

# Living with Rainwater

a guide to working with nature to make  
Hammersmith & Fulham more flood proof

5

simple ways  
to reduce your  
neighbourhood's  
flood risk



Protecting London's  
wildlife for the future

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hammersmith & fulham

# Welcome



Although they can feel increasingly disconnected, cities and the natural environment don't have to be separate. London was built around a network of rivers, many of which have since been pushed underground by our thirst for urban development and growth. However by working with nature to restore water's natural flow, which is often lost in cities, we can create resilience to extreme weather as well as providing beautiful spaces for people to enjoy and where wildlife can flourish. This guide gives an introduction to small-scale projects that can do just this.

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London Wildlife Trust is the only charity dedicated solely to protecting the capital's wildlife and wild spaces, engaging London's diverse communities through access to our nature reserves, campaigning, volunteering and education

[www.wildlondon.org.uk](http://www.wildlondon.org.uk)

Registered charity number 283895





## A ghost river

Counters Creek was originally a small stream that flowed from Kensal Green down through Shepherd's Bush, flowing underneath where Stamford Bridge now stands, and into Chelsea Creek, where it joins the Thames beside Lots Road Power Station. It formed an important part of the natural drainage in the area. Rainwater would find its way into the creek and be carried down into the Thames.



## From river to sewer

As the areas along its banks became more heavily used by people and industry, Counters Creek became more and more polluted, eventually becoming a health hazard and contributing to outbreaks of cholera and other waterborne diseases. There was little option but to confine the river into the brick tunnels of the original Victorian sewers in the 19th Century, where it still flows in secret today underneath our feet. This outdated sewer network combines all of the dirty wastewater from our kitchens and toilets with clean rainwater and is now under a lot of pressure. Even though the system is designed to cope with storms, occasionally the rainfall can be so heavy that it overwhelms the pipes and causes flooding. This is a particular issue for Counters Creek and its neighbourhoods.

# What's the problem?

Photo: Guerilla Exploring

## Flooding in Hammersmith & Fulham can be put down to four main factors:

1. The loss of green space in favour of hard surfaces means rainwater cannot soak into the ground but flows instead into the nearest drain, filling the overstretched sewers even fuller.
2. When it rains there is often not enough capacity in the sewers, which can result in sewer water overflowing into homes and roads.
3. Some property basement levels are at the same level or below that of the sewer. So, as soon as the water levels in the sewer rise during heavy rainfall, the water backs up the pipework serving the properties and flows into the basements.



## Rainfall flooding

Flooding caused by heavy rainfall is becoming more common in Hammersmith & Fulham. The network of Victorian sewers is under increasing pressure from the extreme downpours caused by climate change, a growing population sending more water down into them and the increasing paving over of green spaces and gardens that provide natural drainage. Much of the borough is at risk from flooding from either sewers overflowing or through rainwater ponding. Sewer flooding causes huge social, economic and environmental impacts to residents, businesses and communities.

4. Large flows generated in other boroughs also pass through the local sewer system which can mean that when it rains the system is already under extra pressure and overflows.

**These factors make the area vulnerable to the heavy and unpredictable rainfall events that we are experiencing more frequently as a result of climate change.**



The solution lies in turning our urban areas from grey to green; to give rainwater somewhere to soak in rather than running into the nearest drain. There are easy and affordable things that you can do in your home and garden to help reduce the risk of local flooding. From putting a green roof on your shed to regreening your front garden, the following pages of this guide provide an introduction to what you can do to make your neighbourhood more resilient to flooding.

**Projects to increase plant cover and hold water where it falls can bring a huge range of benefits to our neighbourhoods...**

- Local flood risk is reduced;
- Tolerance to drought is increased as more water is held at ground level;
- Water quality is improved as it is filtered by plants and bacteria;
- Valuable urban wildlife habitats are created increasing biodiversity;
- The urban heat island effect that causes London to be up to 9°C hotter than its surrounding areas is reduced as plants cool the air around them;
- Air quality can be improved as oxygen is produced and particles filtered out;
- They provide new outdoor places for us to enjoy and relax in;
- Increased access to nature improves people's wellbeing;
- Significantly cheaper than pipes, tunnels and hard engineering.



# Solutions

As well as using policies to promote flood prevention measures in new developments, the council is also proactively creating gardens and green roofs that soak up rainwater, using the rainwater to nurture plants and reducing pressure on the sewers. Look out for some of them in this guide and get some inspiration for what you could do in your own garden or community space to make Hammersmith & Fulham greener, cleaner and more flood proof.



