

i-Tree Eco

Cambridge

Section 1 :

The Land

Section 2 :

The Shrubs

Section 3 :

The Trees

Help us to unlock the value of Cambridge's trees and green spaces!



@CamCanopyProj

#iTreeCambridge

Evaluating urban trees in Cambridge

Trees provide lots of different benefits to people: they make urban areas healthier, more enjoyable and more attractive places to live and visit. They provide habitat for birds and other animals, helping us to stay connected with nature. Trees are also an important part of our response to climate change - they help to remove carbon dioxide from the atmosphere and keep us cool on hot summer days.

To help us look after trees across Cambridge we need to understand what types of trees are present, where, and what condition they are in. Cambridge City Council are working with Anglia Ruskin University, Treeconomics and Forest Research to undertake an 'i-Tree Eco' study for Cambridge. This study will allow us to assess the trees across Cambridge, and to describe and value in monetary terms the contribution they make to society. The project also aims to help inform the sustainable management of the city's urban forest. This involves developing and maintaining a resilient urban forest to aid adaptation to a changing climate and other threats such as pest outbreaks.

This project has been funded by the Interreg 2 Seas Programme 2014-2020 co-funded by the European Regional Development Fund under subsidy contract No. 2S05-048 and Cambridge City Council.

We need your support to complete this project.

An i-Tree Eco assessment requires information to be gathered from at least 200 randomly selected locations – 'plots' – across Cambridge. Your property has been selected to be part of the study. However, because of the COVID-19 movement restrictions, our scientists are unable to visit you in person to do the surveys. Please help and contribute to this valuable research. In total, *we require about half a day of your time*. This user guide will teach you to carry out the survey of the trees, shrubs, and land cover within your own garden.

We invite you to be a part of this exciting project by completing the enclosed paperwork.

Don't worry, we provide full guidance to help you through and have a *FAQ section*, an *instructional video* online and a *WhatsApp community* to send queries to. You can also email Matt at [REDACTED]. If you have children in your household, you might like to use this opportunity for home schooling on the benefits of trees. We'd love to see some of their sketch maps too, so do send them in alongside your photographs!

What is involved?

Within this information pack there is a '*Plot map*' – this shows the circular area that we would like you to survey. We'll be asking you to record some information about any trees in your plot, for instance, how tall you think they are and whether they look healthy. *We are fully expecting* there to be estimating involved – which is absolutely fine, as we don't need this to be exact.

There are two ways in which you can record the information: using our enclosed **paper recording sheets** or using an **online recording form**. Look at our 'What next?' section below to see which method will work best for you.

Before you start, we recommend that you have a look through the User Guide to get a sense of what the assessment entails. It might also help to look at the recording sheets or the online

recording form so that you are familiar with them before you start. We've also suggested some mobile apps and other resources that might help you complete the survey.

What's in it for me?

We really appreciate the time and energy you are putting in and, as a thank you, Cambridge City Council are offering a **free tree** for your garden and acknowledgement within the project's report. To register for your free tree and to be acknowledged in the report please complete the 'About you' questionnaire after assessing your plot.

Will it require much time?

On average, it takes around half a day to complete the assessment. If you have lots of trees and shrubs in your garden it could take longer. If you have no trees it might only take an hour. This is a big commitment and *we Thank You in advance for your invaluable time* to complete the assessment and support the project. We've split the survey up into bitesize chunks so you can do the assessment over a few days. Or, if you're feeling up to it, you could do it all in one go!

What next?

You'll complete the recording sheet or online recording form as you go through the assessment. Once completed, return the results and supporting information to us. In total, we need three pieces of information from you and these are:

- The **results** from the assessment
- A bit of information **about you**
- Some **photos** of your plot

This information will need to be returned via one of the methods below:

Information we need	Can I do this on paper?	What you need to do		Can I do this online?	What you need to do
The plot results	✓	Complete the enclosed recording sheet and return via post in the stamped addressed envelope provided	OR	✓	Complete the assessment using the online recording form at: ██████████ ████████████████████
Completed 'About you' questions	✓	Complete the enclosed 'About you' questionnaire and return via post in the stamped addressed envelope provided	OR	✓	Complete the online 'About you' questionnaire at: ██████████ ████████████████████
Photos of your plot	✗			✓	Email your plot photos to ████████████████████ Don't forget to insert your unique reference in the subject line!

Please note: If using the online recording form, you will need to enter all of your data and complete the online submission in one session.

Privacy statement

Treeeconomic's Privacy Notice can be found here: <https://www.treeconomics.co.uk/wp-content/uploads/2020/05/Privacy-Notice.pdf>. This Policy is subject to data protection and complies with the General Data Protection Regulation (EU 2016/679) introduced on 25 May

2018. Contact information provided to this Project (the Cambridge i-Tree Eco Project) will be managed by Treeconomics according to this Policy, for the purposes of the Project. It will not be used for any other purpose. In providing information to the Project you accept the conditions of this Policy.

Please note that you will need to consent to your Plot Data being used by the project on the 'About you' questionnaire.

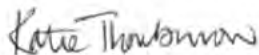
How soon does the assessment need to be completed?

Please complete the assessment and send us your results at your earliest opportunity, and by August 31st at the latest. You do not need to complete the assessment on any particular date.

We will report our findings online this winter so you can see how you have contributed to the care of Cambridge's tree population.

In anticipation, we thank you for your time and very much look forward to receiving your results.

