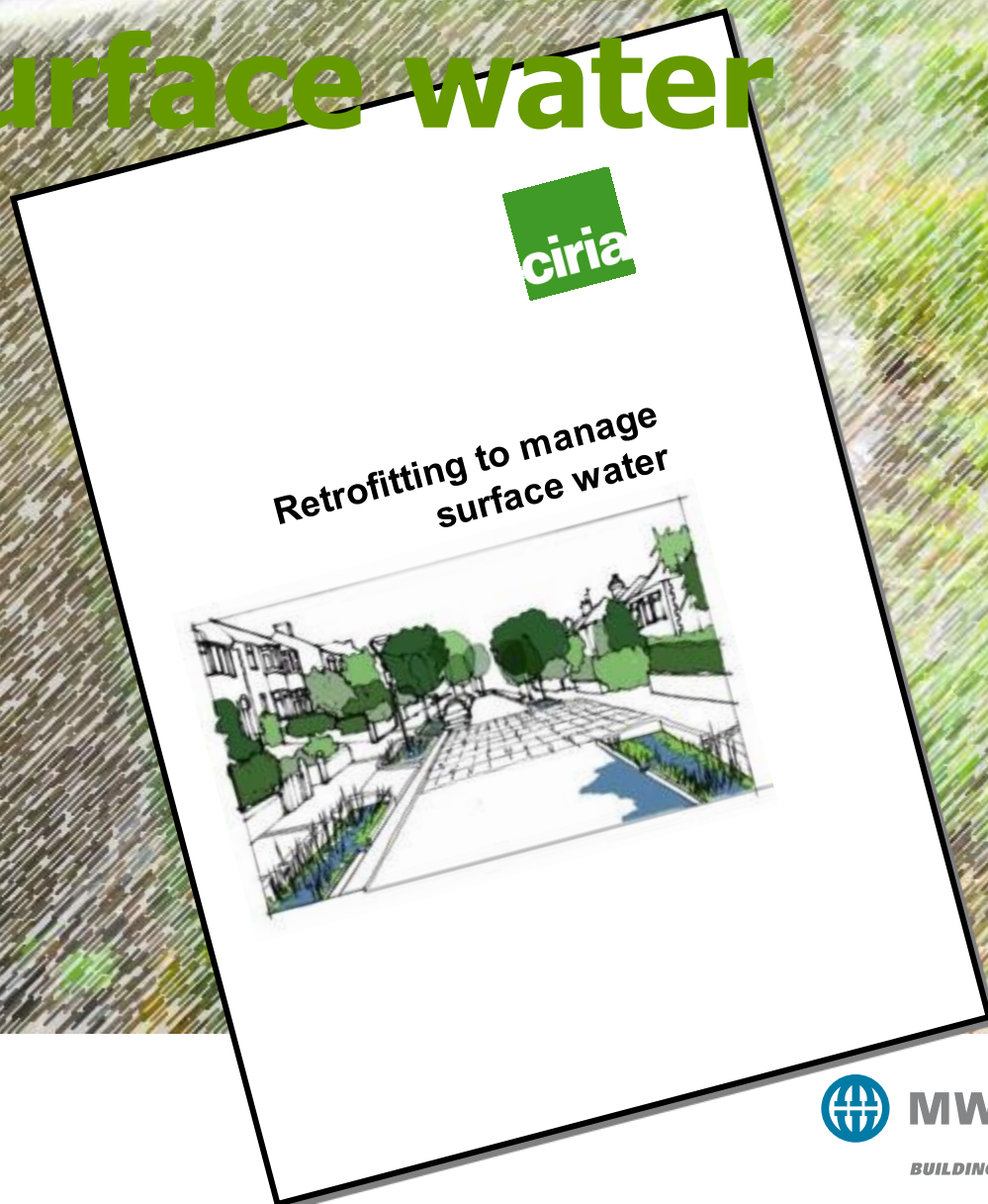


Retrofitting to manage surface water

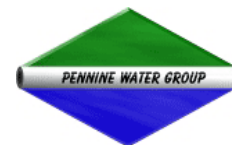
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MWH

BUILDING A BETTER WORLD

susturb



Retrofitting to manage surface water



- A great opportunity
- Why retrofit?
- What we can retrofit
- The benefits of retrofitting - differently
- Guidance overview



