

Australian Construction  
Achievement Award

**Technical Paper**

**Parramatta  
Connect** 



# Parramatta Light Rail Stage 1 Infrastructure Contract

---

# Table of Contents

01	PARRAMATTA LIGHT RAIL STAGE 1
03	PROJECT SCOPE
05	WHAT'S MY PART IN THIS?
06	ONE HSE CULTURE
07	VALUE FOR MONEY OPTIONS
13	INNOVATIONS AND SOLUTIONS THAT ENHANCE PRODUCTIVITY
15	COMMUNITY AND STAKEHOLDER ENGAGEMENT
19	TIME, COST AND QUALITY OUTCOMES
22	SUSTAINABILITY
25	REDUCING THE IMPACT ON THE ENVIRONMENT
27	URBAN DESIGN AND LIVEABILITY LEGACY
29	CONNECTING WITH COUNTRY
31	RELATIONSHIPS WITHIN PROJECT TEAMS AND THROUGHOUT THE SUPPLY CHAIN
33	PRIORITISATION OF LOCAL SUPPLIERS, ABORIGINAL BUSINESSES AND SOCIAL ENTERPRISES
35	OUR PEOPLE
37	TRAINING AND SOCIAL OUTCOMES
41	WORKPLACE HEALTH AND SAFETY
43	CONCLUSION



# Parramatta Light Rail Stage 1

## Infrastructure Contract

Stage 1 of the Parramatta Light Rail connects Westmead to Carlingford via the Parramatta CBD and Camellia, with a 12-kilometre, two-way track featuring 16 stops and 12 new or refurbished bridges.

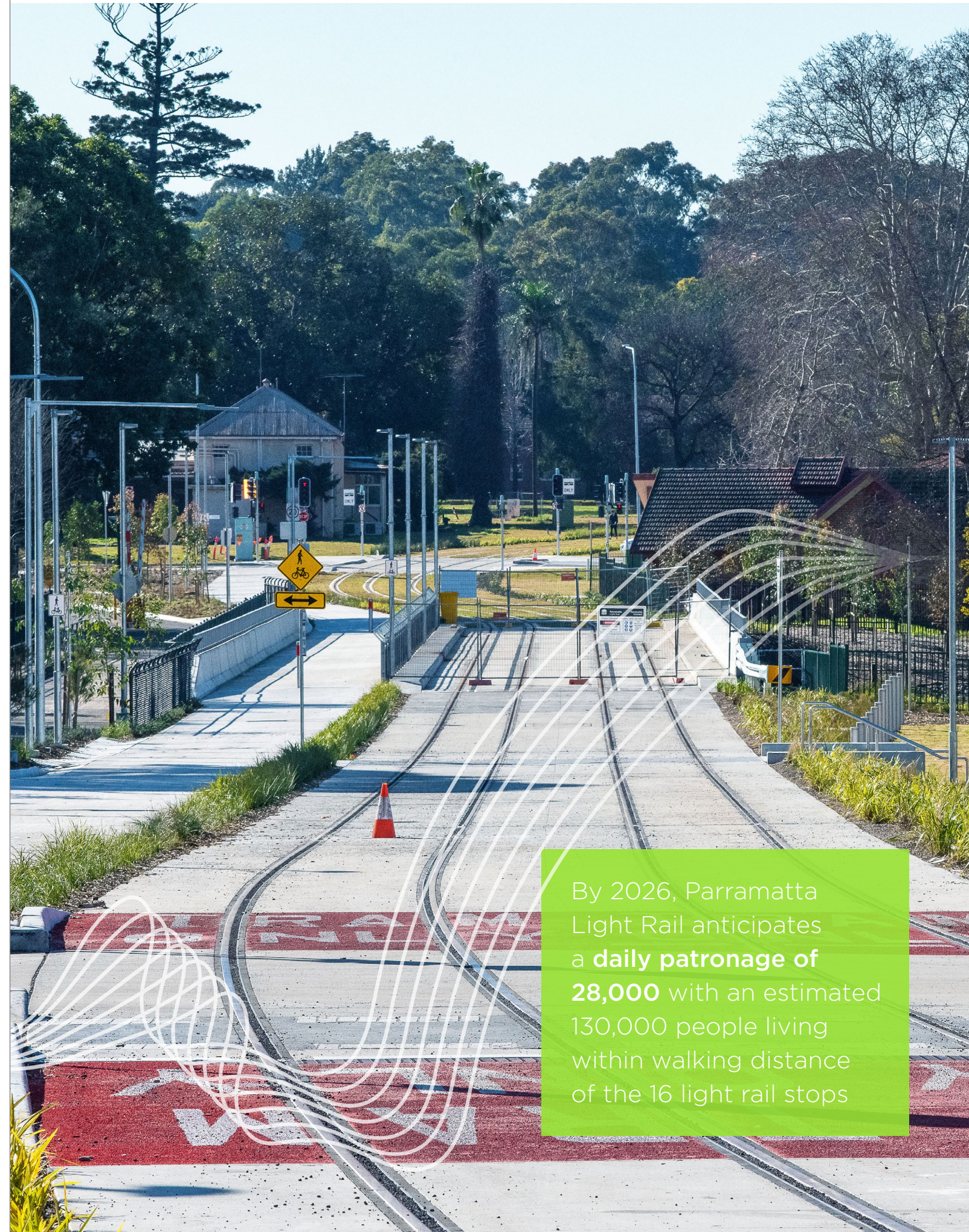
Parramatta Light Rail connects three distinct precincts - the Westmead Health precinct, Parramatta CBD and the suburbs along the former T6 Carlingford Line. The route will link Parramatta's CBD and train station to CommBank Stadium, the largest museum in New South Wales (NSW) Powerhouse Parramatta, the planned private and social housing redevelopment at Telopea, the future Camellia Town Centre, Rosehill Gardens Racecourse and three Western Sydney University campuses at Westmead, Parramatta and Rydalmere.

A dedicated Active Transport Link (shared walking and bike-riding path) was created from the decommissioned T6 Carlingford Line, increasing connectivity between the CBD and cultural precincts for passengers, cyclists, and pedestrians

Parramatta Light Rail is a city shaping catalyst and given Parramatta's unprecedented growth, will leave a lasting legacy as a key infrastructure component of the NSW Government's a Metropolis of Three Cities strategy.

The project will provide Parramatta residents with a high-quality urban realm outcome, and outstanding environmental, social, and economic benefits, while delivering a world class travel experience to Transport for New South Wales (TfNSW) customers.

Parramatta Connect, a CPB Contractors (CIMIC Group company) and Downer EDI Works (Downer Group company) 50:50 joint venture, delivered the Stage 1 Infrastructure package over four years on behalf of TfNSW.



By 2026, Parramatta Light Rail anticipates a **daily patronage of 28,000** with an estimated 130,000 people living within walking distance of the 16 light rail stops

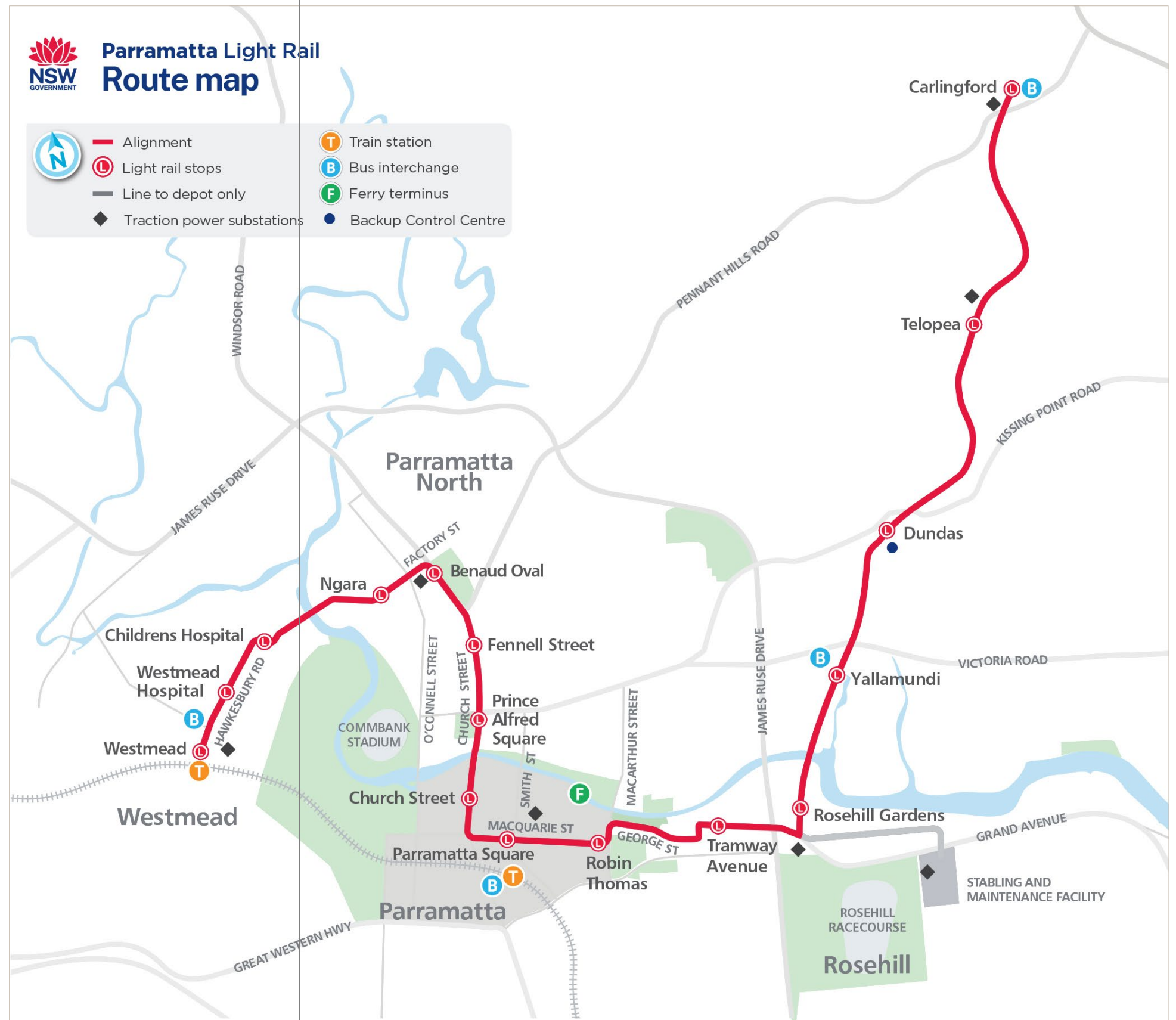


# Project Scope

The scope of works included:

