



'In 2009, we embarked on a journey to design a ground-breaking health facility. The design needed to be functional for health care delivery but also present an aesthetically pleasing presence within the surrounding urban landscape. With an experienced management, design and bid delivery team, the design, construction and operational methodology was formed into what you see today.

The success of a project of this scale can only be achieved by ensuring that policy and procedures are in place to coordinate and implement the build. With over 80 different stakeholder groups and over 500 user group meetings executed, facilitating 300 submissions for particular packages of works, having the right procedures is paramount.

We utilised BIM as the principal tool for the management of data with respect to design and program. This enabled design development to address many of the complex building elements required in this facility. The hospital has been designed to withstand earthquakes and extreme weather events, with ground anchors and other construction features able to withstand seismic loads due to earthquake motion. Horizontal or vertical forces generated by wind or other environmental conditions are also accommodated for in

the design. The on-site power plant and the water storage tanks have also been designed with inbuilt redundancy to enable the hospital to continue to function if a piece of equipment fails.

Taking occupation of the site in June 2011, the first of our site amenities was established and the team cleared the remnants of the existing rail yard. By the end of 2012, ground works were advanced, drilling of 2,000 piles was underway, our first ground slab had been poured and we had erected the first of eight tower cranes. By 2013, the site had become a sea of structure, formwork, tower cranes and concrete. In the basement, we achieved our first services milestone with the delivery and installation of the hospital's cogeneration plant.

Activity on site in 2014 saw close to 2,000 people on site each day. Work within the lower levels had advanced with the commencement of wall partitions, electrical, plumbing and services now clearly formed. It was during 2014 that we reached our biggest structural milestone, the final Level 10 concrete pour and topping out of the building's structure. Focus now shifted from external to internal.

Progression through 2015 saw us peak at over 2,500 people on-site, the removal of our last tower crane and the completion

of our first internal area. Planting of 85,000 plants commenced, the installation of 10,000 facade panels was concluding and we achieved our first electrical link up to the outside world.

In the first half of 2016, we achieved an incredible amount of work and the feedback we received from members of the public and staff at the Royal Adelaide Hospital is nothing but positivity and amazement. It's not just about the exterior, which blends into the urban landscape and sits seamlessly with the South Australian Health and Medical Research Institute (SAHMRI), but also the well-thought-out integration of health design, interiors, landscaping, lighting, artwork, wayfinding and technology.

Over the past six years, we have faced a number of challenges, both predicted and unforeseen, but it's the manner in which we have overcome these challenges that is testament to the level of passion, dedication and expertise of our people.'

— Peter Salvesson, CEO & HYLC Development Director

New Royal Adelaide Hospital

The scale of the \$2 billion new Royal Adelaide Hospital (nRAH) cannot be overstated. It is the single largest building infrastructure project in South Australia's history and the most technologically advanced hospital ever built in Australia. It is the country's most seismically resistant building, designed to withstand and remain operational through a '1 in 500 year' earthquake. It is also among the world's most sophisticated health buildings, with its focus on a patient-centric model of care, and extensive and innovative ICT systems that provide the backbone for a new breed of 'digital hospital'.

At the genesis of the project, Hansen Yuncken formed a joint venture with Leighton Contractors (now known as CPB Contractors) to establish HYLC. Hansen Yuncken provided the Project Development Director, the Commercial Manager and the Design Manager positions during the project. Reflecting international best practice in hospital design, nRAH was the first project undertaken in Australia to implement the integrated and collaborative Building Information Model (BIM) in such complexity and scale, with collaboration of all design consultants and subcontractors from the

outset to collate and manage data for the benefit of design and the project. As a result, HYLC was able to undertake new and sophisticated planning and construction processes. Many of the new-found skills were driven by Hansen Yuncken's innovative agenda for digital construction processes.

This mammoth project involved thousands of people (including more than 200 from Hansen Yuncken) working millions of hours over a challenging six years. The new Royal Adelaide Hospital is an enormous accomplishment for the joint venture team of HYLC, and all involved.

Opposite: SA State Manager Mark Rosenboom in front of the completed new Royal Adelaide Hospital.

Overleaf: HSE Manager David Lynch and Project Engineer Craig Holm during construction of the hospital.

Photos: Anthony McKee (opposite), Steve Rendoulis (overleaf)

'There are projects within an organisation's life that are game-changers for the business. The new Royal Adelaide Hospital has been that for Hansen Yuncken. It took us to new levels in management, technology and logistics planning. It developed our people to a high level, and we found and nurtured new talent along the way. This massive project, with all its complexity and challenges, and its six years of focus and dedication by the construction team, was truly an amazing endeavour.'

— David Beslich, Chairman/Executive Director & HYLC (JV) Chair



The Building

175,000 square metres of accommodation
30 individual departments
700 large single overnight rooms
100 day beds
40 technical suites
70 ED treatment spaces
60 ICU rooms
3 quarantine rooms
Post-disaster capable (island mode 48 hours)
2-bay helipad
25 AGV 'robots' to move up to 1,800 trolley movements per day
4 Star Green Star rating
More than 70 internal courtyards, gardens, balconies and terraces
2,300 car parks
300 bicycle parking bays

Materials

12,960 tonnes of concrete
2,500 tonnes of structural steel
40 kilometres of partitioning
10,288 facade panels
85,000 plants

BIM

200 people working on the design proposal simultaneously
176,000-square-metre building divided into 19 sectors (all acting as standalone projects)
450 Revit models
11,107 room spaces
4,000,000+ 3D objects
450 user group meetings
viewing design in 3D
80GB model data handed to facilities manager, Spotless, on completion

People

2,500 people on-site at project peak
Over 3,500 people in the project community
Over 24,000 people inducted onto the project
88 consultants
209 subcontractors
14,598,044 man hours worked

'The new Royal Adelaide Hospital is one of the most technologically advanced hospitals in Australia. The design integrates automated guided vehicles, wireless technology and equipment with tracking capabilities, dispensing robots in pharmacies as well as the use of wireless patient-nurse call systems. Significant coordination between consultants, trades, suppliers and manufacturers was necessary to ensure the facility fully accommodated the interface requirements.

