



# CITYWIDE TREE STRATEGY

2016 - 2026

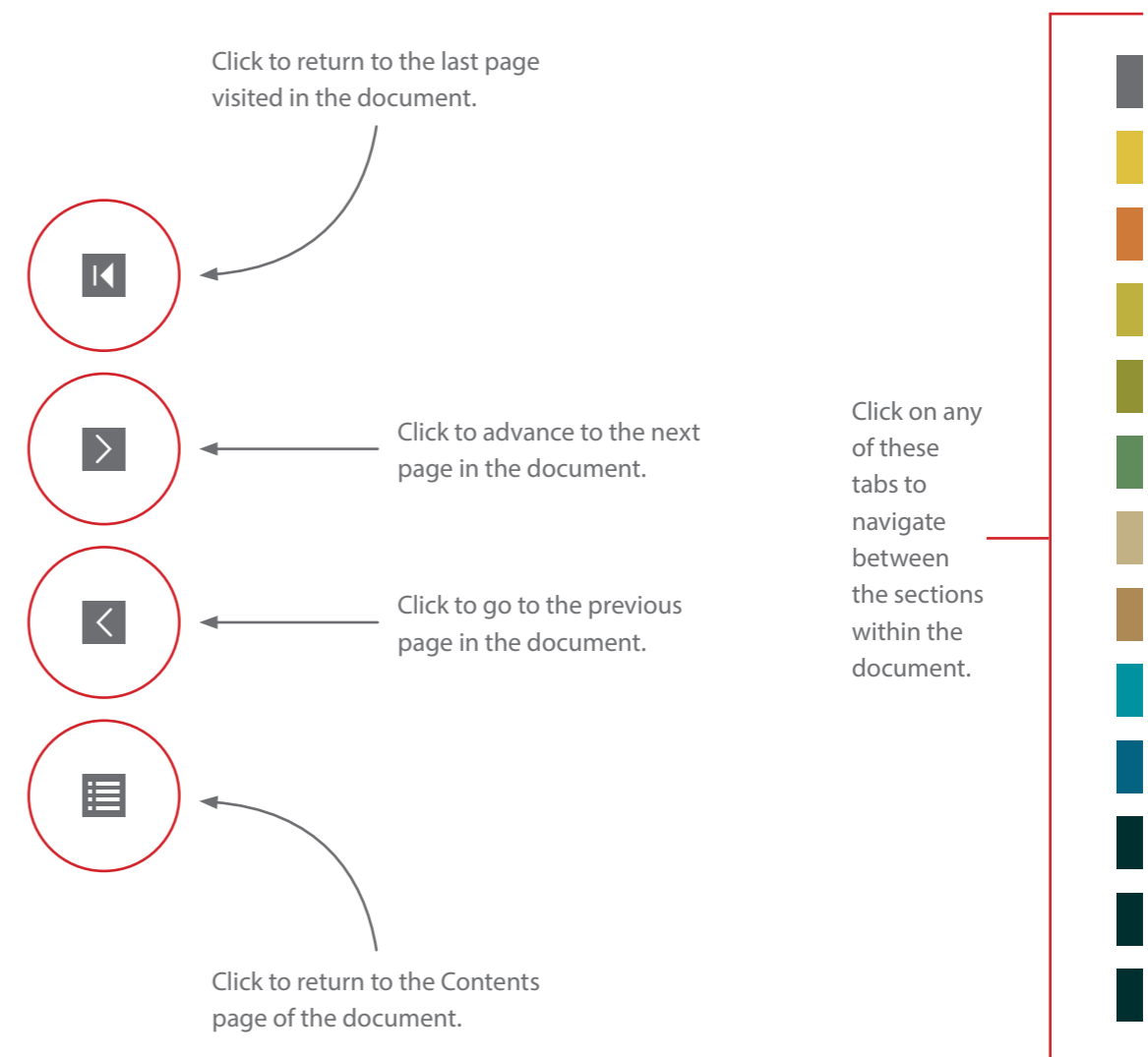
PART ONE

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Throughout the text in this document you will see text highlighted like [this](#), these are links to the Glossary.





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## OUR VISION

"To manage our City's trees so as to maximise the benefits they offer, whilst ensuring that the trees we leave for future generations, and the character they bring to our City, are better than those we have inherited."

The City of Cambridge's tree population contributes greatly to the City's character and is integral to providing cleaner air, filtered [storm water](#) and lower city temperatures. Trees, shrubs and other plants create an important habitat for birds and insects and make the City beautiful. Streets, parks and gardens filled with trees can also have psychological benefits in reducing stress and providing spaces for relaxation and contact with nature.

The Council will work to ensure a resilient tree population that respects Cambridge's unique character, responds to [climate change](#) and urban expansion and underpins the health, liveability and well-being of the City and its inhabitants by taking an integrated approach to the management of the City's trees, regardless of ownership.

This integrated management approach to achieving the Council's long term vision has the following aims:

- To sustainably manage the Council's own trees and those it manages by agreement.
- To foster a resilient tree population that responds to the impacts of [climate change](#) and urban expansion.
- To raise awareness of trees being a vital community asset, through promoting continued research, through education via the provision of advice and through partnership working.
- To make efficient and strategic use of the Council's regulatory powers for the protection of trees of current and future value.



Shaftesbury Avenue (Residential)

 ONE

# INTRODUCTION

## 1. How the strategy works

- 1.1 The strategy takes three approaches to the delivery of the Council's vision and aims, namely:
- To protect – existing trees, where appropriate, through the Council's regulatory responsibilities; and through the provision of tree management advice.
  - To enhance – tree cover, through the Council's regulatory responsibilities; through education; through public engagement; and through new tree planting.
  - To manage – sustainably, the Council's tree stock and those we maintain by agreement, in accordance with current best practice and within the resource allocated.

- 1.2 The strategy is divided into three parts:

### Part 1 – Tree protection and enhancement

This part sets out the Council's overall strategic vision and background to the strategy. It also sets out policies that will inform how the Council will protect the City's tree population, as a whole, with specific reference to tree preservation orders, development control and tree [canopy cover](#) enhancement through public and partnership engagement.

### Part 2 – Tree management policies

This part sets out the background and policy as to how the Council's own tree stock should be sustainably and responsibly managed. It also provides guidance on how to inform the public on tree-related matters and on their rights and responsibilities.

### Part 3 – Action plan

This part sets out actions, timescales and responsibilities with regard to implementing the Council's tree policy.

- 1.3 This document is Part 1 of the strategy.

- 1.4 This strategy replaces:

- Cambridge City Council. Citywide Arboricultural Strategy. 1996;
- Cambridge City Council. (7/11/2000). The Citywide Arboricultural Strategy: 2000-2007;
- Cambridge City Council. (13/7/2004). Mid-period review of the Citywide Arboricultural Strategy: 2004-2007. Unpublished report to Environment Scrutiny Committee; and
- Protocol for the consultation and determination of tree work operations to trees on [City Council](#) owned land. June 2009.

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- 1.5 This strategy builds and expands upon the above documents, such that some of the background historical context is not revisited within this strategy.
- 1.6 It is intended that the strategy should be reviewed every five years and it is hoped that it will continue to develop with each review.
- 1.7 The strategy seeks to establish a point of reference for the public, councillors, officers and professionally interested people to enable informed discussion and to establish a clearer and more structured approach to the issues affecting trees in Cambridge.



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BACKGROUND

2. Why do we need a strategy?

- 2.1 Trees play a vital role in the health, social framework and economic sustainability of a city. An abundance of research shows that trees improve our air, soil and water quality; they improve mental health and well-being; provide a sense of place and enhance property values. Increasing [canopy cover](#) over paved surfaces is a cost-effective means of mitigating [urban heat islands](#), controlling [storm water](#) run-off, and increasing pavement longevity (see Appendix 1, The benefits of trees, for more details).
- 2.2 In view of the multi-benefits that we receive from trees, it is appropriate for the Council to set out its approach to tree management and protection. By moving towards a more integrated or '[urban forestry](#)' approach to tree management, the Council will extend the scope of its policies beyond that which relates to solely the management of its own asset and statutory responsibilities, so as to include policies that recognise and enhance the overall environmental benefits of all urban trees.

3. What is our management approach?

- 3.1 The Council will take an integrated, [urban forestry](#) approach to the management of the City's trees. [Urban forestry](#) is practised more in Europe and the U.S rather than the UK. It can be defined as the science and art of managing trees regardless of ownership, in and around urban areas, so as to maximise the social, environmental and economic benefits that trees provide.
- 3.2 [Urban forestry](#) is distinct from [arboriculture](#) in that it considers the cumulative benefits of an entire tree population across a town or city. Looking holistically at the urban forest and its associated benefits allows for consideration of the broader issues of [climate change](#) and population growth that can be influenced by, and that can affect, an urban forest.

Traditional Tree Management	Urban Forest Model
Trees seen as ornament	Trees considered as infrastructure
Trees seen as individuals	Overall <a href="#">canopy cover</a> is important
Trees have low priority	Trees have equal priority to other urban infrastructure such as roads and services
Trees have no monetary value	Urban forest is seen as a valuable asset
Small and ornamental trees	Large <a href="#">canopy</a> trees
Tree maintenance	<a href="#">Canopy cover</a> management
Aesthetics-based design	Ecological-based design
Legal boundaries determine management	Urban forest as a continuous resource regardless of ownership

Table 1. Traditional management Vs urban forest model comparison (Adapted from : North Sydney Council 2011)

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- 3.3 The guidance from Government is that integrated management of the urban forest is a local government function<sup>1</sup>. It should fulfil this function by working in partnership with external organisations and groups, whilst developing the integrated approach within the authority itself. A major aspect of any integrated approach to management is the involvement of the local community. Local communities, schools, community groups, developers, business, industry and householders all have important roles to play. Every part of the city contributes in some way to the urban forest as a whole.
- 3.4 As with all local authorities, the [City Council](#) is continuing to face significant budgetary pressures due to a reduction in Government funding associated with the global economic downturn and public sector austerity agenda. Over the period 2010-15, the Council has already delivered £11 million in annual revenue savings. In October 2014, the Council published its Mid-year Financial Review which identified a further budget requirement of ~£6 million in net revenue savings across the Council up to 2020. This equates to a total net budget reduction across the Council of around 30%. At the same time as the Council is experiencing financial pressures, Cambridge is experiencing significant growth, with 33,000 new homes and 22,000 new jobs to be provided in and around the city by 2031. As a consequence of this growth, the Council is adopting and taking on the management of additional public realm assets whilst continuing to ensure it maintains the quality of its existing infrastructure, including the city's historic streets, parks and open spaces.
- 3.5 The challenge for this strategic approach is to raise the general awareness of trees as a valuable community asset with multiple benefits, as opposed to them being viewed as either a problem, a drain on resources, or of limited value at a time when the Council is experiencing considerable pressure on its resources.

#### 4. The City's trees – where are we now?

- 4.1 Cambridge's tree population consists of a mixture of deciduous native and [exotic trees](#) which include many [cultivars](#). There are a few [evergreen species](#), most notably in Newnham, Trumpington and Queen Edith's [wards](#). These trees naturally have different sizes, ages and levels of significance in the landscape. The Council has developed a detailed knowledge of the public tree population located in the City's streets, parks and open spaces. These trees are assessed triennially and all necessary maintenance is then performed, in an effort to maintain good health and condition. Details of all of the Council's trees are held on a database that

<sup>1</sup> Britt, C. & Johnston, M (eds). Trees in Towns II. A new survey of urban trees in England and their condition and management. February 2008. Department for Communities and Local Government: London.

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- is regularly updated, which records the tree location, species, and all maintenance works performed on the tree. See Appendix 2 (for more details of Cambridge's urban forest).
- 4.2 The information the Council has on the private tree population, is on the other hand more limited, as the City is not responsible for their maintenance.
- 4.3 A recent tree audit<sup>2</sup>, based on an analysis of 2008 aerial photographs, was completed in 2013. The data was checked for accuracy by carrying out a tree survey on the ground in a representative number of sample plots across the City, in 2012. The audit provides a useful baseline from which to measure change.

A summary of the key findings is provided below:

- a. The [canopy cover](#) in the City averaged 17%, ranging from 12% in Cherry Hinton [ward](#) to 22% in Newnham [ward](#). Generally, [canopy cover](#) in each [ward](#) was proportional to the land area that the [ward](#) occupies. Those notable exceptions were Abbey [ward](#), where [canopy cover](#) was lower than expected in relation to its land area; and Newnham, which had a higher [canopy cover](#) than expected.

