



Statewide seawater interface - Esperance groundwater area

Town subarea

The freshwater zone centred on the Town subarea is surrounded by a saltwater interface to the North and a seawater interface adjacent to the ocean (Figure 1). There is a thin mixing zone above the saltwater wedge that extends further along the base of the Superficial aquifer (Figure 2).

Along the northern boundary, a saltwater interface from the hypersaline waters from Lake Warden extend approximately 300 metres into the Superficial aquifer. To the northwest of the subarea, near the boundary with the Twilight subarea, hypersaline water extends from Pink Lake along the base of the aquifer for over 800 metres.

Along the ocean boundary the SWI extends around 300 metres inland around the port (Figure 2) where it is overlain by a thick mixing zone which is estimated to extend over 1 km to the west, running parallel to the coastline and ending where the granitic basement outcrops. In the most southwestern part of the Town subarea, licensee data shows the SWI has progressed inland and is now over 1 km from the coastline. East of the port, the SWI is less than 100 metres inland, however the mixing zone that is present still poses a risk of salinisation to nearby abstraction bores.

The geology in this area has an influence on how the saltwater at the base of the aquifer can move, with variations in the thickness of the saturated zone and lithological heterogeneities impacting groundwater flow. Basement highs, that are often present at the coast, limit the thickness of the aquifer in these areas. Furthermore, nearby abstraction to the SWI can cause saline water to move inland.

Groundwater use has caused drawdown of groundwater levels to fall below sea level (0 m AHD) in the southwest of the Town subarea. When groundwater levels drop below sea level it further increases the risk of drawing saltwater from the ocean and local saline lakes into the freshwater part of the aquifer.

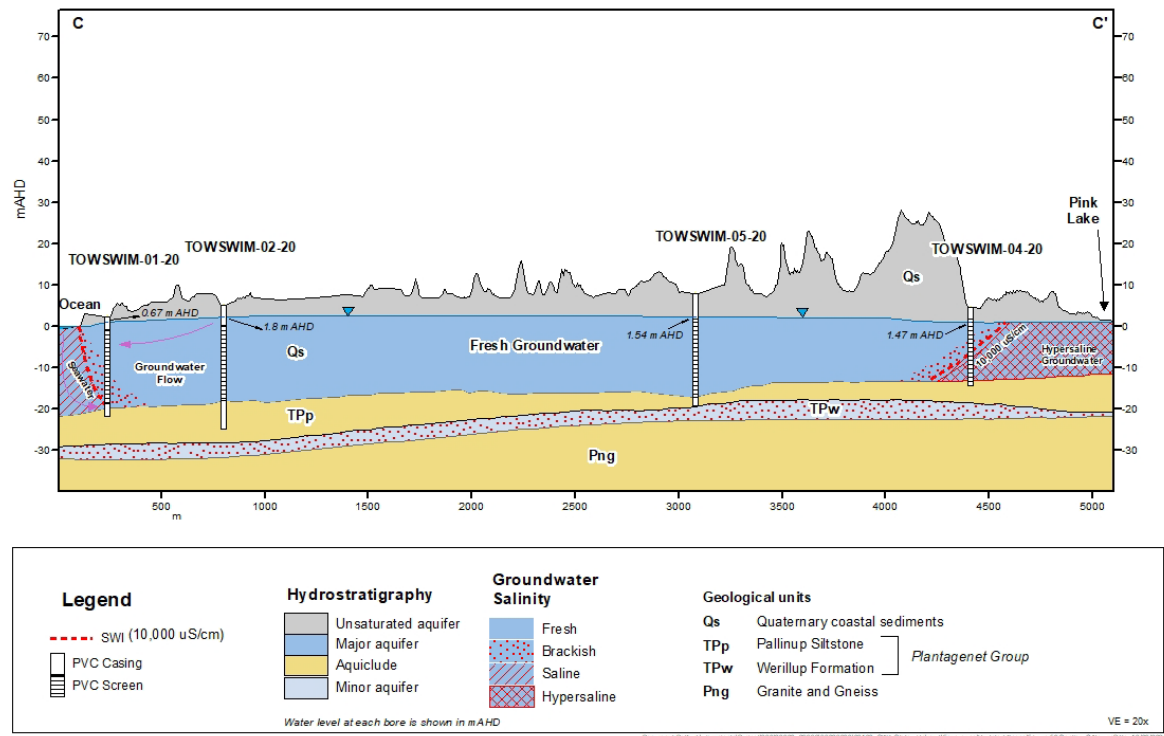


Figure 1: Cross section C-C' through Town subarea showing two saltwater interfaces

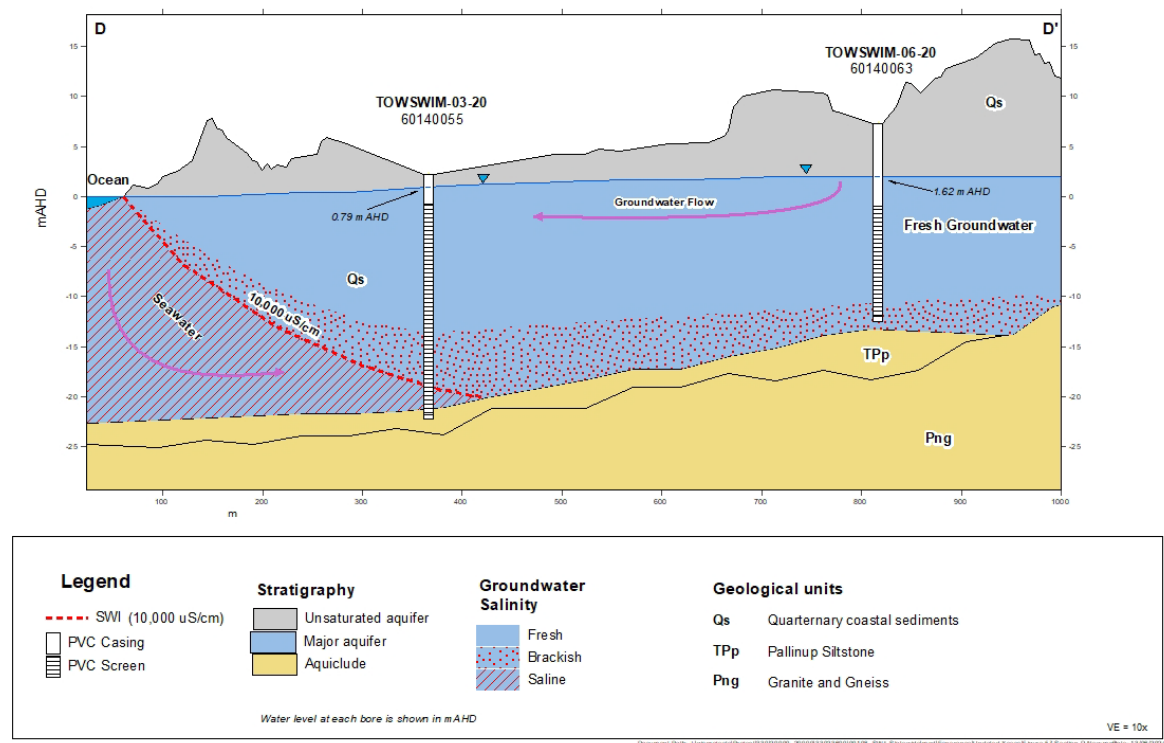


Figure 2: Cross section D-D' through Town subarea showing a thick zone where saline groundwater and fresh groundwater mix