

Star Attraction

How the Spencer Street Station redevelopment went from vision to reality

Southern Cross Station

Cost: \$700 Million

Structural Engineers: Winward Structures

Architects: Grimshaw Jackson

Constructors: Leighton Contractors

Developer: Civic Nexus Consortium

Consisting of: ABN Amro

Australia, Leighton Contractors, Honeywell, Delaware North Australia.



begun in October 2002, the redevelopment of the Spencer Street Station is significant. The change of name from Spencer Street to Southern Cross station is an indication of how extensively the redevelopment has embraced the renewal of what is a vital transport node in Melbourne. Being the only station in Melbourne that services both metropolitan and country transport, with over 700 trains departing daily, it is predicted that by 2021 over 35 million people will make use of its services each year. The public-private partnership created for the redevelopment is one of the largest undertakings of its kind anywhere in Australia.

To embrace the vision of the architects in creating a hub of transportation that was not only functional and efficient, but also returned the public transport space to the people of the city was a challenge in itself. Leighton Contractors are no strangers to bringing complex and challenging projects to fruition and this award-winning project is another example of their expertise in delivering above and beyond what was originally envisaged.

During the redevelopment, the station remained 'open for business' and works were conducted around the normal operations of the busiest station

in Victoria, with up to 55,000 passengers passing through each day. This in itself provided significant challenges in planning, execution, and delivery of the project, which was successfully expedited in stages without significant interruption to day-to-day operations.

Without doubt, one of the highlights, literally, (23 metres at its highest point) of the project is the undulating waveform roof, which serves as a venting mechanism for the station as well as an architectural feature. Each of the aluminium roofing panels has a 50mm cavity that allows natural ventilation of the pollutants that are, unfortunately, part of life in a busy transport hub. Also incorporated into the roof are high-density polymer, ETFE Cushions that allow natural light into the station areas. These are lightweight inflatable plastic cushions that are extremely durable and, have the added benefit of diffusing some of the harsh glare of the sunlight, creating a more comfortable environment for the passengers.

Leighton's worked closely with the structural engineers, Winward Structures, to erect the 37,000sqm roof in independently supported sections during the night, with minimal disruption to the stations normal operations. Each of

the 54 sections erected were required to be structurally complete and able to stand alone, independently of the roof as a whole. Twenty-nine, concrete filled steel columns were erected throughout the station and these supported the massive spine trusses that were shipped most of the way to the site by barge. Each spine truss weighed over 25 tonnes, and was approximately 20 metres long, and 10 high. One of the few 600 tonne crawler cranes in the country was delivered to the site to undertake the task of lifting them into place. The delivery of this complex part of the project was undertaken without significant issue or delay, and credit must go to those involved in the planning and execution at Leighton's.

Another feature of the station is the glass façade that fronts onto Collins Street. This entrance generates a considerable amount of light and air into the complex and provides an entry to the station that is significant in its seamless transition from the bustling street outside. This transition is integral to the overall project whereby the station and its retail areas will become accessible to the public in general.

The completed project consists of state of the art facilities that are more

Traffic and Transport Fact Sheet

Company Name: GTA Consultants **Founded:** 1989, Sydney office opened 2004 **Staff:** Approximately 60, including 6 directors, an associate and skilled support staff. **Directors:** Greg Tucker, Michael Durkin, Kate Partenio, Christian Griffith, John Kiriakidis, Craig Gist **Associate:** Emmanuel Natalizio **Skills:** Staff at GTA Consultants have a mixture of engineering, management, economics, commerce, planning, geography, information technology, computer science and mathematics degrees. Support staff also include a graphic designer and a survey coordinator.

Services: GTA Consultants provide a complete range of traffic and transport planning, engineering and management services to all industries and sectors. Southern Cross Station: Services provided to Leighton Contractors included detailed traffic engineering and design services for the station redevelopment including the West End Plaza development comprising retail uses. **Involvement:** GTA Consultants' involvement with Southern Cross Station commenced in late 2001 and is ongoing.

Experience: GTA Consultants tends to be involved with commercial, residential, retail and transport projects as well as projects that combine some or all of these uses. The firm has worked on projects for companies including Westfield, Mirvac, Australand, Delfin Lend Lease, Port of Melbourne Corporation, ABN Amro, Multiplex and Urban Pacific.

