

The banner features the text 'Waterwise Alice Springs' in a blue and white font. The background is a landscape with a blue sky, a thin layer of water, and a brown, textured ground surface.

Waterwise Alice Springs

ROE CREEK BOREFIELD - FACTS AND FIGURES

1. Extensive, deep groundwater resources occur close to Alice Springs in sandstones of the Mereenie Formation. This Formation is part of a very large and complex groundwater system within the Amadeus sedimentary basin. The Amadeus Basin extends south more than 250 kilometres and is about 800 kilometres wide, continuing into Western Australia. The groundwater system containing the Mereenie Formation is about 500 kilometers east west and 100 kilometers north south. The Mereenie sandstone outcrops at the surface adjacent to Roe Creek. It drops down to about 6500 metres underground then rises to the surface on the northern slopes of the Waterhouse Range some 40 kilometres to the south.
2. The groundwater systems of the Amadeus Basin are **not** part of the Great Artesian Basin nor are they connected to other large groundwater systems to the north.
3. Since the 1960s, twenty eight water supply production bores have been constructed into the Mereenie Formation in the Roe Creek area.
4. The deepest production bore drilled to date in the Mereenie Formation at Roe Creek was 570 metres. At the time of drilling in 1965 the water level in this bore was about 100 metres below the surface.
5. The deepest investigation bore drilled to date in the Roe Creek Borefield was 619 metres. Currently the town water supply production bores are much shallower and will need to be deepened or new deeper production bores drilled some time in the future.
6. Water is now drawn from four different aquifers in the Roe Creek Borefield: the Mereenie Formation, upper Pacoota Sandstone, lower Pacoota Sandstone and Upper Shannon Formation (limestone and limy sandstones). Some 80% of the Alice Springs Town Water Supply is from the Mereenie Formation.
7. Over the whole area of this groundwater system (500 km x 100 km) there is considerable recharge from periodic flows in rivers and creeks. It is estimated that only a small percentage of the current extraction from the Roe Creek Borefield is recharged from the periodic flows in Roe Creek and other creeks in the area.
8. Some beds of the Mereenie Formation can be unstable when pumped at high rates, but unusually hard rock just west of Roe Creek means that bore yields of more than 100 litres per second are possible in that area.
9. Since pumping commenced 40 years ago, over 250,000 megalitres of groundwater have been extracted from the Mereenie Sandstone aquifer within the Roe Creek Borefield. This is about half the water in Sydney Harbour. One megalitre is about the volume of water in an Olympic sized swimming pool.
10. The water table in the Mereenie Formation at the Roe Creek borefield was around 100 metres below the surface in 1964. In the central area of the borefield near Roe Creek, the water level has dropped 45 metres due to extraction for our town water supply. Extraction over the 40 years has withdrawn water from the Mereenie Sandstone over its full width (about 500 metres at Roe Creek) and over a length of 23 kilometres from beyond a few kilometres west of Pine Gap to the east of the Santa Teresa Road (just east of the airport).



11. The rate of decline of the water table in the central area near Roe Creek gradually increased from 1964 to just over 2 metres per year. Since 1992/93 the rate has dropped to around 1.2 metres per year in the central area adjacent to the cluster of production bores, about 0.7 metres per year south of the airport, and 0.4 metres per year south east of the airport.
12. The future rate of decline below the current 145 metres (below ground level) in the central area is dependent on a wide range of factors not the least being the annual demand for the town water supply. Currently, the Alice Springs consumption is around 1,000 litres per person per day compared to the southern cities of around 635 litres per person per day (or comparable climatic areas of around 800 litres per person per day). Significant increases in the population of Alice Springs or per capita increases in water usage will result in increased demand and higher rates in the decline of the water table unless other town water supply sources are developed or, in the case of the Alice Springs Town Basin, expanded.
13. Current assessment of the groundwater resources of the Roe Creek Borefield indicates that the water in storage below the current water table to 600 metres below ground level could provide the town with several hundred years of water at the current rates of extraction. (It will take an estimated 150 years to reach 380 metres below ground level).
14. The two key issues with the Roe Creek Borefield are the economic depth of pumping and future behaviour / characteristics of the deeper aquifers.
15. The economic depth of pumping includes: the very high cost of deep production bores in this area; the need for deep monitoring bores; the high, increasing cost of pumping from great depths, and the technical depth limit of current pumping equipment. Deep production bores can cost upwards of several hundreds of thousands of dollars to drill and complete. Very deep large diameter production bores production bores could run into the millions.
16. With respect to the future behaviour / characteristics of the deeper aquifers, it is a question of monitoring in the short term and possibly additional expensive groundwater investigations in the long term. Our current assessment is that there are ample groundwater resources within the Roe Creek Borefield area to provide the primary water supply for Alice Springs for the immediate future. In due course some of the existing production bores will need to be rehabilitated, including moderate deepening as required, and eventually new deeper production bores will need to be constructed.
17. To the east of the Roe Creek Borefield a new town water supply borefield is proposed at Rocky Hill on Undoolya Station. This is within the same aquifer system as the Roe Creek Borefield but is currently outside its area of impact. Land has been set aside for this new borefield but its development is not currently planned. This is due to the infrastructure capacity of the existing Roe Creek water supply system, the high cost of developing a new borefield and associated infrastructure, and the ample groundwater resources available in the existing borefield region.
18. Whilst there are very large groundwater resources potentially available from the Roe Creek Borefield there are a range of cost and management issues that the community, Government and the Power and Water Corporation must take into account. These include the increasing pumping costs from the Roe Creek Borefield, water supply demand management (including reducing per capita demand), potential cheaper supply options for some of the demand (expanded use of the Town Basin), and other innovative approaches including rainwater tanks and expanded reuse of waste water. The Alice Springs Urban Water Reference Group, the Power and Water Corporation, the Town Council, various Northern Territory Government Departments and various interest groups are considering a number of these issues and options.

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