Geology of the Andover area: Applied geology - Hydrogeology

This page is part of a category of pages providing a summary of the geology of the Andover district (British Geological Survey Sheet 283), which extends over approximately 600 km^2 of north-west Hampshire and a small part of eastern Wiltshire. Links to other pages in this category can be found at the foot of the page.

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The principal aquifer within the district is within the Chalk Group. Public water supplies are also derived from the Upper Greensand Formation, although this resource is more important to the south-west in the Wincanton and Shaftesbury areas. Local supplies come to a lesser extent from the Palaeogene and Quaternary strata. The latter source probably taps the underlying bedrock aquifers with which the deposits are in hydraulic continuity. Brief notes on the hydrogeology are given below, but for detailed information readers are advised to consult the reports on minor aquifers (**Jones et al., 2000**)[1] and major aquifers (**Allen et al., 1997**)[2] that give valuable overviews of the water resources. Stream sinks are known at the margin of the Palaeogene strata and also associated with Quaternary deposits such as the clay-with-flints.

The hydraulic properties of the Chalk aquifer are complex and result from a combination of matrix and fracture properties. The Chalk is microporous with low intrinsic permeability. The intergranular porosity of the Chalk is high, usually around 35 per cent for the White Chalk Subgroup, falling to around 25 per cent for the Grey Chalk Subgroup (**Bloomfield et al., 1995**)[3]. However, the pore sizes are so small that the permeability of the rock is minimal. The high transmissivity of the aquifer is provided by fractures, which are commonly enlarged by dissolution.

The hydrology of numerous of streams within the district (e.g. the River Test, tributaries of the River Enborne) are dominated by groundwater flow from the Chalk. Hence the lithological properties of the Chalk and the geological structure will have an important influence on how the streams behave and the aquifer functions.

Each Chalk formation has differing aquifer properties resulting from the lithological control on fracture style and spacing, the presence or absence of marl seams, and the frequency and style of flint bands. Marl seams, bedding planes, district flints and tabular flints are all horizons where downward percolation of water may be impeded. Dissolution occurs and conduits often form where flow is concentrated along these horizons. The strength of the chalk is also important. Fractures in very soft chalk are often sealed by remoulded chalk putty, and thus form aquitards or even aquicludes. Joints in harder, nodular chalks often remain open and thus solution cavities can develop more readily.

Many springs occur across the Andover district. These vary in size from small flows to larger streams. There are concentrations of springs in the north-east corner of the area around Highclere and Burghclere; adjacent to the River Test around Whitchurch; and in central Andover. The area around Burghclere sees regular up-sequence changes from clay-rich London Clay facies to sand-rich facies and many small springs are developed as a result of the interbedded nature of the formation locally. In this area streams sink and resurge over short distances within a single stream course and constant flow is only achieved during high rainfall periods when the perched water tables in each

sand body are fully charged.

References

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3. ↑ Bloomfield, J P, Brewerton, L J, and Allen, D J. 1995. Regional trends in matrix porosity and dry density of the Chalk of England. *Quarterly Journal of Engineering Geology,* Vol. 28, S131–142.

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