



TTW

INFRASTRUCTURE & TRANSPORT

Expression of Interest

Your Partner in Engineering

ABOUT US

As award-winning consulting engineers, for over 60 years we've partnered with architects, builders, developers and project managers to tackle the most complex projects and engineer their vision. As a privately owned Australian company, we have earned a reputation for smart and practical engineering design that balances the asset owner's expectations with strategies for contractor success. We offer the benefits of scale with the largest structural team in NSW who successfully delivers significant projects. This is underpinned by the hands-on approach led by our directors.

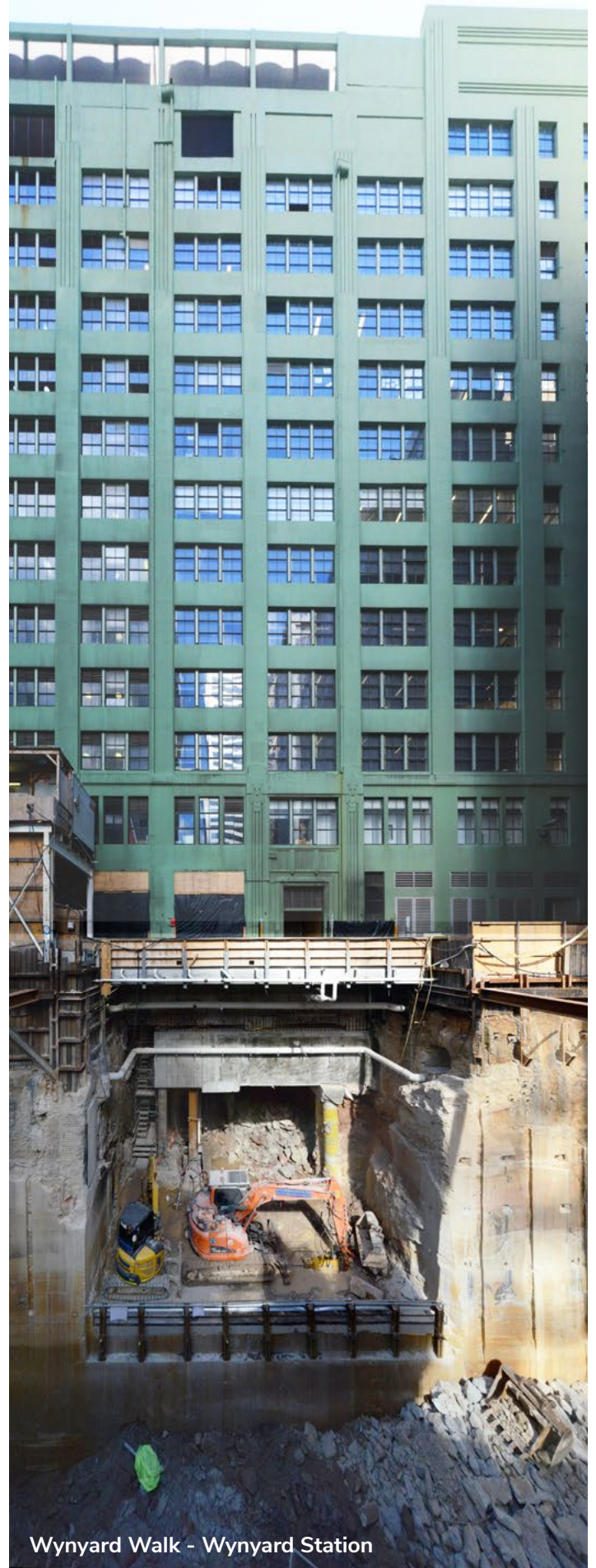
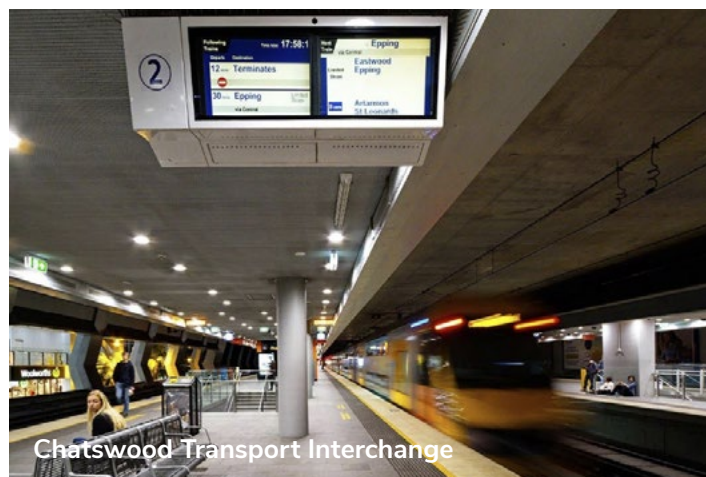
Transport and Infrastructure

With decades of strong working partnerships with local and state government, TTW has successfully engineered and overseen the construction of award-winning integrated Transport projects across Australia.

