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

April 2012

The Clay Research Group

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Issue 83, April, 2012

Root induced clay shrinkage claims cost more to settle than other categories, occur more often and can be technically challenging, sometimes leading to delays in achieving an equitable claim settlement.

The environmental issues add a layer of complexity, as do changes to the law on tree root nuisance. The Aston Conference reflects these issues and we are looking forward to hearing from the speakers and meeting colleagues.

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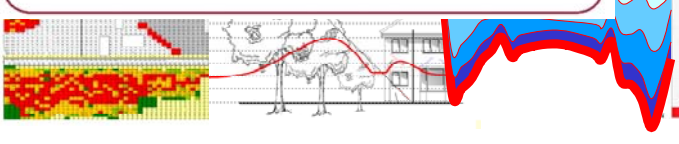


ASTON UNIVERSITY
BIRMINGHAM

The Annual Subsidence Conference
20th June, 2012

The agenda is set, and a copy is on the back page of this newsletter. Richard Rollit has agreed to chair the day, and the opening speaker is Maciek Kawecki. Maciek will be providing case studies of rehydration schemes that he has been using on domestic claims for many years. Next, Paul Harris will give his perspective on tree root nuisance claims. Paul represents a large number of Local Authorities and feels that a different approach may be beneficial.

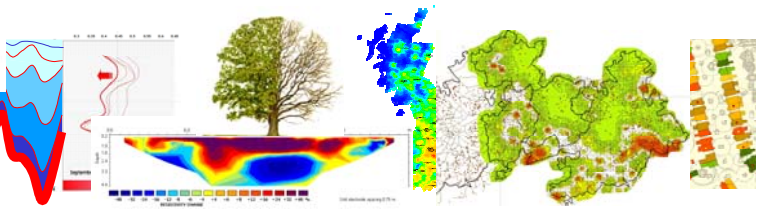
Michael Lawson from OCA will be reviewing the data he has collected over many years, and looking at claim numbers for the period 1975 – 2011.

The afternoon session covers recent developments on the legal aspects of tree root nuisance. Margaret MacQueen will outline the recent changes in the TPO legislation. Rachel Bolt will be explaining the significance of recent case law, and Ian Brett-Pitt looks at the practical implications for insurers.

Rachel and Ian are involved with some cases that are running at the moment, and the decisions (assuming they are given before the conference) could change the current views on liability.

Finally Richard brings us up to date with the current work of the CRG and related parties.

To book, please see details at the foot of the attached program.