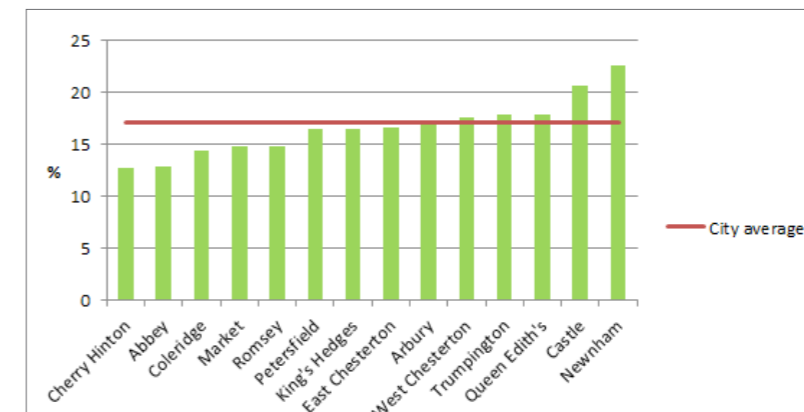


Figure 1. Relative [canopy](#) coverage by [ward](#)

- b. How land is used is probably the greatest determining factor in how many trees it can support. For the purpose of the audit, land in the City was classified as one of nine different categories:
  1. Town Centre and Commercial (TC)

<sup>2</sup> ADAS (2013) Analysis and Interpretation of Tree Audit Data For Cambridge City Council. Final Report.

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2. Residential – Low Density (LDR)
  3. Residential – Medium Density (MDR)
  4. Residential – High Density (HDR)
  5. Industrial (I)
  6. Open Space 1 (Formal and informal/amenity land) (OS1)
  7. Open Space 2 (Institutional) (OS2)
  8. Open Space 3 (Derelict/neglected/abandoned) (OS3)
  9. Open Space 4 (Remnant countryside) (OS4)
- c. The proportion of the [canopy cover](#) in Medium Density Residential areas (~38% of the total [canopy cover](#)) was more similar to the proportion of the land area occupied by Medium Density Residential land (~31% of the total land area). The results show that despite the areas covered by High and Low Density Residential land being similar (~4% of the total), the Low Density Residential areas have a greater proportion of [canopy cover](#) (~10% compared to ~4% of the total [canopy cover](#)). This is to be expected, since Low Density Residential areas consist of detached houses with large front and back gardens, which have space for large trees. Typically these houses tend to be older, with mature trees characterised by a large [canopy](#) area. High Density Residential areas typically consist of small terraced houses with, at most, a small back garden or yard. The gardens have little potential for any significant [canopy cover](#).
- d. The Town Centre and Commercial and, in particular, Industrial land use classes have a disproportionately smaller [canopy cover](#) compared to the size of the areas they occupy. This is to be expected, especially for the industrial areas, in which the land area has a purely functional purpose with little planting.
- e. Institutional Open Space covers a relatively large proportion of the Cambridge area and has the second greatest proportion of [canopy cover](#) after Medium Density Residential land. This land use class includes the University colleges with grounds which typically contain mature trees with large [canopy](#) areas.
- f. Despite ~25% of the total land area of the Cambridge area being classified as Remnant Countryside, it contains only ~14% of the total [canopy cover](#). This is because this land use class consists largely of big open arable fields, which often only have trees and shrubs at their boundaries.

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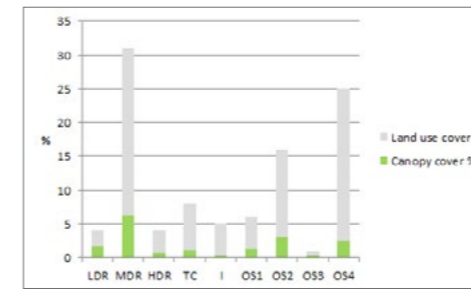


Figure 2a. Absolute [canopy cover](#) to land use by proportion for the total area of Cambridge.

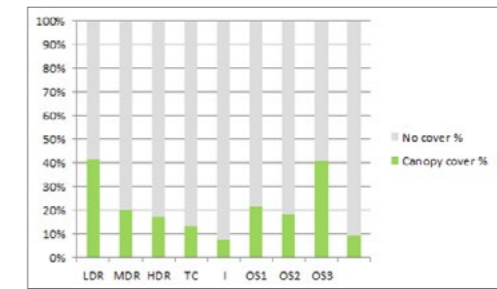


Figure 2b. The proportion of [canopy cover](#) for each land use.

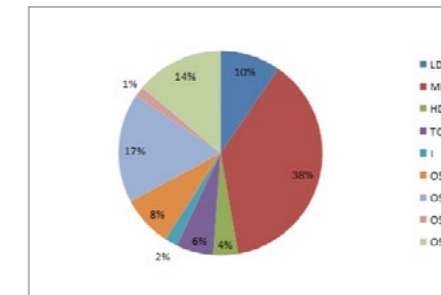


Figure 2c. Proportion of total [canopy cover](#) in Cambridge by land use.

- g. The majority (77%) of land area in Cambridge was found to be privately owned; [City Council](#) land comprised 13.5%, with Highways comprising the remainder. [Canopy cover](#) was split in similar proportions, both at a City and [ward](#) level. Exceptions included Abbey and Cherry Hinton [wards](#), where [canopy cover](#) in the [City Council](#) and Highways categories was higher than expected based on land area.

Ownership	Canopy cover (%)	Land Area (%)
<a href="#">City Council</a>	16.3	13.5
Highway	9.6	9.5
Private/other	74.1	77

Table 2. [Canopy cover](#) and land area comparisons by ownership

- h. Almost three-quarters of the trees in Cambridge were between 2.5 and 10m high. Fewer than 2% were over 20m tall. Institutional Open Space had the greatest proportion of trees over 15m tall, which probably reflects the abundance of large mature specimens on college-owned land. Over three-quarters of trees had a [canopy](#) spread between 2 and 10m.



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Less than 2% had a [canopy](#) spread under 2m or over 20m. Open Space categories had the greatest abundance of trees with canopies over 15m. Medium Density Residential land use had the greatest proportion of trees with canopies of under 5m. Castle, Newnham, Market and Trumpington [wards](#) had the highest proportions of taller trees.

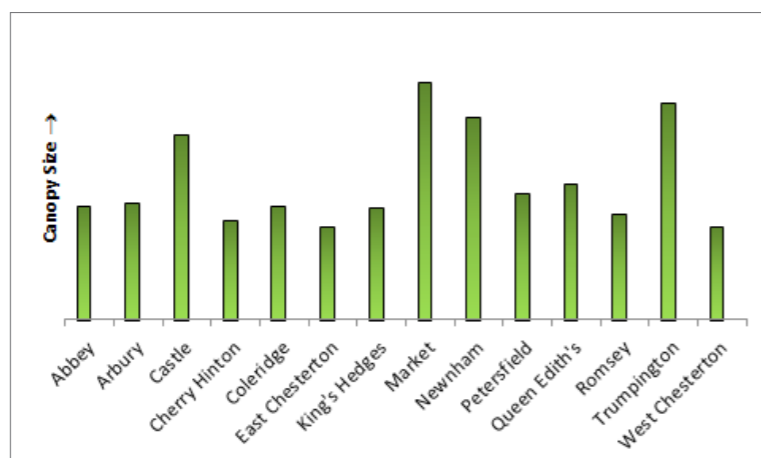


Figure 3. Representative tree [canopy](#) size by [ward](#)

- i. Overall, 25% of the [canopy](#) in the City was in private ownership in [conservation areas](#). There was great variation between [wards](#), with four having no private [conservation areas](#). On average across the City, 4% of the [canopy cover](#) was within [Tree Preservation Order \(TPO\)](#) areas and 9% was associated with trees with individual TPOs. There were a number of [wards](#) in which the majority of the [canopy cover](#) had a protection status (see Table 4). Within privately owned land in [conservation areas](#), 75% of trees were over 5m high c.f. ~60% in the City as a whole. Of the City trees over 20m high, 56% were in privately owned land in [conservation areas](#). Of the City trees with a [canopy](#) spread of over 20m, 31% were in privately owned [conservation areas](#).
- j. The most common [tree family](#) in the council-owned stock was Roseaceae (cherry, apple, pear, and rowan) family (33%), followed by Betulaceae (birch) family (14%) and Aceraceae (maple) family (12%). The most common [genus](#) was Prunus (cherry) (14%). The majority of the council-owned stock with a condition assessment was in good (56%) or fair (36%) condition. Condition varied with land ownership, for example [County Highway](#) and [City Council](#) other categories had a greater proportion of trees in good condition than [City public open space](#).

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- k. The most common [tree family](#) for trees regardless of ownership was Roseaceae family (28%), followed by Olaceae (ash) family (21%) with these two families making up almost half of the surveyed tree stock. The most common [genus](#) was Fraxinus (ash) (>20%) followed by Prunus (>15%). The next most common of the surveyed trees were lime species, followed by apple/pear species and then Leyland cypress. Of the surveyed trees, 71% were found to be in good condition and only 2% in poor condition or dead. The majority (38%) of surveyed trees had a stem diameter of 10-20cm. Forty percent of surveyed trees were estimated to be 5-10 years old and 32% between 25 and 50.



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## CONTEXT

## 5. What is the strategic context?

## 5.1 National Policy Background

- 5.1.1 The Department for Communities and Local Government report *Trees in Towns II* in 2008 acknowledged the beneficial role that the urban forest plays and carried out a national survey with the aim of obtaining a robust estimate of the urban tree stock and its management by local authorities in towns and cities in England. The study concluded that whilst the integrated management of the urban forest is primarily a local government function, local authorities should undertake the required work in partnership with other organisations. The study also identified a need for all tree-related activities to be incorporated in a coherent and coordinated management plan.
- 5.1.2 In 2009, an independent assessment (Read, 2009) was commissioned by the Forestry Commission to examine the potential role that the UK's trees and woodlands can play in mitigating and adapting to a changing climate. In relation to urban trees, the assessment concluded that trees play an important role in helping society adapt to [climate change](#) in the urban context through the provision of shelter, cooling, shade and control of run-off. It recommended that tree planting should occur in places where people live and gather, particularly those that currently have low tree cover.
- 5.1.3 The Government published the Natural Environment White Paper in 2011. This paper recognises the importance of trees and woodlands in providing valuable ecosystem services. It identifies that the health of trees is essential for societal wellbeing and highlights the ambition for a major increase in the area of woodland in England, as well as better management of existing woodland. As a step towards attaining this ambition, the authors highlighted a need to create more opportunities for planting trees in our towns, cities and villages, helping mitigate and adapt to future [climate change](#) and increase resilience. The Government welcomed the case that Read (2009) set out with respect to tree planting rates, and asked the Independent Panel on Forestry to provide advice on the appropriate level of ambition for woodland creation and management. The Panel's report was published in July 2012, and the creation of opportunities for woodland and tree planting within the urban environment was reported as particularly important in order to improve the quality of towns and cities.
- 5.1.4 In 2013, the Department for Environment, Food and Rural Affairs published the Government's Forestry and Woodlands Policy Statement incorporating a response to the Independent Panel on Forestry's report. It particularly wanted to see more trees and woodlands in and around our towns and cities where they can safeguard clean water, help manage flood risk and improve [biodiversity](#).



Newmarket Road Cemetery (Open Space)

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5.1.5 The National Planning Policy Framework was published by the Department for Communities and Local Government in March 2012. It sets out the Government's planning policies for England and how these should be applied. It identifies three dimensions to sustainable development: economic, social and environmental. One of the roles of the planning system in the social dimension is to create a high quality built environment that supports the health, social and cultural wellbeing of its inhabitants. In the environmental dimension, the planning system needs to help improve [biodiversity](#) and mitigate and adapt to [climate change](#). [Green infrastructure](#) is a key element of sustainable development and urban forests are a key component of [green infrastructure](#). A large body of research and policy supports the social, environmental and economic roles of trees, for example, references to the economic benefits of trees are incorporated in the National Ecosystem Assessment and the Natural Environment White Paper.

### 5.2 Regional Policy Background

5.2.1 The [Green Infrastructure](#) Strategy for Cambridgeshire (2011)

The [Green Infrastructure](#) Strategy for Cambridgeshire was designed to help shape and coordinate the delivery of [green infrastructure](#) in the county to provide social, environmental and economic benefits. Cambridge City is one of the target areas in the strategy and the importance of taking opportunities to enhance the [green infrastructure](#) in development localities is stressed. The importance of green space as part of the City's historic character is also noted as well as the promotion of the health, education, recreation and [biodiversity](#) benefits of such areas.