Some of the gardens that help to soak up rainwater and stop Hammersmith & Fulham from flooding

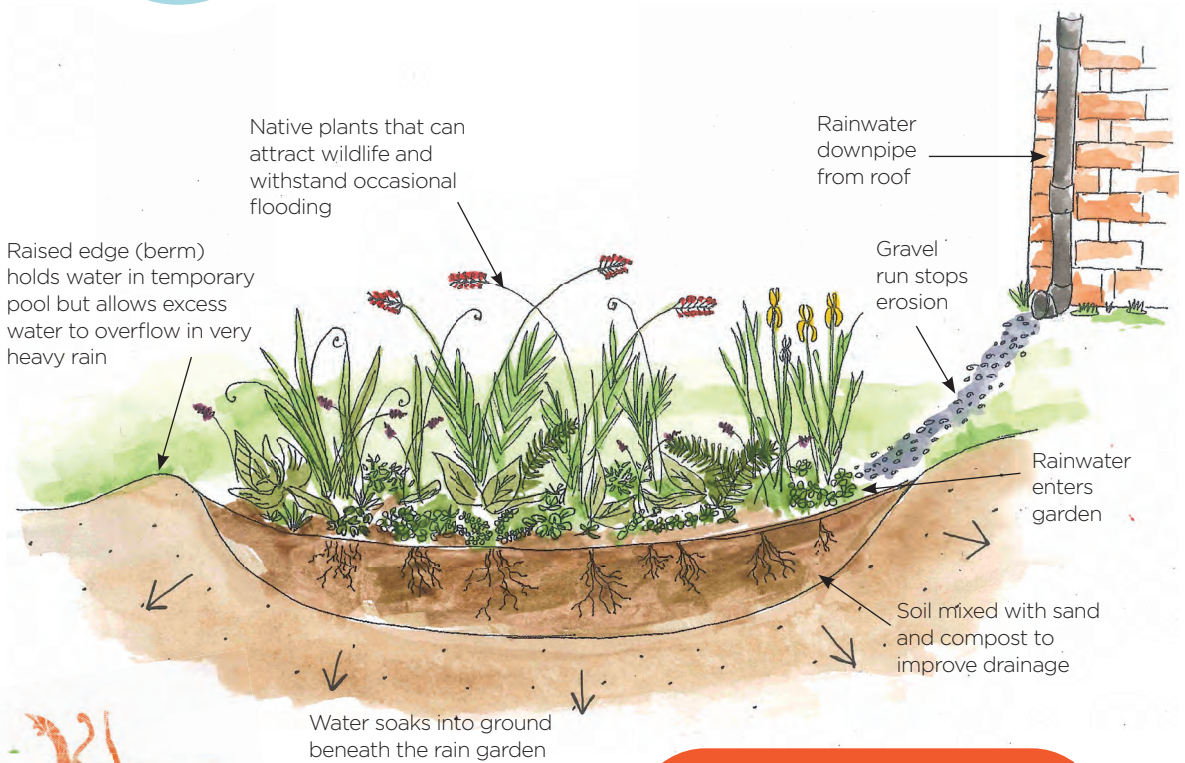


# Rain gardens

divert rainwater from buildings and hard areas  
into wildlife havens

## WHAT ARE THEY?

Rain gardens are shallow planted basins that allow water to drain naturally into the soil. When it rains, water that falls on hard surfaces like paving and rooftops can be diverted into rain gardens where it can soak into the ground or be absorbed by plant roots. Rain gardens provide simple, attractive and wildlife friendly ways to reduce flood risk and improve our urban areas.



## TOP TIPS

### 01

Dig a test hole and time how long it takes for water to drain away - you may need to improve drainage by adding sand and gravel

### 02

Think about an overflow system so that your rain garden doesn't fill up more than you intend it to! There is plenty of advice at [raingardens.info](http://raingardens.info)

### 03

Keep your rain garden 3m away from buildings to protect their foundations



## FAQs

**Useful resources**  
UK Rain Garden Guide  
at [raingardens.info](http://raingardens.info)

### **What's the difference between a rain garden and a pond?**

Ponds are full of water most of the time, whereas rain gardens are usually dry. They can tolerate occasional spells of flooding but this usually drains away a few hours after a storm.

