TERTIARY CONFINED SAND AQUIFER MODEL 2000

Purpose

The objectives of the model, as described in Brown (2000), are to:

- organise and evaluate hydrogeological information in order to construct a conceptual model of the Tertiary Confined Sand Aquifer within the study area
- develop a transient, numerical three dimensional regional groundwater flow model for the Tertiary Confined Sand Aquifer
- assess the likely impacts of extracting the volumes of groundwater from the Tertiary Confined Sand Aquifer as determined by the Department of Natural Resources and Environment in Victoria (1998)
- examine the possible impacts of the long term extraction in the main artesian area in the South East of Australia.

Background

From Brown (2000), there is relatively minor groundwater use in the Border Zone Designated Area (which is a 20 km wide strip on each side of the South Australian/Victorian Border), compared to the high groundwater demand in the main artesian area, which is approximately 15 km east of Robe. This contrast, coupled with the sensitivity of groundwater extracted from a confined aquifer because it is released from elastic storage, can result in large drawdown cones when compared with an unconfined aquifer. Therefore it is important to manage the Tertiary Confined Sand Aquifer as a whole and a groundwater flow model was constructed to determine appropriate volume of extraction from the Tertiary Sand Confined Aquifer.

The model covers the period from 1973 to 2073. Modelling of predictive scenarios begins in April 1998.

The model was built with Visual MODFLOW.

Location

The location of the model domain is shown in Figure 1.

Model structure

Model domain and grid size

The model domain simulates an area of approximately 45000 km^2. The bounding coordinates are 377300E, 5770000N (south-west) and 573300E, 5998000N (north-east) (GDA 1994, MGA Zone 54).

The rectangular model grid is divided into 57 rows by 49 columns. The grid has a uniform cell size of 4000 m × 4000 m. The model grid is applied to three layers, resulting in 8 379 finite difference cells.

Figure 1. Tertiary Confined Sand Aquifer model domain

Model layers

The regional aquifer system is conceptualised as three layers, including two aquifer layers and one aquitard layer (Table 1 and Figure 2).

Table 1. Model layers

Layer	Hydrogeological unit	Aquifer/Aquitard
1	Tertiary Limestone Aquifer	Aquifer
2	Lower Tertiary Confining Beds	Aquitard
3	Tertiary Confined Sand Aquifer	Aquifer

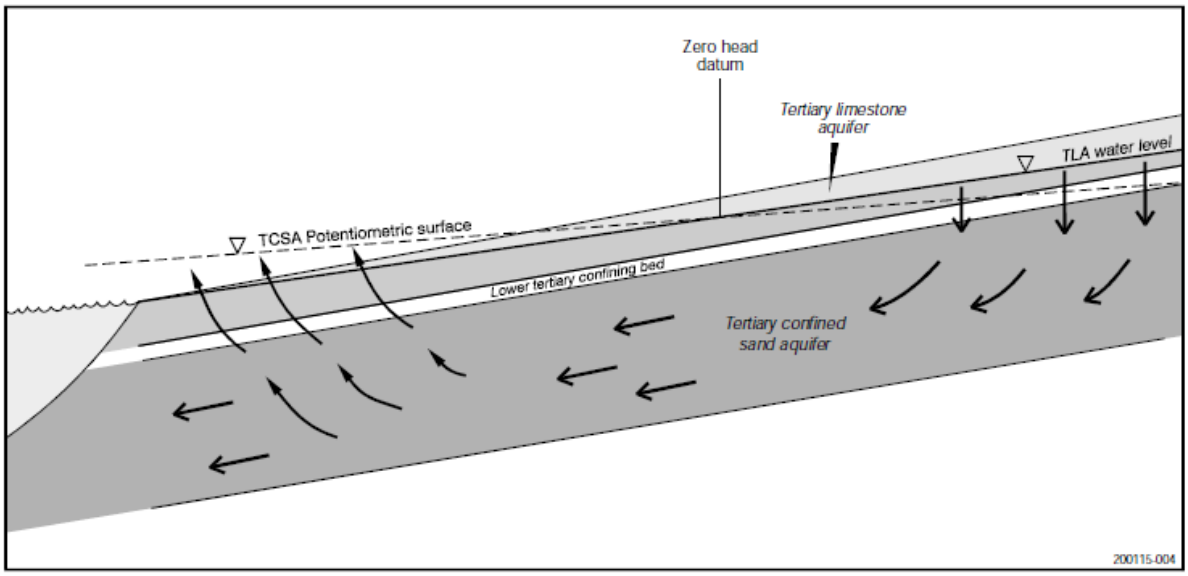

Figure 2. Conceptual Hydrogeological Model (Cross-section)

Report

Brown K, 2000, *A groundwater flow model of the Tertiary confined sand aquifer in south east South Australia and south west Victoria*, Report PIRSA 2000/00016, Primary Industries and Resources South Australia, Adelaide