settlement of the facing elements during construction without causing bulging of the elements between layers of reinforcing strips.

A recent innovation, a flexible spacer named SpringTrel™, keeps the initial vertical spacing between the elements constant, until squeezed by the weight of the ongoing backfill placed above it during the construction process.

A specific complication that had to be considered with the design was that the wall was to be constructed on a curve. This meant that at certain locations across the wall, the wall footprint would be reduced/impacted. This meant that the required steel reinforcing strip lengths in those zones would not fit. Consequently, Geoquest made use of its TerraLink® and Friction Ladder system which created a connection between the Lateral Support System and the TerraTrel ® wall. In these specific locations, permanent soil nails had to be installed for the two structures to be combined and to ensure that the stability of the MSE wall would remain in check.

To validate this and justify the solution, Geoquest made use of internal design software in combination with Numerical Modelling software – FLAC, as well as Limit Equilibrium software – TALREN, to confirm that the design assumptions were accurate/appropriate.

Environmental Impact Consideration

TerraTrel ® construction for permanent works requires rock with diameter greater than 100 mm to be packed behind the facing. This presents an environmentally attractive gabion-type appearance. Vegetation takes naturally to the facing and could, relatively easily, be encouraged to become a "green" wall.

The aesthetics of the structure are always dependent on the standard of construction.

Health & Safety

Since work takes place from the back of the facing, while personnel stand on top of the compacted backfill layers, and because the advancing facing provides a barrier during construction, there is reduced risk associated with working at height.

Quantifiable Time, Cost and Quality

The pacing time for construction is the placing and compaction of the earthworks. When the earthworks are complete, so is the structure. This allows a significant saving in time compared to reinforced concrete retaining walls.

The cost is influenced by the rate of construction, the availability of the backfill and the height of the structures. The Geoquest® solution succeeded in replacing an alternative, less optimised solution, and was accepted by both engineers and contractor. The cost effectiveness of the TerraTrel ® solution proved to be an added benefit.

Risk Management

The excavation for the wall had to be made into the existing R61 embankment slope while the R61 remained operational during the works and, as such, a significant Lateral Support System was required to mitigate risk of collapse of the excavated embankment.

To monitor the long-term degradation of the buried reinforcing strips, test strips were installed. These strips can be extracted at any stage during the life of the structures. Tests to determine the amount of corrosion as well as tensile strength will be carried out on the test strips by an accredited laboratory.

The TerraTrel® facing cannot easily be vandalized. To our knowledge, no TerraTrel® structures have been vandalised on any of the hundreds of Reinforced Earth® projects throughout 16 African countries. ■

DEVONBOSCH BLOCK B – STELLENBOSCH: SUPER BASEMENT

The Devonbosch precinct in Stellenbosch is rapidly establishing itself as a landmark mixed-use development, skillfully integrating residential, commercial, and lifestyle components into a modern, sustainable urban node. This expansive multi-phase project aims to redefine the Stellenbosch skyline and urban experience. Among its various blocks, Block B is notable for its intricate engineering challenges, particularly its basement which demanded a specialised approach to geotechnical works, including lateral support and piling.

GeoCiv Group was appointed as the principal contractor responsible for all geotechnical works on Block B. GeoCiv's reputation as experts in piling and lateral support was a critical factor in their selection, as the site conditions and project requirements demanded sophisticated solutions coupled with precise execution. The contract scope encompassed the installation of 349 lateral support piles, 320 m of capping beam, 174 Self-Drilling Anchors (SDAs), 720 m^2 of shotcrete, 294 structural piles ,and a 50 m shotcrete retaining wall. The works further included management of over 32 000 cubic metres of in-situ bulk excavation material.

Design innovation

Deep basement lateral support traditionally relies on whaler beam systems. These systems employ substantial horizontal steel compression members, whalers, that connect anchors across pile faces to distribute lateral earth pressures. While widely used, whaler systems can be bulky, difficult to install, and may cause programme delays due to the need to install, tension, and later remove the whalers.

For Devonbosch Block B, GeoCiv implemented an advanced solution that replaced whalers with Self-Drilling Anchors (SDAs) installed through sleeves pre-cast into the capping beam. This innovative method enabled the installation of anchors after the capping beam was cast, without the need for face-of-wall drilling and tensioning of whaler beams.

The advantages of this approach were multifold:

Faster Sequencing: The system allowed lateral support pile installation, capping beam reinforcement and casting, and anchor drilling to proceed in close succession without idle time. Unlike traditional methods, excavation and anchoring operations could proceed without interruption, accelerating the critical path.

Cost Reduction: By eliminating the fabrication, installation, and eventual removal of steel whalers, the project reduced both material and labour costs significantly.

Safety and Programme Benefits: SDAs operate as passive anchors, requiring no high-pressure jacking or de-stressing processes. This not only removed hazardous activities from the site but also freed up valuable time on the programme's critical path, contributing to overall efficiency.

This design innovation was a key factor enabling the rapid excavation and lateral support of the basement while maintaining structural stability and minimizing ground movement.

Quantifiable time, cost and quality efficiencies

The scale and complexity of Devonbosch Block B demanded innovative approaches that maximised efficiency while maintaining the highest standards of quality. GeoCiv's choice of installation techniques was central to delivering these outcomes.

The use of Continuous Flight Auger (CFA) auger extensions was a critical factor in enhancing drilling productivity. This allowed crews to maintain consistent

penetration rates without manual tooling changes. The result was reduced downtime and streamlined piling operations, contributing directly to faster project progress.

Self-Drilling Anchors (SDAs), installed through sleeves cast into the capping beam, greatly improved the lateral support process. Unlike conventional pressure-grouted anchors that require staged stressing and de-stressing, the passive nature of SDAs eliminated the need for high-pressure jacking. This removed a significant labour and safety sensitive step, reducing both programme duration and labour costs.

Shotcrete application methods also played a vital role in quality and time efficiencies. The downward spraying technique, coupled with real-time debris suction, produced an exceptional Class 1 finish on the retaining wall. This innovative application not only enhanced structural integrity by promoting excellent layer bonding and compaction but also reduced the need for extensive surface repairs or remedial work, saving both time and costs.

Together, these combined installation methods created a workflow where each stage; piling, capping beam casting, anchoring, excavation, and shotcreting, was closely coordinated, minimising idle time and maximising resource utilisation. The result was a lateral support and piling system that balanced speed, safety, cost, and long-term durability.

Risk Management

Managing risk was a fundamental consideration throughout the project, encompassing both structural and safety elements.

Structural Risk

Block B's close proximity to Block E, a fully occupied residential building, introduced heightened sensitivity to lateral ground movements during deep excavation. Excessive movement could cause soil displacement, foundation cracking, and settlement, potentially compromising the integrity of the adjacent structure.

The SDA anchor system mitigated these risks effectively. Because SDAs provide passive restraint and are installed at carefully calculated spacing and levels, they ensured lateral movement remained negligible throughout excavation and construction. The combination of soldier piles, SDA anchors, and shotcrete arches created a robust lateral support system that distributed loads evenly and prevented displacement.

Safety Risk

Traditional pressure-grouted anchors necessitate jacking and de-stressing to achieve and release tension, introducing dangerous activities involving high hydraulic pressures and stored energy. These processes also add complexity to project sequencing and ongoing monitoring obligations.

By contrast, the SDA system is entirely passive. There is no requirement for jacking or subsequent de-stressing, removing one of the most hazardous operations common in deep excavation projects. This passive design greatly reduced safety risks and post-construction liabilities.

Ongoing safety oversight included monthly client audits, weekly Quality Assurance checklists, and daily Safe Task Instructions (DSTIs), ensuring continuous compliance with occupational health and safety standards.

Design

The geological conditions at Devonbosch Block B featured highly plastic clay layers overlaying weathered soft rock. These conditions required a hybrid piling solution combining friction and end bearing capabilities.

Lateral Support Design Components

- **Soldier Piles:** Installed to transfer vertical loads deep into competent soil strata, providing the foundational support for the retaining system.
- **Self-Drilling Anchors (SDAs):** Installed through sleeves embedded in the capping beam, providing passive lateral restraint at staggered depths, complementing the piles.
- **Shotcrete Arches:** Applied between soldier piles, shotcrete formed arches locking the system together and distributing earth pressures evenly.

A key design philosophy was treating each system element independently, rather than assuming interdependent behaviour common in traditional methods.

