Raine Square Development

Client: Saracen Property Group
Location: Central Business District, Perth, Australia
Date: 2006-ongoing

In 2006, as a result of the high demand for quality office space in Perth's CBD, the Saracen Property Group began work on a 22 level commercial/ residential development at Raine Square. The development will include three levels of retail and three levels of underground parking.

ATC Williams* was commissioned to undertake the geotechnical investigation and analysis. We had previously carried out similar geotechnical analyses at other high-rise residential sites in Perth for one of the client's related companies, Saraceni Engineering.

The specific services we delivered for the Raine Square development included:

- geotechnical investigation by drilling and CPT
- acid sulphate soil (ASS) investigation and assessment
- analysis of raft foundation behaviour
- assessment of pile capacity for piles taken to bedrock
- advice on diaphragm wall design
- review of diaphragm wall construction and anchor capacity
- review of ASS and dewatering management plan
- site inspections during excavation and on completion of basement slab subgrade preparation
- assessment of temporary wall support at sections where anchoring was not permissible
- review of available geotechnical information for design of pedestrial tunnel and retail area between Raine Square and William Street station.

Construction of the diaphragm wall and basement excavation began in April 2007.

Determining the appropriate foundations to support the structure was a key issue for the development. Although a raft foundation was considered feasible, piled foundations to lift cores and load bearing columns was preferred, to minimise the differential settlements and optimise the construction programme.

We also recommended split level dewatering of upper unconfined and lower confined aquifier.

Results of the ASS investigation suggested that all soils below the water table (most of the 11m deep excavation) required neutralisation rate. A particularly concentrated layer of sulfidic acidity was discovered between the upper dune sands and the Perth Formation alluvial clays.

ASS treatment, using an in situ belt fed treatment system, was initially adopted but as the excavation progress was too fast, off-site treatment was subsequently undertaken to complete the excavation.

The basement construction was successfully completed in October 2008 and above-ground construction is now underway. ATC Williams continues to support the client with geotechnical investigation for the proposed tunnel that will link the site to the William Street (Perth Underground) station platform.