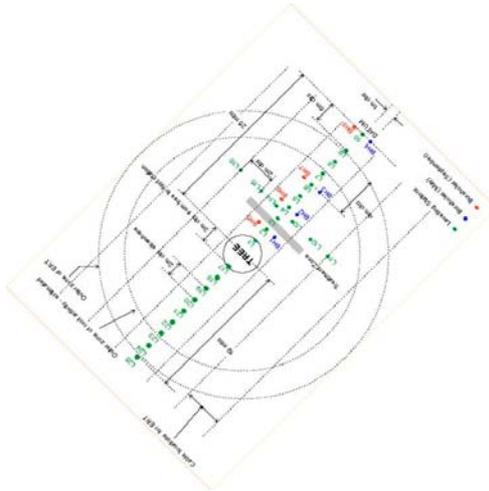


The Site
Aldenham Instrumentation

The installation is complete - apart from the fact we have the stations across the goalmouth of the sports ground, everything is fine! As ever, Aldenham weren't phased in the slightest and have arranged to move the football pitch.



Each of the Stations has a protective cover, concealing a shallow concrete plug into which has been set a rod. The cover is removed and levels taken by sitting the staff on top of the rod. See the arrangement below.



And then we add the tilt sensors. Measuring fine rotational movements and producing high value graphs taking readings every hour. We should start to see changes related to root activity in a few months time.

One of the unexpected by-products has been the integration of a soil testing device which measures moisture movement as well as rotation.

Imagine having positive evidence, day by day, that building movement is associated with moisture change. It is far better than taking soil samples once, and possibly missing the evidence.

Join Now

It makes sense to join The Clay Research Group. We can keep you updated. You would be made welcome at the meetings to review the data and discuss progress. You can share in the developments and add any areas of interest.

Better still, once every few months, meet your colleagues socially. Most of us get together at a local university or the Institution of Civil Engineers in London to review progress.

Be part of the team. Entry costs aren't huge. The benefits are.

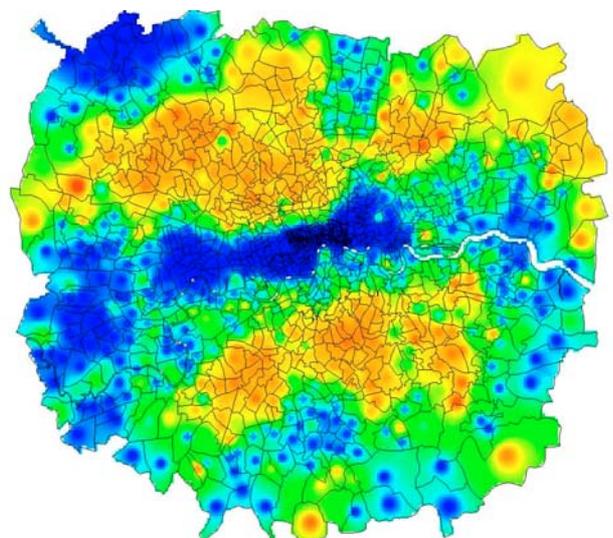
If you have the will, E-mail ael@blueyonder.co.uk and we can add you to the list of prestigious members.

A New Geology

Yes, we know you have seen it before, but it is worth showing again.

Digital data, insurance related. How many claims, where, and what were the results of investigations? It reflects the real world.

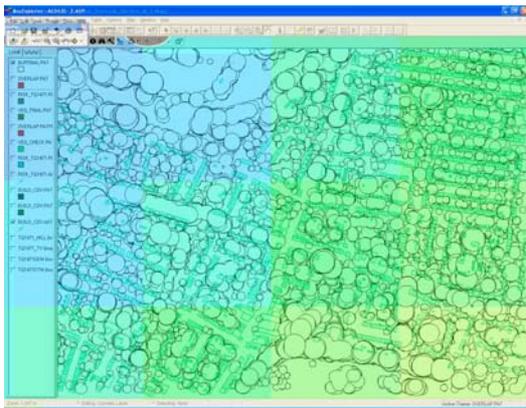
This is an extract of the risk map within the M25. It is used by some of our members as the engine driving their virtual investigation and soils testing web sites. You know the sorts of applications.



Risk

Continuing the theme from Page 1, our new geology, GeoSTAT, drives the new range of virtual investigations.

It also forms the base for the risk models being developed by Addressology. Good products based on the latest innovative techniques.



Here, each tile is 250mtrs across, and represents a gradual change in the plasticity index of the shrinkable clay soil. It enhances the definition considerably.