Past Projects: Recent projects undertaken by the firm in Melbourne include Westfield Southland, the Waverly Park redevelopment for Mirvac and the Dandenong Rail Corridor Review for the Victorian Department of Infrastructure. The firm is currently involved in the Melbourne Convention Centre redevelopment for Multiplex and the Royal Women's Hospital redevelopment.



Raising the standards

The \$700 million Southern Cross Station Project is one of the largest investments in public infrastructure that has been undertaken in Melbourne for some time. Formally the Spencer Street Station, it has now been transformed into a state of the art hub for transportation within Melbourne, Victoria and the surrounds.

The project incorporates two main objectives, which are the revitalisation of the Spencer Street Station transportation hub and the development of a new 120 outlet shopping and retail complex with parking for over 800 cars.

The completed development incorporates full glass frontage to Spencer Street and Collins Street, 120 passenger information screens throughout, waiting areas, a 30 bay coach station, enhanced passenger security, new baggage handling facilities utilising advanced screening and security, secure parking, and new retail outlets, cafes and eateries. The development will provide passengers with a 21st century experience and the facilities of a modern day airport, designed in compliance with the Disability Discrimination Act; the facility incorporates wheel chair accessibility, lifts, ramps, and access to all areas and levels.

The project was envisaged to create an air of openness and light, leading almost seamlessly for visitors and pedestrians from Collins Street through into the station areas. The signature feature of the development is, without doubt, the expansive and undulating roof created from interconnected domes. This design intends to reflect an earlier age, when the steam train ruled the tracks and the 'Victorian era' station was the central point of any great city. Interestingly, the creation of the roof has more in common with those days than might be first apparent. Both the expansive glass structures of the 'Victorian era' and the geomorphic terrain of the Southern Cross Station roof were designed with the intention of exiting fumes from the station surrounds whilst providing an environment of light and openness to contrast the functionality of a train station.

The Southern Cross Station is a major transport centre within Melbourne, conveying 15 million passengers a year and vital for the cities effective functioning. As a result, the redevelopment project, including the creation, assembly, and erection of the 37,000 square metres, aluminium panel roof, had to be undertaken whilst the station remained fully operational. This was a considerable challenge for the project.

However, Winward Structures, the structural engineers for the project, were able to provide a solution early in the design and planning stages. The theory was relatively simple, but required complex design, calculation, and 3D computer modelling to ensure that it could be put into practice. The design of the entire roof form required each individual part of that roof to provide lateral stability and structural integrity for the rest. Winward Structures solution was to construct the roof in sections, working around the operations of the station. To do this it was essential that each individual section of the roof was structurally sound and stable as an individual construct, and also once it formed part of the entire completed roof form.

For this operation to be successful, the components of the roof had to be readily assembled and erected within limited periods, and work hours, during the windows of opportunity provided by the station schedules and limited track stoppages. This required extensive prefabrication to reduce the amount of on job fabrication.

Careful analysis of the stages of construction was undertaken as the work progressed, to ensure that each section met the required strength and support conditions for the overall roof structure. As a result, the outstanding

roof solution for the complex was completed as designed with minimum disruption to the stations day-to-day operations. It is a significant achievement of structural engineering that demonstrates not only Winward Structures considerable expertise and skill, but also the true principal of structural engineering. That is to create solutions through innovation.

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Setting the Standard

Staff of life

The new \$700 million Southern Cross Station development on Spencer Street in Melbourne will be a landmark transport interchange for the people of Victoria, an iconic development providing Melbourne with a world-class gateway featuring state-of-the-art facilities. When Leighton Contractors required labour to complete such a significant piece of infrastructure, they went to MC Labour Services.

MC Labour Services was founded in Melbourne by Mr. Marc Lunedei in 1995. Since that time, it has grown into the building and construction industry's leading supplier of labour hire. In addition, MC Labour Services provides quality staffing and office support solutions through their recruitment services division. They have the capability to provide permanent or short term office staff. The policy of the firm is to only use staff with previous on-site experience and a strong knowledge of the industries that MC Labour Services supply to. This ensures that staff supplied by MC Labour Services are the most qualified and experienced personnel available for the required job.

For the Southern Cross Station project, MC Labour Services selected and supplied skilled hire labour to Leighton Contractors for the duration of the project. In addition, MC Labour Services monitored the performance of their workforce for the duration of the project to ensure that Leighton Contractors only received the highest quality personnel.

