

Green Capital

Green Infrastructure
for a future city

SUPPORTED BY
MAYOR OF LONDON



CROSS RIVER
PARTNERSHIP



“

We need to re-think future urban design to deliver more balanced metropolitan landscapes - ones that support healthy, active living and that are more environmentally resilient and sustainable. The challenges we face demand that. Green spaces, big or small, are a vital part of the solution. The projects showcased in this handy guide provide ‘know-how’ and encouragement. I hope they inspire others to emulate their achievements.

”

Sir Terry Farrell, CBE, RIBA, FRSA, FCSD, MRTPI, Principal, Farrells

Foreword

London is the world’s greatest city. It is also one of the greenest. And while we can rightly be proud of our established green assets - from magnificent Royal Parks to much-loved local spaces - there’s a new, unsung hero taking root. All across London a network of pocket parks, planted roofs, rain gardens, living walls and street trees are greening our city streets, making our grey public spaces more colourful and vibrant places to visit, live and work in.

This ‘green infrastructure’, or GI, is a vital part of the complex organism of our city – as essential to London as the roads, rail and cables that carry life and energy around our capital. GI brings the benefits of nature right into the places where we work and live. And as London’s population grows, and our neighbourhoods see more development, that will be more important than ever.

GI allows our towns and cities to adapt to climate change, by cooling the built environment and reducing energy consumption. It mitigates localised flooding, improves air quality, provides a home for wildlife, improves our health and wellbeing and creates attractive places where people want to be. It benefits us all.

Working together, the Mayor, Natural England, major landowners and the wider business community represented by Business Improvement Districts (BIDs), have recognised the increasing importance of GI for future-proofing our capital.

Assisted by less than £500,000 of public funding, central London BIDs have been nurturing a range of successful projects that demonstrate imagination and determination to make the built up areas of London more attractive and, more importantly, resilient and sustainable. Major landowners are seeing the benefits to the environment and the quality of place that GI brings, and they are following suit.

The results achieved by this collaboration are truly impressive. They provide a model for what can be delivered across the whole of the city and beyond, showcasing London as a place well equipped to address the considerable growth, resource and environmental challenges of the future.

The Mayor, Natural England and Cross River Partnership (CRP) are proud to be part of a partnership spearheading the greening of urban London. We hope the GI case studies in this publication will inspire local authorities, BIDs, developers, land owners, community groups and others and ensure green infrastructure is an integral part of London’s future development, balancing our rich and dense urban fabric.



MATTHEW PENCHARZ
Deputy Mayor for Environment & Energy



JAMES CROSS
Chief Executive, Natural England



SUSANNAH WILKS
Director, Cross River Partnership

“

The results achieved by this collaboration are truly impressive - 117 installations delivered over the past 4 years, leveraging over £4.3m of private sector investment.

”

Susannah Wilks, Director, Cross River Partnership

How green infrastructure is taking root

Nearly half of our capital is green, making it unique among major conurbations. But the need to accommodate a growing population and London's continuing attractiveness for investment means this green space is under threat.

Urban green spaces like parks and gardens have long been appreciated as cherished parts of our city. But in 2008 there was a step-change in the way we recognise the value, and function, of London's green features. **The London Plan**, the Mayor's spatial development plan for London, introduced a new concept – green infrastructure – and showed how it is vital to building a sustainable future for London.

The key innovation with green infrastructure, or GI, has been to **widen the scope for greening**, bringing different planted interventions into the urban environment through living walls, green roofs, rain gardens, parklets, tree pits and more. Together these interventions begin to build a network of installations that deliver multiple

benefits to London's residents, workers and visitors, as well as wildlife - benefits like mitigating surface water flooding, improving air quality, cooling the urban environment, encouraging walking and cycling, and enhancing biodiversity and ecological resilience. And, of course, they make the city a more attractive place to be.

Green infrastructure continues to gain ground through planning. In 2012 the **All London Green Grid** set out guidance on how to design, deliver and manage GI across London, establishing the idea of a network that is essential for the city. And the March 2015 version of the **London Plan** included new planning policies to promote the integration of urban greening, green roofs and sustainable drainage in developments.



The term “green infrastructure” may sound odd, but given the scale and range of benefits these spaces can give our city and its neighbourhoods, it is vital we see them as being as integral to the capital's metabolism as its roads, rail lines or water pipes.



Mayor's Foreword to the All London Green Grid Supplementary Planning Guidance (March 2012)



The **London Infrastructure Plan 2050** looks ahead to our infrastructure needs for the coming decades. It calculates that the capital will need the equivalent of 13,000 football pitches of new green cover by the middle of this century.

It's a huge challenge and needs many different capabilities. A group of experts has come together in a Green Infrastructure Taskforce, and established a way forward in **Natural Capital: Investing in a Green Infrastructure for a Future City**. This sets out the changes to policy, governance, valuation and funding needed to ensure the long-term investment in London's green infrastructure will take place, actions like appointing a Green Infrastructure Commissioner and new ways to demonstrate the economic value of GI.

Spatial planning is just one tool in delivering this step change for improving London's health, air quality, streets and neighbourhoods.

Not surprisingly it is also being woven into other strategies and programmes too, from the Roads Task Force report **The Vision for London's Streets and Roads**, to the Mayor's **Cycling Vision**, **Transport Emissions Roadmap** and **Mayor's Air Quality Fund**. These all address the role that green spaces play in meeting the needs of London and Londoners in the 21st century, from quietways to mini-Hollands, green corridors, linear parks and tree planting to electric vehicle-friendly Low Emission Neighbourhoods.

London Sustainable Drainage Action Plan shows how green infrastructure can play a significant role in reducing surface water flooding, and **Better Health for London**, the report of the London Health Commission, highlights the value of green infrastructure in improving the health and well-being of Londoners.