- A new dual track light rail network of 12 kilometres in length, including approximately 7 kilometres within the existing road corridor and approximately 5 kilometres within the existing Carlingford Line and Sandown Line
- 16 fully accessible stop platforms
- Intermodal interchanges with existing public transport services at the Westmead terminus, Parramatta CBD, and the Carlingford terminus
- Overhead line equipment over all tracks except the two wire-free light rail and pedestrian zones within the Parramatta CBD along Church Street
- 12 new or modified bridges
- Alterations to the existing road network
- Relocation and protection of existing utilities
- Public domain and urban design works.

Stage 1 of the project will continue beyond the Parramatta Connect scope with Great River City Light Rail responsible for delivering the Supply, Operate and Maintain package of works.





# What's my part in this?

At the beginning of the Parramatta Light Rail project journey, the Senior Leadership Team came together to work on a project culture that everyone could identify with and would not only support safety and program, but also develop our people to be the best they can be.

A big part of this was creating a project name that would unite the team as one. **Parramatta Connect**, symbolised the connection of the team between each other as well as a connection to the community and its history.

The cornerstone in developing the Culture was to ensure that it was personal and that each individual had a contribution to make, so we developed **"What's My Part in This"** as the project's unique strapline. This allowed team members to remind themselves as well as others they had a part to play in any and all outcomes, project related and or personnel.

The team explored values that would support individuals success and therefore the project's success and through that, they came up with two pillars that would support the establishment and delivery of a strong project culture, of Leadership and Communication.

Our pillars of Leadership and Communication were supported by four behaviours; **We actively develop ourselves and others, We hold ourselves and each other to account, We have direct and honest conversations, Listen with curiosity**, and each behaviour were supported by 2 guiding examples.

Despite the challenges we faced we stayed true to our culture of **"What's My Part in This"**. We persevered, and used our cultural pillars to guide us with leadership and communication at the forefront of our minds.



**"What's My Part in This?"** is the first question we all ask ourselves in relation to our impact on others and it links our cultural pillars

## Cultural Pillars

### Leadership

- We actively develop ourselves and others**  
We deliberately develop specific aspects of ourselves  
We coach/support each other

- We hold ourselves and each other to account**  
We take responsibility for our part  
Hold others accountable for their part

### Communication

- We have direct and honest conversations**  
No triangles  
Direct conversations with care and respect
- Listen with curiosity**  
Active Listening - listen to hear not to respond  
We empathise when needed

# One HSE Culture

THEME	EVERYONE	SUPERVISORS	MANAGERS
Risk management	Understand hazards	Promote risk awareness	Challenge and improve
Standards	Follow rules	Positively reinforce	Set high standards
Communication	Speak up	Encourage the team	Maintain openness
Involvement	Get involved	Involve the team	Provide support

Parramatta Connect adopted the **One HSE culture program**, which ensured a common and consistent set of behaviours for all of us and placed safety at the centre of everything we did.

The program's framework guided our behaviours and defined what each of us could do to build and maintain the One HSE Culture. It ensured that we asked the question, **"What is my part in this?"**.

The behaviours were defined for three groups: Managers, Supervisors, and Everyone, with the 'Everyone' behaviours applying to all people regardless of their role.

The behaviours underpinning the One HSE Culture framework were grouped into four broad themes: risk management, standards, communication and involvement. Each theme was supported by a set of positive ('I will') behaviours.

Following the one HSE Culture philosophy led us to the ultimate goal - that we completed our work successfully, safety conversations were easy, and everyone went home safe each day



# Value for Money Options

Complexity, difficulty, and optimisation of the construction task, including approach to effective risk management

Building in the heart of existing communities is both challenging and rewarding. Working together, Parramatta Connect and TfNSW were focused on delivering the project while remaining sympathetic to Parramatta's rich heritage, and ensuring that we minimised disruption to Westmead health facilities, as well as businesses, residents, and road users.

To deliver a value for money outcome, the project had to be delivered on time whilst minimising disruption, which is very difficult when delivering light rail projects

## Complex Construction Staging

To deliver Parramatta Light Rail Stage 1, the project team operated across multiple construction work fronts, managing concurrent road closures across 7km of urban roads and at 32 existing signalised intersections, while considering the impact on road users and the light rail network

While the work was staged to minimise disruption, the sheer volume of road shutdowns presented a challenge.

The team met these challenges head on, with a robust methodology based on comprehensive planning, detailed staging and traffic management, and an overarching commitment to safety for the workforce, public and road users.

Combined with cutting-edge construction techniques and close collaboration with TfNSW and other external agencies, Parramatta Connect effectively managed risk, minimised disruption, and delivered a truly city shaping project.

**Construction of the Bidgee Bidgee Bridge** was staged to minimise disruption to road users and nearby businesses. The Bidgee Bidgee Bridge has the second longest steel arch bridge span in the state, behind the Sydney Harbour Bridge, and stretches across 65 metres and six lanes of traffic on James Ruse Drive in Rosehill. The main steel sections were fabricated off-site and assembled onsite. An innovative installation approach used a self-propelled gantry system which lifted the whole bridge deck and rolled it across James Ruse Drive to its final position. This eliminated any risk to businesses and traffic, allowing both to operate uninterrupted while the bridge lift was completed in an overnight 12-hour road occupation.

**Construction of a 1500mm micro-tunnel beneath Church Street** in Parramatta's premier dining and entertainment precinct to reduce disruption to businesses and the community. The solution was completed in difficult ground conditions, but avoided the need for traditional, more impactful excavation techniques. The excavation was undertaken beneath the feet of unsuspecting business owners and restaurant diners, without interrupting breakfast, lunch or dinner.

**Considerable effort was employed to manage complex and space-constrained utility relocations.** In traditional light rail projects, the utility relocation programs are underestimated and problematic. Parramatta Light Rail was the largest utility relocation program in NSW to date and required innovative thinking to guarantee success. The best in the business were pulled together at tender time to glean the lessons learnt from previous light rail projects. These lessons included the development of a complete, fully coordinated 3D model of the underground services/civil works. To accomplish this, over 4,000m of non-destructive silt trenching/mapping was required. We found approximately 1750 'unknown utilities' during the investigation phase and subsequently decommissioned them before the construction phase. In previous light rail projects, these "unknown utilities" were a constant source of delay and disruption. Real time Augmented Reality (AR) vision was provided to the design team, minimising the need for redesign work and associated delays. This de-risked the relocations and led to delivery efficiencies that mitigated the impact to local stakeholders.

