

Getting it right for trees on streets and highways



Chair: Jim Smith, Urban Forestry Adviser, Forestry Commission

The challenges for existing streets

Robert Huxford, Director, Urban Design Group

Why highway engineers welcome technical planting guidance

Hen Abbott, Highways Engineer, Gloucestershire County Council

The benefits for developing Authority Wide Urban Design Codes

Esther Kurland, Director, Urban Design Learning

Understanding the process to get the specification and contractual/technical drawings right

Chris Kendrick, Associate Director, Civic Engineers

Partners:

Institute of Civil Engineers, Institute of Highway Engineers, Institute of Chartered Foresters

QUESTIONS, COMMENTS AND REFERENCES BY TOPIC (AS FAR AS POSSIBLE!)

NB. Questions and comments are anonymised unless answered in the chat by one of the speakers.

Robert Huxford opened with the need for balanced decision making and the need to understand the details of the Highway Act (1980) in relation to trees as well as the reality of what utilities companies can and cannot require in relation to trees and distances from utilities.

Hen Abbott brought her experience at the delivery end and said that it was now critical for highway engineers to have detailed tree planting advice, to know how to make the most suitable, long term planting choices in various situations and to do as much as possible to overcome common issues such as trees causing problems in footways and blocking drainage. Ongoing 'maintenance' costs are one reason why highway authorities can be reluctant to adopt tree-lined streets or at least the 'tree' element, so demystifying life cycle costs is important in this respect.

Esther Kurland explained that all local authorities were required to develop Authority Wide Design Codes and also that Biodiversity Net Gain (BNG) was now a requirement in England for both major and small developments. Codes should have content on street trees both for new homes accommodating existing trees and new streets with new tree planting. This alongside the NPPF requirements for all new streets to be tree-lined and the need to incorporate active travel (LTN/120) with cycle routes.

Chris Kendrick outlined how engineers could and did approach the more specific elements of delivery and this approach would inform the guidance that the Forestry Commission and TDAG are working on as an update of ON/51.

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Held on 21st May 2024. Questions, comments and references
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The 'chat' was wide ranging and raised questions, offered some answers, highlighted what needs further information along with a number of useful references.

Wednesbury Test

The Wednesbury test was much mentioned in Dillner, R (On the Application Of) v Sheffield City Council [2016] EWHC 945 (Admin) (27 April 2016):
<https://www.bailii.org/ew/cases/EWHC/Admin/2016/945.html>

Manual for Streets and National Model Design Code

What intrigues about the National Model Design Code is that it suggests street widths that are unlikely to be achieved. I realise the ambitions of LTN/120 but cycle routes, bus routes, pedestrians, trees...and private cars...can it work?

- If the new Manual for Streets, which is written and sits with DfT, is ever published it will hopefully explain what elements should be provided in what types of streets in what types of places. That is, how to prioritise use of space in existing streets, and how to ensure new streets provide enough space. But it is still up to each highway authority to consider how to use the street design ingredients

Issues with footways

Is there any technology or pavement surface that wouldn't be destroyed by tree roots?

- Concrete block permeable pavements are unaffected by tree roots as they allow dispersed water ingress and oxygen/CO2 exchange
 - Not strictly correct with regards to permeable pavements, the same goes for surfaces such as Flexipave/Flexistone which is extremely porous, but will deform over time, without underground architecture
- London Tree Officers Association (LTOA) guidance (May 2017): Surface Materials Around Trees in Hard Landscapes - published before the Council's decision to fell Sheffield's Western Road Trees, on the 100th anniversary of the end of WW1):
<https://www.ltoa.org.uk/resources/surface-materials-around-trees>
- Forestry Commission publications (2019) Highway tree management: operations note 51:
<https://www.gov.uk/government/publications/highway-tree-management-operations-note-51>
- Big issue In Sheffield with root damage, more so with the resurfacing of carriageway (planning old surfacing)
- We only allow street trees within footways/cway to be planted with the appropriate underground architecture. New developments off highway must include root barriers.
- Big issue In Sheffield with root damage, more so with the resurfacing of carriageway (planning old surfacing)
- For discussion of acceptable levels of tolerance, see the Institute of Highway Engineers publication: Well Managed Highway Liability Risk (March 2017. See page 18):
<https://www.ciht.org.uk/media/11802/lr-ihe-risk-liability-guide-v3.pdf>

Root barriers

- Can we explore root barriers as they are not long-term solutions...what is more relevant is planting the trees correctly.
[SJ: root barriers are not permanent solutions and need to be used with care to retain tree stability – this needs more discussion]
- Are we saying no to root barriers...so how do we answer issues about footway issues.
- The GreenBlue Urban RootSpace soil crate system does not restrain the roots from spreading beyond the structure. In pragmatic reality, many soil cell installations are sub-optimal volume but give the tree a fantastic start in life, energizing roots to keep growing and exploring the native soil conditions beyond...