MC Labour Services provides skilled labour for a range of industry sectors, including the commercial building industry, civil construction sites, manufacturing and distribution, office and administration situations, accounting and logistics support. All MC Labour Services labour hire construction employees are members of their relevant unions if required. All appropriate funds are paid under any enterprise bargaining agreements that may apply. MC Labour Services is involved in many iconic and landmark developments in Victoria. Recently they have provided staff for the MCG redevelopment by Grocon, the Telstra Dome and the Melbourne Sports and Aquatic Centre, to name just a few.

MC Labour Services is capable of providing clients with all of their staffing needs, from on-site skilled labour to management. Their job recruitment service places staff in a range of situations and they employ a sophisticated data system to match the skills and experience of new staff with current and upcoming job vacancies. New job placements at MC Labour Services are listed daily in casual and full-time positions over both the long and short term.

The focus of MC Labour Services is firmly on providing a high standard of quality to all their clients, at the best rates possible, in the widest range of situations. Unlike many of their competitors, MC Labour Services is owned and managed by people with many years of "hands on" experience on building sites, helping them to understand the unique needs and requirements of clients in the development and construction industry. When you are hiring for your next construction project, contact MC Labour Services at their offices in Melbourne to find out why, in their own words, they are "Setting the Standard".

Furthermore MC Labour has branched out into the security industry. MC Security was established as a result of requests from industry clients to provide highly qualified and experienced security personnel. So for all your security requirements look no further than MC Security Services.

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Traffic and transport planning and engineering consultancy services for the new Southern Cross Station project in Melbourne were carried out by GTA Consultants, a specialist traffic and transport planning consultancy. Since 1989, GTA Consultants has built a strong reputation across all industries in both the public and private sectors and have expanded to employ approximately 60 staff at offices in both Melbourne and Sydney.

GTA Consultants' involvement in the Southern Cross Station project commenced in late 2001 and is ongoing. The firm was initially engaged by Civic Nexus to provide services for the preparation of the winning bid for Southern Cross Station. GTA Consultants was subsequently contracted by Leighton Consultants to provide traffic engineering and design services for the project, including the design of a new 30 bay bus interchange and a proposed 800 space car park. The firm also designed temporary bus facilities and new traffic signals, analysed pedestrian demands along Spencer Street, designed commercial vehicle access and new loading docks.

During the Southern Cross Station project, GTA Consultants used AutoTURN software to model every vehicle requiring access within and around the station, including unusual vehicles such as cherry pickers, service trucks and scissor lifts. The AutoTURN software then simulated turning movements for these vehicles to ascertain the requirements for vehicular access to specific areas. The firm prepared traffic management plans to facilitate station construction and completed a Road Safety Audit of the plans following installation.

GTA Consultants has experience across all transportation modes and their clients include government, transport authorities, architects, planners, lawyers, developers and other private sector companies. Recent projects undertaken by the firm in Melbourne include Westfield Southland, the Waverly Park redevelopment for Mirvac and the Dandenong Rail Corridor Review for the Victorian Department of Infrastructure. The firm is currently involved in the Melbourne Convention Centre redevelopment for Multiplex and the Royal Women's Hospital redevelopment.

Southern Cross Station represents GTA Consultants' first involvement with Leighton Contractors. "Leighton get the job done, no mess, no fuss," said Mr. Craig Gist, one of GTA's directors. "They've got good people who make decisions and move forward. They listen to their consultants." GTA Consultants pride themselves on the range of their service. "Our advice spans broad level strategic policy and transport planning and modeling, through traffic and parking assessments to road design," said Mr. Gist. "GTA Consultants is one of Australia's largest specialist consultancies, offering a range of traffic and transport planning, engineering and management services to all industries and sectors."

The strong reputation of GTA Consultants is built on a tradition of quality, value and outstanding service coupled with an innovative, ideas-based approach. Their highly skilled workforce and focus on teamwork enables them to consistently achieve the best outcome on a wide range of projects. Visit <http://www.gta.com.au> for more information.

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Pump up the volume

One of the biggest infrastructure redevelopments in the history of Victoria is taking place at the site of the former Spencer Street Station on the western edge of Melbourne's CBD. The new Southern Cross Station precinct being developed by Leighton Contractors is valued at \$700 million dollars and will incorporate an airport-style transport interchange and associated retail and commercial office areas, linking the heart of Melbourne with the emerging Docklands precinct and providing a new interchange between suburban and regional trains, buses and trams. The construction of the new facilities was a logistical challenge, especially given that the railway station had to remain operational throughout the construction phase. Improved Concrete Pumping Services (ICPS) were the ideal candidates to meet the challenges associated with this landmark development.