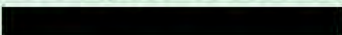
With kind regards,



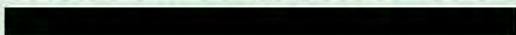
Cllr Katie Thornburrow
Executive Councillor for Planning Policy and Open Spaces

Further help and support

There is a dedicated **project webpage** where you can access an instructional video and further information about the project: <https://www.cambridge.gov.uk/i-tree-eco-project>

If you have any queries about the project or completing the assessment, you can drop Matt an email 

And there is also a **WhatsApp group** you can join if you've got any questions about the assessment or need some help identifying a tree or shrub in your garden.

You can access the WhatsApp group using the QR code on the right or using this link: 

Please be aware that your phone number will be visible to the whole group whilst you are a member of the WhatsApp group. You can exit and rejoin the group at any time, and the group will be closed at the end of the project.

And finally, don't forget to follow us on social media and use the hashtag **#TreeCambridge**



Twitter: **@CamCanopyProj**



Instagram: **@camtrees**

i-Tree User Guide: Getting started

How to use this User Guide:

The User Guide includes three sections, one for each group of measurements. These are:

- **Section 1:** The land
- **Section 2:** The shrubs
- **Section 3:** The trees

Each section is designed to be a bite-sized chunk so that you can complete the survey in stages if you would prefer. We've included a rough estimate of how long it might take you to complete each section. Please note that if you would like to complete the assessment over a few days, you'll need to be able to leave your plot set up so that the plot centre and boundaries don't move.

Throughout the User Guide there will be some examples provided to help you with the survey process. These include some examples of plot maps, as well as some photos and other images.

If you have opted to complete the assessment using the online recording form, you will need to read the blue boxes within the User Guide, like this one:

If you are using the online recording form, there may be some differences in how you record the information. These blue boxes will help guide you through the process and with filling in the information where it differs from using the paper recording sheets.

Throughout the User Guide you will notice grey boxes with light bulbs in, like this one:



These 'Help boxes' are dotted throughout the User Guide to provide helpful hints and extra guidance where measurements may be a bit tricky.

At the end of the User Guide is a FAQ section where common questions and queries are answered. If you need further support there are plenty of other resources to help you out, such as the WhatsApp group and instructional video. You can find a list of some additional resources on the reverse of this document.

To complete this survey, you will need:

- Tape measure
- Tablet or smart phone, if you have access to one
- Compass (or access to a compass app)
- Pencil or pen
- Camera
- Centre marker (e.g. tin of baked beans)
- Boundary markers (e.g. bamboo canes)

Mobile apps you may find useful:

- Arboreal - for measuring tree height
- Measure Height – an alternative option to Arboreal
- PlantNet - for identifying trees and shrubs
- what3words – to help identify the location of your plot centre
- Compass app – for taking measurements in different directions

Setting up your plot



We estimate that this will take you about 30 minutes to do



Steps 1 - 4

What is a plot?

A plot, as you will see from your enclosed plot map, is a circle-shaped area of land which has been randomly generated. It is *in this plot* that we will need you to take the measurements and tell us about what you can see. To do this, you'll need to mark out the plot according to the landmarks on the map; it won't be perfect, just do the best you can.

Step 1. Locate your centre point

The plot has a centre point which is shown as a dot on the plot map. Take a look at your plot map and try to match the centre point with this – it might be easiest to compare with the aerial photo in the bottom right of the page. You can also use what3words or coordinates if you feel confident doing so.

Make sure you visibly mark your centre point so you can find it again – a tin of baked beans would work well! There is some leeway: but please be careful to locate your plot centre to within a couple of metres of that indicated in the plot map. In other words, the plot centre should not be placed at a random location. Please don't move it so as to include your favourite tree!



Can't find or access the plot centre? Check the FAQ section for help!



If you do have a tree located outside your plot, why not record it as part of Cambridge Council's Tree Map Project! <https://www.cambridge.gov.uk/help-us-map-the-citys-trees>

Step 2. Mark out the edge of your plot

It is helpful to use some markers to visualise where the edge of your plot is. Standing in the centre, measure 11.3 metres to the North. If you don't have a long enough tape measure, you could pace it, or cut string or garden twine to this length and use this instead.

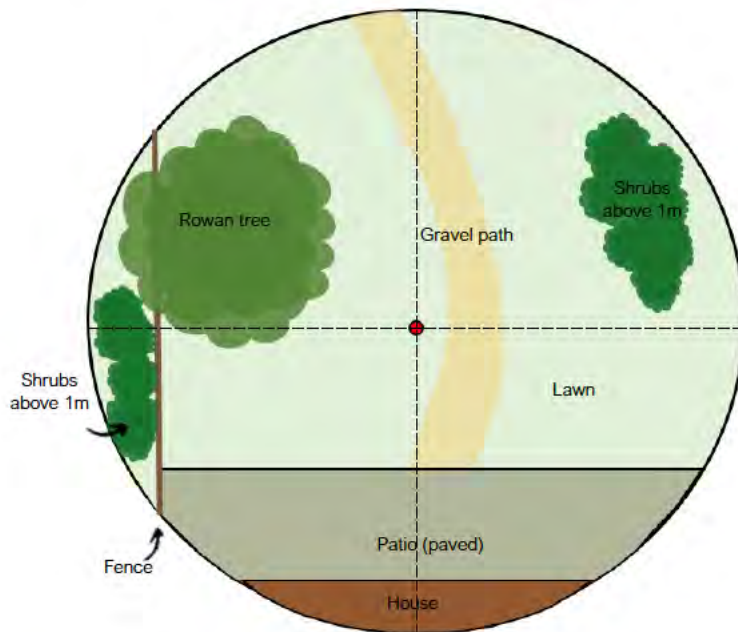
Place a visual marker at this 11.3m point – we suggest using a different object to the plot centre so you can tell the difference between the two. Repeat this for the South, East and West. You can use a compass or a compass app on your phone or tablet to help you locate the directions, or you can use the enclosed plot map and orientate according to the North arrow marker.



