

# HOME SWEET HOME

When Adelaide Zoo announced it had special new black and white residents on the way from China, it embarked on the greatest infrastructure changes in the Zoo's 130-year history in order to accommodate them. "It will change everything," said Adelaide Zoo CEO, Professor Chris West. He was right.

In order to house The Giant Pandas, Adelaide Zoo required: a specific Giant Panda enclosure, holding rooms, a conservation centre; a new perimeter fence, extensive landscaping and a new entrance precinct to manage the thousands of visitors who would be drawn from all over Australia to see these remarkable endangered species. Following a competitive tender, national property and construction company, Hindmarsh, was appointed Managing Contractor.

One of the primary aims of The Giant Panda exhibit was to convey an understanding of both the natural habitat of The Giant Panda and the current context of research and conservation efforts which are strongly associated with the Wolong sanctuary, a protected area in Wenchuan County, Sichuan Province, China.

The project works had many complexities including: an extremely tight timetable, restricted building noise in consideration of the other zoo inhabitants, protection of heritage listed trees, shielding the work from public view and re-creating the bamboo forest of the Sichuan province against the backdrop of Adelaide's extreme weather.

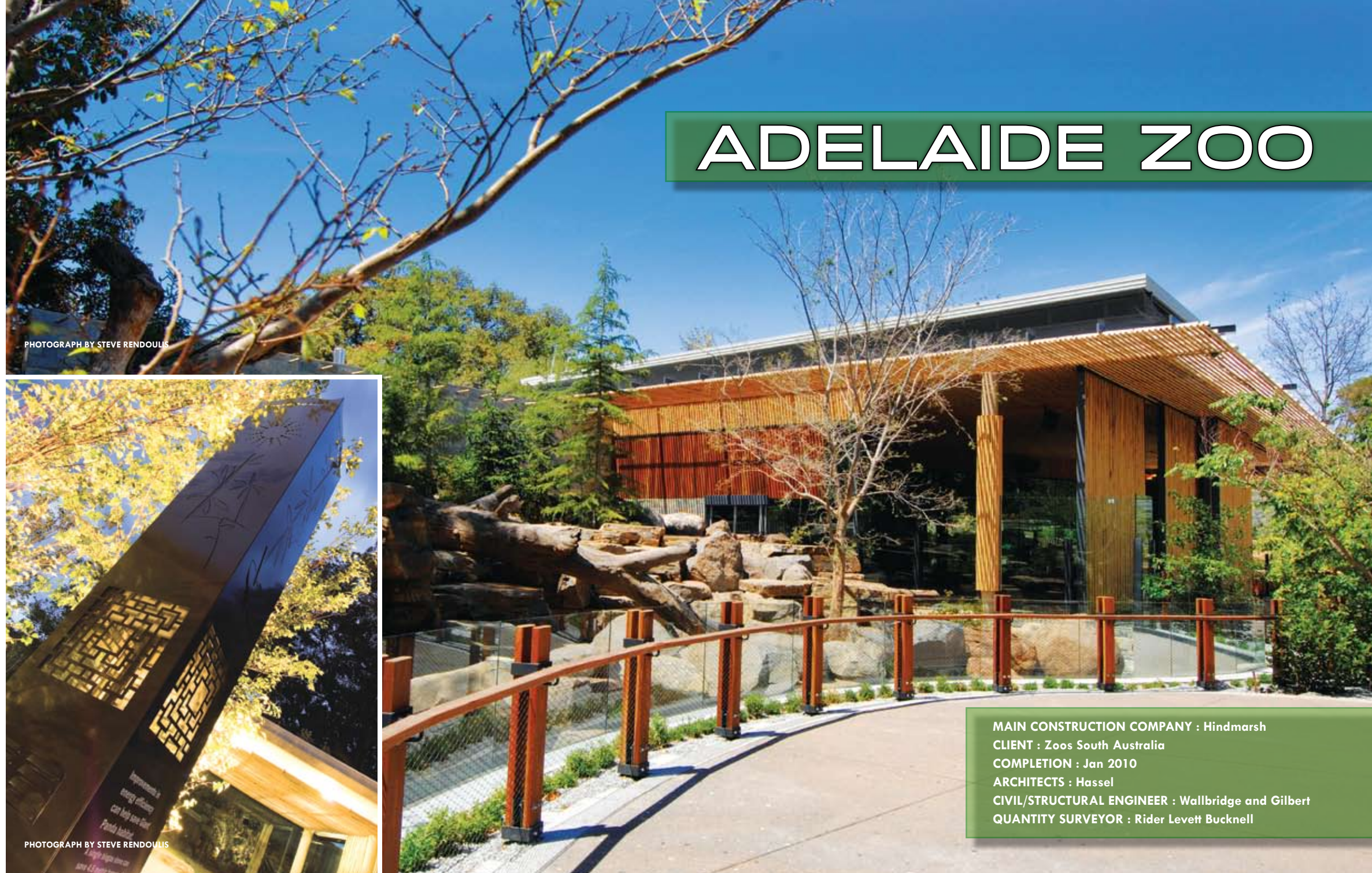
Hindmarsh went to extraordinary lengths to make sure that the project was delivered ahead of time, on budget and that it exceeded all expectations. The Giant Pandas had to be comfortable in their new homes roaming around happily – and also hopefully able to produce offspring during their 10-year stay. Visitors had to feel welcome and experience a new frontier in animal conservation, research and education about world wildlife.