Instead of knowing it is London Clay, we can anticipate the depth of the drift deposits, and we can be reasonably assured we are targeting a depth coincident with maximum tree root influence.

It is 'accurate' to three or four roads, but much depends on the number of investigations that have been carried out. Definition is highest where we have more investigations, as we would expect, and less where there have been fewer claims.

Telemetry

Telemetry is being adopted by our subscribers. The use of remote sensing - the black box assessment of house movement - is being rolled out commercially by SP Property Services, who recognise its benefits.

Our old friend Graeme Phipps will no doubt be knocking on your door shortly. Graeme views this not as a threat to his business of crack monitoring and precise levelling, but an opportunity. He understands the future is about business efficiency and technology.

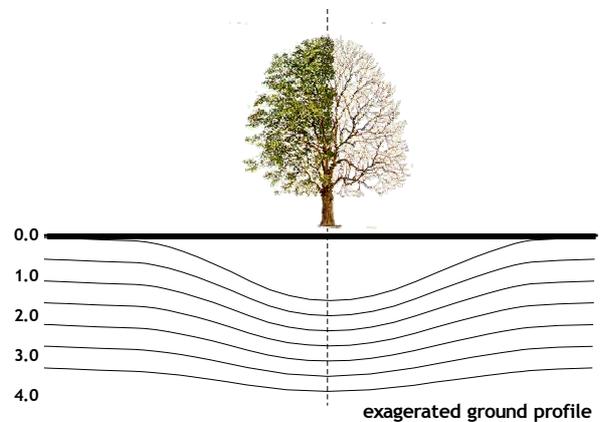
Using the Black Box approach he can reduce the amount of labour and yet provide more information of higher value to his clients.

Models

The ability to bring together the periodic signature of ground movement, tree root activity, species, height and distance from the building, together with climate has to be useful. Surely?

Aren't 75% of high value, valid claims attributable to this combination?

InFront and Crawford have both adopted the technology that drives their applications, OSCAR and VISCAT, with great success.



The Site

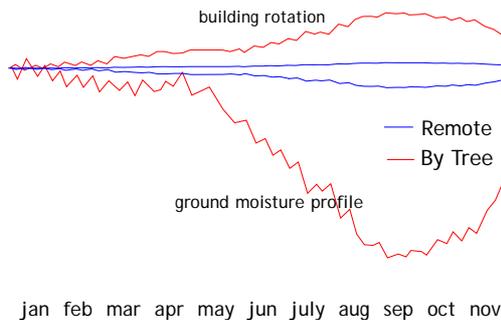
Here it is. Or at least, part of it. Aldenham School stretches to 100 acres, and the trees that form the subject of our research sit to the top right and bottom left of the screen.



Investigations, Monitoring and Arborists Assessment, all in one.

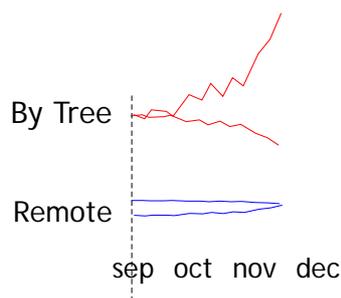
~ "This is a quite remarkable development" ~

More change but all for the better. Our research is pointing the way to an entirely new method of investigating claims.



Instead of sinking boreholes, retrieving soils, testing them, monitoring and then asking the arborist if the tree is influencing the soil, The Clay Research Group have developed a combined and remote monitoring station, taking real time measurements of building and moisture movement - at the same time.

The graph above shows how the data might appear for a typical year. The red line shows the moisture drying closer to the tree, and the building moving as a result. The blue lines show data from a remote station. Less fluctuation in both moisture and building movement - and by comparing the two - the red and the blue lines - we can prove the building is moving as a result of soil drying.



The above graph shows how we can conclude claims notified in the summer very quickly. Here we see the changes on recovery - 3 months should be enough time to gather the evidence we need.

It is quicker and cheaper than existing methods. Data can be reviewed from your desk, and the quality is far higher than any other technique. It delivers more for less, and allows the user to make a profit.



Come along to the annual subsidence conference at Aston if you can. It is being held on the 15th June, and we have a full agenda.

Malcolm Cooper, the Director of Underwriting from RBS Insurance is the keynote speaker. Malcolm will be telling us how insurers view risk, and giving a glimpse of the market from an underwriting perspective.

A speaker from Addressology will demonstrate the risk models that are derived from our research and make reference to Malcolm's talk no doubt.

