

# The Barriers and Drivers to Planting and Retaining Urban Trees

## Working Draft for Discussion

### Introduction

The Coalition Government wishes to ensure the long term success of its national tree planting initiative, The Big Tree Plant (TBTP) as well as providing legacy benefits from the initiative. Defra tasked the Forestry Commission to set up a Working Group of partners to highlight the main barriers and drivers to both planting new trees and retaining existing ones within urban areas. This report highlights potential solutions through recommendations from the Working Group. The Big Tree Plant is an opportunity to promote a cultural change in relation to tree provision and management within urban areas. This change could challenge and overcome some of the main barriers highlighted in this report. Everyone who currently engages in an activity that predicated against tree planting or retention could take steps to create an environment that supports more urban trees of better quality and longevity. This culture change should enable all of an area's tree cover to be considered an urban forest, irrespective of the land use on which the trees are growing. Tree and woodland strategies will be crucial in articulating the issues locally and stipulating action to overcome these barriers. The recommendations below reflect the views of the Working Group. The Working Group recognises that not all the recommendations listed below are capable of being implemented immediately or even in the medium term. However, this report aims to highlight barriers and recommendations in one report.

### Summary of Barriers and Recommendations:

| Barrier   | Recommendations  |
|---|--|
| A) Lack of an integrated process embedding new trees into the Planning Process at the conceptual, design, implementation and enforcement stages of development. | Tree's status within the Planning Process should be upgraded so that they are recognised as essential urban infrastructure alongside utilities, transport, drainage etc. (See examples in Appendix 1)  |
| B) Highway Authority and PFI Contracts predicate against adopting new estate roads that are planted with trees.   | Identify mechanisms and evidence that supports local highway authorities and PFI contract providers to accept newly planted trees on newly built highways adopted under a Section 38 Agreement.<br>Amend PFI Contracts for highway services to ensure tree planting is a requirement and so that PFI Contracts do not budget for the full life time cost of providing the tree unless there is an acknowledgement of the life time financial benefits provided by the tree also. Balance the books in favour of tree planting. (See examples in Appendix 1.) |

| <b>Barrier</b>  | <b>Recommendations</b>   |
|---|--|
| C) The perception that trees widely cause or contribute to building damage, coupled with a risk averse approach to retaining trees where there is concern that liability and insurance claims may result.   | Challenge the perception of fear of future damage by trees. Rebalance the inequity of approach between privately and local authority owned. (See examples in Appendix 1.)  |
| D) Utility apparatus and service runs/sight lines preclude tree planting and damage or compromise existing trees on new and existing development sites.   | Increase dissemination of the NJUG Volume 4 Guidance and provide effective advice on how it should be implemented within the planning process and utility sectors (See examples in Appendix 1.)  |
| E) Inadequate aftercare and maintenance of trees in the short to medium term, three to ten years following planting, leading to high rates of tree mortality.   | Resource and provide longer young tree maintenance periods through a combination of local partnerships between local authorities, schools, residents and businesses. (See examples in Appendix 1.)   |
| F) Local authorities funding has been reduced and due to competing priorities, less is dedicated to tree maintenance and retention.   | Acknowledge the role trees can play in delivery of key local authority priorities through prioritizing tree planting and retention. (See examples in Table 1.)   |
| G) Increased requirements for car parking leads to conflicts between car parking and tree provision on retail parks, new developments and across permitted parking schemes, through provision of cross-overs and off street parking on front gardens. | <p>Create a car bay to tree ratio for new developments, retail parks and also residential estates where permitted parking schemes * are allowed. (See examples in Appendix 1.)</p> <p style="text-align: right;"><i>* Schemes that permit parking on the pavement/kerb edge.</i></p> |
| H) Tree planting in urban areas by local authorities on public land is not a statutory function (save for TPO replacements and as a duty under the planning legislation).   | Create a duty to plant trees on public land, similar to the duty in the planning system for tree provision on private land. Link between annual losses and removals to numbers of trees planted to ensure tree populations are stable or increasing (See examples in Appendix 1)     |
| I) Misinformation about the difficulties of planting trees in urban areas and on highways predicate against community groups initiating tree planting schemes.  | Challenge the myths commonly held to be true about the difficulties of planting trees in urban areas and publicize best practice about how to overcome them (in line with the Tree Council's Handbook). (See examples in Appendix 1.)  |

## **Method for agreeing Main Barriers**

A working group (comprising of representatives of the organisations below) met to agree the barriers:

1. Forestry Commission.
2. Welwyn Hatfield Borough Council.
3. Natural England
4. The Tree Council
5. London Tree Officer's Association.
6. National Association of Tree Officers
7. Birmingham Trees for Life
8. Community forests; Red Rose Forest
9. Greater London Authority
10. Trees and Design Action Group

The Working Group drew up a checklist of the main barriers, real and perceived, that were believed by the group to inhibit the provision of trees within urban areas.

Each of the barriers identified was allocated into six distinct functional categories:

1. Community
2. Planning and development
3. Legislation/Regulation
4. Tree related issues
5. Resources
6. Cultural

*(These categories, with their associated barriers and suggested solutions are detailed in Appendices 1 &2)*

The final draft of this report once agreed by the Working Group will be circulated to canvass the views of stakeholders from all sectors that may have a view. These will include representatives of the utility, insurance, development and architectural sectors as well as local authorities, civil society and professional associations.

## Objective

This report distils the information provided by the Working Group into a single document (with Appendices) that highlights the main barriers that prevent the planting and retention of trees in urban areas. The barriers are not presented in any priority order. In fact the barriers and solutions to overcome them are often interrelated. These barriers have been further analysed to include the evidence and rationale for intervention and a very brief assessment of the costs and benefits associated with the barrier and the actions required to overcome them.

This information will enable discussion on where further work is needed. It establishes the generic issues, priorities and actions needed to resolve them, by whom, over what timescale and the implications for resources to achieve success.

These actions and responsibilities will need to be attributed to, or in some cases shared between, all partners, governmental, businesses and charities, and where appropriate, individuals. Often these barriers will only be resolved by effective collaboration. Existing approaches will need to be assessed and innovative delivery mechanisms proposed. This report provides clear advice on what is needed and from whom.

Trees interact with a myriad of individuals, organisations and interests over their lifetime. These interactions are often only documented when the tree is perceived to be a problem and they predispose the tree to failure/loss before reaching maturity. Examples include local authority defect reports, insurance records of building damage, vehicle accidents attributed to low trees etc. The many positive interactions with trees are not recorded in the same way. They are generally personal, subjective and experienced in an ad hoc informal way and due to not being reported systematically, consequentially have less beneficial influence on the tree and its immediate environment. This report attempts to capture and balance these positive benefits against the negative barriers by briefly detailing the most common drivers for planting and retaining trees. It also tries to answer the question as to why, even as many organisations and individuals place such high value on trees and their planting, there remains such difficulty in providing for them in urban areas.

## **The drivers for tree planting in urban areas**

There is a significant amount of evidence that generally trees are good for people<sup>1,2,3,4,5,6</sup>, they improve quality of life and their presence makes urban areas pleasant places in which to live and work<sup>7,8,9,10,11,12,13,14,15,16</sup>. Recently various reports have highlighted that certain drivers are increasingly being recognised by policy makers and practitioners when considering trees importance in urban areas<sup>17,18,19,20,21,22,23,24,25,26</sup> and why greater efforts should be made to better integrate them as part of urban infrastructure<sup>27,28,29,30</sup>. Examples of these drivers are:

- 1) Development pressure creating changes in tree cover
- 2) Adaptation to climate change
- 3) Better evidence of what benefits trees provide for us
- 4) The need to design sustainable resilient cities.

### **1) Development pressure creating changes in tree cover**

Historically, urban areas in Britain were not well served with trees, or least not intentionally. Cities like London, Manchester, Birmingham and Liverpool were commercial centres where trade and commerce reigned. Development in the latter part of the 18<sup>th</sup> Century did not generally include green infrastructure as we know it today. Georgian squares, which were originally tree-less, became fashioned by the new English Picturesque style.

The Victorian era saw public works creating parks and open spaces to emulate the private garden squares and treed gardens of large houses which previously had been the preserve of the wealthy and privileged. Formal street tree planting started in London in the mid 1850s. The new vogue for planting street trees began to spread across London and into other cities in the UK.

Street tree planting really came of age during the inter and post 2<sup>nd</sup> World War period when large residential suburban estates around London were developed in response to the extension of the Northern, Piccadilly, Central and Metropolitan Lines. Similar suburban development took place on the outskirts of all the UK's major metropolitan centres and such names as Acacia Avenue, Hawthorn Road, Cherry Tree Avenue and Lime Grove became synonymous with suburban development all over the country. The post 2<sup>nd</sup> World War Abercrombie plan highlighted the importance of providing the population in London with trees and open spaces that were integral to the planned reconstruction of the capital.