Insurance and Quality Assurance

Understanding the risks involved, GeoCiv implemented a rigorous quality assurance programme designed to mitigate design, workmanship, and liability risks:

- **Anchor Pre-Testing:** All SDA anchors were tested in similar geological settings on previous projects to validate design assumptions and performance expectations.
- **Cube Testing:** Cube strength assessments were conducted throughout the project lifecycle.
- **Documentation:** As-built records, test results, QA/QC logs, progress reports, RFI Register, SI Register, Rain Register, and Geotechnical engineer reports were meticulously compiled and handed over to the client, providing thorough traceability and confidence for insurers and stakeholders.

This documentation and testing regime underscored GeoCiv's commitment to transparency, technical excellence, and risk management.

Construction Innovation Technology

A standout element of the project was the shotcrete method used on a 50 m retaining wall segment

approximately two metres high, which achieved a Class 1 architectural finish. Notably, this finish is exceptional for shotcrete walls, often relegated to temporary or structural uses rather than architectural.

Key aspects of the shotcrete process included front-face formwork only, with the back face cast directly against in-situ material. Applying shotcrete from top to bottom allowed each layer to build progressively and compact effectively, reducing cold joints and ensuring continuity.

Structurally and in respect to compressive strength testing: Wet - Shotcrete is not a product, but a method of placing batched concrete. It thus achieves the same design strengths as that of traditional cast in place concrete. This goes someway to dispel misconceptions that wet shotcrete is inferior or only suited to temporary applications.

Corporate Social Investment

Despite the specialist and niche nature of piling works, which limited the extent of subcontracting, GeoCiv maintained a strong commitment to social responsibility throughout the Devonbosch Block B project. Local labour was employed in various supporting roles such as logistics, site security, and material handling. Furthermore, GeoCiv invested in training initiatives to upskill site labourers in basic safety procedures and introduced them to modern geotechnical tools and techniques, fostering professional development.

Health & Safety

Health and safety were paramount throughout the project and extended beyond the passive anchor system to encompass broader site operations. Special attention was given to the design and construction of the piling platform, which was built using compacted layers of half bricks. This design ensured the platform could safely support the heavy loads imposed by the CFA piling rigs, some weighing up to 80 tonnes with full tooling attached. Beyond structural support, the platform was engineered with integrated drainage features to effectively manage stormwater and prevent flooding or muddy conditions that could disrupt operations. Water was designed to percolate through the platform layers into strategically positioned sumps, where it was pumped away to maintain a dry, operational site.

Environmental Impact Consideration

GeoCiv incorporated several environmentally sensitive practices, including minimising spoil generation via CFA drilling and strict depth control. Water management systems were implemented to control runoff and prevent contamination and locally sourced aggregates were used to reduce transport emissions.

The consolidated grouting used with SDAs increased soil bond strength and stabilised hole walls, reducing grout bleed and environmental effluent risks. ■

PROJECT INFORMATION

- **Main Contractor:** GeoCiv Group
- **Client:** DB Property Development Company
- **Principal Agent:** Davidoff Project and Development Managers
- **Consulting Engineer:** Ekcon Consulting Engineers
- **Architect:** Osmond Lange Architects and Planners
- **Quantity Surveyor:** RLB Quantity Surveyors

EXPECT NEXT LEVEL

GEOTECHNICAL SOLUTIONS

GEOCIV GROUP has been a leading specialist in Geotechnical Works, Piling and Lateral Support in Cape Town, South Africa and other SADC nations since 1996. Services and products are on a full design and construct, or construct-only, basis. GeoCiv Group's ability to project manage entirely in-house has enabled us to secure major government and private contracts in the Commercial, Industrial and Residential spheres.

It is GeoCiv Group's objective to further develop our experience, growing in a sustainable, controlled manner, and expanding in terms of both geographical coverage and product offerings.

GeoCiv Group management have a combined sectorial experience of more than 100 years in the piling & geotechnical works field. GeoCiv Group operates in a highly specialised market with a vision of being the most efficient **GEOTECHNICAL** company in the Southern Africa region.

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CONTROLLED BLASTING AND TOPPLING OF COMPROMISED CONCRETE CONVERTER STACK

In June 2025, Draco Group successfully delivered a technically demanding demolition project, the controlled blasting and toppling of a 107-metre-tall, structurally compromised concrete converter stack at the Palabora Mining Company (PMC) site in Phalaborwa, Limpopo.

Built in 1960 and refurbished in 1986 and 1989, the reinforced concrete converter stack had become dangerously unstable. A 2025 structural assessment by Knight Piésold confirmed a 6° lean and 600 mm off-centre deflection, failing to meet national structural serviceability limits.

The deflection exceeded the SANS 10160 allowable serviceability deflection by 22%, with survey data confirming a 547 mm displacement in a singular plane. This movement was not evident in the 2022 inspection and was classified as sudden and potentially catastrophic. The concrete converter stack could no longer return to its original 'at rest' position, a clear sign it had reached structural fatigue.

Draco Group was entrusted with the high-risk demolition of the concrete converter stack, located at the heart of PMC's live operational smelter. Surrounded by critical infrastructure within an operational smelter and located inside the boundaries of the Kruger National Park, the project presented exceptional environmental, engineering, and safety challenges.

As a specialist contractor, Draco Group was entrusted to execute this high-risk project with precision, speed and care. Cutting-edge blasting design, environmental safeguards, and meticulous project planning were used. PMC designated a section containing three live railway lines as the drop zone for the concrete converter stack toppling. Due to the tight spatial constraints, this was the only feasible location. All three railway lines, along with their associated materials, had to be removed three days prior to the drop. Following the toppling, Draco Group was allocated 48 hours to clear the area, enabling PMC to reinstate the lines and resume full operations. The company completed this task, and the area was handed back to PMC within a 48-hour window.

This entry demonstrates how Draco Group met and exceeded the criteria for Category 4: Specialist Contractors or Suppliers, through innovation, risk management, community engagement, and record-setting execution.

Construction Innovation & Technology

The demolition of the 107-metre concrete converter stack at PMC was a feat of engineering precision and innovation. Faced with a severely compromised, 65-year-old concrete structure leaning six degrees off vertical, Draco Group developed a custom-engineered blasting & toppling strategy. The solution required a blend of traditional demolition methods and high-tech tools:

- Over 400 precision-drilled blast holes were strategically placed to form a controlled failure plane.
- Diamond rope cutting technology was employed to pre-weaken a "hinge line", giving engineers directional control over the fall.

- Thermal drone technology was used pre-blast to scan for wildlife or human presence in the 300-metre exclusion zone.
- Structural bracing with steel and masonry was applied to reinforce a large void caused by removed ventilation ducting, eliminating backward fall risk.
- Survey data was gathered using reflectorless methods, capturing over 1,000 individual points across the 107-metre structure. This information, combined with thermal drone scans, guided real-time decisions and collapse modelling.
- A DJI H20T thermal camera showed a 6°C variation between the base and crown of the concrete converter stack - thermal movement that compounded structural stress.

According to research conducted by Draco Group, this marked the first time in South Africa that a concrete converter stack of this height and level of instability was dropped with such pinpoint precision, surrounded by critical infrastructure and an operating plant.

Corporate Social Investment (CSI)

Although the demolition timeline was tight, Draco Group ensured engagement and consideration of local stakeholders in consultation with PMC. The following was actioned:

- Public notices were issued in local newspapers to inform the community of the upcoming blasting and toppling of the compromised concrete converter stack.
- Worked closely with the Palabora Foundation (PMC's CSI arm) to ensure that there was no impact to local community structures, services, or wildlife.
- Employed and trained local subcontractors and support staff to assist with post-blast clean-up and material handling, creating short-term employment and upskilling opportunities in the region.

This approach ensured not only community inclusion but also helped mitigate potential reputational risk during a highly visible, high-risk operation.

Design Innovation

The structural and blast design had to account for numerous site-specific risks:

- The concrete converter stack's 6-degree lean and 600 mm deflection were asymmetrical, demanding a non-linear collapse plan.
- The deflection created eccentric loading that significantly increased the movement forces within the structure, further disqualifying conventional methods.
- The surrounding 340° of infrastructure included high-value assets and rail lines; only a narrow 20° fall zone was available.
- A traditional top-down or crane-based dismantling approach was dismissed due to the structure's instability and access limitations.
- Scaffolding was ruled out due to added wind load and access risk.

