



Trees and the underground (Part A) – understanding the conditions, regulations and relationship with utilities (Held online)

Agenda

Chair: **Nicole Metje**, Professor of Infrastructure Monitoring, University of Birmingham

Mapping – what is there?

Holger Kessler, Science Lead, Future of the Subsurface,
Government Office for Science

Rules and regs – what can go where, overcoming conflicts with utilities?

Pete Stevens, Environmental Consultant, AJS Flood Risk Consulting Ltd

From masterplan to underground – above ground aspiration to below ground delivery

John Rose, Urban Forest Consultant, Treeconomics

Root barriers – when to use, when not to use and long-term ineffectiveness

Keith Sacre, Urban Forestry Director, Barcham Trees

The recording and presentations are available on the TDAG website:

<https://www.tdag.org.uk/past-events.html>

Below are the comments, questions, responses from the speakers and attendees as well as references that took place in the 'chat' during the meeting.

Holger Kessler outlined a number of current information sources to identify and what is below ground.

Climate Action Strategy for City of London – Adaptive Design/Pathways for London' cubic mile.

<https://www.ukclimateresilience.org/projects/climate-action-strategy-for-city-of-london-adaptive-design-pathways-for-londons-cubic-mile/>

British Geological Survey (BGS) GeoIndex Onshore – free to use

<https://www.bgs.ac.uk/map-viewers/geoindex-onshore/>

National Underground Asset Register (NUAR), Geospatial Commission

The Geospatial Commission is building a digital map of underground pipes and cables that will revolutionise the way we install, maintain, operate and repair our buried infrastructure. This will be developed progressively and currently covers Northeast England, Wales and London.

<https://www.gov.uk/guidance/national-underground-asset-register-nuar>

This applies to England, Northern Ireland and Wales, but NUAR is working with Transport Scotland to ensure alignment with data model and symbology.

NUAR raised a number of questions and comments:

- Are the utility assets on the site mapping as shown accessible now for Local Authorities?
- What information is the NUAR based on (e.g.C2 statutory undertaker plans)?
- This is all very good, but from my experience, the information isn't always accurate at a site level...

Response: Data and accuracy will improve over time

- Will local authorities be able to share the information to their appointed consultants?

Reply: NUAR will be available to the entire supply chain of Utilities and Local Authorities for the specified use case (safe digging)

- How do you get access to trial pit info for NUAR? local authorities contractors do many of them, but not aware that they are shared

Responses:

- This is very interesting - we hope that in future at least a photo would be fed back and share with the NUAR users.
- Photos are taken and plans are made when tree holes are done, so this would be relatively simple to do.
- Apart from cost, is there any reason why access is restricted to LA's? Being able to see underground services in road verges etc would be really useful to Tree Wardens looking for planting sites.

Response: There are commercial, legal and security barriers we needed to overcome - therefore we created a closed and very secure role-based access model. Future use cases and usage is under consideration.

Please feed any overarching and general thoughts directly to the NUAR team via geospatialcommission@cabinetoffice.gov.uk and if you are working for a Local Authority or statutory undertaker reach out to nuarcontact@atkinsglobal.com (Atkins are the delivery team on behalf of Government).

Basic Registration Subsoil (BRO) – a Dutch model for assessing multiple layers below ground.

Major tasks such as energy transition, climate adaptation, housing and economic growth have an enormous impact on the immediate living environment - not only above, but also below the ground. All these tasks are related to the use of the subsoil. Not everything can be done in the same place. It is therefore essential to gain a spatial and integral insight into the subsurface. For good policy and management. The basis for this is clear, reliable data and information about the subsurface of the Netherlands.
<https://geodan.maps.arcgis.com/apps/MapJournal/index.html?appid=3a348ac9d2a847ba8a8a360a5c1bc234>

The BRO project raised a number of questions:

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CPD Partner: Institute of Highway Engineers

- How often is it updated?
- Do we have costs for this system?

Response: We are lining up UK-NL high level talks about their "key registers" which includes HMLR, OS, BGS to learn more.

- How long has it taken the Dutch government to get to this point?