This positive aspect of development pressure, which actually increased tree cover in urban areas, began to change subtly in the 1950's & 1960's when new construction methods, new hydraulic earth moving equipment and the invention of the chainsaw made very large scale development practical and economical. Where previously large trees had been retained because the effort of removing them was too great, it became a quick operation to remove them and start with a blank slate on a new development.

Anecdotal evidence suggests that this trend of developers generally preferring treeless sites on which to construct their schemes continues. This is allied to tree replacement policies and a culture that favours smaller, less long lived ornamental trees which require less maintenance, or trees planted in insufficient rooting volumes<sup>20</sup>. This gradual shift has fixed conditions that result in less canopy cover in urban areas. This trend needs to be reversed so that development can again become a driver for increasing tree cover in urban areas.

## **2) Adaptation to climate change**

Tree planting is increasingly being promoted as a mechanism for dealing with the expected increases in temperature likely to occur in the future through climate change. Research by Manchester University shows that a 10% increase in green infrastructure ( mainly serviced through tree canopy cover) in a heavily urbanised areas can reduce ambient temperatures by between 4° to 5°, the expected temperature increases parts of the UK will experience in the medium to high emissions scenarios envisaged by UKCP09<sup>31,32,33</sup>. These temperature increases will be exacerbated by the mass of the built environment. Central London is already some nine degrees warmer than its rural hinterland on very hot summer days.

Trees can significantly contribute to improving and ameliorating the worst impacts of climate change in urban centres<sup>34,35,36,37,38</sup>. They will only be able to fulfil this function if the benefits they bring outweigh the disadvantages that may occur by creating space for them. It is difficult to retro-fit trees into the built environment. Trees only begin to provide the ecosystem services required for effective climate adaptation when they have established large mature canopies, which are much more effective than large groups of smaller canopied trees. Planning effectively for climate adaptation of urban areas will require greater efforts to retain and plant more large species trees.

### **3) Better evidence of what benefits trees provide for us**

Evidence suggests that people like to live and work in well treed environments and trees add value to residential property<sup>39,40,41,42</sup>. Some of the more desirable property addresses in cities have some of the highest percentages of tree canopy cover, usually much higher than the average for the city as a whole.

A large amount of recent research has confirmed that trees are actually good for us, as well as providing a multitude of benefits. These benefits are best expressed as the many ecosystem services that we receive but do not actually notice directly.

These benefits include ameliorating air quality<sup>43,44</sup>. Children growing up in locations with street trees are less likely to suffer from childhood asthma<sup>45,46</sup>. Trees planted on roads around hospitals contribute to shorter in-patient stays when patients have a view of them through a window<sup>47,48</sup>. Studies demonstrate lower incidences of crime and domestic violence in areas with denser tree canopy cover<sup>49,50</sup>. Rainfall interception by large canopied trees and riparian woodland can moderate water runoff during flash flood events and reduce flooding at pinch points in water management systems<sup>51,52,53</sup>. These and other ecosystem service benefits are being integrated more into the provision of trees in urban areas. They act as a driver in creating parity between the provision of green and grey urban infrastructure.

### **4) The need to design sustainable resilient cities**

New tree planting is often lower down in the order of priorities in terms of urban infrastructure for the built environment, which potentially impacts on trees future viability. Evidence suggests that we are losing our own ability to provide a tree legacy for future generations<sup>54,56,57,58</sup>. A key notion of the Brundtland Commission on sustainable development (recently included in the National Planning Policy Framework) is that we provide for our needs while not compromising future generation's ability to provide for their own. This driver is perhaps the one with most traction in terms of achieving a cultural shift from a culture that predicates against or by default unintentionally threatens long term tree survival to one that positively encourages it. Evidence also suggests that this shift requires behaviour change or a new way of thinking within those who design, build and manage urban development, working alongside those who then specify or influence tree planting and tree management within it,<sup>59,60,61,62,63</sup> and that this change needs to actually accept that trees are living biological systems that require water, space, light, nutrients and air to survive and thrive.

The majority of us now live in towns or cities. Towns and cities require huge amounts of resources, but if designed and managed effectively urban areas can provide very sustainable models for future growth and development. Our ability to accommodate trees (and other green infrastructure), and the benefits they provide, whilst regenerating and redeveloping our urban environments will be an indication as to how sustainable and resilient our urban environment actually is.

## The Main Barriers

The following barriers have been highlighted by the Working Group from the wide ranging list in Appendix 2 as the most detrimental in terms of their impact on sustaining trees in urban areas. The following table puts these barriers into context and demonstrates why they have become so challenging to overcome. The practical mechanisms suggested for addressing these barriers are detailed in column 3 of Appendix 1.

**Table1. Urban Areas: The Main Barriers to Tree Planting and Retention (not hierarchical)**

| <b>BARRIER A: Lack of an integrated process embedding trees into the land use planning process at the conceptual, design, implementation and enforcement stages of development.</b>   |  |   |
|---|--|---|
| <b>RECOMMENDATION: The status of trees within the land use planning process should be upgraded so that they are recognised as critical urban infrastructure alongside utilities, transport, drainage etc. by, for example:</b>  |  |   |
| <ul style="list-style-type: none"> <li><b>i. Highlighting best practice</b></li> <li><b>ii. Using the Green infrastructure Partnership to promote this policy</b></li> <li><b>iii. Raising the profile and status of tree and woodland strategies in the land use planning process.</b></li> </ul>  |  |   |
| <b>Mechanism: Policy and increasing awareness of the issues.</b>  |  |   |
| Evidence  | Rationale for Action   | Cost/Benefit  |
| <p><b>Background</b></p> <p>Trees are frequently used in images and presentations of development and large scale regeneration projects to promote the positive benefits of a particular proposal. However there is increasing evidence that their effective and long term provision is seriously compromised because they are dealt with and specified as part of the soft landscape element. This is usually only scoped and detailed after all the design and engineering decisions are agreed for the other infrastructure. Consequently there is generally no opportunity to influence the tree's immediate environment so that it is more conducive to its presence in the longer term.</p> <p>Also, some new trees are being planted into sites with poor soil volumes which predisposes them to drought and future conflict with adjacent infrastructure and buildings. In urban areas there is a trend from the loss of larger canopied longer lived trees towards provision of smaller canopied less long lived trees <sup>20, 30, 56, 57</sup>. There is a clear link between this trend and the way in which trees are being provided for within new developments</p> <p>This barrier encompasses many of the other barriers in Appendix 1 under Planning and Development.</p> | <p>To maximize urban trees usefulness and value, accepting and accommodating their long term presence at the very earliest conceptual and design stages of development is essential<sup>27, 28, 29, 30</sup>. The retrofitting of significant trees into the fabric of a modern city can be costly, extremely difficult and frequently not possible in any meaningful way that maximizes their potential.</p> <p>To fail to take account of the practical aspects of delivering trees within the planning process at its earliest stages means opportunities are lost to maximize the ecosystem services provided by trees. This curtails their prospective lifespan within the development and reduces the value of the investment made in trees.</p> | <p><b>Background</b></p> <p>The concept and practice of valuing urban trees, a practice already well established in the US has been gaining credibility with practitioners in the UK<sup>18, 20, 26, 28, 29, 30</sup>.</p> <p>Using freely available valuation tools it is possible to demonstrate that increasing the scale and numbers of trees planted on development sites produces real economic benefits. This is true whether this is commercial, retail, residential or a leisure environment. These tools can predict substantial returns on initial investments in tree planting by extrapolating future valuations and annualized financial benefits as the trees mature into larger canopied organisms.</p> |

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| <p><b>Key Facts:</b></p> <ul style="list-style-type: none"> <li>• <b>Most landscaping schemes and tree planting are dealt with as reserved items in the planning process</b></li> <li>• <b>Tree planting schemes are not considered a constraint in the planning process</b></li> <li>• <b>Tree species choices on developments are frequently inappropriate and under exploit space available for planting larger species trees (Right Place Right Tree)</b></li> </ul> <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• <b>No Trees No Future, TDAG</b></li> <li>• <b>The Canopy, TDAG</b></li> <li>• <b>CIRIA</b></li> <li>• <b>Trees in Towns II</b></li> <li>• <b>LTWF</b></li> <li>• <b>Trees in the Townscape, TDAG</b></li> <li>• <b>A Chainsaw Massacre. The London Assembly</b></li> <li>• <b>BS 5837</b></li> <li>• <b>Independent Panel on Forestry Report</b></li> </ul> <p>See Appendix 3 for full references</p> |  | <p>The benefits provided by trees usually outweigh the costs in providing or maintaining them<sup>29</sup>. This is particularly so of larger species trees within urban areas<sup>29</sup>.</p> <p>Alterations can be made to the surrounding infrastructure to accommodate trees so that consequential future savings are made in maintenance of both the tree and its surroundings.</p> <p>These saving are additional to the economic benefits derived from integrating trees into the site in the first place.</p> <p><b>Key Facts:</b></p> <ul style="list-style-type: none"> <li>• <b>The actual cost of planting trees within new developments is negligible compared to most other infrastructure costs incurred during development.</b></li> <li>• <b>The real cost savings are made as a result of effective integration and planning of trees into a site at the earliest stages of design</b></li> </ul> <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• <b>CIRIA</b></li> <li>• <b>The Tree Council</b></li> <li>• <b>CABESpace</b></li> </ul> <p>see Appendix 3 for full references</p> |
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**BARRIER B: Highway Authority and PFI Contracts predicate against adopting new estate roads planted with trees.**

