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BIRMINGHAM CITY COUNCIL

TREE POLICY TASK & FINISH GROUP

THURSDAY, 30 NOVEMBER 2017 AT 12:00 HOURS
IN COMMITTEE ROOM 1, COUNCIL HOUSE, VICTORIA SQUARE,
BIRMINGHAM, B1 1BB

A G E N D A

1 NOTICE OF RECORDING/WEBCAST

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2 WELCOME AND INTRODUCTION

Cllr Fiona Williams, Chair

3 APOLOGIES

To receive any apologies.

4 EVIDENCE GATHERING SCHEDULE - TREE POLICY

3 - 6

4a COUNCILLOR LISA TRICKET, CABINET MEMBER FOR CLEANER STREETS, RECYCLING & ENVIRONMENT

For consideration

7 - 20

4b EMMA FERRANTI, UNIVERSITY OF B'HAM

For discussion

<u>21 - 26</u>	4c	<u>CHRIS RANCE - BRISTOL STREET GREEN SCREENS</u>
		For discussion
<u>27 - 34</u>	4d	<u>SIMON NEEDLE & SIMON SMITH - REVIEW OF TREE STRATEGY AND POLICIES ON TREE MANAGEMENT</u>
		For consideration
<u>35 - 38</u>	4e	<u>JONATHAN WEBSTER - B'HAM TREE BANK</u>
		For discussion
<u>39 - 56</u>	4f	<u>RICHARD COWELL - PLANNING & DEVELOPMENT</u>
		For consideration
<u>57 - 60</u>	4g	<u>PETER PARKER - TRANSPORTATION & CONNECTIVITY</u>
		For discussion
<u>61 - 68</u>	4h	<u>NICK BARTON, AMEY</u>
		For discussion.
	5	<u>CLOSING REMARKS AND NEXT STEPS</u>



Birmingham City Council

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24 November 2017

Councillor Fiona Williams
Chair, Tree Policy Task and Finish Committee

Dear Fiona

Re: Tree Policy Task and Finish

Regrettably I am unable to attend the evidence gathering sessions due to existing commitments; I am however pleased to submit the thoughts and considerations below which I hope will be useful to your enquiry. I am also mindful that the officers that are able to attend will be able to provide much more detail.

In my mind there is no doubt whatsoever that street trees can and do play an important part in the improvement in air quality, particularly in respect of PM_{2.5}. However, the science available demonstrates that it is equally true that they can have a negative impact on air quality if their dense canopies restrict air circulation thereby trapping poor air quality at low levels where people breathe.

What is clear and suggested by several studies is that urban tree planting, if it is going to have a positive effect on air quality, must be properly coordinated alongside other PM reduction strategies such as transportation, SO₂ and NO_x reduction whilst also taking into consideration the locations where trees would have a positive impact, what type of tree should be planted and the space required between them. Trees should not be planted in a particular place just because they look nice; decisions should be taken based on an urban tree strategy which identifies where they will do more good than harm.

Finally, we know of course that trees play a much wider role as with the other aspect of natural capital, and one which is just as important, than just improving air quality – they provide a multitude of other benefits including: countering the effects of heat and UV radiation, flood relief, house value uplift, psychological well-being, etc. I would urge the Scrutiny task and finish to recommend the drawing up, by a representative citywide group, of an urban tree planting strategy driven by a clear policy that demonstrates the importance of trees in their widest contribution.

I have drawn this conclusion from the summary statements below:

- The science is equally weighted between benefit and blockage when it comes to air quality; but if this is considered on a singular approach it is yet another aspect of a silo thinking as the multiple benefits absolutely outweigh the negatives. The presence of trees has several behavioural effects e.g. it slows traffic, people will walk and cycle more through a greened route.
- The issue is complex and one we mustn't shy away from – it needs holistic thinking- that informs- simple actions; not single thinking informing single simple actions.
- As a city we should be very mindful about not only the role played by an individual tree in someone's garden but the whole urban forest canopy across the city; so for that should we set some ambitions or visions as has been the case elsewhere. Both the Mayor of Manchester and London Mayor have both got citywide plans out for consultation where one of their primary long-term objectives for their cities is canopy cover. For all these multiple benefit reasons; London is a 5% increase by 2025 and 10% increase by 2050; Manchester is to get from 15% to 20% by 2025. Should Birmingham have similar ambitions?
- Planting trees is widely recognised as a cost effective way to tackle urban air pollution.
- A recent study has shown that the average reduction of particulate matter near a tree is between 7 – 24%
- As well as avoided mortality there is even more avoided hospitalisation as a result of cleaner air.
- Planting trees in urban areas is not without pitfalls; one is regarding the flow of air in heavily polluted streets, particularly those with large volumes of traffic e.g. Northumberland Avenue. Thick canopies can limit air circulation, trapping poor air quality at low levels where people breathe.
- Planting the right trees in the right place is critical, should develop a 'planting strategy' that is properly determined and plants the right trees in the right places with the right spaces between to ensure air flow.
- A 2014 report, following what was described as the largest worldwide tree survey of its kind, it was calculated that London's trees provided at least £133m of benefits every year in terms of air pollution removal, carbon sequestration and reducing the amount of water flowing into drains.
- Parks management, developers, planners and health professionals must work together.
- Natural capital – re-greening the planet could cut as much Carbon as halting oil use! Natural solutions such as tree planting, better land management, protecting peatlands could account for 37% of all cuts needed by 2030.
- Answers to the following questions are needed: 1) what fraction of the air quality problem can trees solve? 2) Which neighbourhoods can be helped the most [working on a total place agenda should capture and record this information]? 3) How much investment in terms of trees planted, £'s spent? 4) Where are trees a cost effective investment, relative to other strategies that can reduce PM or combat air temperature?
- The findings from the recent Nature Conservancy report (global) emphasises the importance of maintaining the current stock of urban trees.
- Targeting the neighbourhoods with the highest mitigation impacts is crucial.

- Planting of street trees should be part of a cost effective portfolio of interventions aimed at controlling particulate matter and not considered in isolation.
- Need to bear in mind that the median cost of tree planting for PM mitigation may be higher than other PM reduction strategies.
- New draft guidelines from NICE suggest that ad hoc planting of street trees may in fact cause air quality to deteriorate at street level.
- NICE urges planners, LAs and developers to work together and take into account the adverse effect that trees can have on air quality if badly sited or unmanaged.
- Research published in the Atmospheric Journal states that hedges (with greatest leaf surface area) should be planted on the edge of pavements (or central reservations by traffic islands – many of these have been removed in B’ham to reduce maintenance costs and trapping of litter) as they are closer to the source (exhaust pipes) and can absorb PM before they disperse into the air.
- Trees do play a vital role in battling pollution in towns but they can create ‘street canyons’ making matters worse.
- Study in Guildford found that planting hedges along busy main roads cut toxic fumes by around a third.
- There is a crucial need for research to provide effective tree planting policy advice for urban planners. This could lead to substantial air quality improvements depending on the interaction of trees with local meteorological conditions and building arrangements.

Yours sincerely



Councillor Lisa Trickett
Cabinet Member for Clean Streets, Recycling & Environment

Evidence for the Scrutiny Committee, Birmingham City Council, 30th November 2017

Submitted by Dr Emma Ferranti, Research Fellow in green infrastructure and air quality in the School of Geography Earth & Environmental Sciences at University of Birmingham.

Green Infrastructure

- Green infrastructure describes all things green and living with urban areas, such as street trees, parks, green walls, green roofs, urban woodland, etc. Trees are a fundamental part of the Birmingham's green infrastructure.
- There are many good reasons for green infrastructure in our cities. Green infrastructure positively impacts public health from birth to death: new-borns from areas with higher levels of urban forest have a higher average birth weight (Donovan et al. 2011); children in classrooms with a view of green infrastructure have higher attention levels than those who do not (Li & Sullivan, 2016); adults have lower frustration and higher meditation when moving in greener streets (Aspinall et al., 2015); a view of nature following surgery can improve emotional well-being, reduce minor complications, and shorten hospital stays (Ulrich, 1984); and, wander-gardens and horticulture can reduce medication and falls for Alzheimer's sufferers (Detweiler et al. 2009).
- Green infrastructure also makes our cities more liveable and resilient to extreme weather. For example, green infrastructure can provide shade and improve thermal comfort on hot days (e.g. Norton et al., 2015). Green infrastructure can reduce the amount of surface run-off following heavy rainfall (e.g. Mentens et al., 2006; Forest Research, 2010), and therefore reducing the risk of urban flooding. Finally, green infrastructure can lessen the impact of against poor air quality. Globally, air pollution is the biggest environmental risk to health. Within the UK, poor outdoor air quality is linked to 50,000 deaths each year.
- This document provide evidence specifically on green infrastructure and air quality. I have summarised the key points from the relevant literature. If you wish to read the original scientific literature, I have provided the full reference list, and can provide the original material on request.

Green infrastructure can mitigate (lessen the negative impact of) poor air quality

If strategically designed, green infrastructure can be used to mitigate (lessen the negative impact of) poor air quality in urban areas (Abhijith et al., 2017). Road transport emissions are now the largest source of air pollution in urban areas in the UK. Please note that green infrastructure can never remove all the pollutants from air, and becomes less and less efficient as the distance from the pollutant source increases. The best way to improve poor air quality is to reduce road transport emissions.

Modelling studies indicate that:

- Large areas of green infrastructure, such as parks, generally have cleaner air for they contain fewer roads and traffic emissions.
- Trees and other green infrastructure influence wind flow. The combination of parklands, buildings, trees, and gardens creates a rough surface of different heights creating turbulence that increases mixing, and pollutant dispersion (Barnes et al., 2014).
- Green infrastructure such as hedges or shrubs, can be used as a barrier to increase the pathway between pollution source and receptor, which increases mixing and reduces pollutant concentration (Hewitt et al, <submitted>).
- In comparison to similarly sized grey infrastructure such as concrete walls or bricks, green infrastructure has a far greater surface area. This means that far more air pollution can be deposited on the surface of green infrastructure therefore more air pollution can be removed from the ambient air (Pugh et al, 2012).

Green infrastructure can exacerbate (worsen the negative impact of) poor air quality

Trees do not produce pollution. Air pollution comes predominantly from road transport. However, in certain circumstances, trees can make poor air quality worse. The best way to improve air quality would be to remove the emission sources (road transport), rather than the tree.

- Trees produce natural chemicals called volatile organic compounds. On very hot days with strong sunlight (e.g. during a heatwave) these volatile organic compounds can mix with pollution from road transport to form ozone. At ground level, ozone is a pollutant with negative health impacts. To be significant in terms of poor air quality this takes several hours, and needs many millions of trees. This effect is large-scale (not local street-level), and the ozone formation make take place hundreds of miles away from the original source. **Note: This should only be considered an issue when increasing the total number of urban trees by more than 10%** (Hewitt et al, <submitted>).
- Dense avenues of street trees with large interconnected canopies can trap air in street canyons therefor eliminating mixing. If the pollution source is located inside the canyon this causes fumigation – i.e. the air pollution is trapped inside the street canyon (Jeanjean et al., 2015). If the source is located outside of the canyon the canopies prevents mixing into the canyon, creating locally cleaner air (positive benefit). **Note: This is not an issue when planting new trees. Overtime (e.g. 10 years), when the new trees have grown canopies of a sufficient extent, the traffic emissions fleet should contain more electric cars and therefore this issue will become redundant.**

Full Reference List – I can provide these academic references if requested.

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Urban Green Infrastructure



Urban green infrastructure is a network of green spaces, water and other natural features within urban areas. A green infrastructure approach uses natural processes to deliver multiple functions, such as reducing the risk of flooding and cooling high urban temperatures. This POSTnote summarises research evidence of the effectiveness of green infrastructure, and challenges to its implementation.

Green and Grey Infrastructure

Familiar urban infrastructure such as roads, sewer systems and storm drains is known as 'grey infrastructure'. Such conventional infrastructure often uses engineered solutions typically designed for a single function.

'Green infrastructure', includes parks, playing fields, private gardens, allotments, green roofs and walls, and cemeteries. The term refers to ecological processes rather than colour, so includes sustainable urban drainage systems, wetlands, rivers and canals, which are also sometimes referred to as 'blue' infrastructure. Green spaces in cities are not new, for example urban parks were implemented widely by the Victorians, but ways of incorporating green infrastructure into modern urban design are still being explored.

80% of the UK population lives in urban areas¹ and with an increasing population,² many UK urban regions are becoming more densely populated. This is often at the cost of green space,^{3,4} loss of which is associated with risks to human health that are greatest in deprived areas. This briefing outlines the evidence for how green infrastructure may help to address these problems, and examines the issues raised by green infrastructure delivery.

