

Coomera Connector South

Mass Soil Mixing for Retaining Wall Foundation Treatment



4,600+ m³

Total Volume Mixed

350+

MSM Cells Constructed

1.0 to 3.0 m

MSM Treatment Depth

5 Weeks

Project Length incl Verification

PROJECT OVERVIEW

The Coomera Connector Stage 1 South is a major Queensland Government infrastructure project delivered by Seymour Whyte Constructions under contract to the Department of Transport and Main Roads, linking Smith Street Motorway to Nerang-Broadbeach Road on the Gold Coast. The project forms a critical missing link in the motorway network serving one of Australia's fastest-growing urban corridors. DGSA was engaged as a specialist ground improvement subcontractor to deliver Mass Soil Mixing (MSM) at the RW01 retaining wall location, where soft alluvial soils required treatment to provide a stable, shear-resistant foundation for the permanent retaining wall structure.

THE CHALLENGE

Geotechnical investigation along the Coomera Connector corridor identified deep deposits of very soft to soft alluvial clay at the RW01 treatment zone, with undrained shear strengths as low as 25 kPa in the near-surface layer. These conditions presented slope stability and settlement risks that could not be managed through conventional embankment design alone, and the soft clay profile posed an unacceptable bearing and sliding risk for the proposed retaining wall foundation. The design specified MSM treatment at a binder dosage of 300 kg/m³ to create a homogeneous, cementitious treated mass capable of resisting the structural and geotechnical loads imposed by the retaining wall system. A further complication emerged during initial Cone Penetration Testing (CPT) verification: the founding layer was encountered at a shallower depth than the original design had assumed across portions of the treatment zone, requiring the treatment profile to be reassessed and adjusted in the field to suit the actual subsurface conditions revealed by verification testing.

SITE GEOLOGY

The RW01 treatment zone lies within the Coomera River floodplain, where geotechnical investigation identified a soft alluvial clay profile extending from near surface to varying depths across the site. The alluvial clay is characterised by very low undrained shear strengths, in the range of 25 to 50 kPa in the upper profile, with high compressibility and sensitivity typical of recently deposited floodplain sediments. CPT profiling conducted during the investigation phase identified variability in the depth to the underlying founding stratum across the treatment footprint, with the competent layer encountered at shallower depths than the original design model had assumed in some areas. Groundwater was encountered at or near surface level, consistent with the low-lying floodplain setting. These conditions, combined with the structural demands of the proposed retaining wall, made untreated founding on natural soils unviable without ground improvement.

PROJECT SNAPSHOT

CLIENT

Dept. of Transport and Main Roads

HEAD CONTRACTOR

Seymour Whyte Constructions

LOCATION

Coomera, Gold Coast QLD

OUR SERVICES PROVIDED

Mass Soil Mixing (MSM)

MSM CELLS

361 no. (5.0 x 1.5 m)

TREATMENT DEPTHS

1.0 - 3.0 m depth range

TOTAL VOLUME MIXED

4,676 m³

VERIFICATION

Cone Penetration Testing (CPT)
Unconfined Compressive Strength (UCS)

PROJECT LENGTH

5 weeks including verification testing



On-site Batch Plant, Coomera QLD

Our Solution



On-site Batch Plant, purpose-built cement mixing and delivery system

MASS SOIL MIXING (MSM)

DGSA mobilised a 50-tonne MSM rig with dedicated mixing arm to the RW01 location, supported by a purpose-built on-site batch plant comprising a cement silos, dual agitator tanks, and a progressive cavity pump system. Grout was prepared on site to a 300 kg/m³ cement dosage, pumped continuously to the mixing rigs, and blended into the in-situ clay across the full treatment depth on a cell-by-cell basis. Where ground conditions required it, cells were pre-dug prior to mixing. The dual-rig configuration allowed simultaneous treatment of adjacent cells, maintaining production efficiency while meeting the rigorous documentation requirements of the Transport and Main Roads specification. Prior to full production, a pre-production site trial was completed at RW01, including laboratory mix design, field mixing, and coring to confirm binder performance before works commenced.



Mixing operations, Coomera QLD



Finished MSM Product, Coomera QLD



CPT operations, Coomera QLD



UCS Sampling, Coomera QLD

VERIFICATION TESTING

DGSA's integrated CPT and UCS testing programme ran concurrently with production throughout the works. Where CPT verification identified that the founding layer was shallower than originally assumed across portions of the treatment zone, treatment depths were adjusted in real time to ensure the MSM mass was correctly terminated at the appropriate stratum. A total of 216 CPTs and 189 UCS tests were completed, confirming treatment depth, uniformity, and strength compliance across the full RW01 footprint in accordance with the Transport and Main Roads specification.

OUTCOME

DGSA's MSM works at RW01 delivered a homogeneous, cementitiously treated foundation mass capable of supporting the permanent retaining wall structure under the geotechnical and structural demands of the Coomera Connector corridor. The dual-rig production approach, combined with an integrated CPT and UCS verification programme, enabled treatment depths to be confirmed and adjusted in real time against actual subsurface conditions. All 4,676 m³ of treatment was completed and verified in compliance with the Transport and Main Roads specification, with plant demobilised from site by December 2025.