### **Will it attract mosquitoes?**

No – mosquitoes need standing water for over a week to successfully reproduce, whereas a rain garden will only contain water for a few hours following most storms.

### **Are they expensive?**

No – they are no more expensive than planting in other areas of your garden! The biggest cost involved is buying plants but you can save money by splitting plants that you already have in your garden or sharing new plants with friends and neighbours.

### **What can I plant in it?**

You can really make it your own. It is a good idea to plant taller plants at the centre of the garden with a variety of species to create dense and

resilient planting. Planting native species that are nectar rich will encourage bees and other pollinators into your garden, but avoid plants that are better suited to dry conditions such as lavender or those susceptible to root rot.

### **What about maintenance?**

The only maintenance that rain gardens need is occasional weeding, and watering in dry weather when the garden is first planted to allow the plants to become established – not a lot!

## IN PRACTICE

### Rain garden on the Queen Caroline Estate, W6



In Queen Caroline Estate, close to Hammersmith Bridge, you will find a series of rain gardens designed to drain areas of hard paving and rooftops into gardens that soak up the extra water. These rain gardens stop the rainwater from flowing directly into the sewer which previously contributed to flooding in areas further along the sewer's path. Instead, when it now rains these spaces hold rainwater on the surface allowing the water to soak into the ground, get soaked up by plants, or evaporate, before any excess water that is left overflows back into the sewer. The rain gardens include play features, including bridges, mounds, stepping logs, balance beams and boulders - well worth a visit! They are bigger and more technical gardens than you might make yourself but are brilliant examples of how we can make neighbourhoods more resilient to extreme weather - and look great at the same time!

*As part of Groundwork London's LIFE+ project*

# Green roofs

plant cover on roofs to catch rainwater  
and create new wildlife habitats

## WHAT ARE THEY?

Quite simply, green roofs are rooftops that have been deliberately covered in plants. They act as a sponge, soaking up the rain and also providing important wildlife habitat for pollinators and insects, supporting the birds that rely on them. They also help to cool urban areas and increase both air and water quality - an impressive CV!



### Q: WHAT IS SEDUM?

A: Sedum is a low growing, evergreen plant - often on green roofs for its drought tolerance

- ← Planting
- ← Soil layer
- ← Filter layer to stop soil from washing through
- ← Drainage layer
- ← Waterproof liner (like pond liner)
- ← Original roof

**DID YOU KNOW?** Intensive green roofs are essentially rooftop gardens, containing thick soil with plants and trees. Extensive roofs have much thinner soil and are not usually intended for public access

## Types of green roof



### LIGHTWEIGHT EXTENSIVE

- The simplest green roof type!

**Planting:** sedum

**Value:**

- 🌱 Light and low maintenance
- 💧 Thinner soil layer = hold less water
- 🐦 Support less wildlife

**Cost:** £



### EXTENSIVE - what we like!

**Planting:** mixture of sedum and wild flowers

**Value:**

- 🌱 Support more wildlife than sedum alone
- 💧 Deeper soil = hold more water
- 🐦 Heavier and need occasional watering if very dry

**Cost:** ££



### SEMI-INTENSIVE - more like a garden than a green roof!

**Planting:** mixed - ornamental planting, herbs and small shrubs

**Value:**

- 🌱 Excellent wildlife habitats
- 💧 Hold a lot of rainwater
- 🐦 Very heavy and complex to install

🐦 Require routine maintenance

**Cost:** £££



## FAQs

### More information:

The DIY Small Scale Green Roof Guide is available at [greenrooftraining.com](http://greenrooftraining.com)

#### Can I green my roof?

There are a few things you need to think about before you can build your green roof. Firstly, you need to make sure the building will be strong enough to hold the extra weight of a green roof. Supports and reinforcements can be used to increase the loading weight of a roof. You also need to think about the roof's slope. Flat roofs and those with a slight slope are simplest to green

but you can create green roofs on those that slope up to 45 degrees with a little more thought.

#### Do green roofs need watering?

In general they don't need watering and will bounce back from dry periods. Remember that you're dealing with nature - if grasses and flowers go brown in summer they will recover with rainfall, just like they would in a meadow or lawn! However

if you'd rather it didn't go brown you can water your green roof easily by incorporating a simple irrigation system into its design.

#### Who can build a green roof?

It's up to you! There is a lot of help and information available about how to build your own green roof but there are also plenty of qualified installers that will happily do it for you, depending on your preference (and budget!).