Overview

- 80% of people in the UK live in urban areas. Green space has decreased in many cities in recent decades.
- This reduction poses risks to human health and natural systems that may increase with climate change. Urban green infrastructure can help to mitigate these risks.
- Green infrastructure can often provide the same functions as conventional infrastructure, such as water management and flood risk alleviation, with other benefits for health and biodiversity. However, these benefits are not always well quantified.
- Constraints on green infrastructure provision include a lack of understanding of natural systems and their associated benefits, a lack of strategic green infrastructure plans and a lack of co-ordination within local authorities.

Health and Wellbeing Benefits

There is evidence that access to green spaces can provide health benefits, through improved mental wellbeing and levels of physical activity, reduced exposure to pollution and high urban temperatures.⁵⁻⁷ For example, the NHS is increasing green space on its estates through the NHS Forest Project, which will plant 1.3 million trees by 2015.⁸ However, there are many factors that affect human health and wellbeing, of which access to green space is just one. It is usually not practical to conduct experiments to test the effects of green space on health, so researchers often rely on observations. As a result, the evidence is statistically less certain than would be expected for medical treatments.

Mental Health and Wellbeing

The UK Public Health White Paper 2010 notes that green spaces can improve mental health and the quality of community life.⁹ Researchers have observed a link between increasing urbanisation and psychosis or depression;^{10,11} living closer to urban green spaces is also associated with lower mental distress.^{5,12-14} However, such observations may not indicate a causal relationship and could be explained by other factors. For example, socially deprived areas typically have low levels of green space (Box 1). One study aimed to reduce the problem of confounding factors by studying the same 10,000 people over 18 years.

Box 1. Social Equity and Urban Green Infrastructure

Low income areas systematically have fewer and poorer quality green spaces compared with more affluent areas in the same city.^{3,15} Investment in green infrastructure has a greater positive effect in economically deprived areas than affluent areas, since economically deprived communities spend more time in their neighbourhoods, and the quality of these green spaces has a larger impact on their health and wellbeing. The use of green infrastructure might also vary between ages, gender, ethnic groups and socio-economic backgrounds,¹⁶ making it difficult to predict the effect of a green space on the health and wellbeing of a local community. However, there is evidence that successful and well-maintained projects are those that have public support and engagement.

It concluded that living in an area with high levels of green space led to a decrease in mental distress compared with living in areas with little green space, once factors such as age, gender and income have been statistically accounted for. The improvement is equivalent to one third of the increase in the mental health benefits of being married rather than unmarried.¹²

Experimental evidence suggests that spending time in green space, or simply having views of nature, can improve reported mood, self-esteem and concentration, and treat stress and mental health disorders.¹⁷⁻¹⁹ These benefits have been shown to occur over very short exposure periods to green space, for example, five minutes.²⁰

This improvement in mental health from exposure to green spaces can be explained by a direct effect on the brain (through reduced stress²¹ and improved concentration^{17,22}). However, indirect benefits can also come from increased exercise²³ and improved social interactions, though the evidence for these effects is less clear.²⁴ The UN Millennium Ecosystem Assessment 2005,²⁵ and the second phase of the UK National Ecosystem Assessment (under review), identify the multiple benefits of nature for mental wellbeing. The magnitude of these benefits is partly dependent on the quality of a green space, so careful design and maintenance is important (see below). The greatest health benefits are seen in the poorest urban areas (Box 1).

Physical Activity

There is less evidence for improvements in physical health than for mental health, because access to green space does not guarantee that local people will exercise more. The statistical evidence is weak, but some researchers have suggested that levels of physical activity increase with proximity to green areas.²⁶⁻³² Where people do exercise in green space, it leads to lower anger, fatigue and depression than the same exercise in urban areas.^{18,19,31} Some studies also indicate that for mental illness, such as depression, exercise can produce similar improvements in mental wellbeing as conventional medication.^{27,32} Regular physical activity reduces the risk of coronary heart disease, obesity and diabetes.²⁸ This might include gardening, conservation work through 'green gyms', or walking to work.

Environmental Benefits

Water Management

Flooding in urban areas is estimated to cost a minimum of £270 million per year in England and Wales.^{26,27,29} A high coverage of impermeable surfaces in urban areas prevents

surface water from soaking into the ground, increasing the risk of flooding and pollution from heavy rainfall (POSTnote 289). Two thirds of the homes affected in the floods of 2007 were flooded as a result of surface water.³³

Sustainable Drainage Systems (SuDS) are designed to mimic natural drainage and filter and retain rainfall where it lands to prevent 'grey' drainage systems from becoming overwhelmed during storm events (POSTnote 289). SuDS – including green roofs, permeable paving, swales and rain gardens – provide an example of the problems and challenges of green infrastructure (Box 2).

SuDS are often used to retrofit existing infrastructure including transport routes, in the form of rain gardens and street tree pits that receive surface water run-off. For example, rain gardens are now being implemented on highways in a number of London boroughs. However, while SuDS can provide drainage solutions for single sites, a more effective approach is to integrate the water cycle with the built environment at an earlier stage through planning and urban design. An example of this would be Water Sensitive Urban Design (POSTnote 419).

Reduced Air Pollution

Air pollution tends to be highest in deprived urban areas.³⁴ Exposure to high air pollution can cause and exacerbate respiratory problems, heart disease and cancer (POSTnote 272). Green infrastructure can reduce exposure in two ways:

- Trees and vegetation can reduce air pollution directly by trapping and removing fine particulate matter³⁵ and indirectly by reducing air temperatures. The strength of the effect depends on multiple factors, such as the weather, the pollution concentration, and the type and quality of vegetation.³⁶
- Urban transport infrastructure often results in the funnelling of pedestrians along major roads, where the concentration of air pollution is highest.³⁷ Green corridors across cities can reduce pedestrian exposure to pollution by providing alternative routes.

Box 2. Implementing Sustainable Drainage Systems

- **Planning:** The impact of a new development or project on the flow of water through a catchment requires hydrological modelling. Maps of flooding hazards derived from such models are required in England and Wales by December 2013 under the Floods Directive 2007. These maps can inform local planning, such that SuDS are prioritised in areas of high flood risk. This approach is used by Lambeth Council in London, using flood risk maps produced by Drain London Forum and the Greater London Authority.
- **Standards:** SuDS are required on new developments in England and Wales under the Flood and Water Management Act 2010, although national standards remain under development by Defra. It is intended that SuDS Approval Bodies within local authorities will assess the quality of SuDS against these standards, once they are published. Some have suggested that a similar system of guidance and approval bodies could be adopted for all green infrastructures in urban areas.
- **Maintenance** of SuDS is no longer the sole remit of local authorities. The Water Bill 2013 proposes to allow companies that provide sewerage services to construct and maintain SuDS to reduce the risk of sewerage systems being overwhelmed during high rainfall.

Cooling Urban Heat Islands

Urban areas often experience elevated temperatures compared with the surrounding countryside, because of extensive heat absorbing surfaces, such as concrete and tarmac, concentrated heat production and impeded air flow.³⁸ For example, the centre of London is on average 5°C warmer than surrounding rural areas.³⁹ Heat waves during the summer pose significant health risks to urban populations either directly from the heat^{28,40} or from increased air pollution. During the 2003 heat wave, a temperature difference between urban and rural areas of up to 10°C was recorded for London⁴¹ and estimates suggest that 40% of the 600 excess deaths (the number of actual deaths minus the number of expected deaths) in London were due to the urban heat island effect.⁴² Climate change projections suggest that by 2050 such summer temperatures will be common. Green infrastructure can lower air temperatures through the evaporation of water from vegetation^{31,43} and shading⁴⁴ (Box 3). These benefits are recognised in the Heatwave Plan for England 2013 that recommends the use of green infrastructure around hospitals and care homes.⁴⁵

Challenges to Delivery

Green Infrastructure in the UK

The extent and type of green space in all Scottish urban settlements was mapped in 2011 by Greenspace Scotland.⁴⁶ An equivalent resource is not yet available across England, Wales or Northern Ireland, and data availability varies between local authorities. Natural England, Ordnance Survey and others are discussing developing a mapping solution for England.

Green Infrastructure Policy

In May 2013, the European Commission released a Green Infrastructure Strategy⁴⁷ which recognises the significant contribution of green infrastructure to growth (Box 4), jobs, health and social welfare, climate change, disaster mitigation, and agricultural and environmental policy. The strategy promotes green infrastructure across rural and urban areas within existing legal, policy and financial frameworks. In the UK, the Natural Environment White Paper 2011 for England⁴⁸ committed to supporting the development of green infrastructure, and led to the creation of the Green Infrastructure Partnership (GIP), co-ordinated by Defra and DCLG. The GIP aids knowledge exchange between over 300 partner organisations. From 1 April 2014 Government facilitation of the GIP will end, but Defra hopes that it will continue into the future.

Planning and Design

Local authorities such as Birmingham,⁴⁹ London,⁵⁰ Manchester,⁵¹ Plymouth⁵² and Worcestershire⁵³ have developed green infrastructure strategies. However, the uptake of green infrastructure in local planning is variable. The National Planning Policy Framework 2012 (NPPF 2012) suggests that all local authorities set out a strategic approach to the creation, protection, enhancement and management of green infrastructure networks.⁵⁴ It also requires that Local Planning Authorities take into consideration the needs for open space, recreation and sport, based on an assessment of needs and opportunities

Box 3. Green Infrastructure for Cooling Urban Heat Islands

Well designed green roofs and walls can contribute effectively to the thermal insulation of buildings,⁵⁵ reducing the need for air conditioning. Green spaces and water bodies also lower air temperatures and are on average one degree cooler than the surrounding urban areas.³¹ Heat dispersion around a city depends on a number of factors, including weather, street layout, and the surface material of buildings. Determining the cooling effect of green infrastructure at the urban scale therefore requires modelling. In Manchester, the SCORCHIO project predicted that an increase in the area of green space of 10% would reduce the maximum surface temperature by 2.2°C compared no change in green space. This cooling increases to between 2.4°C and 2.5°C under low and high UKCIP02 climate scenarios.⁵⁶ Similar results have been found by modelling projects conducted in Birmingham (BUCCANEER project)⁵⁷ and London (LUCID project).³⁹

(previously the PPG17 assessment). However, with the exception of SuDS, new green infrastructure is not required by national legislation. The Landscape Institute recommends that to prevent implementation being restricted to a few local authorities, green infrastructure is made a core requirement in relevant local authority documents, such as Local Plans.⁵⁸

Green Infrastructure Networks

While careful design and maintenance can improve individual sites, many of the benefits of green infrastructure such as flood alleviation, improved air quality and improved connectivity for organisms^{59,60} derive from interaction between multiple green spaces. To maximise these cumulative benefits, the network itself would need to be well planned. This may entail the provision of new green spaces, as in the case of Coventry City,⁶¹ or the strategic improvement of existing sites, as in the case of the All London Green Grid.⁶² Networks can be planned by engaging with experts during the early stages of development. Only a few local authorities have green infrastructure strategies that include spatial plans of additional sites, such as Birmingham.⁴⁹

Site-Level Design

Design recommendations for individual green infrastructure projects are difficult to form, as they are necessarily site specific and existing projects are rarely monitored after implementation. However, some general principles can be applied. For example, increasing plant species diversity, or increasing the range of vegetation by planting trees and shrubs rather than grass alone, can significantly increase other forms of biodiversity.^{63,64}

Planning for Climate Change

There is good evidence that green infrastructure can aid climate change adaption and mitigation in urban centres. Under a warming climate, extreme weather events are expected to become more severe and frequent.⁶⁵ Infrastructure built today will need to resist these predicted changes in climate in the following decades, although this is not always considered in Local Plans. The NPPF 2012, the UK Climate Change Risk Assessment 2012 and the subsequent National Adaptation Programme 2013 all recognise the role of urban green infrastructure in climate change adaptation. This is reflected in the London Climate-Change Adaptation Strategy, which aims to increase green

Box 4. Economic Benefits of Green Infrastructure

Natural England has argued that green infrastructure can provide a competitive advantage to urban centres at a local scale^{66,67} through:

- **Inward investment.** Attractive areas encourage the movement of employers to an area, and increase the value of local property. The Glasgow Green Renewal Project led to a 47% increase in council tax receipts.
- **Visitor spending.** Attractive areas with green infrastructure attract more visitors, increasing spending with local businesses.
- **Environmental cost-saving.** Green infrastructure can be a cost-effective alternative to grey infrastructure. In New York, a mixture of green and grey infrastructure was predicted to provide the same benefits for water quality as grey infrastructure alone, but at a saving of \$1.5 billion.⁶⁸
- **Health improvement.** Where the provision of green infrastructure has a positive effect on the physical and mental health of local communities, it may reduce NHS spending and improve workforce productivity (see health and wellbeing benefits). Researchers have not quantified the economic benefit of these effects robustly.
- **Job creation.** Green infrastructure can create jobs directly through activities involved with construction, maintenance or management, and indirectly through increased visitor spending. The Commission for Architecture and the Built Environment estimated that 5% of all jobs in England are in the green space sector.

