

DISCIPLINE CASE STUDY

Geotechnical Engineering



Sydney Metro — Western Sydney Airport Station

SYDNEY, NSW, AUSTRALIA

CLIENT: CPBG

The new Sydney Metro — Western Sydney Airport metro railway will become the transport spine for Greater Western Sydney, connecting communities and travellers with the new Western Sydney International (Nancy-Bird Walton) Airport and the growing region.

The project includes six new metro stations at:

- St Mary's, interchanging with the existing suburban railway station and connecting customers with the rest of Sydney's rail system.
- Orchard Hills, to service a future commercial and mixed-use precinct.
- Luddenham, to service a future education, innovation and commercial precinct.
- Bradfield, for connectivity with the future new central business district of the Western Parkland City.
- Two stations within the airport site, at the airport terminal and at the airport business park.



SERVICES

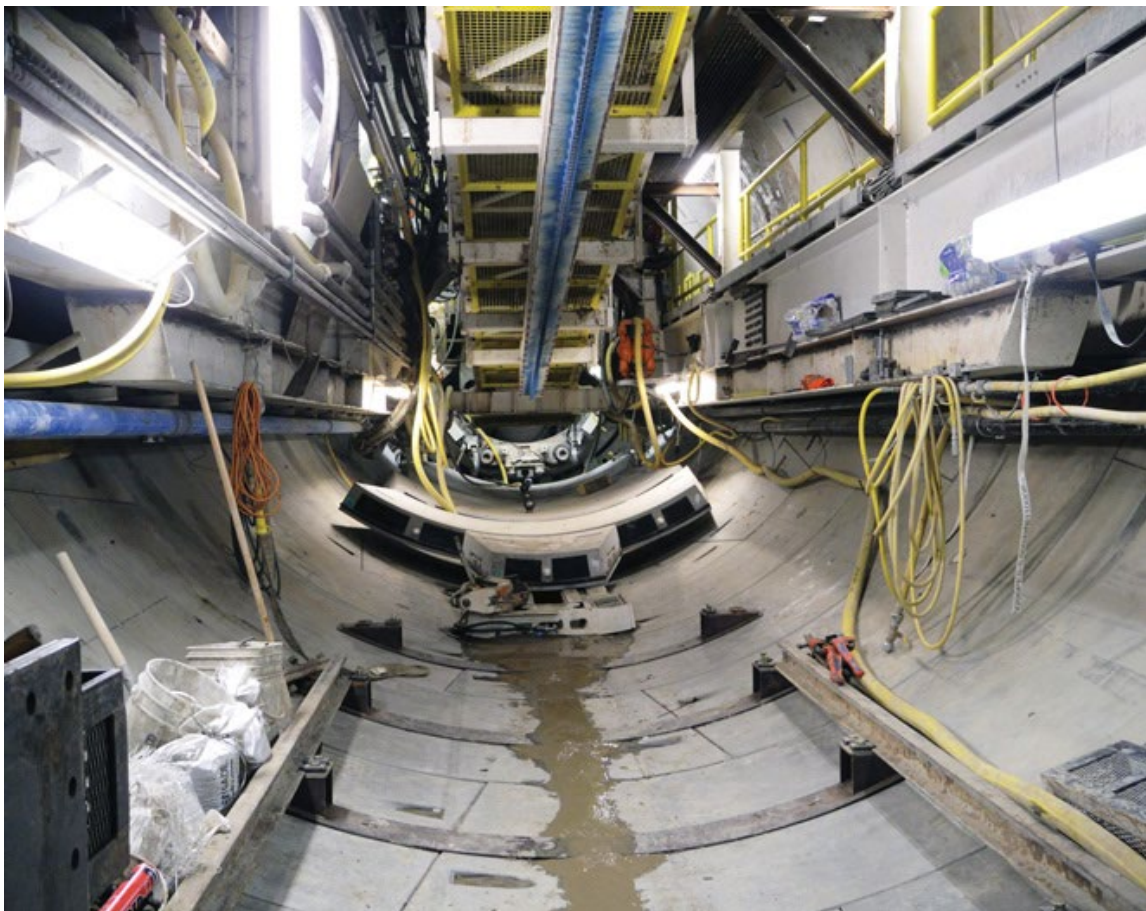
- Provided geotechnical services to CPBG for slope stability.
- Designed the stabilisation measures for the proposed cutting.
- Designed the 300 metre long Orchard Hill station box and dive structure, and the bridge crossing above the dive structure.

BENEFITS

The city-shaping project, from St Mary's through to the new airport and Bradfield City Centre, will provide a major economic stimulus for Western Sydney, supporting more than 14,000 jobs during construction for the NSW and national economies.

The new 23 kilometre railway will link residential areas with job hubs including the new Bradfield Metro Station (previously Aerotropolis), and connect travellers from the new airport to the rest of Sydney's public transport system.

*Sydney Metro — Western Sydney Airport Station —
Sydney, NSW, Australia.*



Western Harbour Tunnel

SYDNEY, NSW, AUSTRALIA

CLIENT: JOHN HOLLAND & CPB CONTRACTORS JV

Western Harbour Tunnel (WHT) will see a new motorway built underneath Sydney Harbour to connect North Sydney to Rozelle, bypassing the CBD.

