

The Clay Research Group

RESEARCH AREAS

Climate Change ♦ Data Analysis ♦ Electrical Resistivity Tomography
Time Domain Reflectometry ♦ BioSciences ♦ Ground Movement
Soil Testing Techniques ♦ Telemetry ♦ Numerical Modelling
Ground Remediation Techniques ♦ Risk Analysis
Mapping ♦ Software Analysis Tools
Artificial Intelligence



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The Clay Research Group

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Hot Spots?

Since the Berent judgement, delivered in 2012, many cases of alleged tree root nuisance have turned on defining whether the local authority could reasonably have foreseen a problem based on what were termed 'hot spots'.

That is to say, should the local tree officer have been aware that 'x' tree was likely to cause damage and what level of pruning might be judged reasonable, and in what circumstance.

This is fine but for one thing. There is no definition of what a 'hot spot' is. Is it as simple as recognising that a tree is within influencing distance of a property built on a clay soil? Not really adequate, unless we want to lose all of the trees that meet these criteria.

How many claims, how close together, represent a 'hot spot'? Should it be linked to tree species, height and distance? How do we find out where these hot spots are? Is it the case of asking every borough for details of claims under the Freedom of Information Act?

Colleagues from both sides (borough tree officers and engineers acting for insurers) have sought clarification. Why would Tree Officers submit data to identify hot spots that could be used against them in disputes? How can we build a model acceptable (and helpful) to everyone? On Page 8 we take a preliminary view following a review of Wandsworth district.

Should we look at claim count within an agreed area, and what would that area be? A postcode sector, a road, a group of roads – or perhaps frequency? What is a 'hot spot'? Next month we consider the issues. If you have a view, please contact us.

Future Flooding

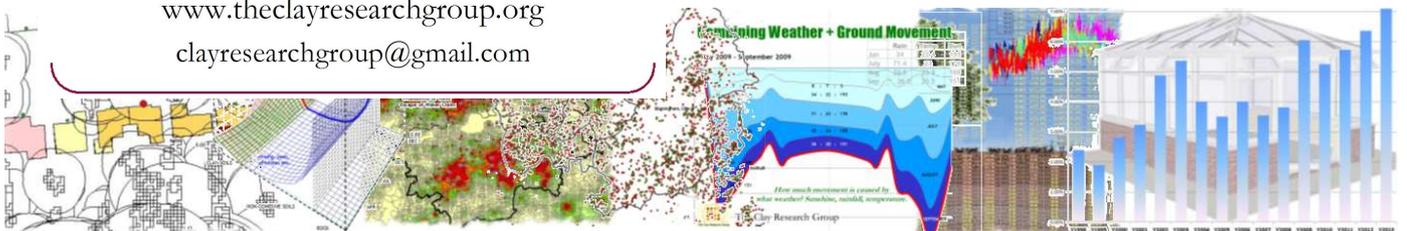
The Committee on Climate Change (CCG) outlined their concerns relating to the increased flood risk around the UK coastline

Baroness Brown, chairing the committee, thought it unacceptable that people were buying homes in areas at risk without being informed, saying "most people living on the coast will assume that it will remain protected. We want to stimulate some honest conversations with affected places about the difficult choices which lie ahead".

More on Page 2.

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Coastal Flood Risk

Predictions by the Government's Committee on Climate Change (CCG) suggest that 90 miles of the UK coastline could suffer flooding by 2025, with 100,000 cliff top properties at risk by 2080.



Professor Jim Hall, the CCC's flood and erosion expert, said: 'There's already a very significant risk of flooding and coastal erosion. That could get a lot worse – about a million-and-a-half properties in future at risk from flooding, 100,000 properties at risk from coastal erosion.'

