

Waterfront Brisbane Eagle Street Pier

Mass Soil Mixing Working Platform and Deep Soil Mixing Trench Support for Diaphragm Wall Construction at Waterfront Brisbane



62,300+ m³

Total Volume Mixed

19,500+ t

Slag/Cement Blend

4.5 to 8.5 m

MSM Treatment Depth

17 to 19 m

DSM Treatment Depth

PROJECT OVERVIEW

Waterfront Brisbane is a \$2.5 billion transformation of Brisbane's iconic Eagle Street Pier into a world-class riverfront precinct. The development comprises two premium office towers, a revitalised city reach riverwalk, and a vibrant waterfront destination, making it one of Australia's most significant urban renewal projects ahead of the Brisbane 2032 Olympic and Paralympic Games. Developed by Dexus and delivered by John Holland Group, the project demanded specialist geotechnical expertise from the ground up.

THE CHALLENGE

The temporary works phase presented a significant geotechnical challenge. Located directly on the Brisbane River in the heart of the CBD, the site comprised reclaimed land underlain by deep soft clay deposits extending up to 20 metres below existing ground level. These highly variable, weak, and compressible soils could not support heavy construction plant or provide the trench stability required for diaphragm wall construction. A stable working platform and effective earth retention solution were required within a tight sheet-piled cofferdam, while coordinating with live streets, occupied buildings, and multiple concurrent work groups immediately adjacent to the works.



Aerial view — Waterfront Brisbane excavation within the sheet-piled cofferdam

SITE GEOLOGY

Geotechnical investigation identified a complex multi-layer subsurface profile beneath the site. Deep deposits of very soft to soft Holocene clay extend to approximately 15 to 20 metres depth, interlayered with loose to medium dense sands. Below this, Pleistocene firm to stiff clays transition to bedrock at approximately 20 to 25 metres depth. The depth and extent of the soft clay layer was the primary driver for both the MSM platform design and the DSM column depths required to achieve D-Wall trench stability.

PROJECT SNAPSHOT

CLIENT

Dexus

DEVELOPER

John Holland Group

LOCATION

Eagle Street Pier, Brisbane CBD

OUR SERVICES PROVIDED

Mass Soil Mixing, Deep Soil Mixing

DSM PURPOSE

D-Wall trench stability

TREATMENT DEPTHS

DSM: 17m standard / 19m maximum | MSM: 4.5m to 8.5m

BINDER

Blastfurnace slag and cement blend

MSM VOLUME

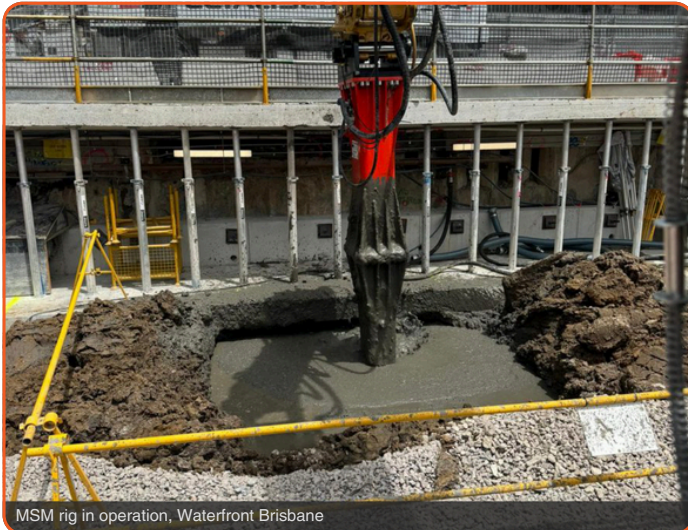
40,800m³ | 7,800 t Binder Consumed

DSM VOLUME

21,600m³ | 11,800 t Binder Consumed

Our Solution

On-site Batch Plant, purpose-built cement mixing and delivery system supporting dual-rig MSM operations, Brisbane CBD



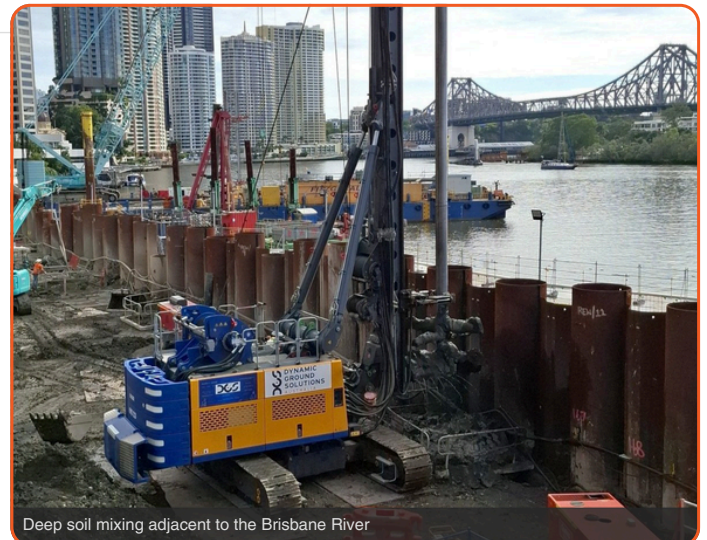
MASS SOIL MIXING (MSM)

MSM was employed to create a stiff, load-bearing working platform across the full site footprint, enabling heavy plant to operate safely over the weak soft clay deposits. Two DGSA rigs worked simultaneously, treating a combined 40,800 m³ of soil and incorporating 7,800 tonnes of a blast furnace slag and cement blend. Treatment depths ranged from 4.5m to 8.5m, increasing progressively as works advanced towards the river. This environmentally responsible binder utilises recycled industrial by-product, reducing the embodied carbon compared to a standard Portland cement mix. A comprehensive verification testing programme including CPT profiling and UCS sampling confirmed treatment outcomes against specified strength requirements throughout execution.

DEEP SOIL MIXING (DSM)

DSM columns were installed in three rows across the site perimeter to provide trench stability for the construction of reinforced concrete diaphragm walls, forming the primary earth retention system for the basement excavation. The 288-column layout was installed to a standard depth of 17 metres, with a section extended to 19 metres to address a deeper zone of soft clay identified through geotechnical investigation. A total of 21,600 m³ of soil was treated incorporating 11,800 tonnes of blast furnace slag and cement blend, alongside 900 metres of pile removal drilling. Verification testing including CPT at 55 locations confirmed column integrity and compliance with design specifications throughout.

Across both MSM and DSM the project consumed 19,600 tonnes of blended binder and achieved an estimated saving of 9,300 tonnes of CO₂e compared with an equivalent GP cement-only solution. This is a reduction of approximately 55% in binder-related carbon emissions for that scope.



OUTCOME

DGSA's ground improvement works successfully created a stable, trafficable platform and provided the D-Wall trench stability required to enable safe progression of the temporary works programme. The combined MSM and DSM approach, using a blast furnace slag and cement blend, delivered a technically demanding solution in one of Australia's most challenging CBD construction environments, on programme and to the highest quality standards.