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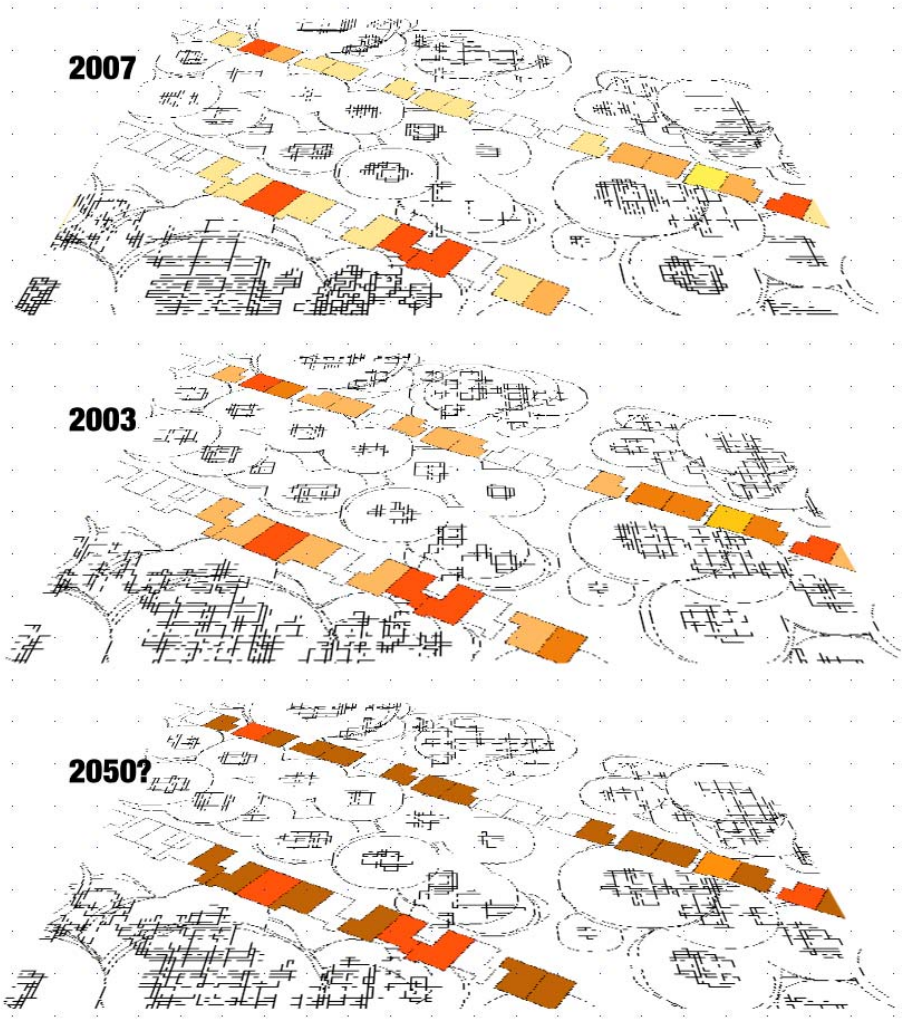
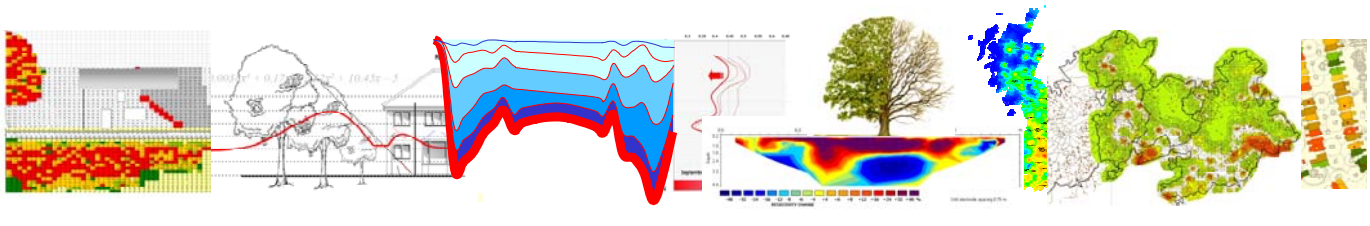
MODELLING RISK by CLIMATE

We mentioned in an earlier edition the ability of the risk model to be 'fine tuned' to cater for different seasons, but perhaps more importantly, to take account of Climate Change.

The top layer represents the present situation, in a 'normal' year (we have used 2007) with claim notifications of around 30,0000 p.a.



The middle layer represents a surge year (2003), with claim numbers closer to 50,000, and the bottom layer is a projection of what could happen if climate predictions are correct. The shading represents properties at risk and we are currently working on what percentage of these 'at risk' properties results in a claim over a ten year period.



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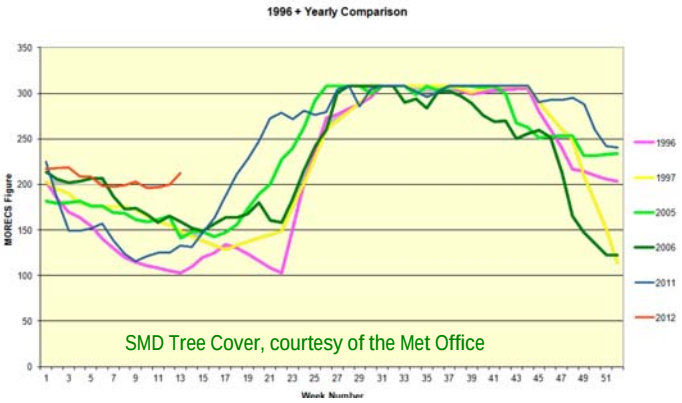
SMD Beneath Trees

Michael Lawson from OCA has been modelling SMD data from beneath trees for the past 20 years, and has supplied the following graph revealing just how dry 2012 is when compared with other years.



SMD Tree Cover, courtesy of the Met Office

March has set a record for being dry and with trees coming into leaf shortly, it is not surprising that Michael should upgrade the likelihood of a busy claims year to amber. Visit his web site at michael.lawson@landscapeplanning.co.uk for more information.