Improved Concrete Pumping Services started business in 2005 from new headquarters in Laverton, conveniently located ten minutes from Melbourne's CBD. They were formerly known as Geelong Concrete Pumping which was founded in 1981 by Mr. Paul Willard, now the Managing Director of Improved Concrete Pumping Services. As the firm built its good reputation first in Geelong and then in the western suburbs of Melbourne, it has expanded to now employ 30 staff members, all of whom were involved on the Southern Cross Station project. The firm's involvement with the project lasted approximately two years and has been recently completed.

The concrete pumping work carried out by Improved Concrete Pumping

Services involved the use of two on-site mobile concrete pumps and large placing booms, up to 55 metres long. The cement mixers on site were often located a considerable distance (up to 200 metres) from where the concrete was required to be poured. Improved Concrete Pumping Services solved this problem by setting up a 5-inch static steel line to pump concrete from the cement mixers located at the perimeter of the station under trailer tracks and along station platforms to the pouring site.

The concrete that was pumped by Improved Concrete Pumping Services was used for a wide range of structural elements within the Southern Cross Station project, including new platforms and in-situ walls. Concrete was also required for the support pylons for the spectacular undulating roof structure designed by internationally renowned architects Nicholas Grimshaw and Partners.

One of the major challenges associated with the Southern Cross Station project was that the station had to remain operational throughout the construction phase. The Spencer Street Station Authority had very strict restrictions on when Leighton and other contractors could access the site, and work often had to be completed at odd hours when trains were not using the station. No timetable adjustments were made to accommodate construction over the course of the project. Improved Concrete Pumping Services were often not allowed to commence work until eleven o'clock at night and were required to complete a particular pour by the time the first trains arrived the next day. It is a testament to the efficiency and reliability of the firm that they

managed to complete their work on time every single day of the construction process.

Improved Concrete Pumping Services specialize in high rise buildings and complex projects which require the use of large placing booms. In fact, the firm uses the largest placing boom in Australia, up to 55 metres long. The firm has been involved in many iconic and landmark projects in Victoria, including the MCG redevelopment and Docklands Stadium, now known as the Telstra Dome. The firm was involved with the Southern Cross Building on Exhibition Street and the Herald and Weekly Times Building on Flinders Street for Bovis Lend Lease. Improved Concrete Pumping Services also worked on the QV project on Swanston and Lonsdale Streets for Grocon. They are currently working on the Eastlink project which will extend the Eastern Freeway which currently runs from Clifton Hill to Donvale in Melbourne's east.

Improved Concrete Pumping Services is the largest privately owned specialist concrete pumping company in Australia, with all staff fully employed on a wage. "We currently have more privately owned concrete pumping units than anyone else in Victoria," said managing director Mr. Paul Willard. "All of our equipment is new, and we buy Schwing™ pumps which are the best brand you can get." Schwing America Inc. is a highly regarded Minnesota-based company that manufactures a wide range of truck and trailer mounted concrete boom and line pumping units for a range of applications. They have built a reputation for enjoying the highest repeat sales of any manufac-

turer of pumping equipment

The focus of Improved Concrete Pumping Services is firmly on quality and expertise, while remaining as cost-effective as possible for the client. In fact, the firm's move from Geelong to Laverton was calculated to provide a more centrally located and therefore more cost-effective base of operations. The firm prides itself on their efficiency and has maintained a good working relationship with Leighton Contractors over the course of the Southern Cross Station project. "We found Leighton Contractors very good all through this project," said Mr. Willard. "They're a very reputable company, and really good to work with."

For more information on Improved Concrete Pumping Services and the value and expertise they can add to your major construction projects, contact them at their new Laverton headquarters on (03) 9311 7511 or email icps@swiftdsl.com.au.

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closely aligned with the look and feel of an airport rather than the archetypal train station. There are over 120 passenger information screens throughout the complex, a 30-bay coach station, complete security, baggage handling facilities, secure parking for 800 cars, 120 new retail outlets, offices, and cafes and restaurants. During construction of the new facilities over 500 concrete piles have been driven varying in depth from 9m to 25m, and the additional West End Plaza incorporates 60,000sqm of suspended concrete slab over two levels.