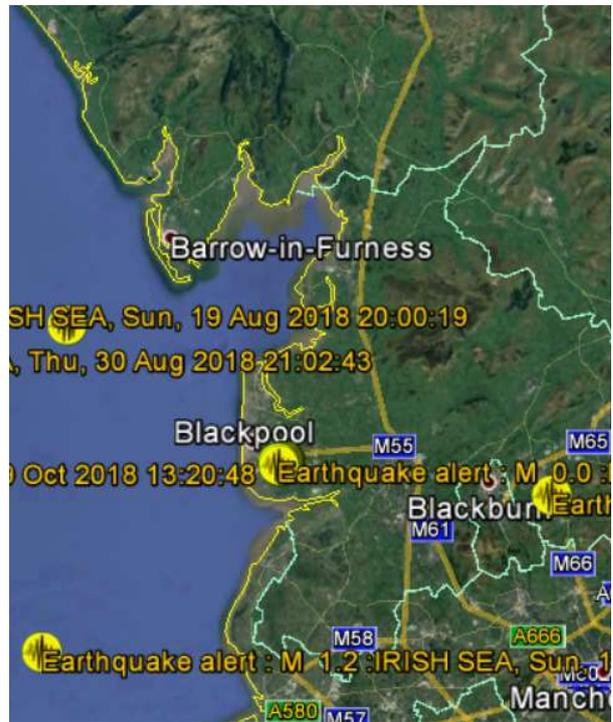
He said "the Government needed to have an 'honest conversation' with small coastal communities and villages where it's very difficult to make an economic case to continue holding the line. We are talking about abandoning houses and people being exposed to intolerable levels of coastal flood risk."

Fracking in Blackpool

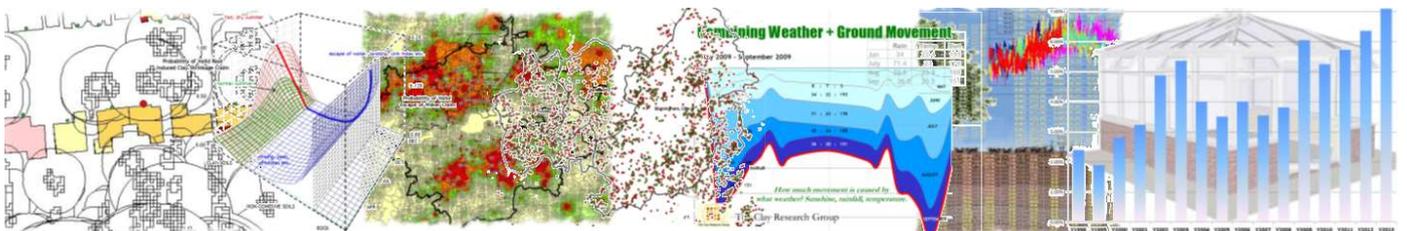
It's been stop/start at the fracking site, following minor tremors recorded by the BGS at nearby stations. For an update, visit: http://earthquakes.bgs.ac.uk/earthquakes/recent_uk_events.html

At the time of issue, the highest value from the station closest to the Blackpool fracking site was 1.1, recorded on the 29th October. Elsewhere (and unrelated) across the UK, readings of 2.4 (Caerphilly) and 3.1 (Durham) have been recorded over recent months.

By agreement, drilling stops when values reach 0.5.



Map produced using a KML file downloaded from the BGS web site, using Google Earth as a background.



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Subsidence Forum Annual Award and Training Day

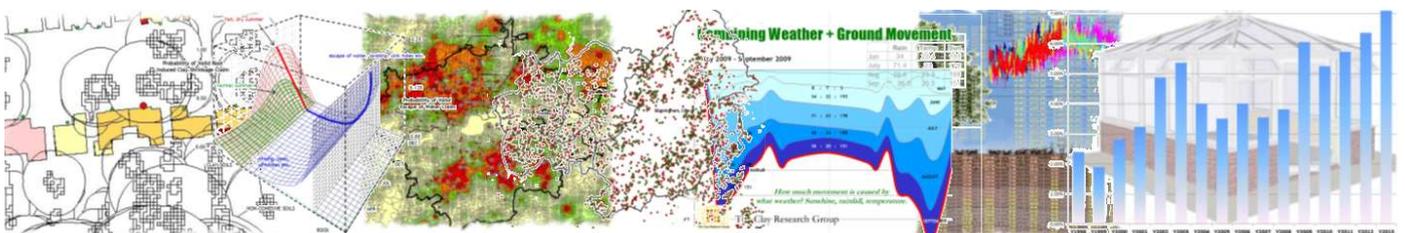
Some snapshots from the Subsidence Forum training day held on the 17th October at Tewin Bury Farm, Welwyn. For more information, visit <http://www.subsidenceforum.org.uk>.



In the (Arboricultural) News

Thanks to Keiron Hart of Tamla Trees for the following updates.