### 5.3 Local Policy Background

5.3.1 Cambridge Local Plan 2014 – Draft Submission Plan

The Cambridge Local Plan sets out the way in which the development needs of Cambridge will be met up to 2031. In this time it is anticipated that the city will grow significantly. The Draft Submission Plan contains policies that will influence the management of trees in future years

Strategic Objective 6 of this local plan requires all new development in Cambridge to: protect and enhance the landscape setting of the city, which comprises the Cambridge [Green Belt](#), the [green corridors](#) penetrating the urban area, the established network of multi-functional green spaces, and tree [canopy cover](#) in the city.

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The Local Plan sets out policies and proposals for future development and [spatial planning](#) requirements to 2031. When approved, a number of policies will relate to the management of trees including:

Development will be permitted; which avoids felling, significant surgery (either now or in the foreseeable future) and potential root damage to trees of amenity or other value, unless there are demonstrable public benefits accruing from the proposal which outweigh the current and future amenity value of the trees.

Development proposals should:

- a. preserve, protect and enhance existing trees and hedges that have amenity value as perceived from the public realm
- b. provide appropriate replacement planting, where felling is proved necessary; and
- c. provide sufficient space for trees and other vegetation to mature.

Particular consideration should be given to veteran or ancient trees, as defined by Natural England, in order to preserve their historic, ecological and amenity value.

5.3.2 [Climate change](#) Strategy 2016 -2021

This strategy establishes objectives and actions by which the [City Council](#) can address the causes and consequences of [climate change](#).

5.3.3 Cambridge Nature Conservation Strategy (2006)

The vision of this strategy is to see a "net gain" in [biodiversity](#), both within the city and its immediate hinterland, including the extent and quality of priority habitats and populations of priority species. Wildlife habitats will be protected, enhanced and, where possible, expanded and linked. The very best wildlife habitats will form part of a much wider ecological network that will permeate the whole of the city and beyond.

The following objectives within the strategy relate to trees:

- Increase the area of [native woodland](#) and [scrub](#) habitats within Cambridge
- Increase the length of [hedgerow](#) within the City
- Identify and protect all veteran trees, and potential future veteran trees.

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### 5.3.4 Open Space and Recreation Strategy (2011)

The strategy covers many open spaces within the city, from major tracts of green space to small pockets of open space. It includes land which is available for use by the public, but also private land which contributes to the character, environmental quality or recreational resources of the city. The strategy seeks to ensure that open space supports the development of sustainable communities, and the enhancement of the health and well-being of residents and the [biodiversity](#) of the city.

### 5.3.5 Cambridge Landscape Character Assessment (2003)

The Landscape Assessment identified areas or features in the Cambridge area that should be conserved. It also categorised different landscape types and areas as either 'Supporting or Defining Character' to inform the process of choice of location for new development and ensure that new development takes existing character into account in the design and execution of proposals.

It found that Cambridge is essentially a well-treed City and the tree belts and avenues that are characteristic of many streets are an important part of the City's character but are not in themselves Defining Character, but that their summed contribution to the City's environment is immeasurable. They are classed as Supporting Character. Where they coincide with major green spaces, settings or views for instance they become by association the Defining Character.



Highsett (High density residential)

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### 5.3.6 [Conservation Area](#) Appraisals

Part of the Council's remit is to identify areas of 'special architectural or historic interest' that makes them worth protecting and improving. What makes these areas special might be the buildings, open spaces, trees, or a mixture of these and other features. Cambridge has eleven [conservation areas](#) at present each with its own area appraisal document containing guidance to protect the best features of the area, and to improve the less attractive parts.

1. Brooklands [Conservation Area](#)
2. Central [Conservation Area](#)
  - i. Castle and Victoria Road Area
  - ii. The Kite [Conservation Area](#)
  - iii. Mill Road [Conservation Area](#)
  - iv. New Town and Glisson Road [Conservation Area](#)
  - v. Riverside and Stourbridge Common [Conservation Area](#)
  - vi. Station Area
  - vii. Historic Core
3. Chesterton [Conservation area](#)
4. Conduit Head Road [Conservation Area](#)
5. De Freville [Conservation Area](#)
6. Ferry Lane [Conservation Area](#)
7. Newnham Croft [Conservation Area](#)
8. Southacre [Conservation Area](#)
9. Storey's Way [Conservation Area](#)
10. Trumpington [Conservation Area](#)
11. West Cambridge [Conservation Area](#)

 FOUR

## KEY CHALLENGES

### 6. What are the key challenges

#### 6.1 The key challenges are:

- The problems facing trees from a changing climate, pest and disease, an ageing tree stock, population increase and urban intensification;
- The problems caused by trees.

#### 6.2 [Climate change](#)

Research suggests that trees within cities can help the city to adapt to some of the adverse effects of [climate change](#). These adaptation benefits include direct and indirect cooling effects, reduction of the urban heat island effect; shelter from harmful radiation; improvement of urban air quality; reduction of energy consumption from urban buildings; increasing soil water storage, absorption of [atmospheric carbon](#), and [storm water](#) management for example.

The changing climate presents both benefits and risks to the trees themselves. Increases in carbon dioxide and warmer temperatures will lead to improved growth rates and longer growing seasons. Conversely, increased storm frequencies and summer drought will lead to tree losses.

Diversifying tree species and age structure will help to mitigate these adverse effects.

Cambridge's tree population consists of a mixture of deciduous and evergreen native and [exotic trees](#), which include many [cultivars](#). The Roseaceae family (cherry, apple, rowan) followed by Olaceae family (ash) of trees make up almost half the trees in Cambridge. The most common [genus](#) is Fraxinus (ash) (>20%) followed by Prunus (cherry) (>15%). The next most common trees are lime species, followed by apple/pear species and then Leyland cypress. 94% of trees are under 50 years old with only 1% over 100 years.

Achieving an appropriate diversity of tree species is one important factor in achieving a sustainable urban forest. Trees in Cambridge do not generally occur as a [monoculture](#) to the extent found in agricultural crops or forest plantations; nor would a [monoculture](#) be suitable over the range of conditions encountered.

There are guidelines that aim to set target levels for tree diversity within a street tree population. It has been suggested that there should be no more than 30% of any one family,



## FOUR | KEY CHALLENGES

20% of any one [genus](#), or 10% of one species in an urban tree population<sup>3</sup>. Whilst Cambridge does not reach these criteria, both the Olaceae (ash) and Roseaceae (cherry, apple, pear, rowan) families come close and the devastating effect on the character of Cambridge of serious pest and disease in these two taxa is clear.

Good structural diversity is essential for future population stability. Inadequate replacement of the large tree species is a threat to future stability of the urban forest.

It has been suggested that a good age distribution for population stability would be about 40% trees under 20cm diameter, 30% 20 to 40cm trees in the [early functional stage](#), 20% 40 to 60cm [functionally mature](#) trees, and 10% older trees with most of their functional life behind them<sup>4</sup>. The table below shows a comparison between this suggested distribution and that from a statistically valid sampling in Cambridge<sup>5</sup>, indicating that Cambridge is under-represented in the larger, older tree brackets.

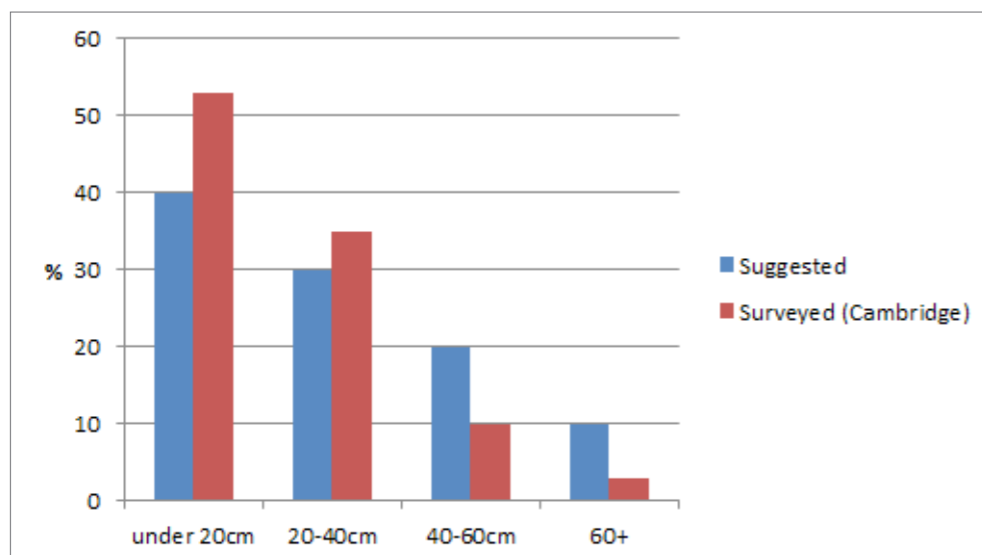


Figure 4. Suggested and surveyed age class comparisons

<sup>3</sup> Santamour, Jr. F. S. (1990). Trees for Urban Planting: Diversity, Uniformity, and Common Sense. Proceedings of the Seventh Conference of the Metropolitan Tree Improvement Alliance.

<sup>4</sup> Richards, N.A., (1983). Diversity and stability in a street tree population. Urban Ecology. 7: 159. 171.

<sup>5</sup> ADAS (2013) Analysis and Interpretation of Tree Audit Data For Cambridge City Council. Final Report.

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### 6.3 Pest and disease

It is likely that [climate change](#) will adversely affect the impact of existing pests and diseases on trees. Hotter, drier summers for example, may stress individual trees making them more susceptible to infection.

Some of the most damaging pests and diseases have come from abroad often causing little trouble in their native habitats. Some of these organisms can be virulent, fast-spreading and unstable when introduced to the UK, which has few of the environmental or biological controls that keep them in check in their native habitats.

Chalara dieback of ash for example was first found in the UK in 2012. Chalara has potential to cause significant damage to the UK's ash population. Since its initial identification in the UK it has been found widespread across the country. It has caused widespread damage to ash populations in continental Europe, where experience indicates that it can kill young ash trees quite quickly, while older trees can resist it for some time until prolonged exposure, or another pest or [pathogen](#) attacking them in their weakened state, eventually causes them to succumb. It has yet to be confirmed in Cambridge, however, but as a substantial proportion of Cambridge's trees are ash, should the impact of this disease be similar to continental Europe it will have a significant effect on the character of Cambridge, possibly similar to that of [Dutch Elm Disease](#) in the 1970's.

Government strategy to control exotic pests and diseases is founded on three basic principles:

1. To keep it out if we can;
2. if we can't, to eradicate it before it spreads and becomes [endemic](#);
3. if eradication is impossible, to control and manage it to keep it below epidemiologically significant levels.

The Council will follow Government advice about the control of current and future outbreaks. Past outbreaks suggest that control of a pest or disease is extremely difficult.

### 6.4 Population increase and urban intensification

In the short term, Cambridge is likely to experience significant population growth. The projections indicate that the population of ~132,000 in 2014 will carry on rising for at least the next decade, adding about another 20,000 people in that time to ~155,000 by 2036, with the projections suggesting that the City's population may start to fall slightly in about 12 years' time.

## ✓ FOUR | KEY CHALLENGES

Population analysis by [ward](#) indicates that the bulk of the population growth over the next few years is expected in Castle and Trumpington [wards](#), associated with major housing developments in these two areas<sup>6</sup>.

The number of dwellings was estimated at ~49,000 in 2013 with a forecast of ~63,000 by 2036. Dwelling analysis by [ward](#) show that the bulk of new housing will be in Trumpington and Castle, with significant numbers in Coleridge and Queen Edith's<sup>7</sup>.

In addition to the growth in Cambridge's population and associated dwelling houses, the numbers of jobs (and hence commuters visiting the city) is forecast to increase; as are business' and industries' requirements for new floor space; as well as tourism.

The increase in development densities often results in greater site coverage by buildings and pavements, resulting in a reduction in the extent of vegetation on private land, especially large [canopy](#) trees.

An increase in population, both permanent and non-permanent, will increase pressures on public spaces to accommodate more uses – whether for recreation in parks or for more parking in streets – which can result in direct competition with plantings for space as well as making growing conditions more demanding, due to more extensive hard or compacted surfaces.

