

GROUNDWATER AVAILABILITY IN THE NEWCASTLE BIGHT PENINSULA

The following groundwater availability characteristics are based largely on information contained within "Tomago Tomaree Stockton Groundwater, Technical Review", Woolley et al (1995).

Unconsolidated Sediments:

Pleistocene Tomago Sand Member Aquifer

The groundwater contained within this member is of very low salinity usually less than 500 mg/L total dissolved salts (TDS) and often less than 200 mg/L. This is due to several factors including mineralogy of the aquifer, high aquifer recharge through direct infiltration, high transmissivity and short distances to discharge areas. Dissolved iron can be a problem in some parts of the aquifer ranging up to a maximum of about 40mg/L. Heavy mineral mining practices and heavy pumping for town water supply within this formation have been linked to the high iron content and in some places elevated arsenic concentrations within the Tomago Sandbeds (CPI, 1996). Yields are variable ranging from less than 5 L/s to up to around 50 L/s. These groundwater is suitable for most purposes including town water supply subject to reduction of dissolved iron and arsenic concentrations where necessary.

Holocene Stockton Sand Member Aquifer

There is little or no apparent difference in water quality between groundwaters contained within the Stockton Sand Member and the Tomago Sand Member although water quality information is sparse. There is some suggestion that the iron content in this member is less than in the Tomago Sand Member, but there is little data and this conclusion needs verification (Woolley et al, 1995). Groundwater salinity is generally less than 500 mg/L, except near the formation boundary with the Tilligerry Mudstone Member or near the saltwater/freshwater interface along the shoreline. Yields are generally greater than 5 L/s and can range up to 40 L/s. This groundwater is suitable for most purposes including town water supply. Treatment of the water may be necessary to reduce iron and arsenic levels to that of ANZECC drinking water guidelines.

Pleistocene Tomaree Sand Member Aquifer

The most apparent feature of this member is the high proportion of sodium and chloride ions which comprise the large proportion of the total salinity. In an aquifer of this nature in which the residence time is small and with its close proximity to the coast, the most likely reason for this high sodium chloride content is windblown salt from the ocean. Notwithstanding groundwaters from this formation are suitable for most purposes including town water supply. Groundwater salinity is usually less than 500 mg/L and often less than 200 mg/L. Yields are highly dependant on the thickness of sand and can range from less than 1 L/s to up to 50 L/s.

Pleistocene Anna Bay and Tilligerry Mud Members

Groundwaters within these aquifers are generally moderately to highly saline, with chloride concentrations up to 12 000 mg/L due to the estuarine origin of the sediments. Yields from this member are likely to be small ranging up to 5 L/s but may be useful for some industrial purposes. Notwithstanding groundwater potential increases with depth beneath the Tilligerry Mud with the eventual intersection of the southeasterly dipping Tomago Sandbeds. Groundwater quality of the underlying Tomago Sandbeds is unknown as there are no registered bores within this section of the aquifer, but water quality is expected to be similar to that within the outcropping Tomago sandbeds. Suitably constructed bores would require the separation of the saline groundwater via cement grouting to avoid cross aquifer contamination of the groundwater quality in the underlying Tomago Sandbeds.

Fractured Basement Rocks

Carboniferous Volcanics and Volcaniclastics of the New England Fold Belt

Compared to the sandbed aquifers of the Tomago, Stockton and Tomaree members there is little or no groundwater potential within Carboniferous basement rocks that make up the headlands and escarpments around Nelson Bay. Groundwater salinity is judged to be in the range of 501-1500 mg/L. It will be associated with fractures and joints at depths less than 50 metres and yields are expected to be less than 1 L/s.

Permian aged rocks of the Sydney Basin

Groundwater resource potential within the Permian strata outcropping in the west of the map is poor being restricted mostly to stock use with low yields (generally less than 1 L/s). Groundwater is held within porous sandstones and fractured conglomerates with salinities generally in the range of 1501-5000 mg/L.

REFERENCES:

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