

Built to Last:

What a Century of Complex Infrastructure Teaches Us About Delivering Australia's Next One



FROM WHY TO HOW

In our first paper, *Building Australia's Next Productivity Boom*, Webuild argued that infrastructure is far more than construction. It is Australia's most powerful productivity engine. Every rail line, energy corridor, water system and digital network shapes how efficiently businesses operate, how people move and where investment flows.

The scale of the opportunity is clear. Construction generates around 7 per cent of national GDP and employed around 1.3 million Australians in 2023–24. Infrastructure Australia values the five-year Major Public Infrastructure Pipeline at a record \$242 billion. And in an era when capital is increasingly mobile and selective, investors look for more than opportunity. They look for certainty of delivery.

That paper set out why infrastructure matters. This paper turns to how it is delivered well. What turns an ambitious plan into

an asset that serves communities for a century?

It is a question Webuild has been answering for a long time. Through Clough, our history in Australia stretches back to 1919. Around the world, the Webuild Group has delivered some of the most complex dams, tunnels, bridges and rail systems ever built. This paper distils that experience into five practical lessons for Australia's pipeline. Most of them the industry can apply itself, on every project, starting now; others depend on how projects are planned and procured.



Narrows Bridge, Perth, Western Australia, 1959

A CENTURY OF BUILDING AUSTRALIA

Clough was founded in Perth in 1919 as builders J.O. Clough and Son. Over the decades that followed, it helped shape modern Western Australia: Perth's first high-rise in 1955, the Narrows Bridge in 1957, the Barrow Island oilfield development in 1965, the Stirling Bridge in 1972 and the Graham Farmer Tunnel in 1996. From the 1970s, Clough expanded into Queensland and across Asia, and it has delivered projects in Papua New Guinea since 1983.

Webuild's own Australian journey began in the 1970s, when it entered the Victorian market through its predecessor companies, to build the Melbourne Underground Rail Loop, known today as the City Loop. Since then, the Group has contributed to projects across Australia and New Zealand, from Perth's Forrestfield-Airport Link and the Sydney Northwest Skytrain project to Snowy 2.0, currently under construction.

In 2023, Clough's operations became part of the Webuild Group, and they now operate together as Webuild in Australia. Today, the Group is delivering 14 projects with 10,000 direct and indirect employees as part of a global group of around 85,000 people working in more than 50 countries. Our current work spans transport, water, health and industrial infrastructure, including the North East Link tunnels and the Suburban

Rail Loop East in Melbourne, and, in Western Australia, the Woodman Point Water Resource Recovery Facility, the K2 Power Generation project and the new Women and Babies Hospital in Perth.

The Narrows Bridge still carries Perth across the Swan River. The City Loop still moves Melburnians every day. That is what built to last means: infrastructure that outlives the people who built it and continues to serve the generations who follow.

FIVE LESSONS FROM A CENTURY OF COMPLEX INFRASTRUCTURE

As the pipeline grows, the most valuable investment any project team can make is time at the start. Thorough site investigation, early collaboration between designers and builders, and realistic programmes are the foundations of certainty of delivery.

Every major project is different, but the lessons that stand out are:

Lesson 1: Plan Before You Build

The most important decisions on any major project are made before construction begins. Professor Bent Flyvbjerg's research across more than 16,000 projects in 136 countries shows that outcomes are shaped less by what happens on site than by the quality of thinking that comes before it. His advice is simple: **think slow, act fast.**



For complex infrastructure, planning is not paperwork. It is ground investigation, so that tunnels are designed for the geology they will actually meet. It is design maturity, so that construction starts with answers rather than assumptions. And it is interface planning with utilities, transport operators and neighbours, so that the hardest problems are solved on paper during planning, where changes are easier and cheaper to make rather than in the field, where they become more complex and costly.

This is also why early contractor involvement matters. When clients, designers and builders test the design, the ground and the programme together before scope and price are fixed, risks are understood earlier and can be allocated to the party best placed to manage them. Australian governments are already using early contractor involvement and collaborative models on a number of major projects; applying them consistently across the pipeline would be one of the most effective ways to improve certainty of delivery.