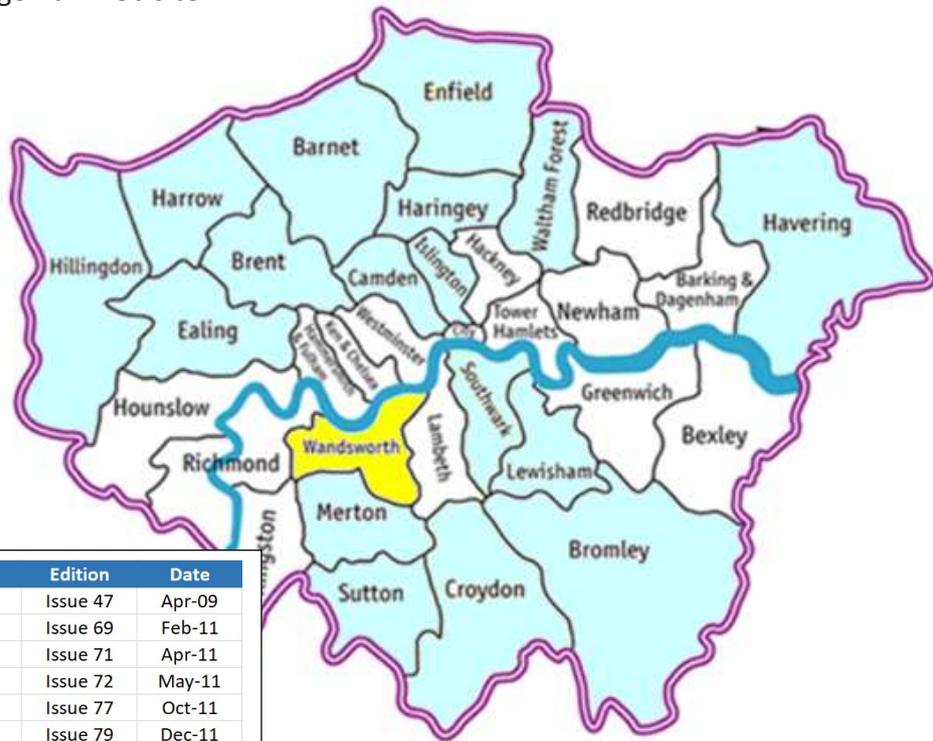
- The National Association of Tree Officers (NATO) and the London Tree Officers Association (LTOA) are merging. Imogen Mole, Director of NATO, said *“It’s brilliant news. Our members have always recognised the importance of a strong National voice for Tree Officers, by working together we are more able to do this. Our new relationship promises a positive and constructive future and I hope you’ll continue to support us.”*
- Chesterfield Council have released details of a court case in which a builder, D. J. Atkinson Construction Limited, pleaded guilty to damaging the root system of a cherry tree protected by a Tree Preservation Order. The company received a fine and costs totalling £12,000. The builder was working on a development of 37 homes, and failed to protect the tree and their actions caused root damage on two separate occasions - January and September 2017.
- The Government’s recently appointed Tree Champion, Sir William Worsley, has called for stronger protection for England’s street trees with the launch of a new Urban Tree Manual. Aimed at local authorities, charities and community groups, the manual provides practical advice on selecting the right tree for the right place in towns and cities, including tips on choosing planting location, tree type and soil to maximise the environmental benefits.



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London Borough Subsidence Risk Profile - Wandsworth -

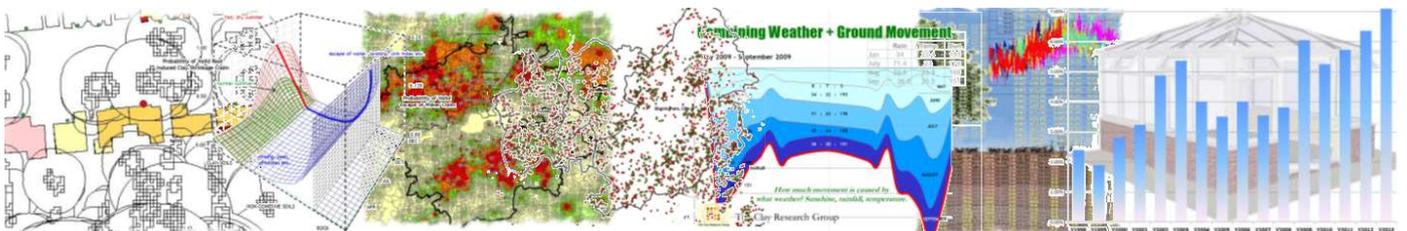
The London Borough of Wandsworth lies to the south of, and borders, the Thames – see map below. It has an area of 34.26km² and a population of 307,000. The 2001 Census lists 2,840 detached houses, 8,603 semi-detached and 31,916 terraced. Just over half of the dwellings in the borough are owner occupied. Data obtained from Wandsworth.gov.uk web site.