Draco Group's engineers collaborated with surveyors and structural specialists to map a custom collapse trajectory, marked by a centreline aligned to the only safe corridor. Innovative use of land surveying, progressive pre-weakening, and digital simulation informed every phase of the design.

Environmental Impact Consideration

The site is located within the boundaries of the Kruger National Park, necessitating exceptional environmental compliance:

- A full ground sweep and thermal drone scan were conducted pre-blast to ensure no wildlife was present.
- All demolition debris was collected within 48 hours and trucked to a designated mine landfill site 4km away.
- The operation included strict dust suppression, water spraying, and zero tolerance for contamination.
- The blast blanket around the base minimised the spread of particulate matter and debris.
- All structural debris was deemed non-hazardous post-blast, and all reinforcing steel was cut, removed and sent for recycling.

Following the project, environmental monitoring confirmed no contamination, no wildlife disturbances, and no secondary impacts. The operation stands as a model for environmentally responsible demolition near protected ecosystems.

Health & Safety

Draco Group maintained an impeccable safety record throughout the operation:

- The project achieved zero incidents or injuries.
- All work was approved by blasting inspectors and the Department of Mineral Resources (DMR).
- A 300-metre exclusion zone was enforced and cleared using both ground crews and drone thermal imaging.
- Safety briefings and PPE checks were conducted daily.
- A blast window and rubble clean-up of just 48 hours was adhered to with precision, allowing operations to resume swiftly.
- Due to the structure's instability, emergency response protocols were updated and tested in advance of the blast, in partnership with PMC's internal safety teams.

Given the proximity to high-risk infrastructure, the live mine environment, and the potential hazard of toppling a 107-metre structure, this achievement reflects world-class demolition safety standards.

Quantifiable Time, Cost, and Quality

Time

- The blast and clean-up were completed within the allocated 48-hour window.
- Rail operations resumed promptly, ensuring no delays to production.

Cost

- Draco Group's solution offered cost savings compared

to alternative dismantling methods (e.g., top-down deconstruction).
- The rapid turnaround minimised production downtime, saving the client operational revenue.

Quality
- The concrete converter stack landed precisely within the demarcated fall zone, across three railway lines, with less than 20 metres of tolerance.
- No damage occurred to surrounding plant, pipelines, or assets.
- All materials were processed and cleared to meet non-hazardous standards, with steel recycled responsibly.

Risk Management

Risk on this project was multi-dimensional: structural, environmental, operational, and reputational.

Key risk mitigation measures included:
- Engineering Design Validation: The blast plan was reviewed and approved by independent structural engineers and PMC's risk managers.
- Environmental Clearance: Mitigation strategies were endorsed by PMC's environmental team.
- Wildlife and Public Protection: Active monitoring ensured zero harm to people or animals.
- Structural Reinforcement: Draco Group custom-built bracing to strengthen weak points created by previous duct removals.
- Real-time Coordination: Close liaison with PMC, emergency response, and regulatory bodies ensured seamless execution.
- Continuous survey logging between October and November 2024 identified movement trends, allowing timeous escalation to specialist intervention.

This multi-layered risk strategy resulted in zero operational, legal, or reputational incidents.

The project is more than a successful controlled blasting and toppling of a compromised concrete converter stack - it is a record-setting engineering and demolition milestone.
- The tallest concrete converter stack ever, blasted and toppled over in South Africa.
- A structurally compromised, leaning structure, safely dropped in a dense, live industrial zone.
- Carried out within a national park, with full environmental compliance.
- Executed with zero harm, zero damage, and maximum efficiency.
- Represented a pinnacle of innovation, planning, and teamwork.
- It showcased the value of cross-disciplinary engineering, from drone inspection and thermal analysis to structural forensics and field execution. ■

DRACO GROUP

TURNKEY SOLUTIONS WITH A DIFFERENCE.

Draco Group successfully completed one of South Africa's most technically challenging demolition projects: the Controlled Blasting and Toppling of a Structurally compromised 107-metre concrete Converter Stack at Palabora Mining Company and is thrilled to celebrate its winning award!

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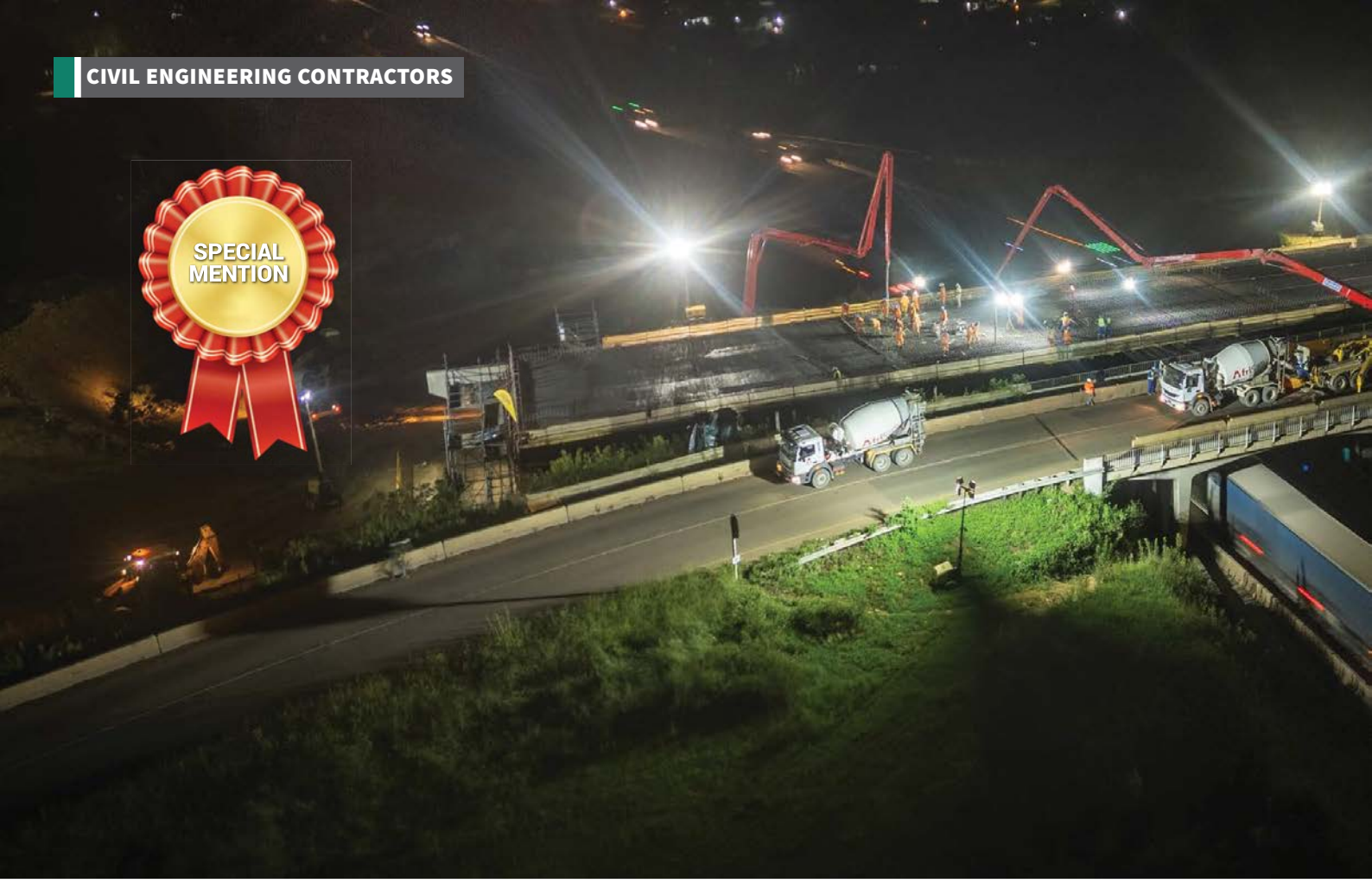


CONTINUOUS CONCRETE POUR ON MARKET ROAD BRIDGE, PIETERMARITZBURG

A carefully planned and executed continuous concrete pour has created a 103 metre bridge deck across one of South Africa's busiest freight highways. The key achievement of this overnight pour was to successfully avoid any significant disruption of traffic and logistics.