SMD and Ground Movement

In his days at the Building Research Station (BRE), W. H. Ward recognised a relationship between SMD values and ground movement. He suggested that the SMD value be divided by a factor of 4 to derive ground movement. So, for grass = 100/4 = 25mm, and trees might be 300/4 = 75mm.

Subsiding say 80mm in 4 months (May to September) is a problem, but what does dropping 40mm due to incomplete rehydration over the winter mean? Are dry winters always a precursor to surge years?

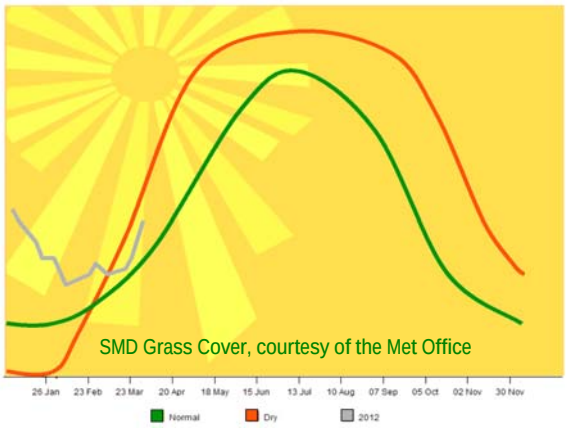
Another Dry Start

2011 Started off very dry, and then we had intermittent rainfall through the summer, only to see the dry spell return in the Autumn.

The climate is becoming increasingly erratic, and making predictions about what the summer will hold is no more than a guess.

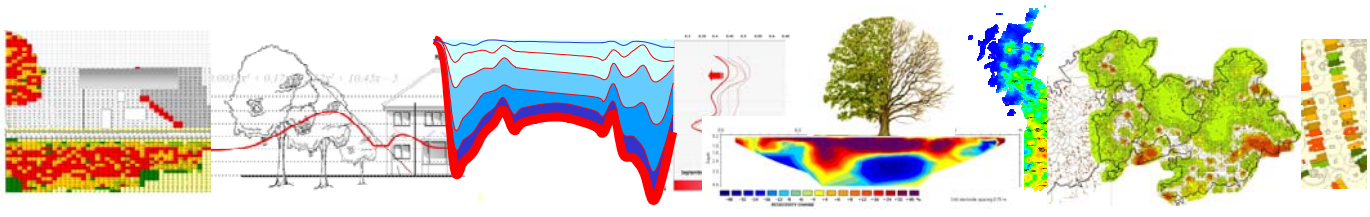
What we do know is that an exceptionally dry Spring and a baking hot summer would be entirely exceptional in the UK. We reflect on 1976, the exception that makes the point.

We share the view of our colleagues at Cunningham Lindsey in anticipating a year that will be close to normal in terms of claim numbers, but perhaps similar to 2011 in terms of weather.



SMD Grass Cover, courtesy of the Met Office

Do we have anything to support this idea other than suggestions by the experts that climate is becoming more unpredictable? No, beyond saying that statistically it would be most unusual. Hotter. Dryer summers are one thing. Sunshine all the year round would be entirely another, but who can say?



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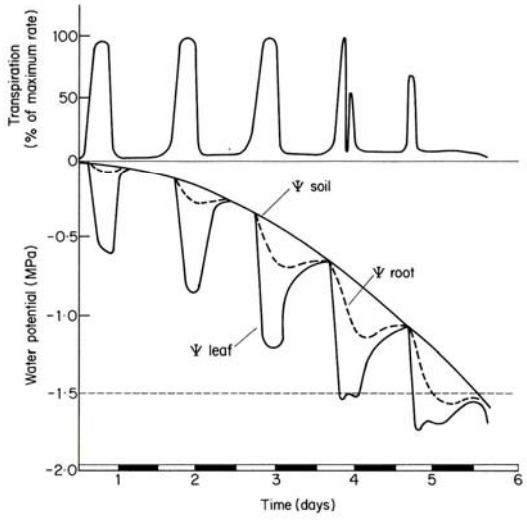
PLANT WATER RELATIONSHIPS

Academic Press, 1967

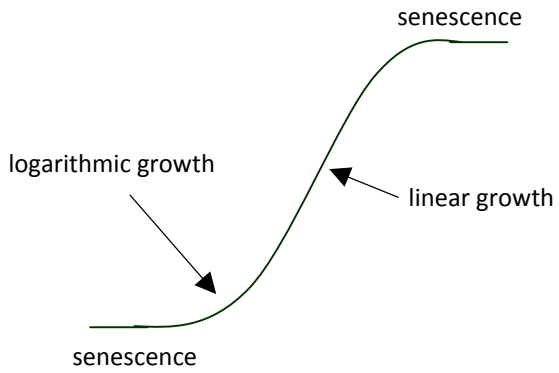
The diagrammatic below has been taken from Fitter & Hay, (1993), **Environmental Physiology of Plants,** after Slatyer (1967), "Plant Water Relationships", Academic Press, revealing the interaction of various water potentials over a 5 day period.



