

NSW PROJECT FEATURE

NORTHERN BEACHES HOSPITAL

CPB Contractors / Sydney



THE EPITOME OF HEALTH CONSTRUCTION



DEVELOPER : Northern Sydney Central Coast Health and Healthshare NSW
MAIN CONSTRUCTION COMPANY : CPB Contractors
ARCHITECT : BVN Donovan Hill
STRUCTURAL ENGINEER : Aecom Cost Consulting
CONSTRUCTION VALUE : \$600 million

The \$600M Northern Beaches Hospital is the first 4 Star Green Star hospital in New South Wales. The modern, 9-storey world class development contains 488 beds, a 50-space emergency department, support infrastructure, a helipad and 1,400 carpark spaces.

In December 2014 the NSW State Government contracted Healthscope, one of Australia's leading private healthcare operators, to deliver the Northern Beaches Hospital. The development is a ground breaking project for New South Wales as the state's first healthcare operator led public-private partnership, and the state's the first 4 Star Green Star hospital. The building project is a joint venture between Healthscope and major construction company CPB Contractors.

Set on a 6.5 hectare site at Frenchs Forest in the northern suburbs of Sydney, Northern Beaches Hospital is a 9-storey building providing clinical and non-clinical support services for both public and private patients. It comprises 488 beds, a 50 space emergency department, 14 operating theatres and six surgical suites as well as modern intensive care and critical care units, and inpatient mental health and training facilities.

Northern Beaches Hospital also houses state-of-the-art digital technology solutions including equipment for modern medical imaging; real time location systems for medical equipment and utensils; a microwave line-of-site link for transfer of large medical imaging files as well as wandering technology for mental health patients.

The hospital is set to use 15% less power when compared to other facilities of the same size and function, due to the integrated Energy Management System put in place. A cogeneration base load plant was installed, with the capacity for modular expansion,

contributing to reduced capital and maintenance costs.

In January 2015 CPB Contractors started the concept design of the \$600 million development which included 70,000m² of hospital space along with 40,000m² of parking and a rooftop helipad. The complex also boasts campus wide roads and bike paths, retail tenancies, café and outdoor eating areas.

The main building, surrounded by landscaping, has a spectacular light filled atrium at the entrance, natural wood panelling throughout the interior and individual rooms that offer sweeping views across Middle Harbour to the city.

During the three year build CPB Contractors set new benchmarks for large scale construction projects across many fields. The project required negotiation with a network of infrastructure authorities; considered planning of the environmental features of the greenfield site; and the integration of stakeholder and local community needs.

A major challenge of the construction involved identifying and segregating hospital works from RMS works and continuing coordination with the RMS. Road building projects were in progress at three of the site's boundaries and site access and egress had to be coordinated with existing infrastructure. CPB Contractors worked with the RMS to finalise the design of boundary levels, road geometry and stormwater paths as well as the concurrent upgrade and connection of sewage, telecommunications, water and natural gas supplies and high voltage electrical upgrades.

Existing public roads around the site carry 130,000 cars per day and a high school on the western boundary contributed to flow of vehicular and pedestrian movement. CPB Contractors dealt with this challenge by creating a signalised intersection at the entry to the site, including digging 4kms of trenching through an RMS site to match established traffic switching methodology.

Significant traffic movement within the construction zone was dealt with by



Below Northern Beaches hospital is set on 6.5 hectares in Frenchs Forest and contains 14 operating theatres and six surgical suites.

constructing loop roads for the movement of materials around the site and establishing an offsite truck staging area. Planning the deliveries was a key factor too, especially for the movement of many concrete trucks. To minimise traffic impacts CPB Contractors employed the innovative solution of using two concrete plants, one to the east and one to the west of the site, so that concrete trucks travelled against the peak hour flow of traffic.

