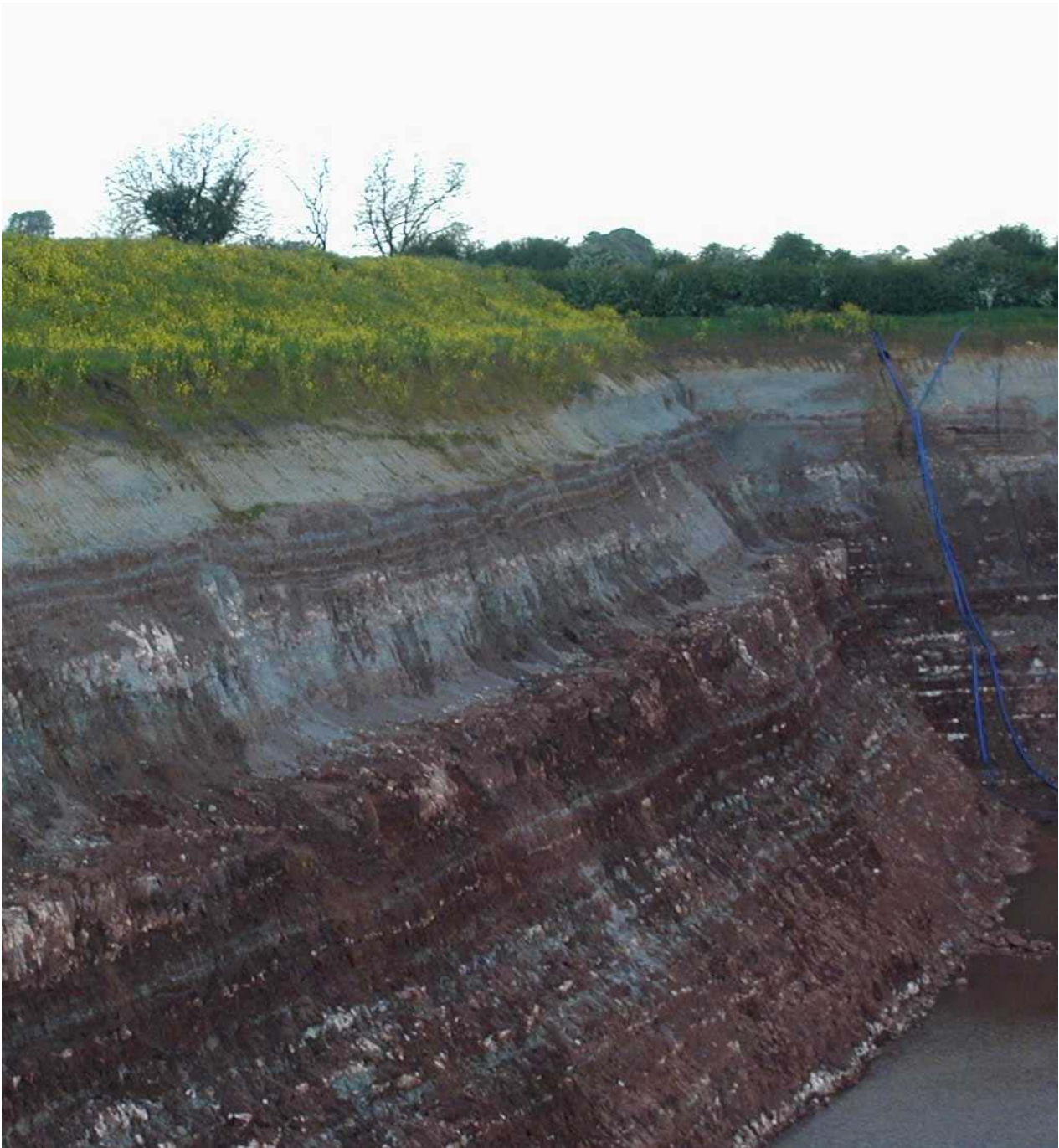

Chapter 10

GYPSUM



Kilvington Quarry

Introduction

- 10.1 Nottinghamshire is a major producer of gypsum accounting for a significant proportion of the estimated 1.5 to 2 million tonnes extracted in the UK every year. About 75% of gypsum is used in plasters and plasterboard, and 20% in cement. The remainder, which comprises high quality gypsum, found only in Nottinghamshire, is put to a wide range of specialist uses including ceramics, paint, dentistry and food.