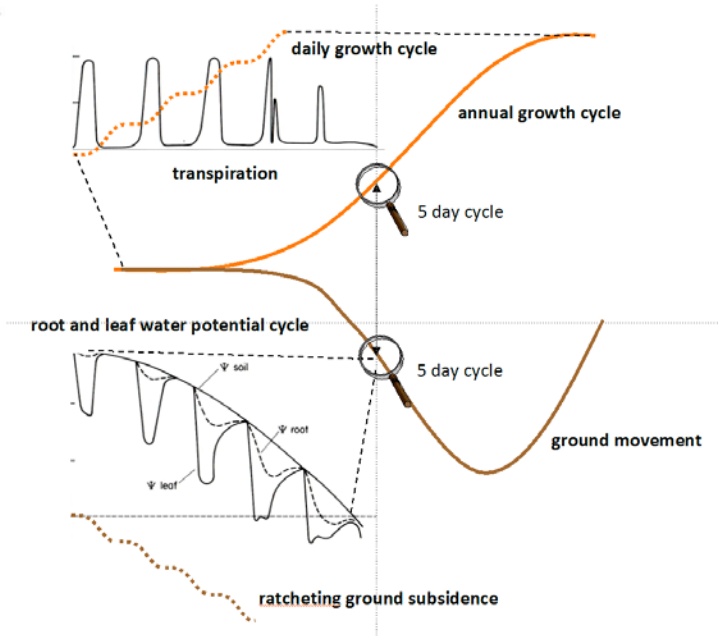
Transpiration gradually slows as the soil water potential decreases. Overlaid we see the daily struggle of the root and leaf to maintain flow. With increasing suctions, both have to work for longer periods, increasing soil drying.

Top right we see the sigmoid form of growth throughout the year, with senescence through the winter, followed by logarithmic increase in height and weight in the spring followed by linear growth through the summer.

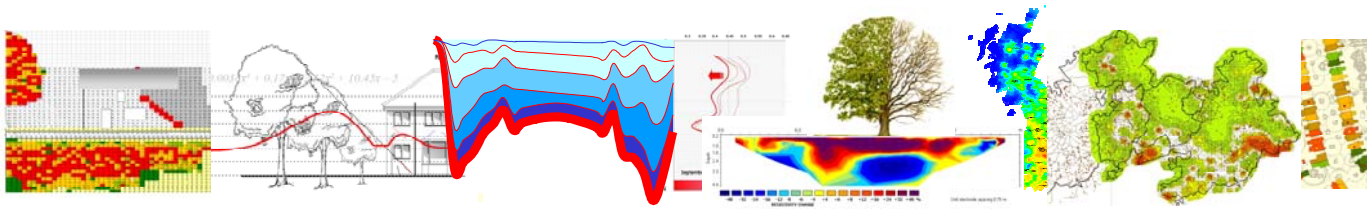
Superimposing the above graph onto this chart provides a profile throughout the life of the tree, adjusted to take account of climate.



When the elements are assembled we see repeating patterns, all linked with the annual growth profile matching the daily profile in the summer months. Early spring matches early morning, and annual senescence is evening.



The leaf water potential is much higher than that found in the root, and the result is a gradual ratcheting down of the soil, causing subsidence.