The Giant Panda enclosure required water-chilled rocks which could be cooled to 12 degrees Celsius, waterfalls, pools and water misters to keep The Pandas cool, plus over 5000 plants and 900 tonnes of rock in the exhibit on which The Pandas could climb. Several well-established trees were sourced from around Australia for the enclosure.

Facilities behind the displays included research laboratories where keepers can easily rotate the animals, weigh them and monitor their diets. The centre of the undercover enclosure includes a glass-fronted 'looking glass' style passage allowing public view.

The enclosure had to be completed in a little over a year. The deadline was absolute. Experts from China assessed progress. Before The Pandas arrived, the Chinese delegation required changes to the bamboo ceilings and new viewing screens. It also insisted that additional security measures be added to ensure The Pandas' security.

The recently opened entrance building had its own construction complexities. A concrete structure providing high thermal mass to reduce heat gain in summer and to capture, store and return heat in winter, it includes a range of administrative and public functions including: a 125-seat café, 150m2 retail space and visitor services. A large public forecourt creates an "outdoor experience" avoiding an enclosed air-conditioned lobby. The conservation centre holds a



**MAIN CONSTRUCTION COMPANY :** Hindmarsh  
**CLIENT :** Zoos South Australia  
**COMPLETION :** Jan 2010  
**ARCHITECTS :** Hassel  
**CIVIL/STRUCTURAL ENGINEER :** Wallbridge and Gilbert  
**QUANTITY SURVEYOR :** Rider Levett Bucknell



110-seat theatre and raked insulated glazing overlooking Botanic Park. An international standard quarantine and vermin proof fence had to be maintained around the perimeter of The Zoo throughout all construction.

The new facilities, including the relocated entrance, the building of new retail and conference facilities and outer perimeter fence returned approximately 2000m2 of previously alienated park land for public use.

Royal Zoological Society of South Australia President Heather Caddick praised Hindmarsh's commitment and delivery. It took an enormous amount of talented and committed human energy to deliver the final works.

Over the past 30 years, Hindmarsh has built its reputation on achieving exceptional standards throughout Australia and overseas. The Giant Panda Enclosure and associated works exemplify Hindmarsh's

commitment to quality. Its collaborative, proactive and effective management sets new standards of accountability and collaboration.

South Australian Premier Mike Rann MP officially opened the new Adelaide Zoo front entrance in February 2010 and said he's delighted that more than 100 000 people have visited the Adelaide Zoo since the unveiling of its high profile residents, Wang Wang and Funi, to the public just eight weeks ago.

A fantastic result.

**HINDMARSH**  
57 Wyatt Street  
Adelaide SA 5000  
t. 08 8228 4188  
f. 08 8228 4199  
e. charlotte.waddy@hindmarsh.com.au  
www.hindmarsh.com.au





Adelaide Zoo, SA



## STANDING ON SOLID GROUND

Attention to detail has gained I & S Psarras Concrete a solid reputation in the industry, and a job for John Hindmarsh, constructing the exposed aggregate paths for the Adelaide Zoo's new Giant Panda Exhibit.

I & S Psarras specialise in finishing concrete and working with exposed aggregate concrete, in addition to coloured concrete, exposed aggregate with seeded pebbles and exposed aggregate recycled concrete. Their crew is meticulous in their approach when forming up curves around trees and bends or achieving the straightest possible lines along paths and edges. "This project was a tremendous opportunity for us, both for the unique nature of the Giant Panda Exhibit and as a lasting, very public, showcase of our skills," said Company Director, Soula Psarras.

"Some of the paths had seeded pebbles in them as a design feature, which was something quite new and different. While the work was straightforward, the challenge was the many curves and bends the concrete path had to take around rocks, plants, trees, and other ornamental and practical features the architects had designed.

"The work had strict schedules, as everything had to be complete before the Giant Panda's arrival date. We were helped in achieving this by working with another company, M&I Concrete Constructions. They worked with us on the edging and the concreting. We have worked on other large projects with them, and find that co-operating in this way

allows us to stay a small company focused on maintaining high quality, while undertaking major projects."

I & S Psarras began operations in 2000, building on Iov Psarras' 23 years experience in the concreting industry. In a decade, the company's track record on projects such as Moana Foreshore Development, upgrading the footpaths for Onkaparinga Council, constructing Lochiel Park and Bluestone Estate's paths, and their demonstrated commitment to the best finish and timely completion has brought a growing number of assignments from architects, builders and landscape companies on projects ranging from single driveways to whole subdivisions. Their specialty, exposed aggregate, can be employed in a diversity of textures, colours and finishes which complement any building's architectural style and setting.

Current projects include paths, driveways and reserves for the Noarlunga Affordable Housing Demonstration Project for SA's Department of Family and Community; Munno Para-East Parkway and Andrews Farm.

**I & S Psarras Concrete P/L**  
14 Milton Avenue  
Tranmere SA 5073  
p. 0414 900 240  
f. 08 8364 1649  
e. [ipsarras@bigpond.net.au](mailto:ipsarras@bigpond.net.au)





## NATURAL FLAIR

Woodform Architectural know timber so well, they were able to supply \$200,000 worth of custom cut, dried and fabricated timber products to the Adelaide Zoo project utilizing architects' plans and engineering specifications alone. Their expertise not only created an outstanding result, it also saved the project's main Contractor, Hindmarsh, time and money.