We understand that our communities require smart and sustainable transport systems that last for generations to come. To support this goal, we deliver projects with an integrated approach from our Structural, Civil, and Construction Engineering teams. They develop innovative solutions while collaborating with key stakeholders, often working in sensitive environments.

Our added value

- Experienced in building adjacent to, beneath, and above, rail and other transport infrastructure.
- A proven ability to work closely with contractors to achieve practical solutions in challenging conditions.
- Economical and sustainable designs through digital optimisation and smart construction methodology.
- Sophisticated prediction methods for building damage assessment adjacent excavations.
- A demonstrated history in the delivery on design commitments and assisting builders with construction phase challenges.
- The capacity to resource projects of scale with the majority of our engineers in NSW.



CAPABILITY

Structural

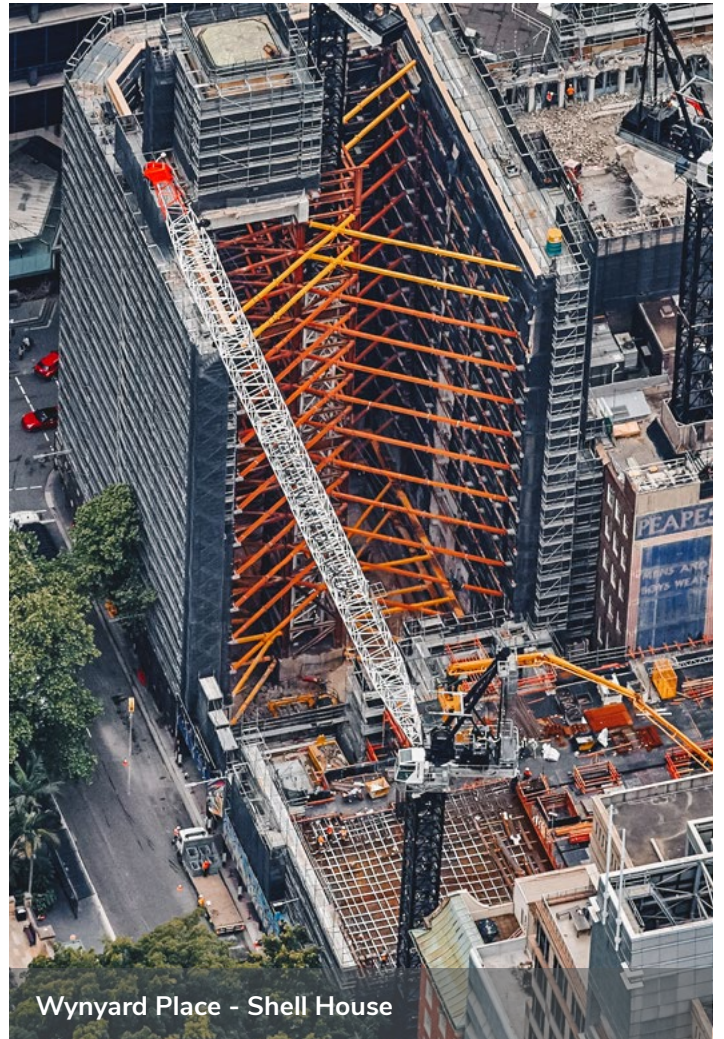
Our structural team is the largest in NSW and renowned for their technical expertise in complex structures both above and below ground. We excel in city environments where existing constraints require smart solutions but are equally adept at optimising all structural types. This is supported by the power of computational design which results in a more cost effective and sustainable outcome.

We have both the local capacity and experience in delivering integrated rail stations which involve complex excavations, retention, underpinning, and civil / building structures. Our ability to partner with project stakeholders has resulted in TTW's involvement in most of the rail/metro stations between Chatswood and Waterloo.

Construction Engineering

Our engineers provide construction engineering services across the industry to a range of landmark projects of varying complexity. Knowing construction engineering is a critical factor in the success of a project, we add value by delivering efficient, practical, construction-friendly solutions that mitigate site risks, delays, and minimise construction costs for any project.

We can advise on the most suitable temporary works by taking into consideration the condition of the structure, the surrounding environment, and adjoining or neighbouring buildings, which ensure a seamless phasing between all stages of construction. Successful deliveries are seen at Wynyard Station, Chatswood Station, and West Connex.