Highways Act (1980)

Highways Act S 96 outlines that the highway authority may plant trees etc. S141 makes it an offence for anyone else to plant trees in a carriageway or within 15 feet of the centre of the carriageway.

- The information that I was given is: However, Clause 141 as applied to Clause 142 should not be interpreted as meaning that no trees can be planted within 15 feet from the centre of a made-up highway as many urban streets and very many rural roads and lanes are less than 30 feet wide.
 - Yes. S142 is a licence to 'cultivate'. It's the unauthorised planting that is an offence under S141.

Design Manual for Roads and Bridges (DMRB)

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- DMRB does say there is restrictions on size of tree and distance to highway
 - This is the first sentence in DMRB into 'The Design Manual for Roads and Bridges (DMRB) is a suite of documents which contains requirements and advice relating to works on motorway and all-purpose trunk roads for which one of the Overseeing Organisations is highway or road authority.'. In London Transport for London is the overseeing organisation for the trunk roads while boroughs look after all other streets. But TfL still plant trees on their roads.
- DMRB isn't the guidance to use for streets - surely this is for trunk roads and roads managed by Highways England?
- DMRB is often misquoted and DfT officials acknowledge it should not be used for urban areas just major routes class A roads and above
- Is DMRB relevant for most streets which people would want trees on? I thought it was written for trunk roads and motorways specifically? And MfS 1 and 2 are appropriate national guidance for town centre, village, residential streets?
- It is an old guidance document that helps ensure motorways and trunk roads are consistent to use and safe for lots of fast vehicles. Unfortunate it gets used for streets people live, work, play, walk etc within too which can cause real problems

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- Manual for Streets (MfS) and Design Manual for Roads and Bridges (DMRB)
Currently we have MfS and MfS2
(<https://www.gov.uk/government/publications/manual-for-streets>). This is currently being updated.

MfS covers all streets in England except for motorways and all-purpose trunk roads forming the Strategic Road Network (<https://nationalhighways.co.uk/our-roads/roads-we-manage/> /) managed by National Highways. The DMRB is used for these roads.

<https://nationalhighways.co.uk/suppliers/design-standards-and-specifications/design-manual-for-roads-and-bridges-dmr>

- We have Trunk roads that run through towns and have Street trees along them. but yes, generally not street trees
 - This raises interesting issues about who manages what...in Oxford it is hard to separate the 'trunk roads' from the city roads!
 - NMWTRA , (Welsh Gove agents) look after the trunk roads, and work with the PA on some parts and our roads are "well defined " due to being trunk roads.

Funding

Street trees are primarily funded through UTCF / Trees for Climate / LATF. There is no budget for planting trees in most cases from local government council tax in my experience

Need for urban greening

Greening Up: from fights to rights: making it the default to re-green our streets and squares

(A research report by Create Streets. Archived on the 28th of September 2023):

<https://web.archive.org/web/20230928142539/https://www.createstreets.com/front-page-2/library/research/>

Trees as a fifth utility – how to accommodate other elements such as lighting

What came first - the street light or the tree???

- In new streets trees and other elements of infrastructure (lights etc) need to be considered at the same time
- Street lights are often installed right into the tree crown - digital modelling not taking into account what's actually already there. It's happened for years and still is - I saw some going in just this week.
- Why shouldn't lighting be designed around trees in the same way as it is designed around buildings and junctions
- Toronto has some lovely guidelines for birds and lighting -
<https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/design-guidelines/bird-friendly-guidelines/>

- The British Standard for Street Lighting actually advises this and furthermore that trees should be utilised by uplighting and the like to help guide motorists at bends etc
- ...over to the street lighting engineers
- In Sheffield, Amey Hallam Highways didn't consider trees when designing lighting design. Many street lights were shoved in to crowns and trees pruned. Amey said design was compliant with a British Standard for lighting that required overlapping cones of light at ground level
- Much depends on the height of lighting columns when considering how far apart they can be placed.
- Very often the hard infrastructure is already determined e.g. lamp columns, service runs and the trees are filling small, vacant spaces.

