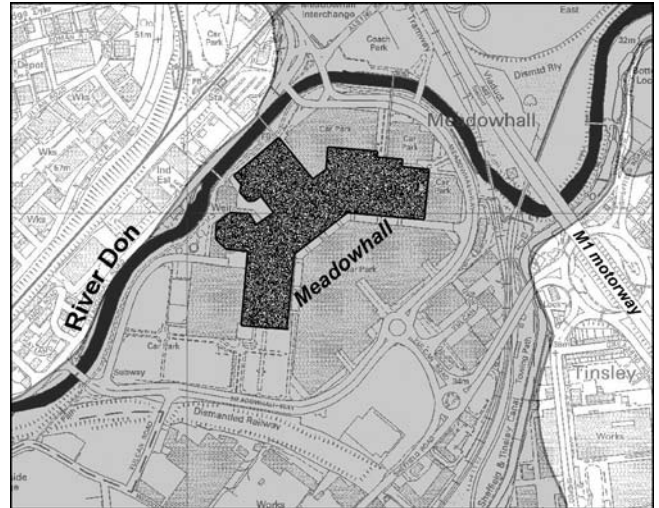


FLOOD REPORT

Summer rainstorms bring more geology lessons for planners

In June of this year, a succession of slowly-rotating depressions brought torrential rain to many parts of southern Britain. The East Midlands and South Yorkshire were badly affected, with several centimetres of rain measured over a 24 hour period. Some of the heaviest rain fell over the Pennines ranges, ensuring that stream courses were full and peat bogs saturated. Massive runoff was inevitable, and it was equally obvious that the water would ultimately flow into the tributaries and trunk streams of the River Don. This is unfortunate, because in the Sheffield and Rotherham areas virtually the whole of the Don Valley is a classic example of burgeoning over-development on a floodplain, with industries, residential housing, roads and railways concentrated along it. Urbanisation of this type dates back to the start of the Industrial Revolution but, due to an emphasis on 'brownfield regeneration', development continues apace today, fuelled by planning policies that seemingly do not fully understand the fact that in valleys, space also needs to be made for water (see photos on back cover).

Geological maps show the distribution of deposits such as alluvium, indicating the extent of the floodplains along which excess water is conveyed during extreme rainfall events (see *Mercian Geologist*, 2001, p126). This relationship was highlighted by the flooding that occurred at the Meadowhall Centre, on the River Don floodplain in Sheffield, first on the weekend of June 15-18 and then, with far more devastation, on June 24-25. During the culmination of



The Meadowhall Centre, outside Sheffield, sited on the flood-prone alluvium (shaded) of the River Don floodplain (from DigMap, the BGS digital geological map of Great Britain, with topography by Ordnance Survey).

this flooding, many industries and houses were also inundated, people were stranded overnight and some even had to be rescued by helicopter. Although there is some degree of flood protection along the River Don, either in the form of defences or ground raised by building construction, this has been at the cost of confining and concentrating streamflow. When the Don eventually overtopped its banks, it did so with predictable consequences for those areas that were slightly lower than the artificially elevated 'safer' parts of the modified floodplain. Meadowhall did not re-open until July 2nd, and then only 120 of the 273 stores were back in business.

Active floodplain of the River Rother, with backflooding into Catcliffe village (top left), beneath junction 33 on the M1.





Floodwater in the Meadowhall Centre.



The Magna Charta public house in Lowdham, flooded on June 25th (photo: James Brunton).

Apart from Sheffield, many small East Midlands villages with stream courses running through them were at least partially inundated by muddy ‘flash floods’ (though not comparable to the flash floods that can advance down desert wadis as walls of water, this term is now used to describe floods that rise very rapidly, generally within small catchments): and Southwell. Though relatively localised and of short duration, flooding of the villages of Lowdham, Woodborough and Oxtun had much in common with

(The aerial photographs opposite and on the back cover are by courtesy of British Geological Survey)

The main street in Woodborough, which was flooded four times by the series of heavy rainstorms this summer (photo: John Hoyland, www.woodborough-heritage.org.uk).



Sandbags against rising water to protect a bungalow on the main road through Woodborough (photo: Pam Footitt).

the Sheffield devastation. Typically it was caused by inappropriate development on floodplains, exacerbated by inadequate provision, or poor maintenance, of channels or drainage systems designed to convey water from extreme rainfall events.

In Lowdham, the specially designed flood-prevention basin (which doubles as a cricket pitch) overflowed, and the Cocker Beck was in many places constricted by badly designed bridges or culverts. These form ‘pinch-points’ that obstruct flood flows (ie, they encroach on the floodway), and so cause backing up of the flood waters - which then spilled over along roads and into houses built on or close to the floodplain. Houses in Woodborough were again flooded where the culvert that lies partly beneath the main street could not carry the storm flow; this was at least in part due to silting in the tunnel section, but is probably now exacerbated by a small reduction in its gradient induced by mining subsidence in 1990.

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