ROSEHILL  
GARDENS

P2

park

28 CIRCUS



## Managing Service Relocations

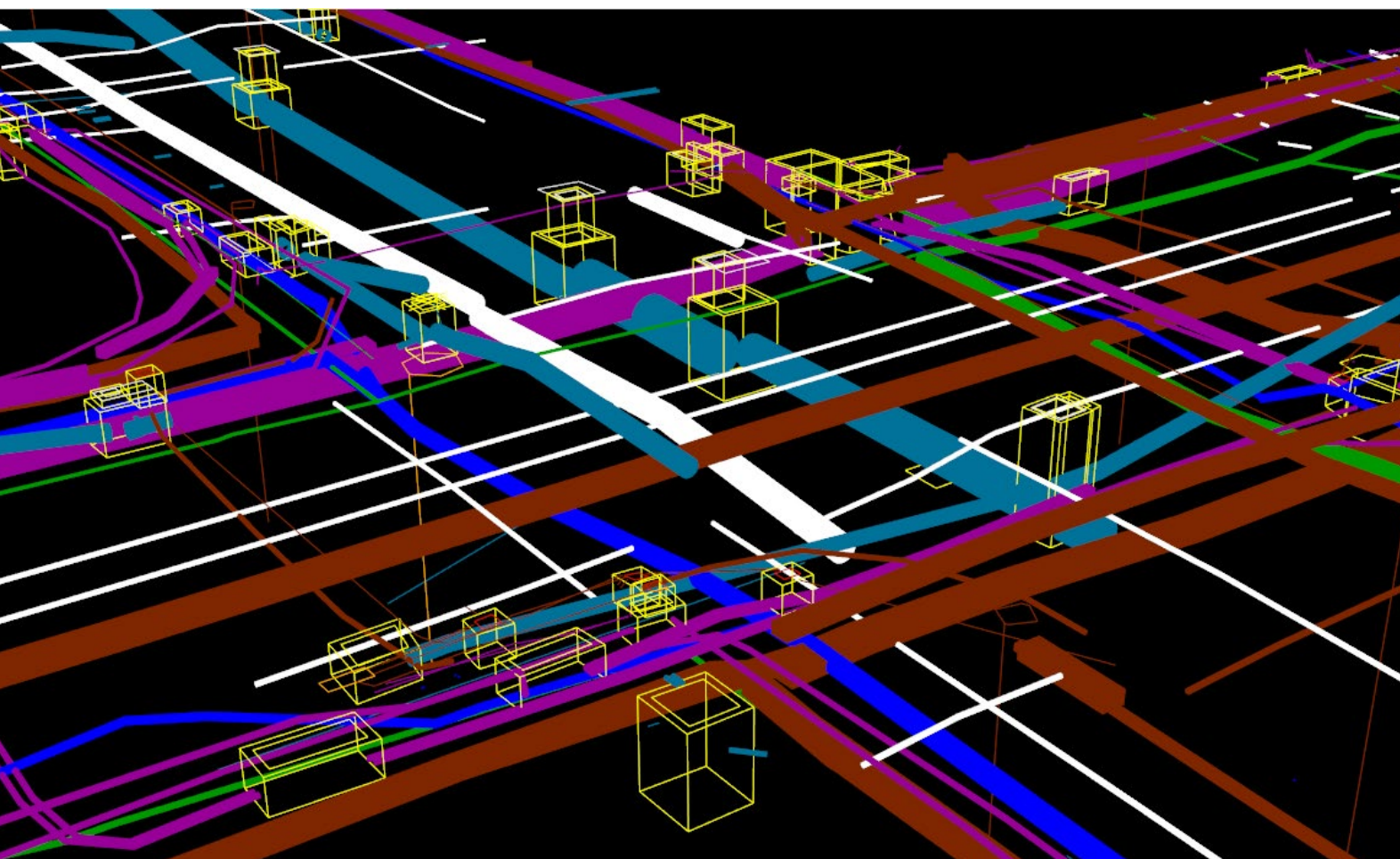
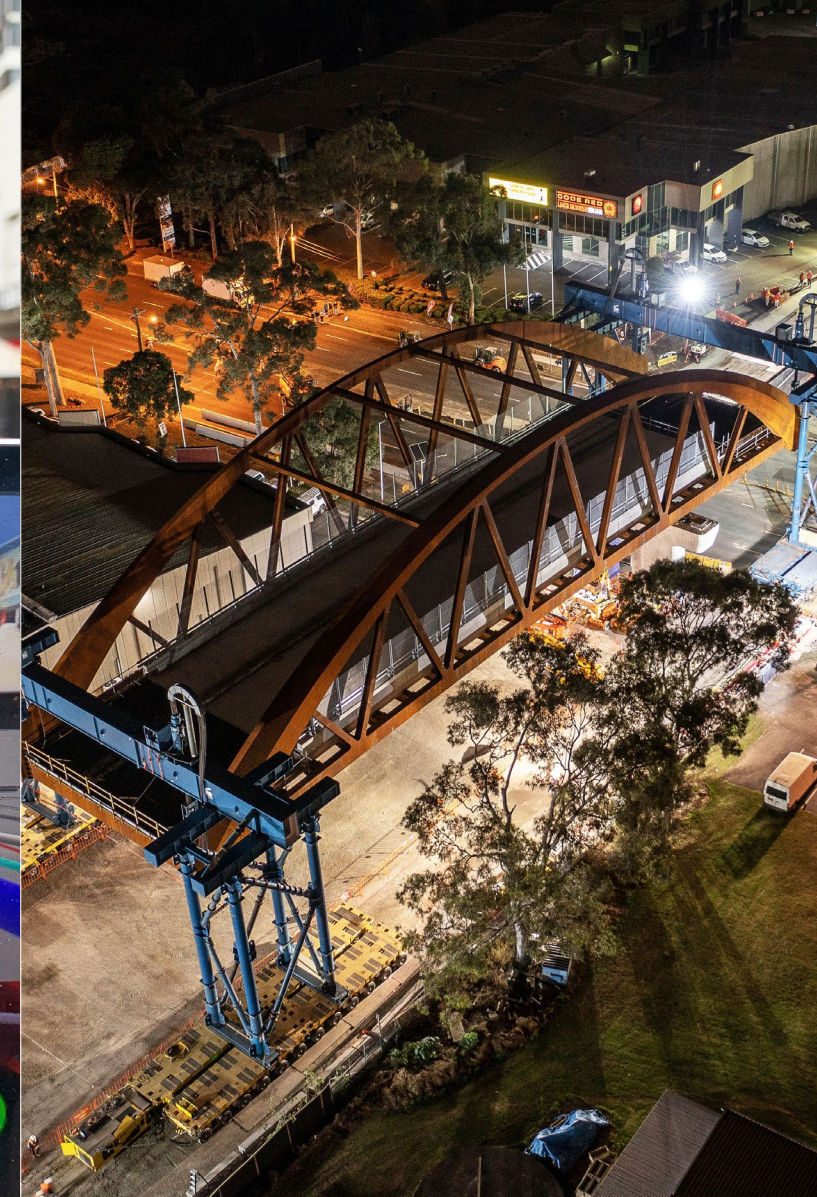
The project included complex service relocations, particularly in the Parramatta CBD areas of Church Street and Macquarie Street. These two streets required comprehensive investigation periods before we commenced detailed utility relocation designs.

Apart from future-proofing the existing utilities for maintenance, a key aim of the utility relocation works was to clear the path as much as possible to allow construction of the subsequent civil and rail works. Utility relocations crossing or running alongside and near the proposed rail alignment were undertaken ahead of the civil and rail trades to minimise congestion and optimise access between work crews.

Due to time considerations in many project areas, it was not possible to have all relocation works completed ahead of the civil and track-slab teams. In these locations, planning and staging the construction works was extremely important. Each project area had integrated teams of utilities, civil and light rail personnel who understood the full scope, and developed programs that allowed the work to be delivered seamlessly.

## Streamlining Utilities

Partnering with experienced utility contractors to develop whole turn-key solutions ensured streamlined delivery and cost savings. A dedicated utilities team was embedded in design and construction, with a focus on managing constraints. The team also invested in detailed site investigations upfront to improve the quality of existing utilities information. It meant that utility relocations were de-risked and undertaken seamlessly, avoiding protracted re-negotiation and design approval gates. Augmented Reality enhanced tools provided us with a clear understanding of the constraints below ground and allowed us to surgically relocate utilities with certainty, guaranteeing value for money outcomes and reducing costs and disruption.



## Accuracy to design and survey

By combining prior knowledge from other light rail projects, the team anticipated issues and developed solutions. Widely varying temperatures over the duration of the project meant that welding works, pre-pour checks and concrete pours needed to take place during consistent weather conditions.

Geometrical and structural challenges including 25m radius curves, multiple crossovers and two triangles made from three complex turnouts, were resolved in a number of ways. These included distributing and reinforcing the rail support system for each rail segment, including an overhang section, and monitoring the rail while pouring concrete, especially on small radius curves; and set out accuracy.

Due to the deflection of the long span Bidgee Bidgee Bridge, a different rail construction methodology had to be employed for each span which required design calculations of the track slab and rail positioning for the different construction phases.



## Managing Heritage

Parramatta has a rich and varied history of Aboriginal and European significance.

**This unique history was respected through bespoke designs, developed in consultation with Heritage NSW, including:**

- A wire-free design in two major sections
- Thin, resin-bound footpath pavements to avoid disturbing unmarked graves
- Avoiding the unnecessary removal of heritage bridge abutments
- Lighting solutions to minimise visual clutter
- Salvage/reuse of local sandstone and bricks.

**Heritage interpretations included:**

- Paving inlays
- Interpretive signage
- Landscaping and installation of an indigenous garden in the Cumberland Precinct.

The project produced a high-quality urban realm finish which is sympathetic to the heritage and cultural fabric of the three distinct precincts.

During construction, community engagement initiatives specific to heritage interest included social media updates, articles, webinars, and a free public heritage exhibition 'A Journey Through Time' at the Parramatta Heritage Centre and Visitor Information Centre, providing interesting insights to more than 1000 visitors during the three-month showing. The exhibition featured local historical information and artefacts that were carefully uncovered and preserved during construction of Parramatta Light Rail, and culturally significant locations and heritage sites, including the culturally significant Cumberland Precinct, former Rum Corps Barracks at Robin Thomas Reserve, and a World War II air raid shelter uncovered at Camellia.

In addition, the project ran heritage webinars accessible for the general public to provide updates on both the Aboriginal and European heritage being uncovered during construction works.

## Managing Environmental Risks

The major environmental risks on the project included:

- Unexpected archaeological finds
- Noise and vibration impacts to residents near works, in-particular during out of hours works
- Contaminates in land and water including acid sulphate soils, asbestos, and contaminated ground water.

To achieve the intended project outcomes, which included enhanced environmental performance, the team established, maintained, and continually improved an Environmental Management System (EMS) in accordance with the requirements of ISO14001:2016. The EMS included a Construction Environmental Management Plan (CEMP), sub-plans, procedures, and tools.



1000+

Aboriginal objects  
discovered

The Traditional First Nations Owners of the Parramatta  
by local Darug people today as the Burramattagal or th

Over the last 34,000 years the Burramattagal lived in several places  
windblown sand banks, looking down onto the river.

This park is located above one living site. Archaeological excavations  
large numbers of stone artefacts, fireplaces and cooking pits. The stone  
used by Aboriginal people changed over time, with yellow mudstone  
by red silcrete, and then white quartz. The materials used in this park  
different types of stone material, and their changing use through time

Aboriginal Heritage  
in Cumberland  
Institutions Precinct

Dyurumina (Sisters)

This precinct was Australia's  
site for convict work  
health



# Innovations and solutions that enhance productivity

Innovation was achieved through a thorough understanding of the challenges and interrogating the benefits and disadvantages of previous methods.