### 6.5 Ageing tree stock

Larger, older trees are underrepresented in Cambridge (ref. paragraph 6.2) with fewer than 2% of trees being in the over 20m height or [canopy](#) spread or 60cm+ diameter classes. These are Cambridge's largest trees, and many will be over 100 years old and approaching the end of their useful life. They add disproportionately to the character of Cambridge and have performed remarkably well in faring against droughts, storms, urbanisation and changing cultural trends. However, the older a tree becomes, the less tolerant it is to change.

The distribution of the larger, older trees is found disproportionately to the west side of Cambridge, where it significantly contributes to the character of those areas (see Figure 5). Both large deciduous and coniferous species are represented including beech, oak, ash, lime, horse chestnut, plane, pine and redwood.

<sup>6</sup> <http://www.cambridgeshireinsight.org.uk/population-and-demographics/population-forecasts>

<sup>7</sup> <http://www.cambridgeshireinsight.org.uk/population-and-demographics/dwelling-forecasts> (last accessed 18/9/2015).

## ✓ FOUR | KEY CHALLENGES

The Council manages its own population of ageing trees through regular assessments to determine which trees need to be treated or removed, and by planning when, how and with what trees they will be replaced. Managing ageing trees requires careful consideration. Urban tree renewal is not simply a question of replacing dying trees like-for-like, but is also one of identifying the most resilient and appropriate replacement plan and engaging in a meaningful dialogue with a broad range of stakeholders and community members.

Cambridge's key challenges in terms of ageing trees are:

- An ageing tree population requires increasing resources to manage and sustain. Over time, the environmental value of urban trees diminishes and they become hazardous to people using the City's public spaces. A proportion of over-mature trees carry an element of public risk and cost and must be managed accordingly.
- Uniform, symmetrical avenues and rows of trees create wonderful vistas in our parks and main streets. In Cambridge these are largely synonymous with the deciduous tree species of limes, horse chestnuts and planes. This raises an issue that needs to be carefully managed in consultation with the community. To achieve these aesthetics, it is desirable to plant identically aged trees that will maintain visual consistency. However, this can pose challenges for the community when confronted with large numbers of trees that require replacement at the same time. Community and stakeholder cooperation will be crucial in determining how we manage the loss of these trees and plan for their replacement.

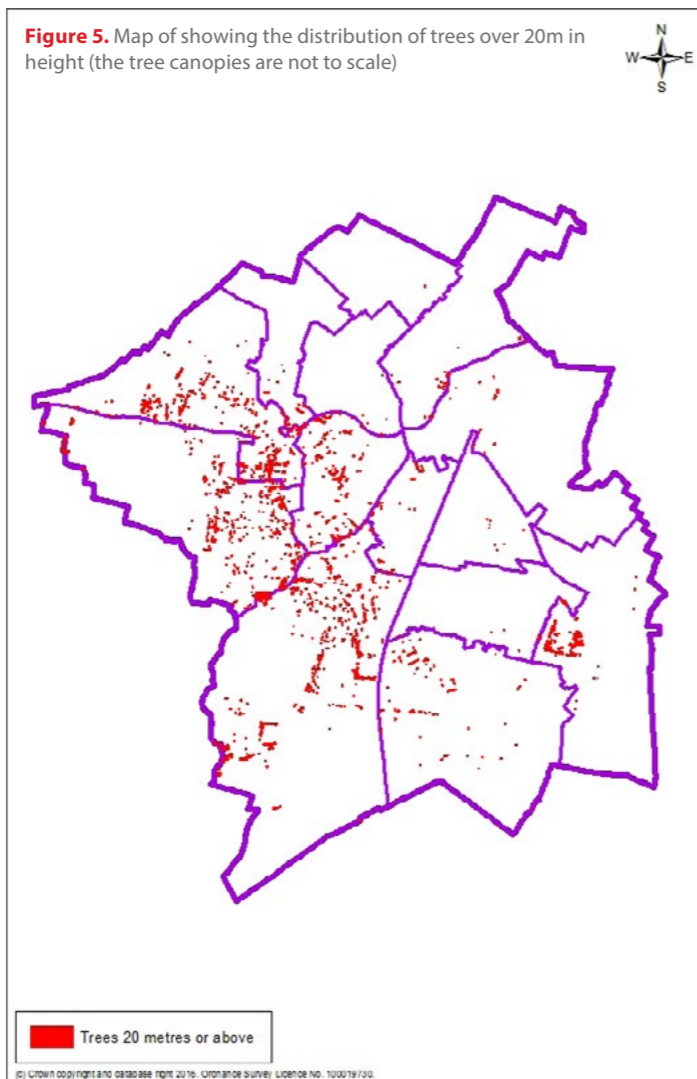
### 6.6 Problems caused by trees

From [semi-maturity](#) onwards, trees may present a number of problems, varying in severity from nuisance (such as unwanted shading and blocking views) to danger to life, limb and property due to defective limbs, roots, the effects of disease, or extreme weather. In most cases these issues can be effectively managed. There are variations between species and varieties in the probability and severity of problems occurring, and it is of key importance to select the right tree for the right place.

One of the key problems from urban trees in the coming decades is likely to come in the form of building [subsidence](#) as a result of water abstraction by tree roots. Trees are heavy water users and soil moisture content is reduced as tree roots take up water, which can result in destabilization and ground movement in certain circumstances. Cambridge lies upon predominantly shrinkable, clay soils which are more likely to be prone to [subsidence](#), especially as rising summer and autumn temperatures are likely to contribute to a deficit in soil moisture content in the coming years under future climate scenarios. While modern buildings with sound foundations are expected to be less vulnerable to [subsidence](#), structures constructed

## FOUR | KEY CHALLENGES

prior to 1970 are likely to be increasingly at risk, particularly where soils are prone to frequent occurrences of shrinking and swelling. As a result, consideration should be given to the location and species of trees prior to planting, with the aim of minimising future damage. Aesthetically suitable species can still be identified for planting prior to considering their potential for future damage, since the benefits of planting urban trees greatly outweigh the potential negative consequences. A tree's suitability in the urban landscape can be reviewed on an ongoing basis with trees not necessarily being grown to maturity in order for communities to reap their benefits.



## FIVE

# AIMS & OBJECTIVES

### 7. How are we going to achieve our vision?

- 7.1 Government policy acknowledges – and research supports – the vital role that trees can play in the health, liveability and well-being of the urban environment and its inhabitants. The Council can only directly manage those trees growing in the public realm, a small but significant part of the Cambridge's tree stock. To maximise the benefits trees can bring to a city, Government advocates an integrated or [urban forestry](#) approach be taken to their management and declares this to be essentially a local authority function.
- 7.2 Cambridge City Council's long term vision recognises the value of the City's trees as a vital community asset. It also recognises that the benefits they bring support – and are supported by – a number of its other key plans, strategies and policies.
- 7.3 This strategy sets out four aims that are the broad, long-term goals that define the accomplishment of the vision. These aims address the key challenges and day-to-day management issues facing the Council. The tables 3a and 3b below set out the Council's objectives or targets in relation to these issues and challenges. Specific policies as to how the Council intends to meet these objectives are set out in Part 1 and 2 of the strategy. Part 3 will set out actions, timescales and responsibilities with regard to implementing the Council's tree policies.
- 7.4 The strategy's policies come in two categories that can be broadly described as:
  - Operational – those activities that the Council will or won't do.
  - Aspirational – those activities the Council will seek or endeavour should its resources allow.

	Aims	Issues and Challenges	Objectives	Part 1/2
Protection	To make efficient and strategic use of the Council's regulatory powers for the protection of trees of current and future value.	Tree Preservation Orders	To review old tree preservation orders	Part 1
			To review TPO serving procedures	
			To use TPOs strategically	
		Conservation areas	To clarify the procedures for assessing amenity	
		Development control	To reduce the numbers of unsolicited consultations	
			To Review the scrutiny procedures for notifications	
			To produce supplementary planning documentation with regard to trees and development	

Table 3a. Objectives – Protection



▼ FIVE | AIMS & OBJECTIVES

	Aims	Issues and Challenges	Objectives	Part 1/2
Management	To sustainably manage the Council's own trees and those it manages by agreement.	Safety	To achieve the right balance between safety and amenity	Part 2
		Tree related problem vs tree benefits	To achieve an appropriate balance between the interests of the individual(s) affected the interests of the community and the legal obligations of the Council.	
		<a href="#">Biodiversity</a>	To maintain and enhance <a href="#">biodiversity</a>	
		Replacement planting	To replace trees where appropriate.	
		New planting	To find and plant up all appropriate new tree planting locations	
		Plant health care	To apply current good practice in all tree related issues	
		Asset management	To systematise the management of the Council's tree stock and those it manages by agreement.	
Enhancement	To foster a resilient tree population that responds to the impacts of <a href="#">climate change</a> and urban expansion.	Species/age diversity	To enhance species and age diversity	Part 1
		Large trees	To prioritise large <a href="#">canopy</a> species for planting in appropriate locations	
		<a href="#">Climate change</a>	To increase <a href="#">canopy cover</a> across the City by 2% to 19% by 2050.	
	To raise awareness of trees being a vital community asset, through promoting continued research, through education via the provision of advice and through partnership working.	Valuation project	Valuation provides an ideal opportunity for training and motivation of volunteers from the community and for generating a real understanding of the importance of the urban forest.	Part 1
		Education	Education to raise awareness of trees as being a vital to the community's social, environmental and economic well-being.	
	Partnership	Effective engagement with private land owners on whose land the majority of City's trees grow and where the greatest opportunities for new planting exist.		

Table 3b. Objectives – Management and Enhancement

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In 2015 the Council sought the views of residents to help shape this strategy<sup>8</sup>. It found that there was support for enforcement, promoting tree coverage and community engagement and involvement through creating partnerships, voluntary tree schemes and information and guidance for homeowners.

8. Protection

The Council's statutory responsibilities regarding the protection of trees fall into the following broad categories:

- Dealing with applications to carry out works to trees protected by Tree Preservation Orders (TPOs);
- Dealing with notifications to carry out works to trees in [Conservation Areas](#);
- Serving TPOs;
- Providing advice to Development Control on the implications of development on trees and opportunities for new planting; and
- Monitoring and taking action against unauthorised works to trees.

The City currently has 11 [Conservation Areas](#) and over 600 active TPOs.

There are a number of key issues facing this statutory service:

- The consultation process associated with tree work application/notification;
- Maintaining the accuracy of TPOs; and
- Delegated powers

8.1 Serving TPOs

The Town and Country Planning Act 1991 and associated regulations give Councils powers to make TPOs where it appears to be expedient in the interests of amenity. The Act does not define amenity or prescribe when it may be in the interests of amenity to make a TPO. Government guidance emphasises visual benefits (present or future), suitability to site and landscape and cultural, historic or species value but suggests that other factors, such as 'response to [climate change](#)' may be taken into account without necessarily being the sole reason for serving a TPO.

<sup>8</sup> Trees in Cambridge – Issues and Options, July 2015 by Phil Back Associates.

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The 2013 audit of Cambridge City’s trees found that the percentage of protected [canopy](#) is at disproportionately lower levels in the north and east of the City – those areas of the City which have low levels of [canopy cover](#).

Ward	% of <a href="#">Canopy cover</a> that is associated with individual TPOs	% of <a href="#">Canopy cover</a> that is associated with individual TPO group or area designations	Proportion of <a href="#">Canopy cover</a> by Ward (%)
Abbey	5.4	0.3	7.3
Arbury	3.6	2.1	3.7
Castle	10.4	3.2	10.1
Cherry Hinton	3.1	1.9	6.8
Coleridge	2.1	0.9	4
East Chesterton	5.7	3.8	6.3
King's Hedges	2.4	1.8	3.8
Market	7	0.2	3.6
Newnham	11.4	3.1	14.4
Petersfield	30.4	4.6	2.5
Queen Edith's	21.2	9.8	11.6
Romsey	11.1	0.5	3.2
Trumpington	6.7	9.6	18.8
West Chesterton	6.2	0.3	3.9
<b>Total Area</b>	<b>9.3</b>	<b>4.4</b>	<b>17.2</b>

**Table 4.** Percentage of tree [canopy](#) protected by TPO by [ward](#)

As part of a response to [climate change](#) the Council will look to proactively target these areas to protect, where appropriate, those trees that will develop into or have developed into, the larger [canopy](#) categories (i.e. circa 15m or more).

**POLICY P1:** The Council will consider a response to [climate change](#) as a contributing factor in serving TPOs and will seek, where appropriate, to increase statutory protection in areas of low [canopy cover](#).