## IN PRACTICE

### Green roofs at Richard Knight Estate, SW6



Nestled amongst rows of terraced housing near Parsons Green sits the Richard Knight Estate where the roof of the main residential block has been transformed from lifeless asphalt to a vibrant wildflower roof. The roof has been planted with a variety of wildflowers, providing homes and feeding stops for insects as well as the birds and even bats that feed on them. The green roof reduces the amount of water draining into the sewer and reduces UV damage to the roof, helping to prolong its lifespan, as well as keeping the flats below cool during summer heatwaves. As well as on the main building, several mini green roofs have also been created on bin stores and pram sheds around the estate. The project has brought more colour and life to the estate and greened up the view out of lots of residents' windows. *As part of Groundwork London's LIFE+ project*

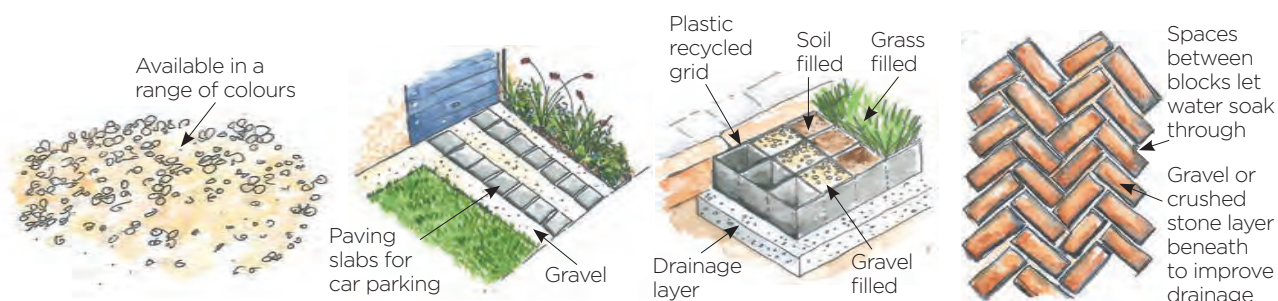
Photos: Groundwork London

# Depaving

take up hard paving to allow water to soak through into the ground beneath

## WHAT IS IT?

Depaving is the process of removing impermeable surfaces such as tarmac, concrete and paving slabs and replacing them with alternative materials that will allow water to pass through to the soil beneath, such as gravel, soil and grass. It can also be the process of getting rid of unnecessary tarmac to create new green spaces for people to enjoy and wildlife to thrive. It aims to counteract the problems caused by the mass-paving of London's urban gardens and can create not just permeability but attractive, healthy places for people to enjoy.



**Gravel** – in many ways the simplest and cheapest permeable surface! However it is prone to spreading and forming ruts so may need a little maintenance to keep it in the right place and isn't suitable for very steep driveways or wheelchairs.

**Cost:** from £3.75 per square metre (including delivery)

**Wheel tracks** – only pave the section that you actually need to drive on! Using planting and gravel in between wheel tracks is cheap, easy, attractive and better for wildlife.

**Cost:** about £5 per paving slab

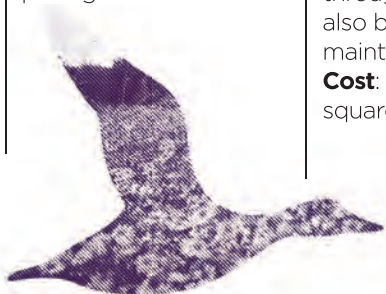
**Grass and gravel reinforcement** –

Using a grid of strong recycled plastic that can be driven over provides a permeable surface that grass and tough low growing plants can be grown through. Gravel can also be used for a low maintenance option.

**Cost:** £16-20 per square metre

**Brick pavers** – looks like traditional block paving but gaps between bricks let water soak through to a layer of improved drainage below. Low maintenance but needs to be installed by a specialist contractor. Needs to be installed on compacted aggregate to allow water to soak through.

**Cost:** Pavers £16-20 per square metre



## DID YOU KNOW....

Specific rules apply for householders wishing to pave over their front gardens.