Parramatta Connect conducted a series of face-to-face workshops with representatives from previous projects to assess the opportunities for improvement. This resulted in a number of tools and processes that enhanced productivity and saved time and money.

Innovation was embedded into the design and delivery of Parramatta Light Rail.

## Macro synthetic fibre

A **NSW first innovation** was the use of BarChip macro synthetic fibres (MSF) within the light rail concrete track. This increased concrete durability and performance, enabled more efficient construction, and mitigated potential stray current issues, which are often an ongoing negative legacy issue for light rail systems. The use of MSF within concrete reduced the amount of steel reinforcement required of 2,426 tonnes, resulting in a reduction of carbon dioxide output of over 4,800 tonnes.

Parramatta Connect was able to also reduce labour costs by approximately 15% and significantly reduce the overall construction.

## Rail boot system

An **Australian first** was achieved with the use of an enhanced, more rigid, encapsulating rail boot system. The bespoke boot made the requirement of a floating track slab redundant as it provided a complete system for rail resistivity, stray current and noise and vibration attenuation requirements.

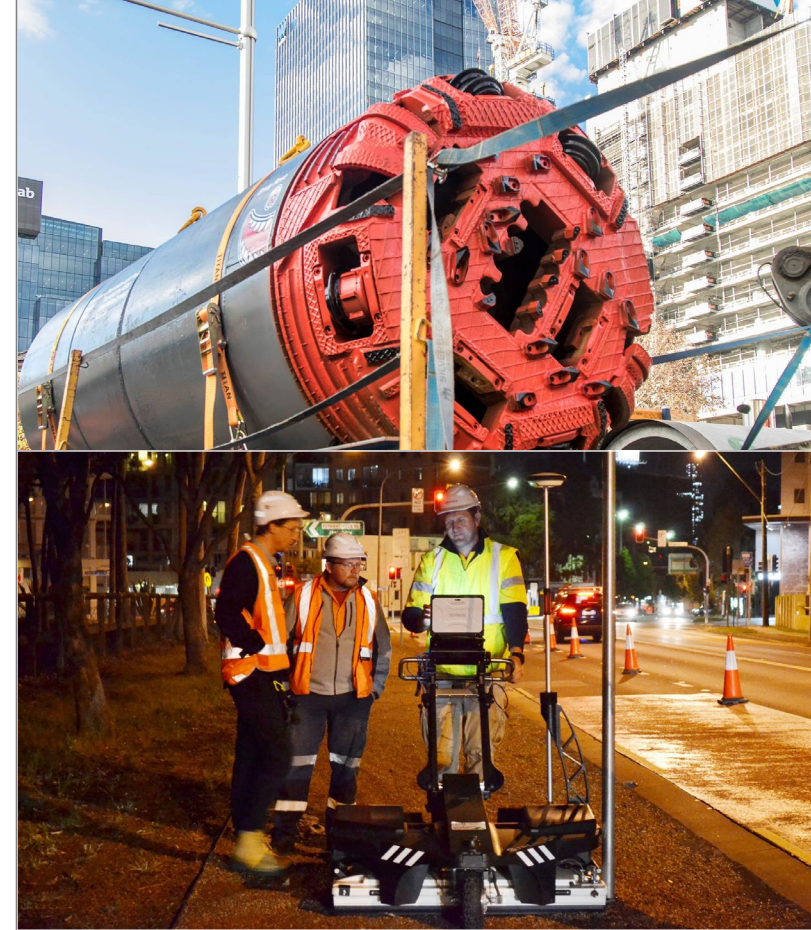
The light rail boot has a double-wide top, an innovation unique to the project within Australia, which prevents rail wear, allows for reduced maintenance issues across the life of the light rail system, and minimises repair works or replacement.

## Micro-tunnel under Church Street

Parramatta Connect designed a micro-tunnel under Church Street to enable more storm drainage capacity within the Parramatta Central Business District (CBD). The solution was completed in difficult ground conditions but avoided the need for traditional excavation techniques which would have been extremely intrusive to the CBD restaurants, other commercial entities, and local residents.

The micro-tunnel:

- **Minimised utility relocations and was a key energy and water saving initiative**
- Minimised the impact of construction through built-up environments like Church Street
- Reduced road and footpath excavations
- Involved smaller construction sites compared to trenching at street level and then laying down a new pipe
- Was quicker and safer compared to traditional excavation methods.



## Utility relocation and management

**Parramatta Light Rail was one of the largest utility relocation projects in Australia** with 14,600 new and existing utilities along the alignment. The delivery of the utility services was very challenging due to the number of locations where work needed to take place simultaneously.

Efficiently resolving unknown services was critical to optimising design and delivery. Parramatta Connect used a unit which operated remotely from outside the excavation to drill or tap services, to determine if they were 'live' or 'dead'.

Identifying live services allowed early solutions to be developed with utility asset owners.

## Smarter Active Transport

Parramatta Light Rail's Active Transport Link is 5.7 kilometres in length and connects people to public transport. The link is **lit by 'smart' overhead lighting** that saves energy by brightening when it senses walkers or riders in the area. When occupants leave the sensor range, the luminaires dim down. This reduces energy and maintenance costs and minimises light pollution, while also ensuring public safety.

## Transposition

**Rail re-use from the T6 line was maximised with a technique called 'transposition'** which swaps the left and right rails, effectively providing a brand-new rail head profile with the worn face now opposite to the running face.

## Head profile design

The profile of the old heavy rail AS60 tracks didn't quite match the profile needed for the new light rail tracks. The existing tracks were only 10 years old and most were in good condition so they were ground to fit the 54E1 profile for the light rail track gauge and ensure compatibility with the light rail vehicle wheel profile.

The new head profile design with a Buffer stop friction head maximises contact area and functionality in the event of a collision.

## Bidgee Bidgee Bridge

A **weathered steel solution** for the long-span steel through truss structure of Bidgee Bidgee Bridge will minimise future maintenance and disruption to rail operations. The installation approach was also innovative with the use of a self-propelled gantry system to lift the bridge deck and roll it across James Ruse Drive to its final seating position.



# Community & Stakeholder Engagement

The project was located within a diverse community with many businesses and residential populations.

Our team needed to be proactive. We worked closely with key interface stakeholders and neighbouring projects to engage with the community and build positive, solid relationships with businesses, residents, and community groups.



## Church Street

The Church Street precinct was one of the most sensitive in the project alignment, involving dozens of businesses and key stakeholders who were affected by the works. Church Street traders open early and close late, meaning that effective construction staging, and open, transparent stakeholder management were essential to minimise disruption.

Conceived during tender and further developed with Parramatta Council, the local businesses and TfNSW, we developed a game winning strategy to get in and get out with as little disruption as possible. We delivered on this strategy with initiatives including:

- Our Microtunnel solution, that travelled over 600m along the dining strip, 5m below the restaurant diners without them even knowing we were there
- Developing the construction schedule to reduce disruptive works on the Thursday, Friday and Saturday nights when restaurants were at their busiest
- Consultation with Church Street business owners which led to a commitment to not undertake any construction activity between 6pm and midnight without prior consultation, meaning businesses could operate with minimal disturbance during the evening trade
- Redesigning the vertical track alignment along Church Street to provide improved flood immunity. The track was redesigned so that the lowest point of the street cross section was lower than the entrances to buildings and shop frontages
- Designing drainage systems to cater for 1% Annual Exceedance Probability (AEP) flows, plus the installation of linear drainage units, optimised flow from the surface to the piped network to reduce the potential for floods created by blockage.

These initiatives demonstrated our commitment to effective engagement, innovation, and advances in new rail line construction, while meeting the expectations of vendors and patrons.

## Activate Parramatta

TfNSW rolled out a comprehensive range of activation events during construction to encourage visitation and ensure business resilience. The Parramatta Connect team supported and promoted these activities which included:

- Initiating an independent business advisory support service, 'Realise Business', which provided free one-on-one support to local businesses impacted by light rail construction
- Establishing a Business Reference Group (BRG) for the local business community. The BRG allowed members to influence the project by providing local knowledge, advice, and recommendations on project initiatives/delivery
- The installation of nearly 2000 metres of colourful shade-cloth and hoarding to highlight the array of local retailers in the popular dining area
- Launching 'Activate Parramatta', an initiative to bring life and vitality into the Parramatta CBD and across the wider alignment in support of local businesses. Activate Parramatta included a series of activities, events and campaigns which promoted businesses and encouraged footfall and visitation (e.g. temporary art, performers, mini parks etc.).

As a result of the COVID-19 pandemic, following extensive consultation with local businesses and the BRG, the project changed its original construction program to implement a three-month construction 'grace period' over the summer months, and instead fast-tracked construction and launched a new extended activation. In September 2021, TfNSW launched 'Eat Street Uncovered' with activations including vibrant and colourful music, lighting, outdoor seating, games, and events.

“ By Parramatta Connect following this consultative approach, the BRG was able to make an informed decision ensuring the concerns of businesses was heard and issues were able to be negotiated.

I am thankful for the efforts Parramatta Connect has taken and look forward to continuing to work collaboratively with you during the ongoing construction of the Light Rail.