Woodform are specialists in the manufacture and supply of unique solid timber building products including facades, decking, screening and flooring, all with concealed fixing. For the Adelaide Zoo project, they worked collaboratively with the architect and project managers to ensure the right products arrived on site for the new entrance building, extensive landscaping works and the Panda Enclosure. The designs called

for expert timber work such as vertical mullions in glass facades, and a vertical timber blade façade, in addition to extensive numbers of bollards, handrails, benches, arbors and many lineal metres of decking. All needed to be manufactured in varying earthy shades of Native timber.

"The Architect sought a consistent timber theme throughout the project, with a range of aspects specified in Spotted Gum, which is a dark brown species with a class 1 above ground durability rating," explained Woodform Project Supervisor Jeremy Napier.

"The Spotted Gum was used for a range of applications including the unique blade façade, the vertical batten façade on the west elevation, joinery mullions, vertical tongue and groove cladding on the Panda enclosure, bollards for lighting, handrails, a pedestrian bridge and two decks. Assistance was provided to the architect in specification so that he could achieve the desired appearance in a durable manner.

"A detailed schedule was prepared from the plans for all timber aspects and possible cost savings discussed with the project manager prior to the submission of the final tender."

Woodform design, manufacture and supply unique products directly to building projects. Their care for quality extends right back to the timber source, with all timber sourced off the log from mills, and kiln dried and machined in-house into their own range of product and custom solutions for specific projects, such as Adelaide Zoo.

"The timber blade façade on the north elevation of the entrance gateway building is an example of this. The timber was specified as a custom chamfered profile of specific cross-section and length. This had to be milled specially, kiln-dried and profiled to suit. The result is a no compromise solution which exactly matches specification," said Jeremy.

"The click on batten façade utilized on the west elevation of the entrance building is an example of Woodform's innovative concealed fixing. The architect's product of choice here was the Concept Click batten screening system.

"All the timber was packaged, shrink wrapped and labeled, cross referenced to the tender so that post delivery timber management was an easy task for Hindmarsh."

Hindmarsh were entirely delighted with the results of Woodform's labours. Michael Foreman, project manager for Hindmarsh, said he believed engaging Woodform in the initial stages led to design improvements and cost savings.

Woodform are a family business located in Bendigo, Victoria, with an efficient transport network which allows them to supply projects nation-wide. They are dedicated to quality, with a system of cross-checks throughout the manufacturing and dispatch process. All their timber is precision machined to a furniture-grade finish, generally suitable for immediate application of surface finishes without the need for further sanding.

As a company which relies on future timber supplies, Woodform are committed to supporting environmentally sustainable forest stewardship, and source their timber only from selected reputable sources.

Other projects which feature Woodform Architectural's products are Waterfront City at Docklands Melbourne, Seaford Life Saving Club at Port Phillip Bay, the The Rathdowne apartment building in Carlton Melbourne and The Gateway building at Circular Quay Sydney.

### WOODFORM ARCHITECTURAL

9 Gray Street  
PO BOX 1323  
Kangaroo Flat Victoria 3555  
t. 1800 008 828  
f. 03 5447 1166  
e. [jeremy@woodformarchitectural.com.au](mailto:jeremy@woodformarchitectural.com.au)  
[www.woodformarchitectural.com.au](http://www.woodformarchitectural.com.au)





## MARVELLOUS METAL

From shipyard metalwork to the new perimeter fence for Adelaide Zoo, Tri-Metal Engineering have been applying their skills in metal fabrication to major projects across the construction, civil, manufacturing and mining sectors for the last 20 years. For their recent Zoo commission, in addition to fabricating and installing the fence, Tri-Metal fabricated and installed the new gates for both main entry and service entries.

The task was completed over 10 months. Site surveys and detailed measurements were taken, and the existing fence progressively removed. Tri-Metal fabricated and installed solid temporary fencing to maintain security and safety of the Zoo while works were in progress. Site welding was kept to a minimum, with temporary welding shields erected on site to protect the public when needed.

In addition to a substantial workshop capable of handling beams up to 15 metres long, and facilities to lift steel up to 10 tonnes, Tri-Metal have their own truck cranes, an invaluable asset in performing work to tight schedules. Their workshop is equipped with AUTOCAD Drafting, Maching Centres, vertical & horizontal borers, mills, through to lathes, and the company's staff of 70 includes boilermakers, sheetmetal and stainless steel workers with a number of apprentices. Up to 30 staff contributed to the drafting, fabrication and installation for Adelaide Zoo.

“Our skills base allows Tri-Metal to provide cost-effective solutions in mild, aluminium structural and stainless steel. The company's aim is to provide our customers with a solution that best meets budget,

scheduling and quality requirements. This meant that we were able to provide the Zoo with the perimeter fence and gates that they required,” said Tri-Metal Operations Manager Dominic Fazzalari. “Our ability to operate in a confined work area, with the general public and animals close by as well as the need to be installing a finished product were key constraints in completing the task.

“Quality is one of the key elements in the company's success and growth, with ISO accreditation ISO9001 now being the cornerstone. Our other key element is ongoing training of staff. This is based on ensuring we have a number of apprentices at various stages, and an ongoing commitment with additional training in all areas the company works in. We can provide Green Star steel products, and the company strives for minimum harm policies. This covers recycling of scrap steel, oils and solubles, paper & cardboard, water retention, through to introducing the use of energy efficient welders & tools.”