Natural Capital sets out five objectives for the future:

1 Promote Healthy Living

by increasing physical activity, reducing stress and removing pollutants

2 Strengthen Resilient Living

by keeping the city dry and cool and its air clean

3 Encourage Active Living

by increasing levels of walking and cycling

4 Create Living Landscapes

by conserving the most special landscapes, habitats and species

5 Enhance Living Space

by providing a range of outdoor spaces for cultural, civic, learning and community activities like productive landscapes.

Making the case for business

The widespread public benefits of green infrastructure mean that delivery of GI has previously been seen as the role of the public sector, and the challenge has been to make the case for businesses to invest. However, evaluation of Victoria BID's Cleaning and Greening programme suggests that businesses increasingly recognise the value of green infrastructure, for example in:

- **attracting customers** by linking green infrastructure benefits with their products, services or corporate social responsibility
- **maximising spending** by increasing dwell-time
- **motivating staff** by increasing wellbeing and making links to wider environmental concerns such as air quality, flooding, climate change
- **adding value** by building partnerships with local authorities and community groups

Green infrastructure is much more than something that is 'nice to have', and certainly not an afterthought at the end of a development scheme. Planning for urban greening should be the foundation on which we design London, so we create an environmentally resilient, liveable and economically sustainable city for the future.

The case studies detailed in the following pages demonstrate just some of the ways in which businesses, through BIDs, land owners and others, have embraced green infrastructure, delivering benefits to London in ways that also contribute positively to the bottom line.



Featured
case studies



The Rubens Living Wall
Victoria



The Missing Link
Vauxhall



Greenwood Theatre
London Bridge



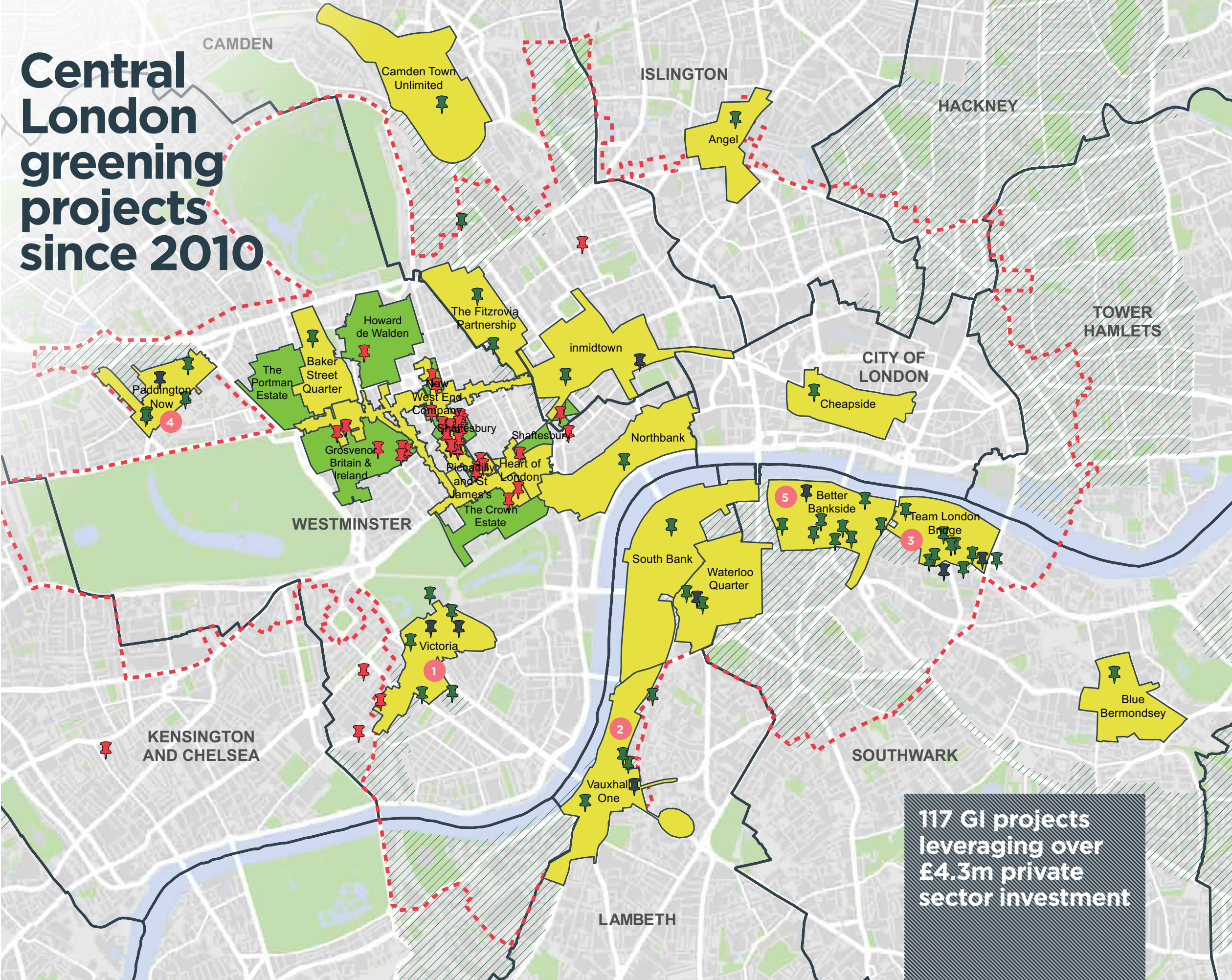
St Mary's Hospital
Paddington



The Low Line
Bankside

- Key**
-  BID Installation
 -  Greening the BIDs Installation (see list of GTB installations at p.22)
 -  Wild West End Installation
 -  BID Area
 -  Wild West End Area
 -  Central Activities Zone
 -  Opportunity Area
 -  London Borough Boundary

Central London greening projects since 2010



The Rubens Living Wall

Victoria

1.



2.



