



HR Wallingford  
*Working with water*



*Bristol Harbourside, Grant Associates*

# The New SuDS Manual

## Guidance for all, now and into the future

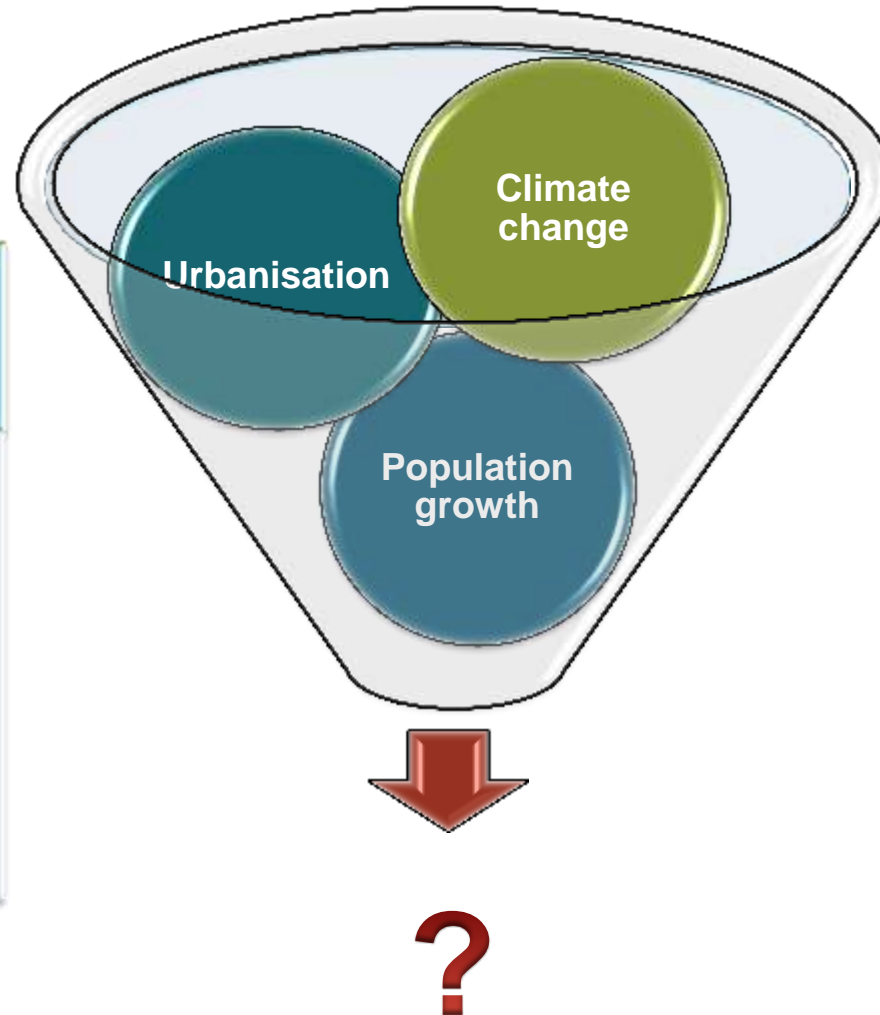
12 November 2015

Bridget Woods Ballard, HR Wallingford

# Why SuDS?

## Urbanisation

- Reduced land permeability
- Reduced vegetation and habitat fragmentation
- Increased population densities