Pete Stevens provided a comprehensive review of the legislative aspects of utilities and the relationship with trees.

One problem is that the underground is unregulated and that the guidance generally and specifically in relationship to trees is voluntary and not mandatory and so trees are not accurately protected from damage.

If CAVAT is embedded in Council Tree Policy, value can be requested from Stat companies if they need tree removal

Questions and comments:

- Utility depths are often irrelevant as statutory undertakers such as Water have easements and won't allow planting over their apparatus.
- If all local authorities had adopted tree strategies would these override rights of utility companies?
- Highways Act s.96 1980 overrides these internal guidance notes
<https://us02web.zoom.us/j/82320951534?pwd=V1A4>
- What will happen from November 2023 when mandatory Biodiversity Net Gain (BNG) will become a requirement for most planning permissions granted, if a tree in conflict with services will that be considered?
- Could we not also have safeguarded areas for trees? they are critical infrastructure!
- I work in a local authority and a utility is referencing the 3m rule and 6m rules/guidance objecting to us planting trees in a public realm project. They say they don't recognise tree root directors as a mitigation measure, what is your view on these?

Responses:

- Highways Act gives us legal powers to plant trees, this is a statutory right and overrides this advice. Otherwise, we would not be able to plant ANY street trees
- Highways Act S. 96 – "Subject to the provisions of this section, a highway authority may, in a highway maintainable at the public expense by them, plant trees and shrubs and lay out grass verges, and may erect and maintain guards or fences and otherwise do anything expedient for the maintenance or protection of trees, shrubs and grass ..."

- But these rules are only the utility companies' rules, they are not legislated rules.
- There is no legal basis for the restriction of tree planting. However, there is statutory powers to lop or fell trees that interfere with utilities, so we need legislative change to better protect established trees, or we will end up with young trees constantly being planted (an issue as well with tree planting targets, rather than canopy cover targets) and older trees being (legally) removed
- The 3/6 metre rule has no legal status. However, it is always good to work proactively with utility companies where possible to avoid future damage to the tree during utility works. TDAG's Trees in Hard Landscapes has good advice on protective and preventative measures to avoid root intrusions into pipes, see page 115 <https://www.tdag.org.uk/trees-in-hard-landscapes.html>.
- Can you please send link to this legislation allowing stat companies to lop or fell trees? And is that only for electricity?
 - Electricity Act 1989 - Schedule 4 (9) of the Electricity Act 1989 enables electricity companies to require the felling or lopping of trees which obstruct or interfere with the working of their lines or constitute an unacceptable source of danger
 - Communications Act 2003. Part 13 gives the right of utility undertakers to require the lopping of trees which overhang the street or interfere with their electronic communications apparatus.
 - Then there is their statutory power to place utilities, and the exemption from TPO's (as outlined in Part III, Exceptions of Town and Country Planning Act 1990)
 - The relevant legislation for Water and Gas makes no reference to trees
- On the back of the current conversation what about when the LA haven't maintained the tree correctly so the roots have grown out of control and cause tree root trespass and damage to a building?
- On shared service ducts/trenches (at least for new developments)
 - Strange, whenever I ask if utilities can share trenches, I generally get the answer no....
 - Realistically utility companies aren't going to relocate all their existing apparatus into a single shared utility corridor.
 - Could you please forward a project/case where the utilities have been shared?
 - Using conduit / utility tunnel is so blindingly obvious that other than new development it can only be the mind-boggling cost and practical implementation of changing the entire infrastructure that prevents it.
 - I would not imagine any house builder wanting to pay anything extra for utility provision - pity, but they are purely profit driven.
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- GLA infrastructure team has a project working with the utilities companies to try to coordinate them so that when one digs the street all are encouraged to do any work they have scheduled at the same time
<https://www.london.gov.uk/programmes-strategies/better-infrastructure/infrastructure-coordination>

Responses:

- The Scottish Road Works Register in Scotland is designed for co-ordinating works from LA and utilities. Great in principle, the reality is, works are programmed differently with very budget limitations etc there can also be issues with traffic management. I have found it is very rare for works to be co-ordinated.
 - Political will and distraction with short-term economics...
 - Collaboration is a growing area, as the cost savings alone make it an attractive option for utility companies. As Pete mentioned before Cadent Gas are doing a good job in London - around 1,000 days of streetworks saved this year by working with other utilities and LAs (as opposed to all doing their street works separately). This can be built upon to include tree planting too and other players in the future. Behavioural change is the main barrier - but now there are growing examples of why collaboration works I am positive that change will speed up
 - <https://www.hauc-uk.org.uk/news/2022/haucuk-and-transport-for-london-on-the-road-to-net-zero>
- There is an issue with reinstatement with shared utilities. If a reinstatement fails then which utility is responsible?
 - A lot of the talk is about dealing with new utilities. Urban environments like the City of London have existing incredibly dense utility arrangements at very shallow depths as there is no space available. So not sure how many of these proposals would work in these existing environments

Response:

Retrofitting utility tunnels is very costly, but where large scale redevelopment takes place. it would be cost-effective to add these. Another improvement is shared trenches (In City of London Cadent Gas are doing great work in this area, Lloyd Dowding is their contact for this) to reduce the number of trenches being dug, hence reducing the continuous damage to tree roots. Regular disturbance is a key driver of tree failure - not just one-off damage

- Do you have thoughts on 'Stockholm' tree pits and their effectiveness in allowing trees and utilities to co-exist?

Responses:

- We will discuss this in the next TDAG meeting in July, if you don't get an answer now (link - <https://www.eventbrite.co.uk/e/trees-and-the-underground-part-b-tickets-592262572297>)
- More detail in Part B of this webinar. While many of the systems allow trees and utilities to coexist, the problem comes if the utilities need to be

accessed in this future - how to dig up the area without damaging the established tree. This is true of all the tree pit systems

- One more argument for utilities tunnels I suppose!
- They are also trying to get boroughs to plant trees/implement SUDS at the same time where possible

Response:

- Goes hand in hand in my mind...there's no alternative!
- And getting pushback by the stat companies on this too!
- It would be great if there could be some pressure for the kerbside of footways to be notionally designated as a tree planting lane for new developments or where it is currently available for planting. I agree that collaboration between all sectors in the light of the climate crisis might improve awareness and behaviour.

John Rose explored how above ground ambition could be achieved but also required below ground knowledge.

Tree strategies, however they are termed, are vital. These must be adopted. The Birmingham Urban Forest Masterplan is very comprehensive and is worth following for progress in delivery.

- TDAG has also just published an additional section for *Trees, Planning and Development: A Guide for Delivery*. This is *Section Two: Planning the Urban Forest: how to develop a strategy that delivers* (generic guidance, of course, rather than place specific).
<https://www.tdag.org.uk/trees-planning-and-development.html>
- Love trees, however we have to be mindful of tree root damage to an adjacent property. Let's say we have a 'hypothetical' situation where even though a tree has been there in excess of 60-70 years and an alleged damaged building extension less than 10years. We are held to be liable even though we were there first. How do we balance that risk against benefits of trees in highways?

Responses:

- Can this not be dealt with in planning conditions before an extension would be built? Eg., your extension is moving nearer to a tree, so if there is damage, it is the home owner who is liable
- Tried that one, but outside of scope of planning remit
- IStructE is updating its guidance on low rise buildings on shrinkable soils and subsidence. Trees are not always the cause of subsidence! new build will need more resilient foundations and TDAG is working with NHBC on this to review chapter 4.2. This will, hopefully, in turn change some of the so-called recommended distances for different trees as used by insurance companies as these are not sufficiently evidence based!
- Just looking at this again...if the tree is there first, why is it not a prior condition as with any other element to be taken into account with design of adjacent buildings/extensions etc?
- Oh absolutely. My argument entirely.