Can't fit the whole plot in your garden? Check out the FAQ section which will help you.

Step 3. Draw a rough sketch map of your plot

Drawing a quick *rough sketch* map of your plot will help you with making some estimates when you get to 'Section 1'. You can draw on the enclosed plot map and please include anything that is permanent and covers the ground. This includes grass, gravel, patios, decking, pavement, buildings, flower beds, shrubs and trees. Try to draw these on the plot map to scale as best you can – this will be helpful when making your estimations. Have a look at the example sketch map below.



If you have children in your household, why not ask them to get creative and draw their own plot map like this one? We would love to see your plot maps – you can use the hashtag #iTreeCambridge or tag us on twitter @CamCanopyProj and Instagram @camtrees



Sometimes there are shrubs or patio areas below the tree's canopy, and it is important to try and include these on your sketch map too to help your estimations in Section 1.

Don't worry if you're not an artist – the aim is just a quick sketch using basic shapes to help you make some guesses of how much of the plot they cover.

Step 4. Take some photos of your plot

It would be really helpful for us if you are able to take some photos of what your plot looks like. We would suggest taking at least one photo of the entire plot. You may also like to stand in the centre of the plot and take a photo in each direction: North, East, South and West, or choose extra photos if there are any trees or shrubs you are unable to identify or if you have any particularly interesting specimens. We would be more than happy to receive these!



That's your plot all set up ready for measuring! Please head to the next page to do some measurements on the land in your plot.

Section 1: The land



We estimate that this will take you about 45 minutes to do



Steps 5 - 9


These measurements involve looking at the land within your plot, such as what types of ground cover there are and what the land is used for. Your sketch map will come in handy for this section.

Step 5. Note your unique reference



Before you start, please make yourself aware of your unique reference. This will already be printed on your paper recording sheet. This code helps us identify each individual plot, so please make sure you quote this when you contact us, e.g. when you send us your plot photos.

If you are using the online recording form, head to [REDACTED] where you can access the form. You will need to enter the unique reference under 'Surveyor' to be able to log in and access the form. You don't need to enter your name here.

Once you have logged in, you'll need to change some settings before you can start measuring.

- Click the  icon at the top of the screen and then click 'Settings.'
- Here, you'll need to select 'Circumference' (not Diameter). Circumference will then be highlighted in blue like this:



- Then, click the  icon to save your changes, then the back icon 
- Use the 'Next' button at the bottom of the page to scroll to and select *your* Plot number (You can find this plot number on your cover letter, plot map and paper recording sheet.)
- Then, click the 'Plot Info' option to enter the information for steps 6 and 7.

Step 6. Estimate how much of the plot can be seen and measured

If you can see and access the whole of your plot, this will be 100%. However, it's likely that you won't be able to access the whole of your plot because some of it may cover your neighbour's garden. Taking that into account, how much of the plot that you have marked (or partially marked out) do you reckon you can measure or see? If you can see parts of the plot but can't access them, then you may be able to guess or get your neighbour involved. If you don't think you are able to guess, then please estimate how much of the plot you think this makes up and subtract this from 100%.



For some further guidance on how to do measurements when you can't access the whole of your plot, check the out FAQ section towards the end of this document.


Step 7. Estimate some ground covers in the plot

This is where your sketch map will come in handy! There are a few key types of ground cover we would like you to estimate first before we ask for some more specific ones. If you are able to

estimate these *to the nearest 10%* that would be great. The ground covers that we would like you to estimate in this step are listed below:

- **Tree Cover:** within the plot area you have marked out, approximately how much of this is covered by tree canopy above you? The aerial view of your sketch map will help you with this estimate. Please record this as a percentage.
- **Shrub Cover:** as we did for estimating tree cover within the marked our plot, approximately what percentage is covered by shrubs? We define shrubs as woody plants that are over 1 metre in height but with a trunk less than 22cm in circumference.
- **Potential Plantable Space:** estimate how much of the plot is not already covered by tree canopy, buildings or hard surfaces such as patios or decking. If you were keen on trees, then this remaining space - in theory - would hold the potential to plant more trees - we call this 'potential plantable space'. It helps to us to calculate how much space across Cambridge hasn't been used for planting trees on.

If you are using the online recording form, make sure you've saved your information in the 'Plot info' section. You can ignore the boxes 'Contact info' and 'Photos' – this information will be collected using the 'About you' form and when you email us your photos.

Please now head to the 'Ground covers' section to enter the information for step 8. You will need to click on the  icon to add the different types of ground cover in your plot. Make sure you save each ground cover.