Lesson 2: Let Engineering Lead

Complex infrastructure is, first and foremost, an engineering challenge. Ground conditions, groundwater, live transport networks and dense urban surroundings are technical problems that must be understood before they can be managed.

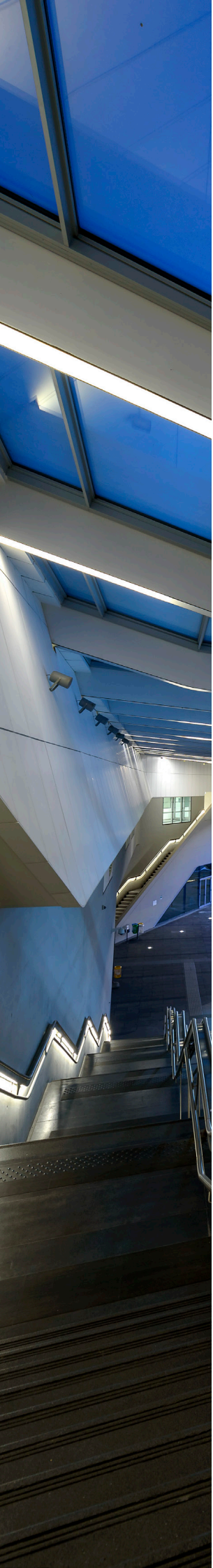
North East Link illustrates the scale of that challenge. The largest road project ever undertaken in Victoria includes approximately 6.5 kilometres of twin three-lane tunnels between Watsonia and Bulleen, which Webuild is delivering as part of the Spark consortium. The tunnels are being excavated by two tunnel boring machines with 15.6-metre cutterheads, among the largest in the world. Each machine is more than 90 metres long and weighs over 4,000 tonnes. Once complete, the tunnels are expected to take 15,000 trucks a day off local roads and cut travel times by up to 35 minutes.

Projects of this kind succeed when engineering expertise is brought in early and given a strong voice. When the people who understand the ground, the machines and the methods help shape the plan, risks are identified, understood and designed out, rather than simply priced in.

Lesson 3: One Team, One Goal

The most remarkable delivery achievements rarely come from a single organisation. They come from many organisations acting as one.

When Genoa's Polcevera viaduct collapsed in 2018, the city lost a vital artery connecting its port to northern Italy and France. Its replacement, the 1,067-metre San Giorgio Bridge designed by Renzo Piano and built by Webuild with Fincantieri, was constructed



in 12 months from the handover of the site.

Around 1,000 people worked on a site that operated 24 hours a day, seven days a week, and continued safely through the COVID-19 pandemic. The bridge opened in August 2020.

The engineering was exceptional, but the decisive factor was alignment. Designers, builders, authorities and the community shared one clear objective, decisions were made quickly, and every party understood that success would be shared.

Genoa had an exceptional legal framework that few projects will ever enjoy, but its central lesson travels. Collaboration is not only a contract model; it is a culture. Shared objectives, integrated teams, fast decision-making and open communication are choices any project can make, and they consistently deliver better outcomes for clients, partners and communities. In Australia, the growing use of alliance and other collaborative contracts provides the framework; the culture has to follow.

Lesson 4: Design for 100 Years, Not for Handover

A major infrastructure asset is operated and maintained for far longer than it takes to build. The real measure of its value is not the cost at completion, but its performance over a lifetime. In Australia, that means designing for the climate an asset will face over its whole life, not just the one it is

built in: more intense rainfall and flooding, longer heatwaves and greater bushfire risk.

It means choosing materials and systems for durability and ease of maintenance, and handing operators the data they need to look after the asset.

Major tunnels and rail structures in Australia are typically specified for a design life of 100 years. Building to that standard costs more at the start and far less over the life of the asset.

Lesson 5: Leave Skills, Not Just Assets

The most enduring legacy of a major project is not always made of concrete and steel. It is the skills, careers, suppliers and capabilities that remain long after the project team has moved on.

Every major project is a training ground. Engineers, tradespeople, project managers and trainees who work on complex infrastructure carry that experience into the next project, and the one after that. Local suppliers who meet the standards of major projects become stronger, more competitive businesses.