Many of these local benefits may be generated by the displacement of wealth from one area to another. The extent to which green infrastructure creates additional economic growth at the national scale is not possible to estimate with the available evidence.

space in central London to provide a cooling effect.⁶⁹

Access to expertise

Good design depends on an understanding of natural processes. Over recent decades the capacity of local authorities to plan green infrastructure has been reduced through the loss of experts, such as hydrologists and ecologists. Worcestershire County Council has pooled its experts at the county level, to provide an ecological consultancy service for districts and cities.⁷⁰

Standards

National standards exist only for a small subset of green infrastructures such as the national Green Roof Organisation Code, and draft Defra standards for SuDS (Box 3). As such, approaches to green infrastructure implementation by local authorities can vary significantly.⁷¹ Codes of building excellence, such as BREEAM, and points systems, such as the Green Space Factor,⁷² can be used by local authorities to set minimum standards for green infrastructure in new developments. Many local authorities are following the northwest European approaches to implementing green infrastructure, for example, Sutton in London and Southampton City Council. In the absence of national standards, available guidance documents include:

- Good Practice Guidance for Green Infrastructure and Biodiversity by the Town and Country Planning Association and Wildlife Trusts
- Green Infrastructure Guidance by Natural England
- GRaBS (Green and Blue Space Adaptation for Urban Areas) Climate Adaptation Action Plan Guidance
- Delivering Biodiversity Benefits through Green Infrastructure by CIRIA (the Construction Industry Research and Information Association)
- UK Rain Garden Guide. Depressions that collect

rainwater from impervious surfaces, known as Rain Gardens, reduce the risk of flooding and water pollution by allowing water to soak into the ground.⁷³

However, much advice remains general since data on the effectiveness of green infrastructure projects are limited.

Maintenance

Maintenance of green infrastructure is essential to maximise its benefits. For example, while well-maintained green spaces can improve mental health, overgrown vegetation can have a negative impact by increasing the fear of crime,⁷⁴⁻⁷⁶ although these overgrown spaces may be better for biodiversity.⁷⁷ Some infrastructure such as green roofs, walls and rain gardens require minimal maintenance once installed. For other types of infrastructure, such as green spaces, the cost of maintenance can be higher – through mowing, weeding and watering. These costs often fall to local authorities, and have been the focus of budget cuts in recent years. Green Infrastructure includes a wide range of infrastructure types, so generalisations regarding the cost of implementation and maintenance are difficult to make. Maintenance may increase long-term jobs in the local community (Box 4), but alternative sources of funding are required to cover these costs (Box 5). Design that is sensitive to maintenance costs can improve the sustainability of a project by minimising this budget.

Box 5. Sources of Funding for Green Infrastructure

Installation or maintenance may be funded from a number of sources.

Installation

- **EU funding through the Structural and Cohesion Policy and its European Regional Development Fund (ERDF) or LIFE+ programme.** Both enable green infrastructure projects by providing funding to support ecological coherence or connectivity. Most projects are rural, but some urban projects have been funded.⁷⁸
- **Match funding.** Community groups that provide funds (or volunteer time) to a program can apply for a similar value again from the Government. For example, The Big Tree Plant has attracted around £7m in match-funding so far.
- **Utilities subsidy.** For buildings with green roofs, United Utilities in Manchester allow a 50% discount of the surface water drainage charges for that portion of the property.

Maintenance

- **Section 106 agreements** negotiated with developers by local authorities. These generally last for five years before costs fall back to the local authority, and relate only to on-site measures.
- **The Community Infrastructure Levy** (Planning Act 2008) is a local development tax toward the upkeep of all types of community infrastructure. One example is the Portbury Wharf nature reserve in Bristol, funded by a new residential development nearby.⁷⁹
- **Other hypothecated taxes** used to fund local infrastructure, for example business rates. This approach has been implemented in Business Improvement Developments (BIDs).⁸⁰
- **Voluntary maintenance by local communities** to maintain green spaces on a volunteer basis. Some councils, such as Islington Council in London, transfer a proportion of maintenance funds to the community for this service.
- **Existing maintenance funds** for highways and buildings. These are often very large sources of funding that some have suggested could be redirected to green infrastructure.

Endnotes

For references, please see:

http://www.parliament.uk/documents/POST/postpn448_Urban-Green-Infrastructurereferences.pdf

Green Space and Health



A range of bodies, including Government agencies, have promoted the possible physical and mental health benefits of access to green space. This POSTnote summarises the evidence for physical and mental health benefits from contact with nature, such as reducing rates of non-communicable diseases, and the challenges for urban green spaces.

Background

The 'green spaces' that are the subject of this note are natural or semi-natural areas partially or completely covered by vegetation that occur in or near urban areas. They include parks, woodlands and allotments, which provide habitat for wildlife and can be used for recreation.¹

Research suggests there may be health benefits associated with proximity and access to green space for the 82% of the UK's population now living in urban environments.^{2,3} Only half of people in England live within 300 metres of green space and the amount of green space available is expected to decrease as urban infrastructure expands.⁴ While this POSTnote focuses on green spaces, other research has suggested that 'blue' spaces such as coastal areas can also provide health benefits (Box 1).

More responsibility has been placed on local authorities to improve public health cost-effectively and reduce deprivations (Box 2), and there is growing evidence to suggest that physical and mental health can be improved with greater access to green space.² There is environmental legislation in the UK for the protection of biodiversity, but not for the provision of green spaces (POSTnote 429). A number of NGOs including the RSPB and The Wildlife Trusts, have proposed the adoption of a Nature and Wellbeing Act for the protection of green spaces as a public health strategy.⁵

Overview

- Physical and mental illnesses associated with sedentary urban lifestyles are an increasing economic and social cost.
- Areas with more accessible green space are associated with better mental and physical health.
- The risk of mortality caused by cardiovascular disease is lower in residential areas that have higher levels of 'greenness'.
- There is evidence that exposure to nature could be used as part of the treatment for some conditions.
- There are challenges to providing green spaces, such as how to make parks easily accessible and how to fund both their creation and maintenance.

The Quality of Green Space

The design and maintenance of green space is important for whether it is considered 'good quality'. Green spaces that are well designed and maintained attract more visitors, and neighbourhoods with attractive green areas or vegetation are viewed as safer, which makes them more 'walkable'.⁶ However, the appeal of green spaces can be reversed if they become derelict and littered, or the focus of anti-social behaviour.⁷

Green Space and Health Inequalities

Low-income areas are associated with lower quality housing and education, poor diet, and less access to good quality green space.^{8,9} Such deprivation is closely linked to poor health (POSTnote 491): life expectancy is on average 7 years shorter for people living in the lowest income areas (lowest quantile) and they will live more of their lives with disabilities. Health inequalities are halved in greener areas. For example, a recent study suggested that in the most deprived groups the number of mortalities are halved in areas with the greenest space.¹⁰ Improving green space use may promote social cohesion by allowing groups from different social backgrounds to interact, which in turn has health benefits, such as reducing stress and depression.¹¹ However, health inequalities are the result of complex interactions between physical, social and economic environments, not just income.¹²

Box 1. Blue Spaces

Blue spaces are areas near to or adjacent to water, including coastal areas, lakes, rivers and even artificial features such as fountains. Studies have shown that when people are asked about preferences they prefer images of urban environments containing blue features over areas with green spaces.¹³ The Blue Gym project investigated the potential benefits of activity outdoors in, on or near water,¹⁴ but further research is needed to provide robust evidence for evaluating health benefits; the EU BlueHealth project aims to do this.¹⁵ A recent review of the literature found that proximity to coastal areas is positively associated with better physical and mental health.¹⁶

Evidence for Health Benefits of Nature

Urban vegetation is known to improve the quality of the local environment; for instance reducing air pollution and noise (Box 3).¹⁷ Research into the direct public health benefits of urban green spaces has focused on three main areas; physical activity, mental health and the development of specific treatments. Different types of study have been used to examine the link between green space and health.

Study Design

- *Cross-sectional observation studies:* These studies use regional or national survey data to explore correlations between public health and the amount, or proximity to, nearby green space at a population level. However, green space often correlates with other socio-economic measures so causation cannot be identified.¹⁸ For example, wealthier areas have better housing and health care, and its inhabitants eat a healthier diet. The direction of causation is also unclear as areas with more green space may attract wealthier (and therefore healthier) people.¹⁹
- *Cohort studies:* These studies select groups from the wider population, which are followed over time to identify changes to physical and mental health as a result of their access to green spaces. These studies can be set up to look forward or can retrospectively look back at past behaviour. For example, one study selected participants from a national survey in England who had moved from areas with more green space to areas with less, or vice versa, and identified changes in their reported mental wellbeing.²⁰ Despite the possibility of confounding factors, these studies offer better causality evidence than observational ones. However, there are still very few pre- and post-change studies, with a subsequent lack of clarity about what long-term public health benefits could be achieved by increasing access to green space.²¹
- *Experimental studies:* These studies have looked at the direct effects of green space on indicators of health and wellbeing.^{22, 23} There are two main types: one looks at the effects of exposure to stimuli associated with natural environment, including sounds or images, and the other looks at direct effects of being outdoors in green space.

Physical Activity

Being physically active for 30 minutes a day can directly reduce the risk of strokes, cardiovascular disease, obesity, some cancers and type 2 diabetes.²⁴ It is estimated that 1 in 4 women and 1 in 5 men in the UK are less active than this and 1 in 4 children spend less than 30 minutes playing outside per week.^{5,25} Physical inactivity is the fourth largest

Box 2. Current Policy and Legislation

- The Health and Social Care Act 2012 delegated duties to local authorities to improve public health and reduce health inequalities.
- There is a range of legislation that protects biodiversity and urban green spaces by regulating planning, contamination and conservation, including the Wildlife and Countryside Act 1981, Environmental Protection Act 1990 and the Planning Act 2008.
- The Natural Environment White Paper addresses the importance of accessible green space and links to human health. Informed by the national ecosystem assessment, it refers to the links between public health and green infrastructure and advises that green space be incorporated into urban developments.

cause of disease and mortality in the UK, contributing to 37,000 premature deaths in England every year.

- *Is outdoor exercise better than indoor exercise?*

There are no clear physiological health benefits to outdoor activity compared to indoor activity. People participating in outdoor activity are no more likely to participate in activity more frequently or have increased physical health benefits compared to those who exercise indoors.^{26,27}

- *Does the amount of green space correlate with levels of physical activity?*

A link has been found between people's physical environment and their activity behaviour. However, there are only limited studies in the UK that explicitly assess the link between the amount of green space and levels of physical activity. National cross-sectional studies have linked levels of physical activity to the amount of green space, but evidence from regional studies show little or no association. At a national level, levels of physical activity are higher in areas with more green space with people living near the greenest areas achieving the recommended amount of physical activity.^{4,28,29,30} However, this was not always explained by increased use of green space and a causal relationship has not been found.

- *Does proximity to green space, quality and accessibility influence physical activity?*

Those living closer to green space are more likely to use it, and more frequently.³¹ Studies outside the UK suggest that people living closer to good-quality green space are more likely to have higher levels of physical activity.^{32,33} A national cross-sectional study in the UK found a similar correlation: people who live within 500 metres of accessible green space are 24% more likely to meet 30 minutes of exercise levels of physical activity.^{4,30,34} However, there has been no agreement in regional studies and some researchers suggest that it is 'perceived' access rather than measured proximity that influences activity levels.³⁰

- *Does the use of green space lower the risk of disease?*

Large-scale observational studies in the Netherlands have linked increased green space to increased perceived health and reduced prevalence rates of a number of diseases, such as diabetes.³⁵ In the UK, studies of disease, mortality and green space have generally been in the context of health inequalities. A correlation has been observed between those living closest to greener areas and reduced levels of mortality, obesity and obesity-related illnesses.^{10,36} This has been

Box 3. Indirect health effects

Urbanisation damages the environment and has a range of implications for human health (POSTnote 448). Increasing urban vegetation could help reduce:²

- Flooding – 10,000 trees can retain approximately 35m litres of water per year, reducing flood risk (POSTnote 529).
- Noise pollution – a border of trees and shrubs 30 metres wide can reduce noise levels by 5-10 decibels.
- Air pollution – doubling tree cover across the West Midlands could reduce the concentration of fine particulate matter by 25%, preventing 140 premature air pollution-related deaths in the region.
- The urban 'heat island' (UHI) effect – vegetation creates shade, which reduces the risk of heat stroke and exhaustion.^{17,37}

linked to higher levels of exercise, but causality has not been demonstrated.