The successful completion by Leighton Contractors of a complex redevelopment project, whilst ensuring the normal operations of one of Victoria's busiest transport hubs was not disrupted, is in itself a clear indication of their abilities. The fact that the project was on time and within budget is confirmation of their place as one of the leading companies in their field in the country and their involvement has been integral to the successful creation of a new era in rail transport not only for Victoria but also for Australia as a whole.

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Surveying the scene



The building and occupancy permits for the new Southern Cross Station were issued by Philip Chun and Associates, one of Melbourne's leading building surveying and regulation consultants. Philip Chun and Associates was founded in 1990 and now employs 55 staff at their offices in Melbourne, Sydney and Brisbane. The firm specializes in major projects, including multi-storey and large floor area buildings, and provides building design certification, permit, approval and regulation consultancy to both the private and public sectors.

For the Southern Cross Station project, Philip Chun and Associates utilized a performance based design and approval methodology. The focus of the firm is on innovation and the firm strives to apply and advise on innovative design solutions while maintaining a responsible attitude towards building regulations and controls. The company has also developed a comprehensive quality assurance system and maintains an efficient quality program in regard to building regulation and control.

Philip Chun and Associates is now the largest independent surveying company in Australia. Their involvement with Leighton's Southern Cross Station project lasted four years. The firm has been involved in many major and iconic projects both in Melbourne and around Australia. Notably, the firm has provided services for the Austin Hospital in Heidelberg, the Royal Melbourne Showground redevelopment, the MCG redevelopment and Grocon's new Eureka Tower in Southbank. Philip Chun and Associates employs staff qualified in building surveying, inspection and engineering and provides a comprehensive national regulatory advice and design certification service.

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Timing is everything



The new Southern Cross Station in Melbourne is a world class transport interchange, with state of the art facilities in the new terminal building. Honeywell Building Solutions has been contracted to provide total asset management services for Southern Cross Station for a period of 30 years, including access control, surveillance and security, heating, ventilation and air conditioning systems, all managed by the Honeywell Enterprise Buildings Integrator™. Honeywell worked closely with architects and consultants to help deliver a truly iconic landmark for Victoria.

Founded in Minneapolis, USA in 1886, Honeywell has delivered solutions to business, industry and consumers in the Pacific region since 1962. Honeywell Building Solutions design, install and maintain building systems to keep workplaces safe, secure comfortable and cost efficient.

A challenge that needed to be overcome by Honeywell was that they had to install their systems whilst Southern Cross Station remained operational. They used the approximate 4-hour window between the last and first trains the next day to occupy a railway platform in order to undertake their scheduled activities.

The entire system runs on an intelligent fibre network which uses state-of-the-art switching devices and blown fibre connectivity to allow for future expansion. Running on this network is the security and building management systems using Honeywell Enterprise Buildings Integrator™ in a distributed systems configuration. Managed systems include access control, intrusion detection, building automation and Honeywell Digital Video Manager™ which controls approximately 100 surveillance cameras.

With the responsibility for ongoing management, Honeywell's design was developed with long term life-cycle goals in mind. One example was the design, supply, and installation of the Passenger Information Display System (PIDS). The 53 vandal-proof and non-reflective stands house 136 LCD panels distributed over the site which are used to display timetables, free-to-air television and advertising. The PIDS needed to be tested to ensure resistance

to Melbourne's extremes of temperature and were designed to maximise the life of the LCD panels. They include a casing which facilitates screens to be maintained and replaced easily, without compromising the overall security of the enclosure.

Over the next 30 years, Honeywell's research and development centre in Sydney will continue to develop innovative building control solutions which will be incorporated into the Southern Cross Station. "When we maintain buildings for an extended period," said Honeywell's Marketing Manager, Deborah Learoyd, "we are able to bring in technological advancements to our sites so that facilities remain state-of-the-art over the life of the contract. The advantage of a company like Honeywell is that we have such depth of experience in managing complex facilities enabling consistent improvement across all our sites in Australia."

Honeywell has a wealth of experience on complex building projects including landmark commercial buildings, industrial facilities and large-scale infrastructure projects. A pro-active approach to problem solving has built their reputation and their expertise. Honeywell's service network and financial stability will ensure they continue to meet customer requirements, with their skills and experience enabling their clients to reduce operational costs while maximising service delivery at all times. "We believe in finding solutions," said Ms. Learoyd. "Companies turn to us when they need the right building automation solution to manage risky or complex environments."

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