Borough	Edition	Date
Islington	Issue 47	Apr-09
Camden	Issue 69	Feb-11
Brent	Issue 71	Apr-11
Haringey	Issue 72	May-11
Barnet	Issue 77	Oct-11
Waltham Forest	Issue 79	Dec-11
Welwyn and Hatfield	Issue 80	Jan-12
Ealing	Issue 84	May-12
Sutton	Issue 91	Dec-12
Hillingdon	Issue 106	Mar-14
Havering	Issue 149	Oct-17
Harrow	Issue 150	Nov-17
Enfield	Issue 155	Apr-18
Southwark	Issue 156	May-18
Lewisham	Issue 157	Jun-18
Bromley	Issue 158	Jul-18
Croydon	Issue 159	Aug-18
Basingstoke & Deane	Issue 160	Sep-18
Merton	Issue 161	Oct-18

Data and maps in the following pages have been built from a five-year claim sample, which includes one surge year and four ‘average’ years.

Most are based on frequency calculations – total claims for the five-year period divided by the housing population.

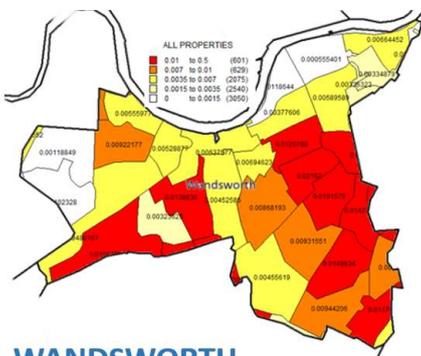


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London Borough Subsidence Risk Profile - Wandsworth -

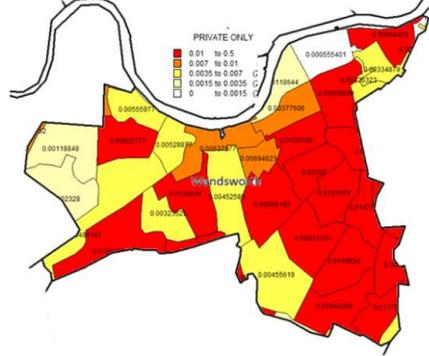
Below, left, a postcode sector map showing the risk of subsidence based on claims experience for the total housing population. Right, the difference in risk distribution using the same claims data but taking account of houses in private ownership only.

Frequency Risk - All Properties



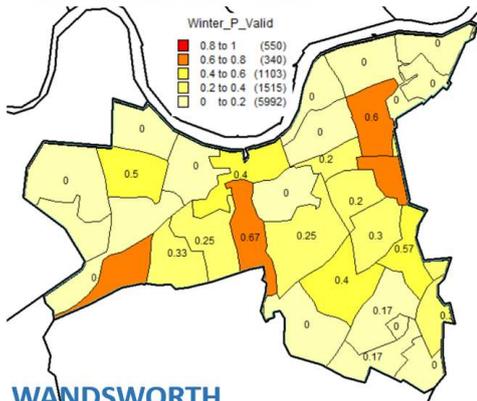
WANDSWORTH

Frequency Risk - Private Properties Only



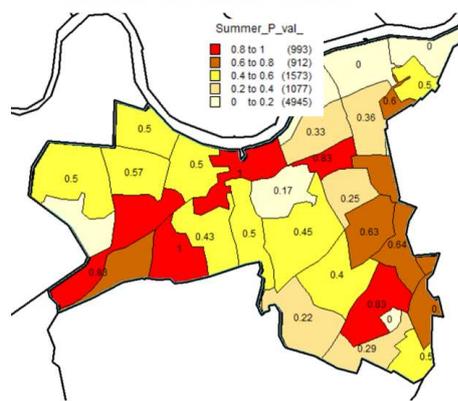
Below, the probability of a claim being valid, by season. ‘Summer’ is classified as a period from the middle of July to the middle of November to take account of the geology and based on our analysis of over 100,000 claims to determine significance.