**Schon G Condon RFD**  
Chair, PLR1 Business Reference Group



## Westmead Hospital and the Children's Hospital

The Westmead Hospital is one of the busiest medical facilities in Western Sydney, and the construction of this stop presented unique challenges. Works needed to be planned and managed to ensure there was no impact on the day-to-day operation of the hospital, including maintaining emergency access and not affecting sensitive medical equipment. Through close collaboration with key hospital stakeholders and sympathetic construction staging, the Parramatta Connect team were able to successfully undertake the works with zero disruption to the ongoing safe operation of the hospital.

The Children's Hospital stop also presented challenges for both the construction team and the community. The relocation of The Children's Hospital Emergency Department during peak construction, and unprecedented pandemic related issues, complicated construction, and hospital operations. The team worked closely with health authorities and local residents to maintain operations and access for staff and clients.

## Westmead Health Precinct

The Parramatta Connect team undertook extensive engagement with health authorities in the Westmead Hospital and Health Precinct. Work within the Westmead Health Precinct required multiple residential driveway closures. The Parramatta Connect team worked with Westmead Hospital to organise parking for residents on the hospital site and provided security guards at night to walk residents from the car park to their properties.

The team also provided impacted residents with vouchers for meals and coffee that they could redeem with businesses in the construction area.

## Westmead Institute of Medical Research (WIMR) Human Activities Laboratory (HAL)

A WhatsApp group was created for the WIMR HAL. The WhatsApp message informed the Parramatta Connect team of the arrival of donated tissue. All construction activities then stopped in the vicinity of the laboratory until the vibration sensitive medical research was completed. Once the all clear was given, work could resume.

## Engagement during COVID

With COVID-19 and the associated restrictions coming into play midway through our construction period, we needed to alter the way we engaged with the community. Face to face meetings, events and workshops were no longer an option, so we explored digital methods to engage with our stakeholders. For example, we held a series of virtual open days focusing on heritage finds in the project area. Experts spoke to audience members on some of the archaeological discoveries, and attendees could ask questions through the virtual platform.

770,000  
information  
brochures

4,500 enquiries  
answered

330 businesses  
surveyed





# Time, cost, and quality outcomes

Early engagement with multiple stakeholders and meticulous planning delivered outstanding cost, time, and quality outcomes, but the ability to see opportunity in the unforeseen set the culture of the Parramatta Connect team apart.

Ensuring high quality work that met timing and cost constraints was a constant focus for the Parramatta Connect team, who **delivered the Parramatta Light Rail infrastructure package on time and budget despite the staffing, logistical and supply chain challenges resulting from COVID-19.**

To ensure a strong and collaborative relationship with our client TfNSW, the Parramatta Connect project team worked in a co-located office over two floors which included TfNSW, independent certifier, functional leads, and design teams.



## Methodology

On Church Street, we constructed the footpaths with the high-risk tree-pits occupying up to 16m<sup>3</sup> of space in an extremely restricted environment, prior to track slab, so any unknown clashes with utilities or other infrastructure could be designed without limiting design solutions. This prevented significant rework or expensive construction techniques experienced on previous light rail projects.

A delay in the access to one of the abutments for the Bridge Street Bridge saw TfNSW and Parramatta Connect working in collaborative workshops to develop a change in access methodology and the development of temporary works. This meant the delay was mitigated and taken off the Project critical path

The team worked hard to minimise the amount of spoil material leaving the site. Extensive testing was carried out to determine if the excavated material was suitable for reuse on site. Although challenging, due to space constraints, material was temporarily stored on site and then reused in the road and track slab formation or retaining wall backfill.

## Managing COVID-19

March 2020 saw the onset of COVID-19. With Parramatta declared an LGA of concern and the majority of the Parramatta Connect workforce residing in declared areas, we needed to be agile. The project effectively paused for a month before resuming 24/7 operations.

Ensuring high quality work that met timing and cost constraints was a constant focus for the Parramatta Connect team, who delivered the Parramatta Light Rail infrastructure package on time and budget despite the staffing, logistical and supply chain challenges resulting from COVID-19.

The team mobilised quickly and nimbly to take advantage of opportunities caused by reduced vehicle and pedestrian traffic volumes during lock down. The project team was able to close roads and intersections for longer periods of time, enabling continuity of works and more efficient construction, which reduced the impact on the community once lock down was lifted.

### Some of our COVID-19 pivots included:

- Continuing to deliver the D&C scope, introducing bespoke working practices and optimised sequencing across 56 road intersections, while taking the opportunity to accelerate works during periods of lower traffic volumes
- Parramatta Connect empowered the BRG to make construction decisions – for example, waiving the three-month construction embargo in favour of fast-tracking construction and the launch of ‘Eat Street Uncovered’.



# Sustainability

In designing and constructing the project, Parramatta Connect sought to benchmark the project in the wider infrastructure industry by attaining an Infrastructure Sustainability Council (ISC) leading design and As-built rating.

**Parramatta Light Rail Stage 1 Infrastructure Contract was awarded an ISC As-Built Leading rating of 104.35, which is the highest awarded to a project in Australia to date.**

The ISC rating demonstrated Parramatta Connect's commitment to creating a lasting legacy through integrating positive economic, social, and environmental outcomes in the design and construction of Stage 1 of the Parramatta Light Rail project. The achievement of a Leading As-Built Rating showcases the project's continued commitment to sustainability, demonstrating industry leadership and securing beneficial outcomes for the larger community.

## Green track

In a NSW first, Parramatta Connect designed and integrated 1.3 kilometres of green track within three heritage-sensitive environments along the Parramatta Light Rail alignment. Green track requires 81% less concrete compared to standard embedded track form.

### It helps improve urban life through:

Reduction in **rail noise**

**Evaporative cooling** from vegetated tracks

Binding of **particulate matter**

**Production of oxygen**

Providing **habitat and biodiversity**

**Filtering pollutants** from runoff

Regulating **stormwater drainage**

Development of the green track included partnering with Western Sydney University to assess viability and develop a prototype to meet the conditions of Western Sydney.



Parramatta Light Rail Stage 1 Infrastructure Contract was awarded an **ISC As-Built rating of 104.35**, which is the highest awarded to a project in Australia to date





## Key Achievements

**The project has achieved outstanding outcomes through:**

- Implementation of robust management and procurement systems that incorporate sustainable processes
- Thorough assessment of climate change risks and implementation of climate change adaptation measures
- Integration of significant energy, water and material reductions throughout the project's lifecycle
- Excellent environmental management of emissions, pollution, waste and ecology
- Exceptional heritage management and monitoring ensuring heritage values are enhanced and leave a permanent legacy within the local community
- Delivery of meaningful stakeholder engagement with creative and innovative solutions
- Integration of best practice urban design principles into local areas
- Australian and State First Innovative solutions integrated throughout the design and construction of the project
- Workforce Development and Social Procurement Strategy which has achieved greater workforce diversity, upskilling of workers, engagement with social enterprises and aboriginal businesses, and provided opportunities for local communities.



# Reducing the impact on the environment

Benefits were realised early on with the recycling of the track, ballast, and sleepers from the former T6 Carlingford Line, eliminating the need for us to manufacture new rail and transport it to site. This resulted in reduced manufacturing, logistics and storage costs.



**1000** tonnes

of recycled glass in asphalt

**25 000** m<sup>2</sup>

of existing asphalt milled and re-sheeted

**6000** tonnes

of recycled asphalt in asphalt works

**5500**

new trees for Parramatta



36% reduction in **carbon emissions**



22% **reduction in water use**



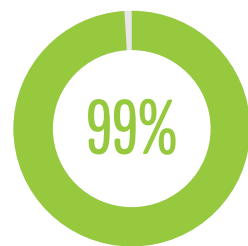
34% **energy impact reduction**



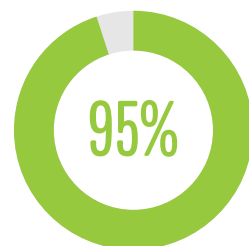
40% of **aggregates recycled**



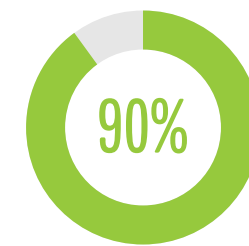
of usable spoil on the project **reused**



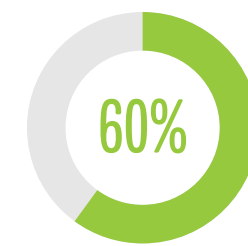
of construction and demolition **waste recycled**



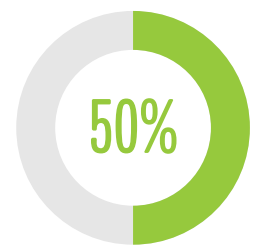
of **topsoil reused** in landscaping works



of the **extracted sleepers** re-used



of the **sleepers** re-used



of the **ballast** re-used



# Urban design and liveability legacy

Parramatta Light Rail is market-leading in terms of light rail delivery, fostering improved community amenity along the alignment and enabling connectivity to, and within, the Parramatta CBD.