Augustenborg, Malmo

Current drivers (opportunity)

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Current drivers (opportunity)



Current drivers (opportunity)



Key opportunities

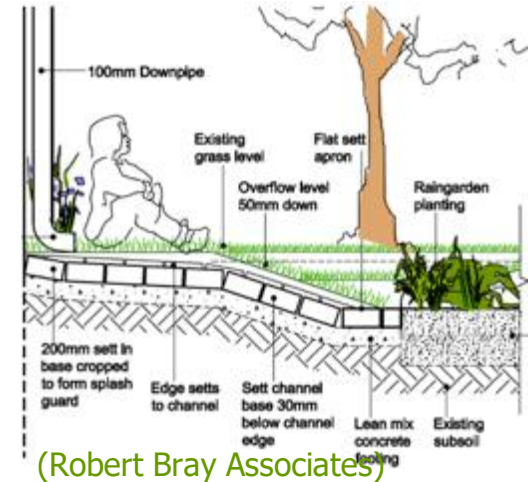
Working together at a variety of scales to deliver multiple benefits



Every space is an opportunity



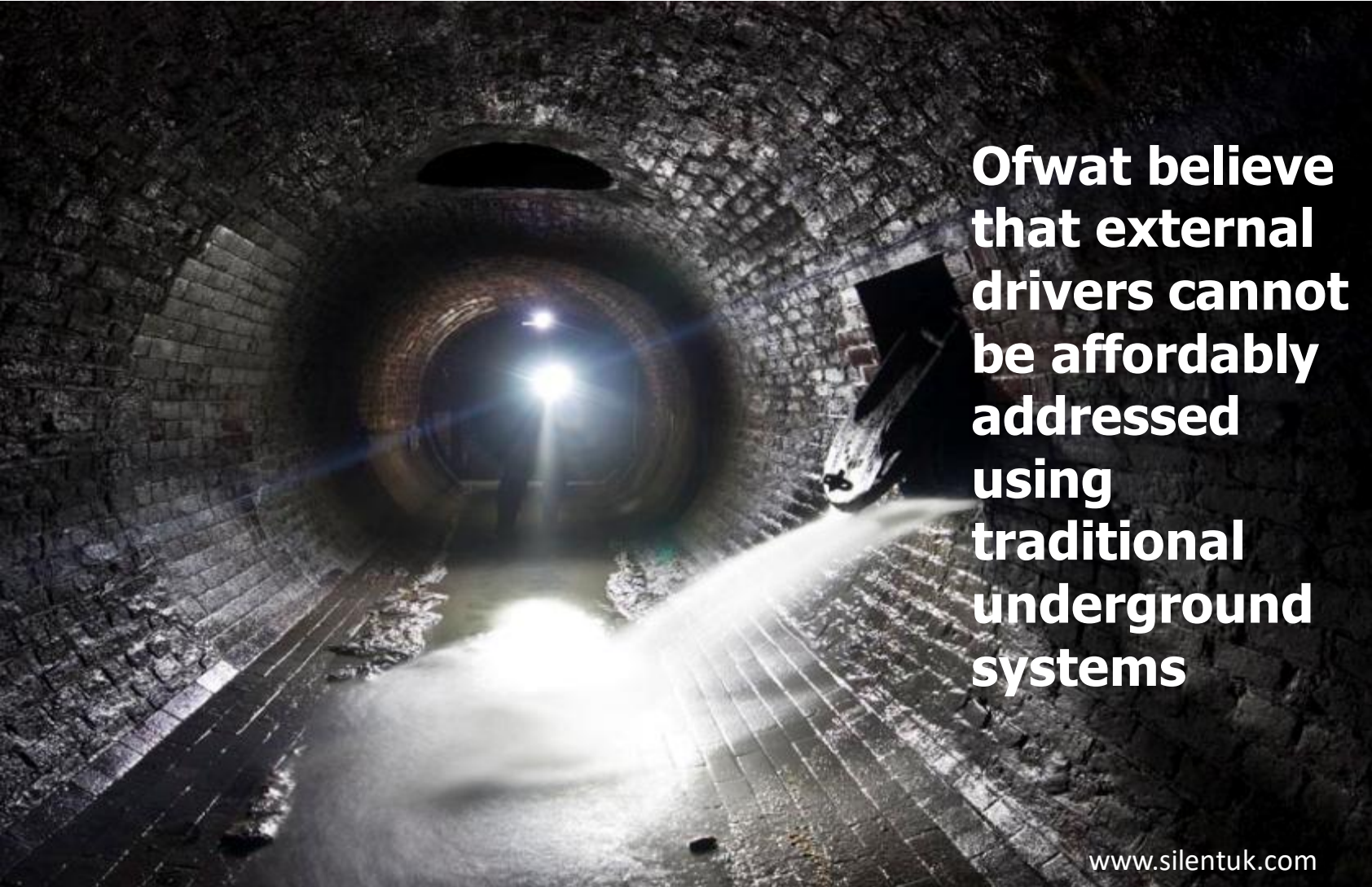
- Within the day-to-day urban design and planning process
 - Enhancing and greening available space and changing surface water management
 - Requires partnerships and planning strategically
 - There may not be a clear individual business case for each scheme