The new Market Road bridge in Pietermaritzburg, KwaZulu-Natal, which crosses the N3 highway, was constructed by Teichmann Structures as a subcontractor to Grinaker LTA in the New England Joint Venture. The structure is one aspect of a significant upgrade project for the South African National Roads Agency Limited (SANRAL); the consulting engineers on the project are WSP.

AfriSam supplied the readymix concrete to Teichmann Structures for the bridge deck. The scale of the pour is indicated by the total volume of concrete - over 1 300 cubic metres - delivered by AfriSam in 218 truckloads during one continuous pour in April 2025.

The pour was successfully completed within a tight timeline, enabling traffic to resume along Market Road into Pietermaritzburg from 6:00 on the Friday morning - having been closed at 20:00 the previous evening. This was achieved without any delays or injuries on site, and the result was a high quality concrete deck ready to form part of the new bridge.

Construction innovation technology

Ensuring that such a large and continuous concrete pour was successfully conducted within the tight timeframe of the road closure, demanded meticulous planning and execution from Teichmann Structures, AfriSam and other key participants.

The critical aspect of the project was to avoid disrupting the traffic on the busy N3 and over the existing Market Road bridge close to the N3. The solution began with placing protective sheeting on the sides of bridge, so that concrete could be safely poured without the risk of any spillage onto the live highway below.

To ensure that the traffic flow was prioritised, the authorities could only close the existing Market Road bridge for a limited period. It could only be closed overnight - from 20h00 on Thursday 10 April to 6:00 on Friday 11 April - so Teichmann Structures and AfriSam were presented with a tight timeframe in which to complete the concrete pour.

Through an innovative and carefully calculated schedule, the placement of concrete onto the first half of the bridge began at 13:00 on the Thursday, so that the mid-point of the bridge could be reached by 20:00. With the existing bridge closed, the concrete pumps could then be moved onto the existing bridge, completing the central spans of the new bridge. The pump and supply rate were meticulously managed to ensure that the existing bridge

could be re-opened for traffic by 6:00 the next morning.

Corporate Social Investment

Teichmann Structures employed a considerable number of local residents during the construction stages of the Market Road bridge, enhancing the local economic impact of SANRAL's infrastructure investment.

This positive impact was further sustained through upskilling of this labour, to broaden the local skills pool in areas such as concrete hands and carpentry. This experience stands the workers in good stead for future projects in the area, or other related construction work.

Design innovation

All stakeholders involved in the project had to play their role in perfect collaboration, requiring intensive planning meetings to design a strategy and sequence that would mitigate every conceivable risk, while ensuring that there was always a Plan B for any eventuality.

A detailed 'pour plan' was devised by Teichmann Structures and AfriSam, with all players including Grinaker-LTA, WSP and SANRAL, to ensure that everyone was in agreement and could act in concert. The New England JV conducted the traffic accommodation as the main contractor, while SANRAL kept the community and motorists informed about the planned road closure times, resulting in minimal disruption to motorists.

Environmental Impact Consideration

Careful management of environmental impacts during the deck pour included a focus on the concrete itself. This included Teichmann Structures placing protective sheeting on the bridge sides to avoid spillage when concrete was being poured.

AfriSam's environmental policy also contributed to a cleaner project by having mandatory covers on the chutes of its readymix trucks. This ensured that there was no spillage from the truck, especially when the truck left the site after discharging its concrete load.

Rinsing of the readymix trucks after discharge was only conducted under controlled conditions when the truck had returned to the batch plant. Here, the water from the mixer was carefully channelled from the wash-out bay to settling ponds, from which the water is re-used for selected applications.

The focus on quality and standards in the mix design, batching and pouring of the concrete delivered a structure with a high level of durability, which itself has a significant environmental benefit.

Health & Safety

As with the rest of the bridge construction, Teichmann Structures applied strict safety protocols during the concrete pour, supported by AfriSam's own health and safety standards. This ensured that the project was conducted without any lost time injuries.

An important safety aspect of the concrete pour was related to the management of traffic while the road closures were in effect. The traffic accommodation was efficiently managed by the contractor, the New England JV, which ensured that motorists were safely guided through or around the temporary diversions.

Quantifiable time, cost and quality

The time factor was critical to the success of this bridge deck pour. Through their judicious use of the time available for the road closure over the existing bridge, Teichmann Structures and AfriSam executed an intricate plan by preparing all aspects in advance.

Concrete quality was fundamental to the success of the project. A 40MPA durability mix was a requirement for the bridge deck, providing the high composite strength required to support heavy vehicle traffic, and the durability to resist deterioration.

Quality was ensured by the stringent testing of the concrete, carried out throughout the project by AfriSam, in collaboration with WSP, the consulting engineers and Roadlab - a SANAS-accredited laboratory on the project

Over 200 test cubes were made during the pour to ensure sufficient compressive strength data was attained and quality was ensured. The standard testing requirements were exceeded, by monitoring strength development at 1, 3, 7, 14 and 28 days.

AfriSam was able to closely control all the aspects of the construction materials it supplied, as approximately 97% of the bridge deck concrete mix comprised AfriSam's

PROJECT INFORMATION

- **Continuous Readymix Pour:** AfriSam and Teichmann Structures
- **Main Contractor:** New England Joint Venture
- **Client:** New England Joint Venture
- **Principal Agent:** WSP Group Africa

own products. Aggregate was sourced from its own quarries, for instance, and cement was supplied from its Roodepoort plant.

Risk management

Various risks had to be carefully mitigated and managed to ensure that this continuous pour could be completed without interruption, and within the challenging timeframe. Planning meetings between Teichmann Structures, AfriSam, the New England JV and SANRAL were held to identify and deal with any possible eventuality.

Large concrete pours like the one on the new Market Road bridge demand considerable resource capacity and flexibility from a readymix provider. Having AfriSam's Pietermaritzburg and Umlaas Road readymix facilities in close proximity to the project was an important advantage, as was the company's sizable nationwide truck fleet.

To ensure sufficient readymix supply, AfriSam allocated 36 concrete trucks to this pour, primarily from its KwaZulu-Natal operations, with additional support from Gauteng to ensure sufficient capacity.

Among the risks assessed for the readymix delivery was the potential for delays caused by road accidents or other disruptions between the AfriSam plants and the site. To mitigate this, a detailed route analysis was undertaken to ensure deliveries could continue smoothly, even in the face of unforeseen challenges.

The heat of hydration also needed to be mitigated by incorporating fly ash into the mix, to reduce the risk of thermal cracking. This had the additional benefit of reducing the proportion of energy-intensive clinker in the mix making for a lower carbon footprint.

Consistency of aggregate materials was another priority, so AfriSam isolated specific stockpiles identified through its testing regime. ■

MALMESBURY BYPASS, WESTERN CAPE

Leading Western Cape-based contractor H&I is close to completing the ambitious Malmesbury Bypass project comprising extensive new road construction, bridges and an agricultural underpass. It is a strategic and integrated aspect of the National Infrastructure Plan 2050 focused on the Saldanha-Northern Cape Development Corridor. Work began in March 2023 and anticipated completion is January 2026.

AfriSam has, for many years, been H&I's supplier of a range of construction materials for fill and final road layers as well as readymix concrete for bridge construction and accessories. AfriSam's Rheebok quarry – just north of Malmesbury – has supplied the gravel fill and rock fill as well as G7, G5, G2 and coarsely graded material for layer works.

H&I's project includes the construction of a 6,7 km greenfield road between the Hopefield interchange on the N7 highway and the intersection of the R45 (to Wellington) and R46 (to Riebeek Kasteel). This streamlines traffic by allowing a bypass to the town of Malmesbury and also renders the road network safer. The hilly terrain required extensive cut-and-fill work to achieve vertical alignment of new roads; this in turn ensures better road safety through longer line-of-sight.

The project includes five post-tensioned, twin rib deck bridges and an agricultural underpass.

Construction innovation technology

To achieve the safer road layout, half of the contract length was 'in cut' involving excavations as deep as 12 m and requiring some 720 000 m^3 of earthmoving. A core challenge, however, was that the material from the cuttings was soft ground of sand and clay which was unusable for road construction.

Despite the relatively small footprint of AfriSam's Rheebok quarry, a number of innovative steps were taken to accelerate the production of rock for this pioneer layer. The project required 600 000 t of gravel fill – which is a decomposed rock or 'brown' rock – and 150 000 t of the more competent rock fill or 'blue' rock. While the gravel fill could be used extensively in the normal fill layers, it was necessary to use the more competent rock fill in water-logged and poor sub-strata areas.