1. Elevation Design by Treebox, Red Carnation Hotel
2. During installation, Red Carnation Hotel
3. 22 species of plants, Red Carnation Hotel
4. Maintaining the installation, Red Carnation Hotel
5. The completed scheme, Red Carnation Hotel

The Rubens at the Palace hotel living wall delivered in partnership with Victoria BID, the Green Roof Consultancy and Treebox Ltd



LEAD BID OFFICER:
Jacqueline Riozzi, Deputy Chief Executive, Victoria BID



MORE INFORMATION:
victoriabid.co.uk

The scheme:

The Rubens at the Palace hotel living wall in Victoria covers an area of 450m² and includes a staggering 10,000 plants. One of London's largest living walls, it weighs in at about 10 tonnes, with 22 different pollinator-friendly plant species including buttercups, crocuses, strawberries, spring bulbs and winter geraniums. This mix provides waves of blossoming plants throughout the year. Rainwater harvesting tanks integrated into the design store rainwater from the hotel's roof to irrigate the plants, diverting it from the mains and reducing the risk of localized surface water flooding.

How we did it:

Victoria BID's 2010 Green Infrastructure Audit was a groundbreaking project in more ways than one. Inspired by local businesses wanting more places to relax and enjoy their working environment, and supported by funding from the Mayor's Greening the BIDs programme, it mapped green and grey spaces in Victoria and identified new opportunities for urban greening.

The BID commissioned a feasibility study for a living wall from the Green Roof Consultancy and the hotel's owners, the Red Carnation Hotel Collection, commissioned concept designs, subsequently developing and managing the project at the Palace living wall.

Lessons learned:

This pioneering project faced several challenges. Although the planning process ran smoothly, schemes of this scale were unfamiliar to planners more accustomed to micro GI projects such as planters and hanging baskets. Timing of construction was important too: installing the wall in winter or early spring would have seen plants establish quicker and the wall looking more beautiful sooner.

“

They see it from far away and follow the road around to come closer – which brings them nearer to our business.

” Quote from local shopkeeper

3.



450m²
of green wall



One of London's
largest
living walls

10

metric tonnes in weight

22

pollinator friendly plants



4.

Achievement and benefits:

As well as being fascinating to look at and a local talking point, the living wall is an important wildlife habitat for bees, butterflies and birds. It significantly increases local biodiversity, improves air quality by trapping pollutants and cuts surface water flooding. It also helps insulate the hotel: in hot summers the vegetation cover can dramatically reduce the need for additional cooling, while in winter it works as a blanket to reduce heat loss. In 2013, the living wall won a Sustainable Water Industry Group award. Thermographs of the wall confirm significant cooling.

The Green Infrastructure Audit was pivotal in providing an effective channel of engagement and collaboration between Victoria BID and the hotel. Hotel staff took pride in the installation of the living wall, and its energy and water saving benefits are a reminder of the hotel's environmental policies and practices. As a new landmark for visitors it also benefits other local businesses, with one commenting, “The wall looks nice and lots of tourists take pictures. They see it from far away and follow the road around to come closer – which brings them nearer to our business”.

5.



The Missing Link

Vauxhall

“We are delighted to have worked with Lambeth Council and Vauxhall One on this fantastic project which will transform this part of Vauxhall. This is part of our commitment to invest in and improve cycling and walking routes, as well as projects that help transform London’s public spaces and improve air quality.

” Ben Plowden, Director of Surface Strategy and Planning at TfL

Partnership project led by Vauxhall ONE BID, working with Transport for London, Lambeth Council, Royal Bank of Canada and Cross River Partnership.



LEAD BID OFFICER:
Chris Law, Public Realm and Safety Director



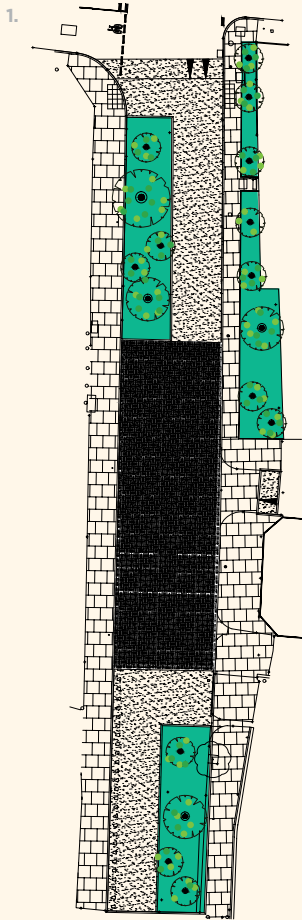
MORE INFORMATION:
vauxhallone.co.uk

1. Concept design, Erect Architecture with J&L Gibbons Landscape Architects
2. Concept design, Erect Architecture with J&L Gibbons Landscape Architects
3. View from Teahouse Theatre, Vauxhall ONE BID
4. Segregated walking and cycling, Vauxhall ONE BID
5. Completed rain garden installation, Vauxhall ONE BID

AWARD WINNING

The Landscape Institute Awards 2015 Winner

Vauxhall Promenade of Curiosities Victoria BID



The scheme:

The Vauxhall Missing Link emerged from a desire to join up new development in the Nine Elms area with Vauxhall’s existing green spaces – Vauxhall Park and Vauxhall Pleasure Gardens – and connect them up to the South Bank.

The 400m² installation, on Vauxhall Walk in front of the popular Tea House Theatre replaces a piece of busy road with a clean, linear space designed to promote walking and cycling.

The project combines a cycle docking station, segregated cycle path and pedestrian walkway with rain gardens and the relocated Hugo Bugg Waterscape Garden exhibited at the 2014 Royal Chelsea Flower Show where Hugo was the youngest-ever winner of a Chelsea gold medal for a show garden. Together, the different elements invite sustainable travel, improve air quality and reduce surface water flooding by introducing Sustainable Urban Drainage that redirects run-off from the mains into the new green areas.