**RECOMMENDATION: Identify mechanisms and evidence that supports local highway authorities and PFI Contract providers to accept newly planted trees on newly built highways adopted under a Section 38 Agreement.**

- i. Communities and Local Government Barrier Busting Initiative: Trees in New Estate Roads Directive**
- ii. Access funding for tree planting and initial maintenance such as New Homes Bonus and The Community Infrastructure Levy or similar**
- iii. Promote best practice where street tree planting has successfully been integrated into newly adopted estates.**

**Mechanism: Procurement policy and raising awareness of issues.**

| Evidence  | Rationale for Action   | Cost/Benefit  |
|---|--|---|
| <p><b>Background</b></p> <p>When a new road is created, a Section 38 agreement is required between the developers and local highway authority. This ensures that the local highway authority is confident that the road is of a satisfactory standard and state of repair and that the local authority will not incur additional expense in bringing the road and footway up to the required specification and maintaining it as such. Trees, (unlike grass verges) can be viewed by highway engineers as being costly. PFI contracts front load lifetime maintenance costs onto newly planted trees. The group felt that there were some Highway Authorities and PFI Contract providers who consider that as they mature, trees can degrade the performance of a road or footway and cause maintenance issues and additional costs. Consequently many local authority highway adoption policies and PFI Contract arrangements predicate against trees.</p> <p>This stance appears to be based on the maintenance costs and the potential liabilities that come with owning and managing a population of street trees. The Working Group highlighted some instances where local highway authorities were inhibiting the planting of street trees as an inclusive part of development by stipulating that as a condition of adoption under a Section 38 Agreement no street trees should be planted.</p> <p><b>Key Facts:</b></p> <ul style="list-style-type: none"> <li>• <b>Highway authorities are not obliged to provide street trees</b></li> <li>• <b>The average spend by local authorities in England on trees is £271K pa</b></li> <li>• <b>Local authority tree maintenance budgets are static</b></li> <li>• <b>The average spend on tree maintenance per head of population is £1.38 annually</b></li> <li>• <b>12% of trees in England are designated as highway trees</b></li> </ul> | <p>Historically street tree planting has developed in an ad hoc way with many of the locations on streets being planted opportunistically with little long term forward planning. One of the best opportunities for establishing new tree planting in urban areas is in new and existing developments on the public realm.</p> <p>The contemporary trend of not planting trees in new estate roads as highlighted by the Working Group will seriously compromise the ability of those estates to adapt to the expected changes in climate in the coming decades.</p> <p>Extensive tree planting in private gardens of these new estates is unlikely to be carried out to the same degree as on similar earlier estates. Street tree planting has become essential for improving the liveability of new developments in the future<sup>2,12,14,15,23,28,29,30,32</sup> and it will provide significant long term advantages as the trees are allowed to develop and mature.</p> | <p><b>Background</b></p> <p>Planting and managing street trees is a cost effective activity that provides dividends in terms of the initial investment<sup>29,58</sup>. Planting new trees can be achieved in urban areas for as little as a few pounds per tree when planting whips to a few hundred pounds or £1K when planting standards. When compared to other urban infrastructure improvements such as road and footway upgrading, hard landscaping of public realm or even low maintenance soft landscaping tree planting and management is inexpensive<sup>28,29,30,58,60</sup>.</p> <p>Undertaking a valuation exercise using the i-Tree methodology of identifying annualized benefits demonstrates significant ecosystem service benefits derived from urban tree populations<sup>18,20,29,30</sup>.</p> <p><b>Key Facts:</b></p> <ul style="list-style-type: none"> <li>• <b>The City of New York was able to demonstrate that for every dollar spent on street tree management five dollars was returned in benefits</b></li> </ul> |

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| <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• Trees in Towns II, Communities and Local Government</li> <li>• No Trees No Future, TDAG</li> <li>• The Case for Trees, Forestry Commission</li> <li>• Chainsaw Massacre, The London Assembly</li> <li>• National Association of Tree Officers</li> </ul> <p>See Appendix 3 for full references</p> |  | <ul style="list-style-type: none"> <li>• Where space allows planting trees instead of retaining large grass verges is actually a cheaper method of land management</li> </ul> <p><b>Key sources</b></p> <ul style="list-style-type: none"> <li>• No Trees No Future, TDAG</li> <li>• Trees not Turf, The Woodland Trust</li> </ul> <p>See Appendix 3 for full references</p> |
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| <p><b>BARRIER C: The common perception that trees indirectly cause or contribute to building damage, coupled with a risk averse approach to retaining trees where there is concern that liability and insurance claims may result.</b></p>  |  |  |
| <p><b>RECOMMENDATIONS: Challenge the perception of fear of future damage by trees. Rebalance the inequity of approach between privately and local authority owned trees by, for example:</b></p> <ol style="list-style-type: none"> <li>Promoting a specified level of technical investigations for all trees of a specific value implicated in tree root damage compensation claims</li> <li>Creating a public interest immunity for trees of exceptional value when they are implicated in tree root damage compensation claims</li> <li>Review withdrawal of Article 5 Certificates for all Tree Preservation Orders</li> <li>Introducing a code of practice for tree management in relation to tree related subsidence risk that if met can be used as a defence to claims (similar to a Section 85 defence on highway trip claims)</li> <li>Support development of a Tree Claim Protocol that covers both public and privately owned trees</li> <li>Supporting extension of the work covered by Hortlink 212 Project to address misconceptions around urban trees' relationship to property damage and how this can be mitigated by regular management.</li> </ol> <p><b>Mechanisms: Regulation, Dissemination of information. Supporting through match funding discreet targeted evidence research.</b></p> |  |  |
| <p style="text-align: center;"><b>Evidence</b></p>  | <p style="text-align: center;"><b>Rationale for Action</b></p>   | <p style="text-align: center;"><b>Cost/Benefit</b></p>   |
| <p><b>Background:</b></p> <p>Trees are often identified as being the cause of direct and indirect (subsidence) damage to property and urban infrastructure. Tree root building damage claims are one of the most numerous types of compensation claim brought against local authorities and private tree owners or those companies that insure against such losses.</p>   | <p>Evidence from the Working Group suggests that the insurance sector has a propensity to pursue local authorities both through the civil law compensation procedures (for council owned trees) and the tree preservation order compensation regulations (for protected private trees) but not to pursue market competitors in the same way.</p> | <p><b>Background</b></p> <p>Larger private trees provide greater benefit<sup>29</sup> than numerically more, but smaller, trees. However it is predominantly these larger trees that are threatened.</p> |

