Most mortgage-payers would agree that buying a property is the average person's biggest and most painful financial commitment. So, if you're a property owner, asks **Richard Hughes,** has it ever occurred to you that your home might suffer damage, subside or collapse because of the geological conditions beneath your feet?

Knowledge transfer in action

Most damage to property in the UK is caused by natural shallow geological hazards (geohazards) unrelated to mining activities. It is a serious and expensive matter for home-owners and insurers, costing at least £300 million in insurance claims in an average year and double that sum in a bad year (according to figures from the Association of British Insurers, ABI). Moreover, it is predicted that these figures are set to rise dramatically in the future because of the higher frequency of extreme weather events in our changing climate. The ABI forecasts that by 2050 these figures could rise to £600 million in an average year and £1.2 billion in an extreme one (at current prices).

The natural geohazards that cause most property damage in the UK are:

- *Shrink-swell clays*. High proportions of certain clay minerals in soils can cause ground movement by shrinking or swelling in unusually dry or wet ground conditions. Almost four million homes, mostly in east and south-east England, lie within potential hazard zones.
- *Soluble rocks*. Cavities and subsidence caused by dissolution of more soluble rocks are most commonly associated with salt and gypsum deposits, but can also affect chalk and limestone areas. Over one million UK homes are in areas that could be affected by this hazard.
- *Landslides*. These are widespread, and their distribution and activity depends on the geology, angle of slope, drainage and rainfall. Up to 370 000 UK homes could be affected, and occasionally people are injured or killed as a result of these events.
- *Compressible and collapsible ground*. This is weak ground prone to subsidence or collapse when an excessive load is applied, such as the building of a new house or house extension. Almost three million UK homes could be affected by this hazard.
- *Running sands*. These are sands that flow due to water pressure, causing collapse. Some 270 000 UK homes could be affected by this hazard.

The BGS is the authoritative source of natural ground stability information in the UK, and in 2004 launched the GeoSure national ground stability digital dataset (**www.bgs.ac.uk/products/geosure**). GeoSure is the product of many years of research and development, and draws

A large landslide led to the destruction of the Holbeck Hall Hotel, Scarborough.

Rural road cut by a series of shallow landslides triggered by winter rainfall.

A subsidence hollow at a housing estate Bank Terrace, Ripon, caused by the effects of gypsum dissolution.

upon the BGS's unique data holdings, geoscientific, and information systems expertise. We believe it is the world's first national natural ground stability dataset.

" GeoSure is the product of many years of research and development, and draws upon the BGS's unique data holdings, geoscientific and information systems expertise "

Transferring the knowledge

BGS GeoSure data reaches its diverse users through several routes, including:

- Site-specific reports provided through BGS's award-winning online GeoReports service (**www.bgs.ac.uk/georeports**).
- Value-added resellers that provide site-specific property and environmental search information for private and commercial conveyancing and development purposes.
- Direct licensing to the insurance industry (to help set buildings insurance premiums), to local government (for better-informed planning decisions), to utilities companies, and other private sector users.
- A joint ground stability report service launched with The Coal Authority in October 2006 aimed specifically at house-buyers — this service provides information on natural ground stability geohazards, coal mining hazards, and salt extraction hazards in a single report for the first time.

Clear communication is essential for successful knowledge transfer. We have spent much time and effort in ensuring that the complex science that underlies our ground stability information is communicated to users in clear and simple words. The style, content, and format of the BGS–Coal Authority Ground Stability Report, for example, was developed in consultation with the Department of Trade and Industry, the Council of Mortgage Lenders, the Law Society, and the Royal Institution of Chartered Surveyors. The Association of British Insurers supported the initiative, the Consumer's Association had a watching brief, and the Plain English Campaign made sure the report is concise, clear, and understandable to the lay person.

Who benefits, and how?

BGS ground stability information was one of several case studies that formed the basis of a report, *Economic impacts of research funded by the Natural Environmental Research Council* (PricewaterhouseCoopers LLP, 2006, **www.nerc.ac.uk/publications/corporate/economic.asp**). PricewaterhouseCoopers estimated this information will save the insurance industry £70 million to £270 million between now and 2030 in avoided claims payments alone. These figures do not include other economic and social benefits whose value is harder to quantify, including:

- Better-informed decision making on purchase, design, and remediation for individuals and businesses in the private and commercial property markets.
- The avoidance (or mitigation) of stress, disruption — and in the worst cases injury — to individuals caused by personal property damage and financial losses.
- Economic growth and job creation in the environmental and property search sector.

" PricewaterhouseCoopers estimated that the BGS's ground stability information will save the insurance industry £70 million to £270 million between now and 2030 in avoided claims payments alone "

We will continue to develop national geohazard datasets, delivering real and tangible economic and social benefits. So when you next venture into the property market, remember that BGS science can help avoid some of the pitfalls and ease the pain of housebuying.

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