



CASE STUDY

BALDIVIS SHOPPING CENTRE

City of Rockingham, Perth, WA

Reinforced Earth® Retaining Walls
TerraTilt®

Owner: Stockland

Consultant: Wood & Grieve
Engineers

Contractor: Probuild Civil Pty Ltd

Construction: 2014

Background

The semi-rural residential suburb of Baldivis is located 46km south of the CBD of Perth and 11km southeast of the regional centre of Rockingham in Western Australia. Due to developing housing estates Baldivis is one of the fastest growing regions in WA, with a strong population growth of 7.6% per annum.

Stockland announced in December, 2013 that it would be commencing a \$116 million redevelopment and expansion project to quadruple the size of their Shopping Centre. Construction schedules commenced in early 2014 to expand the centre from 7,000sqm to approximately 29,000sqm.

The Reinforced Earth Company (RECO) was engaged by Probuild Civil Pty Ltd to design and supply a total of 2268m² of Reinforced Earth® TerraTilt® precast concrete retaining wall structures. These structures provide foundations that assist in supporting the load bearing needs of associated structures such as stairwells, carpark areas, and upper floor sections on this large project.

Challenges

The western half of the Baldivis region is composed of undulating sand and limestone soil with occasional wetlands. This foundation base is not particularly stable or ideal for this large commercial project. Also the large

precast concrete panel walls and glass areas of the centre attract strong wind loads across the flat vast site. Reinforced Earth® structures combine selected granular backfill with steel reinforcements to create a durable mass gravity retaining wall. The walls support their own weight as well as large dead and live loads imposed by associated structures, vehicles and environmental conditions without having to improve the foundation soils. On a marginal foundation soil, it is possible to use the flexibility of Reinforced Earth to build retaining walls without resorting to special procedures as they provide superior differential settlement. This contributes to a greater flexibility in the design process and cost effectiveness in construction time and materials needed.

The technique is adaptable to retaining walls of any practical height. Precast concrete panels are offered in a variety of shapes and sizes. Greater freedom of arrangement and form is provided by the use offered by the various facing elements, and the many ways in which they can be combined. The simplicity of facing joints permits any number of connections and juxtapositions. By working closely



Main Picture: Attaching and draping the steel reinforcing strips

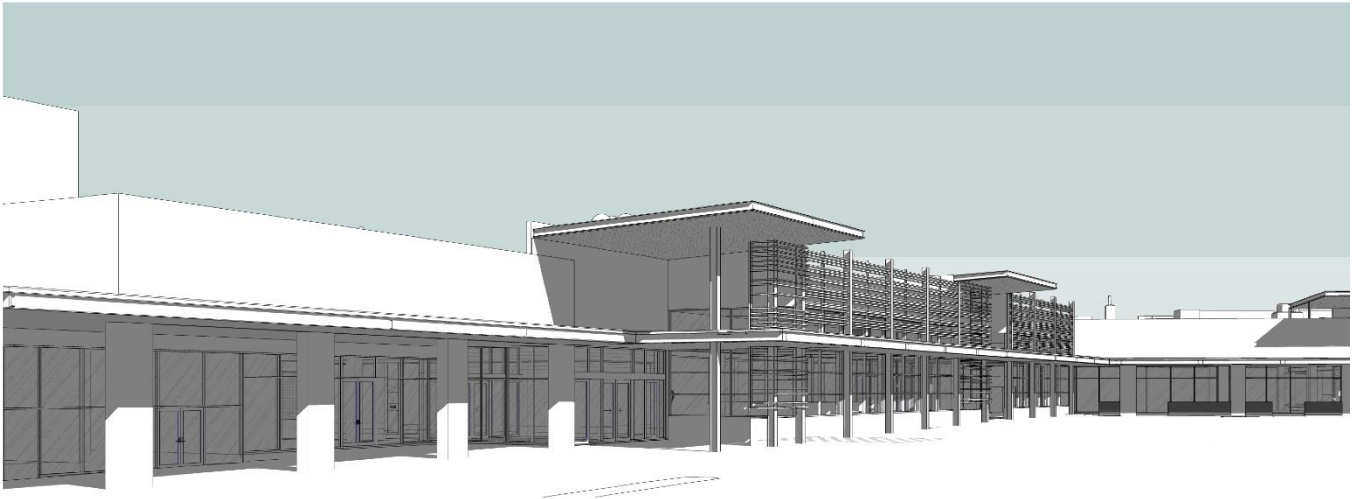
Top: Placing the tall TerraTilt® precast concrete panel

Above: Stairlanding panels will be supported by the Reinforced Earth® block to the right



REINFORCED EARTH
SUSTAINABLE TECHNOLOGY

Commercial Structures



with architects and designers the Reinforced Earth® elements were combined with other specialist engineered systems to create the different structures which make up this shopping centre. One of the retaining walls assisted in supporting a plant room in the upper mall. In other areas air plenum space was provided between the Reinforced Earth® retaining wall and other interior block walls that facilitates air circulation and air conditioning systems. Support was also given for special panels that provided rebates to attach staggered stair landings leading to and from the different levels.

Special Features

The Stockland Baldivis Shopping



Centre continued to trade for the duration of the redevelopment and expansion. One of the advantages of using our proprietary system is that the structure can be built completely from behind therefore not interfering with access, obstacles or the construction of other associated structures. The large full height panels allow simple and rapid erection of the wall. RECO scheduled materials to arrive on site as the construction program dictated and RECO's Precast Facility in Landsdale Perth was able to adjust production to meet with scheduling constraints.

Conclusion

Project specifications

System	TerraTilt®
Finish	Painted Finish
Structure	Reinforced Earth® Retaining Walls 6 Structures in total
Area	2268 m ² (total)
Max. Height	7.65 m
Design load	20 kPa
Design life	100 years

Main Picture: Sketch of Baldivis Shopping Centre

Left: Site View showing the air plenum space for air circulation & conditioners within the centre.