- It seems to me that we will quickly come in to the realm of the solicitors and who ever said that lawyers follow common sense...
- Are we going to encounter further issues with subsidence anyway with climatic changes

Responses:

- I was at a course with the chair of the Subsidence Forum and their opinion was that it definitely will. Areas that previously did not subside at any real amount will move much further.
- <https://www.bgs.ac.uk/geology-projects/shallow-geohazards/clay-shrink-swell/#research>
- Yes, shrinkable soils which have not previously caused subsidence are starting to experience getting wet as heavy rain events take place and the general understanding is that subsidence is moving northwards. (We had a TDAG session on Subsidence on 9th May (see here for details <https://www.tdag.org.uk/past-events.html> - and Tim Farewell put up some maps on this)
- <https://www.bgs.ac.uk/datasets/geoclimate-ukcp09-and-ukcp18/>
- <https://www.theguardian.com/environment/2021/may/19/climate-crisis-to-put-millions-of-british-homes-at-risk-of-subsiding>
- Can I ask what GIS site that John was displaying in his presentation?

Response: QGIS

- Great presentation. Identifying locations for trees is one thing, but how do you go about dealing with statutory undertakers in dense utility environments when installing new trees?
- Are there any thoughts on what will happen from November 2023 when mandatory Biodiversity Net Gain will become a requirement for most planning permissions granted, if a new tree or existing trees would be in conflict with services / infrastructure will that be considered.

Responses:

- Trees removed as part of a new development will need to be mitigated, to achieve the 10% net gain, so it will become more and more costly for existing trees to be removed. BNG makes it very hard to develop, say woodlands, as it will be too costly to still achieve net gain, as work done off site needs to be bigger than work done on site (to incentivise protection of habitats within the development). May also provide a funding source for habitat improvements, so I think it's a major positive step
- See also TDAG's *First Steps in Trees and New Developments* <https://www.tdag.org.uk/first-steps-in-trees-and-new-developments.html>
- What have been the main hurdles to installing trees when dealing with statutory undertakers?

Keith Sacre gave his personal view about the efficacy of using root barriers and deflectors.

One of the key points that Keith emphasised was that the use of various products and even the 'Stockholm' system had only been tested over a relatively short period given the anticipated (and much needed) life of an urban. On root barriers in particular, one of the major issues is that, too often, trees are put into effective pots with root barriers on four sides or very narrow 'trenches' with root barriers on both sides.

- Has there been too much good marketing for products so that there is too much reliance or confidence in root barriers?
- Keith, your linear example questions the use of trenches if tree roots are limited on two long side of the linear routes...so tree roots need areas to exploit and is it really a problem if they do that or do we just assume that they will be a problem?????
- Do you have any views on copper impregnated barriers. They claim to provide a chemical and physical barrier.
- Trees using the Stockholm system may have only been in the ground for around 20 years however some big trees have developed using the approach during that time, and these remain healthy. So, there is evidence that the approach can support mature trees.
- Bjorn Embren, who originated the Stockholm system will be giving up an update at the second part of this topic on 19th July - Eventbrite link is here:
<https://www.eventbrite.co.uk/e/trees-and-the-underground-part-b-tickets-592262572297>
- Keith would maintaining a tree's height in a suitable root barrier reduce risk of failure?
- Where are the relevant places for root barriers? highway engineers prefer root barriers on the highway side of footway tree planting.

Response:

- Maybe just to deflect roots away from a utility where there is sufficient suitable growing medium elsewhere in the vicinity.
- I think it is important not to just deflect roots downwards and they tend to turn upwards again in search of air
- Surely roots will seek out water? They don't need to 'come up for air' If we look at making sure the water provision is where we want the root zone to be won't the roots stay deep if that is where the water is. An alternative consideration is we actively manage the stock and seek to harvest the tree after say 30 years maybe? My current thought on tree boulevards is we plant trees of different ages and maturity along that boulevard so that we manage removal of trees at different times rather than 100% out at 25/30years. Different ages staggered removal to avoid these potential problems
- So, we create a medium at the level we want them to grow that is conducive to breathing? Can that be done?