AfriSam supplied in excess of 13 000 m^3 of readymix concrete for the bridge construction, in-situ culverts and for ancillary works such as concrete-lined open drains and V-drains. The two longer bridge decks required large and continuous pours, requiring careful planning, control and coordination.

With one of the bridges constructed across a wetland, ballast was used to create a firm platform for the piling rig to operate in the marshy area. Water control was also managed through a siphon method using piping of appropriate diameter.

Project specifications required a limit of 30^{0}C for concrete on site, but daytime temperatures often exceeded 35^{0}C. AfriSam applied thermal management such as cooling the water and shading the aggregate.

Corporate Social Investment

The project provided a significant contribution to the local economy, employing labour and sourcing from service providers in the area. A range of work packages allowed access for smaller subcontractors to contribute, and significant upskilling took place through training and mentoring.

The demand for large volumes of material from Rheebok quarry meant that extra shifts had to be added which created job opportunities locally.

Rheebok quarry's production of 600 000 t of gravel fill for this project has had an added positive impact on the local community. The removal of the brown rock has

exposed more of the quarry's blue rock which is in more regular demand by customers.

Design innovation

Soft ground made it necessary for the contractor to fill large areas with rock fill and gravel fill, a design which ensured that the final metre of road layers was well founded for durability and strength.

AfriSam's special blast design at Rheebok underpinned its ability to meet H&I's requirement for large volumes of gravel fill and rock fill. The blasts resulted in a precise fragmentation pattern of minus 500 mm product, with less than 10% under 100 mm.

Environmental Impact Consideration

With the project's longest bridge constructed over a wetland, careful planning and execution allowed the contractor to avoid a 24 m wide, environmentally sensitive 'no go' zone under the bridge. This was done using a modern system of steel trusses to span between the two piers, as a support for the bridge deck.

Sedimentation was carefully controlled, and spillages of concrete or grout during piling operations were mitigated with bidim and other materials.

The concrete mix supplied by AfriSam to meet engineers' specifications included 70% ordinary Portland cement (OPC) from its Ulco factory, and 30% fly ash, creating a solution with a lower carbon footprint.

Both H&I and AfriSam are accredited in terms of the ISO 14001 international standard for Environmental Management Systems.

Health & Safety

The on-site safety was managed by a dedicated OHSE Officer who was assisted by the dedicated site management to ensure compliance with the client's strict policies and to create a safety culture that focuses on a zero incident tolerance.

The project has created road infrastructure with safer curves and gentler vertical alignment for better line-of-sight as well as wide dimensions and easy driving surface.

The strong top metre of layer works includes three

200 mm layers of G7 material, 250 mm of unstabilised G5, and a 200 mm G2 base-course layer. For most of the road, this is covered by a 19 mm Cape seal and in the interchange area a 40 mm AE2 bitumen asphalt layer. The result is a safe and durable driving surface for motorists.

The flow of traffic on existing roads was carefully managed to ensure safe driving conditions for motorists during construction.

Quantifiable time, cost and quality

Critical to the meeting the project's demanding schedule was the streamlined production and delivery of large volumes of fill material for roadworks. This was facilitated by AfriSam applying a special blast design at Rheebok quarry, to sufficiently fragment material that it could be loaded and trucked without double handling.

To manage the size, mass and abrasiveness of the material, H&I invested in a fleet of nine mining trucks to keep the project on a fast track schedule.

Rheebok quarry also provided in excess of 360 000 tonnes of base and sized material for the road layers, including G7, G5, G2 and coarsely graded material. To augment the primary crushing facilities at Rheebok, AfriSam installed a new Sandvik gyratory crusher to achieve higher production throughput and less oversize reporting to the secondary plant.

A 24-hour shift was introduced at Rheebok quarry to meet the high demand of this project while still meeting other customers' requirements. With this arrangement and the new crusher, the site's production capability was significantly ramped up.

Slump checks were conducted at AfriSam's Rheebok and Peninsula readymix plants, and again at the site, before trucks were passed to H&I's site team. This ensured that every delivery over the project cycle has met the stringent specifications of the engineers.

Sand quality: The consistency and quality of sand in the concrete mix is vital to meeting specifications. AfriSam would closely monitor each delivery by its supplier, to avoid rejection of concrete by the on-site engineer.

Risk management

Heavy rains during the two winter seasons since the project began led to regular flooding of the Riebeeks river. This required the H&I team to pay special attention to protecting the staging while preparing for the bridge deck, using barriers of 1 m^3 sandbags and regularly clearing upstream debris.

The 12-hour concrete pours for bridge decks had to be continuous, so AfriSam applied back-up plans for concrete production and delivery. Production was split between the Rheebok and Peninsula batching facilities, with 24 readymix trucks made available.

Expertise on site: To further mitigate risk during the large pours, AfriSam had senior managers physically on the site during the pour, along with the technical team from the laboratory. This would allow, for instance, any necessary adjustment to the concrete slump to be quickly agreed and approved by the relevant engineer. ■

PROJECT INFORMATION

- **Main Contractor:** H&I Construction
- **Construction materials and readymix Supplier:** AfriSam
- **Client:** Western Cape Government

EMERGENCY SLOPE REPAIRS ON NATIONAL ROUTE N2 SECTION 19, KM 57.4

In June 2023, South African National Roads Authority (SANRAL) advertised a tender for the emergency slope repairs on National Route 2 Section 19 and R61 Section 8. The contract consists of three areas where the N2/R61 road was damaged by stormwater. An additional failure on Second Beach Road of Port St Johns was included as part of the repair works required to be completed by the Main Contractor.

The location of the TerraTrel® MSEW was at Site 1, near Xesi on the N2, approximately 33 km from Port St Johns travelling towards Mthatha, in the Eastern Cape Province.

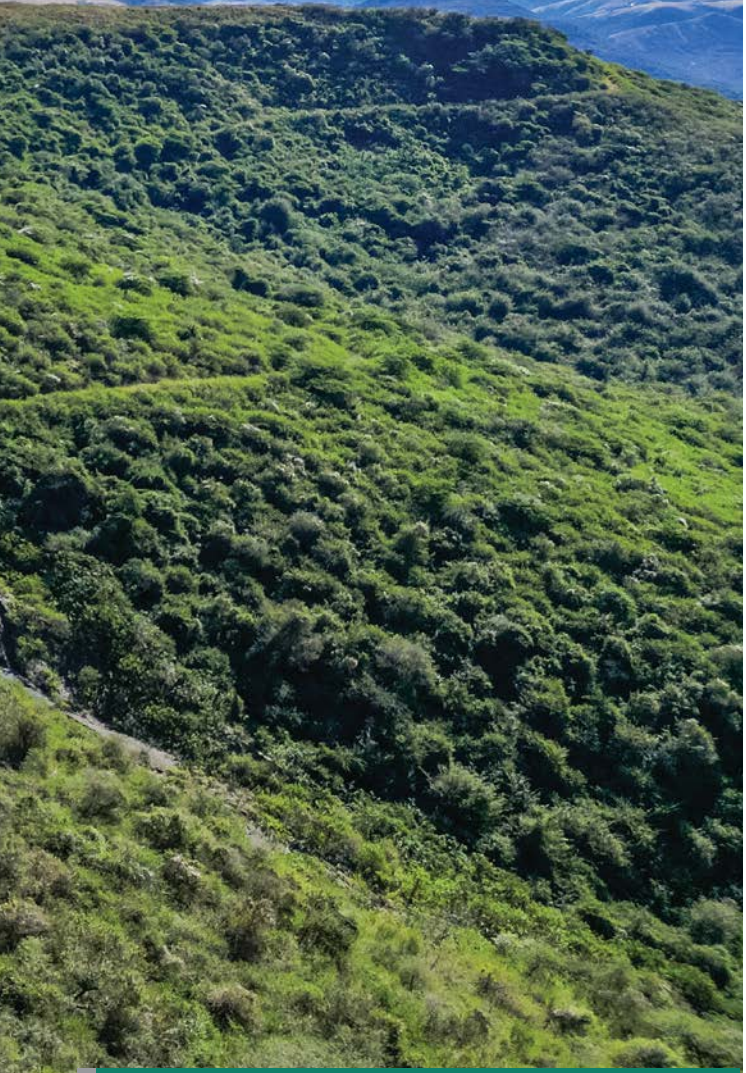
The project became necessary due to a series of 1:100 year storms over successive days in March 2023, which caused full collapses of various sections of the N2 as well as sections of the R61 near Port St Johns in the Eastern Cape.

