

Hydrogeological assessment

This assessment has been written by Richard Engel who has a post graduate diploma in Hydrogeology and who worked for the Department of Agriculture as a Groundwater Hydrologist based in Narrogin from 1982-1990. In 1991 was employed as the Departments Stone fruit Research officer based at South Perth and Stoneville Research Station. working in the horticulture division.

The property is an orchard located in a dissected valley on the Darling Plateau approximately 25km east of Perth. The geology of the area is the Archaean shield, and it is located on the Yilgarn Plateau. The geology generally consists of dissected valleys where lateritic hard cap (ironstone) occurs on the valley shoulders, and these overlie deeply weathered kaolinitic clays which have formed from the weathering of the granite basement rock. The depth to the granite basement rock varies from being at the surface to 50m deep and is dependent on how dissected the valley may be. The granite basement rock has been intruded by thousands of dolerite dykes and these vary in size and length and generally run north -south near the Darling scarp and east- west as one moves east away from the scarp. Variable quantities and quality of water can be found around these dykes in the fractures that formed when they intruded into the granite.

The geology is well represented over the property in question and lateritic hard cap can be observed on the western boundary of Lot 12 and outcropping granite can be observed to the East of the property in a bushland reserve. The valley consists of a deeply weathered granite with kaolinitic clays which range from white to brown in colour.

As the property is located in the Darling Range it lies in an unproclaimed groundwater area and does not require a water licence to pump water under the Rights in Water and Irrigation Act.

The area is well known for the production of high-quality stone fruits and apples and limited vegetables and cut flowers. It has been a horticultural area for more than 100 years and in this time, it has supplied the domestic and export markets with this produce.

Growers in the region have traditionally installed bores to water their crops. Some properties are better watered than others and this is a function of the sporadic nature of the fractures in the granite basement rock underlying the region and individual owners' reluctance to seek better supplies on their land due to the high cost of drilling. The drying climate has forced growers to seek more reliable water supplies, and these can often be found in fractures in the basement rock. Generally, supplies are relatively small, and properties generally have many bores to supply the cumulative quantity of water to meet the crop requirements.

The WA Department of Agriculture estimates that a stone fruit/apple orchard require between 6000kl- 8000kl of water per hectare of orchard. The property in question used to operate 20 ha of orchard and estimates of water used would be in the order 120000kl- 150000kl per annum. Today 8ha of orchard has recently been removed due to poor

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returns. Increasing costs of production, prices which have remained static and old trees and varieties has meant that large parts of every orchard in the district have become unviable. The cost of replanting orchard is of the order \$40000-\$50000/ha and for this reason we are seeing a rapidly declining area of orchard around the state.

The DA for this property is for the Extraction of 30000kl of water for sale to bottling companies to help fund a redevelopment of the orchard. The 8ha of orchard that has been removed would have used 48000kl-64000kl of water. The proposed development is a reduction on the current levels of use and we believe that any impacts will be reduced.