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| <p>Local authorities and insurance companies set aside significant resources reserving for and then settling these claims. Insurance companies can request the removal of trees implicated in causing building damage when the property is built on a shrinkable clay soil. Tree removal is sought as a final remedy to existing damage as well as removing any potential for future damage and in preference to incurring the anticipated costs of major superstructure repairs such as underpinning. Claims can also cause significant stress and concern for owners whose trees are connected with a damaged property, as well as for building owners whose property has been damaged and seek a remedy via their house insurance.</p> <p>Insurers also seek financial recompense from the local authority as the tree owner or regulator (via the Tree Preservation Order process). This has created a risk averse culture amongst local authorities and insurers and their advisers that predicates against the planting and retention of large species trees in urban areas adjacent to property ( when founded on clay soils) as well as causing the premature removal of some of the most important trees in urban areas that provide significant ecosystem service benefits.</p> <p>As a result, local authorities may try to avoid these claims altogether by following a tree removal programme that seeks to pre-empt subsidence occurring before any indication of its likelihood or permit the removal of protected trees without adequate investigative evidence. Some local authorities have already instigated this, removing large existing trees and allowing trees covered by tree preservation orders to be removed replacing them with smaller species that are less likely to be implicated in new claims<sup>20</sup>. However, other local authorities follow a more sustainable approach of managing their tree resource pro-actively by undertaking cyclical management<sup>20,58,64</sup>.</p> <p>See appendix 3 &amp; 4 for greater detail</p> <p><b>Key Facts:</b></p> <ul style="list-style-type: none"> <li>• <b>70% of all building subsidence claims within the UK are in some way tree root related</b></li> <li>• <b>The number of claims fluctuates annually from between 25K in a normal year to as many as 55K in an event year</b></li> <li>• <b>The annual cost of claims fluctuates between 200 million pounds for a normal year to over 450 million in an event year</b></li> <li>• <b>The average cost of a subsidence claim is approximately 7.5K pounds</b></li> <li>• <b>Cyclical pruning regimes reduce by 50% the numbers of trees required to be felled by local authority tree owners</b></li> </ul> | <p><b>Procedures for trees covered by tree preservation orders</b></p> <p>Local authorities often first become aware of compensation claims against preserved trees through local residents requesting a tree preservation order be placed on a tree identified by an insurer as being implicated in a building damage claim. The local authority is often obliged to make a TPO prior to adequate evidence of the tree being involved being presented.</p> <p>Before 1<sup>st</sup> April 2012 for Tree Preservation Orders made prior to 2<sup>nd</sup> August 1999 an Article 5 Certificate could be served with a refusal or consent notice. This certificate protected the local authority from a compensation claim if the tree was deemed to be of outstanding or special amenity value. Many local authorities used these Article 5 Certificates incorrectly for trees that were clearly not outstanding or of special amenity value and regulations were changed in 1999 to prevent this form of misuse. For orders that were made after 2<sup>nd</sup> of August 1999 and without the benefit of an Article 5 Certificate the local authority was automatically responsible to pay compensation for any losses incurred once a refusal notice had been issued.. Since the 1<sup>st</sup> of April 2012 when the new TPO regulations came into force local authorities no longer have the ability to issue Article 5 Certificates. They must instead rely on receiving adequate and timely technical evidence from the insurer. They use this to decide whether or not they will challenge the request for removal. There has been some suggestion by the Working Group that this has led many local authorities to permit, for purely financial reasons, the removal of protected trees even though they have not been given sufficient evidence to implicate the tree.</p> <p><b>Procedures for publicly owned trees</b></p> <p>Claims against local authorities for trees on their own land are made under common law using the civil compensation procedures where the proof required is on the balance of probabilities.</p> <p>In an attempt to introduce a benchmark standard and encourage a practical and realistic approach to managing these claims the Joint Mitigation Protocol was launched in 2007 by a partnership of insurers, loss adjusters, local authority groups and arboricultural consultancies. This codifies the claims handling procedure and agrees a mutual standard for investigations.</p> <p>There has been some disagreement on the importance of which geotechnical test should be discounted or relied upon. The JMP also only covers mitigation and does not address the issue of recovery of costs by insurers, or directly reduce a local authority's liability for those costs.</p> | <p>The primary benefit for tackling this barrier will be to public bodies who are subjected to unreasonable compensation costs in relation to these claims.</p> <p>Local authorities have a difficult balance to achieve between the protection of trees and the protection of public funds.</p> <p>The law currently allows little defence to the issue of foreseeability and bases liability on balance of probability. Costs will often outweigh the benefit of retaining trees, inhibiting the planting of new trees and leading to their premature loss to avoid future liability.</p> <p><b>Key facts:</b></p> <ul style="list-style-type: none"> <li>• <b>Increasingly 50% of a claim's cost goes on solicitor's fees</b></li> <li>• <b>Faster claims handling reduces the overall cost of the claim</b></li> <li>• <b>Mutually agreed Benchmark standards remove the need for an adversarial process</b></li> <li>• <b>Larger canopied trees provide the most in terms of ecosystem services to urban communities</b></li> </ul> <p><b>Key sources:</b></p> <ul style="list-style-type: none"> <li>• <b>ALARM</b></li> <li>• <b>LTOA</b></li> <li>• <b>JMP Group</b></li> <li>• <b>Subsidence Forum</b></li> <li>• <b>CIRIA</b></li> </ul> <p>See Appendix 3 for full references</p> |
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| <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• <b>The Association of British Insurers</b></li> <li>• <b>A Risk Limitation Strategy for Tree Root Claims, LTOA</b></li> <li>• <b>The Institution of Structural Engineers</b></li> <li>• <b>The Subsidence Forum</b></li> <li>• <b>ALARM</b></li> </ul> <p>See Appendix 3 for full references</p> | <p>Building insurers are now increasingly appointing solicitors early in the claim process which can increase costs. These costs eventually fall to the tree owner or regulator to pay (if the tree is shown to be implicated by the investigative evidence).</p> <p>Over 70% of trees in urban areas are owned privately<sup>20</sup>. However, most significant and important trees grow on public land. The most important and significant trees on private land are generally covered by Conservation Area designation or by Tree Preservation Orders. Consequently the approach taken by insurers actually leads them to insist on the removal of the most significant trees in urban areas, replacing them with lesser specimens that provide fewer benefits<sup>20,58</sup>.</p> <p>In areas of shrinkable clay soils climate change will inevitably bring more incidents of building movement irrespective of the presence of trees. However it is likely that trees will continue to be blamed where they are present, removed and not replaced equitably. This has the potential, where the perception of building damage is widespread, to render urban tree planting schemes ineffectual in achieving their overall policy objectives.</p> |  |
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| <p><b>BARRIER D: Managing utility apparatus and creating service runs and creating sight lines for CCTV preclude new tree planting and damage or compromise existing trees on new and existing development sites.</b></p>  |   |   |
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| <p><b>RECOMMENDATION: Increase dissemination of the NJUG Volume 4 Guidance and provide effective advice on how it should be implemented within the planning process and utility sectors.</b></p>   |   |   |
| <p><b>Mechanism: Policy and increased awareness of the issues.</b></p>   |   |   |
| Evidence   | Rationale for Action  | Cost/Benefit  |
| <p><b>Background</b></p> <p>The increase of street trees in most urban and suburban areas has run in parallel with the huge increase in underground services since the mid to late 19<sup>th</sup> Century. Trees and the various utility services competed for space in ever more crowded subterranean situations.</p> <p>Following a national campaign by Which magazine that documented the damage being done to the nation's tree stock by cable television companies the DETR facilitated The National Joint Utilities Group (NJUG) in producing new guidance for utility companies. This was a cross sector working group which produced a set of guidelines for the planning, maintenance and repair of utility services in proximity to trees (NJUG 10, 1994).</p> | <p>Despite the current trend for provision of many telecom services wirelessly, the technology involved in providing urban areas with water, electricity, gas, waste water services, and communications is highly likely to remain reliant on underground pipes and cables indefinitely.</p> <p>Faced with the evidence that we need both trees and essential utilities to ensure the quality of life required to make city living tolerable, it is necessary to create a practical methodology so the two needs can be delivered concurrently without detriment to either. In some cases, such as where roads and footways are the physical space used by both, this will inevitably mean sharing space in the most harmonious way possible.</p> | <p><b>Background</b></p> <p>Bigger better trees maximize the ecosystem services provided by trees in urban areas. These in turn provide economic and social improvements for residents and businesses alike. Following an asset management approach creates lower long term maintenance costs following initial investment and better returns in terms of the benefits provided<sup>2,3,5,12,15,18,20,23,28,29,30,32</sup>.</p> |

This guidance was revised in 2007 - NJUG Volume 4 Guidelines for the planning, maintenance and repair of utility apparatus in proximity to trees<sup>59</sup>.

These guidelines represent the sector taking a responsible approach to the issues raised. They gave tree managers and owners an increased ability to correct poor working practices in the field.

However the guidelines cannot address directly how the planning process implements the provision of new utilities into new developments. This is largely dependent on the local planning authority considering utility provision and its effect on trees at the earliest stages of a development. Because utilities are predominantly underground activities, developed by a statutory undertaker they are not usually considered to be within the scope of the Town and Country Planning Act, Above ground activities that may be considered to be within the scope of the Town and Country Planning Act, such as installation of CCTV systems and satellite dishes, have largely been accepted and installed with the minimum consideration for their potential to have a detrimental effect on nearby trees. Subsequent to these systems being installed tree managers and owners receive belated requests for severe pruning or tree removal due to the tree canopy's effect on sightlines and reception.

It is possible to accommodate all these concerns by the use of conditions and reference to the NJUG guidelines and the appropriate British Standard (BS 5837 Trees in relation to design, demolition and construction. Recommendations<sup>61</sup>). This does not occur in the majority of cases despite all developments requiring those utility services mentioned above.

In other European countries utilities are provided via ducts within the road network and not within footways, avoiding conflict with trees and high maintenance costs.

