Getting it right for trees – Part 2 – monitoring and evaluation to support establishment and growth

Chair: **Kate Sheldon**, Chief Executive, Trees for Cities

The 'performance gap' – what does the global literature say?
Deanne Brettle, PhD candidate, University of Birmingham

Good practice for successful establishment
Rob Murison, Director, Thrive and Champion for Young Tree Establishment & Resilient Urban Forests

How to measure your baseline and short-term (<10 years) change
Oli Back, Schools and Operations Manager, Street Trees for Living

Measuring longer-term tree change
Simon Needle, Green Infrastructure Strategy and Delivery Lead, Birmingham City Council

SUMMARY

The session firstly explored the global literature about the 'performance gap' – the extent to which planted trees do not become established with the following presentations on how these issues could be overcome.

Note: the 'chat' was very busy and we have tried as far as possible to group questions and comments together.

QUESTIONS, COMMENTS AND SPECIFIC REFERENCES

Deanne Brettle gave an overview of her literature review on the 'performance gap'

You mention that climate change not included in research papers. What other elements would you like to see included if we are to have sufficiently comprehensive understanding of what helps survival and what doesn't?

Could planners require young tree monitoring as e.g. a planning condition or in S106? (Anecdote locally is that developers are considering it cheaper to replant than to water - huge losses in strategic development near where I live.) Is there a standardised monitoring/reporting method that could be required (with evidence)?

- We use this condition:
  Within three months following completion of the approved landscaping (excluding private garden spaces) in each phase of the development, a statement of conformity, prepared by a qualified landscape architect, shall be sent to the Local Planning

Authority to confirm the landscaping scheme has been successfully implemented and approved planting specification undertaken in accordance with the details approved under conditions X, X and X, for that particular phase. The statement of conformity shall be submitted on an annual basis for a period of five years.

Reason - To ensure the successful implementation and the long-term success of the approved landscaping scheme.

- "Prepared by a qualified landscape architect" - why not an arboricultural consultant!?

- And this one:
  Prior to the commencement of development, a written schedule of maintenance for all open/public spaces, shall be submitted to and approved in writing by the Local Planning Authority. The approved maintenance schedule shall be carried out for a period of at least five years after planting, or as long as necessary following that five-year period in order to ensure that any tree, shrub or hedging plant planted as part of the landscape scheme has, to the council's satisfaction, become successfully established, can exist independently in the landscape and demonstrates a healthy growth rate.

  Reason: To ensure the environment of the development is improved and enhanced and does not have an adverse effect on the character and appearance of the area, in accordance with Policies SWDPR28 and SWDPR34 of the South Worcestershire Development Plan.

Given that Defra is currently in consultation on the ETAP, did you find any evaluation of existing government schemes e.g. UTCF?

Bearing in mind that trees need to live their long lives to deliver their benefits, the larger question is what is 10 years for trees that could live 100 years and beyond if they were afforded a planting site that could accommodate long term growth, starting with an adequate accessible volume of living soil?
We need to think GROWING rather than planting

In response:
SO! I have a new statement I've been musing on, would love opinions from all you wonderful people... (based on anecdotal musings, not strictly empirical research)...
"Soil might be the reason your trees are not GROWING - but a lack of correct aftercare is why they are DYING." If you have any comments on this please let us know!

Thanks Deanne - I've been interviewing people about the barriers to tree establishment monitoring as part of my Masters dissertation, and one of the major challenges I've found is the fragmentation of responsibility for tree planting and monitoring / maintenance, not only across different council departments, but contractors, not-for-profits, various community groups, private developers, etc. Interested to hear from others about their experience of this.

Monitoring:
- Is there a possibility of tree monitoring citizen science training for other places, please?
  - You can check out Earthwatch Europe, who work on citizen science monitoring and reporting for Miyawaki forests!

- Monitoring is essential alongside having mechanisms to get the responsible for maintenance to act on the actions

- How long and what specific factors to monitor? Any views.