Geology

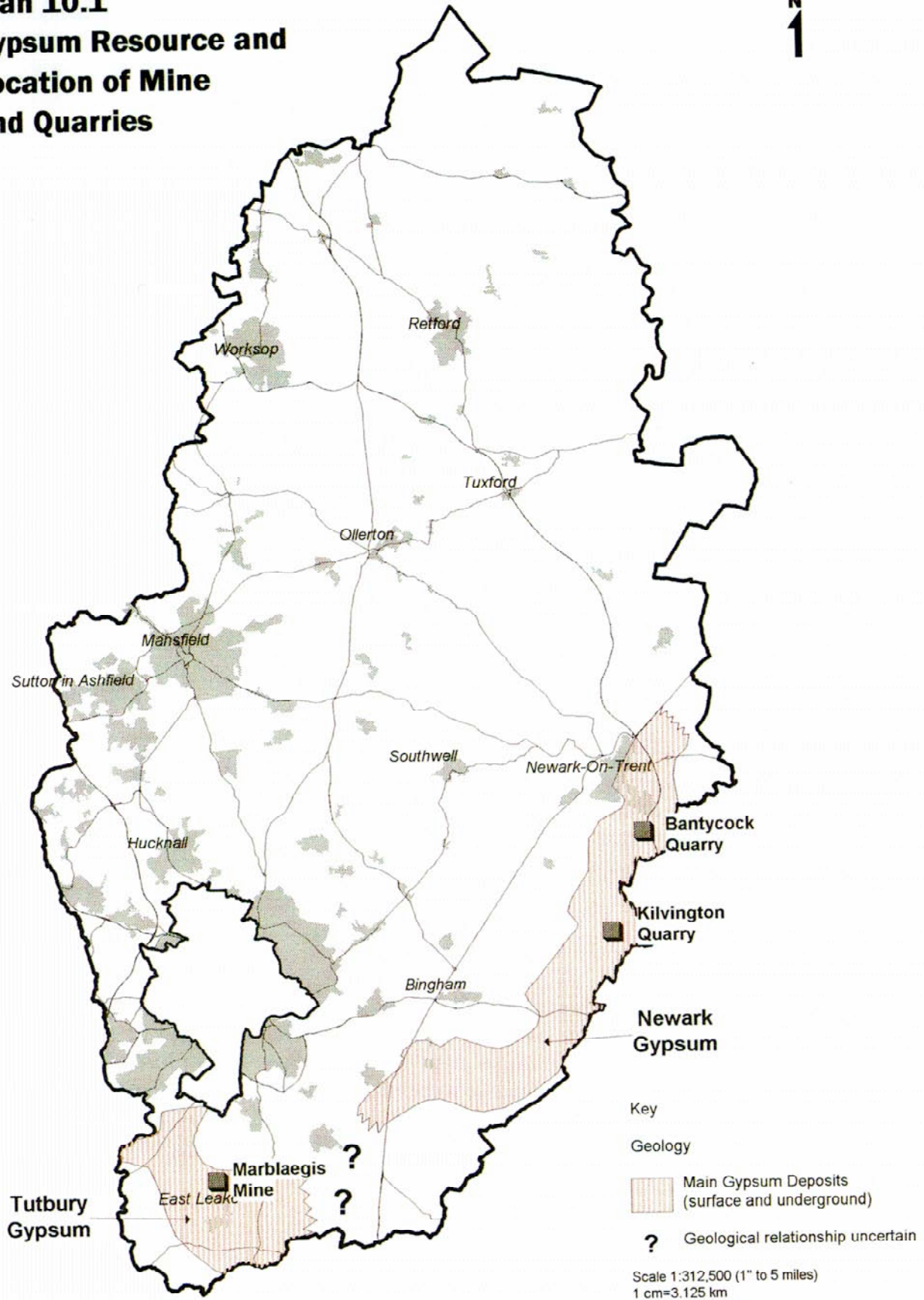
- 10.2 In Nottinghamshire gypsum is present throughout the Mercia Mudstone, (see Plan 10.1). Commercial interest is restricted to two distinct gypsum resources, found in the upper 40 metres of the Mudstone, known as the Newark and Tutbury gypsum deposits.
- 10.3 The Newark gypsum has a long narrow outcrop rarely more than 2 kilometres wide, extending from Newark to Cropwell Bishop via Kilvington and Orston, and is the source of the high purity gypsum. This outcrop comprises up to 7 commercially viable seams of no more than 1 metre thickness and thus opencast extraction is the only feasible method of working. The gypsum seams dip south-eastwards beneath younger cover rocks where opencast extraction remains feasible, providing the overburden to mineral ratio is within the prevailing technical and economic limits.
- 10.4 In contrast, the Tutbury gypsum normally comprises a single seam which is on average 3 metres thick. This seam is found to the south-west of the Newark deposit, and extends across much of Nottinghamshire east of the Soar Valley and south of Gotham and Bunny where it continues into Leicestershire. The Tutbury seam is of lower quality, 'Mill and Cement Grade', and is used mainly in plaster, plasterboard and cement. Shallow underground mining is the usual method of extraction, the mineral normally being within 60 metres of the surface.