## Climate change

- More intense rainfall
- Higher temperatures
- Stressed habitats

## Population growth

- Increased water demand

**Flooding & erosion**  
**Pollution**  
**Urban heat stress**

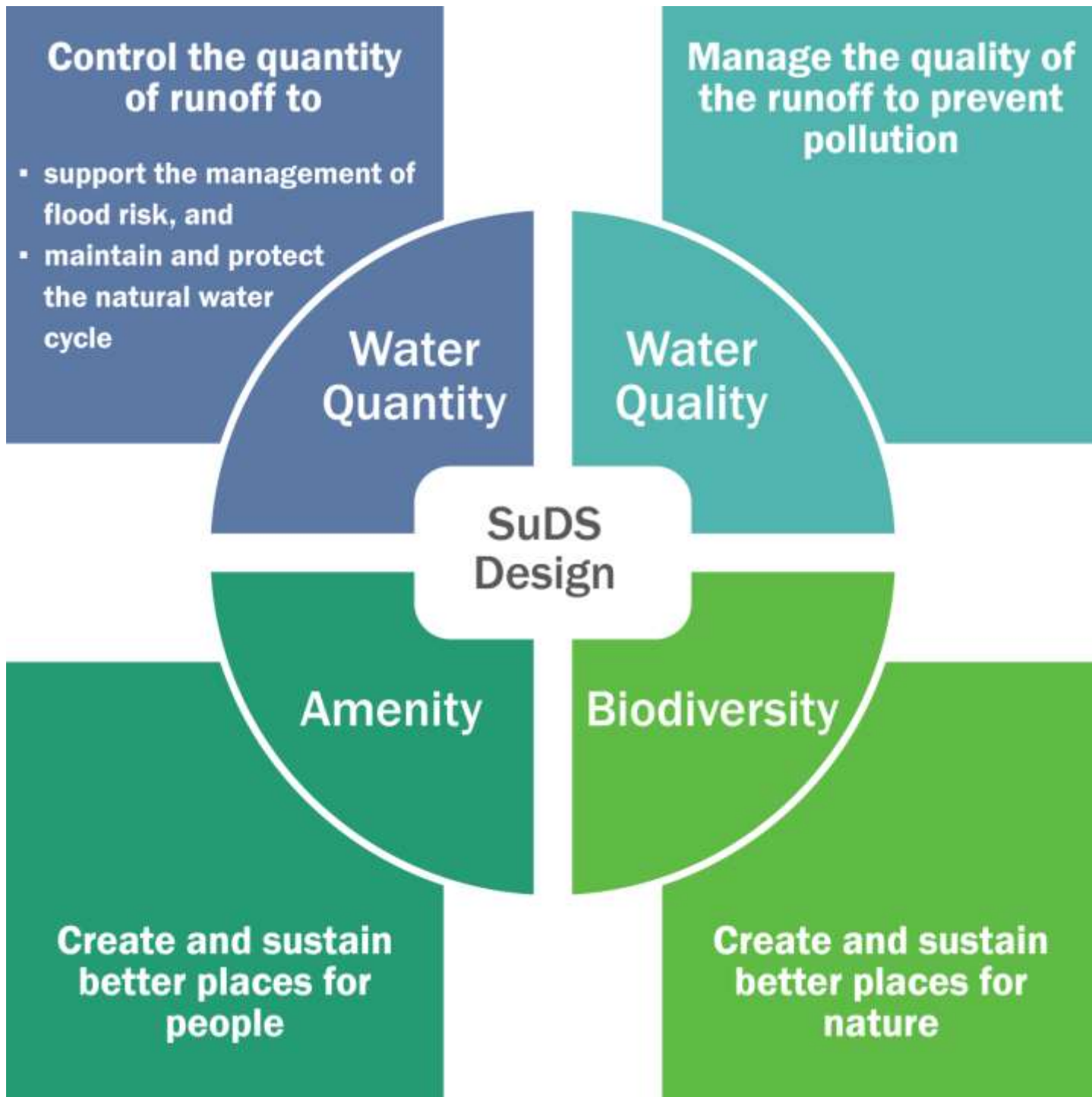


**Water availability**  
**Urban health & wellbeing**  
**Biodiversity & green space**  
**Liveability**

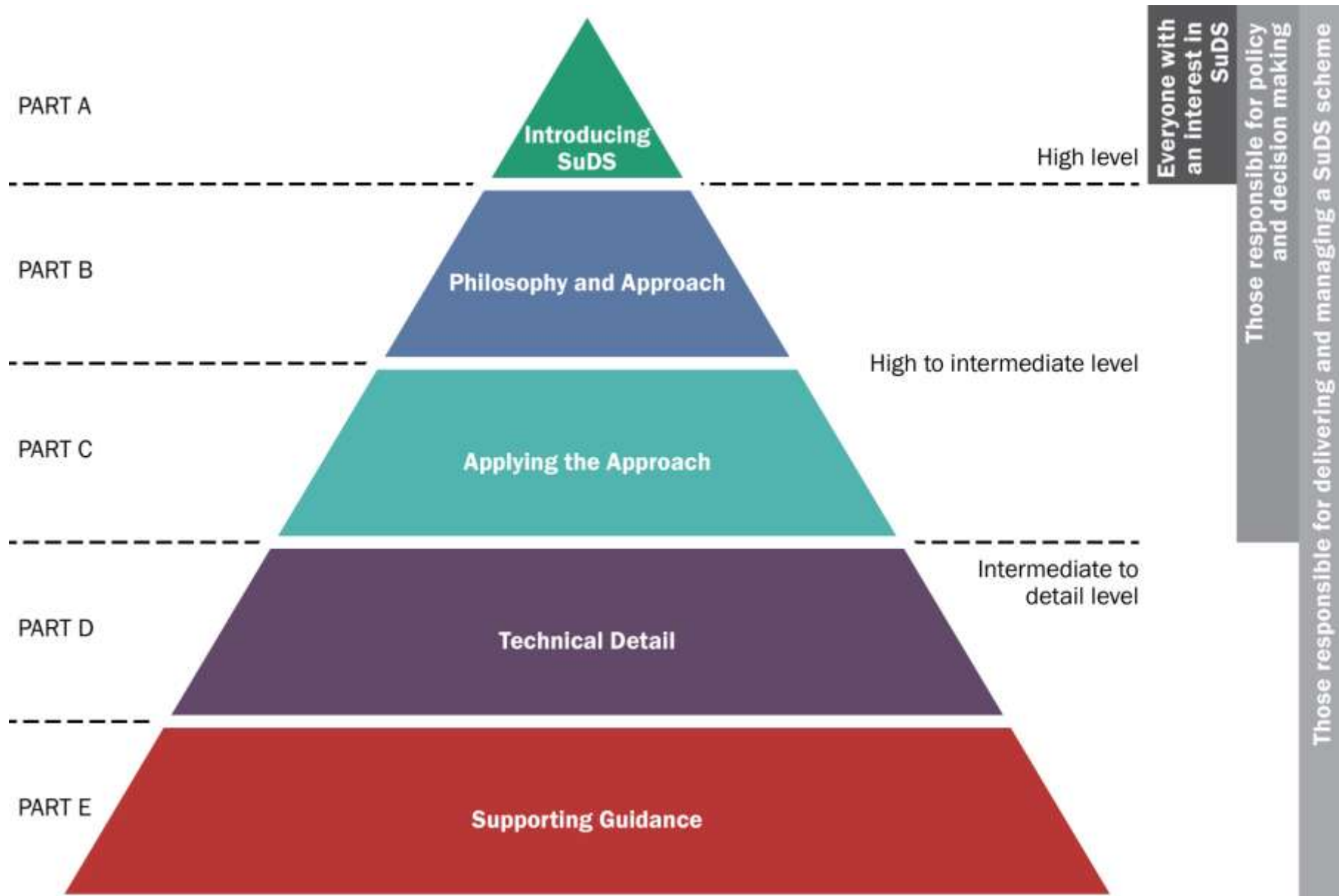


# The principle of SuDS design

**Surface water runoff should be managed for maximum benefit**



# Structure of the new manual



Everyone with an interest in SuDS	<b>Part A : Introduction to the SuDS Manual</b>	
	A high-level introduction to the concept of SuDS, what they are and why we need them.	
Those responsible for policy or decision making	Executive summary	5
	Introduction to the SuDS Manual	11
	<b>Part B : Philosophy and approach</b>	
	The philosophy of SuDS and their role in managing water quantity and water quality, whilst maximising the benefits for amenity and biodiversity.	
	How to design SuDS to deliver these objectives by following design criteria and standards.	
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	Chapter 4: Designing for water quality	50
	Chapter 5: Designing for amenity	66
Chapter 6: Designing for biodiversity	78	
Those responsible for delivering and managing SuDS schemes	<b>Part C : Applying the approach</b>	
	The design process and how to apply the design criteria and standards presented in Part B to different types of development.	
	Chapter 7: The SuDS design process	92
	Chapter 8: Designing for specific site conditions	126
	Chapter 9: Designing for roads and highways	140
Chapter 10: Designing for urban areas	154	
Those responsible for delivering and managing SuDS schemes	<b>Part D : Technical detail</b>	
	Detailed descriptions of different types of SuDS components, with guidance on design, construction, operation and maintenance.	
	Chapter 11: Rainwater harvesting	204