CPB Contractors scope of works also included obtaining environmental approvals which involved working closely with the local council as well as the Department of Planning and Environment. A concern at the greenfield site involved the control of stormwater and a comprehensive stormwater management plan was devised early in the project. CPB Contractors constructed a stormwater system with permanent detention tanks to act as sediment basins to minimise flooding risks to the local area.

The critical interface with the high school on the western boundary of the site was dealt with by CPB Contractors by monitoring and controlling noise and air quality. Acoustic hoarding was put in place, construction work scheduled around school exam periods and a final configuration of roads allowed service vehicles to use the hospital road infrastructure.

CPB Contractors used cutting edge technology to improve design collaboration between stakeholders using BIM and introducing the room data sheet system dRofus which has since become standard practice on all NSW Health building projects.

For such a large project a major logistical challenge was the limited number of workers available. Concurrent excavation of the hospital and carpark was scheduled and the sequential construction which followed ensured maximum efficiencies.

Yet the construction of the Northern Beaches Hospital exceeded all expectations with major programme targets and an Interim Occupancy Certificate achieved months ahead of schedule.

CPB Contractors' contribution to the construction industry's safety standards

and training achievements are also of note. Over the three year construction period a peak workforce of 780 personnel worked over 2.5 million hours and CPB Contractors achieved an outstanding level of onsite safety performance with no serious incidents or injuries.

Particular attention was paid to the operation of mobile EWPs. By introducing new operating procedures and implementing an innovative riser construction sequence, CPB Contractors was able to minimise the major safety risks associated with mobile EWPs and virtually eliminate fall risks for workers.

CPB Contractors also exceeded targets for workplace participation in training by achieving a 23% worker involvement and by creating over 700 jobs.

The construction project employed six undergraduate builders, engineers and architects and contributed to two post graduate studies, 44 apprenticeships and traineeships as well as undertaking 62 vocational courses. Mental health training was provided to over 1,000 people to deliver mental health awareness objectives and access to mental health professionals. CPB Contractors also provided additional training for onsite workers to maximise safe working procedures in regards to mobile plant, working around services and working at heights.



Another significant factor of the development was the comprehensive stakeholder and community relations strategy put in place. Over 130 meetings were held to determine specific requirements of end users and implement their needs.

The CPB Contractors team had to determine clinical functional requirements within the design, especially in relation to fittings, furniture, fixtures and equipment. Site tours were offered to over 2,000 people including community groups, local health professionals and nursing staff who were considering transfers to the new hospital. CPB Contractors became involved with the local high school, participating in fundraising events as well as providing career advice and work experience placements for students.