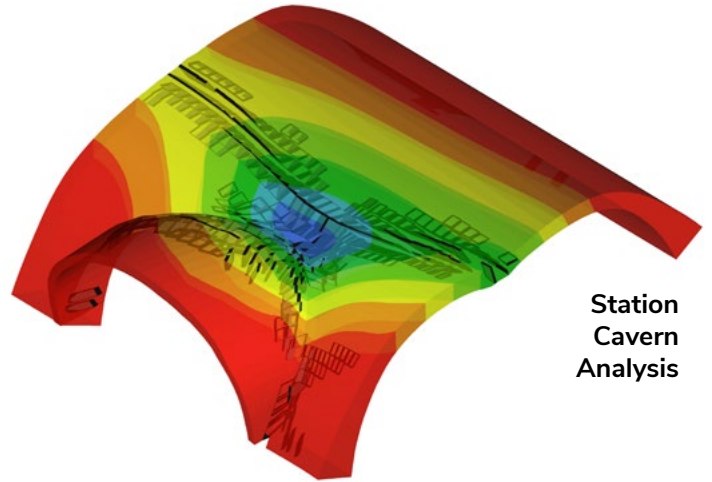


CAPABILITY

TTW Advance

Our specialist team of engineers combines Advance Simulation and Computational Design Methodology to improve buildability and deliver sustainable solutions. Utilising computing power, we optimise and optioneer structures from the outset of the project for quality, cost, time, and embodied carbon. With our multi-skilled team of engineers, analysts, and software programmers, we develop custom solutions to meet the needs of each client and project.

Our team applies cutting edge analysis to design and optimise complex tunnel structures with recent experience on Cross River Rail and Victoria Cross Station underground caverns. Similarly, we are applying advanced simulation to predict damage of sensitive and heritage buildings around Wynyard Station and Martin Place.



Station
Cavern
Analysis

Civil

Our civil engineers have 30+ years of established and outstanding relationships with Government and private sectors. Our support and collaborative approach ranges from the concept stage to planning, design, and construction – with ongoing management and advice for the operating life of a project. This includes in-depth knowledge and guidance of approval processes, ensuring clients reach their objectives.

The TTW team engineer successful solutions in roads, heavy duty pavements, stormwater drainage, flood modeling, in ground services coordination, construction civil works, and traffic management. We own the responsibility to deliver sustainable civil projects to our community.

TTW delivers projects with an integrated approach from our Structural, Construction Engineering and Civil teams