The Client's envisaged plan for the repair at this specific location was as follows:

- Additional geotechnical investigations (drilling five (5 No.) rotary core boreholes)
- Construction of a temporary diversion by widening the road to the cut face between approximately km 57.360 to km 57.660.
- Installation of the Temporary Lateral Support to secure the cut excavation.
- Construct a Mechanically Stabilised Earth (MSE) Wall as per designer's specification.

Backfill and process fill behind the MSE wall, inclusive of installation of nonperforated horizontal and vertical drainage collector pipes, as indicated on drawings.

- Construct the parapet on top of the MSE wall.
- Construct road pavement layers and roadworks.



PROJECT INFORMATION

- **Main Contractor:** Rumdel
- **Client:** SANRAL
- **Consulting Engineer:** Zutari

- Construct erosion protection measures at the base of MSE wall.
- Re-construct the gabion wall, inclusive of backfill between the gabion wall and the cut slope.
- Complete all roadworks ancillaries as shown in tender drawings.

Due to various unforeseen physical conditions on site at the MSEW location, the lateral support works were delayed by approximately nine months due to collapse of the excavated control faces. These excavations were done in 6 m vertical drops and laterally supported during excavation to ensure the temporary stability of the slope.

During this period, Rumdel and Geoquest coordinated their design approach with that of Zutari's design departments to ensure that, once progress was sufficient, there would be no delay to construction.

Rumdel removed all the collapsed material, installed lateral support in the section which had collapsed to a depth of 24 m below road level and constructed a Mechanically Stabilised Earth Wall utilising Geoquest's TerraTrel® system.

Due to the structure's design having tiered levels, certain sections of the MSEW were independent of one another in terms of construction sequence. That allowed Rumdel to accelerate the progress of the works to mitigate the time delay, thereby reducing cost to the Client.

Due to circumstances surrounding the emergency nature of the project and the unknown and unforeseen geological conditions of the site, a scenario was created which required sound engineering principles and innovation. The engineering interventions needed to overcome the ground conditions and required all parties to be innovative and flexible in their approach to the works.

To overcome all these constructability challenges, the design team, specialist subcontractor and main contractor had to collaborate effectively to produce a solution that is fit for purpose, environmentally viable and of the highest standard.

Construction Innovation Technology

The contract had previously specified a Concrete Panel Mechanically Stabilised Earth Wall (MSEW) rather than the TerraTrel® system steel mesh facing system utilised in construction.

Rumdel reviewed the requirements of the Client, the availability of resources in the local area and the local environment and engaged with Geoquest South Africa to present a solution to the Consulting Engineer which would cater for all the above.

Following engagement with the specialist engineering subcontractor (Geoquest), Rumdel noted that the location for the installation of the MSEW was in an environment which made it possible to install their TerraTrel® system. Due to the location being far enough away from the coast for the steel mesh system to overcome corrosion and meet the required lifespan of the specification, the TerraTrel® system became the preferred choice - rather than the more traditionally used concrete cladded system that was initially envisaged by the Client.

Corporate Social Investment

Rumdel engaged with the local community through the contractually prescribed engagement procedure (SANRAL's 14-point plan) and identified various affected communities within the construction locations who had requested different types of assistance.

- The utilisation of the TerraTrel® system allowed the main contractor to engage more local labour in the installation of this solution rather than the concrete panels, which would have been less labour intensive.
- The Xesi Senior Secondary School, immediately above Site 1, requested Rumdels assistance to extend their sports field so that it would be usable for their fixtures.
- In another community, following engagements with the various stakeholders, it was communicated to Rumdel that there were issues with regards to access to the local clinic in this vicinity. Rumdel reviewed the requirements of this community and came up with a solution where it could improve their access in the long-term.
- Rumdel also assisted various local stakeholders to legalise borrow pits which were being mined illegally in the area.

Design Innovation

During the negotiation phase post award, the

Contractor proposed the use of the TerraTrel® mesh facing system as an alternative to the previously proposed concrete cladded wall.

Prior to suggesting the alternative, Rumdel engaged Geoquest to ensure that the proposal was viable based on its location (17 km from the sea.). Geoquest ran various scenarios and advised that the proposal was viable. Rumdel's motivation for the proposal was based on our experience with the product, the socio-economic needs of the surrounding community in terms of being able to employ more local stakeholders as well the speed at which the solution could be constructed.

Rumdel engaged with Zutari and facilitated engagements between all parties to address the various concerns as well as ensure that the stability requirements of the wall had to be met with the proposed alternative. The on-site conditions were reviewed by the entire Project Management Team with in-depth analysis of the geotechnical conditions of the site being undertaken by both the specialist subcontractor, Geoquest, and the Geotechnical Engineering team from Zutari, to ensure that the ultimate construction arrangement was fit for purpose.

A specific complication that had to be considered with the design was that the wall was to be constructed on a vertical and horizontal curve. The excavation control face narrowed on either end and this meant that, over a section of approximately 70 metres, the wall footprint would be reduced/ impacted and meant that the minimum theoretical length of the required steel reinforcing strip lengths in those zones would not fit. Rumdel notified Geoquest of the issue and, Geoquest modelled and proposed and the use of its TerraLink® and Friction Ladder system which created a connection between the Lateral Support System and the TerraTrel ® wall.

Environmental Impact Considerations

The area in which the project is situated is one of considerable natural beauty. The TerraTrel ® construction for permanent works requires rock with diameter greater than 100 mm to be packed behind the facing. The Contractor believed this would provide a more natural appearance over time.

Risk Management

Adherence to the specified sequence of excavation during the lateral support phase of the works was very important, due to the high level of friability of the *in situ* rock. During excavation, the Contractor observed many slippages and introduced various forms of interventions to overcome the slippage, in terms of plumbs and dental shotcrete.

Rumdel accelerate progress and mitigated six months of extension of time for the Employer with the introduction of additional resources and changing our sequence of Works at acceptable risk levels.

Technical Risk Management

During construction of the bypass, which was positioned in the existing cut face, it became apparent that the existing cut face above the collapsed area had become unstable, with visible cracks appearing. A temporary pause to these works was necessary.

Financial

An important consideration was budget management. Rumdel considered it important to manage the risk of the potential for increased spend on commercial fill material and therefore it instituted a rigorous testing protocol on the excavated material to reduce the Client's exposure to additional cost.

Health & Safety

With the introduction of the TerraTrel® mesh panels, Rumdel was able to eliminate the requirement for lifting concrete panels into place. The system allowed for the manual placement and manipulation of the elements into place to produce a smooth, profiled finish. This reduced the possibility for potentially unsafe incidents in the lifting and placing operation.

Stakeholder Risk Management

By utilising the TerraTrel® System, Rumdel was able to introduce a labour-intensive construction method that had previously not been necessary, but which provided a valuable means of engaging the local community and creating opportunities for employment in an area that is in need of upliftment. ■

RUMDEL

RUMDEL BUILDING SOUTH AFRICA'S FUTURE – ONE PROJECT AT A TIME

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With a strong reputation for delivering complex, high-quality projects across the civil engineering and infrastructure sector, Rumdel has established itself as a trusted leader in South Africa. Our expertise spans roads, dams, incrementally launched bridges, and a wide range of other major infrastructure projects.

Built on a legacy of quality, innovation, reliability, and timely delivery, Rumdel continues to play a vital role in keeping communities connected and driving sustainable development across the region.

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KARIBA DAM REHABILITATION: A WORLD-CLASS ENGINEERING FEAT

The Kariba Dam is located on the Zambezi River, which forms the border between Zambia and Zimbabwe. Based on reservoir capacity (180 600 hm³), it is the largest dam in the world. Supplying 2010 MW and 6400 GWh hydro-electric power per annum to parts of both Zambia and Zimbabwe, the Kariba Dam is a crucial piece of infrastructure for both countries. It also supports industries like mining, agriculture, fishing, and tourism. Importantly, the Kariba Dam is a vital water reserve in a region where droughts are common.