How we did it:

Vauxhall ONE, the Business Improvement District for Vauxhall, ran an Urban Design Competition with the Royal Institute of British Architects and the Landscape Institute seeking sustainable ways to improve the public realm and connectivity in the Lambeth section of Nine Elms on the South Bank.

The competition attracted an astonishing 200 entries from 21 countries around the world. The unanimous winners were Erect Architecture with J&L Gibbons Landscape Architects, chosen for an outstanding concept, ‘The Vauxhall Promenade of Curiosities’. Their design proposed a Green Trail connecting Vauxhall’s parks and new developments to the South Bank using a planted walkway. The scheme is part of Transport for London and The Mayor’s Pocket Park programme.

Lessons learned:

The Vauxhall Missing Link could not have been delivered without the committed support of a broad partnership of stakeholders. The local community was a key part of this support: speaking with them early in the process and engaging them in the vision was vital to the success of the scheme.



It was also important to find match-funding support for the installation, and to do so early on. Transport for London, Lambeth Council, Royal Bank of Canada and Cross River Partnership were all instrumental in this. Agreeing the funding early helped partners to see that the vision was deliverable and ensured a high quality design.

Achievement and benefits:

The 400m² of rain garden and planted areas create a valuable catchment that helps alleviate localised surface water flooding, and the specially selected plants support biodiversity. Both are valuable in this urban setting.

The scheme has been extremely well received by local businesses for creating a calmer and more pleasant environment in this busy commuter setting. The nearby Tea House Theatre and Black Dog pub both have outside seating adjacent to the installation.

Not only does the scheme improve the look and feel of the area, it has also supported local jobs and apprenticeships in horticulture. In 2015 Vauxhall ONE and the Missing Link won the Landscape Institute award for ‘Adding Value in the Public Realm’.

400m² of rain garden

22 species of plant

£260,000 of investment

STREETS

Benefits of green infrastructure

Most of us know that spending time in high quality green spaces is good for us.

More than 90% of people in England are known to visit public green spaces, and think it is important to have public green spaces nearby.

But the full range of health, social, environmental and business benefits that can come with increasing green infrastructure in our city are not always so well known.

Health and social benefits

One of the longest-known benefits of being in a greener environment is its impact on our physical and mental health. Victorians knew that creating urban parks could help combat disease, and Florence Nightingale was a notable advocate of hospital gardens.

Since then, research confirms time and again that access to urban green space can improve mental health and wellbeing. Green space diminishes urban noise, reduces stress and shortens recovery times, and it increases concentration, confidence and self-esteem. It just makes you feel better.

As well as recreation, and providing spaces to socialise, relax and learn in, access to urban green space can also encourage physical activity. By reducing obesity and the risk of coronary heart disease and Type II diabetes good access to green space **could offer cost savings to the NHS of more than £2billion per year across England.**

Environmental benefits

As we understand more about the challenges of urban living on our health, we find that many of the solutions can be found in nature.

Air Quality

Vegetation, and especially trees, can contribute to improvements in air quality by trapping particulate matter (PM) and absorbing polluting gases, such as nitrogen dioxide (NO₂) – a significant challenge for London.

Green walls can be particularly effective in urban streets surrounded by high-rise buildings, **reducing NO₂ by 15% and PM by 23%.** The 2015 London i-Tree Eco Project, **Valuing London's Urban Forest** found that London's trees remove more than 2,000 tonnes of pollution every year, a tenth of the pollution emitted by road transport in London.

Carbon Storage

Vegetation stores carbon in its leaves and stems, with trees being particularly effective at carbon storage. For example, the i-Tree survey found that London's trees store almost **2.5million tonnes of carbon each year.**

Urban Cooling

London's future climate is likely to include warmer, wetter winters and hotter, drier summers. Urban landscapes can amplify summer night time temperatures, which in turn affects people's health. In the heatwave of August 2003 there were **2,139 excess deaths in England and Wales** and the centre of **London was up to 11°C warmer than the surrounding greenbelt.**

Vegetation can reduce this heating effect: **vegetated urban parks are, on average, 1°C cooler than built up areas** during the day. Vegetation can also help reduce the internal temperatures of buildings: the insulation provided by green roofs can reduce the need to cool and heat buildings mechanically, making it more comfortable and reducing energy demand and costs.

Water Management

London may be at increased risk from significant flooding by as early as 2050. The combined challenges of more people, more buildings and more rain will mean our urban drainage systems will be increasingly overloaded, potentially leading to flooding of homes, businesses and transport routes.

London's i-Tree survey found that **London's trees reduce storm water runoff by almost 3.5million cubic metres each year**, or 10 times the volume of water in the Serpentine in Hyde Park. Rain gardens, such as the John Lewis Rain Garden in Victoria, are contributing to managing localised surface water flood risk. Green infrastructure can also help to improve water quality.

Support Biodiversity

London Wildlife Trust estimates from aerial surveys that **the capital is losing the equivalent of two-and-a-half Hyde Parks of greenery a year**, as private, domestic gardens are paved over for parking, and sheds replace flowerbeds.

As well as adding to the heat island effect and drainage problems, this reduces the available habitats for wildlife and threatens the range of species living in London.

Green infrastructure provides vital new habitats for wildlife, including hedgehogs, slow worms and sparrows our gardens, stag beetles in our parks, and peregrine falcons nesting on our tall buildings – the world's fastest bird of prey. Green infrastructure also provides food, plants and nectar sources for pollinators, contributing to our EU commitment to no net loss of biodiversity by 2020.

Business benefits

Research has recently begun to explore the relationship between green infrastructure, businesses and the economy. There is evidence that good quality green spaces can help to attract businesses and investment, contribute to employee productivity, and encourage consumer spending.

London Metropolitan University's assessment of the impact of GI in Victoria found nearly **70% of workers surveyed felt 'happier'** being employed in an area with more green spaces.