Kings Avenue Overpass

OUR EXPERIENCE

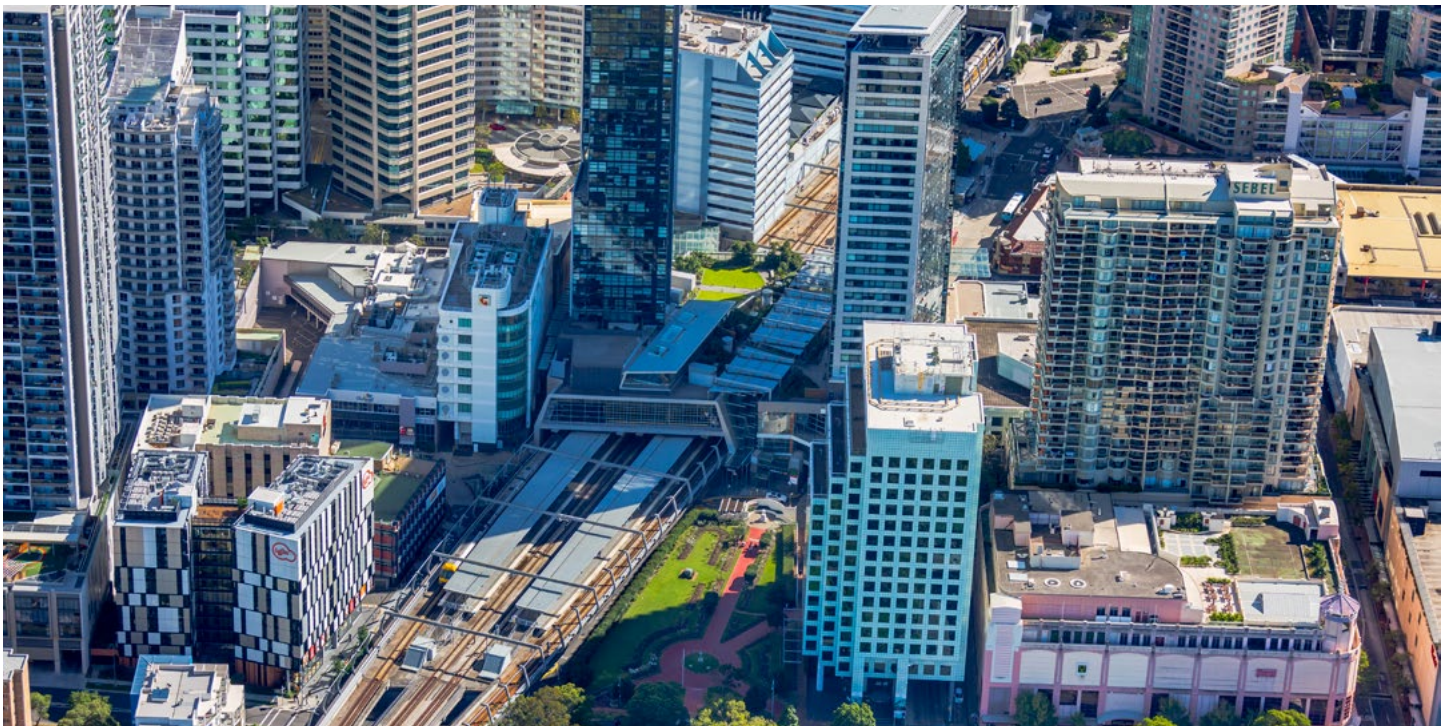


CHATSWOOD TRANSPORT INTERCHANGE + OSD

World class inter-modal public transport interchange

The Chatswood Transport Interchange (CTI) is a mixed-use Transit Oriented Development project underpinned by an urban design strategy that establishes new streets and reinstates connections that were once served by the previous station and railway line. The project demonstrates how transportation infrastructure project schemes can be integrated into the structure of the city to enhance the activity and quality of urban spaces. Representing the largest project of its kind in the state of New South Wales, CTI includes: an upgraded **RAIL STATION** linking the North Shore and Chatswood to Epping lines; an open, landscaped bus interchange; 10,000 square meters of retail spaces at podium level; and public pedestrian linkages reconnecting the centre of Chatswood. Above this sits three towers accommodating 550 apartments.

TTW's role providing **STRUCTURAL, CONSTRUCTION ENGINEERING** and **CIVIL** services developed and analysed complex staging to maintain the operation of two live rail tracks while constructing adjacent and also below for the new rail station. The 350m long station building was broken up into three zones defined by permanent movement joints. A top down construction methodology allowed the new tracks to become operational early prior to excavation under. The station design incorporated basements, track level, concourse, retail podium and enabling works for the oversite development towers "Chatswood Metro" which were also engineered by TTW for a separate developer.



WYNYARD WALK

Sydney's revolutionary urban link, connecting Wynyard - CBD - Barangaroo

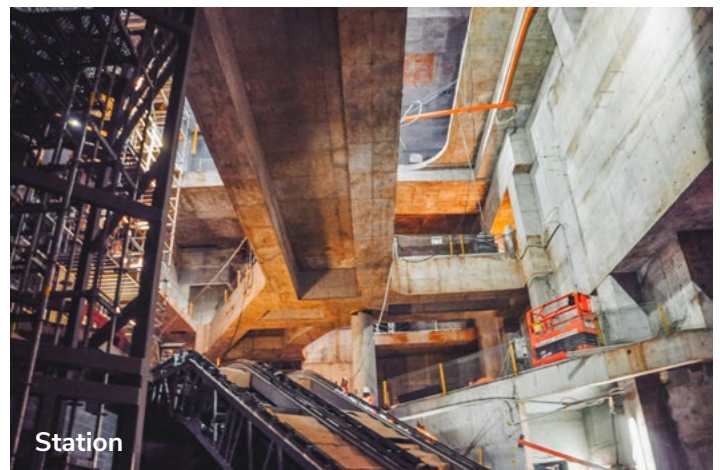
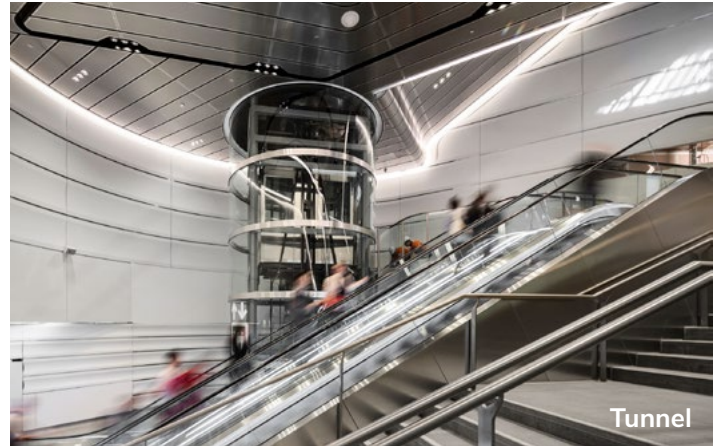
Wynyard Walk was an extremely complex design and construction project in the Sydney CBD consisting of a new rail station entry building to Wynyard Station with a pedestrian tunnel and bridge connection to Barangaroo. TTW worked collaboratively with CPB Contractors and Woods Bagot delivering **STRUCTURAL, CIVIL, FACADE,** and **CONSTRUCTION ENGINEERING** services across the project.