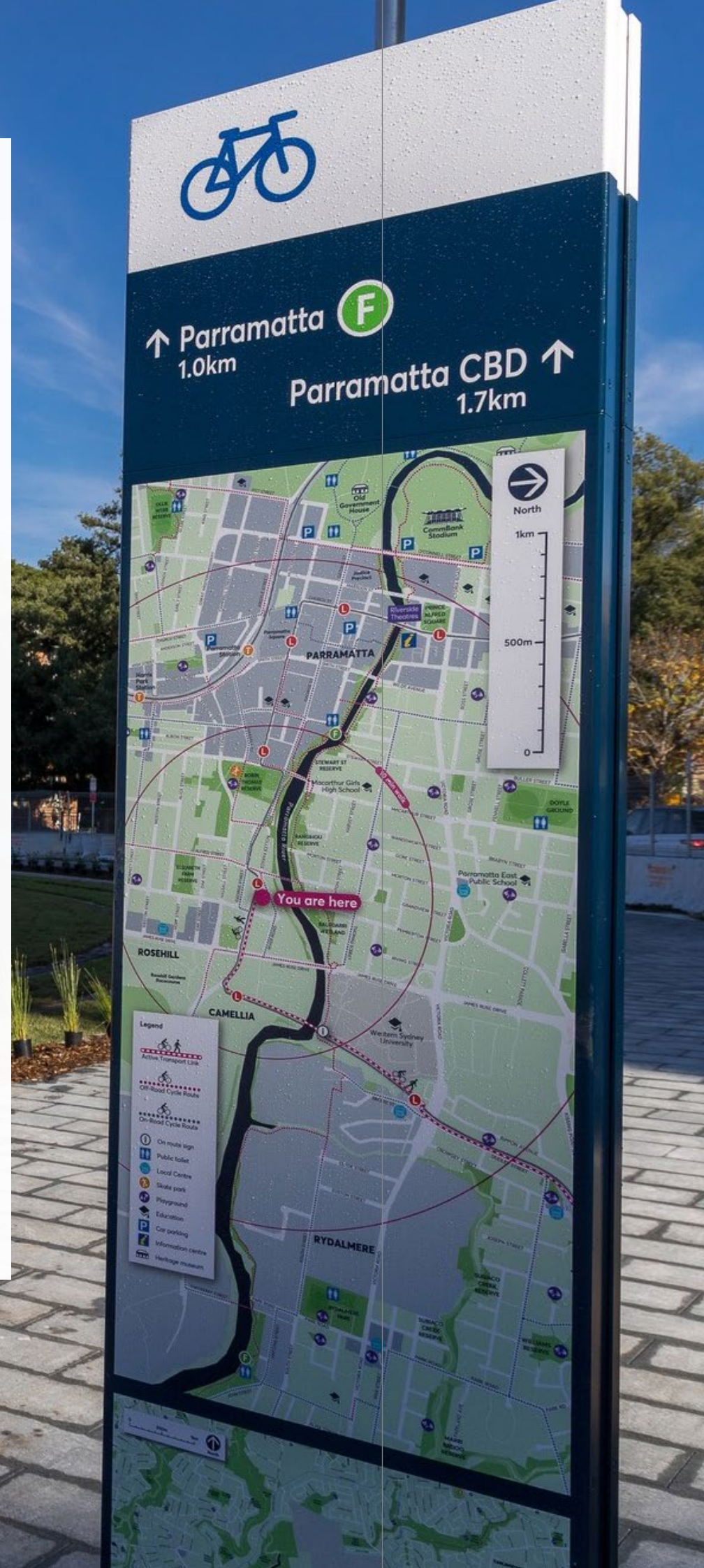
## A shared journey towards a common goal

Light rail has a direct and lasting impact on the form and character of our cities. It directly touches the way people use and interact with the public domain.

Successful delivery is contingent on the ability to bring both the community and agencies - councils, authorities and service providers - on a shared journey towards a common goal.

On Parramatta Light Rail, that process began in the earliest stages of the project. TfNSW established clear expectations and defined outcomes regarding the concept, and formalisation of agreements and deeds prior to selecting Parramatta Connect as the delivery partner.

Parramatta Connect sought to honour those agreements and important relationships from the beginning of the tender process.



Across the project, technical working groups ensured consistency and quality. Development of the Urban Design package was undertaken in close liaison with stakeholders:

- At the beginning of the delivery stage, the tender interactive process allowed new ideas to be tested within the agreed design framework. Council and agency inputs ensured innovations were validated prior to awarding of the contract
- An urban design coordination group was set up with the City of Parramatta and met weekly through the development of construction documentation. Design opportunities were identified and issues addressed
- Advice on the project was provided by an independent Design Review Panel. The process was carefully structured to allow all issues to be canvassed and addressed. Parramatta Connect instigated a formal Issues Log to manage and track design progress. This format has now been adopted by panels on subsequent TfNSW and Sydney Metro projects
- Progressive advice to key stakeholders such as Westmead Hospital and NSW Health ensured that the project delivered on expectations
- Visualisations prepared of the new public realm were prepared to allow community engagement.

## Lasting legacy

The project's integrated urban design elements will leave a lasting legacy for the community. Urban design elements of note included:

- The construction of a green track within three heritage-sensitive environments that merged the infrastructure with the surrounding landscape
- The pedestrianisation of Church Street dining and entertainment precinct which was modified into a car-free zone with the addition of outdoor dining structures and landscaping
- The 5.7-kilometre Active Transport Link between Carlingford and Camelia, which connects people to public transport networks with facilities such as bicycle parking close to stops and drinking fountains
- A strategy to offset the number of trees removed during light rail construction by planting more than 5,500 trees throughout the project corridor to improve urban heat, and community health, and provide increased habitat for local fauna.

Impressively, the project's research study 'Green tracks for Parramatta Light Rail' won the Infrastructure category of the 2022 National Landscape Architecture Awards for 'setting a benchmark for Australian light rail'. The recognition highlighted the project's positive impacts in delivering thoughtful research, design, and infrastructure within built and natural environments.



# Connecting with Country

Parramatta Connect organised an Aboriginal Focus Group (AFG) with local registered Aboriginal Parties (RAPs).

The AFG ensured collaboration with RAPs on the outcomes of archaeological testing and salvage works, management of Aboriginal archaeological artefacts recovered during work, and feedback on project heritage initiatives.

The project worked closely with the City of Parramatta Council and the TfNSW First Nations Engagement team. Graham Davis King, Design Review Panel member for Aboriginal cultural heritage and member of the Deerubbin Local Aboriginal Land Council, held a traditional Aboriginal First Nations ceremony to release the spirit of seven fig trees within the Cumberland Precinct and three fig trees from Robin Thomas Reserve that needed to be removed for light rail work.





# Relationships within project teams and throughout the supply chain

More than ever, our relationships with our client TfNSW, our team, and our supply chain proved crucial due to COVID-19 challenges.

Parramatta Connect **facilitated local Workforce Development Subcontractor forums**

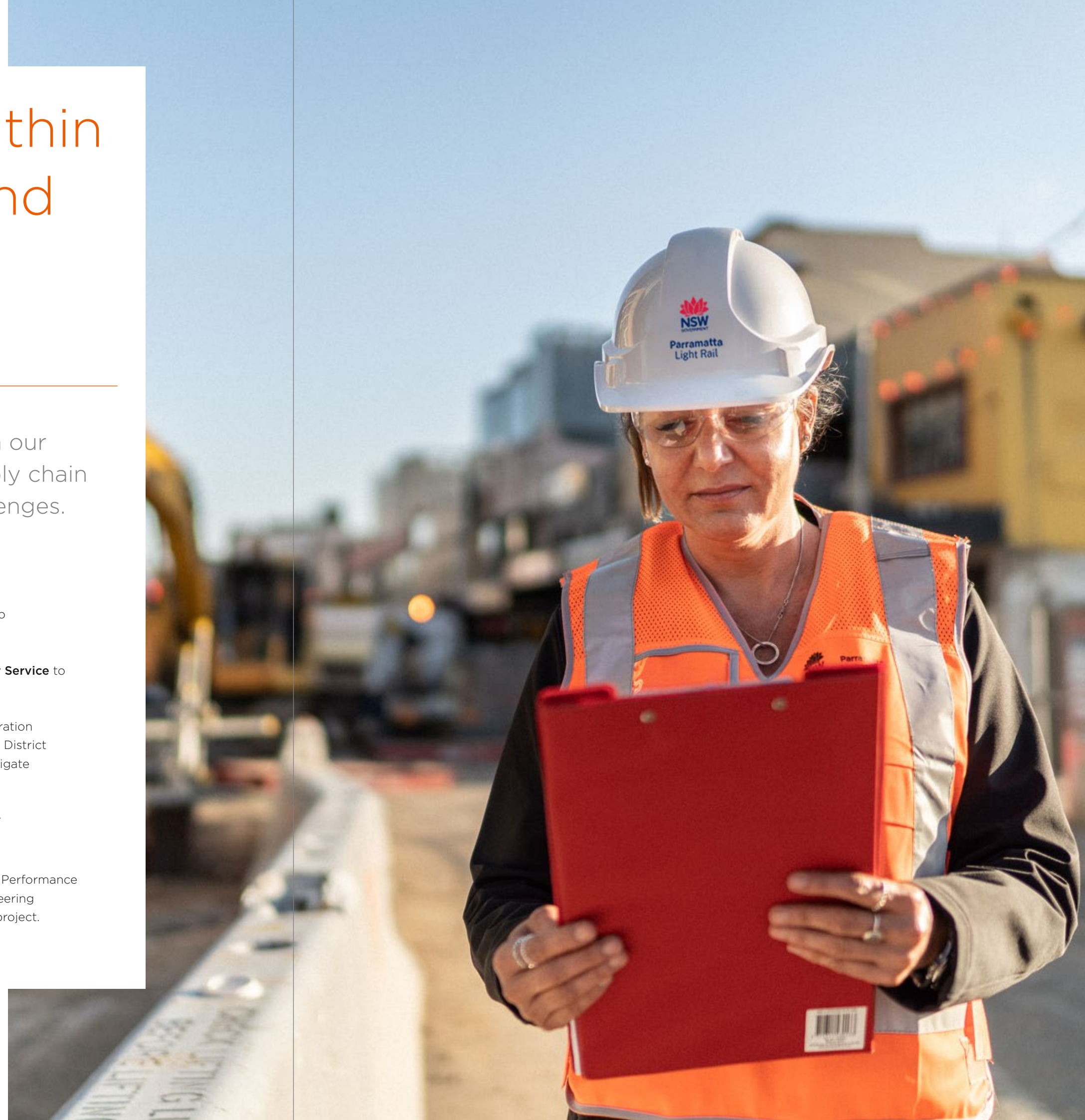
The **team worked with subcontractors** and our direct workforce to co-design project-specific skill sets to upskill existing workers

Parramatta Connect **partnered with the Health & Safety Advisory Service** to deliver a leadership skillset for 'Emerging Leaders'

We **held a series of engagement workshops** with Health Administration Corporation, Research Facilities and Western Sydney Local Health District to understand working and needs of the Hospitals and how to mitigate disruptions and impacts to staff and patients

Parramatta Connect **supported local businesses** during COVID by purchasing coffee and meal vouchers for impacted residents

Parramatta Connect scored highly in the TfNSW Bi-Annual Contractor Performance Report, culminating with the highest score the Parramatta Connect Steering Committee had ever seen in either a CPB Contractors or Downer EDI project.