Probability Valid Claim – Winter

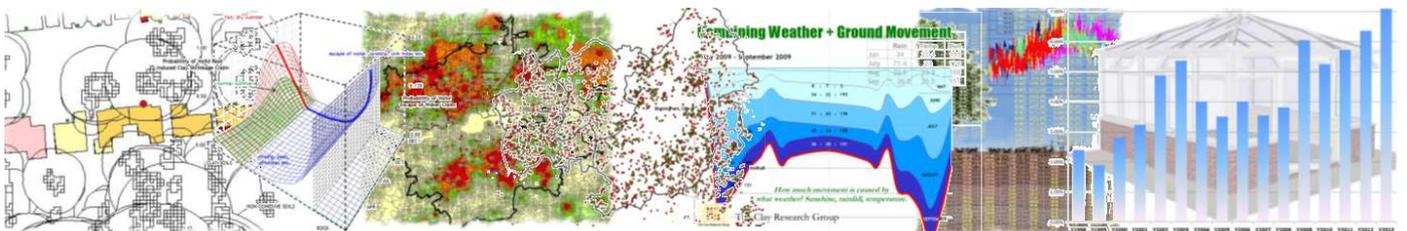


WANDSWORTH

Probability Valid Claim - Summer



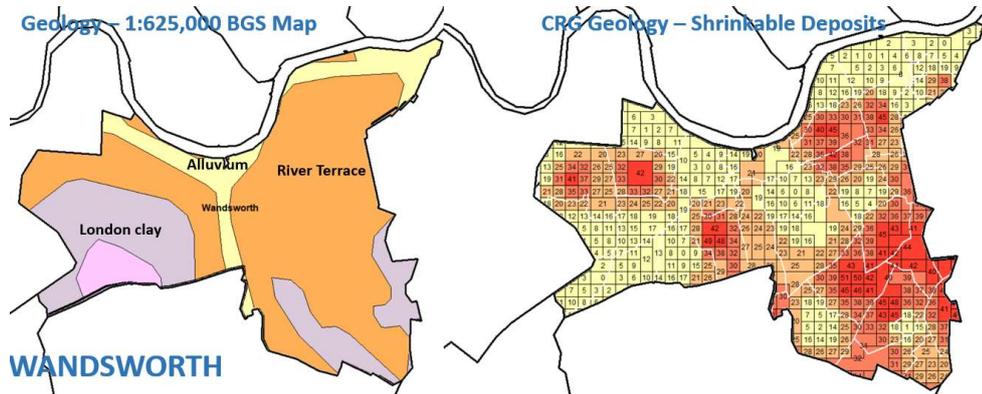
The greater the likelihood that a claim will be valid in the summer reflects the presence of an outcropping clay soil and is further enhanced by dry weather.



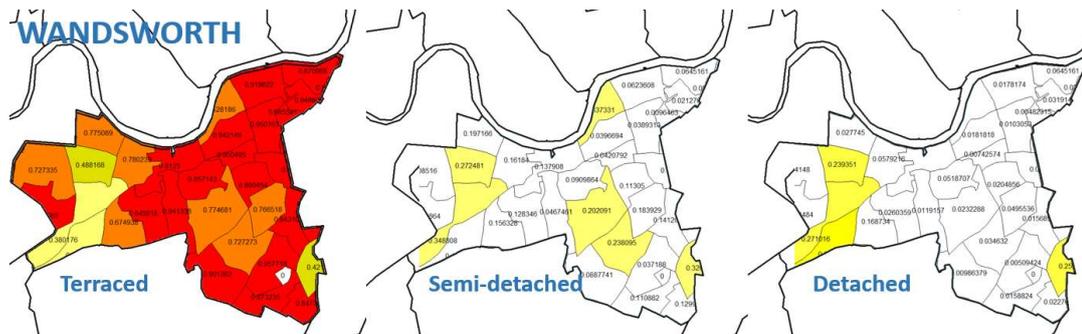
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London Borough Subsidence Risk Profile - Wandsworth -

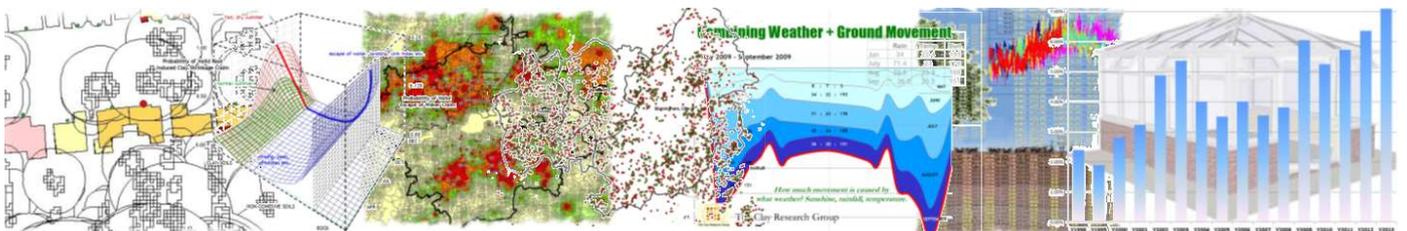
The geology is revealed below. To the left, the 1:625,000 BGS map – a low resolution outline of the series showing river terrace and alluvial deposits over London clay. Right, the CRG version built using data from site investigations and interpolated on a 250m grid.



