



**CIVIL GEOTECHNICAL SERVICES**  
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10 December 2014

Our Reference: 14464:PJF1953/912

Cranbourne Road Holdings Pty Ltd  
C/- Villawood Properties  
Level 1 6 Riverside Quay  
SOUTHBANK VIC 3006

Dear Sirs,

**RE: LOT 912 OF THE PASADENA ESTATE (STAGE 9), CLYDE**

Winslow Constructors Pty Ltd have recently constructed a residential subdivision (referred to as Stage 9 of the Pasadena Estate) which is located at the south west corner of the intersection of Clyde – Five Ways Road and Berwick – Cranbourne Road in Clyde. As part of the subdivisional works, Civil Geotechnical Services were engaged by Winslow Constructors to provide inspection and testing services for the bulk earthworks associated with the construction of the residential allotments. The testing and inspection services have been undertaken in accordance with the Level 1 requirements of AS 3798 – Guidelines on Earthworks for Commercial and Residential Developments.

The fill materials during the recent construction phase were spread and compacted in 0.2 to 0.3 metre (solid) lifts using a pad foot roller and/or compactor. The fill materials essentially comprised clays that were sourced from adjacent stages of the Estate. Compaction testing of these materials was performed at regular intervals (both vertically and laterally) during fill placement. The resulting density ratios were all in excess of 95% (standard compactive effort).

Construction of the Lot noted above essentially involved a cut exercise followed by grading and shaping to re-contour the surface area of the allotment (ie fill placement was generally negligible), together with some localised soft spot remediation.

The Cranbourne sheet of the Geological Survey Maps of Victoria shows the above site to be underlain by Tertiary aged materials of the Baxter formation (typically sands, clayey sands and sandy clays). The anticipated geology was generally confirmed by the field data and examinations of various service trench excavations and the like that were inspected during construction works.

As a consequence of the site earthworks, the founding medium for a conventional shallow footing system will comprise either compacted shallow fill materials and/or the underlying undisturbed materials. As the depth of the compacted fill materials may be in excess of 0.4 metres, a Class P classification in accordance with Section 2 of AS 2870 – Residential Slabs and Footings would normally be appropriate. However, as the fill materials that have been placed during the current phase of construction have been placed in a controlled manner, a less severe classification would, in appropriate circumstances, be applicable.

After a consideration of the foregoing, the site has been reclassified as Class M. Accordingly, a conventional shallow footing system that is founded in the 'undisturbed' fill materials and/or the underlying naturally occurring materials could be satisfactorily utilised at this allotment.

It is recommended that a stiffened raft slab be utilised at this site. The slab should be designed and detailed in accordance with the Class M classification requirements of AS 2870 – Residential Slabs and Footings. The edge and load bearing beams should be founded in the undisturbed soils at a minimum depth of 0.4 metres below existing surface levels. Edge and load bearing beams founding in this manner would have an allowable bearing pressure of 100 kPa. Provided that contact pressures do not exceed 50 kPa, the raft stiffening beams can be founded in the undisturbed materials at higher levels than the edge and load bearing footings. The slab infill panels can also be founded directly onto the undisturbed materials.

Consideration could also be given to utilising a waffle raft slab. However, if a waffle raft slab is utilised, the near surface topsoil and any loose and disturbed materials will need to be removed from the building footprint prior to construction. Site observations suggest that this option will require the removal of up to 0.25 metres of topsoil materials and the like. However, there may be sections of the site where additional excavation depths are required. If a waffle raft slab is to be utilised, the waffle raft slab should be designed and detailed in accordance with the Class M classification requirements of AS 2870. Particular attention will also need to be directed towards ensuring that a stable moisture regime is maintained around the slab periphery. Furthermore, due to the significant problems that have been experienced with washout from the underside of slab corners, it will be necessary to found the perimeter beams into the undisturbed materials for a distance of not less than 0.4 metres. Beams founding in this manner would have an allowable bearing pressure of 100 kPa. Internal beams may be founded in the 'undisturbed' materials at higher levels than the perimeter beams. An allowable bearing pressure of 100 kPa is also available for these latter beams.

The site classifications and design recommendations presented above assume that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to any structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction, garden bed development or tree root action.

Attention is drawn to Appendix B of AS 2870 and its referenced documents as a guide to maintenance requirements for any proposed structures. In particular, attention should be directed at the design stage towards ensuring that any structures are relatively flexible and well articulated. Guidance on articulation spacings and associated detailing are provided in Technical Note 61 - Articulated Walling which is published by The Cement and Concrete Association of Australia.

The base of all footing trenches should be carefully inspected to ensure that a satisfactory founding medium is achieved. If any doubt exists to the suitability or otherwise of the founding medium, this office should be consulted immediately.

Civil Geotechnical Services



Peter Fry