#### Key Facts:

- **NJUG Volume 4 does not preclude tree planting in proximity to utility apparatus**
- **Modern utility apparatus and trees can co-exist and are not mutually exclusive**
- **Dedicated service runs for utility apparatus in new developments are desirable and helpful to both service provider and trees**
- **Cooperative working is key**

#### Key Sources:

- **NJUG Volume 4**
- **BS 5837**

See Appendix 3 for full references

Where opportunities occur to separate these two functions to avoid conflict, such as in the planning of new developments, it makes sense to ensure that adequate space is allocated to both tree provision and utility services<sup>59,61</sup>.

This can be done by having dedicated utility service ducts in new developments that hold all the main services. This leaves the remaining land available for tree planting. Alternatively trees and utilities could share space where the utility is provided in flexible modern piping that can tolerate the presence of tree roots without damage, for example as detailed in Table A.1 of BS 5837 Trees in relation to design, demolition and construction.

#### **?Recommendations?**

To fully utilise the benefits of trees an effective and robust methodology for co-operative working and delivery of trees and utilities will be key.

#### Key facts:

- **For above ground utilities such as CCTV, over reliance on a single camera to provide 360° security coverage is no longer a prerequisite now that technology is able to provide multiple cameras efficiently and at lower cost.**
- **Location of these cameras intelligently to avoid sightline barriers following consultation and co-operation between engineer and tree manager is essential.**
- **Planting larger trees with raised canopies in the longer term permits cameras to retain security sightlines without compromising the full range of benefits provided by the tree**

#### Key sources:

- **NJUG Volume 4**
- **Preparing Borough Tree and Woodland Strategies**

See Appendix 3. for full references

**BARRIER E: Inadequate aftercare and maintenance of trees in the short to medium term, three to ten years following planting, leading to high rates of tree mortality.**

**RECOMMENDATION: Resource and provide longer young tree maintenance periods by creating innovative partnerships through a combination of local actions between local authorities, schools, residents and businesses and other interested organisations such as education and healthcare institutions.**

**Mechanism: Volunteering, engaging trained volunteers by:**

- i. Training Tree Wardens (as run by The Tree Council), tree champions and residents in principles of young tree maintenance**
- ii. Creating a defined role for volunteers when in a safe environment**
- iii. Ensuring young tree maintenance is defined as essential for maintaining the wider urban forest and so may be funded by initiatives such as the Landfill Communities Fund**
- iv. Establishing a volunteer insurance indemnity scheme for trained volunteers for young tree maintenance on highways**
- v. Producing a young tree maintenance toolkit for applicants to The Big Tree Plant.**

| Evidence  | Rationale for Action  | Cost/Benefit   |
|---|---|--|
| <p><b>Background</b></p> <p>Tree Establishment and Survival Rates</p> <p>In many large scale plantings schemes an expected survival rate of 90% is consistently being achieved within the first three years. However thereafter the trees are then left to be almost self sufficient.</p> <p>One empirical study by a London borough that retrospectively assessed its planting records from a ten year period showed that while initial survival rates were good, being in the low 90's, in the period between the fourth to seventh year following planting, these rates dropped dramatically to 65% survival.</p> <p>The reason for this seemed to be that while the trees were being intensively resourced through the young tree maintenance programme they thrived and the only mechanisms that caused losses were vandalism and accidental damage (road traffic accidents etc). However, once the trees moved from being seen as newly planted to being a record in the tree stock database the resource allocated to them dropped off significantly. In essence they were low value and low risk, so in a resource poor environment fewer resources, if any were allocated to their up keep.</p> <p>This is only a snapshot and while it cannot be considered to be definitive and requires more study, it does demonstrate a gap in our knowledge base while at the same time highlighting a significant issue for the long-term establishment and survival of tree planting in urban areas.</p> <p>The issues that affect tree survival can be many, acting singly or in combination Evidence suggests that there is significant variation in tree survival rates when comparing:</p> | <p>The dropping off of tree survival rates after three to ten years has implications for the proposed increased use of trees in urban areas as an adaptive response to climate change. It also challenges the effective use of public funds to achieve such goals. More robust management due to extreme weather events. BS 8545.</p> <p>Extending the young tree maintenance period using more targeted funding and volunteer effort will create a saving in later years due to higher survival rates and healthier trees.</p> <p>Volunteer groups and enthusiastic individuals, tree wardens, tree champions can take a role in young tree maintenance when health and safety considerations are satisfied.</p> | <p><b>Background</b></p> <p>The financial arguments for investing in adequate young tree care can be found within publications including: CIRIA document on large species trees in urban environments, the i-Tree Eco ecosystem service evaluation, The London Tree Officer's Association's CAVAT system of tree valuation<sup>29, 58</sup>. The Tree Council, CABESpace and The Trees and Design Action Group<sup>22, 26, 30, 65</sup> also provide advice on young tree care being an investment worth making as well as more general advice issued by The Institute of Asset Managers on the principles of asset management. Benefits accrue to volunteers in terms of their own health and well being when they become involved in young tree care projects and engage more with their local environment</p> |

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| <p>different methods of production,<br/>planting systems,<br/>plant material itself,<br/>subsequent maintenance<br/>different planting locations</p> <p>Range of stakeholders (large scale planting by local authority, charities through to smaller scale planting by institutions, community/resident's groups and single trees planted by private individuals).</p> <p>Examples of practices that reduce survival rates include:</p> <p>Poor handling of material, inadequate pit preparation, lack of aftercare, ignorance of the tree's requirements, vandalism and accidental damage</p> <p><b>Key facts:</b></p> <ul style="list-style-type: none"> <li>• <b>High rates of survival are achieved during the first three years following planting</b></li> <li>• <b>Losses through vandalism and accidental damage typically run a 10% of all trees planted</b></li> <li>• <b>Low risk, low value trees attract fewer resources</b></li> <li>• <b>Successful establishment rates decline between the fourth and tenth year following planting</b></li> </ul> <p><b>Key sources:</b></p> <ul style="list-style-type: none"> <li>• <b>LTOA</b></li> <li>• <b>Forestry Commission</b></li> <li>• <b>The Tree Council</b></li> </ul> <p>See Appendix 3. for full references</p> |  | <p><b>Key facts:</b></p> <ul style="list-style-type: none"> <li>• <b>The financial returns on an investment in young tree maintenance are high when valued as ecosystem service providers</b></li> <li>• <b>Well cared for tree populations accrue value and benefits exponentially, returning the initial investment many times over in later years</b></li> <li>• <b>Neglected trees cost more to manage than those dealt with as part of a long term management regime</b></li> </ul> <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• <b>The Tree Council</b></li> <li>• <b>CABESpace</b></li> <li>• <b>LTOA</b></li> <li>• <b>i-Tree Eco</b></li> <li>• <b>Team London Volunteering</b></li> </ul> <p>See appendix 3 for full references</p> |
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**BARRIER F: Local authorities funding is under increased pressure and due to other priorities fewer resources are dedicated to tree maintenance and retention.**

**RECOMMENDATION: Promote the role trees can play in the delivery of other local authority obligations and priorities.**

**Mechanisms: Policy**

- i. Promote Tree and Woodland Strategies and GI as an essential component of Local Plans**
- ii. Undertake valuation of the tree resource**
- iii. Defend compensation claims robustly when the evidence submitted with the claim is insufficient**
- iv. Increase Local Authority Member awareness.**

| Evidence  | Rationale for Action   | Cost/Benefit   |
|---|--|--|
| <p><b>Background</b></p> <p>Tree maintenance budgets in England vary widely between local authorities. Tree management is not a statutory function (with the exception of management of the tree preservation order system). Therefore many local authorities are reducing staff numbers within their tree sections, reducing budgets and are seeking ways of providing services innovatively through partnerships with civil society groups and developing residents, volunteer groups, Tree Wardens etc.</p> <p>Some local authorities are also, for understandable reasons, removing trees when faced with a potentially high and recurring management cost or expensive compensation claim. Even when such trees are removed they may still face claims for thousands of pounds for damage already incurred.</p> <p>Finally tree teams are often fairly low in the hierarchy of local authorities and it can be difficult for them to get their voices heard by high level strategic managers within their local authorities.</p> <p><b>Key Facts:</b></p> <ul style="list-style-type: none"> <li>• <b>The average annual local authority tree maintenance budget in England is £271K</b></li> <li>• <b>The average spend per head of population is between £0.08p to £5.00</b></li> <li>• <b>Tree maintenance budgets and in particular tree planting budgets are usually the first to be reduced in times of austerity</b></li> </ul> | <p>Trees can deliver a wide range of ecosystem benefits that will be central to local authorities work to ensure sustainable resilient places to live. However tree officers need to employ clear communication materials, such as TDAG's Trees in the Townscape, to demonstrate how trees can assist the wider aims that high level managers within local authorities are tasked with delivering.</p> <p>Reducing funding on cyclical management regimes may actually expose local authorities to greater financial liabilities than the money saved if the area is prone to subsidence. Also, settling all compensation claims without robustly scrutinizing the evidence presented is likely to result in a higher number of expensive claims being generated as loss adjusters view the authority that follows this path as compliant and vulnerable to further claims<sup>58</sup>.</p> | <p><b>Background</b></p> <p>Traditionally management of trees in urban areas has always been viewed as a cost and liability. Unlike management of woodland or high forest where there is an implicit and realised benefit derived from production of timber and its associated by-products, in the urban context tree managers have struggled to make the financial case for adequate investment proportional to the value and benefits provided by the urban forest.</p> <p>Using a valuation system like i-Tree Eco or CAVAT will provide the annualized benefits and structural value of the tree stock respectively. This valuation can then be used following the principles of asset management to identify an appropriate budget for managing the tree stock.</p> <p>Asset management principles indicate that an asset should have between 0.5% and 1.5% of its total asset value dedicated to its up keep for that asset to be kept in a good state of repair and for it not to degrade and become a financial liability.</p> |