The path of the shallow tunnel and connection excavations to Wynyard Station placed it in direct conflict with the built environment and created numerous technical challenges including:

- Excavation beneath and underpinning of the heritage listed Railway House.
- Construction of a transfer structure below a 21 storey tower to allow tunnelling below.
- Excavation and construction adjacent Wynyard station live tracks and the Western Distributor foundations.

This project was successful because of the effort in establishing strong working relationships between TTW and CPB. These relationships allowed the design and construction challenges to be solved whilst satisfying the numerous stakeholders including TfNSW (RailCorp), RMS, building owners, and utility owners. This project demonstrates our ability to improve on the precedence set by the reference design and offer the client time and cost savings through an integrated approach between structures, geotechnical, and construction engineering. A critical aspect of the project was the **PREDICTED BUILDING AFFECTS** on the existing buildings and infrastructure including Railway House and One Margaret Street which had very tight contract settlement limits of less than 5mm. We have demonstrated on Wynyard Walk that outstanding D&C outcomes can be achieved on a complex site by challenging the design through collaboration across disciplines.

The new station entry building required detailed coordination in 3D to fit all the station functions into a very constrained site. TTW designed both the station and the oversite development for the follow on hotel developer known as "Little National Sydney" which incorporates an innovative steel transfer system embedded in the hotel walls over four stories to allow the 11 story hotel to span 18m across the station void below.



Key Features

- Wynyard Station – a new western station entry building with a hotel oversite development.
- Railway House transfer and underpinning – a complex underpinning and transfer of an existing 12 level 1920's heritage building within an extremely confined basement adjacent the operating trains.
- One Margaret Street transfer – structural transfer beam system within the basement of an existing 20 storey tower to support the building and allow the new tunnel to pass under
- Western Tunnel Portal – excavation and bridging works within a confined worksite with a landmark steel and glass canopy
- Sussex Street Pedestrian Bridge – connects Wynyard Walk to Barangaroo with a bold concrete structure consisting of precast girders stressed to a cantilevering post tensioned abutment
- Pedestrian Tunnel – a new 120m long tunnel constructed below both Clarence and Margaret Street

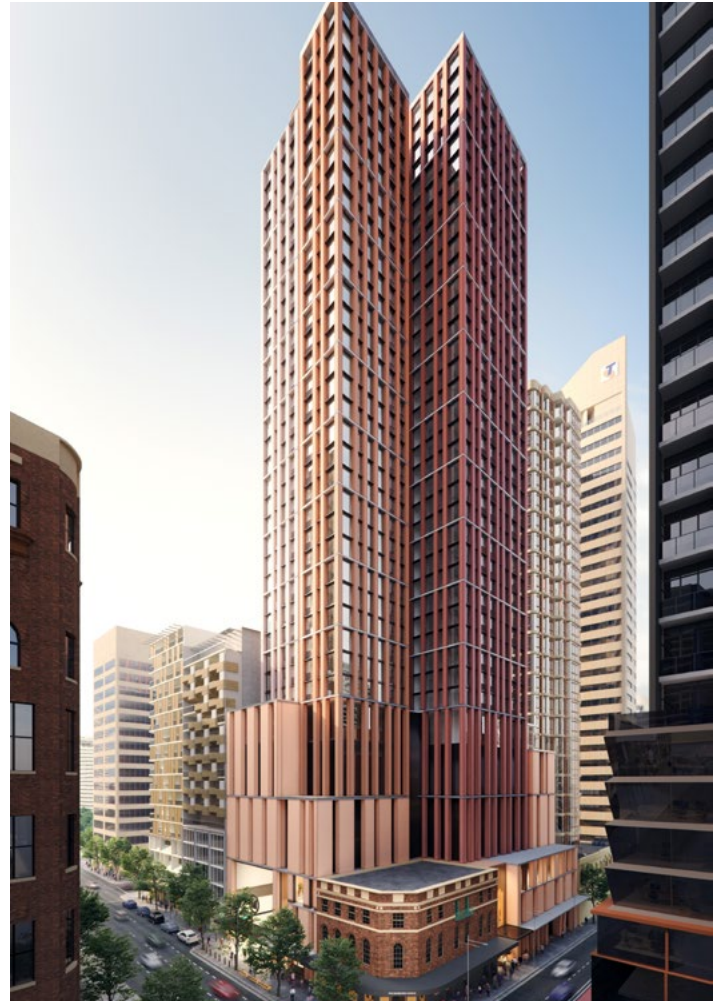
SYDNEY METRO PITT STREET STATION + OSD

New Metro Station and Sydney's first large-scale build-to-rent tower helping shape Sydney's future

TTW has been engaged by the consortium of Oxford Properties and CPB Contractors to provide **STRUCTURAL** and **CONSTRUCTION ENGINEERING** services for the new Pitt Street Metro Station and the oversite development (OSD) tower above.