Mental Health and Wellbeing

Psychosis and depression occur at higher rates in urbanised areas and in the UK 1 in 4 people now experience mental health issues.^{38,39} Local green spaces may provide important areas for social interaction and integration that can indirectly increase public wellbeing. Access to green spaces may also have more direct and immediate benefits for mental health and wellbeing.⁴⁰ However, there are known difficulties in defining and quantifying these benefits.

■ *Do greener areas promote public wellbeing?*

Among cross-sectional studies at a regional or national level there is no agreement on whether greater wellbeing and lower levels of mental illness are associated with greener areas.⁴¹ Cohort studies show that adults who move to greener areas have better mental wellbeing and sustained improvement in self-reported happiness, compared to those moving to less green areas.²⁰ However, people in greener areas generally experience less deprivations, and the disadvantages of the urban settings may exaggerate the advantages of natural environments.⁴² Current studies cannot rule out confounding factors or definitively prove a causal relationship.

■ *Does proximity to green space influence wellbeing?*

While the amount of green space may influence wellbeing, the research into how living closer to green space affects wellbeing and mental health is limited. Living closer to green space encourages use so any therapeutic benefits to mental wellbeing are more likely to be felt by those living closer and visiting more frequently,^{2,41,43} but there is no evidence to support this.

■ *Does outdoor activity improve mental health and wellbeing?*

Although people who exercise outdoors may not do so more frequently than those who exercise indoors, control trials have found that people exercising outdoors report higher feelings of wellbeing, and lower feelings of stress or anxiety, than those doing the same activity indoors.²⁶ In experiments, it has been shown that self-reported feelings of happiness increase and diastolic blood pressure (linked to stress) is lower in groups walking through a nature reserve, or exercising with scenes of nature, compared to those walking along an urban street.^{44,45} However, there is debate about blood pressure as an indicator of stress (see below) and limited follow up suggests feelings of wellbeing are not sustained.

■ *Do views of nature affect feelings of wellbeing?*

Views of nature, compared to views of the built environment, have been suggested to reduce feelings of anxiety and reduce anger. However, while participants report a preference, these preferences and their effects on wellbeing, particularly in the long-term, has not been properly studied.¹³

Therapeutic Use of Contact with Nature

Nature-based therapy has been suggested as a treatment to relieve mental and physical illness and improve recovery time from stressful situations or medical procedures. A study showed that views of trees reduced the amount of moderate to strong analgesics needed by patients' post-surgery and the number of days in hospital. However, the comparison group had views of a solid brick wall rather than comparable views of the built environment.⁴⁶ Patients and hospital staff report feeling happier and more relaxed after spending time in a garden or outdoor space, suggesting that hospitals could incorporate green spaces to improve the wellbeing of healthcare staff, and patients.⁴⁷ Some indicators of psychological stress, including blood pressure and heart rate, are reduced in participants exposed to visual and auditory stimuli associated with nature. Cortisol levels in saliva (also linked to stress) decrease upon entering a natural environment.^{48,49} However, the use of cortisol levels, blood pressure and heart rate as measures of stress is debated. Stress is not a well-defined term: it can present in a variety of ways and it is not clear whether such indicators are always indicative of a person's wellbeing.^{50,51}

The Faculty of Public Health suggests that interaction with nature might be effective in treating some forms of mental illnesses. For example, there is emerging evidence that engaging with nature benefits those living with conditions such as ADHD, depression and dementia, by improving cognitive functioning and reducing anxiety.^{52,53} However, mental illnesses, particularly dementia (POSTnote 535), are very complex making explicit studies difficult. Some projects, such as the ecotherapy projects funded by the charity 'Mind', have reported improvements in participants' mood, self-esteem and fitness.⁵⁴ It is unclear whether the same improvement would be seen if social and physical activities were conducted indoors. Mind recommend that the best treatments combine interventions and warn against moving away from medication.

Behaviour Change Interventions

Green or social prescribing is the referral of outdoor physical activity as well as, or instead of, clinical support and medication. Researchers have used terms such as 'dose of nature' to engage health practitioners and encourage use of exercise prescriptions.⁵⁵ NICE has recommended exercise referral schemes as an intervention only for sedentary or inactive patients that have existing health conditions or other factors that put them at increased risk of ill health.⁵⁶ GPs prescribe activity to improve physical health and wellbeing, but prescriptions should not replace medication. Randomised control trials in New Zealand found that green prescribing increased patient's physical activity, lowered blood pressure and encouraged weight loss.⁵⁷ However, some fulfilled activity requirements indoors at gyms or

swimming pools, and the study did not explicitly discuss the benefits of outdoor activity. 'Green gyms' are now available throughout the UK, where volunteer-led outdoor activities, such as maintaining allotments, are used to increase fitness and burn calories.⁵⁸ The 'Be Active' project in Birmingham has used voucher incentives, redeemable at high-street shops, to increase physical activity.⁵⁹

Challenges to Improving Health with Nature

Beyond evidence of effectiveness, there are a range of challenges to be addressed if green space is to be used to improve health outcomes.

Making Green Spaces Accessible

Factors such as proximity and connectivity influence the use of green space.⁶⁰ Insufficient footpaths or the presence of busy and dangerous roads prevent easy access and deter use, particularly for children.⁶¹

A number of psychological, cultural and informational barriers have been identified, many of which interlink. Few studies have looked at cultural perceptions of green spaces in the UK, but initial research suggests that preferences for types of green space may vary.⁶² Some studies suggest that women are less likely to use green space, particularly open or 'wild' spaces, because of feelings of vulnerability. Only a small proportion of old people regularly use green space, and while health issues may play a part so do a sense of vulnerability from busy roads, fears of crime or poorly maintained facilities.^{63,64} People can also be unaware of nearby green space or the facilities available.

Locally run programmes and interventions can help encourage awareness and visitation of green space. For example, the Chopwell Wood Health Project, near Gateshead, has combined GP referral schemes, educational programmes and woodland activities to promote visitation and physical activity. It reported that 91% of referrals complete their prescribed programme, a high attendance for activities (also linked to social cohesion) and an increase in children's understanding of nature.⁶⁵ Other studies suggest that 'wild' or 'informal' spaces can be more appealing by improving safety.⁶⁶

Possible Negative Health Effects

Without appropriate management, increased human contact with green spaces may increase exposure to environmental allergens such as plant pollen and fungal spores. The transmission of vector-borne diseases ([POSTbrief 16](#)), such as tick-borne 'Lyme disease' and encephalitis, are rising in the UK.⁶⁷ Incidences of mosquito-borne diseases, including West Nile Virus and Malaria, have increased in Europe with the invasion of non-native mosquito species bringing threats of European dengue and Chikungunya virus ([POSTnote 483](#)).^{68,69}

Financing Green Space

The majority of funding for green spaces in the UK comes from the public sector: 70% from local authorities and 15% from Central Government and the EU. Reduction in central government grants to local authorities has led to a 10.5% decrease in spending on green spaces between 2010/11

Box 4. Health Savings from Green Space

The direct health benefits of urban green spaces could save the UK health system money, but more accurate estimates are needed that can be applied at a national level. There have been numerous attempts to quantify the financial benefits of improved health resulting from urban green spaces, but these are purely based on assumptions or the results of small scale regional projects. However, Defra has estimated that if everyone had access to sufficient green space the benefits associated with increased physical activity could save the health system £2.1bn per year.⁷⁰ As well as direct health benefits, analysis from America has highlighted additional financial savings from green space benefits, including air pollution mitigation and social cohesion, at a total worth of \$16m (Box 3).

and 2012/13.⁷¹ As local parks are not a statutory service protected by law, commentators have cautioned that parks may be sold or cease to be maintained. For example, Lancashire Council has announced that it will cease to maintain 93 forest and recreation sites as early as April 2018. Lack of funding has been consistently highlighted as the main constraint for green space improvement, affecting both its creation and maintenance.

Local businesses and property developers benefit from additional green space through job creation, visitor spending and house prices.⁷² For example, it is estimated that living within 600m of a park in London adds 1.9 to 2.9% to property value, while a high quality park could add 3-5%.^{73,74} The Town and Country Planning Association reports that developers are paying more attention to green space provision, particularly for upmarket developments. For example, Leeds City Council secured £3.7m extra investment for public parks from both local businesses and developers.⁷⁵ Lottery grants and fundraising events have also been successful in raising capital. However, funding opportunities like these are often one-off or small short-term grants that will not secure the long-term cost of maintenance. The annual revenue budget for maintenance of all UK green spaces is approximately £2.7bn, a fraction of the estimated health savings that could be achieved by improving access to green space (Box 4).⁷⁶ As part of the 'Active Parks' initiative, Birmingham has looked at redirecting money from the NHS to invest in green spaces used by patients fulfilling 'exercise prescriptions'.⁵⁹ In order to provide long-term maintenance costs, park authorities are using income-generating opportunities like cafes and events, such as Bute Park in Cardiff.⁷⁷

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TRANSFORMING GREY TO GREEN INFRASTRUCTURE

Bristol Street Green Screens Trial – Birmingham
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(formerly of Atkins, Birmingham)

Provided for the BCC Tree Policy Task and Finish Group meeting 30/11/2017

Bristol Street Green Screens Trial



Bristol Street 2014



Bristol Street 2016

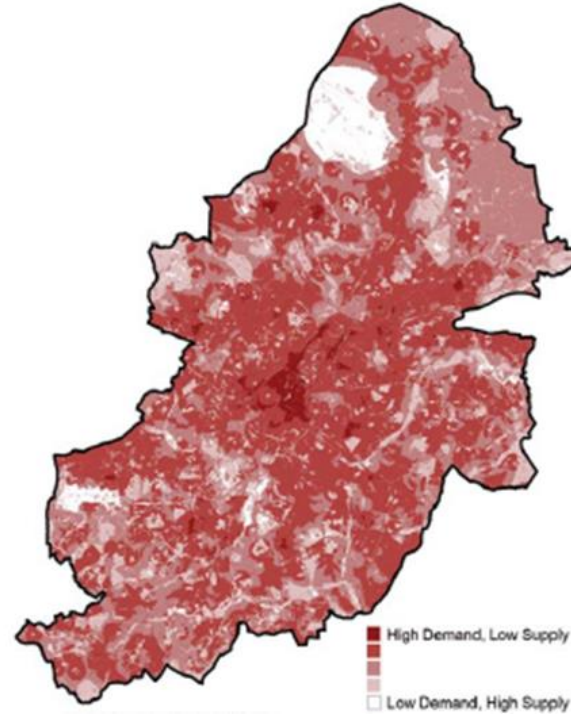
Bristol Street Green Screens Trial

Background to the idea

- Maximise opportunities for greening in dense urban environments
- Use the vertical dimension where there is limited ground level space
- Retrofit and transform a piece of existing and common infrastructure
- Low cost approach
- Multifunctional – identifying the benefits



2009 Corporation St 2016



City centre green infrastructure - high demand but low supply (BCC Green Living Spaces Plan 2013)



aerial images Google Earth



Densely built-up central area - low provision and opportunity for green space and street trees

Bristol Street Green Screens Trial

Project attributes

- Transform the ubiquitous grey pedestrian guardrail
- Retrofit with green vegetated screens
- Located along a major city centre highway
- Test foliage for airborne particulate trapping – Staffordshire University findings
- Supported by local business community - Southside BID members

Benefits

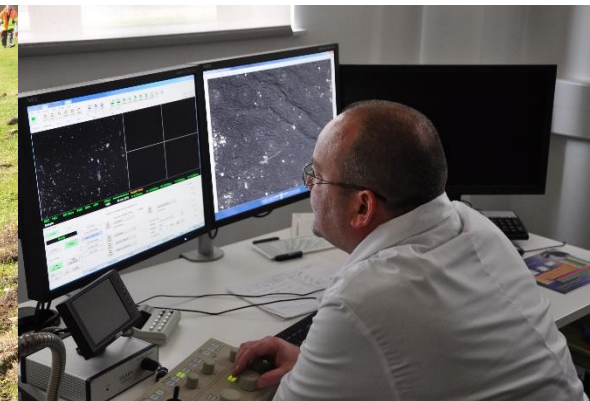
- Airborne particulate filtration
- Improved visual setting for local businesses
- Positive local opinions

Particulate matter (PM) interception rate is likely to be higher than 145 million particles per square metre of green vegetated screen per day – Staffordshire University findings

Installing the green screens



Analysing foliage for particulates



Bristol Street Green Screens Trial

Significance for city scale green infrastructure

- Simple and low cost
- Can be replicated on a broad scale
- Helps to address poor air quality - major health problem for cities
- Space efficient – in high urban density environments



Links to related articles and publications

Atkins Angles (2015)

<http://www.atkinsglobal.com/en-GB/angles/all-angles/turning-the-grey-city-green>

WHO Urban green space interventions and health: A review of impacts and effectiveness (2017) – case study (Appendix 2 pp 26/27)

<http://www.euro.who.int/en/health-topics/environment-and-health/urban-health/publications/2017/urban-green-space-interventions-and-health-a-review-of-impacts-and-effectiveness.-full-report-2017>

Creating a more attractive and healthier environment

- Better for business
- Better for people



Urban Green Space Interventions and Health

A review of impacts and effectiveness

The quickening pace of change and development within Birmingham has been having an increasing impact on the city's treescape. Mature trees are lost to development and often replaced with smaller canopied tree species and of limited diversity. The last 12 – 24 months has seen over 170 trees lost to road layout changes alone (Paradise Circus, Ashted Circus etc.). In particular replacement levels within the city centre can often be limited or non-existent.