**8.2 Amenity assessment**

When considering whether trees should be protected by an Order, the Government advises that authorities develop ways of assessing the amenity value of trees in a structured and consistent way, taking into account the following criteria:

- Visibility

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- Individual, collective and wider impact

Where a tree is being considered for protection, the criteria of the tree being visible from a place accessible to the public should normally be met but alone is insufficient reason for serving a TPO or refusing an application.

In addition to being seen from a publically accessible place, authorities are advised to consider trees and/or groups of trees for their suitability to site, their contribution to and relationship with the landscape and/or character and appearance of a [Conservation Area](#) and any rarity, cultural or historic value.

Where relevant to an assessment of the amenity value of trees or woodlands, the Government advises that authorities may consider taking into account other factors, such as such as importance to nature conservation or response to [climate change](#). These factors alone would not warrant making an Order.

**POLICY P2:** Where a TPO is challenged its provision will be considered against the following "[amenity criteria](#):"

1. Visual
  - Trees visible from a public place.
  - Trees which provide significant screening between land uses.
  - Trees on private land which may not be visible to the general public but significantly enhance the appearance and character internal to a site.
  - Trees which are significant to the defined landscape character of an area or are of defined value to the community.
2. Individual, collective and wider impact
  - The trees size and form and suitability to its immediate location.
  - The trees future potential as an amenity.
  - The trees contribution to, and relationship with, the landscape.
3. Atmospheric
  - Trees which are in the immediate vicinity of congested roads, abutting railways or industrial premises with gaseous emissions.
  - Trees in high density residential areas where opportunities to grow trees are very limited.

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- 4. Climate change
  - Large trees or those with the potential to grow into large trees which have the greater impact with regard to climate change adaptation.
  - Trees which cast a level of shade that can be reasonably managed in relation to the use of the site.
- 5. Biodiversity
  - Trees which are a known habitat of a protected species.
  - Trees which could be managed as veterans.
  - Trees which extend or are an integral part of a city or county wildlife site.
  - Trees or areas of trees which it would be appropriate to manage specifically to encourage colonisation by wildlife.
- 6. Historic or cultural
  - Trees which commemorate and event or notable person.
  - Trees which are historically part of the setting of a listed building.
- 7. Botanical
  - Trees which are in themselves botanically rare or part of a locally significant botanical collection.

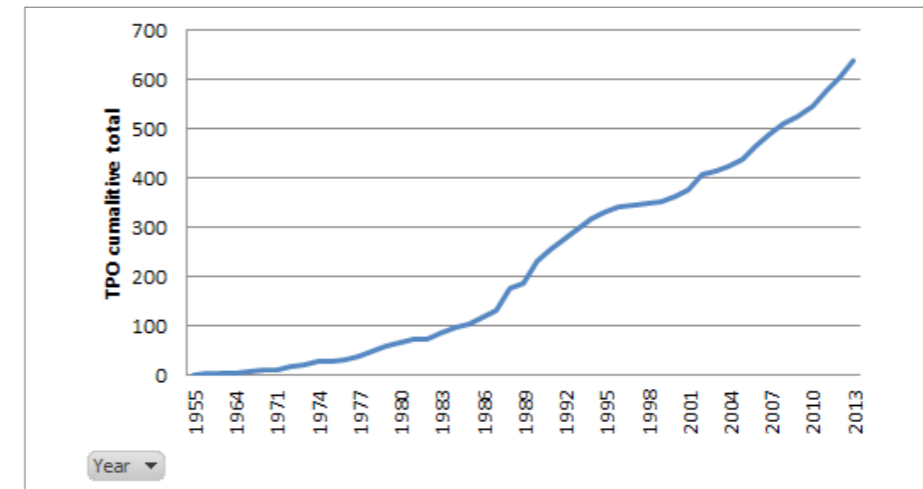
**8.3 TPO review**

TPOs are only useful if they are accurate and reflect the current situation with the trees involved. For these reasons the management of TPOs and their files should be from an active rather than an archival approach.

A very brief look at some TPOs showed that resurveying subsequent to development has mostly not been achieved and the updating of orders as trees have been lost is limited. The need to actively manage TPOs must now be given some priority, especially since they relate to what could be considered to be the best trees within the City.

The graph below shows the cumulative total of TPOs served by year. The oldest was served in 1955 and is still extant. Circa 230 TPOs are 25 years old or older. These should be given priority.

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**Figure 6.** Cumulative number of TPO 1955 - 2013

The Government has discouraged the use of the 'area' designations within the TPO schedule for long term protection as they have proved unenforceable. Many of the Council's larger and older TPOs still contain area designations. TPOs containing these types of designation should also be reviewed.

Reviewing TPOs is extremely resource hungry. Whilst some of the smaller orders could be reviewed in-house without a significant drain on resources, some of the larger more complex orders should be out-sourced.

**POLICY P3:** The Council will seek to review its TPOs using the following priorities:

1. By age, over 25 years.
2. Where the order no longer accurately reflects what is on the ground
3. Containing area designations.
4. By age over 10 years old.

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8.4 Consultation

The current procedure for consulting the general public and [ward](#) Councillors is comprehensive and requires substantial officer time, consumes significant amounts of paper and incurs postage costs.

In 2014 the Council processed 613 Tree Works Applications (TWAs), sending out 8,193 consultation packs to the public. It received 105 responses.

Of these TWAs, 461 (75%) were [Conservation Area](#) notifications (a.k.a Section 211 notices). The number of consultations sent out were 6,224 (76%). The number of responses received was 74; or 1 response for every 84 consultations, a ~1% response rate. The remainder relate to works to TPO'd trees.

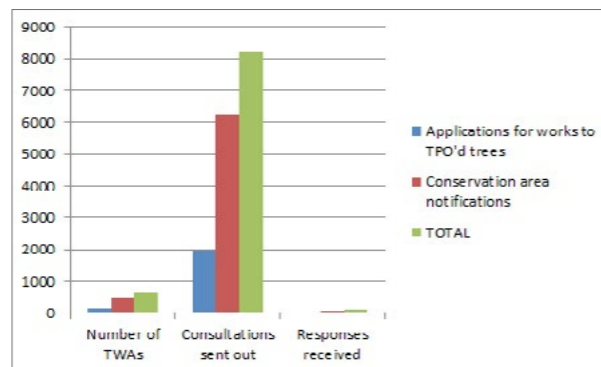


Figure 7. Number of TWAs, consultations sent out and responses received for 2014

The Council maintains a public register of TWAs and asks applicants to display a site notice viewable from a position of public access. The site notice is erected by the applicant, and there is no statutory enforcement, so to this extent the system is voluntary but appears to work. One hidden benefit which might be occurring with the current level of public consultation is that the public in the close vicinity are informed and therefore forewarned of the proposed works.

The Council does not propose to change its consultation procedures for applications to works to trees protected by TPO.

The Council does propose to streamline the consultative process for [Conservation Area](#) notifications, particularly as the Council has no statutory duty in this respect. Government advice on this matter is as follows:

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'A section 211 notice does not need to be publicised. However the authority can consider publicising a section 211 notice in order to seek the views of local residents, groups or authorities, particularly where there is likely to be public interest.'<sup>9</sup>

Consideration has been given to reducing the extent and incidence of unsolicited written consultations with the public and planning it on a more selective level seems to be warranted. The guidance from the Government suggests that the need to publicise applications beyond an entry in the public register and displaying of a site notice should be selective to accord with the impact of the proposal.

Councillors will still be notified of any proposed activity in their [ward](#). The public will still be able to solicit information about tree works in their area by registering with the Council's on-line planning application system. Where it is considered that a notification of tree works may be of significant public interest or they are works to a neighbouring tree, the Council will still consult.

**POLICY P4:** The Council will no longer send out unsolicited consultation letters for notifications of tree works in [conservation areas](#) except in the following circumstances:

- The owner of a tree will be informed where works are proposed by a neighbour.
- Where the works proposed are likely to generate significant public interest.

8.5 Review statutory processes

To broaden the level of protection for the City's trees, the Council will undertake a further review of its statutory processes. It will:

- Review delegated powers relating to the serving of TPOs
- Review delegated powers relating to the determination of Tree Works Applications.
- Review consultation processes relating to TWAs for tree works to protected trees.
- Draft enforcement protocols relating to protected trees.
- Draft a Supplementary Planning Document relating to tree and development sites.

<sup>9</sup> <http://planningguidance.planningportal.gov.uk/blog/guidance/tree-preservation-orders/protecting-trees-in-conservation-areas/section-211-notices/> (last accessed 22/9/2015).

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### 9. Enhancement

The urban forest would be very sparse indeed if Council-managed streets and parks were the only places where trees grew. The Council's regulatory responsibilities affecting private property cannot cover the gap because they deal largely with preservation and planting and not long term maintenance. Ultimately an urban forest approach relies on the support of homeowners, business, volunteers and large land owners.

#### 9.1 Enhancement – resilience

##### 9.1.1 Large trees

Research<sup>10</sup> has shown that the greatest benefits are provided by large trees. Large trees can be defined as those that grow to over 15m. They typically:

- Create more shade per tree due to a larger and wider [canopy](#) spread.
- Create better shade to buildings as they are taller and can cast shadow over roofs and walls of buildings.
- Intercept larger amounts of [particulate pollutants](#) and rainfall due to significantly larger leaf areas.
- Absorb more [gaseous pollutants](#).
- Can provide larger [canopy cover](#) with potentially less intrusion at the ground from stems, trunks and lower branches.
- Are less susceptible to careless or malicious vandalism by passers-by once established.
- Can be pruned to provide higher [canopy](#) clearance over roadways, parking bays and pedestrian footpaths.
- Contribute more to calming and slowing traffic on local streets than small trees.

Large trees can cost more to maintain and remove towards the end of their life. However, when one considers the cost to establishment, to install a tree and look after it in the first few years, the associated costs are essentially the same regardless of whether the tree is a large or small growing tree. Though large trees require larger soil volumes and more physical space above and below ground than small trees, the ultimate benefits to the community are exponentially increased over their lifetime.

<sup>10</sup> Armour, T., Job, M. and Canavan, R. (2012) The benefits of large species trees in the urban landscape: a costing, design and management guide. London: CIRIA.

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The Council will seek to protect and encourage the planting of large species trees on both its own lands and private property.

**POLICY E1:** The Council will encourage and continue to seek new opportunities for the planting of large [canopy](#) trees in appropriate locations.

##### 9.1.2 Species & age diversity

The Council recognises that all trees regardless of their place of origin, contribute to the environment. Whilst native species may be well suited to local environmental conditions, the growing conditions in an urban setting, particularly a street situation, are very different from natural conditions (e.g. soil compaction, altered drainage patterns, etc) and often native species cannot cope with these limitations. Many exotic species have been in cultivation for hundreds of years and over that time they have been carefully bred for superior performance. They have been selected for their vigour in difficult urban growing conditions and many of them are propagated from cutting or grafting, ensuring uniformity of size, shape and growing habit.

A certain level of species diversity will also evolve as a matter of course, as a result of the continuing removal and replacement of trees based on natural attrition, as well as changing social, aesthetic, design, environmental and economic factors.

Good age diversity is essential to maximise the benefits of urban trees. Inadequate replacement of the large dominant tree species that are proven adept in the older age classes is a more certain threat to maintaining the future landscape character of Cambridge than is species diversity. Diversity of age also provides a greater ability to normalise budgetary requirements. By maintaining a mixture of age classes, tree removal and replacement programmes become a more evenly paced process. Extremes, such as those associated with the loss of large number of even aged trees over a short period, are minimised, allowing for budgets to be more easily managed and regulated.

A healthy mixture of young, medium, and old trees provides a near-constant turnover of generations over time, as new trees replace the old. In addition, trees of different sizes provide a more complex habitat for wildlife and can support a greater number of species.

**POLICY E2:** The Council will continue to ensure and encourage a diversity of tree species and ages.

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### 9.1.3 [Canopy cover](#)

A recent independent study<sup>11</sup> of trees in Cambridge was completed in 2013. The aim of the project was to provide an evidence base that can be used to enhance the benefits that urban trees in Cambridge can bring in helping the City and its residents adapt to the worst effects of [climate change](#).

It found that that the level of [canopy cover](#) in Cambridge was ~17% and concluded that ‘research by Gill et al. (2007) identified that increasing [canopy cover](#) by 10% in locations with limited vegetation could decrease [urban temperatures](#) by up to 2.5 degrees based on [urban temperature](#) predictions up to 2080. This research relates specifically to urban areas with limited [canopy cover](#), yet as the study area (Cambridge City) comprises numerous non-urban land use classes, targets should be set accordingly to take this factor into account. A percentage increase of 2% could be achieved by increasing [canopy cover](#) within [wards](#) to the City average.’