Step 8. Estimate some more specific ground covers in the plot

Now we need a bit more specific information about some of the different types of ground covers in the plot. This will be some *more estimates* of how much of the plot they cover! Again, your sketch map will come in handy for this step. Looking at the different ground covers you have drawn onto the map (e.g. patio, lawn), have a go at guessing how much of the plot these cover. There are some categories to record these under. These are preselected by the i-Tree Eco assessment software, not the Cambridge project team. They include:

- **Building** - houses, garages, sheds
- **Cement**
- **Tar** – i.e. tarmac such as pavement, road
- **Rock** – patio, paved areas, gravel, wide stone walls
- **Other impervious** – any hard surfaces that don't fit into other categories, e.g. decking
- **Bare soil** - bare ground, sand
- **Mulch** - bark chip, leaf litter under trees and shrubs
- **Herb** - any plant that's not grass, a shrub or a tree
- **Grass** - mown lawn
- **Unmaintained grass** - the type of grass you might find on Cambridge Common
- **Water** – pond

Try and guess these to the nearest 10%, and be aware that altogether, they will need to add up to 100%. If all of the plot is covered by grass, you would record this as 100%. It's worth considering that if you have shrubs or trees in your garden, there may be some soil or mulch under them that you'll need to include. Take a look at our example sketch map on the next page for some guidance.

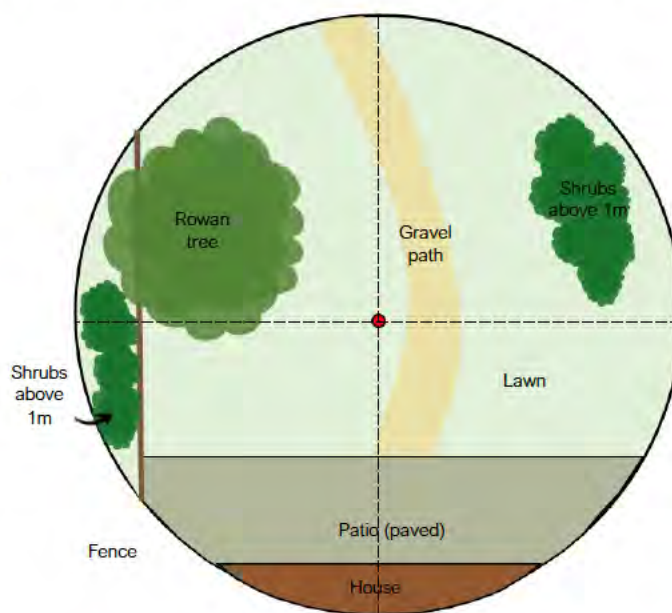
In this example, we are estimating what % of the plot is made up of different ground covers for steps 7 and 8.


Step 7:

- Tree cover – 15%
- Shrub cover – 10% (these are the two areas of shrub added together)
- Potential plantable space – 40% (most of the lawn, except where the trees and shrubs are)

Step 8:

- Building - 10% (House)
- Cement – 0%
- Tar – 0% (no pavement or road in this plot)
- Rock – 20% (gravel path and patio)
- Other impervious – 0% (no other hard surfaces)
- Soil – 10% (some bare soil under the tree)
- Mulch – 10% (some leaf litter under the shrubs)
- Herb – 0% (no flower beds in the garden)
- Grass – 50% (mown lawn)
- Unmaintained grass – 0%
- Water – 0%



If you are using the online recording form, head to the 'Land uses' section to enter the information for step 9. You will need to click on the  icon to add the land uses in your plot and save each one.

Step 9. Record the Land Use of your plot

This should be nice and easy, if the plot is entirely within private property, simply record 100% under residential. If your plot falls partly onto another land use, check the other categories below for guidance.

- **Agriculture** – farmland or farm buildings
- **Cemetery**
- **Commercial/industrial** – Shops, business units, warehouses, factories
- **Golf course**
- **Institutional** – School, college or university buildings or grounds
- **Multi-family residential** – large blocks of flats
- **Other** – any other land use that doesn't sit within the listed categories
- **Park** – recreational grounds or gardens
- **Residential** - housing
- **Transportation** – roads and railway lines
- **Utility** – water treatment works
- **Vacant** – wasteland
- **Water/wetland** – lakes, reservoirs rivers, streams



That's the measurements for the section 1 completed!! Please head to the next page to do some measurements on the shrubs in your plot

Section 2: The shrubs




We estimate that this will take you up to 1 hour to do



Steps 10 - 13

Now we'd like to focus on the shrubs you have in your plot. The key thing to remember is that a **shrub is a woody plant, taller than 1 metre in height and with a trunk circumference of less than 22cm**. It might be worth checking this first before you record them. If it has a trunk circumference of more than 22cm, we will count this as a tree and use the form on the back to record it in the next section. To measure the trunk circumference, use a measuring tape and wrap it around the main trunk of the shrub. This needs to be done at a height of approximately 1.5 metres (breast height).

If you are using the online recording form, head to the '**Shrubs**' section to enter the information for the steps in this section. You will need to click on the  icon to add shrubs in your plot.

Step 10. Record your shrub species

Some gardens contain a lot of shrubs and some contain very few. The key thing here is to make recording the shrubs nice and simple, so we will group together shrubs which are close together in one block and just record the most dominant species (the one that represents the largest proportion of the block). If you have a few different blocks of shrubs dotted around the garden, it is best to record these as separate entries.



Not sure of the shrub species? Why not use some of the suggested resources to help – you could post a picture to the WhatsApp group, or have a go at trying to identify it yourself using the PlantNet app.

If you are using the online recording form, you can search for shrub species using their common name or scientific name. However, be aware that most of the common names are American, rather than English, so they may differ.