Fundamentally, green infrastructure makes cities better places to visit, live and work in. For these reasons, and those outlined above, London's businesses are recognising the value of green infrastructure and BIDs are leading the way on delivering green infrastructure projects that will be London's new green assets of the future.



John Lewis Rain Garden - Victoria

47%

Park

Park

Park

In London, we are lucky that **47% of the city is green**

2000

Every year **2,000 tonnes of air pollution** are removed by London's trees

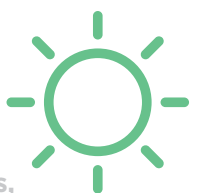


92%

of people in England are known to visit public green spaces, and think it is important to have public green spaces nearby



Green space diminishes urban noise, reduces stress and shortens recovery times, and it increases concentration, confidence and self-esteem



Greenwood Theatre

London Bridge



1.



2.



3.



4.



5.

How we did it:

Supported by the Mayor and Natural England, in 2012 Team London Bridge undertook a Green Infrastructure Audit of the BID area to identify potential sites for new GI interventions. The Greenwood Theatre was one of the opportunities identified. As soon as 'in principle' permission was granted by King's College London and landlord Guy's and St Thomas' Charity, project managers Cityscapes approached Joe to develop the outline design, with Zandra later adding her colour palette. The striking combination of blue, orange and pink was carefully incorporated by Joe into the final planting scheme.

With planning permission received, work started on the four week process of painting the building, followed by 12 weeks of hard landscaping by contractors Gardenlink and concluding with plant installation in March 2015 – most of which was carried out by Putting Down Roots, a horticultural initiative of St Mungo's.

Lessons learned:

In some ways a victim of its own success, the pocket park quickly became heavily used and this put a strain on maintenance and cleaning. Some elements of the planting have since been changed to better withstand the heavy use and a more rigorous cleaning regime introduced. This project showed the importance for any publicly accessible GI installation to factor these considerations very firmly into their whole life plans from the outset.

Achievement and benefits:

The Greenwood Theatre has become a significant local landmark and brings to life what will soon be the gateway into the newly developed station.

By using such an iconic local designer as Zandra Rhodes the project has a strong cultural connection to the area, and the quality of Joe Swift's garden design adds an element of prestige. Environmentally, the pocket park makes a small but locally valuable contribution to supporting biodiversity, mitigating poor air quality and managing surface water flooding.

In January 2016 the scheme won the Society of Garden Designers' People's Choice Award.

Partnership project led by Team London Bridge BID, working with Cityscapes, Guy's and St Thomas' Charity, Southwark Council, the Mayor of London's Pocket Park Programme, Network Rail Thameslink Programme, King's College London, Gardenlink and St Mungo's Putting Down Roots.

The scheme:

Built in 1975, the Greenwood Theatre stands near The Shard, Borough Market and Bermondsey Street. Currently used by King's College London for student productions, this location will be next to a major entrance to the redesigned London Bridge Station, due for completion in 2018. Forty years into its life the theatre is surrounded by new developments and the 70s façade had begun to seem at odds with the thriving creative community that now surrounds it.

Inspired by the opportunity provided by the Mayor's Pocket Park programme, Team London Bridge worked with renowned British fashion designer Dame Zandra Rhodes and teamed her up with garden designer and TV presenter Joe Swift to create a linear 'pocket park' outside the theatre on Weston Street. The building has been painted in Zandra's trademark colours and a raised planting scheme incorporating new seating now envelopes the theatre at ground level. Rainwater run-off from the hard standing is diverted beneath the beds to be drawn up by the plants, a method of sustainable urban drainage preventing rainwater entering the drainage system.



LEAD BID OFFICER:
Shane Clark,
Deputy Executive
Director

TeamLondonBridge
improving our district

MORE INFORMATION:
teamlondonbridge.co.uk

“We are embracing the London microclimate to grow an eclectic and varied mix of plants including some exotics to provide plenty of all year round interest, colour and scent.”

Joe Swift, Garden designer and TV presenter

The project has been delivered with social and ecological sustainability as key drivers. Sustainable Urban Drainage has been built into the planters.



AWARD WINNING

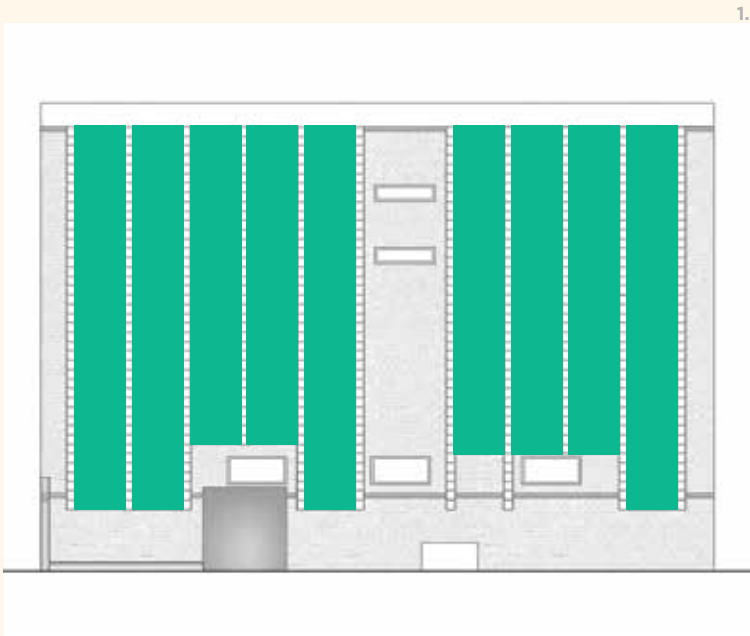
**Society of
Garden Designers'
People's Choice
Award 2015**

**Greenwood
Theatre Garden**
Team London
Bridge

4.

