

Providing GIS solutions for local authorities

The application of GIS to the management of contaminated land data

by Malcolm Brown and Andy Marchant, *Keyworth*

The implementation of Part IIA of the Environmental Protection Act 1990, on 1 April 2000 in England and 14 July 2000 in Scotland, puts the responsibility for the identification, assessment and remediation of contaminated land on local authorities. The key aims of the Act are to identify land that may have a detrimental effect on human health, ecosystems or controlled waters.

The Act requires local authorities to identify contaminated land within its boundary using risk assessment by the application of the pollution linkage concept of contaminant-pathway-receptor. If the linkage does not exist, then in the terms of the Act, the area or site is not designated as contaminated land. The Act operates the 'polluter pays' concept making the owner of the site, who caused the pollution, responsible for its remediation. In many cases the contamination of land is a legacy of long-abandoned industrial processes such as mining, smelting, and gas production.

The key driver for the remediation of contaminated sites is the Government's target that 60% of new residential developments should be built on recycled land. This move takes the pressure off the green belt, but to make further progress, detailed information is required on potentially contaminated sites to assess the cost of clean up.

Local authorities have to produce a strategy document by June 2001 setting out how they are to identify and manage contaminated land within their districts. In order to undertake this task they will have to collate and analyse information on the location of both present and historical contaminated sites, the distribution of receptors (schools, residential areas, Sites of Special Scientific Interest etc.) and data relating to the movement of contam-

inants (pathways). It is also necessary to investigate the potential impact of contaminated sites on both surface and groundwaters. In undertaking risk

The BGS and Lovell Johns recently signed a Memorandum of Understanding (MoU) to work in partnership, offering a range of services to local authorities to assist them in meeting their responsibilities related to environmental legislation. Lovell Johns are a cartographical company specialising in high-quality digital mapping and publishing. They have extensive experience working with over a hundred local authorities in providing local plans and tourist maps in digital format. Following a series of well-attended seminars and meetings with staff responsible for implementing the new contaminated land regime, the BGS and Lovell Johns are now working with a number of local authorities across the Country.

assessment it is important to have an understanding of the geology in terms of the vulnerability of aquifers and the nature and composition of the bedrock, superficial deposits and man-made ground.



Richard Hewish, Business Development Director, Lovell Johns (r) and David Falvey, Executive Director, BGS (l) sign an MoU to work together, to provide an integrated solution to meet the needs of local authorities in relation to the management of contaminated land.

The information to be collated is mainly spatial making the application of Geographical Information Systems (GIS) ideal for the management of data related to contaminated land. Recent advances have made such systems cost effective and easy to use by a wide range of local authority staff with a minimum of training. Most authorities now have GIS and have access to digital Land-Line data (1:1250 scale in urban areas) through the Service Level Agreement with the Ordnance Survey. In order to interrogate sites or specific properties, there is a requirement for a user-friendly system front end based on one of the following: National Grid Reference, Address Point, Postcode, or a gazetteer for those authorities who have collected digital data as part of the National Land and Property Gazetteer (NLPG to BS7666).



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Illustration from the GIS showing areas of potential contamination, water wells and land use.

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“... in undertaking risk assessment it is important to have an understanding of the geology ...”

The BGS and Lovell Johns are working in partnership to provide a service to local authorities and to assist in the collation and capture of geoscience and other environmental data-sets in a GIS environment. Experience gained by the BGS over the past three years from GIS development in ESRI's ArcView for the London Borough of Newham, has allowed benefits to be shared with other local authority clients.

The GIS allows the user to view one or several layers of data and enables quick on-screen analysis to meet the requirements of the Part IIA legislation. Geoscience data-sets included in the overall package comprise digital geological data at either 1:10 000 or 1:50 000 scale and information relating to the hydrogeological regime.

A report writing facility has been implemented within the GIS using ArcView's own programming language, Avenue, with output to Microsoft Word. This allows the user to identify a location on the map and request a range of information held within the GIS for both the site and a user-specified search radius around the site. The report is automati-

cally generated containing a mixture of maps and text related to the site and its environs. This is particularly useful to local authority staff who undertake land searches on a regular basis. It speeds the production of reports for a variety of end-users and, more importantly, provides consistent information and major savings in staff time.

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A risk-based prioritisation facility within the GIS allows the user to select a site from a list of potentially contaminated parcels of land. The site is then given a 'score' based on nearby development and the proximity of surface and groundwater. This 'score' is then used as a mechanism for screening sites so that those which may pose the worst threat are dealt with first.

The application of GIS to the management of local authority information related to contaminated land will assist both the written strategy and the production of reports to a variety of end-users.

Once a system is in place, the authority will find there are other areas of work which will benefit from the application of GIS including air-quality modelling, noise monitoring and the provision of information on authority owned property and land. As GIS becomes more cost effective and easier to use, it will soon become a standard desktop tool for many local authorities.

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