- Bloomington Tree Protocol:
  Kieron Doick, Forest Research, is curious to know Deanne's and Daisy B's opinions on the Bloomington tree protocol for monitoring - do you recommend it? and what, if anything, do we need to change?
  (perhaps promoting here can help those asking about protocols to use and training etc)
  https://urbanforestry.indiana.edu/projects/past-projects/protocol.html

    - @kieron doick i think @Deanne Brettle and I would love to talk to you about Bloomington - we have both made a solid attempt at revising it (or noting revisions we would like to make anyway!) since using it - and I have made an attempt to make an open access method for community groups to digitally collect data - perhaps over the next year we can try and harmonise something that could be recommended by FR etc
      SJ: We will leave you to get in touch with each other and let us know of outcomes/progress.
        - From Kieron, I'd love to see it taken up more often. it'll be interesting to compare to the TC-app, as I'm sure digitalisation is a must. And then - as Deanne said - data sharing can follow
        - From Deanne: The Bloomington Protocol is a solid basis but I think there are many variables over 43 variables, so I think the idea is to pick and choose what is important to you.
          There is more recently another protocol from the USA
          USDA, 2020a. United States Department of Agriculture Urban Tree Monitoring: A Resource Guide.
          USDA, 2020b. United States Department of Agriculture Urban Tree Monitoring: A Field Guide.

      SJ: We will leave you all to get in touch with each other and let us know of outcomes/progress.

- From Deanne: It feels there are a number of different organisations currently working on different protocols e.g. the Tree Council also now have an app for monitoring tree establishment, I did do a review of the variables and which ones we felt within Birmingham Tree People which are important to us in particular to young trees, the Bloomington Protocol is designed for all trees

- Has anyone here trialled the standardised tree establishment monitoring protocol and mobile app in development by the Tree Council & Forest Research? How did it go?
    - What is this? i feel like it is being developed for planting sites not standard trees in the urban environment - correct me if I'm wrong?
      https://treecouncil.org.uk/science-and-research/tree-establishment-monitoring-boosting-evidence-to-improve-practice/

    - As I understand it, it's intended for young trees 1-3 years (which may be in urban environment) rather than standard trees.

- Hi there - Charlotte from The Tree Council here! We are still developing the protocol and app to figure out how best it can be applied in different planting contexts, but the aim is that it will be functional for both urban street trees and those on more densely planted sites (e.g. woodland and hedgerow creation). We are still in the early development stage of the next phase of the research work - once we have more to share, we will do!
    - From Daisy Brasington @Charlotte Benham Hi Charlotte - thanks for the reply - it would be really interesting to know how closely you are aligning with the Bloomington protocol - please feel free to get in touch for a quick chat if you'd like!
- Yes, I surveyed a number of plantings in our local woodland, from 2 to 10 years old and another on a roundabout near Crawley. One slight problem was that the time of year [late summer] meant that most, being natives, were suffering from some form or other of leaf colonisation or degradation so the health reporting was somewhat skewed. And only 4 classes - dead, poor, moderate, excellent was a bit limited but there was scope for comment on individual trees [though no effect on the results]. I found the graphical representation [which I requested] of the results a lot easier to understand than the spreadsheet but that's an individual mindset. It's worth will become much more evident over a longer term, but even the snapshot was very revealing of which species [out of about 15 used] were most successful in different planting locations/conditions

  Another aspect was that the roundabout planning was so poorly planned and executed that I expected few survivors, and was astonished at the success, which turned out to be due to the efforts of a local councillor who lived nearby who approached me and explained that she had set up a resident's group to mulch, water and weed the plantings [and make and plant additional wildflower beds] to massive effect, demonstrating the huge difference community involvement can make.

- Would be good to have a 'tree for life' app, monitoring tree from seed supply, through nursery, to planting out, to 'graduation', and so on!

Rob Murison presented his approach to tree establishment with the analogy that you don't just give birth to a baby and leave it to it, so why assume that trees can survive and thrive without any further care and attention once planted. He also provided a link to his tree establishment protocol:
https://www.thrivetree.co.uk/tree-establishment-protocol

- This analogy is the one I want everyone to adopt…it is highly resonant with the public, so let's use it!

The LA I work for has a dedicated team of people who carry out the choosing of, planting, watering and maintenance of young trees for the first 3 years but with the flexibility to continue if required. It is my job to ensure utility companies then adhere to Street Works guidance to reduce any damage or disturbance to established but also new tree assets.