To unlock the potential of this difficult site TTW optimised the reference tower design during the tender phase by collaborating with the project architects to quickly turnaround options that considered the many site constraints.

TTW was sought out for this project due to our experience in delivering complex tall buildings over or adjacent to rail or road but also for our willingness to engage with the project team to seek out opportunities.



ATLASSIAN HQ

New Innovation and Technology Precinct adjacent to Central Station.

Located in Sydney's new Innovation and Technology Precinct, Atlassian Sydney Headquarters will be a 40-storey building at approx. 180 metres tall and includes a youth hostel occupying the lower levels. To be completed by 2025 and attracting 25,000 workers, the new 40,000m² world-first commercial tower is a groundbreaking global first.

The benchmark design of timber, with a glass and steel facade, includes a mix of outdoor and indoor spaces, and reaches over 40 storeys high. The State Significant Development's design includes a hybrid timber structure incorporating a steel exoskeleton. Being directly adjacent to platform 1 at Central Station, the development requires extensive approval from Transport for NSW (TfNSW). TTW is the TfNSW Approved Engineering Organisation (AEO) for the project. The development involves construction in a live environment including **RAIL** and **PEDESTRIAN TUNNELS**.

The project has ambitious targets for Sustainability; 50% less embodied carbon in construction compared to a conventional building. 50% less energy consumption compared with a new conventionally operated building and solar panels in the vertical facades, to generate green power on-site.



WYNYARD PLACE

Construction Engineering, Heritage Building Assessment and Interface with Wynyard Station

Wynyard Place is a transformational urban regeneration project led Brookfield Property in the heart of Sydney. The development works occur directly above the Wynyard Station Transit hall and across a city block with a total of 3 buildings being incorporated into the development: The Tower, a full demolition and rebuild of a new 27-storey tower and the restoration of two adjacent heritage-listed buildings, Shell House and Beneficial House.

TTW is providing **STRUCTURAL** and **CONSTRUCTION ENGINEERING**. The project design is led by London based practice Make Architects in collaboration with Architectus with construction being undertaken by Multiplex

The centrepiece of the development is a 27 level, 60 000 m² PCA Premium Grade commercial tower (10 Carrington) offering world-class facilities, amenities and finishes to set a new standard in workplace design. The development also includes the retention and restoration of Shell House and 285 George Street, creating 9400 m² of boutique office space. In addition to the commercial space created as part of the project, 7000 m² of high-end retail, a revitalised Wynyard Lane and a major upgrade to Wynyard Station's George Street entrance connecting to a grand transit hall and public concourse are also included within the project.

The project has addressed a significant number of diverse challenges from a design and construction perspective ranging from the integration of highly aspirational architectural design, heritage restoration, heavy load transfers, **RAIL INTEGRATION**, development of operational and building logistics to suit its multi faceted requirements, Physical Security Threat Assessment and working in operational environments.

TTW collaborated with an international design team in a Design and Construct environment to deliver an outstanding outcome for Brookfield and their investors. Collaboration in developing the design into a buildable, economic solution whilst maintaining the architectural intent of the design was a key aspect of the work that TTW undertook across the project.