Cause for alarm: motivating facts about the project

The dam was built on a seemingly solid bed of basalt. But, over the past 70 years, the force of water cascading from the sluice gates has gradually eroded that bedrock, carving a 91 m deep pit – or plunge pool – at its base. The pool is around 40 m from the structure's foundation. If it reaches the foundation, the dam is likely to give way. If that happens, a tsunami-like wall of water would rip through the Zambezi valley, reaching the Mozambique border within eight hours.

Kariba Dam Rehabilitation Project (KDRP)

This necessitated the KDRP. The project's goal was to guarantee the structural integrity of the Kariba Dam, assuring the sustained generation of power primarily for the benefit and protection of the inhabitants of Zimbabwe and Zambia and the broader Southern African Development Community area.

A key component of KDRP involved improving the stability of the plunge pool and reducing the backward scour towards the dam foundations. This was done by enlarging the plunge pool and safeguarding the dam's downstream toe with a concrete lining.

Construction innovation technology

- **Coffer dam**

This reshaping work could only be accomplished under dry conditions, necessitating the construction of a temporary water-tight cofferdam. The 25-metre-deep coffer dam was constructed across the Zambezi River, downstream of the main Kariba Dam wall, allowing the deep plunge pool at the base of the Kariba dam to be drained, reshaped and stabilised. These were the first works of this kind in the world that would be implemented under an existing dam.

The riverbed was cleared at depths of up to 25 m using heavy machinery. Extensive underwater surveys were done to ensure stable foundations for the nine piers. Once constructed and positioned, prefabricated metal gates called stoplogs were the positioned between the piers to form the cofferdam

In total, 550 000 m³ of water had been pumped out of the 90 m deep plunge pool.

- **Pier construction**

A river-based precast yard produced six 15 m x 4,5 m and three 18 m x 4,5 m hollow piers using advanced slip-form techniques from a specially-built rig in the Zambezi River. They were constructed with voids in their sides to house 13-m steel stoplogs, a critical feature for controlling water flow and ensuring structural resilience.

Each pier was constructed in stages, with piers progressing through multiple pours to a height of 24 m. It took roughly a month to construct one pier. When the piers achieved the minimum required height, they were floated into position using submerged lifts. They would then sink into position by being filled with water and secured to the foundation. Once in place, the interior of the pier was filled with concrete, displacing the water.

Climbing platforms and scaffolding ensured stability and safety during high-volume pours at various heights.

After filled with concrete, the piers were up to 24 m high and ranged between 250 tonnes to 700 tonnes in weight. Most of the piers were GPS-guided into the plunge pool and anchored beneath the dam wall.

A total of 48 permanent strand anchors were used to anchor the temporary dam piers to the ground.

There were difficulties in finding bedrock for piers 7, 8 and 9 – near the dam's right bank by the Zimbabwe border – which meant that 22 000 m³ of concrete had to be placed underwater.

This arduous process – which took six months and was completed in September 2023 – involved pumping concrete to 25 m deep and 15 m wide, with divers handling the 125 mm diameter tremie pipe to place the gravity fed concrete.


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Strong currents from the hydroelectric plant made placing underwater concrete challenging, risking washout and reduced visibility. Therefore, the team had to work closely with Zimbabwe's Kariba Power Station where they agreed to switch off turbines at specified times.

CHRYSO® DEM S, a versatile mould-release oil for timber or steel formwork facilitated the release of formwork from the concrete piers.

Design innovation

The concrete mix design for the piers was a watertight concrete. The CHRYSO® Omega 162 superplasticer reduced the need to add extra water, and so increased the durability of concrete. It improved cohesion, viscosity, and finish quality.

CHRYSO® Fuge B, which is a pore-blocking permeability reducer for mass concrete, reduced the size of the capillaries, thereby almost completely eliminating the penetration of water under pressure.

The piers were 22 m below the water and 10-12 m above the water. This in itself created a challenge as the temperature above the water varies significantly to the temperature below the water.

Small adjustments had to be made such as adding valves to the pipes to prevent air bubbles from forming when pumping concrete below the water. If a different concrete mix was to be pumped, all equipment had to be thoroughly cleaned, removing any concrete that had a different mix design.

CHRYSO® Aquabeton ZA played a key role in allowing concrete to be placed underwater. This highly specialised admixture assisted in minimising washout and segregation of the fresh concrete when placed underwater. It also retarded the concrete, minimising the possibility of cold joints. CHRYSO® Quad was also used to improve concrete cohesion and vicosity.

- **Fault lines**

As the coffer dam was dewatered, the contractors started micro-blasting to clear rock from the plunge pool. This was a delicate process where wet geo-textiles were placed over all the blasting areas. The dam walls had to be secured to prevent any rocks from falling. Anchors to secure the safety nets were installed to counteract the risk of rockfalls in the excavation.

A total of 300 000 m³ of rock was excavated on the downstream end of the plunge pool using the drill and blast method. By enlarging the pool, the pressure that the water spilling into the plunge pool exerts on the base of the pool was reduced, slowing the erosion of the natural rock floor, especially along the weak fault zone towards the dam foundation. Reducing the slope at the downstream end also decreased the amount of swirling and ensured the smooth flow of water out of the pool and into the river.

CHRYSO® Jet 30 ensured shotcrete adhered to stabilise the dam wall.

Concrete sealing was applied to fault lines to prevent water ingress and maintain stability. This critical step ensured the dam's resilience throughout the project. Around 600 000 m³ of concrete was produced to protect the geological fault and a cavity threatening the stability of the dam with an impressive reinforced concrete sarcophagus of 6 000 m³, equivalent to an

18-story building anchored in the cliff.

A combination of CHRYSO® Omega 162, CHRYSO® Fluid Optima 206, densified silica fume and fly ash was used in the concrete mix to limit temperature rise during placement and prevent cracking - crucial in ambient temperatures of up to 40 °C. A chiller plant was used to cool the water and aggregate before mixing.

Fly ash helped prevent thermal cracking in large concrete masses. Professor Ballim's model predicted hydration heat, guiding successful mix designs. Fly ash was used to reduce the rise of temperature in the concrete.

Stitching of the fault included the use of 40 mm anchors in the rock with CHRYSO NS Grout added to a concrete mix. A non-shrink powder additive for cementitious grouts and concrete, CHRYSO®NS Grout Additive is a combination between a plasticising agent

PROJECT INFORMATION

- **Implementing agency:** Zambezi River Authority
- **Contractor:** Razel Bec
- **Engineer:** Gruner-Stucky
- **Admixture manufacturer:** CHRYSO
- **Construction chemical supplier:** Mart Solutions
- **Scaffolding and formwork specialist:** Peri South Africa

and a gas producing expansion medium. It ensures low permeability and high density.

Risk management

Laboratory trials were run for three years to ensure that the concrete mix design met the standards specified by the engineers for the wall, where concrete had to remain below 55 °C during placement.

Once construction began, an ISO 17025 accredited laboratory was onsite. This was a huge achievement in itself as the accreditation process is extensive.

Furthermore, material and concrete samples were regularly sent to South Africa to do abrasion tests.

Slump tests were done at the batching plant and then before it was cast from the readymix trucks.

Due to the unprecedented nature of the works components of the KDRP, a panel of seven dam safety panel of experts would undertake bi-annual site visits and provide guidance, recommendations and opinions to help resolve project execution challenges.

Health & Safety

By nature, the KDRP is a high-risk construction undertaking. However, due to robust health and safety interventions instituted on site, the contractor managed to keep accidents to the barest minimum. A total of six-million-person hours over the past seven years was spent on this project. There were no fatalities and only two lost time injures.

During COVID-19, mass testing and strict safety protocols were implemented, including PPE use and sanitation measures.

Crocodiles were also a concern. Some of the bigger crocodiles were safely captured and relocated but the divers had to be aware of the remaining crocodiles.

Corporate Social Investment and environmental impact considerations

- 85% of the jobs created were Zambian.
- The Zambezi River Authority had an extensive capacity building programme that involved 18 post graduate female trainees who were incorporated as part of skills transfer.
- The plunge pool works had minimal negative impact on communities and the environment in the region of the dam. Rather, the works brought some benefits to local communities, creating job opportunities for unskilled and semi-skilled workers and stimulating local businesses.
- No people were displaced or resettled as the works were undertaken within the plunge pool area.
- Flora and fauna near the dam and downstream were unaffected.
- The water used to generate hydropower was diverted from the lake into the power stations upstream of the dam wall.