Cambridge City has a significant amount of land owned privately (~77%); land owners within this audience will be encouraged to plant trees if targets are to be met. (See Appendix 3 – Case Study)

**POLICY E3:** The City of Cambridge’s [canopy cover](#) target will be to achieve 19% coverage by 2050

## 9.2 Enhancement – awareness

### 9.2.1 Valuation project

Quantifying the benefits the urban forest delivers and estimating the value of those benefits to urban communities is a critical element of urban forest management and promotion. Valuation provides an ideal opportunity for the training and motivation of volunteers from the community and for generating a real understanding of the importance of the urban forest. Tools such as i-Tree Eco<sup>12</sup>, exist for this purpose.

Results from valuation could be used to support a wide range of activities, including:

- Strategic planning – to clarify the key services delivered by the trees and see how these compare to local priorities and expectations.
- Financial planning – asset management best practices recommend that the amount spent

<sup>11</sup> ADAS (2013) Analysis and Interpretation of Tree Audit Data For Cambridge City Council. Final Report.

<sup>12</sup> <https://www.itreetools.org/> (last accessed 22/9/2015)

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in management and maintenance is commensurate to the asset value.

- Risk management – to balance risks and benefits.
- Compensation issues for damage to public trees – for example when NJUG guidelines<sup>13</sup> haven’t been followed.
- [Subsidence](#) cases – to contribute to evidence levels as recommended by the Joint Mitigation Protocol<sup>14</sup>

**POLICY E4:** The Council will seek to quantify the benefits of Cambridge’s urban forest, whilst creating real opportunities for community participation in the process of valuation.

The ultimate aim of any valuation project would be to raise awareness that trees are not merely amenities but assets that pay dividends in terms of their social, environmental and economic benefits when well managed.

### 9.2.2 Education

Educating the wider community involves not only informing them about the importance and benefits of trees but also how and where they can make their own contribution by planting trees on their own land. As such, the Council is committed to broadening the range of information and advice it gives via its web site.

The Council will also continue to fund its ‘free tree scheme’ for babies. It will explore extending the principle of a ‘free tree scheme’ into areas of low [canopy cover](#) and schools and use these schemes to raise awareness of the value of planting trees for the benefit of future generations.

Active participation is an important element of education therefore the Council will explore setting up a Tree Warden Scheme.

**POLICY E5:** The Council will educate and encourage the community to participate in promoting and maintaining Cambridge’s urban forest.

### 9.2.3 Partnership working

The vast majority of land in Cambridge is privately owned, which has implications for

<sup>13</sup> National Joint Utilities Group’s Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees.

<sup>14</sup> The Joint Mitigation Protocol is an agreed method of subsidence claims management where trees are implicated as being the cause of building movement.

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enhancing tree cover in Cambridge. Creating partnerships with institutions such as the University and other large land owners would be one way of effectively achieving [canopy cover](#) targets; another would be with local business to sponsor and support tree planting and raising awareness of the benefits of tree cover at a private residential level.

Business partners can be a very useful contributor to the enhancement of the urban forest through financial support, for planting and maintaining trees on commercial property. Some businesses, such as nurseries, garden centres and tree surgery companies, have a direct stake in the urban forest, whilst others may be interested in offsetting their environmental impacts.

**POLICY E6:** The Council will seek to encourage joined up approaches to tree management through partnerships with managers of private trees and by working with local communities and businesses to provide opportunities for donations and sponsorship.



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Trees in Cambridge – Issues and Options, July 2015 by Phil Back Associates



 EIGHT

# GLOSSARY

**Amenity criteria:** When considering whether trees should be protected by an Tree Preservation Order, the Government advises that authorities develop ways of assessing the amenity value of trees in a structured and consistent way, taking into account the following criteria: Visibility; individual, collective and wider impact including, size and form; future potential as an amenity; rarity; cultural or historic value; contribution to, and relationship with, the landscape; and contribution to the character or appearance of a conservation area; other factors such as importance to nature conservation or response to climate change.

**Arboriculture:** The culture of trees singly or in small groups (cf. [urban forestry](#)), sometimes called amenity arboriculture to distinguish the main part of the discipline from the specialist area of utility arboriculture.

**Atmospheric carbon:** Refers to carbon monoxide and carbon dioxide. Trees absorb carbon dioxide and carbon monoxide from the air and release oxygen.

**Biodiversity:** Refers to the wide variety of ecosystems and living organisms from all sources including terrestrial, marine and other aquatic ecosystems, their habitats and their genes, and the ecological complexes of which they are part. Biodiversity also refers to the degree of variation of life forms within a given species or ecosystem, and is a measure of the health of ecosystems.

**Botanical:** Of or relating to plants.

**Canopy:** Of a single tree, its crown, emphasizing its spreading and enclosing character. Of the urban forest, the crowns of all the trees considered collectively.

**Canopy cover:** In an area, the area of the canopy (in plan view) as a proportion of total area.

**Chalara:** A fungal disease of ashes (*Fraxinus* spp.) discovered in Britain in June 2012. In Europe the disease was first noted in Poland in 1992 and has since caused serious losses, for instance killing up to 90% of Denmark's ash trees. Chalara fraxinea is the asexual stage of the Ascomycete fungus *Hymenoscyphus pseudoalbidus*, which inhabits ash leaf litter. North American species are more or less susceptible while Asian *Fraxinus* spp. have high resistance, suggesting that the disease originated from Asia. Die-back in ash has several causes.

**City Council:** Refers to Cambridge City Council.

**Climate change:** A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.



New Hall, Huntingdon Road - Indian Horse Chestnut

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**Conservation area:** An area recognized in the Town and Country Planning Act 1990 as being 'of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance'. Trees may make a significant contribution to the character of a conservation area. Six weeks' prior notice (Section 211 notice) has to be given to the local authority for any works proposed to trees in a conservation area.

**County Highway:** Refers to Cambridgeshire County Council's Highway Department and the land and trees owned by them.

**Cultivar:** A plant selected for specific characteristics (whether useful or ornamental) that are distinct, uniform and stable, and are retained when the plant is propagated by appropriate means.

**Dutch Elm Disease:** (*Ophiostoma* spp.) A fungal wilt disease imported in elm timber from Canada that is fatal to European elms (not just Dutch elm), and largely wiped them out in the 1970s.

**Early functional stage:** The stage in the life cycle of a tree between youth and maturity when its desired benefits are approaching their maximum value.

**Endemic:** Native exclusively to a defined area.

**Epidemiology:** The study of the patterns, causes, and effects of health and disease conditions in defined populations.

**Evergreen species:** Species that are foliated throughout the year, although there is a gradual turnover of leaves (often with a peak in leaf fall at the onset of growth in spring). cf. deciduous (a plant that sheds its leaves annually)

**Exotic trees:** A species that is not native, more commonly applied to plants than to animals. Most exotic plants in Britain were introduced in the first instance for cultivation in gardens including botanic gardens.

**Functionally mature:** The stage in the life cycle of a tree when its desired benefits (social, environmental or financial) are at their maximum value.

**Gaseous pollutant:** Gases such as carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>) that are known to cause social, environmental or financial problems. Trees absorb these gases through their leaves.

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**Genus:** A taxonomic group consisting of related species that resemble each other more closely than they resemble other groups. Genus is subordinate to family and ranked above species. The genus name forms the first part of a scientific name (e.g., *Prunus avium*) and is written in Latin with the first letter capitalized. Collections of similar genera are grouped into families.

**Green Belt:** A land-use designation around towns and cities to check urban sprawl, to stop nearby towns from merging, to preserve the character of historic towns and to assist in urban regeneration.

**Green corridors:** A green corridor is an area of habitat connecting wildlife populations separated by human activities or structures (such as roads or development)

**Green infrastructure:** The network of natural landscape assets which underpin the economic, socio-cultural and environmental functionality of our cities and towns; i.e. the green spaces, water systems and built environment landscapes which intersperse and increase connectivity, multi-functionality and landscape performance in urban environments. Individual components of this network can be referred to as 'green infrastructure assets', and these occur across a range of landscape scales from residential gardens to local parks and housing estates, streetscapes and highway verges, services and communications corridors, waterways and regional recreation areas. Green infrastructure comprises an important innovation in the integrative planning of forests and other green space, and has become frequently used in reference to urban renaissance and green space regeneration. It can be defined as creating networks of multifunctional green spaces that are carefully planned to meet the environmental, social and economic needs of a community.

**Hedgerow:** The line of a hedge, often with trees, commonly seen separating properties. The hedgerow still marks a boundary but does not necessarily fulfil any of the other purposes of a hedge.

**Monoculture:** The cultivation of a single crop in a given area.

**Native tree:** One which has been present in a defined region for a certain amount of time without having been brought in by humans (cf. exotic), for instance in Britain since the English Channel was flooded in the early part of the present interglacial about 6,000 years ago.

**Native woodland:** Native woodland consists mainly of native trees, that is those that have grown here naturally since the last Ice Age and have not been introduced by humans

**Non-native tree:** A species that is not native, more commonly applied to plants than to animals. Most exotic plants in Britain were introduced in the first instance for cultivation in gardens, including botanic gardens.

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**Particulate pollutant:** Small pieces of solid material such as smoke particles in diesel exhaust gases, smoke particles from fires or ash from industrial plants dispersed into the atmosphere.

**Pathogen:** A kind of parasite that causes disease.

**Public open space:** Open green space which is accessible to the general public.

**Scrub:** A vegetation type dominated by shrubs and saplings, whose abundance varies from scattered to closed-canopy, usually less than 5m tall but sometimes with scattered trees. The definition excludes heathland with dwarf shrubs, planted stands of young trees and coppice regrowth. The National vegetation classification recognizes six kinds of scrub, two of which are underscrub. The nature conservation value of scrub is poorly recognized. It forms a significant component of 11 priority habitats.

**Semi-maturity:** Depending on species, trees would be classed as semi-mature if assessed to be between 20 and 60 years old.

**Spatial planning:** An approach that outlines the vision for an area, what type of development is needed and where that development should best be located.

**Storm water:** Surface water in abnormal quantity resulting from heavy falls of rain or snow.

**Subsidence:** Broadly, the downward movement of ground and an affected foundation influenced by soil properties, weather, foundation depth and nearby vegetation.

**Sustainable urban drainage system (SUDS):** SUDS are designed to manage storm water using 'soft' infrastructure including trees, swales (shallow ditches or depressions in the ground), permeable surfaces such as permeable paving etc. to increase interception, infiltration and storage of storm water, and reduce peak flows.

**Tree family:** A taxonomic group composed of one or more genera. The names of most botanical families end in '-aceae' (e.g. Olaceae, Ulmaceae, Plantanaceae etc.), although there are some exceptions. Groups of similar families are placed in orders.

**Tree pit:** The hole in the ground in which a tree is planted. In an urban context, the pit may represent the whole of the root volume available to the tree when mature.

**Tree Preservation Order (TPO):** An order made by a local authority or other planning authority to protect a tree, group of trees, area of (scattered) trees or woodland under Part VIII of the Town and Country Planning Act 1990. There have been several amendments, the latest being the Town and

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Country Planning (Tree Preservation) (England) Regulations 2012. An order is generally made on the grounds of amenity and expediency. Anyone proposing works to a TPO tree must seek prior consent from the authority using the form 1APP. With the advent of the 2012 regulations, some of the detail in existing TPOs in England has been revoked.

**Urban forestry:** A planned and programmatic approach to the development and maintenance of an urban forest, including all elements of green infrastructure within the community. In its broadest sense, this is a multidisciplinary process that takes account of wildlife habitats, outdoor recreation opportunities, design, and care of trees and cultivated landscapes.

**Urban heat islands:** The urban heat island is common worldwide, as cities become warmer than nearby suburban and regional areas, particularly at night. After a hot day parts of the city can be four to seven degrees hotter than surrounding rural areas. This phenomenon occurs all year round, but it becomes a problem during hot weather.

**Urban temperature:** The temperature in man-made urban areas as opposed to rural areas. Urban areas are usually significantly warmer due to human activities.

**Ward:** An administrative division of the city that elects and is represented by councillors. There are 14 wards in Cambridge City.

✓ APPENDIX A

# APPENDIX A

## Benefits of Urban Trees

Why urban trees are so important (Source: Trees and Design Action Group (2010) No Trees No Future)

There is a growing body of evidence that trees in urban areas bring a wide range of benefits.