If you are really not sure what the shrub is, then please enter this default shrub: '**ahakea** which is the first shrub listed if you have '**Common name**' selected.

If you have multiple entries to make, you'll need to work through one shrub entry at a time.

Step 11. Record the height of your shrub

Measure or estimate the height of the shrub block and record in metres. The shrub height might vary in places, but just pick the highest point. Don't forget, the height should be 1 metre or taller.

Step 12. Record the shrub area (%)

Imagine that all your blocks of shrubs add up to 100%, which we will call the 'total shrub area'. Now, we need to estimate how much of that total shrub area each of the blocks represents. Please have a go at estimating this as a percentage. These should all add up to 100%. For example, if you had two blocks of roughly the same size these would be 50% each.

Step 13. Record the amount of shrub missing (%)

For this step we would like you to imagine your block of shrub sitting in a box – like in the example below. The height and width of the box are the same width and height as the shrub, but you will notice that the shrub doesn't fill the whole box because it's not the same shape. Please have a guess at how much of this box is empty and is not filled by the shrub.



It might help to visualise your shrub block like



Imagine framing your shrub block in a box like this. Look at the space between the box and the outline of the shrub – how much do you think there is? Here, we would estimate that the shrub makes up about 80% of the box, which means we would record this as 20% missing.



That's the measurements for the section 2 completed! Please head to the next page to do some measurements on the trees in your plot.



No trees in your plot? You're all done! Take a look at the 'What next' section to find out how to submit your data.

If you are using the online recording form, make sure you head to the end of this User Guide to find out *how to complete your online submission*.

Section 3: The trees




We estimate that this will take you up to 2 hours to do



Steps 14 - 27

This last section focuses on the trees in your plot. If there are no trees in your plot, then you're done – please see the previous page for details on what to do next. For this project, we want to measure any trees in your plot that have trunks with a circumference greater than 22cm. Some trees may have a canopy that covers some of the plot, but if the **trunk** is not within the circle then it is *not* included in the following measurements.

If you are using the online recording form, head to the 'Trees' section and use the  icon to add a tree.

Tree Characteristics

First, we want to focus on some general information about the trees in your plot.

If you are using the online recording form, head to the 'General info' section to add information for steps 14, 15 and 16.

In the 'General info' section, you'll notice that there is also an extra category to complete which is 'Land use'. Here, you simply need to record the type of land use the tree is in. For example, a tree in your garden would be recorded as 'residential.'

You'll need to work through all the measurements one tree at a time. If you haven't saved and completed the section online before moving on to the next tree, then you might lose your data.

Step 14. Was the tree planted?

Did you, a previous homeowner or the local authority plant this tree? If it's in your garden, the answer is probably yes! The answer is also likely to be yes if the tree is on a pavement. Sometimes trees self-seed, which means they were not planted, though this is more common in woodland areas. If it looks like it has seeded itself then the answer is 'no'.

Step 15. Is it a street tree?

Is the tree growing next to or along a right of way such as pavement or a road? If so, the answer is 'yes'. If the tree is in your front or back garden, then the answer is 'no'.

Step 16. Tree species

You may know or be able to identify your tree already! But if not, have a go at identifying it using the enclosed Tree ID guide to some common garden trees. Alternatively, there are plenty of other resources such as the PlantNet app (available from your usual app download site, or via this website: <https://identify.plantnet.org>), or the following Treezilla Urban Tree ID Guide

<https://sites.google.com/view/treezillainfo/home/resources> (this is a new resource; you are invited to submit your comments on it to kieron.doick@forestresearch.gov.uk).



Still unsure how to ID your tree? Check out the FAQ section for further advice on what to do.

If you are using the online form, you can search for tree species using their common name or their scientific name. However, be aware that the common names are mostly American, which may be different to English names.

Once you've saved your information in this section, please head to the section called 'Buildings' to enter the information for step 17.

Step 17. Trees near buildings: Distance and Direction

Is the tree you are measuring over 3 metres in height and within 18 metres of a residential building (such as your house or a neighbour's)? If so, please record how far away the tree is from the building in metres and what direction it is in in degrees. Buildings don't need to be in the plot to be recorded. If there are multiple buildings within 18m then please record the distance and direction from these too. You don't need to include garages in this.

Tree Measurements

Now it's time to take some measurements for each tree in your plot. For this part, it'll be helpful if you have the following: a measuring tape, a compass and a way of estimating heights.

If you are using the online form, head to the 'Stems' section where you can add the circumference at breast height for each tree trunk. You'll also need to record what height you measured the circumference at – this will usually be at 1.5m.

Step 18. Circumference at Breast Height

The first measurement we take is the circumference of the tree trunk. We take 'breast height' to mean roughly 1.5m above ground level, which is the height at which the circumference should be measured. If you cannot do it at this height, please note down the height you took the measurement at. To determine the circumference, please wrap a measuring tape all around the trunk in a complete circle and record the size in centimetres. Most trees have just one trunk, so only one measurement needs to be taken.



Don't have a measuring tape? Take a look at the FAQs section.

Does your tree trunk have lots of ivy on it? Take a look at the FAQs section.

Do you have a multi-stemmed tree with multiple trunks? In this case, take a circumference measurement of each trunk! If there are more than 6, please record the largest 6 in the spaces provided on the back of the field form.

Next, we will be moving on to take some measurements on the height of the tree.

If you are using the online form, head to the 'Details' section where you can add data for steps 19 to 27.