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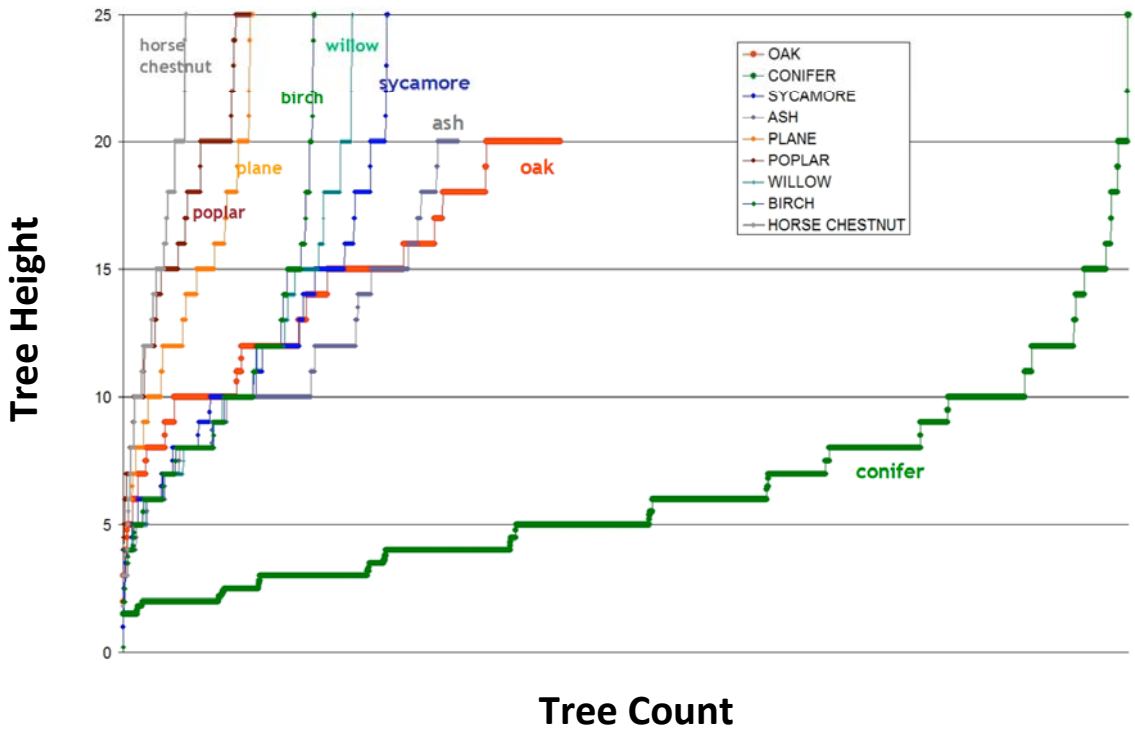
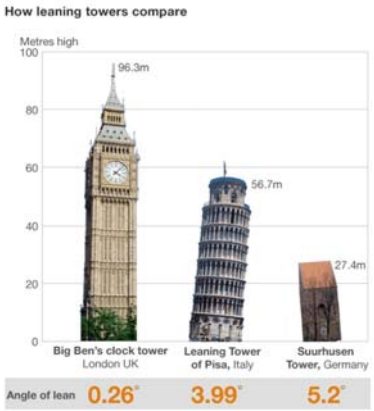
TREE DISTRIBUTION by SPECIES



Relative distribution by species of tree involved in subsidence claims from a large sample (in excess of 25,000) showing the overwhelming proportion of conifers followed, some distance behind, by the Oak and Ash. Conifers cause more damage in height ranges 3 to 5mtrs tall, and Oaks in height ranges 15 to 20mtrs.

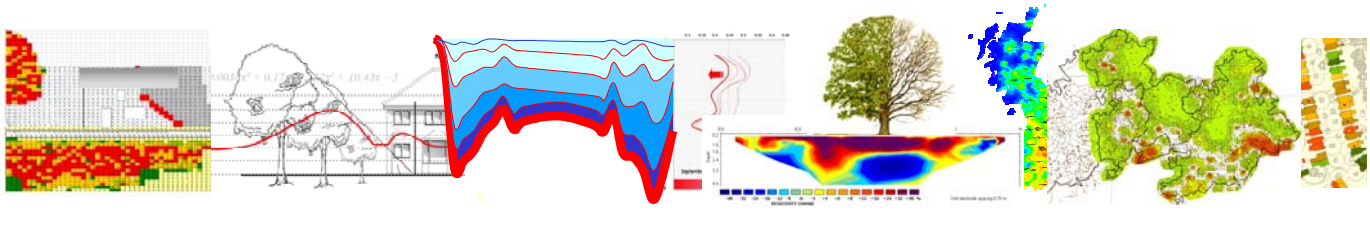


BIG BEN, St Stephen's Tower …

Good news. The odd idea that The Houses of Parliament should be sold off because the tower housing Big Ben was found to be leaning by 450mm have been shelved – at least in the short term.

