PERTH WATERBANK

PREFABRICTED VERTICAL DRAINS & SHEET PILING

Owner: Metropolitan Redevelopment Authority
Main Contractor: Broad Construction

Specialist Contractor: GFWA
Geotechnical Engineer: Worley Parsons

THE PROJECT

The Water Bank Precinct is located on a man-made reclaimed foreshore at the eastern entry to Perth CBD, adjacent to the Causeway Bridge. Riverside Stage 2 comprises of 6.3 hectares of low-lying reclaimed land. Groundwater was very high and water depth had been recorded to be generally less than 1 m below reclamation. Reclamation was generally performed from 1953 to 1970. Uncontrolled fill, understood to predominantly comprise very loose to medium dense sand with layers of rubble and silty clay, was placed over the entire site. The average depth of fill was 2 to 3 m, but ranged from 0.7 to 7.3 m with the deeper occurrences being associated with the Causeway road embankment. The estuarine deposits beneath the fill ranged in thickness from approximately 8 to 24 m and filled a palaeochannel. This layer comprised essentially homogenous, very soft to soft, clay and silty clay. The site was extremely compressible and ground improvement was required to minimise settlement and creep on the site resulting from development. The presence of potentially acid sulphate soils and other contaminants further complicated the ground conditions. The soil improvement method that was specified for this project was consolidation of the soft clay by surcharging. Prefabricated vertical drains (PVD) also known as wick drains were also specified to accelerate the consolidation period to durations that would be within the target construction schedule.

THE ROLE OF GFWA

GFWA was awarded the sheet piling and PVD supply and installation works for the project.

Prior to commencement of the works a 0.5 m drainage layer was placed on site and a 300 m run of sheet piles, each at least 5 m deep, were installed on the southern and western boundaries of the site facing Swan River.

Early on during the works it became apparent that the site was highly obstructed with bricks, concrete blocks and steel bars. GFWA initiated pre-drilling using an augering rig and predrilled more than 18,000 lineal metres into the fill until the main contractor organised six auger and percussion drilling rigs.

In this project more than 31,200 PVDs were installed down to a maximum depth of 22.4 m. The net total length of the PVD was more than 550,000 m.

At the peak of operations two PVD installation rigs were mobilised for the project. Maximum penetration capacity of the rigs was 28 m.

Measurements indicate that the site settled up to 2.8 m under the surcharge load.

AFS
Sydney
Suite 108, 7-11 Clarke Street
Crows Nest NSW 2065
T: 02 9437 6100, F: 9437 6200

GFWA
Perth
113 Radium St Welshpool
WA 6106 Australia
T: 08 9251 1050, F: 9251 1080

MENARD BACHY
Sydney
13-15 Lyonpark Rd Macquarie Park
NSW 2113 Australia
T: 02 9491 7100, F: 9491 7111