Hilary Skinner will outline the work being undertaken by The Clay Research Group, show us slides of the site and explain the objectives.

Nigel Cassidy from Keele is well worth listening to. He forms part of our academic team and is pushing the boundaries of electrical resistivity. Nigel will have some colourful slides demonstrating the uses of tomography and will tell us what he is doing at Aldenham.

In the afternoon we will hear from Richard Rollit about the problems with adoption of new technology. It isn't always 'plug and play', despite what we say!

Nigel Barham, Jill Hunt and Gary Strong discuss the merits and issues surrounding the use of technology in relation to service. Clearly we need to understand the benefits, and not be seduced by the science alone.

As if this wasn't enough, we have the added pleasure of a surprise guest speaker. Someone who is always thought provoking and we are sure you will welcome.

An excellent day and we do hope you can join us. Book tickets direct from Aston. Phone Helen Mallinson on 0121 204 3593.

Gary Strong is handling the advertising. We have had financial help from **GAB, Cunningham Lindsey, InFront Solutions** and **Crawford**, plus our chums at **Plexus**. Many thanks to everyone.

Stabilising Expansive Clays

Ramana Murty and Hari Krishna tell us ("*Stabilisation of Expansive Clay Bed Using Calcium Chloride Solution*", Ground Improvement. 2006.) that CaCl_2 reduces the swell characteristics of clay soils by reducing the Liquid Limit.

It changes the Plasticity Index significantly. By as much as 50% in some cases and effectively nullifies swell.

Lime has this effect, but injection hasn't been feasible on domestic sites. CaCl_2 is readily soluble in water, which help dispersion. Lime isn't.

In a nutshell, the authors tell us a 1% concentration of CaCl_2 reduced swell by 75%. They poured the water onto the ground to achieve this effect, allowing it to percolate through. There was no particular treatment or injection procedure.

Modification of the index properties up to 2mtrs bGL was achieved using this simple technique. The best time of the year to apply it is in the summer because the water enters the desiccation cracks.

At 1.5mtrs below ground level, in a soil with a LL of 71.5% before treatment, they recorded reductions in values in the range of 47.5 to 35%.

Which brave insurer, with a large heave claim, is going to put it to the test? Although desiccation cracks might well help absorption down to 2mtrs, uptake will be reduced significantly from this depth down we imagine.

2mtrs is typically the top of the suction curve. Below this, the going gets tough.

Would drilling a series of small holes down to 2mtrs help? Or would the clay soils struggle to take the chemical? How far would the chemical spread laterally? Is it practical?

Many thanks to Clive from MatLab for drawing this to our attention.

Smile

We see they now have microwave radar imagery capable of detecting ground movement of 1mm or so taken from the ENVISAT satellite circling the earth at 800km! Amazing.

The New Scientist tells us it is used commercially "by insurers to detect subsidence before it happens". Come on. Which of you is taking this imagery day by day to anticipate subsidence? More to the point, what do you do when you have detected it?

Identifying the Soil

Experts on the subject of electrical resistivity can tell you the nature of the soil beneath the ground without digging a hole. Each has it's own characteristic 'signature'.

| Material | Resistivity (Ωm) |
|--------------------|----------------------------------|
| Clay | 1-20 |
| Sand, wet to moist | 20-200 |
| Shale | 1-500 |
| Porous limestone | 100-1,000 |
| Dense limestone | 1,000-1,000,000 |
| Metamorphic rocks | 50-1,000,000 |
| Igneous rocks | 100-1,000,000 |

Typical Geological Electrical Resistivities.
(van Blaricon 1980; Telford et al. 1976; Keller and Frischknecht 1966)

Instead of taking up the newly laid paving, digging the hole, excavating a sample, kneading it between your fingers and wondering what it is before putting it into a bag, sending it to the laboratory and having it tested, we can stick a sensor into the ground, and get the answer.

If it is clay, they can even tell us whether it is drier than it should be.

Moving Water

We start moving water from one place to another in September. Below ground. At Aldenham. We may sell tickets to anyone that is interested. Standing room only.

The tree wants water and the soil is trying to hold on to what it has. The battle takes up lots of energy and can lead to ground movement. Moving tonnes of moisture isn't easy and particularly not when you are carrying it to the top of a very tall tree. Try it if you like.

We are extending the length of some of the ERT array spikes, and passing a small current through the ground.

It creates a differential potential, and this is how we move water. We may also trigger the tree to self-medicate, but who knows? The charge will influence the roots. They contain ions in the same way that the soils do. Watch this space.