Experts including Prof. Burland and engineers from Geotechnical Consulting Group have been investigating and Parliamentarians are reassured that it wont be falling down any time soon.

The situation is to be reassessed in 2020.



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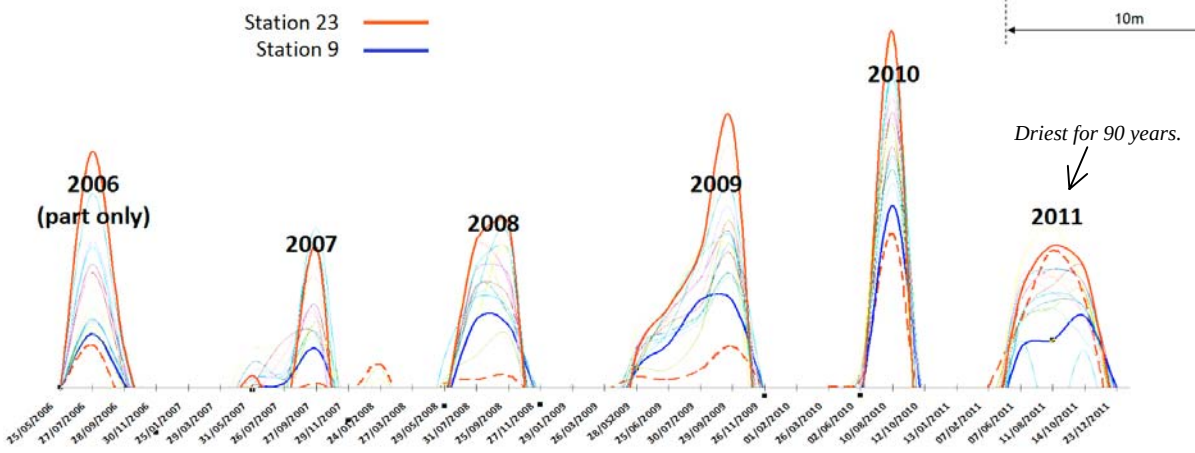
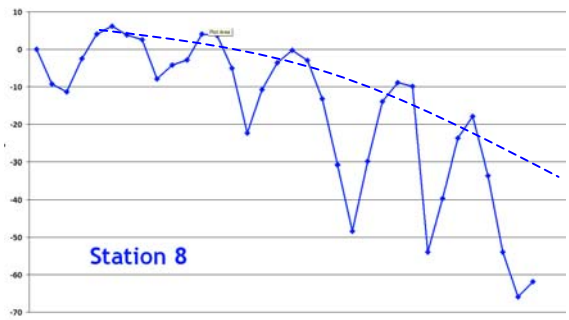
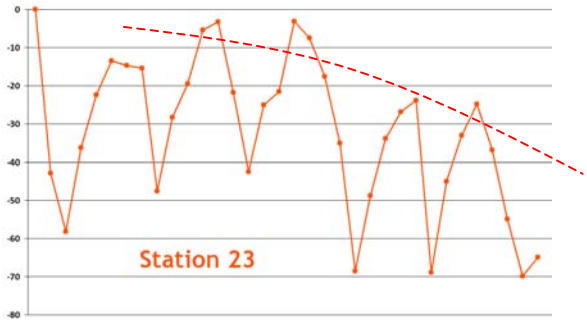
ALDENHAM WILLOW – MOISTURE CHANGE



MOISTURE UPTAKE of ALDENHAM WILLOW SUFFICIENT TO CAUSE GROUND MOVEMENT. PERIOD 2006 to 2011

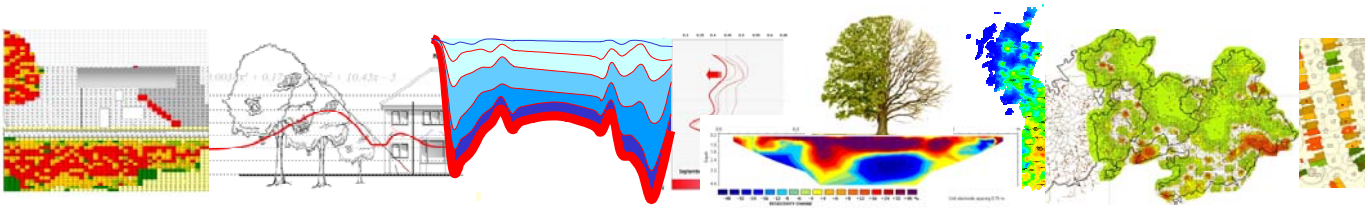
Using ground movement as a proxy measure the above plot shows moisture uptake by the Willow over the last five-and-a-half years. It is interesting to compare years using empirical data, rather than having to rely on assumptions based on estimates of rainfall, hours of sunshine, evapotranspiration, tree health and soil properties etc. The above records what has actually happened. Although the figures will include shallow drying due to grass and evaporation the outcome is driven primarily by tree root activity.