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Those responsible for delivering and managing SuDS schemes	<b>Part E : Supporting guidance</b>	
	Additional guidance to support the planning, design and implementation of SuDS.	
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Chapter 34: Community engagement	714	
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Those responsible for delivering and managing SuDS schemes	<b>Appendices</b>	
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# Chapter 05

## Designing for amenity

*This chapter explains the objective of designing for amenity, and the design criteria that should be followed to deliver this objective.*

- ▶ This chapter should be read alongside Chapters 3, 4 and 6 to understand how the different SuDS design criteria relate to each other, and Chapter 7 to understand when and how to apply these criteria.
- ▶ Further discussion on designing for amenity specifically within the urban context can be found in Chapter 10.

### 5.1 AMENITY DESIGN OBJECTIVE

Create and sustain better places for people

Good urban design aims to deliver attractive, pleasant, useful and above all “liveable” urban environments that support and enhance local communities (Box 5.1). Water is a valuable natural resource, and the management of rainfall and runoff can form a key part of an urban vision. Designs using surface water management systems to help structure the urban landscape can enrich its aesthetic and recreational value, promoting health and well-being and supporting green infrastructure. Water managed on the surface, rather than underground, can help to reduce summer temperatures, provide habitat for flora and fauna, act as a resource for local environmental education programmes and working groups and directly influence the sense of community and prosperity of an area. SuDS can provide opportunities for water to be visible and audible as it travels through the landscape – the places where water flows, stills, trickles or splashes are often where it is experienced and valued the most.