To the citizens of Birmingham trees are seen as being treated as little more than furniture that can be removed and replaced with seemingly no regard given to the potential for retention of mature trees or an understanding of the benefits in terms of ecosystem services that they can and do provide.

In order to prevent public outcry reaching the proportions of that currently encountered in the City of Sheffield (which has generated interest within the national media) and other towns and cities, regular reviewing and updating of the current tree strategy, policies and processes is essential.

A reassessment of our current tree management processes and policies has been undertaken as part of this process to determine if they were still relevant and fit for purpose. In addition research into the current best practice delivered in the UK, Europe and around the world was carried out to give a base line against which to make comparisons.

While there are elements of the current documentation that are still relevant to the day to day management of the city's tree stock there are areas where work is recommended to provide a city wide tree strategy and management document that is fit for the future and will meet the need to build a more resilient Urban Forest that will cope with the pressure placed upon it, and yet still be able to deliver the multiple health and well-being benefits and ecosystem services.

Trees in development

Within planning trees are recognised as material considerations, in the Birmingham Development Plan the tree cover within the city is collectively referred to as "The Birmingham Forest".

Trees are considered in a number of different ways such as:

- Through planning applications impacts on trees are assessed by qualified Arboricultural officers who comment on and make recommendations relating to a range of issues including tree protection measures. This may also involve the use of planning conditions to secure specific works or replacement trees
- Trees in Conservation Areas are automatically protected from being cut down or having work done to them in order to preserve the special character of the area. In addition to this, a specific tree may be protected by a Tree Preservation Order. However it must be noted that the designated Conservation Areas of the City are themselves now being revisited and reviewed against more robust assessment criteria; which may lead to de-designation of some areas.

To carry out work to or remove a tree in a Conservation Area 6 weeks' notice must be given by submitting a Tree Works Consent Form (web based) or provide the notice in writing, including sufficient information as indicated in the form.

Permission is not normally required to cut down or do work to trees that are:

- Less than 75mm in diameter (measured 1.5m above ground)
- Less than 100mm in diameter (measured 1.5m above ground), if it is to help the growth of other trees
- Dead or dangerous (a reputable tree surgeon should be your first contact for advice. Typically the tree surgeon will contact the council with an 'emergency' 5 day notice of works that are urgently necessary to remove an immediate risk of serious harm)
- A fruit tree, grown for fruit production in the course of a business or trade.

However, to ensure there is no misinterpretation of the above guidelines, it is advisable to contact the city's Arboricultural officers before carrying out any work. If a protected tree is wilfully damaged or destroyed the city can prosecute or fines can be issued.

- Tree Preservation Orders (TPO) cover both individual trees and groups. There is a specific methodology applied to assess if trees are worthy of a TPO and this assessment is made by the city's Arboricultural officers. Members of the public are able to request a tree be considered for a TPO through the city's web pages. Applications for work or removal are required as per Conservation Areas.
- Trees and flooding. Trees are known to aid in water percolation into the soil and as part of their growing process require large volumes of water. Flooding and in particular dealing with surface water runoff can be an issue in hard landscaped areas. Modern construction methods are able to combine water attenuation measures within tree pit design providing twofold benefits. While these may appear to be more costly to construct long term benefits and reduction in associated costs have been shown to make these installations cost effective in the long term

Although there is a robust consideration of trees in the planning process clearer guidance on desirable canopy coverage percentage, desirable species (or those over represented and need to be avoided at present) and planting pit design / specifications should be produced to help guide applicants in their design process.

- **The developing Design Guide offers such an opportunity to provide this level of detail within appendices or via the web where these can be periodically updated.**

Trees in Streets

Highways design

It would seem that trees are often not considered within the realm of constraints in the design process (esp. highways design). Officers with specific responsibility for trees are usually not included in the stages

of design resulting in little consideration of retention, suitable tree planting design, locations and species choice for replacement planting. Ultimately this can lead to the managing departments having to undertake remedial work or replacement far sooner than should be expected resulting in increased tree maintenance costs that there should be.

A tree survey to identify tree constraints, compliant with BS 5837 2012 (Trees in relation to design, demolition and construction), should be commissioned prior to any design process. In addition a valuation of the individual trees or tree stock affected should be undertaken. The relevant professionally qualified Arboricultural officers need to be included within the design process. Any design proposals that require tree works or removals should not be signed off without the appropriate Arboricultural professional's approval.

Footway crossings

Each year there are a substantial number of requests for tree removals to facilitate footway crossing, this is either to create new off street parking or create new access roads for developments. While there is a process for the compensation for, or replacement of, street trees lost through this process there needs to be a clear standardised process for assessing whether we should be agreeing to these removals. This process needs to set out a clear methodology for assessing both the value of the tree and the levels of demand for parking within any given street. A draft policy was drawn up in 2011 but has not been formally adopted. This draft policy should be revisited and included as part of an adopted new tree management strategy.

Street tree management

Amey were awarded the 25 year contract for the management of trees within the Highway Maintainable at Public Expense (HMPE). Under this contract they are obliged; at the end of the contract hand back as many trees on the network as were adopted or to a figure that has been adjusted through funded additions to the network.

Amey base their management of street trees on the current (2009) tree management strategy. This identifies suitable survey periods for inspection, sets parameters for levels of work required to ensure a healthy and safe tree stock is maintained as well as details of the quality of work (adhering to BS 3998 2010 Tree work – recommendations). Where trees are removed Amey will aim to replace trees as close to that location as possible or planting that within the same ward.

There is perhaps an opportunity to redistribute trees over a wider area if % tree cover was managed on a city wide basis. There are areas of the city with particularly low tree numbers while other areas enjoy significant tree cover. Planting could be directed in these low tree'd areas where availability of new planting locations are limited due to existing tree cover. This would obviously need to be discussed with Amey and Highways Asset management.

Amey choose tree replacement species based on suitability for the location, this takes in to account rooting area and canopy size when mature. Smaller specimens are planted in restricted locations while those larger canopied trees are directed to larger grass verges and central reservations.

While Amey are able to have control of the tree management process they have no input to tree removals undertaken as part of highways redesign. Where significant numbers of trees have been removed and fewer replaced Amey can be left with a backlog of trees to put in but with no new planting spaces created or identified as part of that process. This could place the city in a difficult position if Amey are not able to maintain tree levels by our actions.

Trees and Health (Air Quality, Forest Bathing, positives and negatives- psychological stress)

There are significant volumes of research indicating the benefits of trees to health and society at large.

Dr Kathy Wolf from the University of Washington has compiled over 40 years' worth of research into the benefits of trees and green infrastructure and this can be found on the [Green Cities – Good Health web pages](#) and much research is being undertaken by Universities in Birmingham, and the UK.

There is too much to go into here but some of the multiple benefits are listed here:

- Reductions in heat island effect – leading to decreased mortality rates for the young and elderly
- Reductions in stress levels and improved overall well-being.
- Trees on streets reduce stress levels of drivers (perhaps leading to less road rage)
- Educational achievement is increased when students can view trees and green infrastructure
- Increased birth weight of children born to mothers in green environments – this leads to fewer long term health issues.
- Increased spend in shopping centres where trees and GI is integrated into the developments.

Japan and China are leading on, amongst other natural health areas, Shin Rin Yoku or Forest bathing. Participants are able to measure stress levels prior to undertaking forest bathing and post activity and see a significant improvement overall. This is being rolled out nationally at specifically identified locations although it can be undertaken in any tree'd location.

There are however a number of real and perceived negatives. Many trees are wind pollinated and this could have an impact on asthma sufferers, a few limited species (mainly male clonal varieties) can produce excessive pollen levels. A few other species can also exacerbate existing or underlying health issues however careful consideration and using the principles of right tree right place these can be minimised or avoided.

Within areas of poor air quality trees (and GI) can improve air quality however where there is low levels of air movement and closed canopy poor quality air can become trapped and have a negative impact on citizens. It needs to be remembered that it is vehicles, plant and street design contributing most to this and not solely the fault of the trees. Careful consideration and right tree right place would aid in reducing these sorts of issues in the future.

Citizens often complain about trees in their neighbourhood, blocking light, dropping leaves etc. and site that this is causing stress and impairing their health. While there may well be some foundation to this it is most likely that there are other underlying factors at work but the tree or trees are being used as a focus

for venting frustration. Removal of the trees may provide a short term affect but will not address other long term issues.

Public and Trees

Given the number of trees in the city and the number of citizens issues relating to trees are relatively limited by comparison.

Common complaints include:

- Lack of phone or TV signal
- Sticky deposits on cars / property
- Loss of light
- Leaves being dropped
- Roots or branches affecting property (including subsidence claims)

These common complaints are listed on the council's web pages and have responses as to the level of action that will be taken by the council.

While we have processes in place to deal with these issues some of these will be reduced in future years as new trees are planted, using the principles of right tree right place will. However evidence of the public reaction to tree removals can be seen on social media where s thousands of comments can be received in a relatively short period of time when a story breaks of tree at risk of removal showing that Birmingham really does care about its green environment.

Information on when street trees are to be inspected and when works to street trees can be expected can be found on the city web pages under Highways, Information on TPO's and conservation areas is under Planning with all other tree works information is under Parks. We do need to be clearer on who manages trees and where, what our management practices are and why we no longer follow certain methods of tree pruning; for example, some of the past practices were detrimental to the long term health of the tree and also resulted in increased maintenance costs from the need to repeat work on a cyclical basis.

The process for claims of subsidence need to be clearly set out, it has recently been agreed that the city will adopt the joint mitigation protocol for dealing with subsidence claims. This will minimise costs to both parties and ensure that timely action is taken to resolve claims or provide sufficient evidence where the city wishes to refute a claim or provide alternate solutions to tree removal.

While each section should still be responsible for its own information there needs to be better cross referencing of trees. There is no link to parks or highways from planning tree information and vice versa. There is a Local View map of TPO and Conservation Area trees but all other tree mapping is in a separate location on the city web pages. None of the tree information mentions the ecosystem services valuation so the general populous cannot easily see just what a contribution the trees in their local park or street make to the local environment.

As a city we should actively promote the value of our collective tree stock just as we would promote the increase in jobs or increase in income from new businesses or major events.

Combined interactive mapping could achieve this using current data.

Valuing Trees

Currently valuation of the city's public tree stock as a valuable asset is not a regular practice and current policy just sees a two for one replacement as the go to standard where trees have needed to be removed for reasons other than health and safety. More recent thinking has seen the need to portray a more realistic value based on the visual amenity and the value of the ecosystem services that trees provide and thereby justify retention over removal or investment into suitable replacements. There are a number of systems available for valuation. Some are more suited to individual trees while others relate better to broader populations of trees.

[Treezilla](#) is an open data source platform where citizens can upload data about individual trees and can get an estimated value for their tree covering a range of ecosystem services.

I-Tree is a US Forest Service developed system that uses a broader range of measures to provide more detailed information on the value of their ecosystem services – providing a Natural Capital value

CAVAT – [Capital Asset Valuation of Amenity Trees](#) is a process used by a number of Local Authorities and London Boroughs to provide a valuation for individual trees and small groups on a replacement basis. Taking a number of factors a valuation to replace a tree of the same size and amenity value can be arrived at.