Rain garden, Ashby Grove, Islington

Traditional approaches to managing our surface water

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Ofwat believe that external drivers cannot be affordably addressed using traditional underground systems

Current drivers (challenges)



Current drivers (challenges)



Current drivers (challenges)

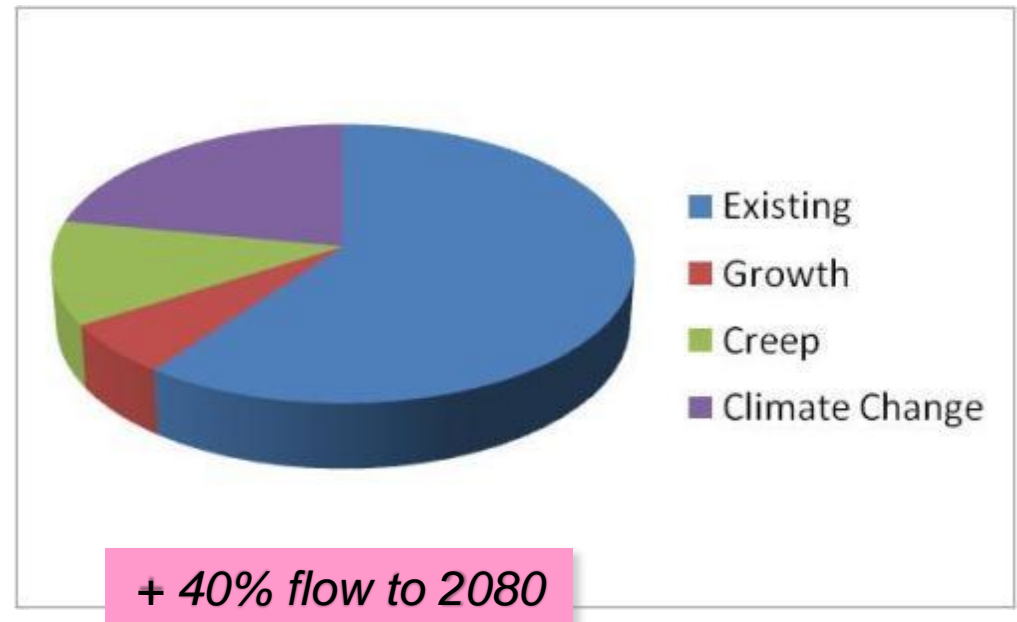
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Key challenges



- Economic uncertainty
- More for less
- European Directives
- Growth and creep
- Climate Change



Development alone will not be enough

Engaging with householders and others

- Need special engagement for the public
 - responsibility for their own surface water
 - embrace retrofit measures
- Financial and other incentives are needed



Images

1. Ashby Grove, Islington
2. Dings, Bristol (Sustrains)
3. Melbourne (Darren Bos)

What we can retrofit - mix and match measures



Images courtesy of
(Floodgate, Jacobs Engineering,
Wayne Rushmere)

What we can retrofit - in urban areas



Images of retrofitting
from Portland, Oregon

The benefits of retrofitting (using SuDS)



