THE TERTIARY CONFINED SAND AQUIFER

Information Sheet 3 of 4

Managing the Groundwater Resources across the South Australian - Victorian Border

The Border Groundwaters Agreement

2014

Government of South Australia

Victoria The Place To Be

INTRODUCTION

Information Sheet 1 outlines the importance of the groundwater resources within the 40 km wide Designated Area along the South Australia – Victoria State border and the management arrangements under the *Groundwater (Border Agreement) Act 1985*.

Within the Designated Area there are two main regional aquifer systems —an upper aquifer referred to as the Tertiary Limestone Aquifer and a deeper confined (or pressure) aquifer termed the Tertiary Confined Sand Aquifer. These aquifers are separated wholly or in part by aquitards (or confining beds).

Two east-west cross-sections which illustrate the relationship of the regional aquifers and aquitards are shown in Figure 1. Section A-A is located in the Murrayville–Pinnaroo area and Section B-B is to the north of Naracoorte and Edenhope.

Information about the Tertiary Confined Sand Aquifer is provided below, and information for the Tertiary Limestone Aquifer is given in Information Sheet 2.

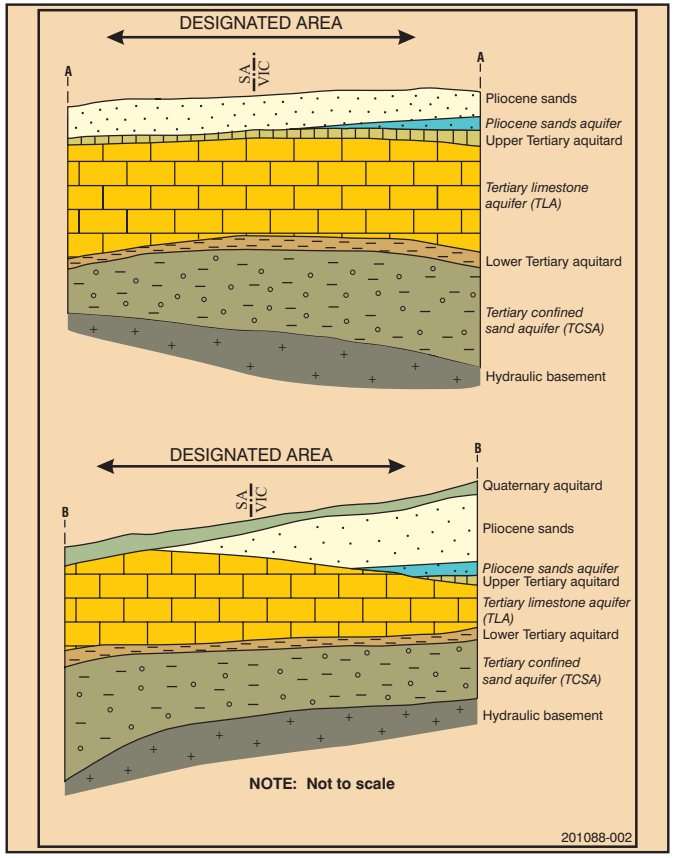

Figure 1 *Hydrogeological cross-section*

THE TERTIARY CONFINED SAND AQUIFER

The Tertiary Confined Sand Aquifer consists mainly of interbedded quartz sand, finer grained sediments and clay horizons.

The Tertiary Confined Sand Aquifer is not greatly utilised in the Designated Area due to the availability of good quality water in the overlying Tertiary Limestone Aquifer, where pumping and drilling costs are lower. The use of the Tertiary Confined Sand Aquifer in the Designated Area is mainly limited to town water supply and industrial use.

Groundwater flow in the Tertiary Confined Sand Aquifer is radially away from the Dundas Plateau in Victoria in a southerly, westerly, and northerly direction.

Groundwater salinity is generally less than 2000 ECU (about 1200 mg/L), however it increases to in excess of 10 000 ECU (about 6000 mg/L) in the north of the Designated Area.

Groundwater elevations in metres Australian Height Datum (AHD) in the Designated Area are shown in Figure 2.