Skills and knowledge...

Role of landscape architects and the need for collaboration

Employ a Landscape Architect! We know how to design this stuff!

- Everything being described is something a landscape architect would do and advise upon. Detail/solution will vary with location and context
- Agreed, but like all professionals some know more than others!
- In my experience they don't know much about urban tree planting
- Designing the correct spec is one thing actually getting it installed correctly is another, main contractors cutting corner and poor contract are a real problem.
- Also, if you have unqualified workers working for landscape contractors where the boss is a trained landscaper, but not his workers, things can go awfully wrong when planting trees.
- Even when the design is appropriate, councils need boots on the ground to ensure correct implementation on the ground!
- I agree that some landscape architects may be less expert than others. Dangers I can see are planting "favourites" and not keeping up to date with current best practice
- I was referring to lack of knowledge around tree underground structures and installation, not about tree knowledge
- Most Highway landscape designs I've reviewed over the years have needed quite some tweaking to be fit for use in terms of trees. Let's work together I say
- There are a lot of interdependencies, LA's and Engineers need to collaborate to make them work.
- I agree a multi-disciplinary approach is what is needed. Just wanted to highlight that it isn't a 'one solution fits all' scenario with trees

- Absolutely...clean sheet of paper and decision -making process each time
- Re. Landscape Architects working for developers with different remits. This shouldn't affect impartiality if a Chartered Landscape Architect (chartered member of the Landscape Institute) is employed by the developer/applicant - CMLI are bound by a professional code to deliver landscape advice that promotes sustainable development in the interest of the public and environment

The value of tree officers...if a local authority has one...

Consult your tree officer

- Lead tree officer I know hadn't planted a street tree in over a decade. That tells you all you need to know about funding and skills gap...
- Just in my local road we'd lost 7 street trees in that time with no incentive for local authority to replace so our local community put in for public realm funding as a 'top up' for Highways to replace - likely the case in other cash strapped LAs...
- You could always communicate with your Tree Officer, they are (usually) nice human beings, and can maybe respond if you have any specific tree "issues" ? We are not all-demi gods, and certainly may be able to discuss the various issues, we aren't all highways' experts. Please drop me a line if you would like to.
bo.walsh@somerset.gov.uk

British Standards

BS 8545 would be more useful than 3998 and 5837.

- Amendments are underway for 8545. These should be consulted on along with 5837, I understand, in September after the summer break.

The upcoming BS8640:2024 Structural and supported soils for trees in hard landscapes – Guide aims to provide clear guidance on tree planting. It's out for consultation now.

- BS8640 on tree planting media is out for consultation until 23rd June. You need to register (free) to comment:
<https://standardsdevelopment.bsigroup.com/projects/2021-03260>

British Standard is more than just guidance if use and application is required within a contract, I believe.

- Yes, it moves from 'guidance' to a 'contractual requirement, so essential that it is properly evidence based and competent.
- Its only if there is a piece of legislation that says that compliance with a BS required that the BS becomes obligatory. See BS 0 for further details.
- Contract terms and conditions - that's up to the people drawing up the contract.

Soil volume

Things like silva cells etc, a large tree needs a volume of soil of around 30m³, multiple trees can use the same area so the total area can be reduced.

- Yes...can we raise the issue of soil volume...and what happens when the trees grow sufficiently to need to take advantage of space beyond the cells...do we provide opportunity space for this or are they effectively in pots even if large ones?
- Yes...can we raise the issue of soil volume...and what happens when the trees grow sufficiently to need to take advantage of space beyond the cells...do we provide opportunity space for this or are they effectively in pots even if large ones?
 - In a pot - a very big pot. It's why urban trees in pits often don't achieve their optimal dimensions and their condition deteriorates prematurely
 - The GreenBlue Urban RootSpace soil crate system does not restrain the roots from spreading beyond the structure. In pragmatic reality, many soil cell installations are sub-optimal volume but give the tree a fantastic start in life, energizing roots to keep growing and exploring the native soil conditions beyond...
 - So, we have to make sure that the sub-surface beyond is not so compacted that roots cannot explore/exploit?
 - Use of root deflectors to direct roots in to crate systems. Compact 'soil' beyond provided soil rooting volume. Use root barriers around utilities
 - Every situation is different - but yes ideally the soil cell zone could lead the root system towards less compacted zones - e.g. towards soft landscape areas. By giving the tree a good volume of quality uncompacted media to root into, it helps the tree adapt to its urban situation, establishing quickly, whilst getting over transplant shock etc and then roots can keep searching adjacent volumes a few years down the line once they reach the crate perimeter.
- Tree pit volumes for tree species of different sizes are recommended in the upcoming BS8640
 - I am not sure how evidence based any of these volume guidance offers
- With many different factors to be considered as per the theme, right tree, right place, right way:- Tree Species Soil Volume Guide - GreenBlue Urban
- As a landscape officer I am always asking for information on soil volumes from applicants even without design codes The NPPF has a paragraph on whether designs are fit for purpose as well projects that are not well 'designed' should be refused.
- The best option is to give trees the volumes that they would have in nature. This is not simple to calculate and have worked hard (with a qualified Arborist) to quantify volumes to maturity including (climate change & flooding).
- Lindsey, P. and Bassuk, N.,1991) Specifying Soil Volumes to Meet the Water Needs of Mature Urban Street Trees and Trees in Containers. Journal of Arboriculture, 17, 141-149.
<https://joa.isa-arbor.com/articles.asp?JournalID=1&VolumeID=17&IssueID=6>