Oli Back focused on street trees and the importance of the first 10 years

But we are taking trees from their natural environment and planting them into what can only be described as a hostile environment. As Ales Shigo once said, we are turning trees into pets. Pets, like children, need constant maintenance. So, question, can a tree actually establish in the hostile built environment?
https://shigoandtrees.com/soul-of-a-tree/

Once trees are established (in whatever environment), they are in place, should they have a legal right and not be pruned back, removed because we want to do something else…building changes etc…? (As you can see, I have been reading Joanna Smallwood on this…guided by Peter Thurman)

- An interesting question. Should tree have rights? A case in New Zealand recently established that a river has rights as a natural entity! Yes, trees should have rights as should all life human or non-human.

- Sue, I do not believe it is a good idea to afford blanket legal protection to all newly planted trees so that they have "a legal right and not be pruned back, removed…". People plant trees in inappropriate places, select unsuitable species and choose to do things close to trees, so there will always be a need to prune, transplant or fell.

    - Of course…but perhaps the outcome is careful consideration for both planting locations and all decisions?

But the tree doesn't exist in a void and is entirely dependent on its life partner - the soil and the soil's ability to function as an ecosystem that supports and sustains the tree, both above and below ground.

Future challenges of tree establishment are the increasing global warming and increasing new pests.

Oli, interested in your relationship with the council - is there good communication & sharing of information, understanding of roles, etc?

When selecting species for planting, do you consider future problems with for example subsidence? All these plantings are in Lewisham which is on London Clay and has a dense population of dwellings. Many plantings are within 10m of buildings.

- So, do you consider what species to plant based on subsidence risk?
    - and do you consider the changing climate?

Simon Needle outlined the multiple challenges for Birmingham and the vital importance of long- term maintenance of the existing tree stock.
It was interesting to hear the challenges in more detail as the situation in Birmingham will exist in other urban areas:

- Population at 1.1million and rising
- One of the youngest populations in Europe
- Significant number of wards in top 10 percentile on the Index of Multiple Deprivation (IMD)

- High levels of Years of Life Lost (YLL) in certain quarters
- Air Pollution
- Urban Heat Island (UHI)
- Pluvial and Fluvial flooding
- Need for 89,000 additional homes by 2031; currently space identified for 51,000
- Covid highlighted the inequality of accessible green space and the higher levels of ethnic minority areas of low GI, poor air quality and high UHI

Slow loss of canopy cover
Meanwhile Birmingham is losing Tree Canopy Cover (TCC) and this will also mean losing the level of ecosystems services provided. If the city is to ensure that canopy cover is shared more equally across the city and if this is to be done with new planting, it will require about £21 million annually to 2051. Again, if this equalising of canopy cover can be done in conjunction with the active maintenance of existing trees to maturity, then that £21 million costs can be dramatically reduced.

Loss of tree through pests and diseases
In addition, there is the risk of disease and the loss of tree value which runs into millions of pounds.

Collaboration must be part of the solution
If trees and GI are to make a contribution it is important to liaise with other departments such as Public Health. The city has undertaken a climate risk and vulnerability assessment and has mapped current canopy cover as well as undertaking an i-Tree Eco study.

Tree value and replacement costs – estimated at £858 million (SJ- not sure where this figure came from?). This was considered a high figure. Is this assuming replacing like-for-like hypothetically as not technically feasible?

- It is on parr with cities of similar size/areas of tree population.

We have so many viable strategies to facilitate tree protection and retention that should be required to prevent the removal of healthy maturing trees because of spatial development. Those strategies need to be specified, implemented and enforced to ensure that the Public's Natural Asset capital investment is protected and conserved

Contract growing is really great. t allows the municipality to specify exactly what they want, not just species but how that species is grown - an essential initiative. if you partner with a nursery that has a lot of integrity

Planning policy is crucial in creating space for trees. In Sheffield there are two deprived areas - one is very tight terraced houses with tiny or absent front gardens, the other has decent gardens and big verges. One is far easier to plant into.

Costs and value
Avoided run-off but could look at heat gain r air quality and estimate medical costs.
CAVAT is a useful method as it's an established figure that people can use, but it doesn't include well-being or biodiversity costs.

‘OUR £9.3 BILLION URBAN FOREST’:

https://ianswalkonthewildside.wordpress.com/2023/06/05/review-of-ancient-woodland-book/#comment-7058

Does anyone know the valuation date used for calculating ecosystem services in Treezilla? Is it a fixed historic date, or does it get updated (like CAVAT)?