This CAVAT process has been used to arrive at compensation values for loss of trees and for loss of value where trees have been recklessly damaged especially where expected levels of tree protection have not been deployed. Within LA's that operate this system these funds are allocated to a ring-fenced pot to be spent on facilitating suitable alternate planting or remedial tree work to damaged trees.

Future Canopy-

The UK as a whole is one of the least tree'd countries in Europe with around 13% canopy cover. Birmingham currently has a canopy cover of around 18 – 19% which while admirable is below the level of many major world cities. It is widely accepted that in order to meet the challenges of climate change (increased temperatures, increased rainfall) that a figure of around 25 – 35% canopy cover is required.

Using GIS data we are able to calculate the current canopy cover levels and determine what these are for certain land use types. This data can be used to inform where tree planting is required most and to set desirable levels of tree planting for any given region of the site or land use type. When you overlay this data with air quality, heat island, flood risk, social deprivation etc. there is a distinct correlation between lack of trees/ GI and the worst instances of these issues. Directing tree planting and using this to inform the planning process should help to address some of these key problems.

Future Funding

Currently each directorate directly funds the management of trees within its portfolio although this may be undertaken by a contractor or different department (Highways HMPE- Amey, Housing, and Bereavement Services, non- HMPE highways, Schools, Parks –Parks tree management). This funding is often under pressure and generally only covers routine maintenance and essential health and safety works. There is currently no allocated budget for proactive management or development of new planting opportunities.

Using a process such as CAVAT or similar systems (green bonds, total place making) could lever in funding to support such work. Alternatively a collection system now that could collect the money owed for non-replacement of lost trees- could be pooled into a **Birmingham Tree Bank**. (see evidence submitted by Jonathan Webster). These monies would be accrued through payments for loss of trees (excluding those removed for H&S reasons) where adequate replacement levels cannot be achieved or where there has been proven reduction in the value of public tree assets through preventable damage. These funds would be ring fenced to the long term management of the Birmingham, forest and could be allocated to projects by a Birmingham Tree Board

Future Maintenance

All policies should be periodically reviewed to ensure it is still fit for purpose. The current tree management strategy was last reviewed in 2009 and while reflective of the practices at the time needs to be updated to reflect current best practice and forward planning.

Once the need for a revised tree policy has been agreed, revision of the policies must not be done in isolation and should include colleagues from across directorates and delivery bodies (Amey) **and** in order to provide transparency external organisations that have a focus on trees in the urban landscape such as Birmingham Tree for Life, The Woodland Trust or Trees for Cities.

This grouping of experts and interest groups could form the basis of a Birmingham Tree Management Board. While the day to day delivery of standard policy would remain with the relevant Arboricultural experts within the city where requests for tree works, major plans etc. that would not meet the adopted policy these should be referred to the tree management board for advice / decision. This would place the accountability for the overall tree management directly with Arboricultural experts and the inclusion of third parties would aid in showing transparency of decision making. This board would also feed into the proposed City design and Conservation Review Panel.

Future Tree Strategy

The Government is about to release a framework for the creation of a 25 year environment plan. This would be applied nationally through Government projects and schemes- but the main delivery mechanism for improvement would come from city and regional locations developing their own 25 year environment plan. Work is ongoing for such a plan for the West Midlands to lock into and integrate with the economic growth plans. This framework would provide the ideal vehicle and timely opportunity for Birmingham to develop a 25 year Tree Strategy – and liaise across border with the other WMCA authorities.

To ensure that there is a long term view and monitoring process of the Birmingham Forest there should ideally be the development of a “25 year strategic plan”. This plan would be used to inform 5 year management plans with each (tree related) service area deriving annual operating plans from these. Consideration will need to be given as to what impact this may have on the PFI contract.

This plan should look to include the following:

- A target increase for canopy cover within Birmingham. While a long term vision would be to reach 25% this would take many years so smaller increments should be set initially such as to raise canopy cover from present levels by 2% (e.g. Move from 18 % up to 20%). Movement towards this would be monitored and reported on a 5 yearly basis
- Set out clear guidance on the assessment and valuation of tree stock (such as CAVAT) and the relationship to retention replacement. The principles of Avoid, Mitigate and Compensate should be applied to all situations as a hierarchical process.
- Provide information on the assessment of current tree stock composition (age, condition, and species) and setting of idealised composition targets. In addition this will guide developers away from species that are over represented but would still follow the principles of “right tree – right place” while considering current and future threats from climate change and pests and diseases.
- Set out clearly desirable standards for tree planting pits with examples of designs for differing locations such as open ground or had landscaped areas. Ideally in hard landscaped areas and on new road systems combined SUDS and tree planting pits would be used to maximise potential ecosystem benefits.
- Identify funding mechanisms
- The need for greater transparency in the availability of information on the distribution and management of Birmingham’s tree stock is obvious. The A review of web page information should be included as currently tree management information is disjointed – a one stop shop for tree related information is needed. The general populous should have access to clear and concise information on the value of the city’s tree stock and the role it plays in delivering benefits across the health and well-being agenda along with ecosystem services. Information of the city’s 25 year strategic tree plan should be published along with an interactive map of the publically owned tree stock. This interactive map should show Location, Species, height, DBH, condition, valuation (CAVAT or I- Tree Eco) managing dept. and contact details.

Above all any new tree policy should seek to be adopted by full council and become the single point of reference for all directorates when considering how they manager or influence the Birmingham Forest.

Information Briefing Paper

From: Jonathan Webster – Principal Landscape Architect – Landscape Practice Group- Place Directorate.

To: Birmingham Tree Policy Task & Finish Group

Date: 30th November 2017

Birmingham Tree Bank

SUMMARY

A suggestion for a new system to replace the traditional two for one tree replacement policy on Council owned land with a scheme to help finance Birmingham's Green Infrastructure.

BACKGROUND

- 1) The current 'two for one' policy doesn't properly mitigate for loss on sites where there isn't enough room to properly accommodate tree replacement.
- 2) It is not flexible enough in terms of the time frame and funding required to successfully re-establish tree infrastructure in suitable locations.
- 3) It takes no account of the visual amenity, health benefits or value of the larger mature trees or larger pieces of green infrastructure currently part of our city.
- 4) Large or important groups of trees, especially within the highway, are vulnerable to loss both as part of adjacent development and as part of road improvement and other regeneration schemes.
- 5) Often BCC Highway road improvement schemes are not subject to the planning process and therefore loss of trees are not regulated by development control.
- 6) As part of the Amey contract any trees removed from the Highway network should result in a saving in the amount paid out annually through the contract to cover revenue costs. In theory this saving can be used to cover the revenue and maintenance costs of new trees added to the network. Currently any 'saving' or net gain in tree 'assets' is extremely hard to both to quantify over the network as a whole and therefore on the whole is not utilised.

THE SUGGESTION

- 1) Trees on council owned land (and possibility including trees under threat from development) are graded using a system similar to the CAVAT or Helliwell system [http://www.forestry.gov.uk/pdf/FCRN008.pdf/\\$FILE/FCRN008.pdf](http://www.forestry.gov.uk/pdf/FCRN008.pdf/$FILE/FCRN008.pdf) which places a monetary value on their visual amenity as well as their replacement cost. This system would place much higher monetary values on important trees than is currently considered as being necessary to cover just the cost of the nearest practical new tree replacement size
- 2) The potential loss of trees on any one particular development site can therefore be valued as a potential asset to BCC and in cases where there is insufficient room for reasonable compensation and mitigation to be secured through new tree planting within any one site in the direct locality, the difference in value is transferred into Birmingham Tree Bank.
- 3) We investigate whether the value of net savings on revenue costs from trees removed from the Amey contract within the Highway could also be transferred into Birmingham Tree Bank.
- 4) Funding secured into Birmingham Tree Bank can then be used to fund both the capital and revenue costs of new tree planting and green infrastructure within the city. Instead of looking at tree mitigation on a site by site basis this would give us the flexibility and funding to consider a more strategically green city wide infrastructure approach.
- 5) There is a potential for funding both more local tree planting through organisations like 'Trees for Life ' as well as council directed schemes as long as a coherent strategy could be adhered to.
- 6) Funding could also be secured from Framework contractors (i.e. Amey) working within the city through their commitment to the Birmingham Business Charter for Social Responsibility. For instance contributions to Birmingham Tree Bank could be part of a target under the Green and Sustainable existing charter principle.
- 7) Birmingham Tree bank could fund 'contract growing' of particular tree species through local tree nurseries which would add extra value to funding secured.

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Tree Policy Task & Finish Group

Planning & Development

Richard Cowell

Assistant Director | Development



Structure

Overview of City's growth agenda

Balancing competing factors / outcomes

Approach

- Planning Guidance
- Masterplans
- Projects
- Planning applications

BDP Vision: Birmingham in 2031

By 2031 Birmingham will be renowned as an enterprising, innovative and green City that has delivered sustainable growth meeting the needs of its population and strengthening its global competitiveness.

Birmingham's Growth Agenda

150,000 increase in population

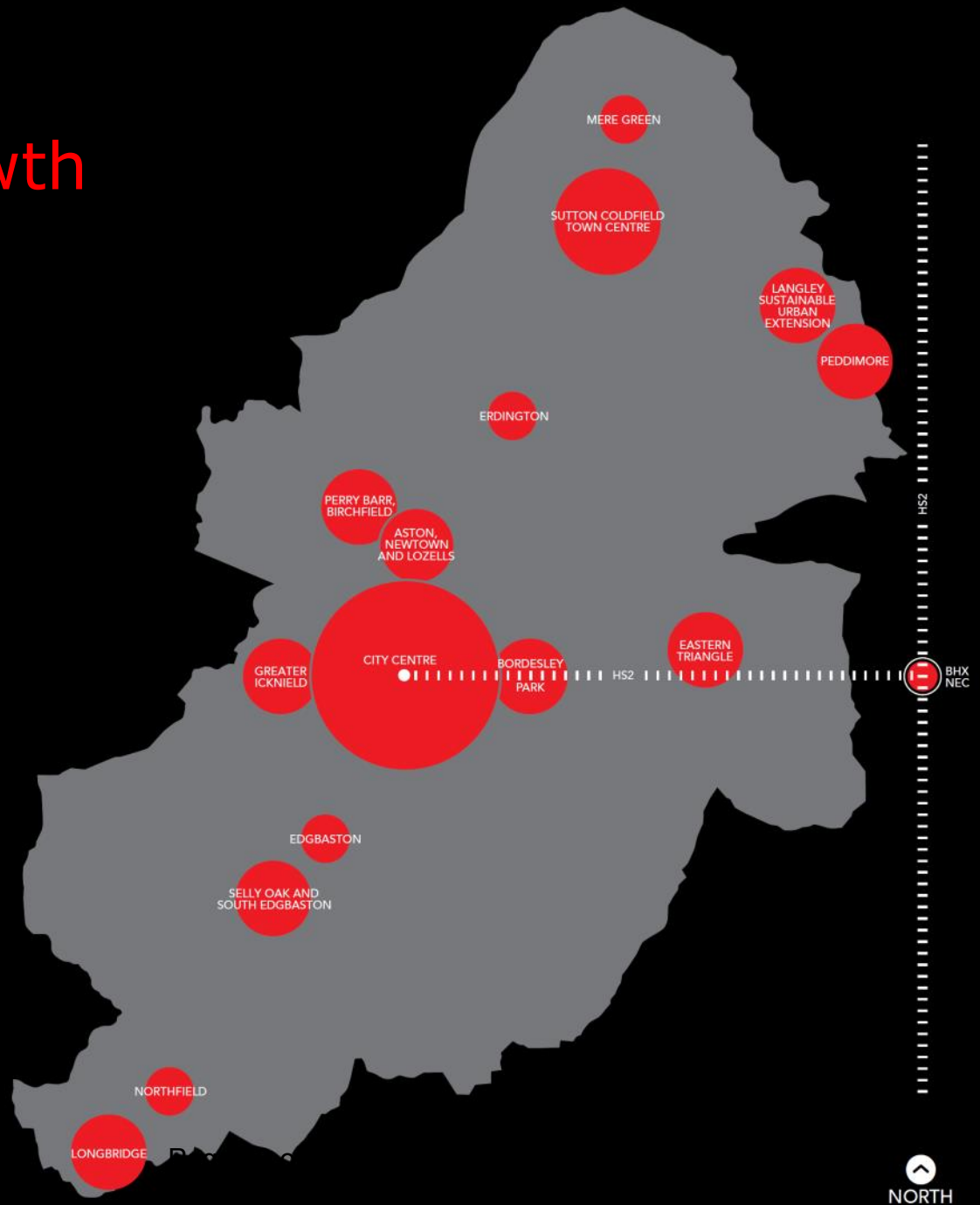
700,000 additional trips daily on the network

100,000 new jobs

81,000 new homes with land for 51,100 identified

£4billion of infrastructure investment

City-wide growth



Birmingham Development Plan

Policies

PG3 place making

.....Take opportunities to make sustainable design integral to development, such as green infrastructure, sustainable drainage and energy generating features.