- Lindsey, P. and Bassuk, N., 1992. Redesigning the urban forest from the ground below: A new approach to specifying adequate soil volumes for street trees. *Arboricultural Journal*, 16(1), pp.25-39.
https://scholar.google.co.uk/scholar?cluster=7488106459446930861&hl=en&as_sdt=0,5

Excess run off and pollution and SuDS

- Where does excess water (particularly saline) drain to from the tree pit, Civic?
- There is ongoing research, and some recently published papers, on the pollutants in road runoff. Should we be encouraging this runoff towards trees? What filtration is necessary to ensure we aren't damaging or killing trees with polluted runoff?
 - I think this is the approach taken in Stockholm...does anyone on the call have information on this?
 - I'd be interested in understanding whether trees/rain gardens can help soak up some highway pollution, without damaging the trees/shrubs of course?
 - SuDS can certainly improve water quality, however in the example shown it looked to be a kerb gully discharging directly to the tree pit. I am not sure that would be best practice?
 - Choosing species with phytoextraction considerations might also help. Species have been used to take heavy metals out of the soil, and the wood then harvested to remove the toxins.
 - The problem you will have is the problem of co-transport of hazardous materials that can be facilitated through various debris from roadways, mainly microplastics from waste but also through the runoff of glass microbeads that is worn away from the reflective road paint. These can allow heavy metals and other contaminants to enter the trees through their root systems
- [Phytoextraction of Heavy Metals by Fast-Growing Trees: A Review | Request PDF \(researchgate.net\)](#)
- Engineers tend not to like to link up tree pit drains to existing drainage networks, for fear if roots wondering in to the drainage network. Could incorporate a sump to be drained.
 - Do we still use sumps?
- Sustainable Urban Drainage systems, SuDs - both hold water back in the system to help prevent flooding and also clean the water through action of the plants and the way the water filters through the materials used under the plants.

Chris, can you comment on trees in swales?

- I think the main consideration will be making sure the tree is drained effectively. A dry swale detail might be the best approach. The challenge with swales will be the depth of the swale base and the depth of the tree pit and providing positive drainage (if needed due to ground impermeability). Is this what you were looking for?

Costs and planting methods

A bespoke planting system is extremely expensive. We had a Green Blue Urban system quoted for some street trees. Around £248,000 for 20 trees, inclusive of installation. There needs to be a common-sense approach towards street tree planting, with a cost-effective method that will be accepted by highways, such as root deflectors.

- This is why the right solution is needed for the right location

There will also be a new 'Guide to Designing Tree Pits with Structural Soils' produced by Stockholm Tree Pits Ltd released within the next two weeks.

TDAG's Trees in Hard Landscapes: A Guide for Delivery could be helpful - <https://www.tdag.org.uk/trees-in-hard-landscapes.html>

[SJ]: There is also a short cost comparison of different planting methods in *Trees, Planning and Development: A Guide for Delivery* (2021) page

Benefits of codes

Esther, have the Cambridge developments benefitted i.e. happier residents as a result of the coded approach?

- I haven't come across anyone who doesn't love the Eddington and Trumpington schemes which have provided masses of new homes - but they are very expensive!
- But Cambridge successes are not all down to codes - the better schemes also have a land owner/client who has a very long view and want quality - Cambridge University. They also have excellent council officers and councillors and a very good design review panel
 - ...and the university can plan for the long term with the incentive to get it right!