#### BOX 5.1 Amenity, place-making and liveability

**Amenity** may be defined as “a useful or pleasant facility or service”, which includes the tangible (something that can be measured in terms of use), and the less tangible (something that can be experienced as pleasure or aesthetic appreciation).

This definition is particularly relevant for describing the multi-functional opportunities associated with SuDS designs, and it provides a link to the concept of **place-making**, now commonly used in describing the quality of a space in urban design.

Amenity also covers **liveability**, which is associated with factors that improve the quality of life for inhabitants. Liveability encompasses the well-being of a community and of individuals and comprises the many characteristics that make a location a place where people want to live and work.

There are many amenity benefits that are intrinsic to SuDS – good SuDS design often provides amenity benefits while delivering water quantity, water quality and biodiversity benefits.

Where the concept of “creating and sustaining better places for people” is embedded in the design process, these benefits can be maximised. Table 5.1 provides a summary of how SuDS can add amenity value. Further information on amenity benefits of SuDS can be found in Digman *et al* (2015).

#### CASE STUDY 5.1 The Triangle, Swindon



Figure 5.1 The green

The Triangle is an award-winning development of 43 low-cost properties (2, 3 and 4 bedrooms) for social housing in Swindon. The design looked to conserve 50% of the area for contiguous open space as a multi-functional landscape. The integrated plan combined social requirements with water attenuation and storage, biodiversity and edible streets and gardens.