**Key Sources:**

- **Trees in Towns II**
- **The London Tree and Woodland Framework**
- **A Risk Limitation Strategy for Tree Root Claims**
- **Preparing Borough Tree and Woodland Strategies**
- **Trees in the townscape**

See Appendix 3 for full references

Local authorities that have already been through the process have identified that they are providing exceptional value for money at the lower end of this range. While this process may not prevent budget reductions it will go a long way to changing the perception of trees from being purely a financial liability to an asset worth funding.

Asset management techniques, tree and ecosystem service valuation all provide effective tools for demonstrating value for money management<sup>18,20,30,58.</sup>

**Key facts:**

- **The annual budget for management of an asset should attract between 0.5% to 1.5% of the asset's total value**
- **Following urban forestry principles can provide an income stream and/or offset costs of urban tree and woodland management**
- **Asset management techniques can demonstrate effective use of resources**

**Key Sources:**

- **Preparing Borough Tree and Woodland Strategies**
- **Institute of Asset Management.**
- **Trees not Turf, The Woodland Trust**

See Appendix 3 for full references

**BARRIER G: Increased requirements for car parking resulting in conflicts between car parking and tree provision on retail parks, new developments and across permitted parking schemes, through provision of cross-overs and off street parking on front gardens.**

**RECOMMENDATION: Create a car bay to tree ratio for new developments, retail parks and also residential estates where permitted parking schemes\* are allowed.**

**Mechanism: Policy and increased awareness.**

*\* Schemes that permit parking on the pavement/kerb edge*

| Evidence  | Rationale for Action   | Cost/Benefit  |
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| <p><b>Background</b></p> <p>Both street trees and cars have become more prevalent in urban areas since the turn of the century. Unfortunately the space available for both these activities has been diminishing, primarily due to the massive increase in the use of cars with families often changing from single to multiple vehicle ownership.</p> <p>This has led to local authorities permitting pavement and off-street parking schemes and increasing the numbers of permitted cross-overs for accessing newly built parking bays in front gardens. These changes have led to a dramatic reduction in the locations available for tree planting along roads and streets and within front gardens.</p> <p>Provision of large scale car parking within new developments and retail parks is also having a detrimental impact on tree canopy cover in these locations as fewer trees are planted and those that are planted tend not to reach maturity due to insufficient soil volumes or other constraints, or are of insufficient stature to maximize the potential ecosystem services the location could deliver.</p> <p><b>Key Facts:</b></p> <ul style="list-style-type: none"> <li>• <b>Off street car parking directly inhibits new street tree planting locations both in the highway and in front gardens</b></li> <li>• <b>Installation of cross-over run-ins removes viable trees and precludes subsequent tree planting permanently.</b></li> <li>• <b>Permitted parking at kerb edge precludes tree planting on highways</b></li> <li>• <b>Retail parks generally over provide car parking at the expense of adequate tree planting on the site</b></li> </ul> | <p>Encouraging off street parking and permitting parking on pavements reduces future opportunities for replacing trees lost due to other factors is very likely to result in many residential urban areas not having any street trees at all. If this trend continues these urban areas will find it impossible to use trees as a mechanism to adapt to the impacts of climate change in the future. They will also lose all the ecosystem services benefits that trees provide and consequentially will be less desirable locations in which to live.</p> | <p><b>Background</b></p> <p>The benefits of providing trees in areas with heavy vehicle use are becoming much more appreciated and include shading, and reduction in air pollution. Planting new trees can be achieved in urban areas inexpensively when compared to other urban infrastructure such as road and footway upgrading, hard landscaping of public realm or even low maintenance soft landscaping. Tree planting and subsequent management is one of the least expensive methods of providing green infrastructure in urban areas<sup>29,30</sup>.</p> <p>Undertaking a valuation exercise using the i-Tree methodology of identifying annualized benefits demonstrates significant ecosystem service benefits derived from urban tree populations<sup>29</sup>.</p> <p><b>Key Facts:</b></p> <ul style="list-style-type: none"> <li>• <b>The City of New York was able to demonstrate that for every dollar spent on street tree management five dollars was returned in benefits</b></li> </ul> |

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| <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• Trees in Towns II</li> <li>• London Assembly report on paving over front gardens</li> <li>• LTOA</li> <li>• Forestry Commission evaluation report on the Mayor's Street Tree Programme</li> </ul> <p>See Appendix 3 for full references</p> |  | <ul style="list-style-type: none"> <li>• Where space allows planting trees instead of retaining large grass verges is actually a cheaper method of land management</li> </ul> <p><b>Key sources</b></p> <ul style="list-style-type: none"> <li>• No Trees No Future, TDAG</li> <li>• Trees not Turf, The Woodland Trust</li> </ul> <p>See Appendix 3 for full references</p> |
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| <p><b>BARRIER H: Tree planting in urban areas by local authorities on public land is not a statutory function (save for TPO replacements and as a duty under the planning legislation).</b></p>  |   |   |
| <p><b>RECOMMENDATION: Create a duty to plant and retain trees on public land, to complement the duty in the planning system for tree provision on private land. Create a link between annual losses and removals to ensure tree populations are managed as whole and tree canopy cover is stable or increasing.</b></p>  |   |   |
| <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li><b>Regulation</b></li> <li><b>Education and sharing of best practice</b></li> <li><b>Encourage database collection of information via tree strategies.</b></li> </ol>  |   |   |
| <p><b>Evidence</b></p>   | <p><b>Rationale</b></p>   | <p><b>Cost/Benefit</b></p>  |
| <p><b>Background</b></p> <p>Most local authorities plant trees in some form on their land, whether as road side whip planting, individual standards in roads, parks or schools and other public sites or as woodland schemes.</p> <p>However because it is not a statutory function the actual effort and resource put into the planting of trees varies considerably around the country.</p> <p>Some local authorities have, in an attempt to save money, placed a moratorium on tree planting for the foreseeable future due to prioritising of budgets. Some only plant a few tens of trees a year while others plant hundreds.</p> | <p>The Working Group felt that without a legal duty acting as a driver for tree planting this essential task will always be vulnerable to short term budget fluctuations. It is difficult to see how the wide ranging ecosystem service benefits expected of trees can be realized if they are not sufficiently prioritized in the minds of local authority managers at Chief Officer and Cabinet level<sup>30</sup>.</p> <p>Creating a statutory function for tree replacement that is linked to tree removals exemplifies the need for a mechanism that demonstrates resources are being used efficiently and providing value for money rather than being wasted or misdirected unnecessarily</p> | <p><b>Background</b></p> <p>In comparison to other urban infrastructure improvements trees are an inexpensive way of achieving climate adaptation and making an area better to live in.</p> <p>The life-time cost of looking after a local authority tree compares favourably to the value in benefits it provides over its lifetime<sup>29,30</sup>.</p> |