Development of a Persistent Moisture Deficit Over Time

Both Station 8 and 23 (see following page for location) are towards the assumed root periphery and both have developed a gradually increasing persistent deficit in the four year period between the winters of 2006 and 2010. The deficit has reached 25mm in the monitoring term. Looking at 2012 so far, Tim Freeman of GeoServ Ltd., points out that "this time last year, the recovery was 80 - 90 % complete, this year its more like 50 %"



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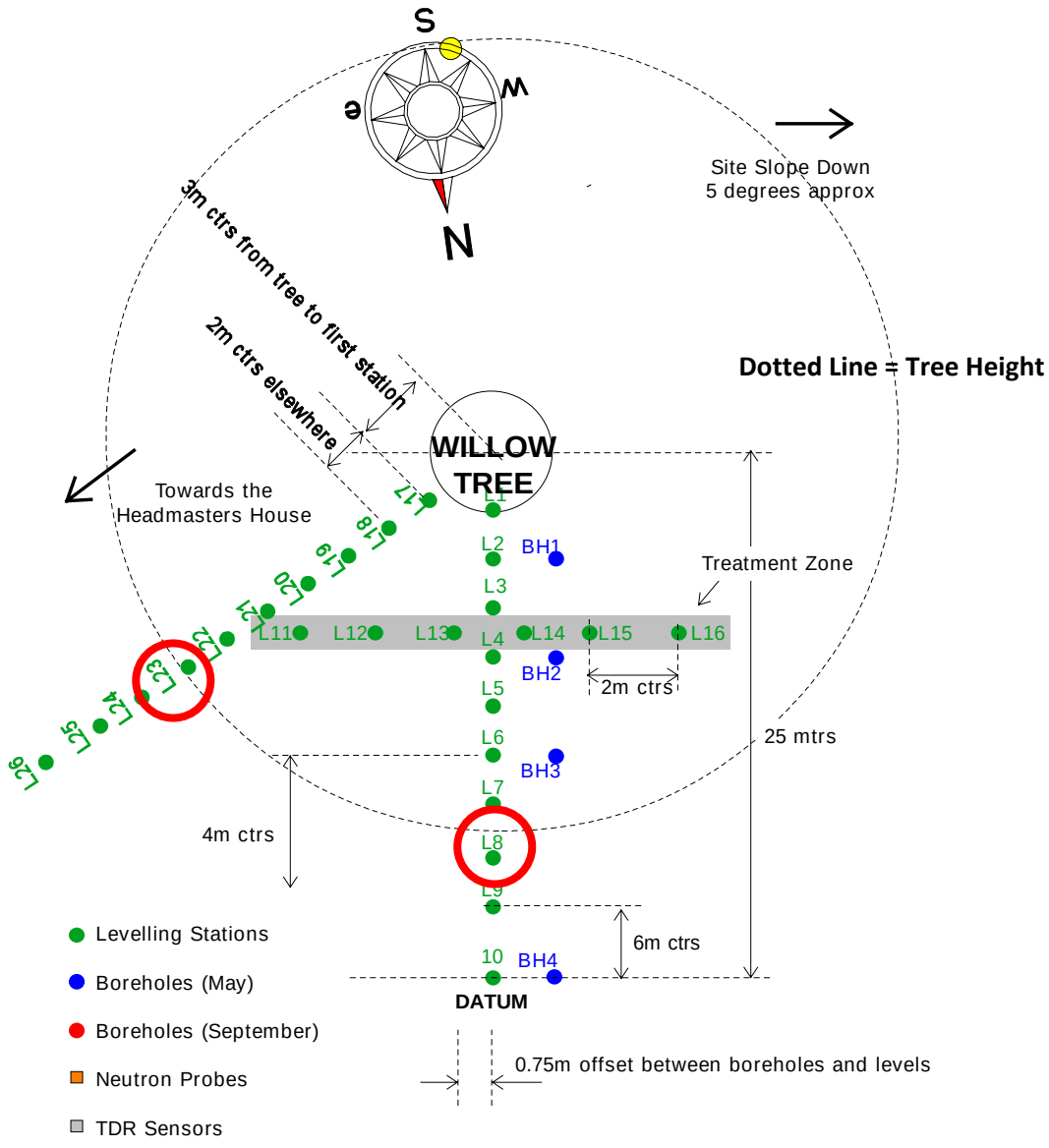
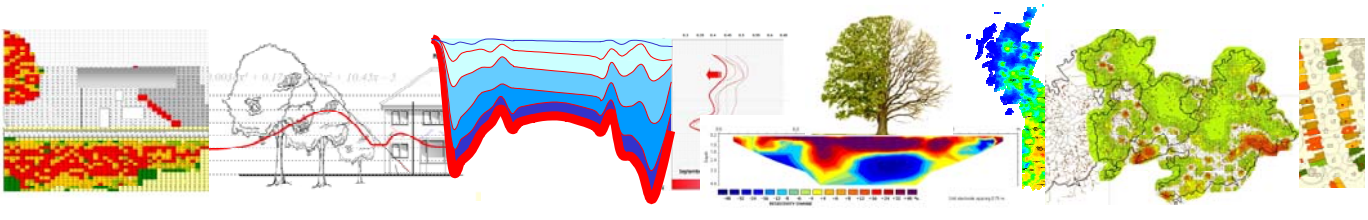
ALDENHAM WILLOW – SITE LAYOUT