If the surface to be covered is bigger than five square metres, planning permission will be needed for laying impermeable driveways that do not allow for the water to drain or to run to a permeable area. See the Council's online Planning Portal for further information or contact the planning department. [planningportal.co.uk/info/200130/common\\_projects/45/paving\\_your\\_front\\_garden](http://planningportal.co.uk/info/200130/common_projects/45/paving_your_front_garden)



**DID YOU KNOW?** Every year, an area of London two and a half times the size of Hyde Park is paved over in people's private gardens – a huge loss to London's wildlife and increasing the city's flood risk

## MORE INFORMATION

Royal Horticultural Society guidance on permeable paving at [rhs.org.uk](https://www.rhs.org.uk)  
All about depaving at [depave.org](https://www.depave.org)

## How to depave – step by step

Although it is a relatively straightforward process, it is important to have a plan when conducting a depave project.

*The steps below provide a*

**1** Make sure you know the whereabouts of pipes and cables before you start digging

**2** Consider how rainwater naturally flows in the area in order to avoid soil erosion and messy runoff when it rains

**3** Suit tools to the thickness of the surface that is being removed – choose either manual or mechanical

**4** Remove waste and arrange for its removal and recycling or disposal

**5** Once the area is clear, lay your chosen materials (gravel etc.) or if using the area for planting add compost with lots of organic matter

**6** Finish as you wish (e.g. planting, sow grass seed, create vegetable patch)

## IN PRACTICE

### Depaving a front garden



This simple example shows how taking up a few paving slabs in your front garden is not only an easy way to bring some life and colour into your patch but also makes your neighbourhood more resilient to flooding and helps to clean the air on your street. By leaving two rows of paving slabs for parking and planting around them, you can create a space that is both practical and beautiful – and your local wildlife will thank you for it too! When you have taken up the slabs, break up the soil underneath and see what condition it is in. You may have to add a layer of compost before planting or if the soil is poor, or why not sow some wildflower seeds to create your own mini-meadow?

# Water butts

stop clean water from being lost to the sewers and protect water resources at the same time

One of the easiest things to do to help your neighbourhood become more flood proof is to fit a water butt. They work by storing the rainwater that falls on buildings which you can reuse to water the garden, wash the car or clean your windows.

## Advantages

- Reusing rainwater reduces pressure on precious water resources, especially in areas of water stress such as South East England.
- Having a water butt can save you considerable amounts of money on your water bills, especially in summer when water consumption in the garden can rise to 50% of household use.
- Biologically, rainwater is better for plants than chemically treated household water so they'll thank you for it too.



100 litre water butt - good for fitting into a tight corner if you're short on space. Available from [savewater.co.uk](http://savewater.co.uk) - reduced price £19.95.

They're both buy one get one half price from [savewatersavemoney.co.uk](http://savewatersavemoney.co.uk)

## FAQs

### What about mosquitoes?

Some people encounter problems with mosquitoes breeding in their water butts but it can be easily stopped by adding a thin layer of vegetable oil onto the water's surface to stop them from laying eggs.

### Are they easy to fit?

There are two ways of fitting water butts, either to cut the downpipe and place the water butt directly beneath it or to cut a notch out of the downpipe and use a diverter to carry the water from the pipe to the water butt whilst allowing you to place the tank where you wish. For more information see the water butt page of [waterwise.org.uk](http://waterwise.org.uk).

### Do they need to be maintained?

Water butts should be covered with a solid top or fine mesh to stop leaves and small animals from falling in. Occasionally you may need to empty your water butt to prevent algae growing but generally maintenance is minimal.

### MORE INFO:

Where to buy them and fitting guide at [waterwise.org.uk/pages/water-butts](http://waterwise.org.uk/pages/water-butts)  
Shop with discounts at [waterwise.savewater.co.uk](http://waterwise.savewater.co.uk)

### DID YOU KNOW?

By installing a water butt you could also cut your carbon footprint as each household has half a tonne of water treated and pumped to their door every day! (Waterwise)



190 litre water butts - the most popular size - online reduced price £29.99.



# Water efficiency

## WHY SAVE WATER?

Water is a precious resource, essential for all forms of life on earth. Less than 1% of all water on the planet is freshwater accessible to people, however our consumption and demand for this resource is putting increasing pressure on this limited resource. Our increasing domestic use of water has also seen the breach in capacity of

our outdated sewer system, causing more frequent overflows of raw sewage into rivers. In 2013, 55 million tonnes of sewage was released into the Thames because of sewer overflows caused by heavy rain. Reducing our water consumption would make more space in our sewers and help to minimise overspill into the Thames.