Cycling

Research shows that cyclists prefer trees between them and vehicular traffic...so do pedestrians

- Just short of 8 percent of pedestrian deaths occur on footways - caused by vehicles running out of control.

Tree lifespans – we must think very long term

Something I think is an issue is city centre designs where trees are treated as disposable objects with a 20–25-year lifespan. This makes it possible to plant anything, no matter how inappropriate the final size may be, because there's no intention that they reach full maturity. Trees should be intended to be permanent; we don't refresh all our buildings every 25 years...

General Guidance

Why wasn't the upcoming 'supplementary technical guidance for highway tree management' that was announced in November 2021 prepared and published prior to the national planning policy requirement for all new streets to be tree lined? And, why have two years passed without the new guidance being published?

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'WORD FROM THE NATIONAL URBAN FORESTRY ADVISOR (Forestry Commission) JIM SMITH':

<https://ianswalkonthewildside.wordpress.com/2021/10/25/late-flowers-and-autumn-berries/comment-page-1/#comment-6001>

There is lots of advice on this in the NMDC, and lots of examples. Basically, on line platforms can help reach some people, but old-fashioned face to face workshops and meetings are often really useful too!

If not aware of it, I'd urge people to take a look at the climate scorecards which is a way of assessing how local authorities are performing in terms of reaching net zero, in which trees play a part - they are included in the biodiversity section of the scorecards. Also looking at local plans in your area/work and see if any are being consulted on and ask for stronger policies in relation to trees generally but also replacement, planting and establishing. <https://councilclimatescorecards.uk/>

AIPH Green City Briefings explore case studies from around the world on urban greening, bring together local authority decision makers and expert in conversation -

<https://aiph.org/green-city/green-city-briefings-2024-25/>

- there are webinars on a range of topics including plant species specific through to community integration

Auditing and value

Natural England's Green Infrastructure Framework Green Factor Audit Rating is much easier to do than BNG which is more for Ecologists to worry about than Arb / landscape / highways officers

CAVAT https://www.ltoa.org.uk/documents-1/capital-asset-value-for-amenity-trees-cavat/309-cavat-full-method-a-guide-for-practitioners?category_access=1

Climate change impacts

The future is here...we had 40degrees in 2022

Trees as the fifth utility

Please may we have a "5th utility" graphic for PR?

- Something to think about...ideas anyone?

As a borough council TO, I find it's very difficult to cut through attitudes that trees should take less priority than streets, buildings and services

Tree replacement

How can we encourage local authorities to replace trees? Ideally, I'd like to see x 2 trees replaced for every tree lost to damage/disease etc the first as close to the original position as possible. But urban street trees are v expensive to install and we often end up with lollipop cherries...

- Commit to replacing trees within Council policy.

- In Birmingham - if I have understood it correctly, when a tree is removed, the CAVAT replacement value goes into a tree management kitty, and this supports trees planting and maintenance
- Valuing trees - do you think it is about time that their biodiversity value was added in to their attributes. I try to tell colleagues that a mature oak tree supports life akin to a village, in contrast to some others that would support the equivalent to a couple of buildings. Colleagues often take the Cat B rating meaning that its ok to fell and 'replace' with a new young tree.
 - Yes!!!! AS part of the BS5837 review, this is a big issue for me!
- Integrated Council policies that promote trees and other critical infrastructure as the 'golden thread' linking policies, such as Public Health, Air Quality, Flooding, etc.
- Do you use CAVAT? this can help provide the funding for new trees
- Commit to replacing trees within Council policy.
- I work for a rural authority as a trees officer due to our location in the fens it is the village and town trees that are the most important as the tree cover in the countryside is very limited

Do we need street trees or should we design differently for urban trees?

I'd like to forward a provoking question: are street trees a concept of the past centuries? As we face a very different environment in the new millennium, such as increasing urbanisation, climate change etc. I believe we should have a different urban tree design altogether. For example, I do believe in "modern woodlands" (as well as pocket parks) as crucial elements of future urban design. This will enhance benefits of single trees, reduce costs, and increase benefits of climate adaptation. Also, trees are growing as parts of communities (forests), so they function much better in a community setting than as locked out individuals. Just my thoughts.

Vandalism

We have had every tree in a new planting scheme snapped off over a bank holiday this Easter, in 2 separate areas of the town. I think a lot of this is about changing attitudes to problems associated with trees. In my experience of working in these areas, a lot of this is sadly socio-economically loaded also.

Sue James for the Trees and Design Action Group