The project is being delivered in two stages. Stage 2 includes connections from Stage 1 at Cove Street, Birchgrove, to the Warringah Freeway near North Sydney, tunnelling under Sydney Harbour, and the complete tunnel fit-out.

Tunnelling on WHT — Stage 2 started in November 2023 from the Cammeray temporary construction site and is slated for completion by 2025.

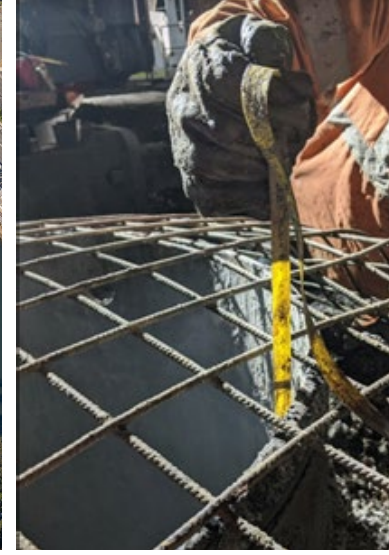
SERVICES

BG&E provided structural, civil, and geotechnical engineering services for WHT — Stage 2. Specifically, our team designed the Cammeray Ventilation Building, the associated ventilation shaft, and several alternations of foundations for mechanical and electrical equipment at Rozelle Interchange.

BENEFITS

On completion, the project's twin, three-lane tunnels are expected to reduce traffic on the Western Distributor by 35%, the Harbour Tunnel by 20%, and the Harbour Bridge by 17%.





Sydney Gateway

SYDNEY, NSW, AUSTRALIA

CLIENT: JOHN HOLLAND & SEYMOUR WHITE JV

Sydney Gateway, a NSW Government project, seeks to complete the missing links in Sydney's motorway network, enhance traffic flow, and reduce travel times between Westconnex and Sydney Airport. Construction of the Sydney Gateway was commenced in 2021 and completed in 2024.

SERVICES

BG&E contributed to the John Holland Seymour Whyte Joint Venture (JHSW JV), which delivered the design and build of the multi billion dollar project.

Services provided by BG&E include:

- Detailed design of the 21 bridges (across 13 bridge locations) within a radius of 2.5 kilometres, which is one of the most congested and complex bridge projects in the world.
- Design services for temporary works and durability, particularly when related to complex steel structure construction.
- Geotechnical services, including pile inspections over 400 bored and CFA piles to validate, and assumed ground conditions with actual ground conditions.

BENEFITS

This critical infrastructure benefits residents and visitors alike — including a new above-ground, toll-free connection from the St Peters Interchange — linking Sydney's motorway network with Port Botany and Sydney Airport's international and domestic terminals.

The new 23 kilometre railway will link residential areas with professional hubs including the new Bradfield Metro Station (previously Aerotropolis), and connect travellers from the new airport to the rest of Sydney's public transport system.

*Sydney Gateway —
Sydney, NSW, Australia.*



M7-M12 Interchange

CECIL HILLS, NSW, AUSTRALIA
CLIENT: JOHN HOLLAND GROUP

The NSW Government has commissioned the M7-M12 Integration project to enhance the road network and support future development growth in Western Sydney.

The M7-M12 Interchange is one of the three major elements of the project and involves the connection of the new toll-free M12 Motorway and the existing Westlink M7 Motorway.

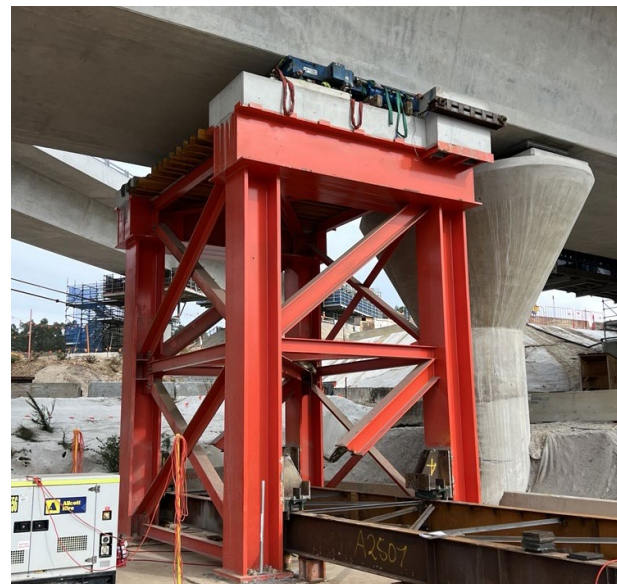
SERVICES

BG&E provided the following services to the M7-M12 Interchange:

- Designed permanent piled foundations for six bridges.
- Designed temporary piles to facilitate girders' launching at two locations.

BENEFITS

The \$2.1 billion M12 Motorway will cut travel time for road users and freight operators by providing an efficient connection to the Western Sydney International Airport at Badgerys Creek and Sydney's existing motorway network.



At BG&E, we are united by a common purpose — we believe that truly great engineering takes curiosity, bravery and trust, and is the key to creating extraordinary built environments.

Our team of more than 800 highly skilled people, in offices across Australia, New Zealand, Singapore, the United Kingdom and Middle East, design and deliver engineering solutions for clients in the Property, Transport, Ports and Marine, Water, Defence, Energy and Resources sectors.