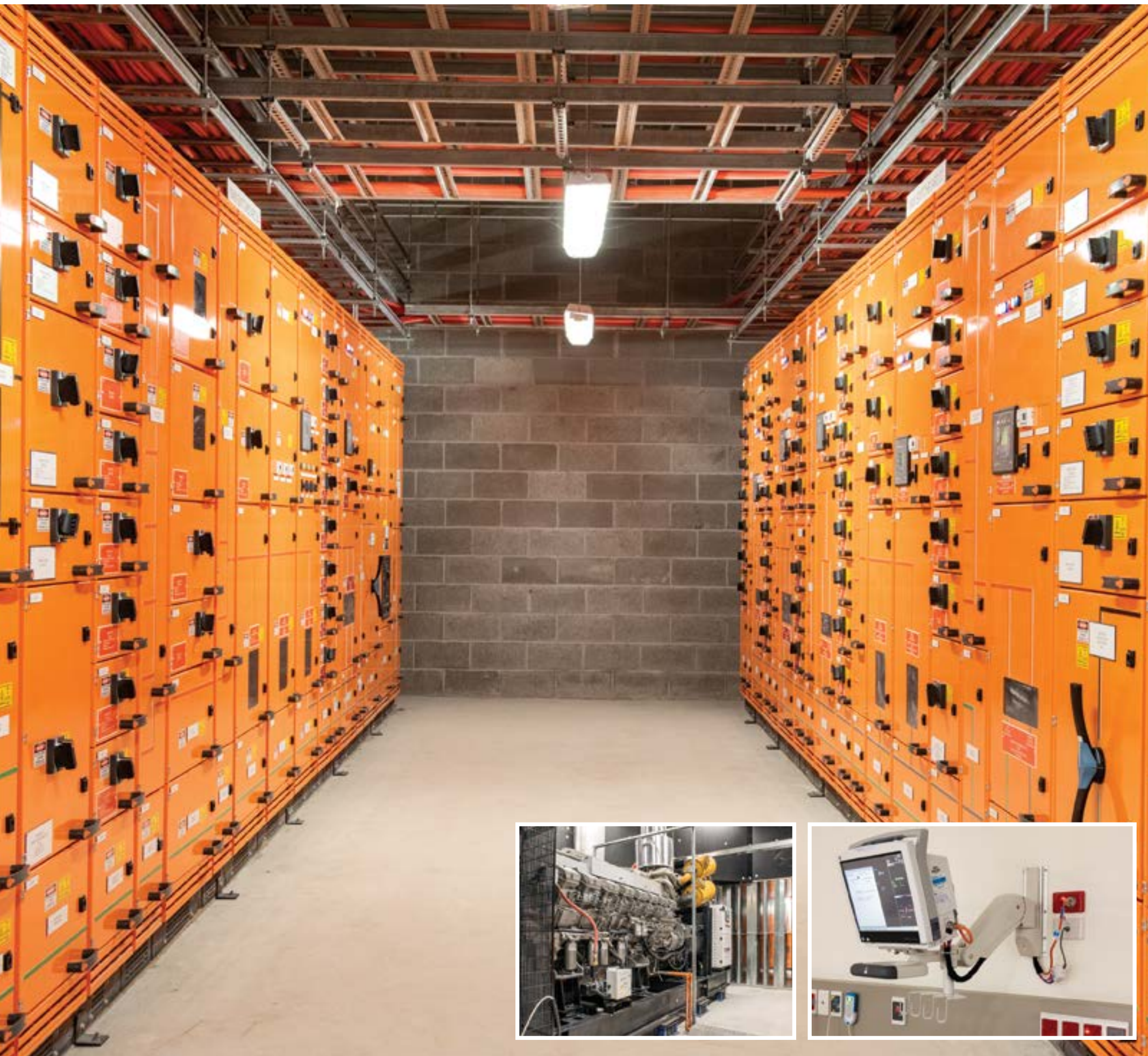
The Northern Beaches Hospital opened to great acclaim in October 2018. The outstanding building, one of six nominees for 2018's Australian Construction Achievement Award, is a highly considered addition to NSW healthcare services.

For more information contact CPB Contractors, Level 18, 177 Pacific Highway, North Sydney NSW 2060, phone 02 8668 6000, fax 02 8668 6666, website www.cpbcon.com.au

For more information contact Healthscope, Level 1, 312 St Kilda Road, Melbourne VIC 3004, phone 03 9926 7500, fax 03 9926 7599, website www.healthscope.com.au



Below Star Group provided the electrical and communications infrastructure including lighting, security systems and the Distributions Antenna System.



Star Group specialises in the delivering of electrical engineering and installation services. Star Group was contracted by CPB Contractors to design and construct detailed, state-of-the-art electrical, high voltage and communication services throughout the Northern Beaches Hospital complex.

In early 2015, Star Group's team of 10 started designing the electrical infrastructure that included the lighting control, nurse call, audio/visual and security systems as well as the Distribution Antenna System (DAS), lightning protection, diesel generator and co-generation systems and high voltage services. Onsite work started in June with 130 tradesmen excavating trenches, laying cables and installing electrical hardware inside the new building. Star Group completed the contract by the end of July 2018.