**DID YOU KNOW?** We only see about 3% of all of the water that we use - the rest is used to grow our food, make our clothes and process fuel for our transport

From shower heads and tap aerators to soil gel and shower timers, claim your FREE water saving gadgets at *freebies.thameswater.co.uk*



## WATER SAVING IDEAS

Saving water around the home, at school and at work doesn't have to mean restricting the amount of water that you use, just minimising the amount that you waste...

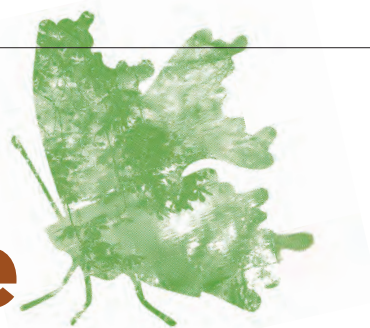
### In the house

- Take short showers – ideally around four minutes! If you shower for more than 10 minutes you'd be better off having a bath;
- A third of the water we use at home is flushed down the loo - dual flush toilets and flush bags in the cistern help cut this amount;
- Keep a bottle or jug of water in the fridge rather than waiting for it to run cold from the tap;
- Wash muddy vegetables in a bowl of water rather than under a running tap;
- Check your home for leaks – a dripping tap can waste 60 litres of water a week – enough to fill a small bath;
- Fully load your washing machine and dishwasher – one full load uses half the amount of water as two smaller loads;

### In the garden

- Fitting a water butt can collect enough water to fill 500 watering cans a year;
- Water plants in the early morning or evening to minimise the amount of water that is lost through evaporation;
- Use bark or pebbles to keep moisture in the soil. This can reduce evaporation by up to 75%;
- Use a watering can rather than a hose.

# Queen Caroline Estate Groundwork London



EU LIFE+ programme - climate proofing social housing landscapes

As a partnership project between Groundwork London and the council, three estates around the borough have been transformed into leading examples of housing that is resilient to the impacts of climate change such as flooding, overheating and declining environmental quality. On each estate, rain gardens, green roofs and other green features have been created to demonstrate how small-scale gardens designed to soak up water and support wildlife can be both practical and beautiful places for people to enjoy!



## WHAT RESIDENTS HAVE SAID:

**81% of residents agree or strongly agree that the project has improved the public green space in their neighbourhood.**

“The LIFE+ Project has made our estate really beautiful and it feels like we are part of a living, growing environment now. Whenever I walk around and see the changes it makes me happy”.

*Shirley Culpit, Chair, Queen Caroline TRA*

“This project has made a lot of improvements to the look of the estate, as well as helping to bring our community together”.

*Ros O’Connell, Treasurer, Queen Caroline TRA*

“The LIFE+ project has made me realise just how much difference greenery makes in the overall appearance of a place, as well as the positive impact on the environment. It has also shown me that we all can contribute towards these small changes to help make our local area a cleaner, safer and more beautiful community to live in”.

*Ayesha Khan, Queen Caroline resident.*

See [www.urbanclimateproofing.tumblr.com](http://www.urbanclimateproofing.tumblr.com) for more information.