All roof water is harvested and stored in underground tanks located in two kitchen gardens, accessed by hand pumps to irrigate vegetables and fruits. Surface water is attenuated in porous paving on all car park spaces, and the home zone street water is conveyed by a wide dished granite sett channel that clearly shows water moving towards a bioswale on two sides of the central triangular green. The base of the swale is planted with white willows and damp meadow species for biodiversity, water treatment, air improvement, urban thermal regulation and aesthetic amenity, making reference to the landscape signature of this clay lowland. It is a place for playing in, with stepping and balancing logs and bridges, and it forms a barrier for cars that might be tempted to park on the green.

Water filtered by vegetation is conveyed to a geocellular storage tank under the green, and a hand pump linked to a rill carved in a tree trunk allows kids to play with water. Finally, any excess water from the storage tank can be stored in oversized storm drains under the road, a requirement of Thames Water.



Figure 5.2 Play pump (a) and hand pump (b) in the kitchen garden (b) (courtesy Studio Engleback)



BIORETENTION SYSTEMS AND RAIN GARDENS



Figure 10.5 Bioretention systems and rain gardens (courtesy Ilman Young, CIRIA)

Planted areas and raised planters can be used as rain gardens including areas between the road and building elevation extensions to create parking bays or traffic calming measures.

SWALES AND LINEAR WETLANDS



Figure 10.6 Swales and linear wetlands (courtesy Essex Council)

ON-LOT SuDS



Figure 10.7 On-plot SuDS (courtesy Ilman Young, Robert Taylor)

There are many opportunities for small on-plot SuDS, including rain gardens, rainwater harvesting tanks, rainwater harvesting tanks with slow release into rain gardens, planted filter and water butts.

Part C: Applying the approach

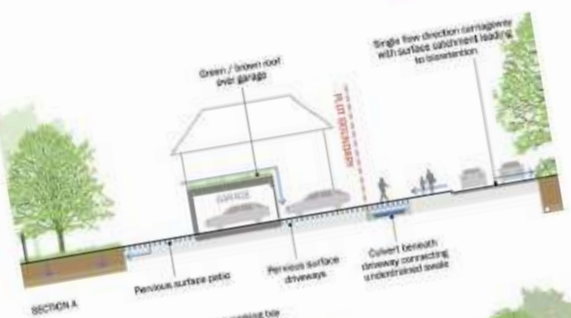


Figure 10.20 Typology 1 – Small residential infill

Typology 1 – Small residential infill

Typology 1 – Small residential infill (housing of detached and semi-detached dwellings. Typically this type of housing is sites with moderate space availability, which allow front and rear gardens, on-street parking and off-street private parking, along with clear boundaries between public and private spaces. It is also assumed that these are relatively high value properties, based on the urban setting.

Each plot should ideally be able to attenuate and treat its own runoff providing SuDS components that would often not be feasible in denser residential developments. All SuDS design should enhance and promote local character to optimise land value and neighbourhood desirability.

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CASE STUDY Derbyshire Street



The eastern end of Derbyshire Street was a dead-end road that only served as a space for 12 parking bays, suffering from fly-tipping and providing opportunities for anti-social behaviour. The pocket park concept was developed to provide a stronger social function with a cycle lane and an outdoor cafe space. Core to the design philosophy was managing surface water runoff within the park and, in turn, reducing the potential for flooding locally and within the wider catchment area.

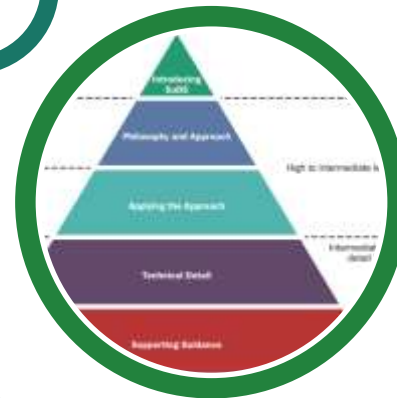
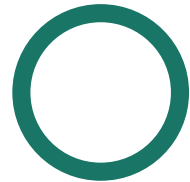
- A planted rain garden receives surface water runoff from the hard surfaces running the length of the street and provides a physical barrier between the cycle lane and the outdoor cafe space.
- Downpipes have been redirected into the ground is provided within the outdoor cafe space overflowing into the rain garden.
- Permeable paving with infiltration into the ground is provided within the outdoor cafe space.
- A swale captures runoff and takes excess water from the rain garden, allowing it to soak into the ground, as well as providing a physical barrier between the cycle lane and adjacent residential flats.
- Green roofs have also been installed to provide interception and attenuate runoff, attracting birds, butterflies and bees.