Economic benefits of urban trees:

- Trees can increase property values by 7-15 per cent <sup>1 2 3</sup>.
- As trees grow larger, the lift they give to property values grows proportionately <sup>4</sup>.
- They can improve the environmental performance of buildings by reducing heating and cooling costs, thereby cutting bills <sup>5</sup>.
- Mature landscapes with trees can be worth more as development sites <sup>3</sup>.
- Trees create a positive perception of a place for potential property buyers.
- Urban trees improve the health of local populations, reducing healthcare costs <sup>6</sup>.
- Trees can enhance the prospect of securing planning permission.
- They can provide a potential long-term renewable energy resource <sup>7</sup>.

Social benefits of urban trees:

- Trees help create a sense of place and local identity.
- They benefit communities by increasing pride in the local area <sup>8 9 10</sup>.
- They create focal points and landmarks.
- They have a positive impact on people's physical and mental health <sup>8 9 10</sup>.
- They have a positive impact on crime reduction <sup>11 12</sup>.

Environmental benefits of urban trees:

- Urban trees reduce the 'urban heat island effect' of localised temperature extremes <sup>13</sup>.
- They provide shade, making streets and buildings cooler in summer <sup>3 5</sup>.
- They help remove dust and particulates from the air <sup>14 15 16</sup>.
- They help to reduce traffic noise by absorbing and deflecting sound.
- They help to reduce wind speeds.



## APPENDIX A

- By providing food and shelter for wildlife they help increase biodiversity <sup>17 18 19 20 21 22 23 24</sup>.
- They reduce the effects of flash flooding by slowing the rate at which rainfall reaches the ground <sup>25</sup>.
- When planted on polluted ground they help improve its quality.

### Trees and climate change

As the effects of climate change become better understood, it is becoming increasingly clear that one of the best ways in which we can make our towns and cities more hospitable over the next few decades is to increase the number, and size, of trees in urban areas. Trees have been identified as being a key element of any urban climate change adaptation strategy <sup>4 26</sup>.

In England, climate change is likely to bring higher average temperatures and increasing incidents of sudden, heavy rain. Already, our cities have higher temperatures than the rest of the country due to the urban heat island effect. As the effects of climate change increase, the temperatures in our cities are likely to become more difficult to live with. In addition, sudden heavy rainfall on built-up areas will be increasingly likely to overwhelm drainage systems resulting in flooding.

Trees, however, can help with both problems. By providing shade for buildings and streets, and allowing water to evaporate through their leaves, they reduce the local environmental temperature. When it rains, tree canopies slow the rate at which water reaches the ground.

This slows the rate at which the water enters the drains, giving them more time to carry away the water and so reducing the likelihood of flooding. This can be particularly effective as part of a sustainable urban drainage system (SUDS).

Consequently, it is becoming increasingly understood that trees are an important ingredient in the creation of successful towns and cities of the future. This is now starting to influence urban development policy at both national and local levels.

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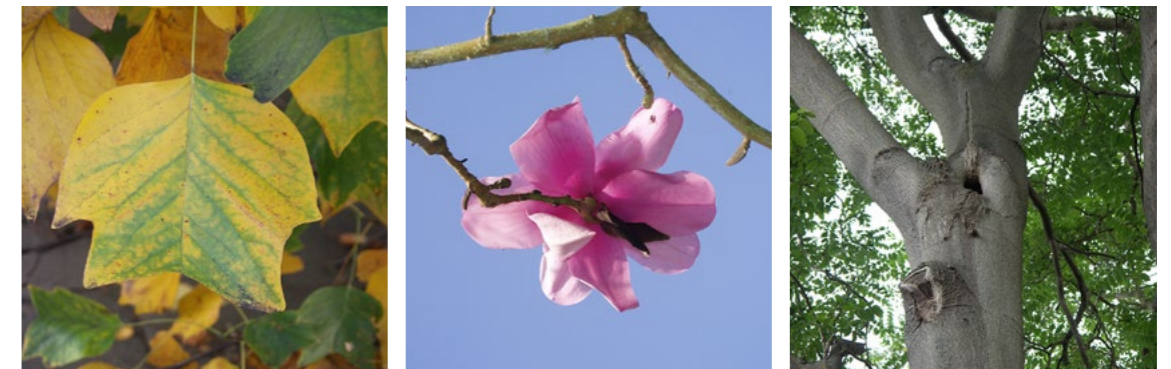
## APPENDIX B

# APPENDIX B

### Cambridge's Urban Forest

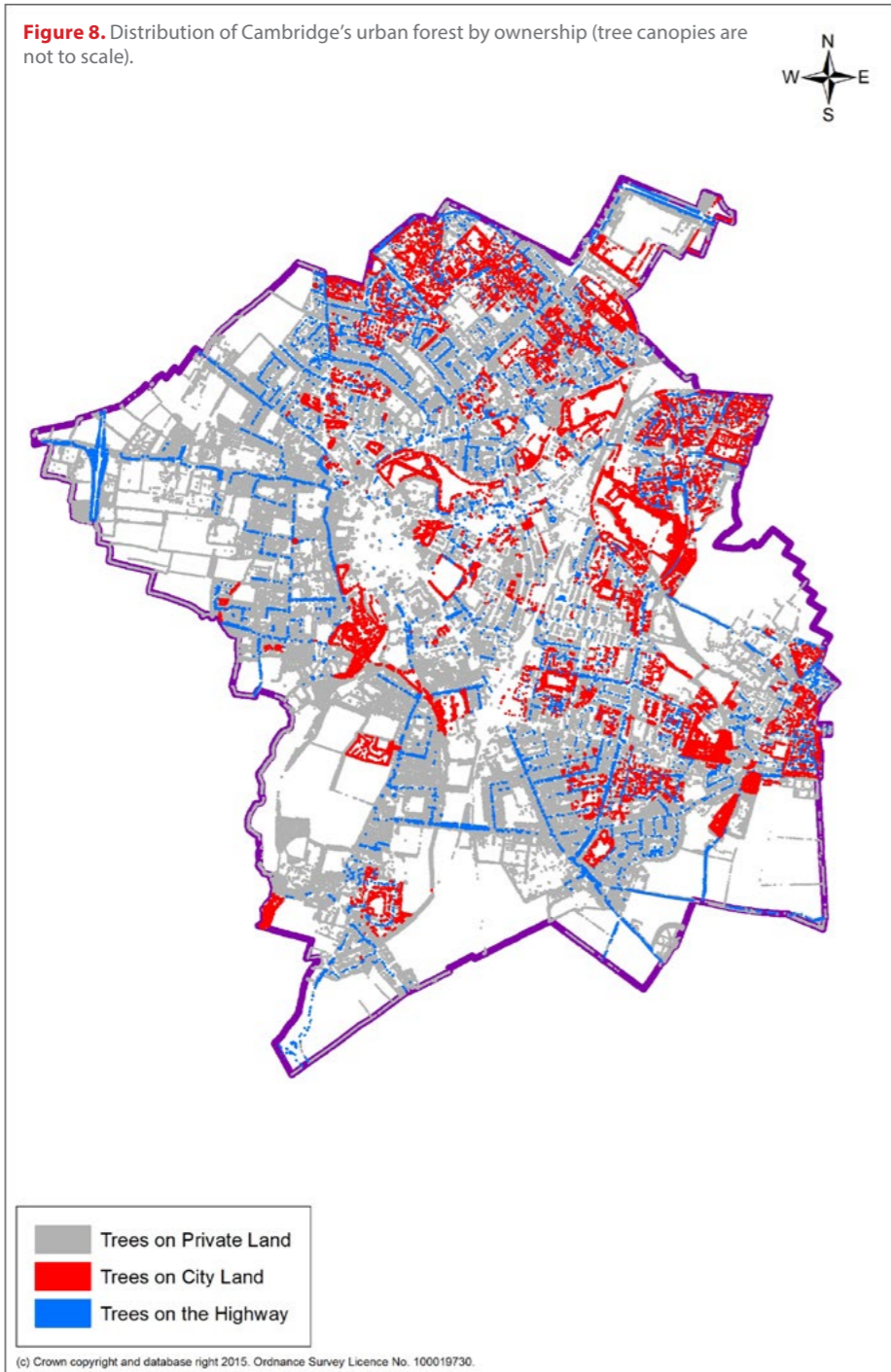
The following maps present a visual representation of the City's urban forest characteristics, showing:

- Distribution of Cambridge's urban forest by ownership – Figure 8
- Distribution of Cambridge's urban forest by height class – Figure 9
- Protected canopy cover – Figure 10
- Canopy cover by ward, overlaid by canopy cover distribution by ownership – Figure 11



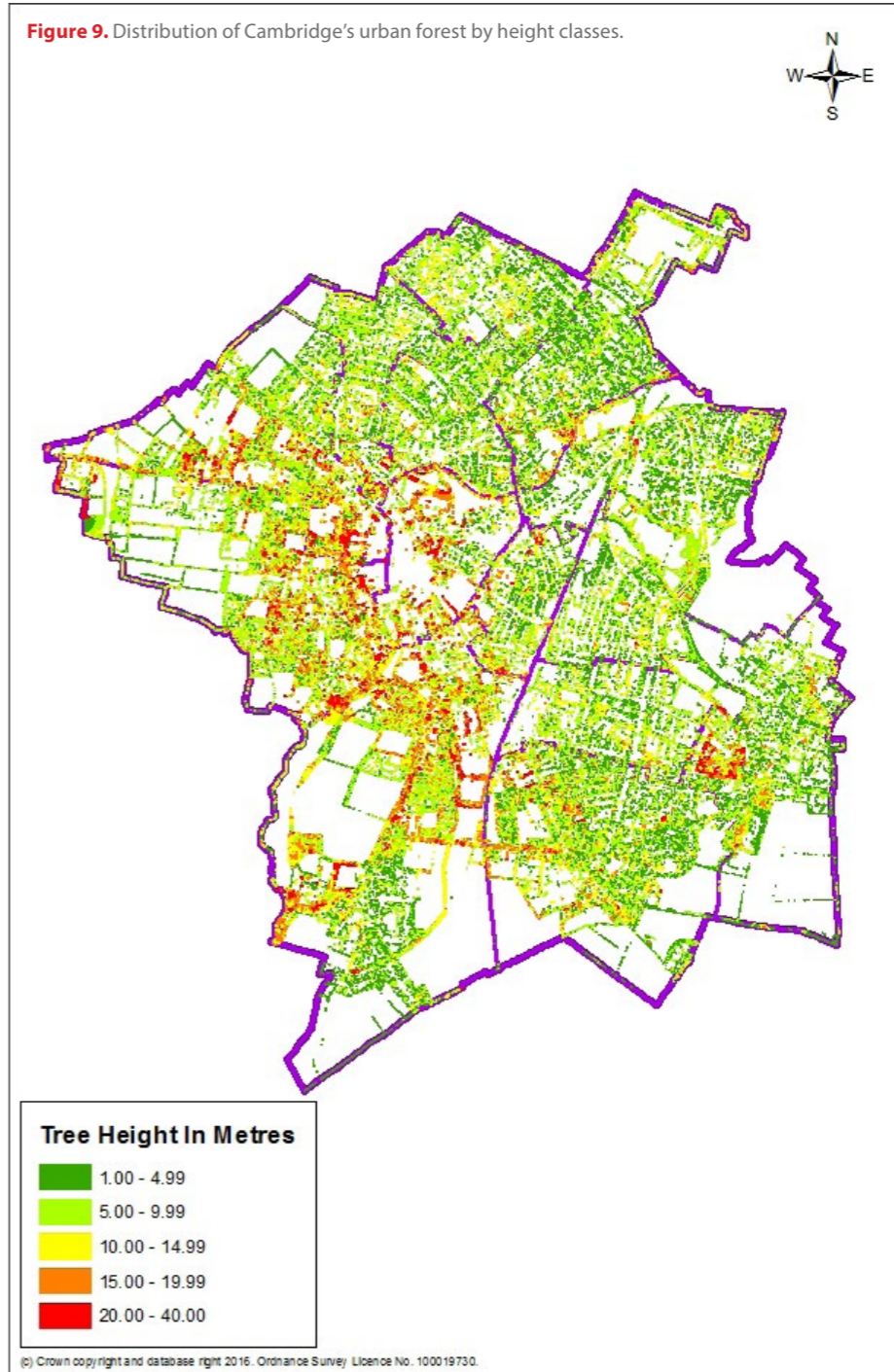
APPENDIX B

Figure 8. Distribution of Cambridge's urban forest by ownership (tree canopies are not to scale).