# Hints & tips



## FUNDING

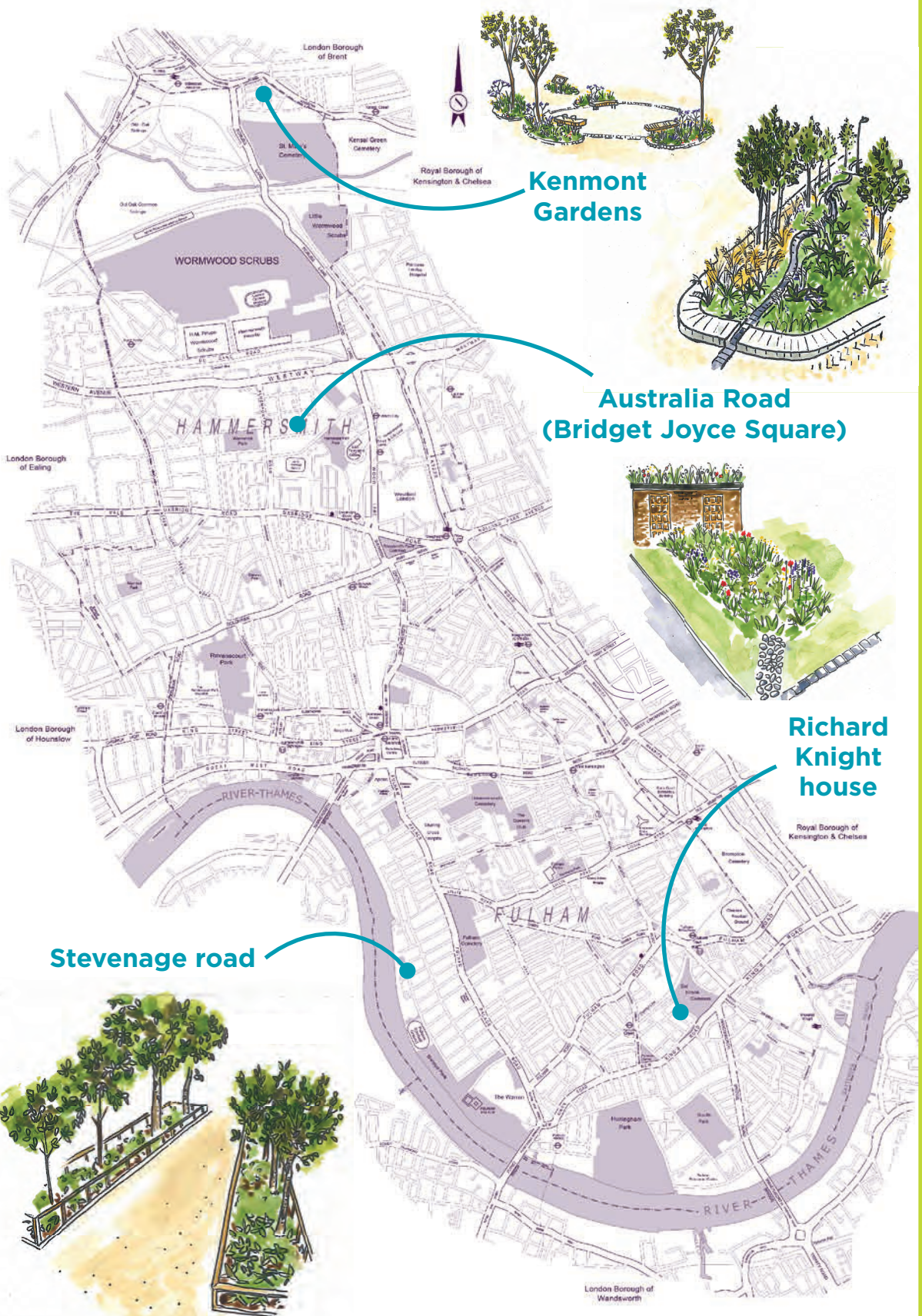
- Funding is available for a huge range of community projects including creating rain gardens, green roofs and making new green spaces in communal areas. You can apply as a community group, residents' association or you can start up your own group for a project.
- Once you've decided what to apply for, you can see what grants are available. Many organisations fund community projects:
  - *Big Lottery Fund*
  - *Biffa*
  - *Tesco bags of help*
  - *Veolia Communities Fund*
  - *Mayor of London*
- It's good to be specific about what you need it for – you are more likely to be given funding if you can show how you will spend it.
- Don't be disheartened if you don't get the first grant that you apply for – it pays to try a few different funders.
- Finally, plan ahead so that you'll be ready if you receive the grant. – if you've got a good idea and a way of making it happen, there's no reason why you shouldn't get funding for it!

## PLANNING PERMISSION

- Generally speaking you won't need planning permission for any of the projects mentioned in this guide unless they are going to significantly alter a structure that they are on. If you're unsure check with your local authority.

## WILDLIFE GARDENING

- By making a few simple considerations in your project you can make a big difference to the wildlife that it can support – birds, butterflies, bees, bats and hedgehogs will be helped by the additional food sources!
- Choose plants that attract nectar seeking insects – ox-eye daisy, foxgloves and cornflowers are all fairly easy to grow.
- Don't forget the birds – include some plants which have berries in winter for them to eat (find plant lists at [www.bto.org](http://www.bto.org))
- Create a pond – even a small one will attract birds, amphibians, insects, mammals and a host of mini-beasts
- Make some shelters – a log pile, some stones or a patch of long grass all provide safe havens for wildlife to make a home.
- Find out more at [www.wildaboutgardens.org.uk](http://www.wildaboutgardens.org.uk)



**Kenmont  
Gardens**

**Australia Road  
(Bridget Joyce Square)**

**Richard  
Knight  
house**

**Stevenage road**