Image Courtesy of Newcastle Light Rail Project

FUTURE READY®

Case Study

NEWCASTLE LIGHT RAIL

Project Overview

Newcastle Light Rail is a city-shaping project and a key part of the NSW Government's AUD650m program to revitalise Newcastle, providing a frequent and reliable travel option throughout the city centre and connecting key precincts in the region. It is the first entirely catenary-free or 'wire free' light rail system in Australia. The unique approach uses an on-board power supply and provides charging at stations while passengers board and disembark through a connection to an elevated charge bar at each stop.

WSP was initially engaged in 2014 as lead designer on the project as part of a design joint venture that undertook project scoping, definition and concept design. In 2016, we moved into detailed design, managing complex design issues and volumes of changes to prepare approved-for-construction documents.

Our work included detailing all infrastructure and requirement specifications for all rail systems components, including alignment and civil works, six stops, a depot, power supply, TCS and communication systems.

The design team introduced several innovations enabling the maximisation of on-street parking and minimising lane-sharing between general traffic and light rail vehicles. WSP worked in a joint venture to deliver the project for Downer and Transport for NSW.

What Future Trends Did We Consider?

Society	Technology	Resources
Densification	Digital Expectations	Water Scarcity
		Renewables Reign

How Did We Consider These Trends?

Society

Densification – team engaged with stakeholders to maximise available space, addressing concerns around how design would manage road side services, the effects to on-street parking, loading zones, taxi zones and accessibility, as well as the impacts it would have to local businesses. The design solution recognises the necessary integration between land-use and transport planning.

The light rail revitalises the city centre of Newcastle, connecting key activity precincts and stimulating urban renewal opportunities while contributing to the continued economic growth of the region – bringing it one step closer to becoming a global gateway city.

Technology

Digital Expectations – advanced visualisation tools were used to enhance understanding of the various elements during detailed design. Using digital engineering models, GIS, Virtual Reality/Augmented Reality and even Google Street View, the team was able to consistently optimise different parts of the project, confirming data accuracy and accessibility for use in 3D software packages and providing a common design to work from. We created several different animations using the same model, in turn helping the project meet tight deadlines and deliverables.

Resources

Water Scarcity & Renewables Reign – with the end goal of a thriving global gateway city in mind, light rail was chosen for its ability to fulfil a need for transport but also to provide a frequent, reliable, comfortable, energy-efficient and sustainable travel option through the city centre that connects the main activity precincts and reunites the city centre with the waterfront.

Removing many overhead wire structures (made possible because of the new battery technology), enhanced the look and feel while preserving aesthetics and heritage architecture. We also designed open plan ceilings to help with natural lighting and ventilation of the depot building, as well as capturing rainwater for reuse.

How Was Our Approach Better?

As one of the first light rail systems in New South Wales that interacts with road vehicles, few guidelines existed regarding how to mark the interactions. WSP explored international standards along with approaches on previous projects in Sydney to develop a solution that aligns international best practice with local needs.

Implementing the new 'wire free' technology brought its own unique set of challenges with regards to modelling and managing expectations to ensure the system is reliable. Our visualisation team worked alongside the design team to continually optimise different parts of the project. The model had increased realism and accuracy, providing an engaging visualisation that reflected the project environment. The animations also helped to maintain the excitement around the project, as it enabled the community and stakeholders to visualise the positive impact it would have on their city.

The Outcomes

The project has helped the city make great strides to becoming a global gateway for economic activity. In the first month of operation patronage numbers on the network were almost double the amount originally forecasted, with businesses also reporting an increase in customers. The end outcome is a light rail that is decluttered and an aesthetic that reflects a thriving mixed-use city.

Newcastle Light Rail was the first Asset Information Management System developed in NSW that complied with the Transport for NSW Asset Standards Authority Standards. This was a significant achievement and a result of strong collaboration between the project team, the ASA and Transport for NSW.

WSP and Aurecon, together with Downer, set a new benchmark in light rail with a 'Platinum' response to sustainability during the detailed design stage. Newcastle Light Rail was named 2019 winner of the Regional Projects category at the Australian Institute of Project Management's, Project Management Achievement Awards. In 2020, it received an honourable mention for the Railway Technical Society of Australasia Project of the Year Award, recognising a significant innovative railway project that has had a major impact on rail transport in Australasia.

For More Information

Scott Ney
Client Director, NSW

+61 2 9272 5489
Scott.Ney@wsp.com

Find Us

WSP Australia Pty Limited
Level 27, 680 George Street
Sydney, NSW 2000

wsp.com