Limit flows entering drainage systems

Manage flows above ground

Surface water used as a resource

Increase extent and viability of green infrastructure

Surface water used as an amenity

Maximise capacity of the drainage system

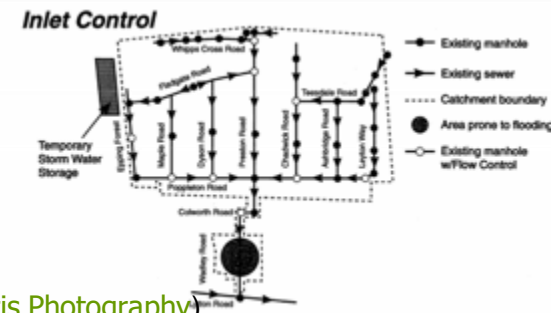
Improve water quality

Improve resilience

The benefits of retrofitting



- Can...
 - Mimic natural drainage processes
 - Improve water quality
 - Reduce flood risk
 - Manage the impact of future changes
 - Enhance urban areas
 - Enhance biodiversity
 - Pollution and climate
 - Create more for less



Images

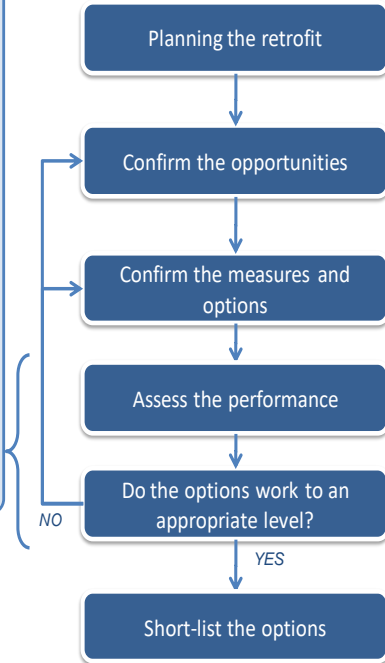

1. Manchester (Paul Harris Photography)
2. Ashby Grove, Islington
3. Dings, Bristol (Sustrains)

The guidance



Box B5-3: Identifying the appropriate measure in East Riding of Yorkshire (Pers comm McLachlan, 2011)

- In Long Riston, a culvert did not have the capacity to convey flows and flooded. This ran overland, ponding in a low spot, before getting to a depth to cause property flooding.
- Retrospectively applying the approach within Table B5-1, the strategic measures would be either to manage flows above ground, manage flows upstream or increase the culvert capacity. The right measures to manage the extreme event could then be selected.
- In this case, the lowest cost measure and option was to re-profile a road, lowering it by approximately 450mm (the photograph below shows the new road). This channelled all the flows on the surface to a newly formed swale and an existing detention basin. The cost to construct was less than £50k.
- Working with the landowners, they agreed to take on the responsibility and maintenance of the highway following its construction.