Below, house types across the borough revealing the high count of terraced properties and the location and density of semi-detached and detached properties. The values in the sectors reveal the proportion in each.



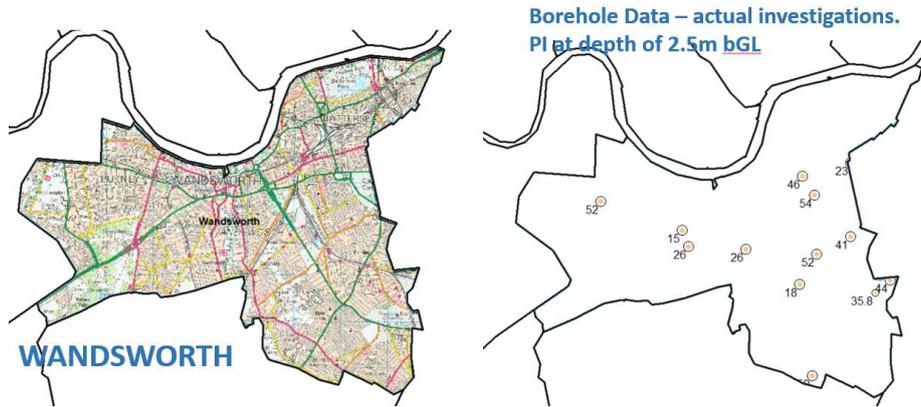
House type alone (semi, terraced or detached) is a low-value risk indicator. Age of construction (and by inference, likely foundation depth) is better.



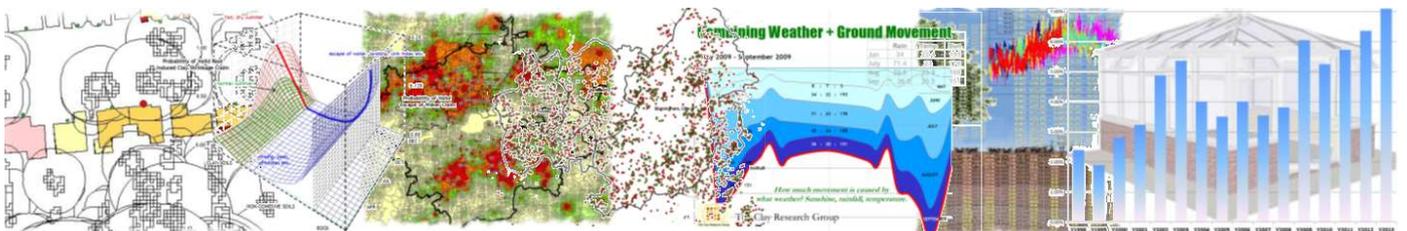
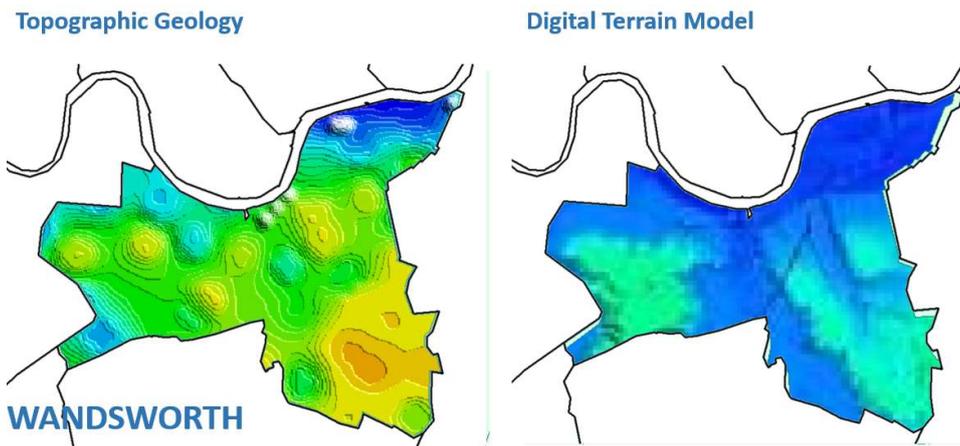
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London Borough Subsidence Risk Profile - Wandsworth -

A map of the area below, left, and location of some boreholes from site investigations relating to claims, together with the soil Plasticity Index noted at a depth of 2.5mtrs bGL.