Step 19. Total Height

This is the height from the ground to the top of the tree! When we say the top, we mean the tallest part you can see! To do this, we recommend downloading an app called Arboreal. It is very easy to use and takes you through step by step what to do so it can tell you the height of the tree. Arboreal will allow you to measure 5 trees for free. Please record in metres.



To download Arboreal, search for it in the app store on your mobile device. Alternatively, or if you'd like to see a tutorial, visit this site: <https://arboreal.se/en/>

Can't download Arboreal? Using your own height can be a very useful reference for estimating tree height – simply think how many times taller the tree is than you!

Step 20. Live Top/ Top Height

If the tree is healthy and alive all the way to the top, then this measurement is the same as Total Height. However, some trees may have what we call 'dieback' at the top of the crown, where some of the branches and leaves are dead. Take a look at the example on the right. Here, most of the crown has died back because of damage caused by squirrels.

If you can see dieback on your tree, then measure from the ground to the top of the live crown using Arboreal or estimation methods as above. Record in metres.



Step 21. Crown Base

This is the height from the ground to the base of the crown. In other words, from the ground to the height of the lowest branch. Use Arboreal or estimation methods as above. Record in metres.



Many evergreen trees, such as pines, can have crowns that come very close to the ground. For these trees the crown base may be as little as 0.5 metres, in which case you might just be able to estimate this or use your tape measure.

Step 22. Crown Width North-South and East-West

Stand beneath the tree, using the north arrow on your field map or a compass to locate yourself at the most Northern extent of the tree's crown. Sometimes it helps if you stand in line with the trunk and look directly up! Then, heading in a straight line to the South, use a measuring tape or pace out the width of the crown to the most Southern edge. One big step is roughly equal to 1 metre. Record in metres. Repeat the same but for the East to West direction.

Step 23. Crown Condition

How healthy is the tree? This is a visual assessment and *just an estimate*. If the tree is completely healthy, it will score 100%. If you can see some dead branches or leaves, try and determine what percentage of the crown this represents, and minus it from 100%. For example, if you think that 10% of the branches are dead, then the tree will have a good condition of 90%. Remember that the higher the % the healthier the tree's crown looks! Have a look at some of the examples below.



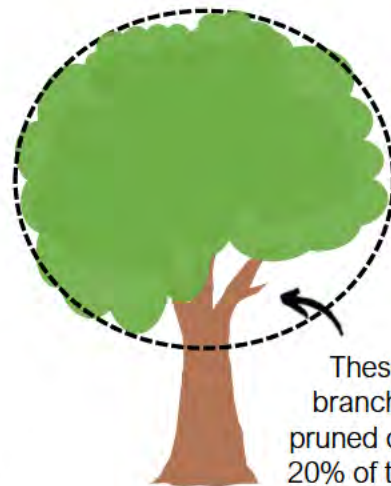
There are a lot of dead branches on this tree, which make up about 60% of the whole crown. You would therefore record this as 40% healthy.



This part of the tree has died, which is about 30% of the whole crown. You would therefore record this as 70% healthy.

Step 24. Percent Missing

Again, this is a visual assessment and an estimation of how many branches and leaves are missing from a complete crown. This requires a bit of imagination! It is best to think of the typical crown shape – for many trees this will be as a sphere. If the crown were to completely fill the sphere shape, there would be 0% missing. If you notice that there is a gap in the branches, try and decide how much, as a percentage, of the sphere this gap represents. There may be more than one gap so add these percentages together. What might be missing? Branches might have fallen due to wind, purposely removed or snapped off. Take a look at the diagram on the right for help.



These lower branches were pruned off, so now 20% of the canopy is missing

Step 25. Crown Light Exposure

This refers to the amount of light that the tree's crown is exposed to throughout the day. Time to think of the tree crown as a different shape now – as a cube, with 4 sides and 1 top. If all of these are exposed to sunlight for at least a few hours a day, record as 5. However, if one or more of these sides are blocked by another tree or a building for example, then these sides will not receive sunlight. Therefore, count how many sides are not blocked and record this as a number between 1 and 5. Please don't use half scores (e.g. 1.5) if one side is partially blocked from the light - we are looking for an estimate, so stick with the majority.

Step 26. Percent Impervious (%)

This is an estimation of the amount of 'hard' surfaces below the tree canopy. This includes roofs, concrete, tarmac and anything else that water can't pass through. For example, if there is a paved patio below the tree canopy, you might think that it covers 20% of the land beneath the tree canopy.


Step 27. Percent Shrub (%)

This is an estimation of how much of the area under the tree's canopy is covered by shrubs. For example, if there is an area of shrubs covering just less than half of the ground beneath the tree canopy, then record as 40%.



If you only have one tree in your plot, then congratulations – you have finished the assessment! If there is more than one tree in your plot, please carry out these measurements for each tree. Once completed, head to the 'What next' section to find out how to submit your results.

If you are using the online form, please take a look at the steps below on how to submit your results.

1. Make sure that all the required fields have been completed. This is really important otherwise the results won't save and submit properly.
2. Next, click '**Mark plot as complete**' which should appear at the bottom of the list of categories under '**Shrubs**' once you have completed all the required fields.
3. Then, click the  icon, where you will then need to click '**Submit data**'.

That's your plot results submitted! Please also remember to complete the '**About you**' questionnaire and send us your **plot photos** – this information is really really useful for us.