"The challenge of the job involved the installation of the high voltage cables," said Construction Manager, Anthony Greenaway. "There was 1.6km of cabling to be laid for connection to a nearby substation and we had to dig trenches alongside roads with a high volume of traffic."

"We also developed a new method for constructing the Medical Service Panels (MSPs) that were fitted behind patient beds," Anthony explained. "Our inhouse engineers worked with our suppliers to design a modular system so the panels could be prefabricated. With 2,500MSPs required we certainly reduced the amount of onsite work, especially as 45 different types of panels were needed to service the different wards."

Founded in 1957, Star Group is a privately owned company employing 350 personnel. They offer consultation, design engineering services and construction of new systems and upgrades as well as ongoing service and maintenance. Star Group is a Sydney based company with six regional offices located along the eastern seaboard of Australia and is accredited with both Ausgrid and Endeavour Energy to deliver both high and low voltage electrical infrastructure services nationwide.

Star Group provides design and installation for infrastructure cabling, with both fibre and copper, for active network systems, carrier lead ins services, wireless access points and Ethernet installations. They also carry out infrastructure audits, testing and certification and offer IT support.

For substations Star Group offers supply, installation and commissioning including excavation, conduit and cable jointing for double and triple chamber substations, construction of underground and overhead cables and cable support systems as well as high voltage switchgear, street lighting and power upgrades.

Star Group's work for water and treatment plants covers the design and installation of earthing systems and low voltage switchboards, comprehensive thermographic testing and instrument calibration as well as maintenance of switchgear and pumps. The company adheres to stringent national health regulations to ensure their construction and maintenance processes don't impede the plant's ability to treat and deliver water and sewerage services.

Star Group works across a range of sectors such as the communications and data industries, educational, commercial and residential developments as well as rail infrastructure. The company install electrical hardware for road networks, power and gas utilities, industrial and manufacturing plants and materials handling facilities.

Health care projects for Star Group include a four year long contract for CPB Contractors at the Royal North Shore Hospital started in 2008. "We've been working for CPB Contractors for over 15 years," said Anthony. "Star Group are one of their preferred contractors."

Star Group recently completed the electrical and communications infrastructure including the lighting and switchboards at Wynyard Walk, a tunnel running between Barangaroo and Wynyard station.

Within the mining and resources industry Star Group work at quarries, coal, oil, gas and metalliferous mines. In 2015 they completed a 15 month long job at Boggabri Coal Mine installing electrical infrastructure, lighting for tunnels, controls for conveyors, crushers and feeders, ventilation fans and air flow monitors.

For more information contact Star Group, 46 Harley Crescent, Condell Park NSW 2200, phone 02 9708 7555, email info@star-group.com.au, website www.star-group.com.au

Below Cherrie Civil Engineering completed the initial excavation as well as concrete pours and road works, laying the kerbing, pavements and roads.



Cherrie Civil Engineering is a diverse civil engineering contractor specialising in large scale projects. At the Northern Beaches Hospital project, Cherrie Civil Engineering carried out over 100,000m³ of bulk and detailed excavation for the main hospital building, carpark, roadworks and landscaping.

In late June 2015 Cherrie Civil Engineering commenced the contract for the main structure with detailed excavation for the drainage layer, footings, basement and lift cores as well as excavation shoring of over 5,500m² of bored piers, shotcrete, anchors and soil nails. The company also carried out concrete works, forming and pouring of 320 structural piles with integral column footings, capping beam and integral structural walls.

Cherrie Civil Engineering returned to the site in September 2017 to start the road works contract and, over the following 30 weeks, laid 10,000m² of kerbing and asphalt for roads and pavements. Other work included the formation of natural swales, shaping the wetland area and the supply and installation of an onsite water retention system, retaining walls, fencing and exposed aggregate

footpaths. Other concrete and structural works included the construction of signage and plinth slabs and excavation for stormwater, power and irrigation.