Shell House

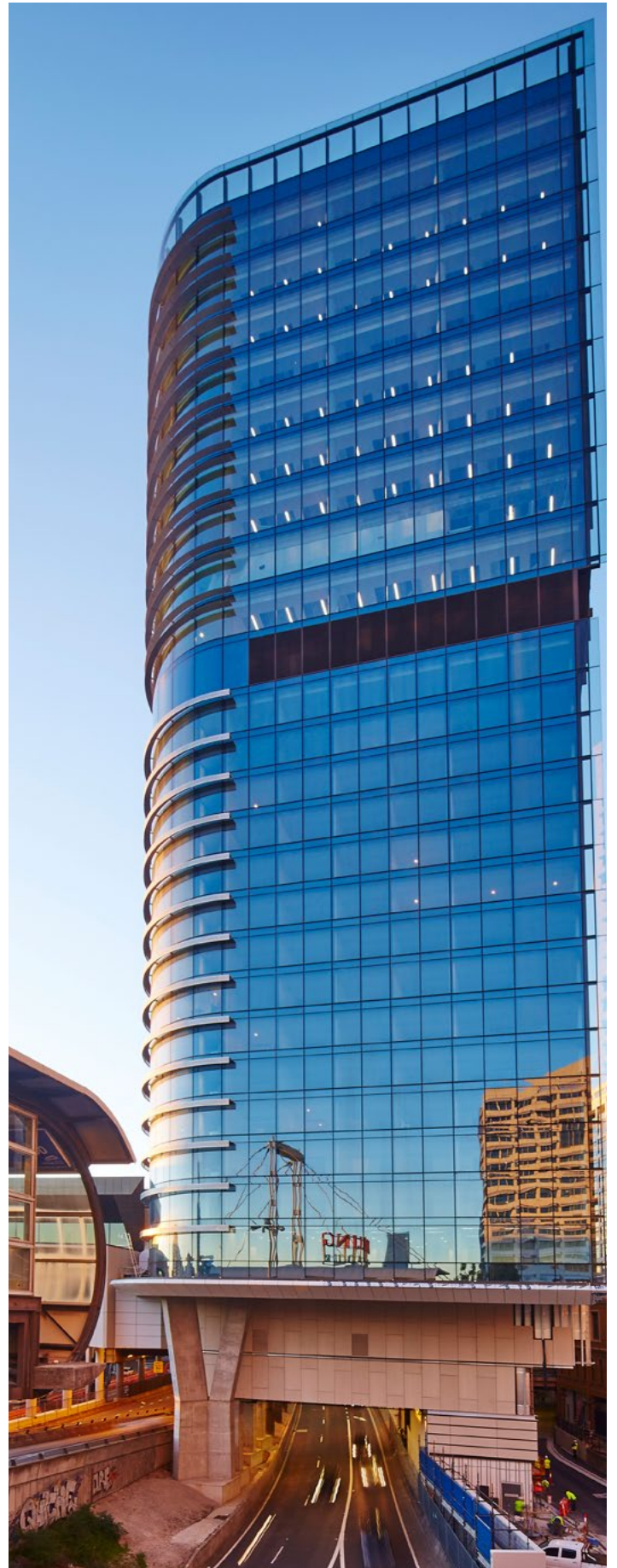
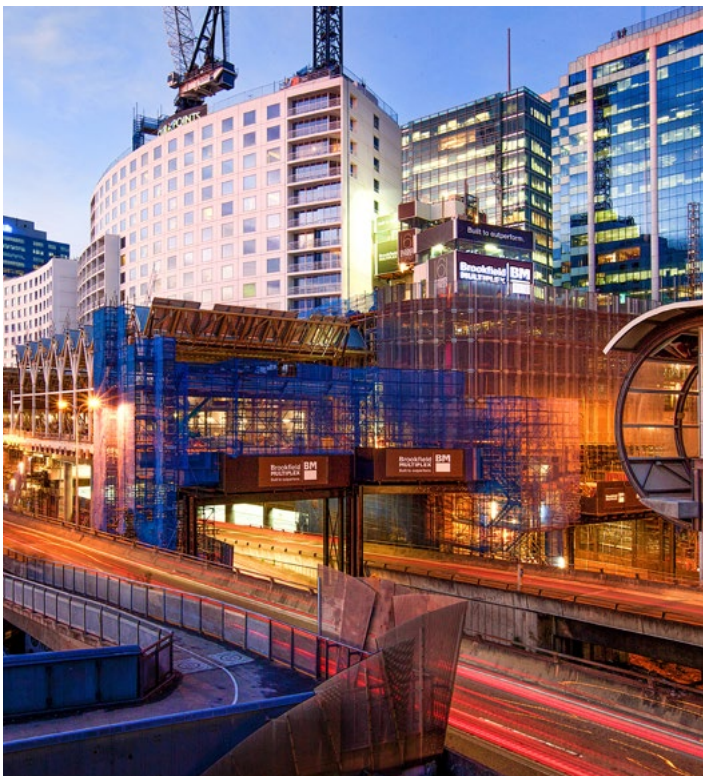
HYATT REGENCY HOTEL

One of Sydney's largest hotels constructed over a major highway

The Hyatt Regency Hotel at 161 Sussex Street Sydney involved the complex refurbishment of the existing hotel, construction of a new 27-level combined hotel and commercial tower, a new two-level 4000m² convention centre with saw-tooth feature roof, and numerous architectural and structural features.

The project site is located directly above the north and southbound lanes of the Western Distributor and adjacent Wheat Road and Slip Street. Maintaining the operation of these roads throughout the project's construction was essential to the design – requiring careful analysis and close liaison with the contractor to ensure that public safety was paramount, with the added complexity that the existing hotel was also to remain operational during construction.

Developing solutions to complex technical challenges required significant integration of a wide range of engineering disciplines across many facets of the works. Not least of these challenges was integrating the new works with the existing operational building across different engineering disciplines – particularly in the coordination with hotel operations and ensuring RMS guidelines and requirements were also satisfied for uninterrupted operation of major roads such as the Western Distributor.



Our Team



Glen Fowlie, Director

BE(Hons) CPEng
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Glen has an entrepreneurial spirit that he takes into each project. With engineering experience across New Zealand and Australia, his expertise has been sought after by leading architects and building firms. Taking the lead on many iconic projects for TTW, Glen's pragmatic approach has seen him excel across many sectors, including transportation, oversite developments, commercial, public and education.