Below, different ways of viewing risk. Left, a topographic model built from the CRG geological map and right, a digital terrain model built using LiDAR data to reveal ground contours and relative heights.



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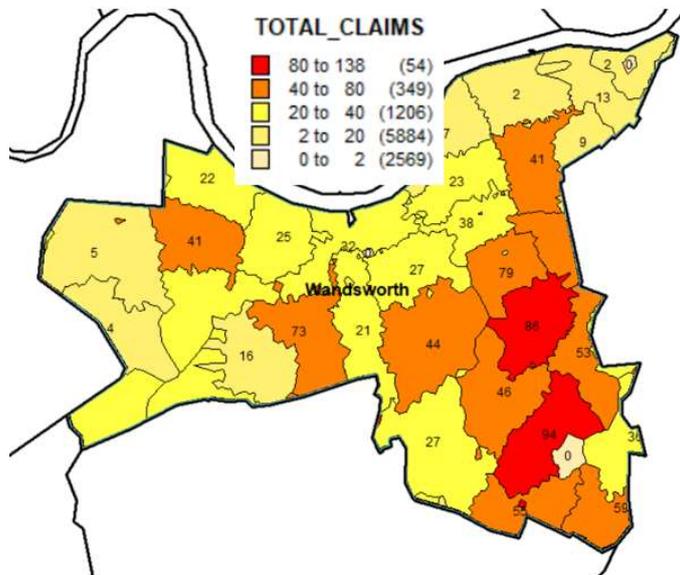
Wandsworth Subsidence Risk

The risk changes by season and year, variable by the geology and weather. In surge years, areas on clay soil will be placed higher in the risk table, falling in wetter, milder years to a lower position. Any attempt to order them has to take this volatility into account.

Over the five-year term covering the data we hold, Wandsworth occupies 19th place in terms of frequency (claims/private housing) in a table covering 413 districts across the UK. In contrast, it comes in at 10th place in terms of claim count – see graph below. So, it receives a high number of claims, but due to the housing population, the frequency is slightly lower. Wandsworth comes 6th in terms of claims/area.

Claim Numbers and Hot Spots

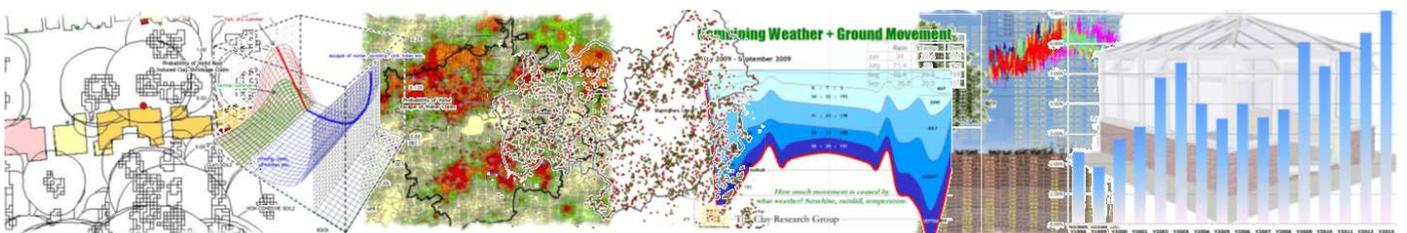
Using this study to explore whether ‘hot spots’ can be identified using claims experience reveals two postcode sectors that might fall into this category. Of course, it’s possible (likely) that trees implicated in subsidence have now been removed and the sector may have to be downgraded. On the other hand, if claims are notified at some future date, such an approach might be useful – subject to legal opinion of course.



The example, left, doesn’t distinguish between tree ownership. It includes both private and Third Party trees – and quite possibly other causes. Leaking drains etc., given the variable nature of the soils.

However, if the industry really does want to tackle the problem, a joint effort using this approach would help. Council Tree Officers could direct their efforts and use limited funding to reduce, or even remove, their liability in the areas identified.

Should the map use frequency data rather than a simple count? Is postcode sector level (“HA5 5”) too coarse – should we use full postcode (“HA5 5SN”)? How do we factor in species and tree metrics etc? More next month.



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How Meeting the Requirements of the Building Regulations Caused Subsidence Damage

One of our readers has highlighted a case where complying with the Building Regulations appears, perversely, to have resulted in substantial losses. Here is the background. The owners of one of a pair of semi-detached houses decided to extend their home and engaged a surveyor to prepare plans and make a submission under the Building Regulations.