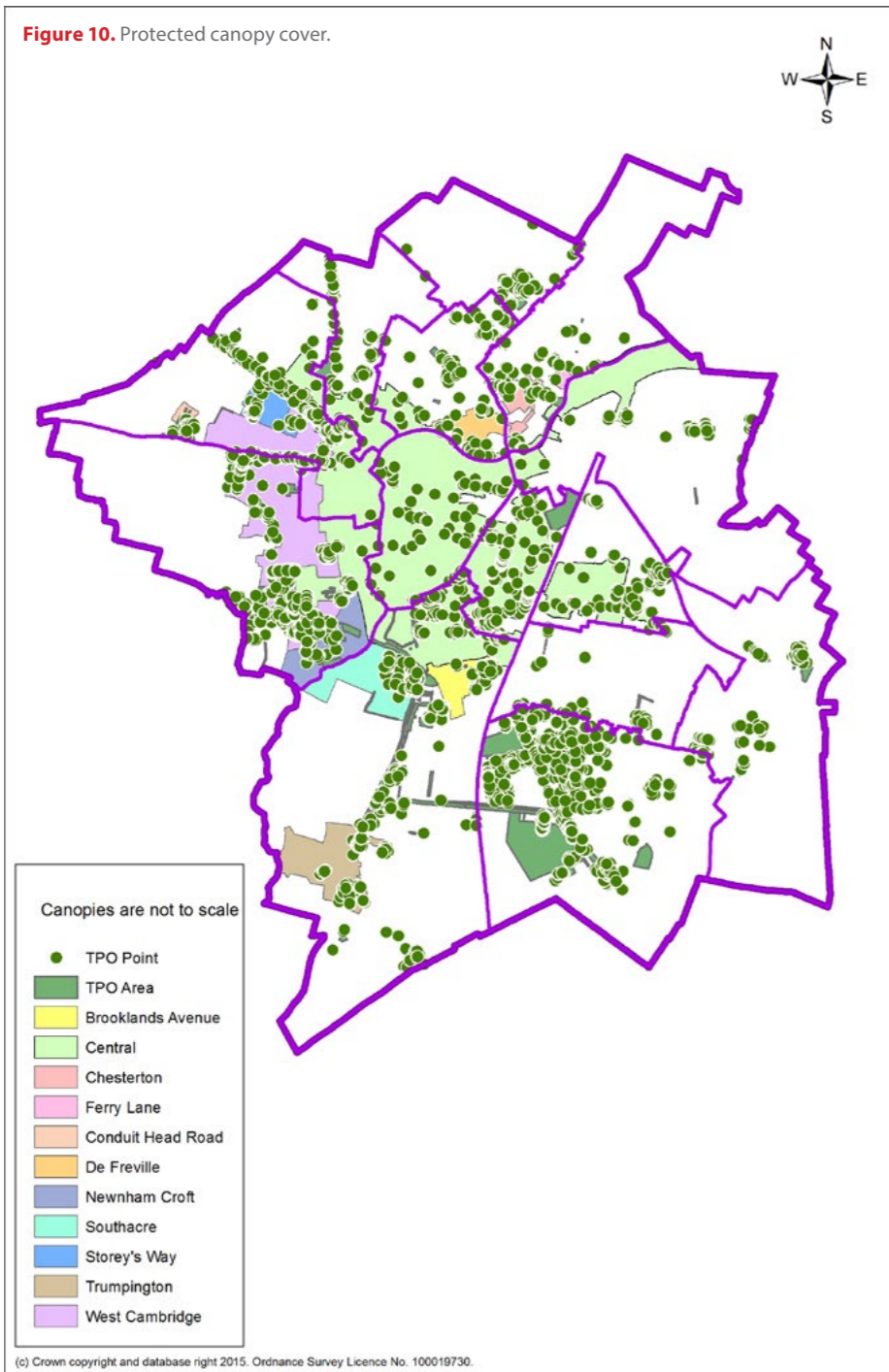
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Figure 9. Distribution of Cambridge's urban forest by height classes.



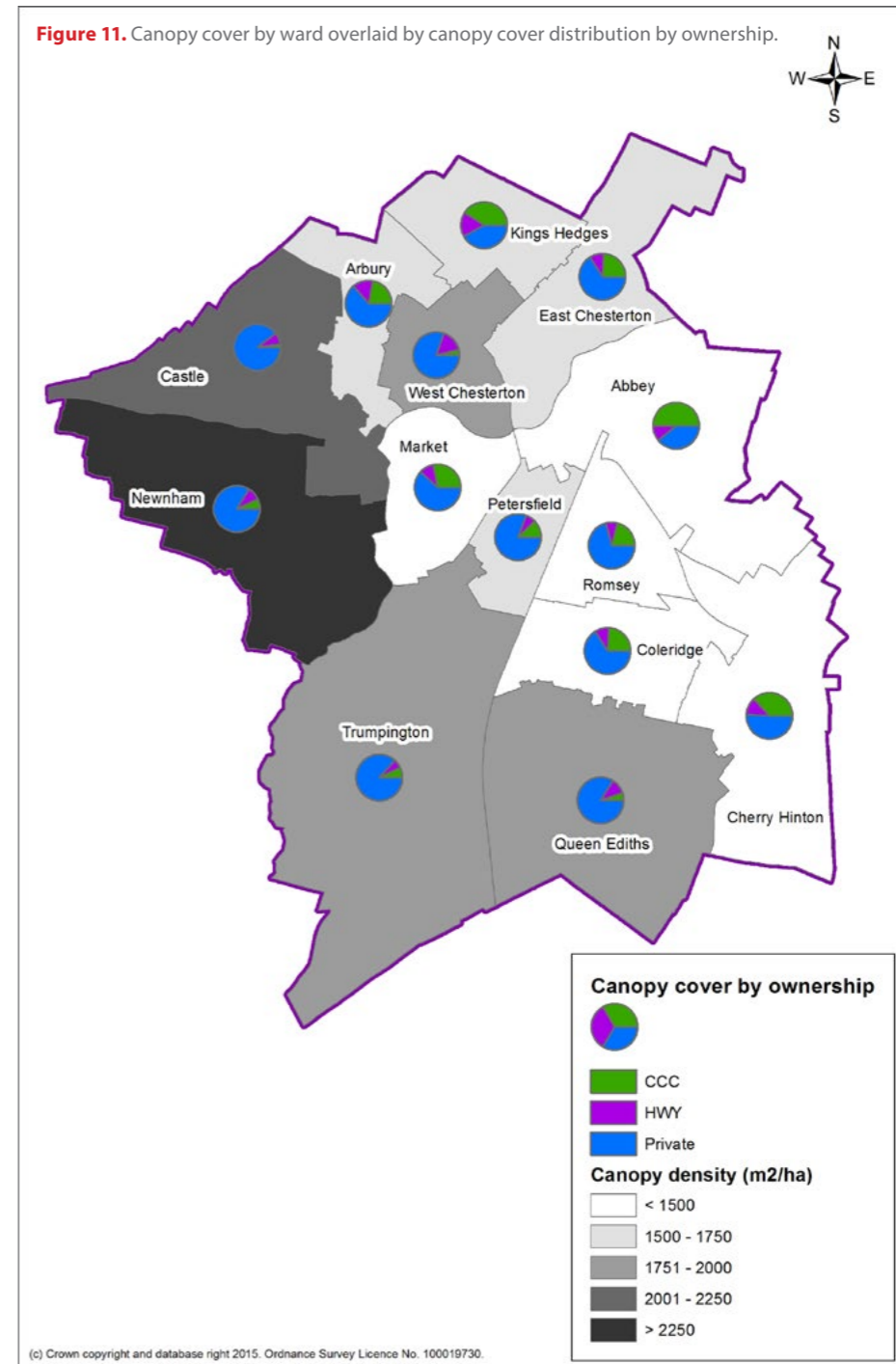
APPENDIX B

Figure 10. Protected canopy cover.



APPENDIX B

Figure 11. Canopy cover by ward overlaid by canopy cover distribution by ownership.





## APPENDIX C

# APPENDIX C

### Case Study - Romsey Ward

Canopy cover is the layer of leaves, branches, and stems of trees and woody shrubs that cover the ground when viewed from above. Canopy cover provides many benefits to communities by improving water quality, saving energy, lowering city temperatures, reducing air pollution, enhancing property values, providing wildlife habitat, facilitating social and educational opportunities and providing aesthetic benefits. Establishing a canopy cover goal is beneficial for communities seeking to improve their green infrastructure and environmental quality. A canopy cover assessment is the first step in this goal-setting process, providing estimates for the amount of canopy cover currently present in a city as well as the amount of canopy cover that could theoretically be established.

This first step was completed by independent consultants in 2013, who found a 17% canopy cover for Cambridge as a whole. They advised a 19% canopy cover target was achievable by the 2050s. This case study looks at how the ward of Romsey might contribute to achieving this target.

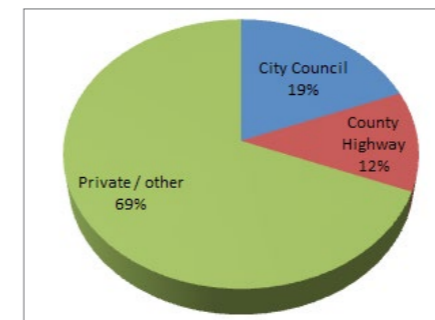


Figure 12. Land ownership for Romsey.

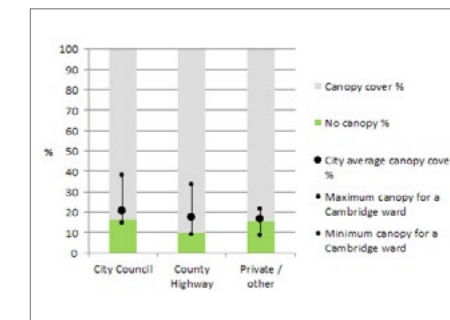


Figure 13. Proportion of canopy cover by land ownership for Romsey.

- The majority of land (69%) in Romsey is in private ownership.
- Over 60% of land in Romsey was classified as medium density residential (MDR) which falls across ownerships, private/City Council.
- Average tree canopy cover for the City for MDR is ~20% as compared to Romsey where MDR is ~17%.
- Romsey has a low canopy cover at ~14%, compared to 17% for the City as a whole.
- Canopy cover is amongst the lowest for wards in the City, for both City Council and County Highway ownerships.
- For all ownerships, canopy cover is significantly lower than the maximum tree canopy cover achieved by a City ward.



Accordia - Plane (High density residential)

## APPENDIX C

Romsey has also has a relatively low average canopy size as compared to other wards in the City. This is probably as a result of the predominance of MDR characterised by small garden areas. Large trees are present predominantly in public open spaces and institutional open space such as Romsey Recreation Ground and Brookfields Hospital respectively. Where it is outside of Council control, this resource should be protected.

### Open Space

- Large open space in Romsey can be found on the Common, the allotments, the recreation ground, play areas, and at the old cement pits.
- All these sites have specific uses and characteristics that limit tree cover but there may be opportunities for additional planting that should be encouraged and explored.
- In particular, large canopied species, i.e. those species over 15m in height at maturity should be favoured where space allows.
- There are 3 allotment sites in Romsey, covering ~6.5 hectares of land. Trees in these spaces can compete for light and nutrients with other food plants and as such are generally low in number. However there may be opportunities for encouraging the planting of small orchards or individual fruit and nut trees that are compatible with the primary purpose of these spaces.



Figure 14. Open Space.

## APPENDIX C

### Street Trees

- Romsey is characterised by its narrow streets and houses with small or no front gardens. There are a few but very limited opportunities to create new street tree pits in these types of situation.
- Coldham's Lane is a larger and busier through road with limited tree cover. Four new tree pits where installed in 2013 to replace existing trees that were removed. Additional planting would enhance this road.
- Existing tree pits should be replanted where vacant.
- Where properties have front gardens, householders should be encouraged to plant trees of an ultimate size and scale appropriate to the space available to enhance the street scene.



Figure 15. Street trees.

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### Housing

- Medium density residential housing (MDR) covers the majority of the land area (69%) in Romsey and may provide the greatest opportunity for raising tree canopy levels
- Rear garden areas are generally more substantial and therefore more amenable to tree planting.
- MDR consists of both private and Council owned housing.
- Average tree canopy cover for the City for MDR is ~20% compared to Romsey MDR at ~17%.
- Opportunities exist for encouraging the planting of small to medium canopy species in gardens to raise tree canopy levels to the City average for this land use type



Figure 16. Housing.