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| <p>There is very often no reconciliation or understanding of the relationship between the numbers of trees lost in a particular area from natural wastage, enforced felling, losses due to development and the numbers of trees required to replenish these losses or indeed improve the overall tree canopy cover, if this is a goal.</p> <p>Therefore there can be no appreciation of what action is necessary to either remedy deficits or pull back from over stocking. Making tree planting a statutory function would create a driver for local authorities to develop more comprehensive tree strategies and monitoring systems to check their actions are efficient and value for money.</p> <p><b>Key facts:</b></p> <ul style="list-style-type: none"> <li>• <b>Tree planting across local authority land in England is extremely variable with no coordinated approach in relation to cross boundary tree planting</b></li> <li>• <b>Only 50% of local authorities in England have a tree strategy that informs and directs their tree planting priorities</b></li> <li>• <b>Tree planting budgets are usually the first to be reduced during times of austerity</b></li> </ul> <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• <b>Trees in Towns II</b></li> <li>• <b>Preparing Borough Tree and Woodland Strategies</b></li> <li>• <b>A Chainsaw Massacre, London Assembly</b></li> </ul> <p>See Appendix 3 for full references</p> |  | <p><b>Key facts:</b></p> <ul style="list-style-type: none"> <li>• <b>Truly sustainable urban forestry needs some way of measuring costs against benefits.</b></li> <li>• <b>Better data recording of tree population statistics is essential</b></li> </ul> <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• <b>A Chainsaw Massacre</b></li> <li>• <b>Branching Out The Future for London's Trees</b></li> <li>• <b>CIRIA</b></li> </ul> <p>See Appendix 3 for full references</p> |
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| <p><b>BARRIER I: The complexities and sector interactions relating to of planting trees in urban areas and on highways predicate against initiating tree planting schemes.</b></p>   |
| <p><b>Recommendation: Clarify the process and challenge the myths commonly held to be true about the difficulties of planting trees in urban areas. Publicise best practice about how to overcome them (e.g. The Tree Council's Tree Warden Handbook).</b></p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>i. <b>Encourage local authority inter-departmental joined up thinking on tree issues</b></li> <li>ii. <b>Set up Governmental inter-departmental group to create joined up thinking within government and effect culture change.</b></li> <li>iii. <b>Facilitate education and sharing of best practice</b></li> <li>iv. <b>Use growing interest in citizen science to communicate best practice in planting and establishing trees</b></li> </ol> |

| Evidence   | Rationale   | Cost/Benefit   |
|--|---|--|
| <p><b>Background</b></p> <p>Many of the barriers highlighted by the Working Group within Appendix 2 of this report stem not from an intrinsic immutable problem but from a basis lack of communication or different cultural values towards trees between various professions and bodies, both public and private. In particular ineffective interdepartmental communications within and between local, district and county authorities. <b>The Working Group considers that within central government the overall lead department for urban trees has not been properly defined.</b> These issues are frequently engendered by silo thinking on the part of the professions represented within these authorities and departments.</p> <p>Examples include; highway engineers making decisions that are known to be prejudicial to trees, planners misunderstanding the physiological needs of trees to ensure effective planting/retention on developments, finance sections rating trees as valueless and a liability rather than an asset, architects and urban designers treating trees as objects rather than living organisms, parks and tree sections failing to communicate the issues to colleagues effectively.</p> <p><b>Key facts:</b></p> <ul style="list-style-type: none"> <li>• <b>Local authority structures for tree provision and management are different around the country</b></li> <li>• <b>Better co-ordination of the various departments that have responsibility for trees within their remit would result in a clearer message to partners and stakeholders on the government's policy objectives for urban trees</b></li> </ul> <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• <b>Trees in Towns II</b></li> <li>• <b>Preparing Borough Tree and Woodland Strategies</b></li> <li>• <b>A Chainsaw Massacre, London Assembly</b></li> <li>• <b>Trees in the Townscape TDAG</b></li> </ul> <p>See Appendix 3 for full references</p> | <p>The Working Group considers that It is unreasonable to expect individuals, resident's and community groups and smaller charities to understand and navigate around the complex issues surrounding urban tree planting and retention when central and local government are at present unable to address and resolve these issues internally within their core functions.</p> <p>Communicating the best solutions will only be effective if government takes a lead in demonstrating how the issues affecting urban tree planting can be overcome. This can be achieved by raising the profile and status of tree provision within each department. This approach will provide parity for trees with other urban infrastructure and cement the multi-faceted benefits trees confer into the urban landscape.</p> | <p><b>Background</b></p> <p>The benefit to this approach will be a significant reduction in duplication of effort as tree provision and retention becomes mainstreamed into local and central governments thinking</p> <p>Costs will be reduced when bespoke changes to urban infrastructure to accommodate trees become everyday and economies of scale kick in.</p> <p><b>Key facts:</b></p> <ul style="list-style-type: none"> <li>• <b>Better joined up thinking during design and planning produces cost savings at the implementation phase.</b></li> <li>• <b>Tree establishment and survival rates will increase in the longer term producing savings on the public purse</b></li> <li>• <b>Unnecessary costs to the public purse can be avoided<sup>58</sup>.</b></li> </ul> <p><b>Key Sources:</b></p> <ul style="list-style-type: none"> <li>• <b>A Chainsaw Massacre</b></li> <li>• <b>Branching Out The Future for London's Trees</b></li> <li>• <b>CIRIA</b></li> <li>• <b>Trees in the Townscape TDAG</b></li> <li>• <b>Preparing Borough Tree and Woodland Strategies</b></li> </ul> <p>See Appendix 3 for full references</p> |

## Conclusion

The barriers listed above demonstrate the complexity of the task in ensuring that the simple act of planting a tree is effective in helping deliver the benefits that mature trees bring to urban areas. This report demonstrates that it is not the task itself that is challenging, but the environment, both physical and cultural, in which it takes place. Achieving trees that are long lasting and beneficial to the communities in which they grow is itself challenging. Increasing tree canopy cover in urban situations is as much about understanding people, how they interact with their environment and what their needs are, as it is about understanding tree physiology and health.

The recommendations of the Working Group set out within this report could instil a cultural change in how trees are provided and planned for in urban situations. If followed, these recommendations will contribute positively to a better quality of life for people in urban areas by improving tree cover, an aspect of the environment that provides many benefits and ecosystem services that until recently have been taken for granted.

The challenge of developing climate change resilient urban communities has brought the need for larger and better quality trees in to sharper focus than at any time since the post 2<sup>nd</sup> World War period. It is incumbent on everyone with an interest in urban living to make this issue a priority for action.

### Appendix 1

Barriers Report Summary Table

### Appendix 2

Barriers Spreadsheet

### Appendix 3 Bibliography / References

1. Stearns F (1972) *The City as Habitat for Wildlife and Man*, in Detwyler R and Marcus MG (eds) *Urbanisation and Environment*, Duxbury Press Belmont California.
2. National Urban Forestry Unit (1999) *Trees and Healthy Living*, National Conference, Wolverhampton, UK, National Urban Forestry Unit, Wolverhampton.
3. Ulrich RS, Simmons RF, Losito BD, Fiority E, Miles MA and Zeison M (1991) *Stress Recovery During Exposure to Natural and Urban Environments*, *Journal of Environmental Psychology* 11: 201-230.

4. Botkin DB and Beveridge CE (1997) *Cities as Environments*, Urban Ecosystems 1: 3-19.
5. Ulrich RS (1984) *View Through a Window May Influence Recovery from Surgery*, Science Journal 224 :420-421.
6. West MJ (1985) *Landscape Views and Stress Response in the Prison Environment*, Department of Landscape Architecture, University of Washington, Seattle, unpublished masters thesis.
7. Newton, J. (2007). *Well-being and the natural environment: a brief overview of the evidence*. Unpublished report to DEFRA. [www.surrey.ac.uk/resolve/seminars/Julie%20Newton%20Paper.pdf](http://www.surrey.ac.uk/resolve/seminars/Julie%20Newton%20Paper.pdf)
8. Takano, T. et al. (2002). *Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable greenspaces*. Epidemiol Community Health 56:913–918.
9. Wagner, J. (2003). *Trees: Positive effects on human behavior*. isa-arbor.com.
10. Hajat, S. et al. (2002). *Impact of hot temperatures on death in London: a time series approach*. Journal of Epidemiol Community Health. 56: 367–72.
11. Peachey, C.J., Sinnett, D., Wilkinson, M., Morgan, G.W., Freer-Smith, P. and Hutchings, T.R. (2009). *Deposition and solubility of airborne metals to four plant species grown at varying distances from two heavily trafficked roads in London*. Environmental Pollution 157: 2291–2299.
12. Nowak, D.J. (1999). *Impact of urban forest management on air pollution and greenhouse gases*. Proceedings of the Society of American Foresters
13. *Trees: Relief for the City*. Green City Initiative, C/O P.O. Box 252, Carlisle, CA6 6YA.
14. Broadmeadow M.S.J., and Freer-Smith, P.H. (1996). *Urban woodland and the benefits for local air quality*. Research for Amenity Trees No 5, HMSO London.
15. Department of the Environment. (1996). *Urban Woodland and the Benefits for Local Air Quality*. Research for Amenity Trees No. 5. London: Department for Communities and Local Government.
16. *The London Plan* July 2011, The Greater London Authority.
17. *Connecting Londoners with Trees and Woodlands, A Tree and Woodland Framework for London* 2005, The Greater London Authority.
18. *Preparing Borough Tree and Woodland Strategies* January 2012, Draft Supplementary Planning Guidance, The Greater London Authority.
19. Land Use Consultants. 1993 *Trees in Towns* Research for amenity trees No.1. Department of the Environment.
20. Chris Britt and Mark Johnston 2008, *Trees in Towns II, A new survey of urban trees in England and their condition and management*. Communities and Local Government, Research for amenity trees No.9.
21. *Action for London's Trees 1994, Investing in a leafy capital*. Task Force Trees; a special programme of the Countryside Commission.
22. The Tree Council 2005, *Trees in Your Ground*.
23. The National Urban Forestry Unit 2005, *Trees Matter!*
24. HM Government. (2009). *Quality of place: Improving the Planning and Design of the Built Environment*. Cabinet Office Strategy Unit.
25. Greenspace. (2007). *The Park Life Report*. The first ever public satisfaction survey of Britain's parks and greenspaces. Greenspace, Caversham, Reading, UK.
26. CABE Space 2005, *Does Money Grow on Trees?*
27. The Trees and Design Action Group 2008, *No Trees, No Future*.