Other metalwork projects Tri-Metal is currently engaged on are the Altitude Apartments for Brookfield Multiplex, ASC Shipyard for Hansen Yuncken (all Green Star steel) and HNA at Edinburgh RAAF Base for Baulderstone.

**TRI-METAL ENGINEERING PTY LTD**  
29 Ceafield Road  
Para Hills West SA 5096  
p. 08 8258 6563  
f. 08 8258 2971  
e. [admin@trimetal.com.au](mailto:admin@trimetal.com.au)  
<http://trimetal.com.au>



## COMPLEXITIES RESOLVED BY EXCELLENCE

Manuele Engineers Pty Ltd's work on the Adelaide Zoo proves they can do anything with steel. They handled all the structural steel needs for the Envirodome, new entry building and Giant Pandas Exhibit, from shop detailed drawings, to fabrication and surface treatment, then site installation. Twenty five workers including a project manager, drafters, boilermakers and site erectors dedicated five months to the job.

“The geometry of the project in general incorporated very complex aspects. There was very little that connected at 90 degree angles, everything was angular, with pieces mating in complex configurations,” explained Manuele Engineers Director, Vince Manuele.

“Our steelwork interacted closely with many other trades. There are a large number of heavy timber vertical elements connecting to the steel framing. Overall, we had to ensure we worked within tight tolerances required by the other building materials. The end result is stunning.

“An added difficulty was that the date the Pandas were arriving was fixed, so all problems, changes and design development had to be resolved within the given time. “

All steel used for the project was Australian steel.

“Australian steel is among the best in the world, and as fabricators Manuele Engineers does its best to exclusively use Australian steel. By using it we have the advantage of traceability of quality, and faster resolution of any

issues as we have instant access to the supplier,” said Vince.

Manuele Engineers are a second generation family business in operation since 1967, and pride themselves on having a high level of technical ability combining human expertise with the latest technology. Their skills are backed by full third party Quality Assurance Accreditation to AS/NZS ISO 9001:2000. In November this year they will relocate to a brand new purpose-built facility adjoining Adelaide Airport, with a height and floor plate giving unlimited scope for the business.

Other major projects recently completed include the Goyder Pavilion at the Royal Showgrounds in Adelaide. This project had unique delivery methods in that Manuele Engineers were engaged before the builder, on the strength of their ability to work with the consultant team through the design development phase. Another outstanding project for the firm was fabricating and installing all the structural steel for the multi-award winning Six Star Green Star SA Water HQ. Currently, they are engaged on the new Western Grandstand at Adelaide Oval, a heavy engineering project challenging both for its scale and complexity.

**MANUELE ENGINEERS PTY LTD**  
16 Drury Terrace  
Clovelly Park SA 5042  
Phone: 08 8374 1680  
Fax: 08 8374 1685  
[www.manueleengineers.com.au](http://www.manueleengineers.com.au)







## MATERIALS DESIGN PERFORMANCE

Zoos are all about protecting the environment, and so is the company behind the new custom-made blinds at Adelaide Zoo. Verosol products have the highest Green credentials, including GECA accreditation, GBCA affiliation, Ecospecifier and OEKO-TEX Standard 100 certification.

Verosol manufactured and installed 15 sunscreen roller blinds for the Panda Viewing Pavilion, also a remote control projection screen, including head box and side channels. Verosol products were installed in the Conservation Centre and Theatre. The Gateway Entrance and Conference Facility now features 45 motorised twin multi-link roller blind systems – a total of 80 blinds - controlled by Dynalite BMS and wireless remote.

“The twin roller blind consisting of two blinds mounted on one bracket will allow for glare control, from the screen roller blind as well as room darkening from the blackout fabric for audio visual presentations.

“The specifications were for Somfy 50mm motors, fabric Veroscreen Charcoal Sable and Trezzini Blockout Pinto.

All blinds have been designed for fitting into Mdf pelmets, recessed for concealment.

Fabrics were selected for their glare control properties in this commercial application, with no more than a 7% openness factor.

“The challenge with custom made product like ours is the fast turnaround time frame. The design of some of the areas required

more thought to meet the designers brief, however it is product knowledge that makes each element unique. stated Glenn Chambers, Verosol Commercial Account Manager.

This points to another reason Verosol products are a sound choice: every component is of the highest quality and delivers long-term performance. The unique metallised fabrics have a demonstrated ability to reduce thermal loads, leading to significant ongoing energy cost savings. The Somfy motors are manufactured in France and they are used because they are ‘the best motors in the world’, according to Verosol SA State manager, Colin Huxtable.

“Across all sectors, from ordinary homes to multi-million dollar developments globally, Verosol is helping cut back carbon emissions and provide cool and shade for our warming planet.

Their products have been used in many of Adelaide’s leading 5 Star Green Star projects, including Citi Central, Tower 1&2, Santos House, Admiral House, Techport Hub, Air Warfare Destroyer Systems Ctr, and are available nationwide through specialist retailers and commercial dealers.

**VEROSOL AUSTRALIA PTY LTD**  
Unit 2, 482 South Road  
Kurralta Park SA  
t. 08 8297 1182  
f. 08 8351 1983  
e. colin\_huxtable@verosol.com.au  
www.verosol.com.au

**Verosol**



## PAVING THE WAY

Adelaide Zoo is not only a showcase for all kinds of animals, it is also a showcase of just about every way of laying paving. Master Paving spent six months supplying and laying granite, cobblestones, Urbanstone and brick throughout the zoo, from the entry to the new exhibits.