St Mary's Hospital

Paddington



“I’m excited about the benefit that our patients, staff, and visitors will feel from the livening up of our estates.”

Jill Blowers, Property manager for St Mary’s Hospital

Partnership project delivered by PaddingtonNow together with St Mary’s Hospital and Treebox Ltd.



LEAD BID OFFICER:
Marisa Barrocas,
BID Operations Coordinator

PaddingtonNow

MORE INFORMATION:
paddingtonnow.co.uk

The scheme:

The St Mary’s Hospital living wall features 10 vertical planted louvres across a 70m² wall. 12m tall, the louvres are planted with six seasonal species including purple flowering Geranium Rozanne, climbing jasmine and ivy, selected to ensure a long flowering season and year round greenery to welcome birds, butterflies and bees.

The living wall is twinned with a nearby rain garden covering an area of 24m², planted with shrubs and garden strips and incorporating an irrigation system and rainwater storage tanks that can store up to 120 gallons of water.

Together, these installations will help to both improve local air quality and reduce the risk of surface water flooding, relieving pressure on an already challenged drainage system.

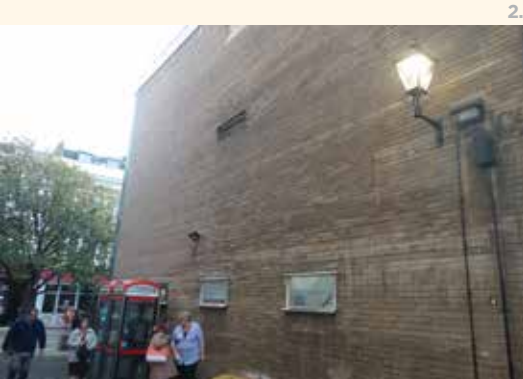
How we did it:

PaddingtonNow’s Green Infrastructure Audit in 2013 aimed to identify locations within the BID area suitable for different types of greening initiatives. The opportunity at St Mary’s Hospital was one of the key sites brought to light.

This visible site suffered from ponding of surface water runoff and a solution was sought that would not only address this but also provide wider environmental benefits and be attractive for passers-by.

Funding from the Mayor’s office via Cross River Partnership provided the impetus to the BID’s board and member businesses, but the key to implementation was the consent and assistance provided by St Mary’s Hospital, on whose land the installations sit.

Support from Westminster City Council was also important, particularly during the Planning Consent process. A healthy dialogue with a number of key stakeholders at the Council allowed the project to overcome various Planning hurdles.



Lessons learned:

St Mary’s Hospital is a Grade II listed building, so installation of the living wall and rain garden required architectural sensitivity and careful design; navigating and satisfying planning and highways regulations was a considerable challenge. Engaging the local authority early to ensure requirements are clearly understood and can be addressed accordingly is essential.

Working with local stakeholders to identify costs – especially those not immediately obvious, such as legal fees – was essential to ensure the project remained within budget. Rigorous contract management was also important to ensure contractors understood what was required, and delivery plotted out in advance to avoid any surprises.

Doing something new and different can often bring risks, and the design of the living wall louvres was intended to be a break from the norm. Finding the right mix of plants to flourish in the shade of a north-facing wall has been addressed by adapting the design to incorporate cables between the louvres to encourage growth of the plants to cover the expanse of wall.



Achievement and benefits:

When the wall is flourishing it looks impressive and has attracted praise from businesses and visitors alike. Despite needing to be replanted it has served its purpose of reducing the risk of localised flooding by collecting around 4,200 litres of water.

The sunken garden has collected over 10,000 litres of rainwater over the course of a year. In addition, both sites have improved the local air quality by approximately 40%, verified by local monitoring.



- 1. Concept design by Treebox Ltd.
- 2. Before the installation, PaddingtonNow.
- 3. Vertical Louvres, PaddingtonNow.
- 4. Completed scheme, PaddingtonNow.
- 5. Rainwater irrigation system, PaddingtonNow.

Delivering Green Infrastructure: A ‘how to’ guide

Inspired by what you’ve read?
Here is a five-step guide to delivering
green infrastructure in your area.

1: Decide on the vision and partners

Undertaking a GI Audit can be a useful way to develop relationships and local engagement

Before beginning a GI Audit you need clearly to understand **what green infrastructure can achieve in your area**, and **why it is important**. Be clear about the different objectives of local partners, including the BID, local authority, community groups, landowner and local businesses. A clear vision will be key to the project’s success. **Ask these questions, amongst others:**

- How does GI fit with existing priorities and initiatives?
- What different skills, and access to funding and information do partners bring?
- Will having a steering group help?

2: Undertake a Green Infrastructure Audit

Don’t let short-term cost considerations outweigh quality of outcome in the selection criteria. Make full use of maps and illustrations maps so the audit is relevant to a wide audience.

Project brief: Write a clear project brief so that consultants with the right experience can tender for the work. These could include landscape architects, ecologists and green roof experts. Skills should include GIS mapping and data analysis.

Time and cost: Based on GI Audits in London so far, this will take approximately three months from appointment of consultants and cost around £15,000. However, savings may be achieved by focusing on priority areas or undertaking joint audits with neighbouring BIDs, authorities, landowners or developers.

The GI Audit should include:

- **key issues** – impetus, local planning and development context
- **benefits** of green infrastructure to this area
- **current** GI resource, mapped and described
- **functional and quantifiable** benefits of existing GI
- **proposed GI projects and assets**, identified, mapped and prioritised

Launch and promotion: A launch event with printed collateral and wider communication will be critical to securing buy-in and support.

3: Design, plan and implement GI projects

The range of potential interventions identified in the audit may vary in scale from a single green roof to the redesign of the whole public realm, but prioritising projects will focus energy and help to ensure the GI Audit is taken forward.