# Prioritisation of local suppliers, Aboriginal businesses and social enterprises

## Leaving a Legacy

During Parramatta Light Rail, the project team engaged extensively with local suppliers, businesses, and social enterprises.

We worked closely with community groups and external partners to ensure we left behind a legacy that was beyond the physical, with a focus on building relationships, fostering trust, and making a long term and tangible difference.

A core focus of procurement was to leave a sustained footprint in the Greater Western Sydney (GWS) region. This included subcontractors we engaged as well as the workforce they employed. We worked with the Industry Capability Network (ICN), a NSW government funded not-for-profit organisation, to run a prequalification process, and ensured that our procurement documentation not only recorded a business' location, but also took into consideration the number of staff employed within the GWS region. These factors were a key part of the procurement decision making process.

### **Bidgee Bidgee Bridge**

The Parramatta Light Rail project saw the construction of the second largest steel arch bridge in the state (behind the Sydney Harbour Bridge). A number of tenders were received, including from out of state subcontractors. One of the tenders was from the S & L Steel Group Pty Ltd who are a fabricator located in Western Sydney. The project team worked closely with S & L through the complex tender review process to improve their chances of success. When they were successfully awarded the work, it resulted in opportunities for their work force who lived and worked in the project areas.

### **Utilities works**

Due to the complex nature of the works and the city environment, there were a large number of utility relocations on the project. We focused on working with local subcontractors, including GWS subcontractor Ferrycarrig.

Ferrycarrig delivered one of the first utility packages on the project, and their performance on this initial package of works provided them with the opportunity to successfully deliver multiple utility and civil packages across all areas of the project for its duration.

### **Aboriginal businesses and social enterprises**

Throughout project delivery, Parramatta Connect maintained a strong focus on identifying opportunities to engage with social enterprises and Aboriginal businesses.

Parramatta Connect partnered with ICN and the Great River City Light Rail consortium to hold a subcontractor forum for small to medium enterprises, Aboriginal businesses, and social enterprises, who were provided with information on potential tender and supply chain opportunities.

Our procurement processes focused heavily on the engagement of Supply Nation Certified Indigenous businesses.

- New Start Contracting was awarded the contract for the supply and installation of street furniture across the project alignment. New Start is a 100% Indigenous owned Australian company whose key focus it to support local business, recruit from local communities and provide training opportunities through apprenticeships on local projects, and support local community-based programs that benefit the local communities where they are working.
- Borger Cranes hire and rigging services secured the contract for the supply of heavy lift cranes in one of the sections of the project.
- Kallico Catering Pty Ltd, provided opportunity to cater most major milestone project functions.
- Geared Up Culcha supplied the project with the necessary Personnel Protective Equipment (PPE).

### **Social Procurement: Green Connect**

The supply and installation of plants was identified as an opportunity for Parramatta Light Rail to strategically partner with a Social Enterprise. Parramatta Connect worked closely with Green Connect, a Social Enterprise business and pathway for young people and former refugees. Through this process it became clear that due to the scale of the scope Green Connect wouldn't be able to deliver the works in full.

Parramatta Connect approached larger landscape subcontractors and proposed that they create a partnership with Green Connect, with Parramatta Connect engaging the larger supplier directly, and Green Connect working as a supplier to them.

Through significant collaboration with all parties the successful subcontractor, HL Landscapes, formed a partnership with Green Connect to deliver the scope. A number of young people and refugees were provided with employment opportunities that would not have been possible without this partnership approach.

Following on from the successful collaboration on Parramatta Light Rail, HL Landscapes and Green Connect continued to work together to roll out this model across other Sydney based projects.

**The procurement team focused on local suppliers where possible.**

The spend with Small and Medium Enterprises (SMEs) in the Greater Western Sydney area totalled \$68,970,964 which was 6.5% of the total project spend



# Our People

The successful delivery of this project is all thanks to everyone working as a united team and being supportive of one another.



**David Jackson**  
Project Director

David has more than 35 years of experience demonstrating strong leadership and governance skills across all areas of project delivery. Key to his successful track record has been establishing a collaborative delivery culture while maintaining commercial control that is balanced with safety, stakeholder, and sustainability outcomes. David advocates instilling a strong value-based culture within his team, with a focus on cooperation and proactivity to ensure successful delivery.



**Mac Harvey**  
Construction Manager

Mac is a communicative and proactive leader who has delivered numerous large-scale infrastructure projects in Australia and the UK and has developed an effective leadership approach over his 23 years within the industry. Mac's experience was invaluable, due to his understanding of the logistics and processes associated with major infrastructure projects, and his commitment to building positive, productive relationships with Clients and key stakeholders.



**Richard Gardener**  
Interface Manager

Richard has an outstanding track record for developing strong, enduring client relationships and managing and meeting the needs of multiple stakeholders and interfaces. During his 30-year career, he has developed an in-depth knowledge of project delivery allowing him to communicate across all tiers of project management, balancing conflicting perspectives.



**Anne Learmonth**  
Stakeholder and Community Relations Manager

Anne has more than 20 years of experience as a communications professional with extensive skills and networks across the media, public affairs, all levels of government and the construction industry. Proactive in her approach, Anne has a proven track record of delivering successful community outcomes on complex major projects in high-pressure political and industrial relations environments.



**Craig Nichelsen**  
Senior Engineering Manager

Craig has over 26 years' experience in engineering management of major infrastructure projects. He has a forthright approach complemented by high commercial acumen and construction knowledge. Craig understands what is needed for total and effective Project delivery, and the critical role design plays in ensuring projects can be delivered to satisfy client requirements.



**Philip Lenehan**  
SHEQ and Project Controls Manager

Phillip has 26 years' experience across large-scale and complex civil engineering projects in Australia, UK, Europe and Asia, with 21 of those years developing his expertise in project controls. He has played instrumental roles in major rail infrastructure projects across the globe.



**David Gough**  
Senior Commercial Manager

With more than 30 years of experience in the construction industry, David is an effective and experienced leader, developing and mentoring staff with a focus on collaboration and team working. He has an excellent track record working across departments to manage project control, change management, financial reporting and adherence to legal and commercial procedures.



**Josh Milne**  
Workforce Development Manager

Josh is an experienced People & Culture Professional with more than 12 years' experience in an operational setting. He has demonstrated experience in partnering with key business leaders by building on and driving a high performing team culture to achieve successful delivery of complex projects within challenging industries.



# Training and Social Outcomes

Parramatta Connect formed partnerships to ensure the Parramatta Light Rail workforce was equipped with skills that helped them perform their role on Parramatta Light Rail Stage 1, while also providing them with a pathway into additional work upon project completion.

## Partnerships

**Partnered with Training Services NSW and Department of Industry** in a pilot project for the Infrastructure Skills Legacy Program to increase capability in the workforce and create employment pathways.

**Provided pre-employment training programs** for Indigenous Australians, refugees, and asylum seekers to learn entry-level construction skills. Graduates from the first tranche achieved employment via a Certificate II Civil Construction traineeship. It included a two-day Mental Health workshop to provide trainees with tools on how to manage stress and build resilience.

**Engaged office cleaners Clean Force** as our office cleaners, with 50% of employees living with a disability or other disadvantages.

**Parramatta Connect partnered with CathWest Innovation College** to provide three Year 11 students with the opportunity to complete a traineeship in civil construction during their final years of high school. The students graduated with a nationally accredited Certificate II in Civil Construction qualification.



## Positive training and social outcomes

- 53.7% trade roles were **apprentices** (target 20%)
- 39% were **learning workers** (target 20%)
- 14.6% of the workforce were **under the age of 25** (target 8%)
- 16% of the workforce were **women**
- 2.6% of the workforce were **women in non-traditional roles**
- 2.5% of the workforce were **Aboriginal people**
- 4.2% of the overall workforce were from **disadvantaged, disabled and underrepresented groups**



## Positive social impacts

- Actively recruited a **diverse local workforce**, representative of Western Sydney
- **Upskilled existing mature age** workforce in essential areas, such as pipe laying and plant operations to trade level
- Provided civil construction **apprenticeships for mature-age workers** aged in their 30s, 40s and 50s, providing them with the opportunity to upskill and gain formal qualifications which in turn created more entry-level vacancies
- Seven employees gained their **Certificate II in Civil Construction** after completing a program providing opportunities for Indigenous Australians, refugees, and asylum seekers
- **Three Year 11 students** completed a traineeship in civil construction during their final years of high school
- **One site visit and four incursions** were organised for students at Catherine McAuley school for girls during construction. Women from the project gave presentations and spoke about their experiences and skills to inspire students to consider a career in construction
- **3,249** workers participated in **accredited training**, **4,306** participated in **non-accredited training**
- **166 promotions**
- **Social** enterprise spend \$2.3 million
- **Aboriginal participation expenditure exceeded target** by almost \$7 million.