Their works included 250Lm of granite edging; 130m2 of muffin top cobblestones in a circular pattern mortared on a sand cement mortar bed; 2,800m2 of UrbanStone pavers 600x300x60mm ‘Black Pearl’ in a honed finish, all hand laid due to the sizes changing on different levels of the falls to garden beds and swales; and UrbanStone in 300x200x70mm size with a honed finish for 400m2 of trafficable areas.

“There was a lot of cutting, a lot of curved and wavy lines and we did a bit of everything on this project, from traditional paving to glue down on concrete,” said Master Paving Commercial Representative, Troy Carrigan.

“Up on the Terrace Level One, we laid pavers on VersiPave pedestals over the concrete slab, which elevates the paving above the slab allowing for drainage under the paving. The VersiPave is made from 100 per cent recycled plastic. It produces a level paved surface on a slope, with no need for grout and excellent drainage through the 2-3mm joint gap.”

A core team of three worked on the project throughout, and when work needed to speed up, the crew was bolstered. Master Paving have access to fifteen crews, so can handle projects of any scope; simultaneously with the Zoo project, they were at work on AAMI Stadium. They recently invested in a mechanical laying machine, capable of rapidly and safely laying large areas of paving for major

projects either in South Australia or further afield.

“Adelaide does the most paving of any city in Australia. Because of our reactive Bay of Biscay clay soils pavers are best suited, so more councils and Engineers are moving towards paving. Paving is far superior for life of the product to concrete and asphalt. King William Road has a 2.5 km paved stretch still in peak condition after 20+ years of service,” said Troy

Master Paving have over 25 years experience and access to all the latest Green rated products. Their talents extend to all hard landscaping features, Permeable Pavements, retaining walls including sleeper walls and segmented block walls, with reliable engineering expertise at hand for challenging projects.

**MASTER PAVING PTY LTD**  
Lot 1 Main North Rd  
Kudla SA 5115  
p. 1800 062 228  
f. 08 8522 6505  
e. sales@masterpaving.com.au  
www.masterpaving.com.au





## GRASS IS ALWAYS GREENER

Adelaide Zoo's new Giant Panda Arena is partly alive, with rooftop gardens and vertical gardens (Fytowall) provided by Fytogreen. Fytowall is an Australian-designed modular vertical garden system: low-maintenance, sustainable, water efficient and suitable for all sizes.

The Giant Panda Arena Fytowalls were established offsite, to provide instant foliage once installed. The exterior wall features native grasses, which are robust and low maintenance. The internal Fytowalls, wrap around a staircase have a wide range of ferns and indoor plants. With a total of around 185m<sup>2</sup> the Fytowalls has around 20-25 different species and over 4600 plants. Fytogreen provides a complete service from design to installation, on going maintenance and/or support for the Zoo's own onsite maintenance team.

"Since vertical gardens are new to the building industry we worked closely with Hindmarsh to ensure the Fytowall fits into the building as per Hassell Architect's designs. With all our projects we provide a consultative service with shop drawings to ensure a smooth installation. All vertical gardens need daily watering and power for the control box to operate timers. Fytogreen have systems to ensure all is operating constantly, so we can keep all the plants happy all the time," explained Fytogreen's Stuart Tyler.

Fytogreen also manufactures and installs extensive roof gardens, which cover a broad area not intended for public access, and provide growing media for standard intensive roof gardens. The Envirodome at Adelaide Zoo has both, 500m<sup>2</sup> of native grasses on a 100mm deep profile and the intensive roof garden hosts tents permanently pitched

on it for overnight stays by school groups.

Fytogreen (Australia) began business in 2002, supplying lightweight soils and growing mediums for intensive roof gardens, planter boxes and water saving soil amendments for landscaping contractors. In 2005 they began an on going research programme of vertical gardens, and developed the Fytowall system.

Since their first installation in 2007, the company has completed over 900m<sup>2</sup> of vertical gardens in most of Australian state capitals and overseas in Europe, Dubai, and USA.

"There is a lot of research to be done into how Fytowalls can provide benefits for sustainable building practice including insulation and reducing reflective heat, light and noise. At ANZ Docklands there is 160m<sup>2</sup> of vertical garden above the airconditioning intakes, and we know the air passing through the garden is cooled by up to 10 degrees on days above 35 degrees. This will assist in reducing the energy costs for running the air conditioning, we are yet to know by how much," said Stuart.

**FYTOGREEN (AUST) PTY LTD**  
3 Webbs Lane  
Somerville VIC 3192  
contact Stuart Tyler  
t. 03 5977 9645  
f. 03 5978 0744  
m.0407 818 074  
e. styler@fytogreen.com.au



## HADEN COOL' N ROCKS

Since Haden Engineering began operations in Australia over 40 years ago they have designed, installed and maintained leading edge air conditioning systems in a diverse range of buildings, from The Port Hedland Hospital in WA to the Greenstar rated Australian Taxation Office in Canberra. But as projects go, keeping pandas cool rates up there with chilling sharks as one of the more peculiar projects Haden Engineering have had the opportunity to work on. "The South Australian climate is much hotter than the pandas' natural environment, so great effort has gone into ensuring they will not suffer from the hot, dry conditions", explains Mark Stevenson of Haden's Adelaide operation. "To accommodate this, we have cooled the enclosure in two ways: an air handling unit services the day rooms while the actual enclosure is cooled using five large, chilled rocks spread around the periphery of the area."

