FUTURE READY®

Case Study

INLAND RAIL

Project Overview

Inland Rail is Australia's largest freight infrastructure project at more than 1,700 km long. Expected to be operational in 2025-26, regional businesses and towns up and down eastern Australia will benefit with a vastly improved freight transport. Providing a more reliable and efficient access to markets through unlocking regional economic potential, the project will reduce carbon emissions and improving safety on our roads.

WSP holds the longest standing role on the project, commencing in 2010 with a comprehensive feasibility study analysing wide-ranging route options to now delivering five of the 13 Inland Rail packages. Leading the joint venture with Mott MacDonald, WSP was engaged to provide detailed design and construction phase services on the first two critical projects – Parkes to Narromine (P2N) and Narrabri to North Star (N2NS) and a concept design for a third project, Illabo to Stockinbingal (I2S). In 2020, WSP was further selected to deliver the reference design and accompanying primary approvals documentation for two additional projects; Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P).

Our services on P2N included engineering design, site investigation, and environmental and planning approvals; for the P2N and also the N2NS, WSP undertook survey and geotechnical site investigation, flood modelling and environmental impact assessments.

WSP was engaged to complete the Phase 2 design works of the Illabo to Stockinbingal package which included undertaking field investigations, developing a feasibility design and the Environmental Impact Statement.

In 2020 WSP was engaged to deliver designs and environmental approval submissions for the Albury to Illabo and Stockinbingal to Parkes enhancement projects over a total 355km. Scope for the engagement comprises track lowering and slews, new bridges and bridge modifications, level crossing upgrades and a new passing loop.

WSP was also seconded to provide communications support across all the project packages. This included one-on-one landowner meetings, community drop-in sessions and feedback for input into the multi-criteria assessment.

Our current role on the generational project adopts an integrated environmental engineering approach that champions constructability, innovation in design, cost effectiveness and efficiencies in project delivery.

What Future Trends Did We Consider?

Climate	Technology	Resources
More Extreme Weather	Digital Expectations	Circular Economy

How Did We Consider These Trends?

Climate

More Extreme Weather - much of the terrain along Inland Rail is flat topography prone to flooding. The WSP hydrology and drainage team developed a set of flood models, upstream and downstream catchments were designed and these models were used to define the baseline flooding conditions. Construction measures were adopted into the design to control the overtopping that occurs in a 1-in-100-year flood, including the future impact of climate change, whilst balancing the effects upstream and downstream of the rail corridor.

Technology

Digital Expectations - 3D models were produced and used as a communication and information tools throughout the project development. By providing a digital engineering platform the process of data sharing was distributed with the extended project team allowing for access to real-time information across multiple international delivery offices; from Manila through to the United Kingdom and Eastern Europe. A huge amount of data was developed across the various packages. WSP took a process which would usually take 6-10 days to complete and made it an overnight task by keeping data in one space and enabling easy access from all partners.

In 2021 the ARTC Inland Rail Digital team described WSP's model for N2NS as, "the Best Federated Model they have received across the projects so far and the benchmark for all other projects."

Resources

Circular Economy – wherever possible, the reuse of existing materials during construction was prioritized and likewise reduced the need for spoil excavation, disposal and the transportation costs. It was important for the team to assess the strength of the existing available ground materials to retain the strength of the rail formation. Using the Li Selig method (1998) the Geotechnics team measured the properties of the soil to see suitability for reuse. This method was not typical in Australasia, and was used for the first time in Australia on the N2NS project. Calculations proved that the soil could be reused, creating many benefits for the client as well as the community, including – smaller carbon footprint: 60 per cent savings of carbon emissions from fuel used in import haulage; less pressure on the road network; less damage to roads; fewer hazards for pedestrians; less pollution; and significant cost savings.

How Was Our Approach Better?

Due to the significant geographic length of the project, WSP implemented computer upgrades to enable our multidisciplinary team including 25 flood modelling experts, to model the massive flood plains and cachment areas (up to 5000km^2). This facilitated optimisation of the height of the rail line, minimising material volumes and costs whilst protecting the local farms and communities from potential adverse impacts.

WSP was the first to apply the Australian Rainfall & Runoff 2016 (ARR2016) guideline to a large-scale flood study. The guideline is typically used to estimate flood characteristics for the design of culverts and bridges, floodplain management and planning and design of urban drainage systems.

Defining the sustainability approach, the Inland Rail Sustainability Requirements Framework creates consistency across all stages of the program and project delivery. Inland Rail has committed to achieving an 'Excellent' Infrastructure Sustainability Council of Australia (ISCA) rating. The N2NS project is the first to be registered for an ISCA design rating.

The Outcomes

As freight transport is expected to grow significantly in Australia, achieving an efficient rail network is crucial to building a more sustainable nation. Bulk transport over long distances offers greater fuel efficiency, reduced greenhouse gas emissions, and less traffic congestion by removing trucks from the roads.

For More Information

Jansen Stewart
National Rail Client Director

+61 2 9272 5207
Jansen.Stewart@wsp.com

Find Us

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

wsp.com