Webuild has long invested in this legacy, including over 300 scholarships around Australia. Today, across the country, school-based traineeships, apprentices, graduates and initiatives to build a more diverse workforce, including First Nations employment and supplier participation, continue that commitment.

A growing pipeline is also a once-in-a-generation opportunity to develop Australia's next generation of infrastructure talent. Every project can leave behind more skilled people, stronger local suppliers and clearer career pathways than it found.

WHAT THIS MEANS FOR AUSTRALIA'S NEXT DECADE

Most of these lessons are within the industry's own control and can be applied on every project in the pipeline. Others depend on clients and contractors working together on how projects are planned and procured, and on how risk is shared.

- **Invest at the start:** dedicate time and expertise to investigation, design maturity and interface planning before construction begins.
- **Involve builders early and share risk fairly:** bring contractors in before scope and price are fixed, and allocate each risk to the party best placed to manage it.
- **Bring global knowledge home:** apply methods proven on complex projects around the world, and carry lessons from one Australian project to the next.
- **Build collaborative cultures:** align every party around shared objectives, integrated teams and fast, transparent decision-making.
- **Develop people as deliberately as assets:** treat skills, training and local supply chains as outcomes of every project, not by-products.
- **Make safety the first measure of legacy:** an asset built to last starts with a project where everyone goes home safe, every day.

Webuild's contribution is to bring together global experience and deep local roots. Our teams in Australia draw on the knowledge of a Group that has delivered dams, metros, bridges and tunnels across five continents, and we are committed to sharing what we learn with our clients, partners and the wider industry.

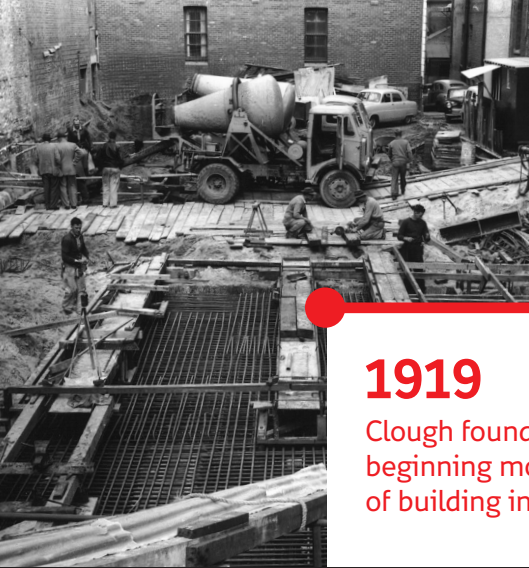


BUILDING WHAT LASTS

Our first paper argued that productivity is the key to Australia's infrastructure ambitions. This paper adds a simple observation: the most productive infrastructure is the infrastructure that lasts.

The bridges, tunnels, railways, power generation, hospitals and water systems being planned and built today will still be serving Australians for decades to come. The choices made now, in how carefully we plan, how well we engineer, how closely we collaborate, how far ahead we design and how many people we develop along the way, will define the quality of that legacy.

Webuild has been building Australia for more than a century. We are proud of that history, and we are here for the next one.



1919

Clough founded in Perth, beginning more than a century of building in Australia.



1970s

Webuild enters Australia to build Melbourne's Underground Rail Loop, today's City Loop.



TODAY

\$242 billion

Infrastructure Australia's five-year Major Public Infrastructure Pipeline.

The contribution of Australia's construction industry in 2023–24:

7% of GDP

1.3 million

Jobs



12 months | 1,000 people:

The construction of Genoa's San Giorgio Bridge from award to handover.



**85,000
people in
50 countries**

The Global Reach of the Webuild Group



**16,000+
projects in
136 countries**

The evidence base behind Professor Flyvbjerg's findings that outcomes are shaped before construction begins.



15.6 metres

The cutterhead diameter of North East Link's tunnel boring machines, among the largest in the world.



Sources

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3. Webuild Group Australia, Our Regions and Our Projects (webuild-group.com.au): City Loop entry; Australia as largest market outside Italy; project portfolio.
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