Images courtesy Greenwith Associates and London Borough of Tower Hamlets

LOCATION: London, UK  
DESIGNER: London Borough of Tower Hamlets

# Technical Leadership

Collaborative work of  
over 70 people



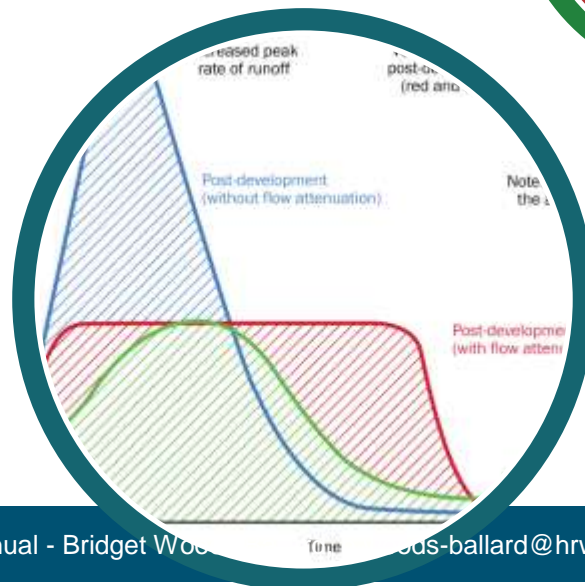
Guidance for now  
and into the future



Internationally  
recognised and  
used



Built upon latest  
evidence, research and  
guidance



# Motivational



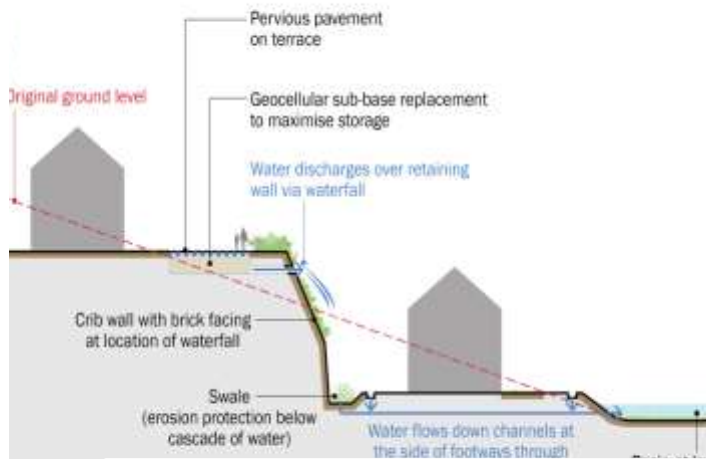
# Supportive



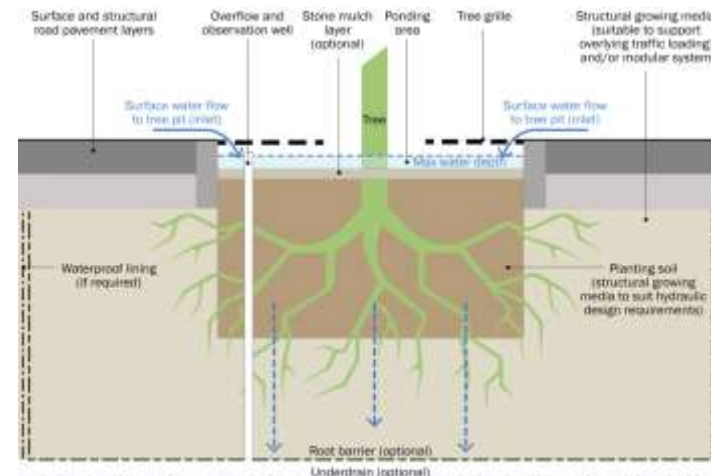
**Comprehensive design example**



**Checklists for designers, approvers, adopters and maintainers**



**Guidance on SuDS delivery for challenging sites**



**Clear, consistent landscaped illustrations**

# Inter-disciplinary



Consideration of amenity and biodiversity



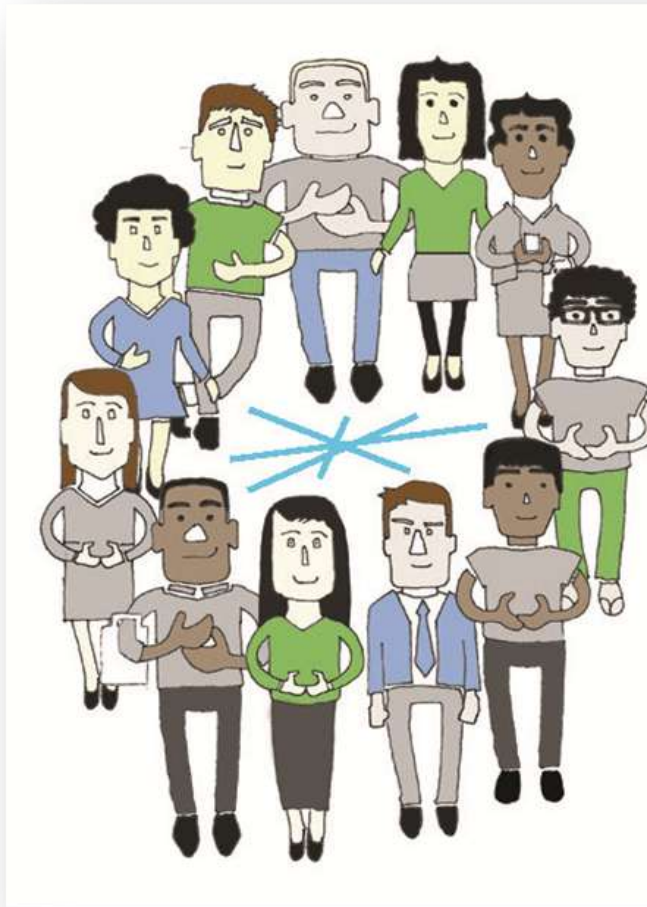
Updated guidance on stakeholder engagement through planning



Manual redesigned to speak to architects, landscape architects, planners and urban designers



More detail on the full range of SuDS components



# Comprehensive

Principles  
Process  
Engagement  
Overcoming challenges  
Costs and benefits  
Submissions

**Planning**

Criteria  
Methods  
