PACKHAM ESTATE

STONE COLUMNS

Owner: Urban Focus

Specialist Contractor: GFWA
Geotechnical Engineer: ATC Williams
(formerly MPA Williams)

THE PROJECT

Packham Estate in Mell Road is located in Spearwood, one of Perth's southern suburbs. This development that consists of 96 plots comprises of 9.5 hectares of land that was previously used for market gardening.

The site generally sloped from +8 m AHD on the eastern boundary to +1 m AHD along the dry lake western boundary. The geotechnical investigation highlighted the presence of very loose sands, typically up to 10 m but occasionally in excess of 15 m, in some areas. Also, extensive deposits of peat, up to 3 m thick, were identified along the lake area, and groundwater was encountered at shallow depth in the low lying area.

Although the exact details of the type of construction were not available, it was understood that single or two storey buildings with slab on grade would be favoured.

Calculations indicated that in approximately 5 hectares of the development and 25% of the plots the ground conditions would not be able to satisfy the design requirements.

THE ROLE OF GFWA

GFWA was awarded the contract for creating a stiffened ground raft, 4 to 6 m thick, by installing stone columns to homogenize the settlements and to reduce vertical stresses in the lower loose layers by the stiff overlying layer.

Stone was specified to be used to groundwater level, typically 0.5 m below ground surface in the western boundary with the provision of sand fill to be used above that level. In 6 lots, where peat had been identified, the soft material was removed, and replaced with sand. Stone was used throughout the length of the columns in those areas.

Columns were initially designed with 1.1 m diameters. Back analysis of data indicates that installed column diameters were 1.2 m.

In addition to the main goal of the project that was increasing the ground's mass deformation modulus by introducing high modulus stone in the form of columns, further improvement was also achieved as CPT testing showed that cone resistance of the sand in between the columns had also increased after installation of the stone columns.

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