Aston CPD Centre
BIRMINGHAM

presents a One-day Conference on Wednesday 20 June 2012
at Aston University

SUBSIDENCE
Topical Issues 2012

09.00 - 10.00	Registration and coffee
10.00 - 10.15	Opening by Chairman: **RICHARD ROLLIT,** Innovation
10.15 - 10.50	The Council as Tree Owner- or, seeing things from other side. **Paul Harris,** Chartered Engineer
10.50 - 11.25	*Rehydration: Case Studies* **Maciek Kawecki,** Director, Subsidence Management Limited
11.25 - 11.40	***Coffee***
11.40 - 12.15	*An Analysis of Clay Soil, Climate and Plant Interaction as this Relates to Claim Numbers 1975-2011* – **Mike Lawson,** OCA
12.15 - 12.45	Discussion
12.45 - 14.00	***Lunch***
14.00 - 14.15	*Changes to the TPO Legislation* **Margaret MacQueen,** OCA
14.15 - 15.50	*Recent Legal Developments and the Implication for the Subsidence Claim Industry.* **Rachel Bolt,** Freeth Cartwright **& Ian Brett-Pitt,** Innovation
15.50 – 16.05	***Tea***
16.05 - 16.30	*CRG Update. Rehydration using the Intervention Technique and EKO* **Richard Rollit,** Innovation
16.30 – 17.00	Discussion
17.00 - 17.30	Tea & Disperse

(Directed by Stephen Plante, The Clay Research Group)

For conference availability: enquiries@astoncpdcentre.co.uk **Telephone Enquiries:** 0121 204 3606
Fax: 0121 204 5079 **Website & Mailing Subscription:** http://www.astoncpdcentre.co.uk
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The views expressed at the conference are personal to the speakers and are not necessarily those of Aston CPD.
Conference Organiser: Dr M Sadeghzadeh 07788947658
Please note the programme is subject to change without prior notice

correspondence to: Aston CPD Centre, Aston House, 6 Greville Drive, Birmingham B15 2UU

Please reserve .....Place(s) at the course, (subject to terms & conditions) **Subsidence: Topical Issues – 20.6.12**

Delegate Name(s): ..... Company: .....

Address:.....

Post Code: ..... Email Address: ..... Tel: .....

Have you any dietary, access or other requirements? **YES/NO if YES** please state .....

Do you wish to be invoiced? (VAT exempt) **YES/NO** Purchase Order No: .....

Invoice address if different from above: .....

.....

Cost **£195** per delegate, VAT exempt, covering attendance, papers, lunch and refreshments during the day.
(Cheques should be made payable to **Aston CPD**)