Detailed component design  
Materials  
Inlets and outlets  
Landscape

**Design**

Planning  
Processes  
Programming  
Method statements

**Construction**

Objectives  
Waste management  
Activities  
Frequencies  
Specifications  
Maintenance plans

**Maintenance**

# Inspirational

## PERVIOUS SURFACES



## SWALES AND LINEAR WETLANDS



## KERB DRAINAGE, RILLS AND CHANNELS



## GREEN ROOFS, GREEN WALLS AND PODIUM DECKING



## PLANTED CHANNELS



## PUBLIC SPACES



## BIORETENTION SYSTEMS AND RAIN GARDENS



## PLAY AND EDUCATION



- **We need visionary housebuilders**
- **We need forward thinking planners**
- **We need supportive local government and regulator policy**
- **We need more high quality SuDS in the ground**
- **We need to collate and share examples and good practice ([www.susdrain.org](http://www.susdrain.org))**



## The SuDS Manual



### THE PROJECT TEAM

CIRIA

HR Wallingford

EPG

EcoFutures

Grant Associates

Illman Young

### FUNDERS

Defra

Environment Agency

SEPA

NIEA

DARD

LODEG

Highways England

NHBC

Welsh Government

Welsh Water

WSP Group

Hydro International

ACO

CPSA

XP Solutions

Campbell Reith

Permavoid

Polypipe

Stormwater Management