“It was a very busy site with the challenge of working around other trades, especially providing access for them while we were doing the roadworks, but CPB Contractors had organised everything really well, there was a good integration of the different contractors and the whole job ran very smoothly,” said Managing Director, Stephen Cherrie.

“The challenge we set ourselves is to work efficiently and deliver a result ahead of schedule,” said Stephen. “We achieved this at Northern Beaches Hospital, handing over for construction of the lift cores months before the expected completion date. Finishing the basement excavation and structural work early meant other contractors were able to start without delay. We were able to contribute to CPB Contractors delivering the project ahead of schedule.”

With 20 years experience in civil engineering projects Stephen Cherrie, along with his father Glenn Cherrie and Bob McKinnon, established

Cherrie Civil Engineering in mid 2015 with the Northern Beaches Hospital as their first job. “Our relationship with CPB Contractors stretches back well over 20 years. CPB’s policies and safe work practices translated to a well run workplace for the 40 men we had onsite,” said Stephen.

With a reputation for delivering on time and an excellent safety record, Cherrie Civil Engineering have established themselves as a reliable and efficient contractor. In October 2018 the company was named 3rd in BRW’s top 100 fastest growing start up businesses in Australia with an annual turnover of approximately \$40 million.

Cherrie Civil Engineering works across New South Wales with the bulk of their work in the greater Sydney area. Their services include demolition, site remediation and asbestos removal as well as concrete works for the construction of bridges, foundations and structural works. Cherrie Civil Engineering also recently achieved their RMS Prequalification of R2, F20 meaning Cherrie Civil can tender on RMS projects up to \$20 million in value.

Other work for CPB Contractors includes Nepean Hospital where Cherrie Civil Engineering carried out earthworks, remediation, excavation and construction of in ground components for the carpark. In March 2018 the company commenced work at Green Square Aquatic Centre for CPB, carrying out ground remediation and constructing in ground structural concrete elements for stormwater and base slabs for swimming pools.

Cherrie Civil Engineering have completed a number of jobs for major subdivisions including a \$10 million project at Sparks Road, Wyong excavating for services and roadworks for 140 house lots including the construction of a wetland sediment basin with sandstone retaining wall in June 2015. Recently Cherrie Civil Engineering completed the early enabling works at Westmead Hospital for Multiplex at a value of \$28 million which included asbestos works, structural works, services, bulk and detail excavation.

For more information contact Cherrie Civil Engineering, 407/29-31 Lexington Drive, Bella Vista NSW 2153, phone 02 8824 8225, email admin@cherriecivil.com.au, website www.cherriecivil.com.au

Below Fredon Air designed and constructed the HVAC services for the project, including steam sterilising systems and pressure controlled environments.

Fredon Air NSW is the heating, ventilation and air conditioning (HVAC) division of Fredon, a leading provider of engineering, construction and maintenance solutions. Fredon Air NSW specialises in the design, supply and installation of mechanical services for large scale commercial, industrial and healthcare developments. The company's four other areas of expertise are electrical and communications, security, technology and asset services.

Fredon Air NSW started the design for the Northern Beaches Hospital in May 2015 with a team of mechanical engineers and drafters engaged to design and construct the mechanical services for the project, including steam plant for surgical equipment sterilisation. Early engagement in the design process allowed Fredon Air NSW to implement several value engineering initiatives, provide experienced input into the Safety in Design process, and produce a detailed construction programme.

"The aggressive programme and the large scale of the job presented a challenge," said Project Manager, Ben Clarke. "We had to utilise some innovative procurement strategies, contracting a number of subcontractors and suppliers for the installation."

Fredon Air NSW was a key member of the design team leading the multi-services BIM coordination process.

"Our work on the hospital certainly showcases our inhouse design and drafting capabilities," said Ben. "Fredon Air NSW took the design from an outline briefing document to a fully coordinated workshop drawing. The production of an efficient, fully coordinated design, paired with a very experienced inhouse site management team resulted in a high quality mechanical services installation. This was all done while keeping a keen eye on providing value for the client."