While the rocks may look like they're natural they are actually moulded from glass reinforced concrete. Inside each rock is a copper coil supplied with water chilled at 6 degrees and a temperature sensor which is used to maintain the temperature to approximately 10 degrees. This provides a constant source of cooling and will allow the pandas to move freely from the air-conditioned enclosed space of the day rooms to the outdoors enclosure in relative comfort. And when the heat is really on, they can lounge about on the rocks to cool down.

Haden's engineering team are accustomed to working on complex and diverse briefs, keeping sharks cool with chilled water in Sea World's Shark Bay installation, and maintaining the HVAC systems for the Australian Antarctic Division's laboratories and krill tanks.



While Haden's current projects may be a little more mainstream, they are at the cutting edge of sustainable solutions, including the Port Hedland Hospital Regional Resource Centre, William McCormack Building (Cairns), 420 George St (Sydney) and Macquarie University's C3 (Library). Haden's in-house BMS capabilities provide customers with a one-stop shop for improving the energy efficiency of their installations.

With over 37 branches across Australia, Haden continues to be Australia's leading provider of non-residential air conditioning maintenance services.

**HADEN ENGINEERING**  
Unit 6-10, 38-46 South Street  
RYDALMERE NSW 2116  
contact David Andrews  
t. 02 9947 7906  
e. dandrews@haden.com.au  
www.haden.com.au

**HADEN**





## FORM TO SUCCEED

Creating curves out of straight lines with a high quality finish, in concrete, is a big ask. Mitcon Formwork (part of the Mitolo Corporation) answered the challenge at Adelaide Zoo, during the process of constructing the concrete structure for the new Panda Pavilion and Panda Day Room, Entrance building and hard landscaping features including water features, a pond, walkway and bridges. Mitcon also constructed the core shafts, including stair shafts, using Startec Formwork Systems supplied by Novatec Construction Systems

Upstand walls, including the perimeter Entrance Wall, comprised class 2 off form concrete walls and columns which took approximately 5000 square metres of formwork. A crew of fifteen Mitcon workers were onsite from February to December 2009, and put 10,000 manhours into the job.

Along with the curves in the structure, the raking floor was another tricky aspect. Mitcon's experience, built up over a quarter of a century in the trade and coupled with leading formwork technology, resolved these challenges.

Founded in a partnership between two brothers, Paul and Mimmo Mitolo, the company's established reputation for delivering construction concreting packages, on or ahead of schedule, is matched by an exemplary safety record.

Mitcon pre-fabricate as much as possible at their St Agnes workshop to reduce noise, waste and additional manpower on site. They take special pride in their ability to perform hard construction tasks in sensitive areas, while ensuring the safety of those both on and around the site, be they humans or rare and exotic animals.

With a staff of 60 including carpenters, labourers, accountants, draftsmen and engineers, and preparedness to roster crews for whatever

shifts a project requires day or night, Mitcon are capable of servicing projects Australia wide.

"Our connection with Novatec Construction Systems commenced 10yrs ago, allowing us to take advantage of new technologies that would make formwork safer and more efficient using less labour. This improved our abilities in project delivery," said Paul Mitolo.

"Novatec Constructions Systems have commenced the hiring of this equipment in South Australia, New South Wales, Queensland and of late, in Western Australia, with the growth of the mining industry."

Some of the recent South Australian projects given form by Mitcon include Adelaide Airport for Hansen Yucken, City Central Tower (Early Works/Superstructure) for Baulderstone; Port River Bascule and Roadbridge for Abigroup; Tivoli Hotel in Adelaide, for Built Environs; Flinders Medical Centre Redevelopment, Hallett Cove Shopping centre, for Hansen Yuncken; Adelaide University – New Engineering Building, for John Hindmarsh, and Bay Junction Shopping Centre for Marshall & Brougham

**MITOLO CORPORATION PTY LTD**  
**MITCON FORMWORK**  
**NOVATEC CONSTRUCTION SYSTEMS**  
 184 Smart Road  
 St Agnes SA 5097  
 t. 08 8265 9999  
 f. 08 8265 9911  
 contact. Paul Mitolo  
 e. [construction@mitcon.com.au](mailto:construction@mitcon.com.au)

## SCORING A CHORUS

While working on the Adelaide Zoo project, P.G. Enterprises were very careful not to disturb the animals. Some of the animals though, were more than happy to disturb the workers.

"There were some birds which were very good imitators," said PGE's Managing Director Peter Little. "When workmen went on their breaks, they thought they heard the equipment running, so they would go and investigate. It would actually be the birds in the cage next door, imitating all the construction noises."

The Zoo project included the new panda enclosure and the front entrance upgrade and extension. PGE carried out demolition, tree removal and earthworks. This included demolishing existing retaining walls, shed, and concrete hardstand to the fence line along the River Torrens; and demolition of existing walls, bitumen paving, gates, turnstiles and other elements of the service entrance. PGE also arranged removal of selected trees, undertaking the removal of root balls and backfilling of voids, along with protection of trees being retained.

PGE did not just demolish, they also created mini mountains, water features and moats for Funi and Wong Wong, SA's two new panda residents. "This was interesting work" said Peter Little "to witness a flat area of ground transformed into a mountain side complete with forest, running streams, and of course bamboo".