28. The Forestry Commission July 2010, *The case for trees in development and the urban environment*.
29. CIRIA January 2012, *The benefits of large species trees in urban landscapes: a costing, design and management guide*.
30. The Trees and Design Action Group 2012, *Trees in the Townscape*
31. Gill S., Handley J., Ennos R. and Pauleit S. (2007). *Adapting Cities for Climate Change: the Role of the Green Infrastructure*. Built Environment 33(1): 115–133.
32. Gill, S. (2009). *The essential role of trees – adapting cities to climate change by managing high temperatures and reducing pressure on drainage systems*. In proceeding Trees and Urban Climate Adaptation: a social agenda for liveable cities, 19 November 2009
33. The United Kingdom Climate Change Projections 09 (UKCP09), Defra
34. London Climate Change Partnership, *Adapting to Climate Change Lessons for London*. 2006.
35. Huang YJ, Akbari H, Taha H and Rosenfeld AH (1987) *The Potential of Vegetation in Reducing Summer Cooling Loads in residential Buildings*, Journal of Climate and Applied Meteorology 26 (9): 1103-1116.
36. McPherson, E.G., Nowak, D.J. and Rowntree, R.A. (1994). *Chicago's urban forest ecosystem: results of the Chicago Urban Forest Climate Project*. Gen. Tech. Rep. NE-186. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station.
37. De Munck, C.S., Hutchings, T.R., and Moffat, A.J. (2008). *Impacts of climate change and establishing a vegetation cover on water erosion of contaminated spoils for two contrasting United Kingdom regional climates: a case study approach*. Integrated Environmental Assessment and Management 4(4): 443–455.
38. Forest Research. *The role of riparian shade in controlling stream water temperature in a changing climate*. [www.forestresearch.gov.uk/riparianshade](http://www.forestresearch.gov.uk/riparianshade)
39. Morales DJ (1980) *The Contribution of Trees to Residential Property Value*: Journal of Arboriculture 6 (11):305-308.
40. Morales DJ, Micha Fr and Weber RC (1983) *Two Methods of Evaluating Trees on Residential Sites*, Journal of Arboriculture 9 (1): 21-24.
41. Anderson LM and Cordel HK (1988) *Influence of Trees on Residential Property Values in Athens, Georgia: A Survey Based on Actual Sales Prices*, Landscape and Urban Planning 15: 153-164
42. GLG Economics (2003). *Valuing Greenness: Green spaces, house prices and Londoners' priorities*. Greater London Authority (GLA), London.
43. Stewart H, Owen S, Donovan R, Mackenzie R, Hewitt N, Skiba U and Fowler D (2003). *Trees and Sustainable Urban Air Quality: Using Trees to improve Air Quality in Cities*, Lancaster University, Lancaster.
44. Broadmeadow MSJ and Freer-Smith PH (1996) *Urban Woodland and the Benefits for Local Air Quality*, Research for Amenity Trees No.5 HMSO, London.
45. Lovasi GS, Quinn JW, Neckerman KM, Perzanowski MS, Rundle A, Journal of Epidemiology and Community health 62(7): pp64709, 2007.
46. Galveston-Houston Association for Smog Prevention. January 1999 “*Trees and our Air*”.
47. Ulrich RS (1984) *View Through a Window May Influence Recovery from Surgery*, Science Journal 224 :420-421
48. Ulrich, R.S., Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A. and Zelson, M. (1991). *Stress recovery during exposure to natural and urban environments*. Journal of Environmental Psychology 11: 201–230.
49. Moore EO (1981-82) *A Prison Environment's Effect on Health Care Demands*, Journal of Environmental Systems 11(1): 17-34.

50. West, M.J. (1985). *Landscape views and stress response in the prison environment*. Unpublished masters thesis, Department of Landscape Architecture, University of Washington, Seattle.
51. Soltis D (1997) *Loss of Trees Increase Stormwater Runoff in Atlanta*, Water Engineering and Management 144: 6.
52. Calder, I.R., Harrison, J., Nisbet, T.R. and Smithers, R.J. (2008). *Woodland actions for biodiversity and their role in water management*. The Woodland Trust.
53. Carroll, Z.L., Bird, S.B., Emmett, B.A., Reynolds, B. and Sinclair, F.L. (2004). *Can tree shelter belts on agricultural land reduce flood risk?* Soil Use and Management 20(3): 357–359.
54. Institution of Structural Engineers, *Subsidence of Low Rise Buildings 2000, 2<sup>nd</sup> Edition*, A Guide for Professionals and Property Owners.
55. Roberts, J., Jackson, N. & Smith, M. 2006 - *Tree Roots in the Built Environment 2006* – Research for Amenity Trees No 8. Published by Department for Communities and Local Government. London. 488pp.
56. London Assembly 2007. *Chainsaw Massacre: A Review of London's Street Trees*.
57. London Assembly 2011. *Branching Out: The future for London's street trees*
58. London Tree Officer's Association 2007, *A Risk Limitation Strategy for Tree Root Claims*
59. British Standard 5837 *Trees in Relation to Design, Demolition and Construction*. Recommendations.
60. *Trees not Turf*, 2011, The Woodland Trust.
61. National Joint Utilities Group 2007, Volume 4 *Guidelines for planning, installation and maintenance of utility apparatus in proximity to trees*.
62. The JMP Working Group 2007, *The Joint Mitigation Protocol*.
63. The Subsidence Forum, Tree Root Claims Liaison Sub-Group.
64. *Subsidence of Low Rise Buildings 2000*, The Institution of Structural Engineers.
65. The Tree Council Tree Warden Handbook 2011

## **Appendix 4**

### **Geotechnical investigations into potential for tree damage on shrinkable clay soils**

The liability for claims is usually decided following a suite of geotechnical soil tests to establish the trees connection to the damage. One of the major areas of local authority concern is the timely receipt of appropriate and accurate geotechnical tests in the context of identifying the culpable tree. For many years these soil investigations and the evidence presented to local authorities to support the claim has been questionable, often lacking key information needed to make an informed judgment on an appropriate course of action. Tree owners and local authority regulators are always placed at a disadvantage when presented with limited geotechnical evidence linking a particular tree to a localized building subsidence claim.

This process used by building insurers and their agents usually operates only where buildings are underlain with shrinkable clay soils but actually results in the much more widespread perception and fear of the potential for tree related damage in areas where the underlying geology normally precludes any kind of tree root induced damage. This inhibits potential tree planting even in areas where trees and buildings can co-exist in close proximity.

### **Legal issues**

Currently the majority of case law pertaining to tree root claims falls heavily in favor of the building insurer and against the tree. The majority of this case law is based on the balance of probabilities that a tree is involved or has a contributing role in causing damage regardless of the extent to which it is actually having an effect. It also considers that local authorities have foreseeability of the risk of subsidence that in effect places a duty on them to prevent it, or pay for damage and associated costs when it does occur. However, the recent Barent case appears to clarify the issues surrounding foreseeability. The courts rarely look closely at the geotechnical evidence, instead apportioning culpability based on examining previous judgments that involve legal definitions of nuisance, trespass and any contribution as being the sole and/or effective cause of damage. These legal points are easily proven in the context of tree roots encroaching into a third party's land regardless of what the geotechnical investigations are indicating. What is much harder to prove is whether or not the tree is actually causing root induced desiccation and therefore the building movement or some other physical mechanism is at work. Another area of concern is obtaining clarity on the efficacy of management practices (pruning) required to mitigate a trees influence on building foundations when it is identified as being related to a subsidence event.

Without a clearly identified causal effect rather than an assessment of probability trees will always be deemed culpable and this barrier to achieving tree planting in urban areas with shrinkable clay soils will persist indefinitely. It will also continue to effect perceptions in other areas with a different geological make up.