Skills
Question: Does the panel have any thought/ opinions on the skills shortage? I agree that there is a lot of information, knowledge and resources - and yet at the same time there is a skills shortage among those who have responsibilities around new tree planting/ establishment. This goes to the point of a break in the chain so it can be that there are instances where one or other of clients, site operatives, QSs, Landscape architects, M&M have a skills shortage -a dn the trees suffer. Evidence? Lots of dead and declining trees on development sites.

- It is not a skills shortage. it is a shortage on the part of large-scale developers of having any interest in the 10, 15 20 years after they have left site. The site managers have absolutely no motivation to think about the establishment of trees
- Education is dire at best, oddly Rob was one of the last to come out of the system and since then the providers are down to one college and we simply have no succession in arboriculture.
    - It needs to begin in primary school with experiential education. The ARB Association is hosting Careers Days with high schools but the interest needs to start early with our kids.
        - SJ; We should all support Teach the Future – this is a student (young to post-grad) campaign to have proper climate and ecological education embedded in all school topics, not just the Natural History (optional) GCSE although that is a start. https://www.teachthefuture.uk/ The consultation on the GCSE in Natural History closes on 4th September https://www.gov.uk/government/consultations/gcse-natural-history-proposed-subject-content

Canopy cover:
Forest Research - UK Urban Canopy Cover:
https://www.forestresearch.gov.uk/research/i-tree-eco/uk-urban-canopy-cover/

- Kieron Doick - Not a project that's easily reproduced but pleased we could give this baseline.
- UK Government Policy paper - Tree canopy and woodland cover Environment Act target delivery plan(Published 1 December 2025): https://www.gov.uk/government/publications/tree-canopy-and-woodland-cover-environment-act-target-delivery-plan/tree-canopy-and-woodland-cover-environment-act-target-delivery-plan
- The way I calculate street tree canopy (though it could be done for any tree set that there was significant crown width data for, is to calculate the total surface area based on treating each tree as a circle with an adjustment for canopy - for example the canopy of a dead tree is zero no matter how wide the branches are.
    - Ok, that' crown/canopy volume
        - Yes, it is. It's not canopy cover, but it works as a tracker, and I could turn it into a "what percentage of an area is covered by street trees" though it's not very meaningful as obviously there are plenty of other trees that are not on street. Could combine it with the Tree equity data; it's not

perfect as they're different methods, but is still ok as a tracker as both datasets are calculated consistently.

- TDAG First Steps Guides for Canopy cover and Assessment provide useful comparison of techniques / datasets https://www.tdag.org.uk/first-steps-in-urban-tree-canopy-cover.html

- Forest Research also provide ward level canopy data: https://data-forestry.opendata.arcgis.com/datasets/ecba26cfaf9d4b61bddc0e3284348d79_0/about There is an example in Trees, Planning and Development: A guide for delivery Section One (page 45 - https://www.tdag.org.uk/trees-planning-and-development.html)

- The Environmental Targets (Woodland and Trees Outside Woodland) (England) Regulations 2022: https://www.legislation.gov.uk/ukdsi/2022/9780348242942
"(2) The target is that by the end of 31st December 2050 at least 16.5% of all land in England is covered by woodland and trees outside woodland."

- Canopy cover statistics are good fun as you need to think about reproducibility (how similar is the result when you repeat your method) and accuracy (how close your data is to the true measure, if indeed you have a method can measure that at all!)

Decompaction – best tips?

A fork? Excluding footfall? Plus mulch… Jon Banks of Bartletts told the SE & Central Tree Wardens Forum last Saturday that adding commercial worms had no effect, they just disappeared. Mulch attracts and concentrates the local microbiological community already there. But in impoverished compacted soils cultivated "indigenous micro-organisms" [lots on the net] can assist the mulch by both physical and chemical penetration into compacted soil. Air spading or Terravent injection can vary ineffectiveness according to the composition of the soil - clays are not amenable to air spades