Method of Working and Environmental Impact

Opencast Extraction of the Newark Gypsum

- 10.5 Extraction begins with the creation of an initial cut which needs to provide adequate space to develop and work the quarry face. Large quantities of overburden and inter-seam mudstones from this cut have to be stored, normally for the duration of the life of the quarry. Subsequent cuts can then simply return the overburden and mudstones directly back to the quarry, enabling progressive infilling as the face advances. When extraction is completed, material from the initial cut goes into the final void. Successive seams of mineral are exposed to form benches, and excavations may exceed 40 metres. Low grade blasting breaks up the mineral which is extracted by draglines or hydraulic excavators. It is then loaded into dumptrucks for transporting to the crushing and processing plant.

**Plan 10.1
Gypsum Resource and
Location of Mine
and Quarries**



- 10.6 The flat topography and depth of working helps to lessen the visual impact and noise impact of the extractive operations, which are often well below ground level. The noisiest activities are most likely to be the removal and replacement of overburden and soils, along with the transport of mineral by dumptruck. Mud on roads can also be a localised problem. Blasting, night-time working, and lighting associated with continuous processing of material have also given rise to complaints.
- 10.7 Until quite recently the worst visual intrusion associated with quarrying was the large overburden storage heaps containing material from the initial cut. These were normally left as steep unvegetated mounds, with no regard for their visual impact. Although this problem has not been entirely resolved, changes in working practices and better planning controls should prevent this situation arising in future.

Underground Mining of the Tutbury Gypsum

- 10.8 The Tutbury Gypsum is worked by the 'pillar and stall' method, whereby 25% of the mineral is left in place as pillars to provide support. This technique is specifically designed to prevent subsidence and is essential for mine safety and to provide surface support. As an added precaution mining has not been permitted beneath settlements, and adequate support pillars have to be left beneath isolated properties.

POLICY M10.1 UNDERGROUND GYPSUM MINING – SURFACE SUPPORT

Where planning permission is granted for underground mining of gypsum, conditions will be imposed as appropriate to ensure adequate support pillars are left to protect isolated buildings and other surface features which could be adversely affected by subsidence. Planning permission for underground mining of gypsum will not be permitted from beneath settlements.

- 10.9 Gypsum mining normally creates little environmental impact, although because of the potential subsidence risk, mined areas are constrained from most forms of built development. Where extraction involves blasting, usually twice a day, recent planning permissions have imposed maximum limits on blast vibration levels affecting properties, (see, Chapter 3, Policy M3.6). New 'continuous mining' techniques now mean that in some areas blasting is not required.

Reclamation and After-use

- 10.10 The high ratio of overburden to mineral allows most of the worked out areas to be backfilled to original ground levels with the use of on-site material. However a significant residual void may occur in low lying areas where the site may need to be restored to above its original contours to assist drainage and allow for settlement. In appropriate circumstances, such voids may be suitable for the reception of certain types of controlled waste in accordance with the Waste Local Plan. The worked out Staple Quarry is being reclaimed with landfill. Where filling does not occur, and the water table is high, the void can be suitably contoured and allowed to flood, as has happened at Hawton Grange Quarry, and is proposed at Kilvington.
- 10.11 The general lack of trees and hedgerows along the gypsum outcrop near Newark means that there is scope for reclamation schemes to improve the environment, by including a greater level of planting than was present prior to extraction. All reclamation and after-use proposals should accord with the provisions of Chapter 4.
- 10.12 The pillar and stall method used for the underground mining of gypsum does not require reclamation measures.

Supply and Demand

Sources of Information

- 10.13 British Gypsum's monopoly of natural gypsum production in the UK has meant that national and local production figures have not been published for many years. The British Geological Survey, however, estimates that national production currently stands at between 1.5 – 2 million tonnes per annum. Statistics for Nottinghamshire are limited to the occasional disclosure of data in support of planning applications. In contrast to sand and gravel for example, the information base for gypsum is very sparse, and this has implications for assessing future needs for the mineral.

Recent Production History and Trends

- 10.14 Gypsum in Nottinghamshire is currently won from the Marblaegis Mine at East Leake and by opencast methods at Kilvington. Although there is no reliable data, it is likely that recent demand for gypsum, which depends on the fortunes of the construction industry, has been broadly flat, in line with aggregate production. Whilst British Gypsum has a monopoly on gypsum mines and quarries, demand for the natural mineral has been significantly reduced due to the availability of desulphogypsum (see Panel 10.1 for background). Gypsum is also imported.

Panel 10.1 - Desulphogypsum – impact on demand for natural gypsum

Desulphogypsum (DSG) is a by-product of Flue Gas Desulphurisation (FGD) plants, which have been installed at some coal fired power stations in order to reduce sulphur emissions, a major cause of 'acid rain'. In recent years DSG has begun to substitute natural gypsum. Although DSG cannot replace the high quality mineral in terms of range of end-uses, it has proved suitable for plasterboard manufacture accounting for about half of total demand. The first FGD plant in Nottinghamshire was installed at Ratcliffe on Soar Power Station. Production started in 1994, and has since averaged 260,000 tonnes per annum. A further FGD plant is being built at West Burton Power Station and another is proposed at Cottam Power Station.