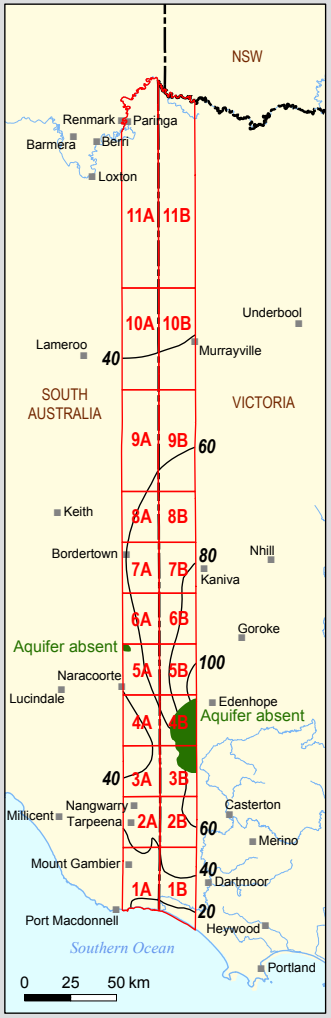

Figure 2 *Tertiary Confined Sand Aquifer groundwater elevation (m AHD) 2006*

GROUNDWATER MANAGEMENT OF THE TERTIARY CONFINED SAND AQUIFER

Management of groundwater resources within the Designated Area has to date concentrated on the Tertiary Limestone Aquifer, given the very low level of use of the Tertiary Confined Sand Aquifer. However, over the last few years there has been an increased level of interest in groundwater from the Tertiary Confined Sand Aquifer. As a result, an assessment of the available resource for this deeper aquifer has been carried out.

Due to the regional nature of the Tertiary Confined Sand Aquifer and its hydraulic behaviour, the assessment needed to focus on the whole aquifer system, not just the Designated Area. For this reason, a number of management areas for the Tertiary Confined Sand Aquifer in both South Australia and Victoria outside the Designated Area were established based on water quality and flow considerations.

Current recharge rates to the Tertiary Confined Sand Aquifer are considered to be low, being only a few millimetres per year. In the past, considerably higher recharge rates occurred during wetter climatic periods.

Proposed volumes of groundwater available for use from the Tertiary Confined Sand Aquifer were developed from lateral groundwater throughflow determinations and by sharing this throughflow along flow paths in the adopted management areas.

A groundwater flow model was also used to assess the throughflow volumes in the southern part of the Designated Area and the adjoining areas in Victoria and South Australia. The model established that there was a reasonable match between modelled inflows to the Tertiary Confined Sand Aquifer under current extraction conditions and the calculated throughflows.

A precautionary approach has been adopted in setting the proposed volumes of groundwater use. It is recognised that there needs to be active review of the behaviour of the Tertiary Confined Sand Aquifer with increased extractions, with on-going monitoring of both water levels and quality. This will enable better assessment of the implications of using the resource at higher extraction rates in the future. The issues include the potential impact of:

- A reversal in the water levels between the Tertiary Limestone Aquifer and the Tertiary Confined Sand Aquifer, which could result in the more saline water from the Tertiary Limestone Aquifer in the western areas adversely affecting the water quality in the Tertiary Confined Sand Aquifer through downward leakage.
- Substantial increase in the downward leakage of groundwater from the Tertiary Limestone Aquifer. This may cause a change in the water balance of the Tertiary Limestone Aquifer resulting in a water level decline in that aquifer as well.
- An increase in the movement of salt to the Tertiary Limestone Aquifer caused by irrigation using the water from the Tertiary Confined Sand Aquifer. This may adversely affect the water quality in the Tertiary Limestone Aquifer.

ADDITIONAL INFORMATION

- Further information is provided in Information Sheets 1, 2 and 4.
- Sheet 1 presents information on the Border Groundwaters Agreement.
- Sheet 2 provides information on the groundwater resources of the Tertiary Limestone Aquifer.
- Sheet 4 presents information on licensing and administrative arrangements in each state.

CONTACTS

For more information on the Border Groundwaters Agreement and/or the groundwater resources within the Designated Area, please contact:

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