Support practitioners to retrofit surface water management measures

The guidance - Two fundamental approaches



Strategic retrofitting

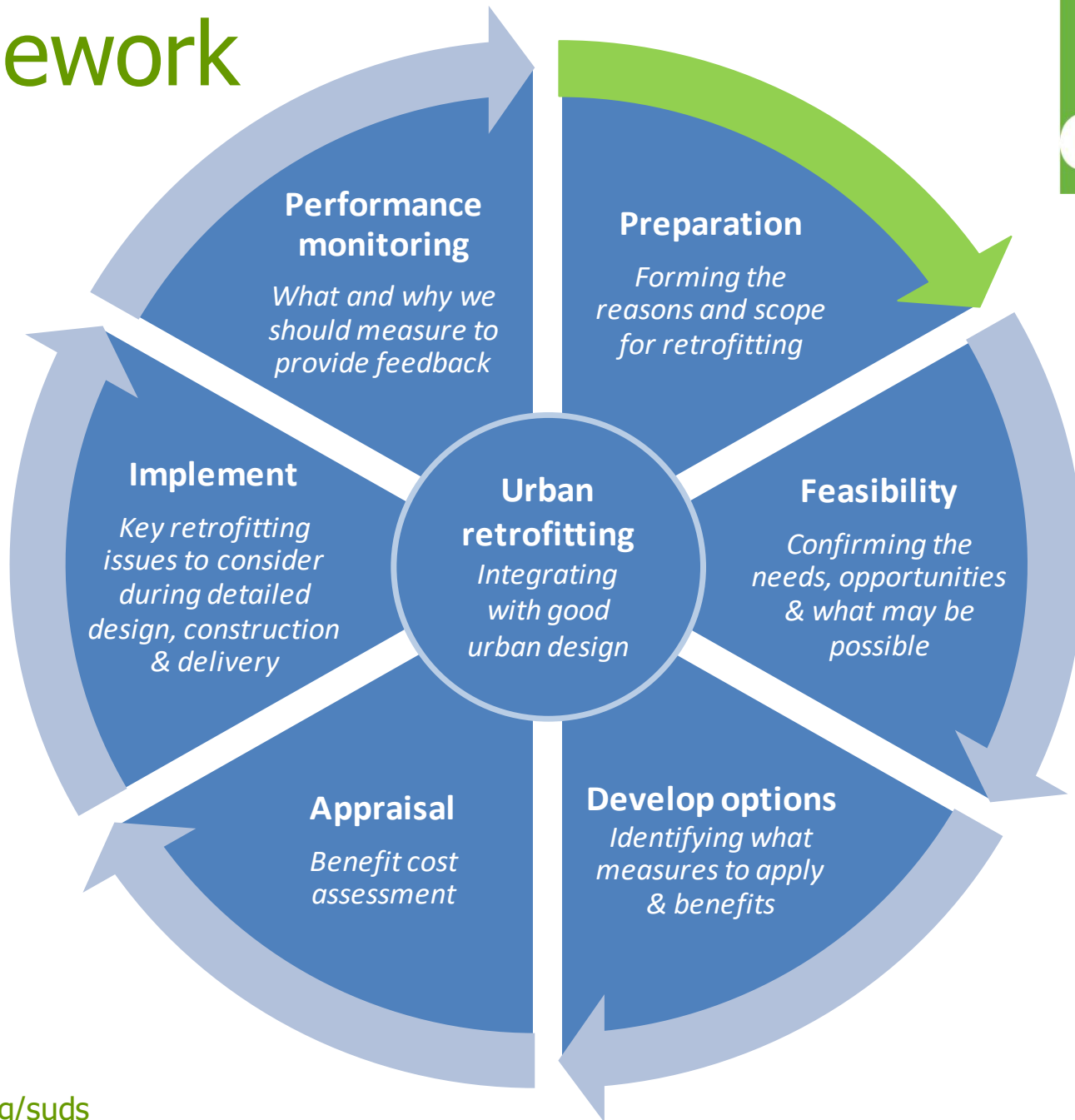


Opportunistic retrofitting

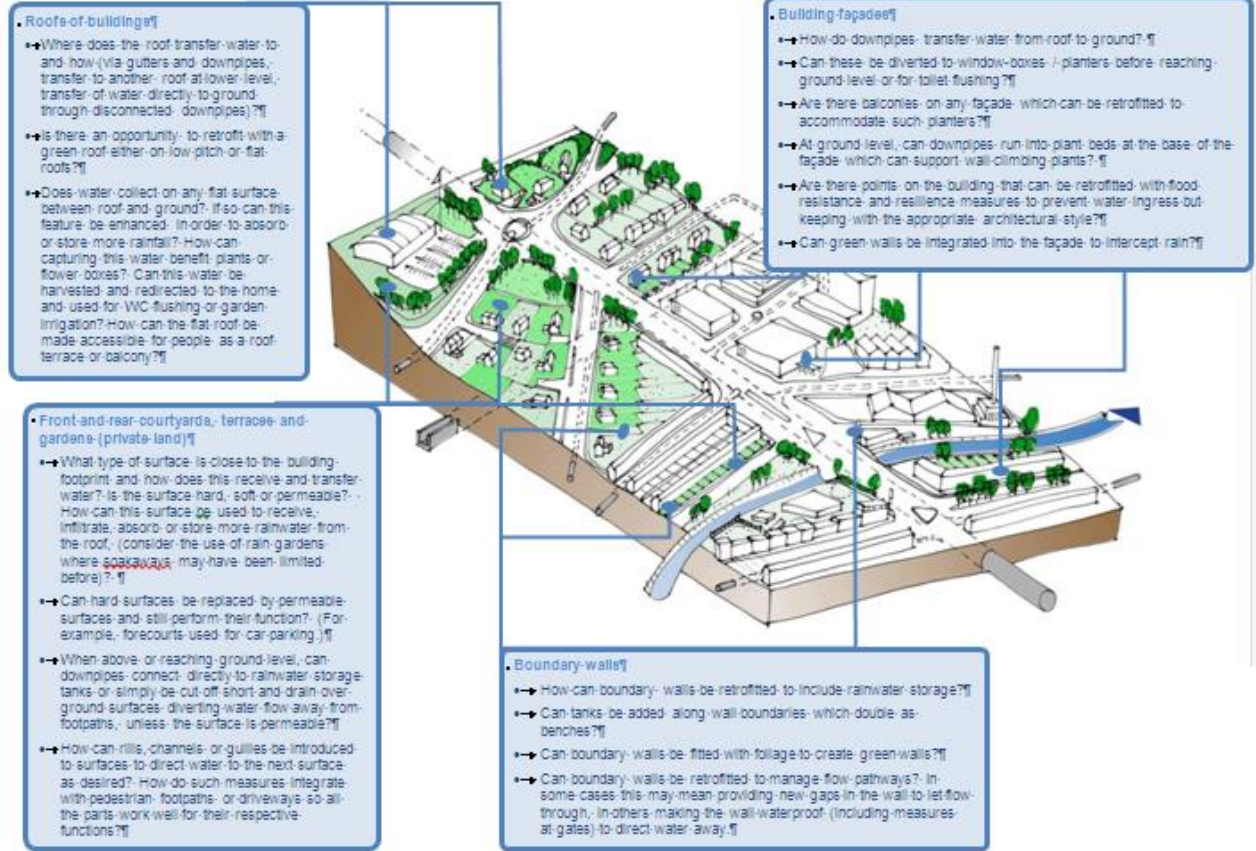