- Mr Sacre's analogy is interesting, if a bit anthropocentric, I'd be very interested to see any research as to the relative immediacy of the need - by tree roots - of air compared to water. Their physiology is rather different to ours, and their respiration as a limiting factor may not be on the same relative timescale. but how bulk density varies from place to place and vertically seems a neglected measure in site assessments.
 - Talk to Andy Hirons at Myerscough about this.
- Has anyone dug up a crate to see if the soil become anaerobic or have other unintended consequences?
- Q for Keith: Would it be fairer to say that root barriers are good at preventing direct damage and not so good at preventing indirect damage and this should be part of the strategy that informs the installation decisions.
- I've been trying to think how we could research this. The best things to do would be to plant several trees and wait 50 years :-). Does anyone in the audience have an idea? Is there software that can model soil conditions and root growth over time?

Response:

- Hortlink 212 study by Neil Hipps and updated and available in draft form only. Original report is here: [https://files.bregroup.com/bre-co-uk-file-librarycopy/filelibrary/rpts/water/Controlling water use of trees to alleviate subsidence risk final1.pdf](https://files.bregroup.com/bre-co-uk-file-librarycopy/filelibrary/rpts/water/Controlling%20water%20use%20of%20trees%20to%20alleviate%20subsidence%20risk%20final1.pdf)
Update available from the Subsidence Forum
[https://files.bregroup.com/bre-co-uk-file-library-copy/filelibrary/rpts/water/Controlling water use of trees to alleviate subsidence risk final1.pdf](https://files.bregroup.com/bre-co-uk-file-library-copy/filelibrary/rpts/water/Controlling%20water%20use%20of%20trees%20to%20alleviate%20subsidence%20risk%20final1.pdf)
- Is there any evidence that the use of root barriers inhibits the growth of the tree?
- I have used root barriers since 2008 at two different councils. I have meant to revisit the first one to see if they are still working. Keith's presentation is a timely reminder.

Response: Please update TDAG with your findings!

- Apart from a 'pot bound' tree will the tree suffer or quite happily exist?
- Kat Hadincova is working with Green Blue to modify the root deflector to a shallower dimension to avoid the girdling that you have shown. Root barriers can be a trade off with Highways Engineers at LA's

Responses:

- Have you got more information on this? We've tried to reduce the footway build-up for a scheme, therefore reducing the root deflector depth, but was told this wasn't possible by GreenBlue Urban
- Hackney modified the GBU root director and many iterations from its original depth, size, use of plastics to a much shallower version and was being further developed but would be happy to speak with Kat.
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- There is a difference between root barriers to root directors in they use and application. We have used root director and changed the Blue Green Urban in modification in Hackney
- Is there any guidance of the offsetting dimension barriers depending on the ultimate size of tree?
- Ribbed barriers in theory should avoid girdling but as has been said, more research and revisiting old sites would be good.

What can government do and which departments must work together?

Holger posed this high-level question: I would love some thoughts and opinions which central or devolved government departments/policy teams you are talking to, are working on these issues or should be working on these issues.

Responses:

- Department of Health
- In my experience LAs will follow the guidance / edicts from central government guidance
- Department for Transport
- Department for Education
 - If anyone knows any KS2/3 teachers they may be interested in Slow the Flow's new free, curriculum-aligned resources at <https://slowtheflow.net/education-resources/> (NFM generally, but including trees...)
 - This looks really interesting – thank you.

Finally -

We are good at raising barriers to increasing urban tree cover...so can the speakers or participants come up with suggestions of key actions that we can all take collectively to break down some or all of these barriers?

- Strong message from Keith Sacre and John Rose is to not lose sight of the role that the community can play and so 'bottom up' is as or even more important than 'top down'.
- Stickers in coffee shops of your local area
- Woodland Trust is encouraging people to water their trees <https://www.woodlandtrust.org.uk/press-centre/2023/06/water-your-street-trees/>
 - AA, MTOA, LTOA did this campaign with downloadable posters and leaflets too <https://www.trees.org.uk/Help-Advice/Watering-Young-Trees>
- Extensive collaboration for the proposed Tree Strategy by the Bournemouth, Christchurch and Poole Combined Authority.
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- I agree from a central London authority, if you can involve residents with species selection etc it becomes a lot easier to get trees in the ground

With thanks to all who attended and contributes.

One last and very apposite comment:

“Thanks to all the presenters - very informative for an old school highway engineer like me. It is clear that the industry can adapt, but the key is everyone buying into the same ideas.”