TP7 green infrastructure network

The City Council will also seek to conserve and enhance Birmingham's woodland resource (collectively known as 'The Birmingham Forest'). Particular attention will be given to protecting the City's ancient woodlands as irreplaceable semi-natural habitats. All trees, groups, areas and woodlands will be consistently and systematically evaluated for protection and all new development schemes should allow for tree planting in both the private and public domains. The importance of street trees in promoting the character of place and strengthening existing landscape characteristics will be recognised.

Balancing Competing Factors

Economic, environmental & social considerations

Development challenges and pressures

Site constraints

Local character

Utilities/Infrastructure

Viability

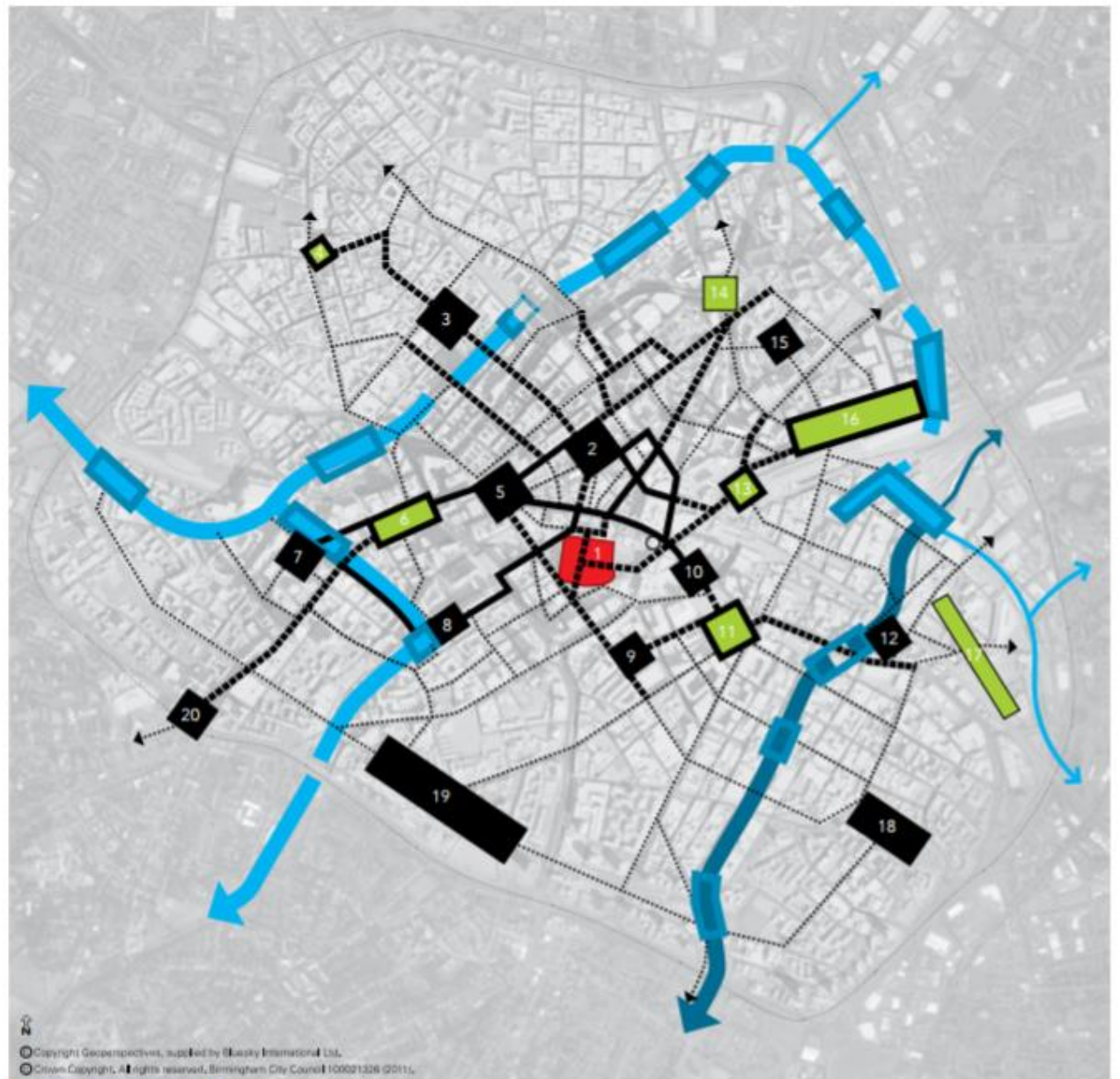
Industrial Landscape



Motor-city



Future City Big City Plan



Birmingham Design Guide

Will add detail and guidance for development

Birmingham ID

Importance of existing trees to City's identity & character

Streets & Connectivity

Role of urban trees in creating quality places & spaces

Green Infrastructure

Need for new trees in development sites

Protection of existing trees

Designing trees into development sites

Birmingham Design Guide

Development stages:

Vision document consultation – Oct / Nov 2017

Draft Design Guide published and consultation – Spring 2018

Adoption of Design Guide – Winter 2018

Masterplanning

key moves | area / landscape analysis | key retentions |
broad landscape gains

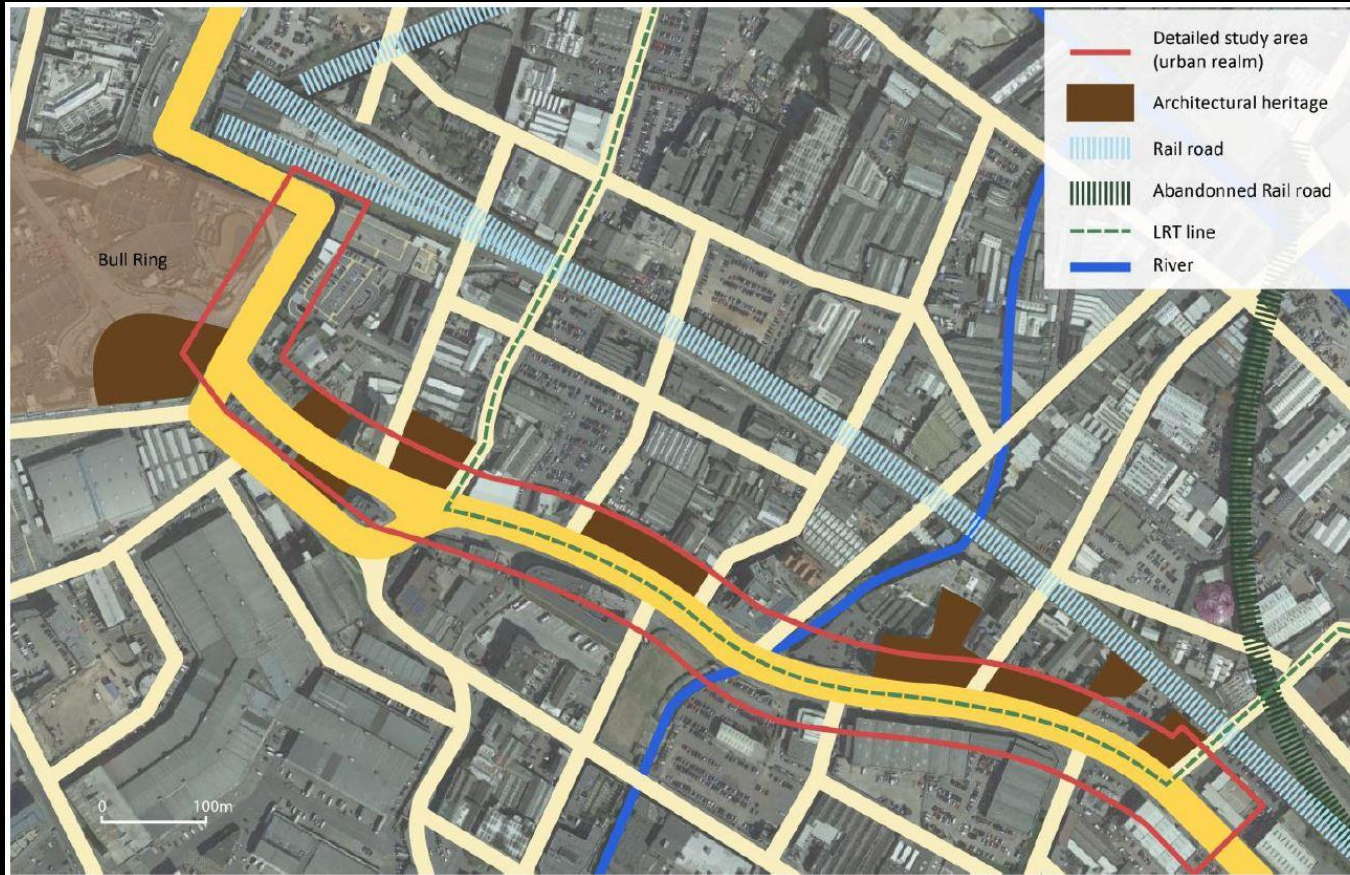


Projects to reconnect & enhance



Eastside Park – example of delivered scheme

Projects to reconnect & enhance



Future - Metro Digbeth High Street Boulevard Project

Planning Applications

Arboricultural Officer

TPO | conservation areas | existing mature trees

City Designer

major developments – seeks long-term gains

Developer Contributions

enables off-site provision / gains

negotiate | balance | seek protection, replacement & gains

Next Steps

- Put in place Birmingham Design Guide along with succinct and clear practice notes
- Birmingham Design & Conservation Review Panel
- Multi-disciplinary working

Richard Cowell

Assistant Director | Development
Birmingham City Council



Birmingham City Council

Economy Directorate - Transportation & Connectivity

Scrutiny Task & Finish Group – Tree Policy Review 30th November 2017

Introduction

Transportation & Connectivity (T&C) deliver transportation and infrastructure projects. The nature of the work, which often involves road widening and junction modifications, does impact on trees. As the work is primarily on the public highway the trees affected are highway trees. The maintenance of highway trees is the responsibility of the Highways Maintenance Contractor – Amey.

Current Practice

When preparing scheme proposals the Project Manager has a number of constraints to balance, including:

- The need to deliver a scheme that achieves the desired outcomes. For example:
 - road widening to provide additional road capacity to better manage traffic;
 - the introduction of safety improvements to reduce accidents;
 - new infrastructure to improve access to jobs and housing to support economic growth;
 - the introduction of cycle routes to support sustainable travel.
- Working within the highway limits, extending the scheme beyond the public highway into private land may require a Compulsory Purchase Order which would considerably extend the project programme and can be costly and there is no certainty of success.
- Impact on underground services, diverting services is costly, designs where possible should minimise impact on services.
- Providing environmental benefits by maintaining landscape areas and trees.

The Project Manager will endeavour to maintain landscaping and trees whenever possible, where landscaping and trees are affected appropriate landscape and tree planting mitigation is considered. Additional landscape and tree planting will also be provided if possible working within the above mentioned constraints.

In recent years, at the outset of the project, T&C appoint the City Council's Landscape Practise Group (LPG) to manage on its' behalf the landscape and tree process from concept to handover to the maintenance providers (Amey for Trees and Parks for landscaping areas). T&C have adopted this approach to ensure, by engaging LPG for the duration of the project, the landscape and tree impacts are properly managed and designs are fit for purpose and, at the maintenance handover stage, there will be no or very few issues.

The landscape and tree planting works are delivered through the City Council's Landscape Construction Framework Agreement 2015-2019 managed by LPG. The

landscape and tree works are co-ordinated by the Project Manager alongside the main roadwork's contract.

For every tree removed two trees are planted. It is not always possible to plant the new trees at the same location for various reasons, including:

- there may not be public highway space available;
- there is no other available City Council land adjoining the scheme boundary;
- underground services may prevent new tree planting;
- visibility lines for road users may be obscured.

In the event new trees cannot be planted within the scheme limits or on adjoining City Council land suitable locations within the vicinity of the scheme are considered, this may be on the public highway or on 'Parks' land.

The works contractors appointed by T&C are from the City Council's Highways and Infrastructure Works Framework Agreement. As stipulated in the Contract, the framework contractors work to the following guidelines to ensure the correct working methods are adopted when working close to existing trees:

- (i) BS 5837: 2005 Guide for Trees in Relation to Construction;
- (ii) NJUG 10 Proximity of Trees to Services.