The three year design and installation job had 140 installers at work during peak periods, and with such a large workforce on site, Fredon was a key member of the site safety walks. "Ensuring everyone gets home safe after a day's work is key to what we do here at Fredon," said Ben.

Fredon Air NSW has designed and constructed HVAC systems for some of the

largest scale and most complex projects in Australia. They also work for state and federal government including the Department of Defence on highly sensitive and mission critical environments.

Fredon Air NSW has extensive experience working for highly rated NABERS Green Star projects and has Green Star qualified engineers on their staff. They have worked on large scale innovative environmental projects, including 161 Castlereagh Street and 50 Martin Place, the largest heritage listed building in Australia to achieve a 6 Star NABERS Green Star certification.

The Barangaroo development in Sydney was designed to be the largest carbon neutral commercial precinct in Australia. Fredon Air NSW designed and installed mechanical services at the \$47 million Lendlease building, a three tower development with 80,000m² of commercial tenancies, achieving a 6 Star NABERS Rating for its use of advanced heat reclaiming systems. Fredon Air NSW also designed and built the central plant, a vast 62MW central chiller plant with the largest seawater cooling system in Sydney, servicing all buildings in the 22 hectare precinct. The use of seawater saves 100 million litres of potable water per year.

Recent healthcare projects for Fredon Air NSW include Royal North Shore Hospital, Westmead Hospital, Blacktown Hospital and Mount Druitt Hospital Stage 1. They are also currently engaged on a major healthcare development at the Prince of Wales Hospital in Randwick.

Fredon is an active member of the Green Building Council of Australia and aims to reduce their carbon footprint by increasing recycling, reducing packaging travelling to site and by using preassembled project fixtures made at their premises.

Fredon was established 1968 as a privately owned electrical construction company and today has offices across Australia's capital cities and New Zealand to provide maintenance and building services across the commercial and industrial sectors.

For more information contact Fredon Air NSW, 123 Wetherill Street, Silverwater NSW 2128, phone 02 9475 9400, email contact@fredon.com.au, website www.fredon.com.au





Northern Beaches Hospital, New South Wales

Below Peter Kelly Flooring laid the vinyl for the wards and surgeries, as well as the carpeting for admin and fitted Bolon feature walls.



Peter Kelly Flooring (PKF) is one of the largest providers of flooring services to the health care industry in Australia. In January 2017 PKF started onsite at Northern Beaches Hospital with 30 tradesmen installing vinyl and carpet.

Carpet was laid in the administration areas and vinyl for the many wards, surgeries and operating theatres. PKF also fixed carpet and vinyl to walls and fitted Bolon, a woven vinyl material, to the 3.3m high walls of the lift lobby and atrium as well as to a ground floor feature wall.

PKF are expert at delivering commercial floor and wall solutions to meet many specific requirements such as for safety and fire compliance, abrasion and stain resistance, infection control and ease of maintenance as well as for anti-static environments.

With offices in both New South Wales and Queensland PKF provides high quality products and installation services throughout Australia and New Zealand.

“We have over 30 years experience in the supply and installation of vinyl, carpet, timber and rubber flooring and we understand the

importance of delivering commercial floor and wall solutions to meet specific building requirements,” said Owner, Peter Kelly.

“We’ve completed many large projects over the years including a three year job at Royal Adelaide Hospital installing carpet and vinyl floor coverings for the entire hospital,” said Peter. “We’ve completed similar work at Blacktown Hospital.”

PKF also works across the aged care, education, sports and transport, commercial, retail, and high rise residential sectors. The company have recently completed the installation of carpet and vinyl flooring across all the units and common areas of Opal Tower in March 2018.



For more information contact Peter Kelly Flooring, 9/6 Gladstone Road, Castle Hill NSW 2154, phone 02 9899 6688, email info@pkfns.com.au, website www.pkfloors.com.au