Delivery plan: Quick-win projects can demonstrate that change is underway and encourage others to get involved. Identifying one or two large projects will raise the profile of GI within an area. These may be completely new or build on existing initiatives.

Funding: Unless funding has been secured beforehand, design should be flexible enough to be adapted to a range of potential funding sources. Partnership working can lead to more imaginative funding solutions, e.g. a combination of public and private funding sources such as Section 106 and Community Infrastructure Levy (CIL).

Consents: Assess the range of planning and consenting issues that may be needed for the delivery of a new GI asset. As well as planning permission these can include Highways consent, Listed Building or Conservation Area consent and environmental permits. Early engagement with local authorities and other statutory undertakers in the GI Audit process can help identify which consents will be necessary, reducing potential delay and even failure.

4: Agree management and maintenance

Planning for the whole life of a GI installation is critical if it is to thrive and deliver continual benefits to an area.

Identify the most appropriate partner to undertake the future maintenance and management of the GI asset. **These can include:**

- **public bodies** e.g. local authorities for assets such as public parks, highways authorities, for assets such as roadside trees, water authorities, for assets with a drainage or water storage function;
- **private landowners** and businesses, for assets on private land such as green roofs;
- **organisations**, e.g. local wildlife groups for assets with an ecological function such as community gardens;
- **community groups**, for assets with amenity value, e.g. food growing space.

Working with partners towards shared objectives can encourage them to adopt the asset following installation. For example, the John Lewis rain garden in Victoria BID has benefited from one year of maintenance by the contractor, after which John Lewis will maintain the garden.

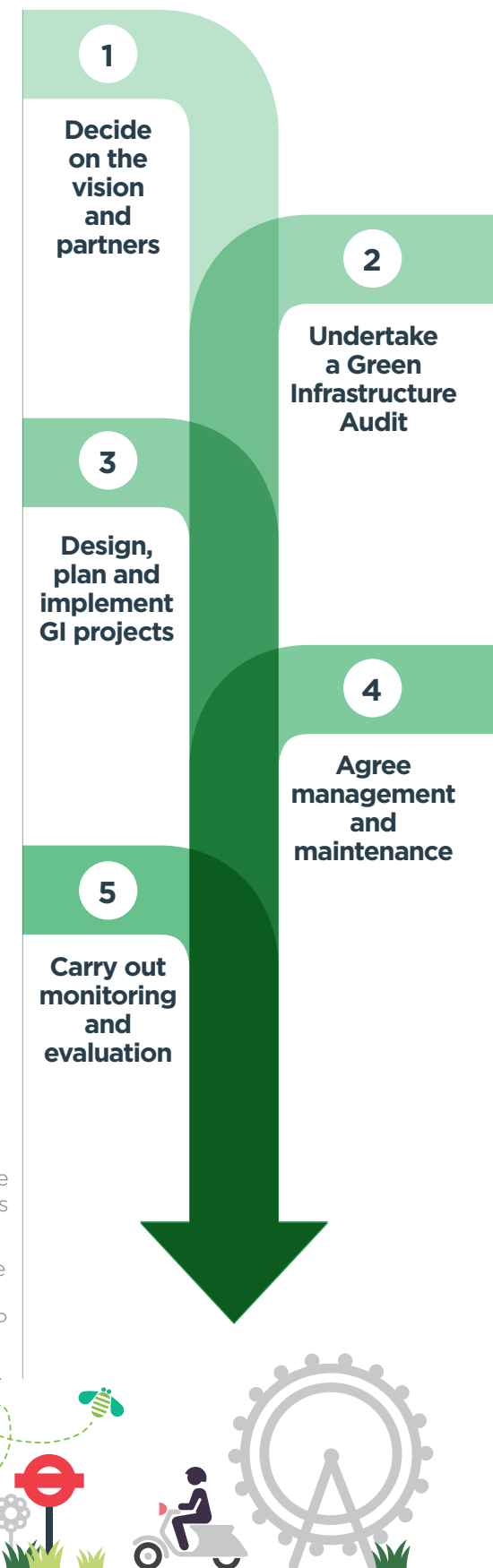
5: Carry out monitoring and evaluation

Evaluating the success of GI projects ensures continuous improvement and increases the evidence base to encourage more partners to get involved.

BIDs, landowners or developers can set up a range of social, environmental and economic monitoring systems to review the impact of GI interventions, including:

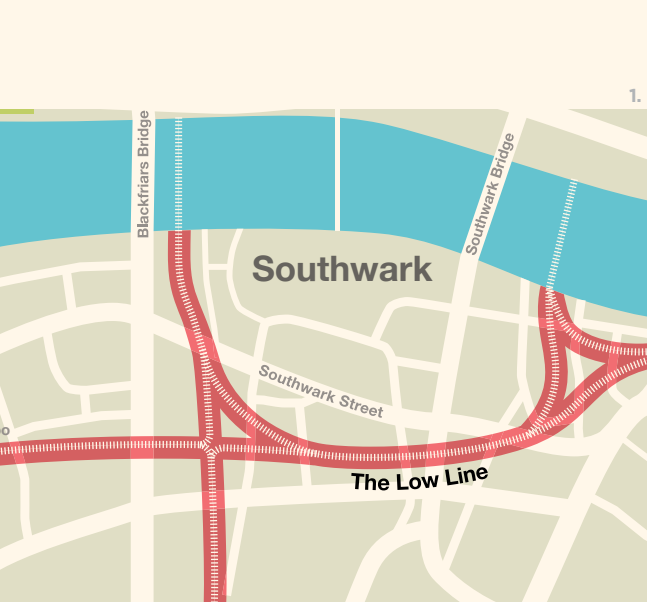
- Footfall, visitor numbers and dwell time
- Annual perception surveys of businesses, employees and visitors
- Number of sick days taken by staff
- Ecological monitoring of species present
- Air quality monitoring
- Number of flood events/ damage or lost earnings caused by flood events
- Increased income from the BID levy
- Updating quantitative data set out in the GI Audit
- Modelling of carbon sequestered, water attenuated or cooling provided
- Wherever possible monitoring should add to the evidence of existing data sets, such as air quality. Setting up a clear vision and objectives in Step 1 will make it easier to set relevant indicators when it comes to measurement.