The appointed roadwork's contractor is responsible for the maintenance of the tree for the first two years, maintenance liability then moves to the Highways Maintenance Contractor for trees in the public highway or to Parks for non highway trees. There is of course an additional maintenance cost as a result of removing a tree and replacing with two new trees. The annual cost of maintaining a tree in the public highway ranges from around £60 to £140.

Site Investigation Works – in order to establish if trees can be planted on the public highway it is often necessary to carry out trial hole investigations to determine the exact location of underground services. Usually a Ground Penetration Radar survey will be done first to locate the approximate position of the services (based on plans provided by the service companies). Trial hole works can be expensive as temporary traffic / pedestrian management measures need to be put in place to undertake the works safely, all these costs have to be built into the overall Project cost.

Planning Consent – most improvement work undertaken on the public highway is permitted development. New roads require planning consent. The planning process will determine the scope of landscaping and tree planting on new road projects.

Conclusion

1. With respect to design development, delivery and handover of tree works undertaken on Projects managed by T&C it is proposed to continue with the current arrangement. That is to engage LPG to work with the Project Manager to manage the whole process and to appoint a contractor through the Landscape Construction Framework Agreement 2015-2019. To date this has proved to be an effective delivery model.

2. Space for tree planting on the public highway is becoming more restrictive mainly due to underground services, the size of tree pits required and the need to maintain sight lines. Therefore, the current arrangement to plant replacement trees off highway (on City Council land) is to continue subject to securing the agreement of the Parks Manager. The cost for ongoing maintenance will need to be moved from the Highway budget to the Parks budget.
3. T&C would welcome, for further discussion, the development a tree replacement policy based around the tree amenity value rather than a rigid 2 for 1 policy. It is accepted that the replacement of a mature established tree with two small trees is unlikely to offer an equivalent amenity value, so therefore would be detrimental to the area from an environmental view point.

Peter Parker
Infrastructure Delivery Manager
Infrastructure Delivery
Transportation & Connectivity
Economy Directorate

16th November 2017

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KEY LINES OF ENQUIRY

Responsibility for trees

Where does responsibility lie for trees on Council owned land?

Who is responsible for managing and maintaining these trees and how is the basis for carrying out this responsibility agreed covering trees in different parts of the Council eg Housing?

Who is legally responsible for highway trees?

BCC. The Birmingham Highways Management and Maintenance Service (BHMMS) contract with Amey transfers maintenance and management responsibilities to the Amey who also indemnify the authority against losses associated with the management and maintenance of trees.

Where does responsibility for the Tree Service sit and what does the Tree Service do?

Who carries out the actual work of pruning and felling?

For highway tree maintenance and management Amey as part of the BHMMS. Other felling and pruning works are undertaken to highway trees as part of projects and developments with the consent of the authority.

Who supervises tree planting works carried out for example on the highways or as part of development schemes?

Highway tree planting is supervised by Amey as part of tree replacement programmes agreed with the authority.

What is the budget and costs involved in pruning/felling/planting/removal of trees?

For highway trees this is dependent on the service need to comply with the BHMMS contract

Planting of trees

What is the current City Council policy for tree planting? What is the current target? What is the current level of canopy cover for Birmingham and should there be a target increase for canopy cover within Birmingham?

Highway trees removed under the BHMMS contract are replaced on a 1 for 1 basis.

What process do we use for identifying and installing tree planting areas within development zones such as highways infrastructure, planning/regeneration schemes and parks or public open spaces?

Do we have a recommended tree species list that can be used to identify the right species to be planted in particular places/where specific conditions exist.

The BHMMS service to use a base list to replace trees from, this is variable depending on availability of supply. There is also a 'Prohibited Species' list that the BHMMS service may not replant in the highway. The use of tree species does come down to professional judgement as the number tree species available is extensive.

Do we have a set of standards or designs for potential tree planting locations covering issues such as, minimum rooting volumes, incorporation of rainwater harvesting within hard landscape situations, cable and services routing and canopy space needed for different species?

The BHMMS develop these on a case by case basis as needed.

Monitoring tree stock

What is the current method of valuation of tree stock and the relationship to retention/replacement?

The BHMMS service does not use a valuation method.

Do we monitor changes in tree stock quantities and if so how?

The BHMMS service is obligated to maintain highway tree numbers for the term of the contract. This achieved through the electronic inventory.

How is the current tree stock composition (age, condition and species) assessed? Do we have targets for what an ideal composition would be?

This is updated as part of the cyclical inspection programme and reviewed in the electronic management system. The BHMMS has no composition targets.

Is information about the distribution and management of the tree stock widely available and is it available to the public?

Do we have a tree strategy which managers can refer to and that can be updated as required to reflect changes to the city's tree stock and new thinking?

There is a BHMMS tree strategy.

Management and maintenance of trees

Can you explain how the Annual Highway Tree Pruning Programme is drawn up, and how it is agreed?

The Annual Highway Tree Pruning Programme is cyclical and undertakes works to 20% of the highway tree stock by geographical area, this is currently 8 wards per year across the city. The works undertaken is identified as part of the annual survey cycle which follows the same rotation. These programmes are reviewed and agreed by the authority's highways officers

What data does the council keep on Council owned trees, how is this data gathered and how is it maintained? Is this data used to determine priorities? Can it be used to deal with enquiries from Councillors and the public?

The BHMMS operates an electronic tree management system for highway trees. Data is gathered electronically as part of an on site survey, is updated by cyclical re-surveys and is used to answer enquiries and queries from all sources.

How is the planned programme of work communicated to local councillors and to the public?

As part of the BHMMS highway maintenance programme information. Or upon request from any source.

Do the public or local councillors have an opportunity to be involved prior to the work being carried out?

Involvement in BHMMS programmes is limited as these are driven by the contract and the condition of the trees. Feedback and suggestions are considered but may not be implemented.

Who decides which roads should be included and what criteria are used to select the roads to be included?

The BHMMS service determine the programme. Highway trees are maintained on a cyclical geographical basis by ward. All highway trees in the wards to be maintained will have work undertaken to bring them to the standards required by the BHMMS contract.

Who is responsible for undertaking this work?

The BHMMS with a direct and also subcontract workforce

Can you explain the criteria used for carrying out other urgent remedial tree works and pruning as necessary throughout the year?

Where highway trees managed by the BHMMS are concerned are found to be causing danger, obstruction or damage that requires maintenance before the next cyclical programme. Where these are of an emergency in nature, the BHMMS will attend and make safe within 1 hour, temporarily repair within 1 day and full y repair within 28 days.

Street Trees

What is the City Council policy on replacing trees on the highway that have been removed for whatever reason?

Highway trees included within the BHMMS are replaced on a 1 for 1 basis.

What is the City Council policy in relation to individual trees on streets that may have outgrown their location and are causing damage to footways or the road surface and may need pruning or replacing? How do we identify these?

These trees are identified as part of cyclical tree surveys, pre-works surveys as part of BHMMS highway works, as part of routine highway inspections and as part of enquiry interrogations

How many street trees have been removed for each of the past 5 years and how many replacement trees have been planted?

June 2016 to May 2017 1638 trees removed – Planting in winter 2017 to replace these trees.

June 2015 to May 2016 1168 trees removed – 1168 trees replanted winter 2016/16

June 2014 to May 2015 1235 trees removed – 1235 trees replanted winter 2015/16

June 2013 to May 2014 1639 trees removed – 1639 trees replanted winter 2014/15

June 2012 to May 2013 1399 trees removed – 1399 trees replanted winter 2013/14

Can you explain some of the constraints which arise around planting trees in the highway?

The significant challenge to planting trees in the highway is the existence of suitable sites. Previous works to remove verges and improve parking have left many areas with poor replant opportunities. Works to provide planting opportunities in schemes in many areas did not provide suitable provision for trees to grow with poor and limited soils, and works to prevent tree roots affecting surfaces with concrete rings or similar generally lead to tree failure as the trees could not grow the roots required to survive. Services and their locations are a challenge in some cases preventing replanting, but replacement in existing locations can generally be achieved as the services avoid the existing trees. The creation of new footway vehicle crossings removes many planting locations especially where these extend to the width of the property boundary, and link up to remove any verge or kerb protected footway. New developments do not generally provide highway trees or options to plant.

Who is responsible for carrying out tree replanting and how is the work monitored?

The BHMMS service is responsible for the planting and work monitoring. This is reported to and overseen by the authority.

Are planting schemes as part of highway improvement projects designed to maximise opportunities for new tree planting? If so, can you explain the process for how this happens?

Highway improvement projects are not a part of the BHMMS service.

Are there any controls in place to ensure that a balance is maintained between incorporating new trees and retaining existing trees and how is this monitored?

Trees and new developments

When a new development is being planned and designed in the city how is consideration of trees within the design scheme, such as retaining suitable trees, identifying tree replacement sites and numbers and appropriate species factored in at the start of the design process?

Are the relevant officers within the Council with the knowledge and expertise in this area included as part of the design process and in particular, are they included where tree works or removals are included in the design proposals?

Where design proposals require tree works or removals how are these approved?

Is any advice taken where the City Council is identifying sites for disposal prior to development to ensure that consideration can be given about whether there are trees on site worthy of retention so that appropriate action can be taken to protect mature trees prior to the land being cleared in preparation for development where necessary?

Trees require an adequate supply of good quality, well aerated, moist and importantly uncompacted soil in order to grow and thrive. Suitable amounts of healthy soil which would facilitate tree planting is often not available in urban environments. New developments present a potential opportunity for tree planting but they need to wherever possible backfill with soil as the default material and to use grass as a default surface as opposed to alternatives such as asphalt (unless there is an engineering need to). What would the implications be of including this in policy?

Impact of footway crossings

Can you please provide data about the numbers of footway crossings installed each year and do you have any data about the number of trees removed to enable footway crossings?

Is there any information available or estimation about the number of trees damaged during construction of footway crossings which would have implications for the future health and stability of those trees? What is the current process for managing this?

Planting of trees in the footway

What is the current planning policy which governs the planting of trees in the footway on new developments? Can you tell us about the impact of this policy on the planting of trees in the footway in terms of the numbers of trees being planted in footways?

Potential conflict between planting trees in footway and street works

Is there a potential conflict between street works and planting trees in the footway? Can you please explain the current system for managing street works and what controls are in place to limit the potential impact of street works on tree planting and maintaining mature trees?

Off-street parking and dropped kerb vehicle crossings

Finding a balance between the need for vehicle access and off-street parking provision in urban areas and tree preservation is not easy. What does the current planning guidance say about how requests for a dropped vehicle crossing should be assessed?

What happens where the verge contains a tree which would need to be removed for the dropped kerb to be installed? How would such a request be assessed? Can we have the data on the numbers of trees removed for crossings over the last 5 years? On what basis have these trees been replaced?

Are there alternative solutions which could be utilised but aren't currently being used to retain trees in some of these situations?

Would you say that the current process enables us to achieve an adequate balance between the competing aspects of highway development and tree preservation?

Is the increasing move towards the electrification of cars and their charging needs likely to have a big impact on demand for off-street parking and charging stations within the highway? If that is the case, is this being taken into account when considering any future changes to the parking policy and the tree policy?

Dealing with public enquiries about trees

Who deals with public enquiries about trees and what is the process for dealing with these enquiries?

For highway trees the BHMMS deals with enquiries. The enquiries are logged within the BHMMS electronic management system, investigated by the Arboriculture asset team and a response is provided from the system by the BHMMS customer service team.

What happens where there are requests for tree removal or tree pruning from members of the public. How are these requests assessed ?

For highway trees the request for tree removal are assessed as to whether there is a need or case for removal as the tree is either unsafe or causing damage to the network or private property that cannot be removed or resolved by pruning or other works. Tree planting requests are recorded, but as the BHMMS is only replacing trees removed as part of the BHMMS are only considered if trees are not able to be replanted in the original or adjacent site.

What happens when calls are received out of office hours or when there is an emergency to do with a dangerous tree?

For highway trees these calls are logged out of hours via online systems and the authority's control centre and any emergency is passed to the BHMMS incident response teams and if appropriate the BHMMS arboriculture call out teams. There is a 365 day 24 hour call out service as part of the BHMMS for highway trees.

What is the process for handling enquiries from councillors?

For highway trees the BHMMS logs and investigates councillor enquiries within the BHMMS electronic management system as with enquiries from any source. There is a dedicated resource within the customer service team to respond to councillor enquiries.

Controlling activities of contractors working for developers, utilities or the highway authority near to trees

What measures does the City Council take to prevent damage to trees caused by works near to trees? How are these measures monitored and enforced?