It was known that the houses were built on a clay soil, and there were mature trees (possibly pre-dating the houses and protected by a TPO) within influencing distance, situated in the neighbour’s garden. The presence of the trees meant that the extension had to have a piled foundation.

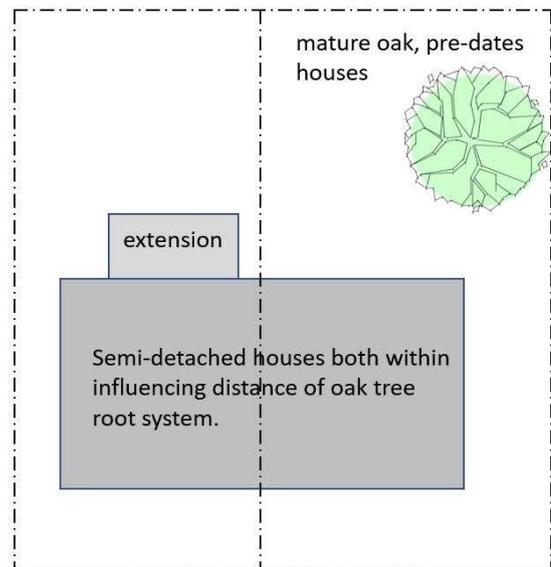
Over a period of time cracks developed at the junction between the extension and the house which led to the notification of a claim. It transpired that the difference in foundation depths was the cause. The houses had been moving seasonally since they were built, coping with the enhanced fluctuations caused by the presence of the trees. Attaching a rigid box (the extension) with deeper foundations was the cause.

Insurers stepped in and determined that the only answer was to underpin the house and their agents designed a pier and beam foundation. What could possibly go wrong?

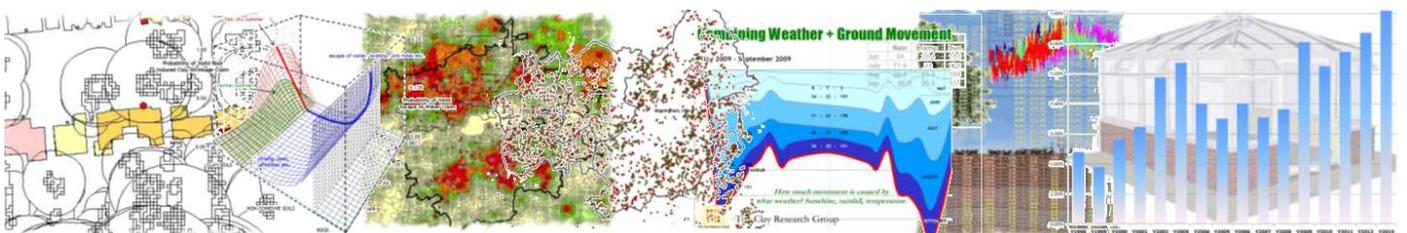
Fast forward to the present time.

Stiffening the semi-detached house meant that the other half of the pair, which was still moving seasonally, started to develop cracks. Each correct step forward (piling the extension, deepening the neighbours house foundations) led to a further problem. The two houses had co-existed well until the extension was built to comply with the Building Regulations.

Difficult to see how the problems could have been reasonably avoided, but welcome hearing from anyone who can.



Diagrammatic view showing the relationship between the original houses, the new extension and the tree.



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In “Quantification of ocean heat uptake from changes in atmospheric O₂ and CO₂ composition”, (published in the journal Nature, Vol. 563, November, 2018), L. Resplandy and his team at the Princeton and the Scripps Institution of Oceanography at the University of California-San Diego have developed a new way of measuring temperature based on measuring the oxygen and carbon dioxide released by the oceans.

Geoscientist Laure Resplandy explains ... “We thought that we got away with not a lot of warming in both the ocean and the atmosphere for the amount of CO₂ that we emitted, but we were wrong. The planet warmed more than we thought. It was hidden from us just because we didn’t sample it right. But it was there. It was in the ocean already.”

Soil Moisture Deficit

Although we don’t have up-to-date figures from the ABI, colleagues in the industry confirm that 2018 has been busier than recent years, delivering a summer surge and estimates by year end vary between 18 – 20,000 claims. Far fewer than the average from 20 years ago, but a 50% increase from a base of 12,000 in 2017.

Data from the Met Office (below) confirm the dry weather continued through October.