Frequently Asked Questions and Helpful Hints



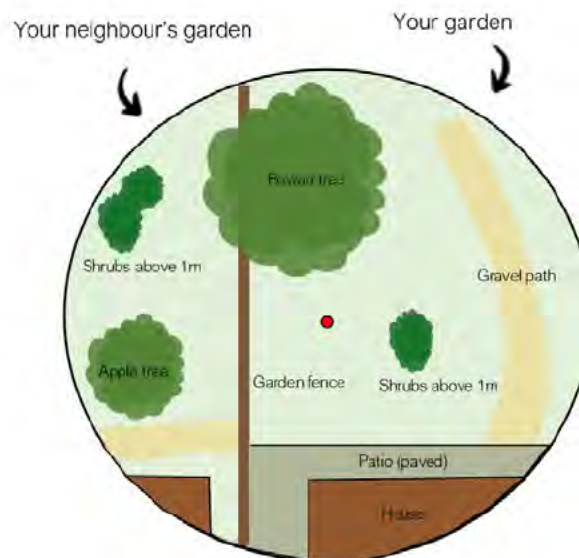
Can't quite fit the whole plot into your garden?

It's quite common to find that some areas of your plot may fall just outside your property, and this is okay. If you can see these areas but can't access them, we suggest you estimate the measurements in these areas if you feel comfortable doing so. This is much easier if there are no trees or shrubs in these areas, but there may be some. If you feel up to guessing these measurements, you could use some trees or shrubs that look similar in size as a comparison.

Your neighbours won't be receiving these plot packs asking them to complete a survey, but if you are able to perhaps you could ask them to complete the results for their portion of the plot?

If you cannot see the plot areas that fall outside your property, and we are still restricted by the Covid-19 lockdown, please exclude these areas and change the % of plot measured in step 5.

For any areas which have not been surveyed, could you please mark this clearly on your field map and return this to us with a note on your form so that we can help with this.



Having trouble locating the centre point within your garden?

The trick with this is to use landmarks and structures where possible. Look for things such as tree canopy or the edge of a house or fences and this will help to orientate you. The maps are drawn to scale.



Hints for drawing a plan of your plot

Use shapes and patterns which you will remember. Cloud shapes tend to resemble tree canopies well and add some dashes through the middle to represent your shrub blocks. Try to keep your images to scale if you can – you could use other objects in your garden to help you do this. Finally, only include things which are permanently a feature of the plot. Remember – you don't need to spend lots of time on this as it is only meant to act as a rough guide to the ground covers in your plot.



Defining Land Use

We expect 100% of the plot to be Residential land use. However, this may differ if the plot also falls onto a road managed by a highways authority. It should be an A or B class road. We do not count small cul-de-sac or roads within housing estates. If this does happen, mark it clearly on your field map and simply estimate the amount of your plot which this land use covers.



Shrub Identification and Measurement

I'm not sure if I have a shrub or not? There are two main questions to answer to work out whether you have a shrub. First, is the shrub over 1 metre tall? (If no then we can discount this). And secondly, is the main trunk of the shrub less than 22cm in circumference? The shrub in the photo on the right meets both these criteria, so we would include this in our measurements.

Species - Some people find shrub ID tricky and that's okay. We have so many different ones within our gardens so just do the best you can. Check out ID guides if you have access to them and some online resources for common shrubs found in gardens. You can also post a photo to our WhatsApp community group if you're not sure.

Height - Remember to only record shrubs over 1m tall. You can use a measuring tape, estimate using your own height as a gauge or use the same process as we use to measure tree height if it's a particularly tall shrub.

Shrub Area - The shrub area can sometimes cause confusion. What we need to know here is how big the shrub block is in relation to the other blocks of shrubs, i.e. how much of the total area of shrubs in your plot this one block represents. If you had two shrubs of equal size, each would represent 50%. If one was a little larger than the other, you might estimate one to be 60% and one to be 40% of the total shrub cover.

Missing – This is quite a challenging estimate to make, especially if you are finding it hard to imagine the shrub in a box! To help with this, why not use an empty photo frame? (You could use a square or rectangular one depending on the shape of your shrub. Frame your shrub – and walk backwards until the top and the side of the shrub touch the outside of the frame. Now you can look at the gaps and estimate how much is missing!





Having trouble identifying your tree?

If you've used other resources such as the ID guides suggested in this document, or the WhatsApp group, you could also send us some photographs. Write down a description in the 'notes' section and send us a photograph of the leaves, the tree as a whole and any fruit or flowers that may be present. For example, 'tree 2 has large, rounded, green leaves with a small point at the tip'. Does the tree lose its leaves in winter? Is there an unusual pattern or colour on the trunk? We can then make an assumption based on this information. Don't forget to clearly note in the subject of your email which plot number you are referring to.



What if I can't access the tree to measure it?

If you feel confident at guessing some of the tree measurements, then you could do so. To help with this, you could compare similar trees in your garden, in the park or on the street. If you don't feel confident guessing, this would then fall into your 'percentage unmeasured', in Step 5.



Unable to download Arboreal?

You could use another app called 'Measure Height' for android devices. If you can't download that, you can use your own height as a reference to estimate the total height, live top and crown base. Alternatively, it might help to use other objects as a reference, such as the roof of a garage!



What if I don't have a measuring tape?

For the crown width and distance to buildings, it is possible to pace out the distance. 1 big step is roughly equal to 1 metre.



What if I have ivy on my tree ?