## Parramatta Light Rail Celebrates Women in Construction

The project team celebrated the significant contributions of women in all roles working to deliver this major Western Sydney project as part of NSW Women's Week 2022. These women in non-traditional roles such as engineering, metals and electrical trades, shared why they enjoyed working on the Parramatta Light Rail.



"The health and wellbeing of our workers and members of the public is my top priority, and I love being able to provide support in any way I can."

**Natalie**, Safety Administrator

"It's really rewarding to plan the work, put it into action, and see the final product come to life when finished."

**Tori**, Site Engineer



"It is satisfying to see Parramatta Light Rail come to life and know the benefits this completed infrastructure will bring to the wider community."

**Sinead**, Project Engineer



"It's great to be a part of something that will improve the community."

**Natasha**, Site Forewoman



# Workplace Health and Wellbeing

Parramatta Connect highlighted the importance of a human-centred culture, that supported our workforce with a continuous program of engagement based on authentic conversations.

## **Parramatta Connect cultivated a culture that prioritised the health and wellbeing of our workers**

- Monthly health, wellbeing and safety campaigns including newsletters, posters, speakers, and pre-starts with themes such as Mental Health, Cancer Awareness, Workplace Safety, International Women's Day, and NAIDOC
- 24/7 access to counselling services with regular communication on free mental health courses
- Overstay alerts (Damstra) kept leadership informed about hours worked to mitigate excessive working (and associated impacts, like fatigue)
- Reward and Recognition programs
- Team-building exercises including:
  - Raising \$25,000 for the World's Greatest Shave Cancer Charity
  - Raising \$14,000 for Cerebral Palsy research, services, and technology through participation in the STEPtember campaign
- 'Mindful Leader' workshops and support for teams.

With around 500 workers during the day and 300 at night during intensive construction periods, **Parramatta Connect supported local businesses** by providing our workforce with free coffee vouchers for redemption at participating cafés and restaurants.

The project provided further vouchers on 'R U OK? Day' as a mental health initiative and in support of local businesses.

**5** million +

hours worked

**5000**

safety inspections

## Flexible working

The project understood its legal requirements regarding flexible working under the Fairwork Act. We also understood that employee circumstances change from time to time during employment which would require our project to be agile, and adapt to opportunities where employees requested a flexible working arrangement.

To manage the arrangement the project had a formal process in place for workers to be able to request, be properly considered and effectively managed. Due to the complex nature of the joint venture, it was imperative that all employees from both Downer EDI Works and CPB Contractors were treated fairly through the process and therefore all flexible working arrangements were to be approved on a case-by-case basis by the Project Director. The project had over 10 instances where individuals had requested flexible working and it was approved.

It was important that our people, especially those working away from the project office, still felt connected and a sense of belonging with the project and the team. Not only did we focus more on 'one to one meetings', team meetings and toolboxes, we held regular quizzes and catch ups on Microsoft Teams, particularly during COVID-19.

## **Parramatta Connect adhered to the government's recommendations around COVID-19 to ensure the safety of our workforce and the wider community.**

The project pivoted to allow work to continue during lock down:

- The project effectively paused for a month, before resuming 24/7 operations
- Working from home opportunities were extended by agreement and through the adoption of Microsoft Teams
- Site personnel were rostered to separate shifts to avoid impacts
- Design and other functions were completed remotely.





# Conclusion

The collaboration by Parramatta Connect with TfNSW, suppliers, contractors, adjoining projects, key stakeholders, and the community has resulted in a high-quality State Significant Infrastructure project within a complex urban environment.

The project has delivered considerable long-term benefits in what is a city-shaping investment and a key part of the NSW Government's future vision for Sydney.

Workforce initiatives have provided training and employment for women in non-traditional roles, First Nations people, apprentices, and young, mature, and disadvantaged workers.

Despite COVID-19, Parramatta Connect continued to deliver the D&C scope, introducing bespoke working practices and optimised sequencing across 56 road intersections, and taking the opportunity to accelerate works during periods of lower traffic volumes. Strategies were implemented to minimise disruption such as micro-tunnelling underneath Parramatta's Church Street dining precinct, and developing a utilities relocation program designed to mitigate unforeseen issues.

A milestone of the project was the installation of Bidgee Bidgee Bridge, the second longest steel arch bridge span in the state, which stretches across six lanes of traffic on James Ruse drive.

An innovative installation approach used a self-propelled gantry system which lifted the whole bridge deck and rolled it across James Ruse Drive to its final position. This eliminated any risk to businesses and traffic, allowing both to operate uninterrupted while the bridge lift was completed.

Industry innovations such as macro synthetic fibres and an enhanced rail boot system have had significant sustainability benefits. The green track, Active Transport Link, heritage interpretation and sustainable reuse of materials have also contributed to Parramatta Connect receiving the record breaking ISC 'As-Built' score of 104.35, demonstrating a true legacy-leaving project.

Parramatta Connect contributes the successful delivery of this project to the supportive, collaborative relationship we shared with our Client, TfNSW, and our shared commitment to ensuring this city-shaping project was delivered at the highest quality, on time and on budget for the people of Greater Western Sydney.





## Parramatta Light Rail



Transport for NSW testimonial

30 November 2022

### David Howarth, Deputy Project Director, Principal's Representative – Infrastructure Contract

Stage 1 of the Parramatta Light Rail is one of the NSW Government's latest major transport infrastructure projects being delivered to serve a growing Sydney. It will connect Westmead to Carlingford via the Parramatta CBD with a 12-kilometre, two-way track.

Parramatta Connect (CPB Contractors and Downer Joint Venture) delivered the Stage 1 Infrastructure package of the Parramatta Light Rail project.

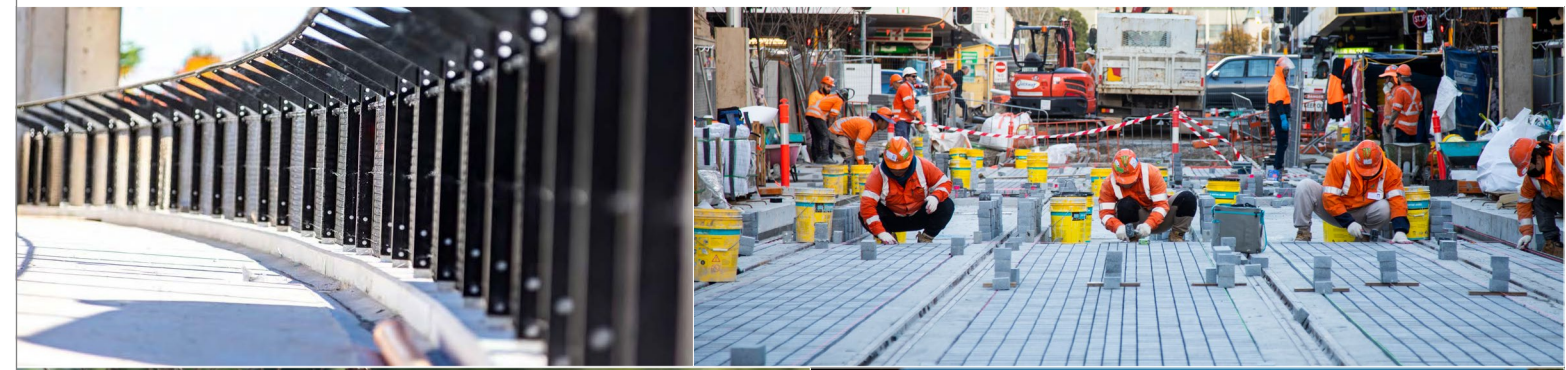
Parramatta Connect has delivered an outstanding package of work for Transport for NSW (TfNSW) and the people of Parramatta who will greatly benefit from the project. Delivering light rail in the heart of existing communities and a busy CBD has proven on many occasions to be one of the most challenging aspects of any project, and the fact that this package was achieved while maintaining public support and broadly on program despite the challenges of COVID-19, bushfires and record-breaking rain events - is a testament to strong leadership and a job well done.

At all levels and throughout the four years of design and construction activities, Parramatta Connect has worked cooperatively and collaboratively with TfNSW and the projects many stakeholders, displaying a problem-solving attitude to the project, resolving issues as they arose, and remaining focused on delivery. The team has performed to a high level of professionalism in delivering major light rail construction on Parramatta's 'Eat Street' on time and to a high quality. Successfully delivering the challenging utility relocation and protection program was a demonstration of the capability and determination of their people.

As a result of COVID-19 and following extensive consultation by the communications and engagement team with local businesses and the Business Reference Group, Parramatta Connect demonstrated flexibility and responsiveness to stakeholders by changing its original plan to implement a three-month construction 'grace period' over the summer months to instead fast-track construction and return the area to local businesses and residents as quickly as possible.

The safety focus of the leadership team has been at the forefront and is reflected in the performance of the team on the ground. Their approach to managing the impacts of COVID-19 was commendable and demonstrated care and attention for their people while maintaining progress on the project.

Parramatta Connect's approach to this project incorporated positive economic, social and environmental outcomes in their design and innovative solutions in their construction methodologies. Their achievement of the highest-ever Infrastructure Sustainability Council score for an as-built infrastructure project is a superior outcome for a complex project and has set a new benchmark of best practice in commitment to sustainability, industry leadership and securing beneficial outcomes for the larger community.





**Parramatta**  
Connect 