- A picture of Robin Hood's oak (killed by soil compaction), from Ian Rotherham, taken in 2023, plus word from Luke Steer (Arboriculturist):
https://ianswalkonthewildside.wordpress.com/2026/06/18/the-end-of-a-very-long-life-the-major-oak/dpress.com/2026/06/18/the-end-of-a-very-long-life-the-major-oak/

  https://www.theguardian.com/environment/2026/jun/18/most-famous-tree-world-sherwood-forest-ancient-major-oak-dies

- The other problem is the importation of heavy clay soils on to designated areas of POS. By the time this is discovered it almost impossible to get them to rectify the issue, though we have had some success on one site, though only because it was such a bloody awful and obvious issue with imported stones they could not kick it into the long grass

Tree health

Is the Tree Health assessment that is done by citizens the final word on health or does it instigate a professional. to go out and visit the site???
Given the extent of health challenges, both abiotic and biotic, I am extremely concerned as to the ability of citizens to pick up on subtle issues that could be remedied if addressed immediately but are not yet profound statements.

It would be much more appropriate to have teams consisting of professionals and citizens who are assigned tasks suited to their expertise

Please could you send information about the Training the Tree scientist/ tree guardians

REFERENCES – with thanks to David Long and others

BS8545 (2014 and 2026) *Trees: from the nursery to independence in the landscape*.
I think the update is now a Code of Practice.

Asset Management: TC251 regularly publishes guidance articles that clarify and further document specific aspects of the ISO 55000 series of standards:
https://committee.iso.org/sites/tc251/social-links/resources/guidance.html
https://committee.iso.org/files/live/sites/tc251/files/guidance/ISO%20TC251%20WG4%20MACAM%20May%202017%20EN%20Rev%203.pdf

Birmingham Highways Maintenance and Management:
https://web.archive.org/web/20150318101824/http://www.amey.co.uk/amey-in-your-area/midlands/birmingham-highways-maintenance-and-management/

Birmingham City Council Gives Amey the Green Light to Start Work on Upgrading Birmingham's Road Network':
https://web.archive.org/web/20240610212156/https://www.amey.co.uk/media/press-releases/2010/june/birmingham-city-council-gives-amey-the-green-light-to-start-work-on-upgrading-birmingham-s-road-network/

- Tree management has now been outsourced again, and I understand that substantial numbers of trees are being felled, particularly in the Bournville area. It is not clear why no consultation is taking place.

Amey Hit By £50m Birmingham PFI Compensation:
https://ianswalkonthewildside.wordpress.com/2018/03/12/the-scandal-over-sheffelds-trees-grows-with-16000-indicated-for-the-chop/comment-page-1/#comment-2250

Number of street trees felled & planted in each part of Sheffield (UK) since July 2012, by Amey Hallam Highways Ltd (PFI contractor):
https://www.whatdotheyknow.com/request/the_number_of_street_trees_felle#incoming-3448211

Cutler, D.F. and Richardson, I.B., 1989. Tree roots and buildings, 2nd Edition. Harlow: Longman Scientific & Technical:
https://web.archive.org/web/20240529100449/https://download.tree-consult.org/download/B/Cutler%20Richardson-Tree%20Roots%20and%20Buildings.pdf

National House Building Council (2024) Chapter 4.2: Building Near Trees, NHBC

Publications):
https://www.newbuildinspections.com/wp-content/uploads/2024/07/NHBC-Standards-2024-4-2-Building-Near-Trees.pdf

- Sue James: The NHBC Foundation is currently looking at revising foundations with a view to revising Chapter 4.2.

Subsidence
'An objective framework for dealing with third party trees' – a paper presented by Tim Freeman to the Subsidence Conference at Aston University, July 2007:
https://web.archive.org/web/20231204093012/http://geo-serv.com/downloads.php

See also the updated Subsidence guidance from the Institution of Structural Engineers (2023)
https://www.istructe.org/resources/guidance/subsidence/

Fraser, L., Giles Mercer, G. and O'Callaghan, D., 2020. Subsidence and tree rooting depth on shrinkable clay soil, ARB Magazine (issue 188):
https://web.archive.org/web/20230804160855/http://dealgas-treeconsultancy.co.uk/dealga/wp-content/uploads/2020/04/ARBMagazine188-spring2020.pdf

From Dealga: Also, a paper by O'Callaghan & Mercer in the Autumn 2026 issue 214 of the Arb Magazine deals with the unexpected consequences of subsidence