Sometimes if you have really thick ivy on a tree trunk it can make the circumference measurement less accurate. Ivy provides a great habitat for many invertebrates so we wouldn't ask you to remove it, but if you could note down that there was ivy on your tree then this will help us account for it.



Unsure?

It's best to try and make estimates rather than have missing data. Estimations can be surprisingly accurate! So, have a go and write in the notes section what you have estimated. If you are struggling with a particular section, don't forget you can send us an email or ask a question on the WhatsApp group.

Imperfect help given is better than perfect help withheld - 1st Aid advice

🔍 Tree Identification

Not sure where to start with identifying what species your tree is? Take a look below at some common garden trees within the UK. If these don't look right, there are plenty of other sources of information to help you work out what tree it is. Why not try an app such as PlantNet, or utilise resources on websites such as the [Woodland Trust](#) or the [Royal Horticultural Society](#).

💡 To help with the identification process, key identifying features of each tree have been highlighted in **bold** text

Apples and crabapples

Apples (*Malus domestica*)

Leaves
rounded with toothed edges and a fuzzy texture above and below

Fruits
Usually form in summer and are ready for picking in autumn



Crabapples (*Malus sylvestris*)

Leaves
Rounded with toothed edges and glossy on top

Fruits
Small, rounded and typically orange/red in colour



Ash (*Fraxinus excelsior*)

Leaflets
long, untoothed oval shape in opposite pairs on a green stalk

Bark
smooth grey/green and, becoming fissured with age

Buds
are black



Cherries and Plums

Plums (*Prunus domestica*)

Leaves
oval and finely toothed. Smooth on top and slightly fuzzy, paler underneath

Fruit
usually ready to pick in late summer



Cherries (*Prunus avium*)

Leaves
oval shape with toothed edges and a pointed tip.

Bark
can range greatly, but commonly grey/purple with horizontal lines



There are lots of different cherry varieties, but most sweet cherries come from the species *Prunus avium*. Plant nursery websites are a good source of information if you would like to find out what variety you might have.

Leylandii (*Cupressus x leylandii*)

Leaves
scale-like. Dense, fast-growing evergreen foliage means it is frequently used as a privacy screen on garden boundaries

Bark
Red/brown with shallow ridges

Cones
brown and globe-shaped with scales





Rowan (*Sorbus aucuparia*)

Leaflets

long oval shape with a toothed edge that come in opposite pairs on a red stalk

red **berries** appear in autumn

Cream **flowers** appear in spring



© Brian Hird

© ScotPlantsDirect



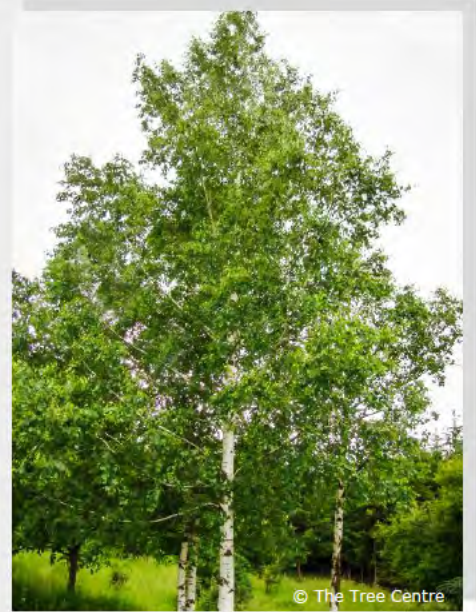
Silver birch (*Betula pendula*)

Leaves

triangle shape with a toothed edge

Catkins produced in April and May

Bark white and flakey, becoming fissured at the base



© The Tree Centre



© BY-SA 4.0



Sycamore (*Acer pseudoplatanus*)

Leaves

have five lobes and slightly toothed edge

bright green **buds**

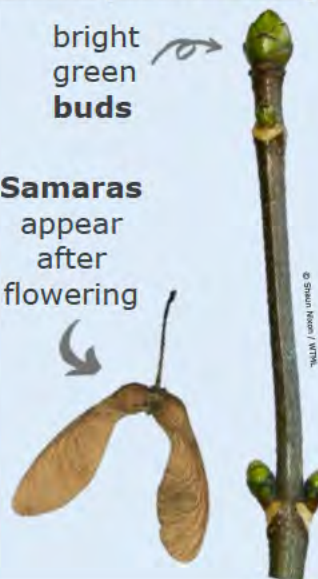
Samaras appear after flowering



© Barcham Trees Plc



© David Gowans



© Stuart Newman / ARTAL

Helpful resources

General info

- Project webpage: <https://www.cambridge.gov.uk/i-tree-eco-project>
- Another Cambridge City Council project which may be of interest: <https://www.cambridge.gov.uk/help-us-map-the-citys-trees>
- Information on other i-Tree Eco projects undertaken by Forest Research and Treeconomics: <https://www.forestresearch.gov.uk/research/i-tree-eco/>
<https://www.treeconomics.co.uk/>

Shrub ID

- PlantNet: <https://identify.plantnet.org/>
- Shoot: <https://www.shootgardening.co.uk/plant/identify>
- RHS <https://www.rhs.org.uk/plants/search-Form>

Tree ID

- Treezilla urban tree ID guide: <https://sites.google.com/view/treezillainfo/home/resources>
- Woodland Trust: <https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/british-trees/a-z-of-british-trees/>
- Natural History Museum: <https://www.nhm.ac.uk/take-part/identify-nature/uk-tree-identification-guide.html>