Opportunistic approaches should fit into a wider more strategic SWM approach providing greater benefit and be 'joined up'.

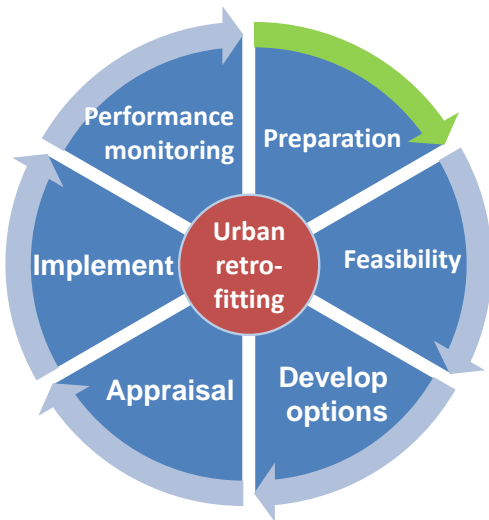
Framework



Urban design



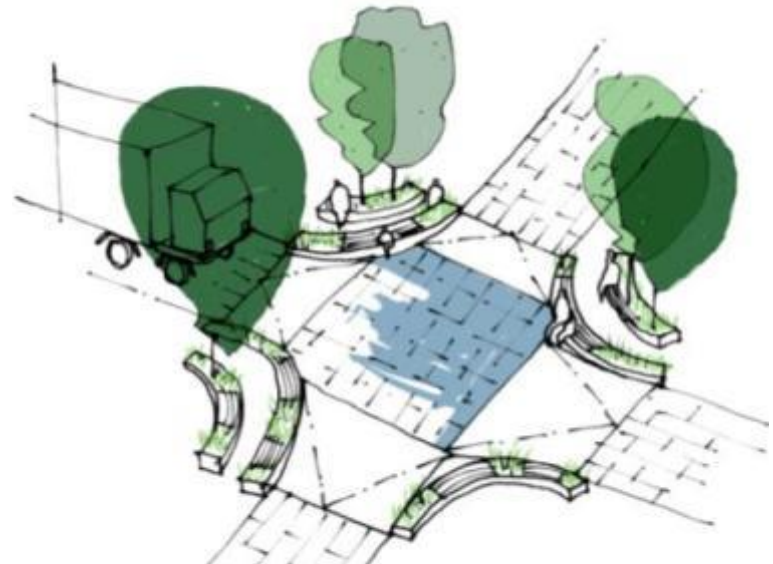
Seven principles of urban design central to the guidance and retrofitting