Glen brings 17 years of major project experience to this area and has a proven track record in delivering complex Infrastructure & Transport oriented projects, including:

- Sydney Metro Pitt Street Integrated Station Development
- Wynyard Walk – Wynyard Station & Pedestrian tunnel
- Wynyard Station OSD - Little National Hotel
- Cross River Rail Station Cavern Structure
- Sydney Metro Victoria Cross Station Cavern Permanent Structure
- Westconnex M4-M5 Link Temporary Works



David Carolan, Director

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David Carolan has over 30 years of engineering experience and is highly sought after for his leadership in the industry. David's diverse background covers the spectrum of project sectors such as train stations, oversite developments, bridges, office buildings, universities, and retail precincts.

He pioneers innovation and design excellence, which has led him to work on many high profile and award-winning projects across the globe.

- Chatswood Transport Interchange
- Chatswood Metro Towers Oversite Development
- Hyatt Regency Hotel
- St Leonards Train Station
- St Leonards – The Forum Oversite Development

Our Team



Glen Hetherington, Technical Director

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Glen Hetherington provides our clients with in-depth experience on a variety of structures and construction techniques. He has a unique experience in assisting Construction Engineering teams with the staging and development of complex structures.

Glen delivers buildability options and details during the complete design process and excels at working collaboratively with project teams and challenges all ideas/concepts always to seek out the best solutions.

Glen has over 20 years of engineering experience and has varied experience on a variety of structures and construction techniques, including:

- Wynyard Place
- International towers Barangaroo
- Project 177 Pacific Hwy, North Sydney



Steffen Schuetze, Associate Director

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Leading a designated team in Sydney, Steffen has more than 20 years of engineering experience. He has specialised experience in leading projects overseas and has recently been the principal structural engineer on the construction site of the Chatswood Transport Interchange.

Strategic, pragmatic and highly efficient, Steffen has a firm understanding of integrated structural design across a host of sectors and projects including:

- Sydney Metro Pitt Street Integrated Station Development
- Wynyard Walk – Wynyard Station & Pedestrian tunnel
- Chatswood Transport Interchange
- Overseas Passenger Terminal
- White Bay Cruise Passenger Terminal

Our Team



Michael King, Associate Director

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Michael leads the Advanced Analysis Team at TTW, specialising in advanced computer modelling, in particular finite element analysis.

Trained in Mechanical Engineering and a Chartered Professional Engineer, he has extensive experience in 3D modelling and analysis, vibration and structural dynamics, complex geometry, nonlinear material analysis, building frame and stability analysis, soil-structure interaction, analysis and design of concrete shell structures, and seismic analysis.

His portfolio extends across a wide range of sectors including commercial, oversite developments, train stations, public buildings, residential and retail. Transport-related projects include:

- Wynyard Walk – Wynyard Station & Pedestrian tunnel
- Wynyard Station OSD - Little National Hotel
- Cross River Rail Station Cavern Structure
- Sydney Metro Victoria Cross Station Cavern Permanent Structure
- White Bay Cruise Passenger Terminal



Richard Whitfield, Associate Director

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A versatile senior engineer with a strong technical background and detail-focused approach to design, Richard is a driving force in computational design. He has an education in both architecture and engineering and has worked on many high profile and complex structures across the UK, Asia and Australia.

- Sydney Metro Northwest
- Sha Tin - Central Link

Our Team



Stephen Brain, Technical Director

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Stephen manages the NSW civil engineering department and has spearheaded its reputation through his dedication to pragmatic engineering and open relationships with clients.

He adopts this approach irrespective of the project sector and has consequently developed a folio of experience in commercial developments, transport and infrastructure projects, public works projects and residential projects.

His specialisation in master planning has been invaluable to TTW's success. Bringing 30 years of experience, Stephen has led many successful projects such as:

- Wynyard Walk – Wynyard Station & Pedestrian tunnel
- Chatswood Transport Interchange
- Kings Avenue Bridge, Canberra
- Railway Parade Burwood



Adrian Hall Associate

B EngSci (Civil)
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Adrian is a civil engineer, project manager and designer with over 25 years experience. He has managed large scale road work projects including several complex signalised intersections in the Wyong Region, road designs on the Bruce Highway in QLD, the Pacific Highway in NSW, and local intersections in Maitland and Wagga.

Adrian has a broad range of expertise in complex infrastructure and brings his experience as the Development Construction Engineer for two of Australia's largest local council organisations in both QLD and NSW. He was responsible for the overseeing of subdivision and private developer funded works, including roads and intersections, stormwater and related public works.

- Signalised Intersection Pacific Highway, Wadalba
- Dual Lane Roundabout Pacific Highway, Wyong
- Signalised Intersection Pacific Highway, North Wyong
- Signalised Intersection Sparks road, Warnervale

TTW



SYDNEY ■ MELBOURNE ■ CANBERRA ■ JAKARTA

Your Partner in Engineering