Other works undertaken by PGE crews included new retaining walls around the Zoo perimeter and providing Gabion walls. More mundane but necessary tasks included preparation and compacted base course under block and concrete paving, excavation and provision of base course and backfilling.

The works program was undertaken over 12 months by up to three PGE crews at a time. Being a company which prides itself on a loyal, close knit team was an advantage on the congested site where numerous trades had to work around each other, without endangering patrons of the Zoo, which remained open throughout.

During the first 8 months of the Zoo project, PGE were also completing construction works at Hallett Cove Shopping Centre, in addition to commencing works at Flinders Medical Centre and University and numerous BER projects. PGE have been certified with DTEI since 2006 in recognition of their high level of competency in the core aspects of Integrated Management Systems, Environmental Control, Strict OH&S criteria and Quality Assurance. They have Pre-Qualification Registration status to Category 2, which allows them to tender on large Government projects.

PGE were winners of the Safework SA Best Workplace Health and Safety Practices in Small Business in 2009.

After three decades providing South Australian projects with their civil engineering expertise, PGE have earned an enviable reputation for excellence, undertaking a range of work which is in a class of its own. Whether it is bulk excavations, close work in or under buildings, or working alongside exotic animals, PGE have what it takes to accomplish project goals.

**P.G ENTERPRISES PTY LTD**  
 PO Box 369 Blackwood SA 5051  
 t. 08 8278 7979  
 f. 08 8370 2950  
 e. [civilworks@pgenterprises.com.au](mailto:civilworks@pgenterprises.com.au)



## THE PERFECT FIT



**F**it out for Australia's most famous foreign bears, the Giant Pandas at Adelaide Zoo, was one of the latest achievements for John Arnold Shopfitters. They specialise in all aspects of shopfitting for the retail sector, as well as commercial fitouts from time to time and can now add Zoological facility to their project list, having installed all the bamboo to the Day Room 1 and 2 ceilings. They also installed the ceiling for the public area, sliding screens and circular columns.

All 14 of the company's staff worked on the project, which was completed on time, and without difficulty. John Arnold Shopfitters tradesmen are highly experienced not only in ceiling installation but also carpet, floor tiles, painting, electrical, plumbing, joinery and glass. "We do shop fitting Australia-wide, and all types of joinery. Our skills are unlimited and we travel anywhere," said Company Founder and Managing Director, John Arnold.

Other showcases of their skills are Leading Edge Jewellers at Mount Barker, Wendys, Brock Harcourt Offices, Swiss Glory at Burnside, Diamond Cameras at Tea Tree Plaza and Radio Rentals at West Lakes and Mount Gambier.

### JOHN ARNOLD SHOPFITTERS PTY LTD

14-16 Regent Street  
Melrose Park SA 5039  
p. 08 8277 8622  
f. 08 8277 3765  
e. jashopfitters@internode.on.net



## SIGN LANGUAGE

**OPTION [a]** is the first choice for any project wanting distinctive, award-winning custom signage. This Adelaide-based company has manufactured and installed graphic products for all manner of projects, including most recently the new entry to the Giant Panda's exhibit at Adelaide Zoo.

This was not the first commission **OPTION [a]** has completed for the Zoo, one of the company's many long term clients. Some other long term repeat customers include Hansen Yuncken, Built Environs, Boulderstone, Hindmarsh, Hassell, Woods Bagot, MPH, Woodhead, Hardy Milazzo, Walter Brooke, Coffey Projects, Schiavello and ISIS.

No assignment is too vast, as proven in 2008 when extensive signage was completed for Ilkurlka, within the 55,000 km2 Spinifex Aboriginal Lands National Park in Western Australia. It is also interpretative signage by **OPTION [a]** which guides tourists around the base of Uluru in Kata Tjuta National Park. Adelaide's Botanic Gardens, the River Torrens/ Riverbank Promenade, Wilpena Pound Resort, Adelaide Oval and the Roma Mitchell Performing Arts Centre also feature their handiwork.

**OPTION [a]** can provide full signage fit outs for any type of project, from the corporate identity at the top of a building, to the exit signs, as they did for SA Water, Network 10, and many other total fit-out projects.

With a team of dedicated specialists, **OPTION [a]** is devoted to providing versatility in product and services to national and multi-national corporations, Government departments, architects and construction companies, particularly in the area of design and construct type signage projects, where working to a budget is extremely important.

"We appreciate good design" said Director, Don Prime.

**OPTION [a] PTY LTD**  
151 Goodwood Road,  
Goodwood, SA 5034.  
p. 08 8373 3502  
[www.optiona.com.au](http://www.optiona.com.au)



## BIG BROTHER MEETS GIANT PANDA

**L**ike true stars, the Giant Pandas at Adelaide Zoo will have their every move monitored for adoring crowds by leading-edge AV technology, supplied and installed by AV Central South Australia, SA's only Sony dealer for professional and broadcast products, and the State's leading audio-visual integrator.

AV Central's contribution to the Adelaide Zoo begins at the front entrance, with a digital signage system comprising large LCD displays and for the forecourt, audio systems installed in the posts which broadcast soundscapes. AV Central also installed a Public address (PA) system in the front entrance area, and LCD projectors, screens, microphones, PA and AMX control system in the new Conference Centre. In the Zoo's new Conservation centre, AV Central installed a PA system and digital signage for the multipurpose area, and a High Definition projector, AMX control system and an induction loop to ensure audio is accessible for the hearing impaired in the theatre.