This five-step guide is based on the **Green Infrastructure Audit: Best Practice Guide**, produced by ARUP and Victoria BID, supported by CRP, the GLA and Natural England.



The Low Line

Bankside



Partnership project led by Better Bankside, working with neighbouring BIDs, Network Rail, Southwark Council, Bankside Neighbourhood Forum and local landowners.



LEAD BID OFFICER:
Valerie Beirne,
Bankside Urban
Forest Manager

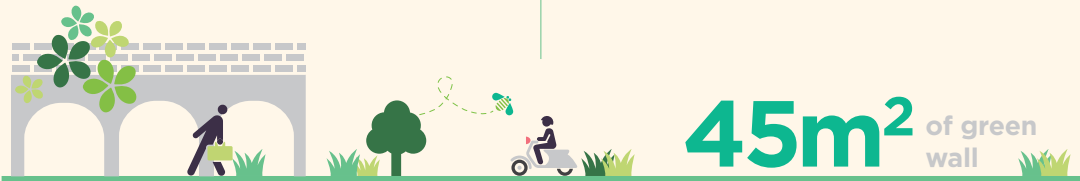
**Better
Bankside**

MORE INFORMATION:
betterbankside.co.uk

The scheme:

The Low Line is both a vision and a work in progress, being pioneered by Better Bankside and now coming to life both here and beyond Bankside.

The long-term aim is to continue the process of opening up areas along and around the elevated rail viaducts running through the Bankside area and across South London, something that was started by Cross River Partnership's successful Light at the End of the Tunnel (LET) programme. By reinstating pedestrian access at ground level the Low Line will promote alternative walking routes, particularly between London Bridge and Waterloo. This will regenerate rundown or underutilised assets such as the rail arches, support jobs and growth, and do so in a way that infuses sustainability and urban greening, enhancing users' experience of the public realm.



45m² of green wall

How we are doing it:

Delivery of the Low Line requires the support of a range of different partners: as landowner and responsible body for the rail viaduct structures, Network Rail is pivotal to delivery of the vision; Southwark Council and TfL support is also vital and the Low Line is being embedded in emerging planning policy.

A key principle of the Low Line is that it will be realised incrementally over time, as projects link together to deliver a greater whole. Early projects coming forward include Union Yard (Network Rail-led) and the Flat Iron Square Project (developer-led), showing how different agencies can deliver different sections of the Low Line.

With these and other projects, the capacity of the spaces to deliver more and better green infrastructure is fundamental to creating inviting pedestrian environments that will make the Low Line a significant new asset for London and Londoners.



1. The Low Line, Better Bankside BID
2. Concept Design, Gort Scott Architects
3. Warden's Grove rain garden installation, Better Bankside BID
4. Stoney Street, green wall, Better Bankside BID
5. Flat Iron Square Planted Canopy, Better Bankside BID

Lessons learned:

The challenges being presented by the Low Line are manifold, not least the unlocking of a route that over the last 150 years has been slowly eroded as different structures have been built along its length. The project is taking a long-term perspective to achieve its vision – in much the same way as London's Thames Path has been unlocked over time. Dedication and persistence over time will be key.

Also fundamental is a partnership approach – no single agency can realise the project, and drawing on the expertise and strengths of a range of partner organisations will be critical to its successful delivery.

Achievement and benefits:

The Low Line offers multiple benefits. On a practical level it can help relieve pressure on the Jubilee Line between Waterloo and London Bridge stations by offering an attractive, traffic free alternative route for commuters and visitors to the area. Linked to this, the scheme can help bring underused rail arches back into economic use by opening up stretches of the viaduct that have previously been inaccessible.

And crucially, all along the route it provides opportunities for urban greening – as early projects like the Verdant Viaduct green wall in Stoney Street, and the Warden's Grove rain gardens already demonstrate.

“As the entrepreneurs who originally built the railway knew, railways don't just move people and freight, they also generate and spread prosperity – they can create jobs, open up new markets and, ultimately, support the growth of a new balanced economy.”
Network Rail
Towards a Better Railway

Further reading

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Green Roof Guide, www.greenroofguide.co.uk

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Living Roofs, www.livingroofs.org

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Greening the BIDs projects:

1. John Lewis Rain Garden, Victoria BID
2. Rubens Living Wall, Victoria BID
3. Tate Modern Green Roof, Better Bankside BID
4. SUDS-y Sumner Buildings Rain Planters, Better Bankside BID
5. Borough Market Hanging Garden, Better Bankside BID
6. Planter Boxes, Brixton BID
7. SuDs Paving & Stockholm Tree pits, Brixton BID
8. Edible Roof Garden, inmidtown BID
9. St Mary’s Rain Garden, PaddingtonNow BID
10. St Mary’s Living Wall, PaddingtonNow BID
11. Fair Street Rain Garden and Green Wall, Team London Bridge BID
12. Tyres Estate Sculpture & Rain Garden, Team London Bridge BID
13. Royal Vauxhall Tavern Green Wall, Vauxhall ONE BID
14. Planter Boxes & SuDS drainage, West Norwood Business Group
15. Planter Barrels, Wearewaterloo BID
16. Bird Boxes, Wearewaterloo BID

“

What we like about the Greening the BIDs programme is that it’s bottom up and business led. It proves that the environment and business; the environment and growth don’t have to be incompatible. The environment is not a blocker to a healthy, thriving economy. In fact, it’s fundamental to it. I hope we’ll see more projects like those showcased here being delivered on a much broader scale.

”

Alan Law, Chief Strategy & Reform Officer, Natural England



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