At the beginning of the project we had an opportunity to collaborate across many industries and adopt an innovative fully integrated digital solution for the whole project life cycle. The ICT systems are characterised as being any system sitting on the converged wired and wireless ICT network. The network itself is the largest campus style rollout in Australia. It is not only the size that makes it different, but the way it was designed and implemented in parallel with the construction process.

To meet the requirements of an aspirational output brief, we assembled a team of best of breed providers to develop a system solution. We were able to deliver coordinated design documentation, ensuring it was a holistic consideration in the building's design. We developed a risk reduction approach to our testing and commissioning during the design phase to validate our design, and we continually engaged with multiple stakeholders across all facets of the ICT functionality.

Throughout the project's life cycle, the team has developed strong skills and processes in ICT and integrated systems management in order to address the requirements of the nRAH. Our team has become thought leaders in management of risk, design, installation and delivery of complex, challenging and integrated ICT systems.'

— James Redwood, ICT Director

Right: Meeting the complex ICT and technological requirements was a major part of the nRAH project.

Opposite: The HYL C team, a consortium formed between Hansen Yuncken and Leighton Contractors (now CPB Contractors) to build nRAH.

Photos: Drew Lenman

'Our Fixtures, Fittings and Equipment (FFE) Team were responsible for procuring and installing more than 200,000 items for the new Royal Adelaide Hospital – including every light fitting, switch and chair. It was a mammoth undertaking.

We started with a very basic list, which evolved through design development, user selection and preferences, functionality, infection control needs, compliance with standards and specifications, OHS requirements, satisfying the designers and satisfying the commercial manager. At times it seemed a never-ending process. Then the fun started with procurement to source the best product and the right price. With many and varied items we had packages that ranged from single items like an altar for the chapel, to thousands of chairs, or complex systems of equipment for the sterilising department.

There were about 100 separate packages, each needing careful attention to specifications and quantities. Needless to say, there was an enormous number of questions to answer, and countless hours of negotiations.

To ensure everything was installed in good time, without a big rush at the end of the project, each area was fitted with FFE as the fitout team completed it. Fixed items were installed towards the end of the fitout period, and then loose furniture and equipment were installed after the builders clean.

We shopped local where we could. The patient chairs – almost as important as the beds – were procured in Adelaide. Some patients may spend more time in this chair than in their bed. It has to be adjustable to meet clinical needs, easy to clean, and easy for the nurses to move around – and very sturdy with a SWI of 250 kilograms. Fortunately, a group in Adelaide was able to work with a local manufacturer to refine an existing design. It was just what the client wanted, and came at the right price! It was an FFE success story!

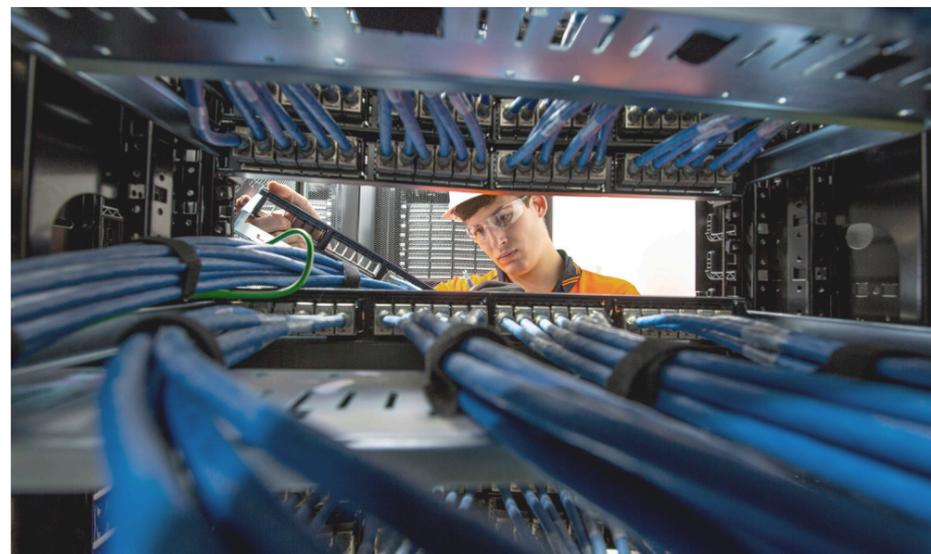
It's not surprising that a lot of the more technical equipment was imported from Europe, which meant ordering well in advance, and close communication to make sure the right equipment was coming, and that the right space and services were available when it arrived for installation and commissioning. Working with the designers, we determined what went in where, and working with the construction and fitout program, we determined when.

Without the FFE, this is just a building. FFE makes it a hospital, and the FFE team make it a good hospital!

— Robyn Ritchie, FFE Coordinator

'A hospital is basically equipment with a building surrounding it. If you don't have the right equipment, you don't have a hospital. It's crucial.'

— Chris Pratt, former National Development Director



'It's not very often you get to build something that's going to serve multiple generations of Australians. People worked incredibly hard and put in enormous effort. They were passionate about it.'

Peter Salvesson, CEO & HYL C Development Director