

distant as a result of interconnecting horizontal discontinuities. Likewise, any long-term settlement or collapse of the metastable materials would necessitate that the piles be designed for collapse and negative skin friction loads.

One example of bored pile design and construction to overcome problems posed by dissolution features is described by Twine and Wright (1991), and is discussed in Chapter 8.

Control of drainage

Concentrated ingress of water into the chalk can initiate new dissolution features, particularly in low-density chalk, and destabilise the loose backfill of existing ones. For this reason, any soakaways should be sited well away from foundations for structures, roads or railways, as indicated below:

- in areas where dissolution features are known to be prevalent, soakaways should be avoided if at all possible but, if unavoidable, should be sited at least 20 m away from any foundations
- where the chalk is of low density, or its density is not known, soakaways should be sited at least 10 m away from any foundations
- where the chalk is of medium density (or higher), the closest part of the soakaway should be at least 5 m away from any foundations.

For drainage systems, flexible jointed pipes should be used wherever possible; particular care should be taken for the avoidance of leaks in both water supply and drainage pipework.

As the Chalk is a vitally important aquifer, the Environment Agency and local authority must be consulted when planning soakaway installations where chalk lies below the site – even where it is mantled with surficial deposits.

7.11

CHALK MINES

Chalk has been subject to widespread mining for agricultural and industrial uses (see Section 2.7). Some of the sinkholes may result from collapse of these mines and many of the trigger actions for their collapse are similar to those for dissolution features.

Vertical shafts, referred to as deneholes, have been sunk in certain areas to obtain flints (see Sections 2.7.1 and 2.7.2). It has been found that many of these shafts have galleries or adits leading from them. In some instances, the shafts have been found to be interconnected by tunnels. Upon abandonment such shafts have often been plugged at the surface – in one instance with the stump and inverted root bowl of a tree!

Chalk mines have been studied as part of the Review of Mining Instability in Great Britain for the Department of the Environment (Arup Geotechnics, 1990). This document should be referred to at desk-study stage in addition to seeking local knowledge, and is available for inspection at DEFRA regional offices and many local planning authorities, as well as being available for purchase. For details of how to obtain this report and its associated documents, see Box 2.6 in Section 2.7.

The treatment of old chalk mines should be given the same consideration as mine backfilling.