"Everything has been designed to be as flexible as possible, and easy to use for non-technical staff," said AV Central's David Chatfield. "We acted as a consultant in the early planning stages of the project, and advised the Zoo, the architect and builder on AV equipment and system design for the Front Entrance, Giant Panda Exhibit and Conservation Centre"

The Giant Panda Exhibit has audio systems which allow the keeper to give presentations no matter where the pandas are in their enclosure, by use of PA systems and distributed audio covering both indoor and outdoor visitor areas. The Panda day rooms, the main exhibit, has an AV system designed for corporate events and public viewing, and a projection system with remote control camera systems controlled by Zoo staff and volunteers giving enclosure-wide

coverage. The AMX control system AV Central installed as part of the package has a touch screen which makes controlling the PA and selecting audio zones easy.

AV Central South Australia is an independently owned and operated South Australian company, which began operations in 1987. They are leaders in the Audio Visual field, both in terms of the size of jobs undertaken and the quality of their work, specialising in Audio Visual System design and integration, Digital Signage Solutions, Videoconferencing, Video and Audio Production equipment.

Other major projects they have applied their expertise to include the University of Adelaide's new Engineering Building, installing a Comprehensive AV System across 7 levels, a complete Audio Visual fit out for SANTOS at their Flinders Street headquarters and the Public Address system at Adelaide Airport. They are also supplying and installing a Complete AV System for five conference rooms incorporating digital signage, public address, projection and control system for the Crowne Plaza Hotel, currently under construction.



### AV CENTRAL SOUTH AUSTRALIA

41 Magill Road  
Stepney SA 5069  
t. 08 8124 7777  
f. 08 8124 7771  
e. [info@av-central.com.au](mailto:info@av-central.com.au)  
[www.av-central.com.au](http://www.av-central.com.au)





## WORK EVERYONE WALKS THROUGH

When architects want specific doors, Woodpend Projects provide and install them. For the Adelaide Zoo project, doors were required to be installed in areas including the Panda Enclosure, Zoo Shop and Café, Ticketing area, Convention Centre Level 1 and the Conservation Theatre.

“Clearly the concept of keeping the doors as part of the wall was the biggest challenge. The Architect wanted to achieve clean lines throughout the job, so that most doors were installed as a concealed pivot system, aligned with the outside wall face,” said Woodpend Project Manager, Damian Ryan.

“The timber doors were sought from a door manufacturer which produced a door with concealed or reversed edge strips to give a clean smooth surface, with no joining definitions to the face of the doors.”

In-house, Woodpend undertook the joinery of the Full Glass Timber Doors, special Veneer facings and the routed faces, as per the architect's specifications and design. All timber used was FSC certified.

With over twenty years hardware and door manufacturing experience, Woodpend can supply and install metal clad, timber and fire rated doors; timber and pressed metal frames; door related hardware items; and also have Locksmiths and Carpenters providing Master Key Systems and Door and hardware installation. They can handle numerous projects concurrently, providing Project Management, Administration, Procurement and Tracking, Site Management and coordination, complete with Site Installation.

**WOODPEND PTY LTD**  
61 Goodwood Rd  
Wayville SA 5034  
p. 08 8357 3530  
f. 08 8357 3537

## A CLEAR VIEW AT THE ZOO

Creating the perfect home for the Giant Pandas at Adelaide Zoo sent Architects Hassell around the world gathering inspiration. When it came time to design and construct the bamboo forest environment, they were able to find the ideal specialized glazing materials right here in Australia, manufactured by Viridian.

“Glass was integral to the design. The need for clear sight lines ruled out materials such as mesh and timber. It was also imperative that the design and materials provided adequate security,” said Hassell Architect, Timothy Horton.

Construction Glazing undertook the glazing, making extensive use of Viridian's products: Point fixed Low E Toughened laminated insulating glass units for the Panda Day Rooms; 12mm toughened glass for the outdoor viewing screens areas; 17.52mm clear toughened laminated glass for the viewing pavilion; and ComfortPlus Low E laminated glass for the Entrance Building.

“We had worked on the Zoo's tiger and orangutan exhibits a few years previous so we had some idea of the type of things that needed to be considered,” says Construction Glazing's Marc Kovacic. “Our involvement began at the design stage of the process and we were able to offer advice on glazing methodology and what glass types would provide the best outcome.”

Open dialogue with between the architect and the glass manufacturer helped crystallize the possibilities and maximize the creative potential

of glass in the final design specifications. The design team also needed to address condensation, thermal and acoustic needs, and it was determined that Viridian Low E toughened laminated insulating glass units were best suited to balance all of the requirements.

“The Viridian Point Fixed IGU's best suited the architects' brief utilising a less obtrusive structural glazing system than the traditional glazed framing techniques, with the thermal performance that an IGU provides,” said Viridian Spokesman Steve Ketzer.

Viridian is certified to Environmental Standard ISO 14001, and was the first manufacturer to sign a sustainability covenant with the EPA. This signals their commitment to green manufacturing processes, and ongoing development and support for products that make buildings more energy efficient, such as the Low E glazing for the Adelaide Zoo. Clearly, Viridian glazing products look to the future of everyone's habitat.

### VIRIDIAN NEW WORLD GLASS

Branches throughout Australia and New Zealand  
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