Quantifiable time and cost

The Plunge Pool component of the KDRP commenced in May 2017 and was successfully commissioned in September 2024 with €83,3 million having been spent while other outstanding claims were still undergoing consideration against a budget of €130-million. ■

NEW MAPULANENG REGIONAL HOSPITAL

The New Mapulaneng Regional Hospital is a world-class 365-bed facility located in the underserved community of Bushbuckridge, in South Africa's Mpumalanga Province. Completed in June 2025, the hospital now provides trauma, tuberculosis, surgical, isolation, and mental health treatment, along with EMS services, to more than half a million local residents – who now no longer need to endure hours of travel to receive medical care.

GIC was contracted to execute Phase 3B works for the project, including earthworks, civils, super-structure, MEP installation, and commissioning under a under a contract (VAT included) of R419 117 000,48.

The project logged a total of 1 414 981 work-hours with a Lost Time Injury Frequency Rate (LTIFR) of just 0.28 and currently at 385 days without a lost-time incident, proving that large-scale public infrastructure can be built faster, safer, and smarter in South Africa, while delivering exceptional value and high-quality facilities to communities in need.

Construction innovation technology

GIC executed Phase 3B of the New Mapulaneng Regional Hospital between June 2020 and June 2025. A R419-million contract involving earthworks, civil construction, superstructure, and MEP installation, the team leveraged advanced digital engineering to ensure timely, cost-effective, and safe delivery.

By using BIM technology guidelines, GIC integrated GIS digital modelling with real-time cost and schedule tracking, enabling precise resource allocation and proactive risk management. This approach minimised delays and kept the project on budget while maintaining the highest safety standards, achieving an LTIFR of 0.28 over 1 414 981 work-hours.

GIC's proprietary SA Infrastructure Online (SIO) platform – with AI-backed technology connects planning, scheduling, budgeting, tendering, procurement, quality control, and document governance – played a key role, empowering GIC teams to utilise AI-driven digital workflows, GIS integration, and live dashboards for better project outcomes.

Key innovations included:

- Automated Bill of Quantities (BOQs) and approvals – digitised workflows accelerated decisions, preventing cost overruns.
- Real-time progress tracking – live data collection, digital platforms and resource management, ensuring alignment between design and execution.
- Agentic AI – agent models flagged anomalies in invoices, contracts, and certificates, while AI assistants streamlined digital workflows and enhanced collaboration among contractors, engineers, and project managers.

The technology helped GIC complete Phase 3B of the hospital project timeously in June 2025, supporting the provision of critical trauma, tuberculosis, surgical, and mental health services for over 750 000 underserved residents in the Bushbuckridge municipal area, in addition to servicing the surrounding Hoedspruit, Graskop, and Hazyview communities.

Corporate social investment

In keeping with the company's commitment to *Changing Lives through Sustainable Infrastructure*, GIC treated the New Mapulaneng Regional Hospital as a platform for local socio-economic development as much as a construction contract.

Through this project, GIC channelled local spend, skills transfer, and lasting assets into the Bushbuckridge area. By the time of completion, R109 832 883 had been paid to community-based subcontractors, suppliers, and lodges,

and other local service providers, retaining a significant share of the R419-million Phase 3B budget within the municipal and provincial economy and stimulating local businesses.

Additionally, site foremen and accredited trainers provided on-the-job training and coaching to local workers and subcontractors, equipping new hires with foundational skills in formwork, bricklaying, and occupational health and safety, among others. These efforts provided additional routes to long-term employment once the project was completed.

Design innovation

The New Mapulaneng Regional Hospital consolidates a full spectrum of district-level health services on one campus, limiting travel time for more than 750 000 underserved residents. Core blocks, including emergency medical services, tuberculosis, surgical/orthopaedic, isolation and sub-acute, and mental health, are arranged to keep related clinical functions close together, reducing patient transfers and shortening response times for critical cases.

GIC's scope under Phase 3B covered earthworks, and civil and building works. Acting as a single turnkey contractor for these disciplines removed hand-off delays and enabled parallel progress on multiple wards.

Structural and services designs were coordinated using its proprietary 5D BIM system, allowing cost and schedule data to accompany every element. This produced clear drawings and precise BOQs for procurement.

Environmental impact considerations

GIC strongly emphasises environmental stewardship in every project. For the New Mapulaneng Regional Hospital, this process began with the selection of materials. Locally sourced aggregates were used wherever possible, which further supported the local economy while cutting down on hauling distances to minimise fuel use. Batch plants finely optimised mix designs, adjusting cement content to avoid wastage.

Furthermore, excavated material was reworked and utilised in repairing and maintaining eroded roads within the local community, diverting significant tonnage from landfill.

On the operations side, plant selections favoured low-maintenance, high-efficiency equipment, improving reliability and lowering lifetime emissions. Solid-waste management spaces met strict Department of Health guidelines, separating infectious, recyclable, and general waste streams at the source to prevent ground contamination.

Health and safety

By June 2025, the site had logged 1 414 981 work-hours, including 385 days since the last lost-time incident, resulting in a LTIFR of 0.28 – comfortably below the South African construction average.

The project's safety plan integrated induction training, daily toolbox talks, and task-specific permits for high-risk activities such as working at height and confined-space entry.

Behaviour-based observations were recorded, with recurring risk trends guiding weekly focus topics. Dedicated safety marshals patrolled worksites, enforcing the correct use of personal protective equipment and isolation procedures for live electrical work. Subcontractor selection criteria required demonstrated safety records, and incentives rewarded crews that met monthly zero-incident targets.

Quantifiable time, cost, and quality

Phase 3B commenced in June 2020, with timelines extended from 36 to 60 months to align with budgetary planning constraints. The total budget amounted to R419 117 000,48.

Quality assurance followed a hold-point system: structural, architectural, mechanical, and electrical stages advanced only after joint inspections by GIC supervisors. Notably, there was only one non-conformance report (NCR) throughout the entire project lifecycle – shortly cleared as a high priority before the next trade mobilised.

The project was completed within the June 2020 to June 2025 timeframe and was timeously handed over to the client.

A total of R109 832 883 from the project budget had been allocated directly to the Bushbuckridge community through the hiring of local subcontractors, procurement from suppliers, and lodging arrangements.

The project recorded a total of 1 414 981 work-hours and 385 lost-time injury-free days, with an LTIFR of 0.28.

The New Mapulaneng Regional Hospital now offers cutting-edge facilities and comprehensive medical services to the region, not only changing but potentially saving lives, and significantly improving both public service delivery and healthcare access within the region.

Risk management

Risk governance began with a pre-project-initiation risk analysis. Key risks included extended funding cycles, supply-chain instability connected to the remote nature of the area, community unrest, and pandemic-related labour interruptions. Mitigations were budgeted and reviewed at monthly steering committee meetings with the client.

Work was planned around the province's annual funding cycle, so payments were made to suppliers and contractors on time, and the site never ran short of funds. Materials, equipment, and machinery were ordered early to mitigate supply delays. Additionally, weekly meetings with local ward councillors solved community concerns before they grew into protests.

COVID-19 risks were addressed by systematically opening more workfaces to restrict team members' proximity to each other. Moreover, hygiene stations were erected and on-site testing conducted, which kept the crew healthy and the schedule intact. Safety practices described in the Health and Safety section controlled day-to-day site hazards.

Heavy summer storms in Mpumalanga can flood excavation sites and wash away newly placed layers. To stay ahead of the weather, GIC built temporary drains before earthworks began and scheduled bulk concrete pours outside peak-rain months whenever possible. Rainfall forecasts were reviewed at daily planning meetings so crews could protect open trenches and stockpiles in time.

Regulatory approvals were another critical consideration, as hospitals must pass rigorous health-facility inspections, and any late design clarifications could stall progress. The project team submitted drawings for review in small, phased packages instead of one large bundle, enabling faster feedback. Monthly alignment sessions with provincial inspectors kept requirements clear and prevented last-minute redesigns. ■

PROJECT INFORMATION

- **Main Contractor:** Gap Infrastructure Corporation (GIC)
- **Architect:** Afro Architectural
- **Client:** Public Works, Roads and Transport, Mpumalanga
- **Principal Agent:** Nala Consulting
- **Quantity Surveyor:** QualConsul
- **Consulting Engineer:** Ilanda Africa

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