Markets

- 10.15 The main manufacturing centres in Nottinghamshire comprise a plasterboard plant at East Leake and a specialist plaster and other products plant at the Jericho Works, Newark.
- 10.16 The main markets for plasterboard and plaster produced at East Leake and Jericho are southern England, East Anglia and the Midlands. At Jericho the industrial and specialist plasters are marketed throughout the UK, and some are exported.

Consideration of Future Demand

- 10.17 Unlike aggregates there is no national demand forecast, but if gypsum follows the same trends, then demand is likely to remain fairly constant throughout the next Plan period. The main factor will be the impact of further desulphogypsum produced from new plants at West Burton and Cottam, and elsewhere in the UK. If these supply the Nottinghamshire manufacturing plants, then they are likely to substantially reduce demand for natural mill and cement grade gypsum. There is, however, no guarantee that desulphogypsum will be produced at the quantities and qualities assumed. A switch away from coal fired power stations could, for example, mean that in the longer term supplies of desulphogypsum may dwindle. The future demand for natural gypsum remains uncertain.
- 10.18 Whilst demand for special or first grade gypsum should remain buoyant, the economics of recovery could also be adversely affected if the market for Mill and Cement grade mineral no longer exists. This is because large quantities of Mill and Cement grade mineral have to be extracted to reach the high quality seams. It could therefore become more economic to import high quality mineral from elsewhere, with possible sources being Spain and Morocco.

Future Provision

Mill and Cement Grade Gypsum – Future Provision

- 10.19 Most of the known Tutbury Gypsum resource in Nottinghamshire has either been worked or permitted. Current permitted reserves are believed to be adequate for the plan period. In the longer term future potential extensions appear to be limited to land to the west of Costock and land to the east in Leicestershire. Although it seems unlikely that these resources will be required during the current plan period, this assumes that desulphogypsum remains available which, as noted above, is by no means certain in the long term. In view of the national importance and scarcity of this resource and its proximity to the East Leake plasterboard plant, there are clear merits in safeguarding this land for future gypsum extraction. This will help prevent the mineral being sterilised by built development, an approach which accords with Policy M2.1. Any future planning permission will however need to demonstrate that the mineral is required within a reasonable timescale.

POLICY M10.2 GYPSUM MINING - SAFEGUARDED AREA AT COSTOCK

101 hectares of land at Costock are safeguarded for future gypsum extraction by underground methods. Planning permission will only be granted where it can be demonstrated that the mineral is required to meet expected demand. Planning permission for surface development, which would materially prejudice the exploitation of this mineral resource will be refused.

Special or First Grade Gypsum – Future Provision

- 10.20 Opencast gypsum extraction currently occurs at Kilvington Quarry which will be exhausted by around 2004. Production is then expected to transfer to Bantycok Quarry which has been dormant since 1991. British Gypsum state that high purity reserves at Bantycok will be sufficient for 11 years, following exhaustion of Kilvington, and therefore should last until 2015.
- 10.21 The previous Plan estimated that further reserves would be required at a much earlier date, i.e. 1999/ 2000, and therefore allocated a southern extension to Bantycok Quarry. That Plan recognised that Bantycok Quarry and the southern extension offered a number of important planning and economic advantages. These comprised the proximity to Jericho Works, which reduced traffic problems and haulage costs, a remoteness from settlements and an existing landscape which had little merit, the site having been previously used as an airfield. Whilst the circumstances have not generally altered, the eastern half of the original allocation is unlikely to be required for many years. Furthermore, it is constrained by Cowtham House which may limit how much mineral can be worked in this area. Accordingly

the original allocation is reduced to only include land that is most likely to be required in the foreseeable future and is least environmentally constrained.

10.22 The main planning issues, which need to be taken into account, are:

- (a) The timescale for release would need to take account of the prevailing estimates of future demand, and life of the remaining reserves;
- (b) The amenity of isolated properties will need to be taken into account;
- (c) The reclamation scheme must take into account the creation of any residual voids both in terms of location, size and after-use. If a void is necessary, any proposal to reclaim it by landfill must take account of Policy M4.5 and policies in the Waste Local Plan.
- (d) The Shire Dyke SINC which runs through part of the allocation and also forms part of the eastern and southern boundaries.

It is possible that there may be operational advantages in working the allocation as an integral part of the current planning permission. Providing this does not create any additional overall environmental impacts then such proposals will in principle be acceptable.

POLICY M10.3 BANTYCOCK ALLOCATION

98 hectares of land to the south of Bantycok Quarry are allocated for gypsum extraction.