Principles of urban design



1. What kind of context?
What scale of retrofit?
2. Design for people first
3. No space is useless
4. Create diversity at the place



Augustenborg, Malmö

Principles of urban design



- 5. Improve connections and cohesion between places
- 6. Connect and integrate resource flows
- 7. Good places are never finished! Design to accommodate change

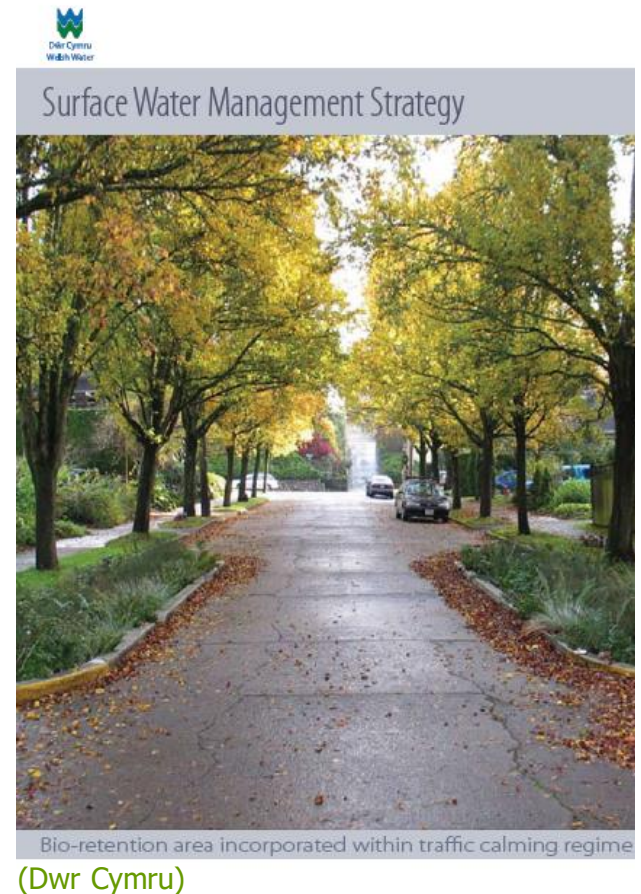
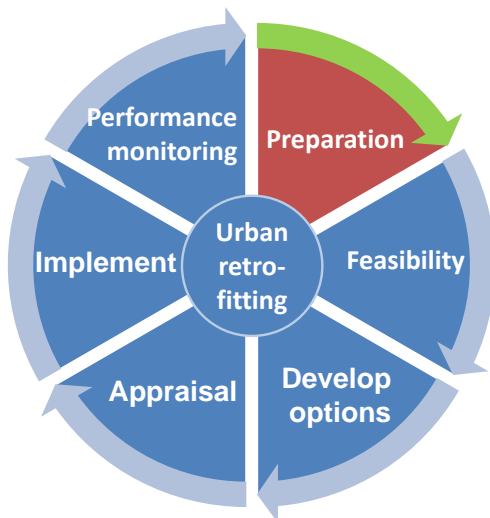


Images

- 1. (Bjorbekk and Lindheim)
- 2. Bioretention plan (Tony Weber)
- 3. Portland, Oregon
- 4. Malmo (Dick Fenner)

Preparation

- Partnership working critical to success
- Linking disciplines
- Linking professions
- Not necessarily one leader



Feasibility

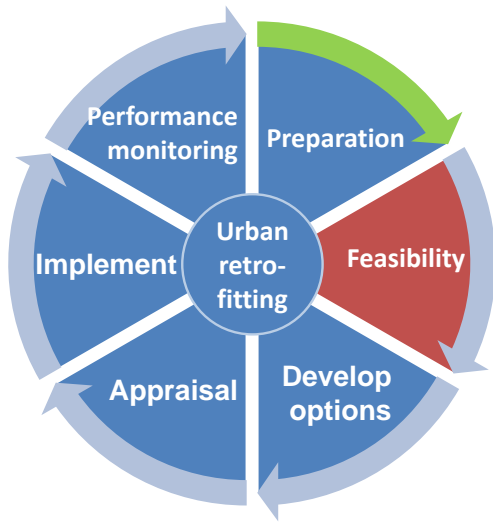
- Think longer term as well as for the immediate needs
- Fit to the planning process



Establishing opportunities



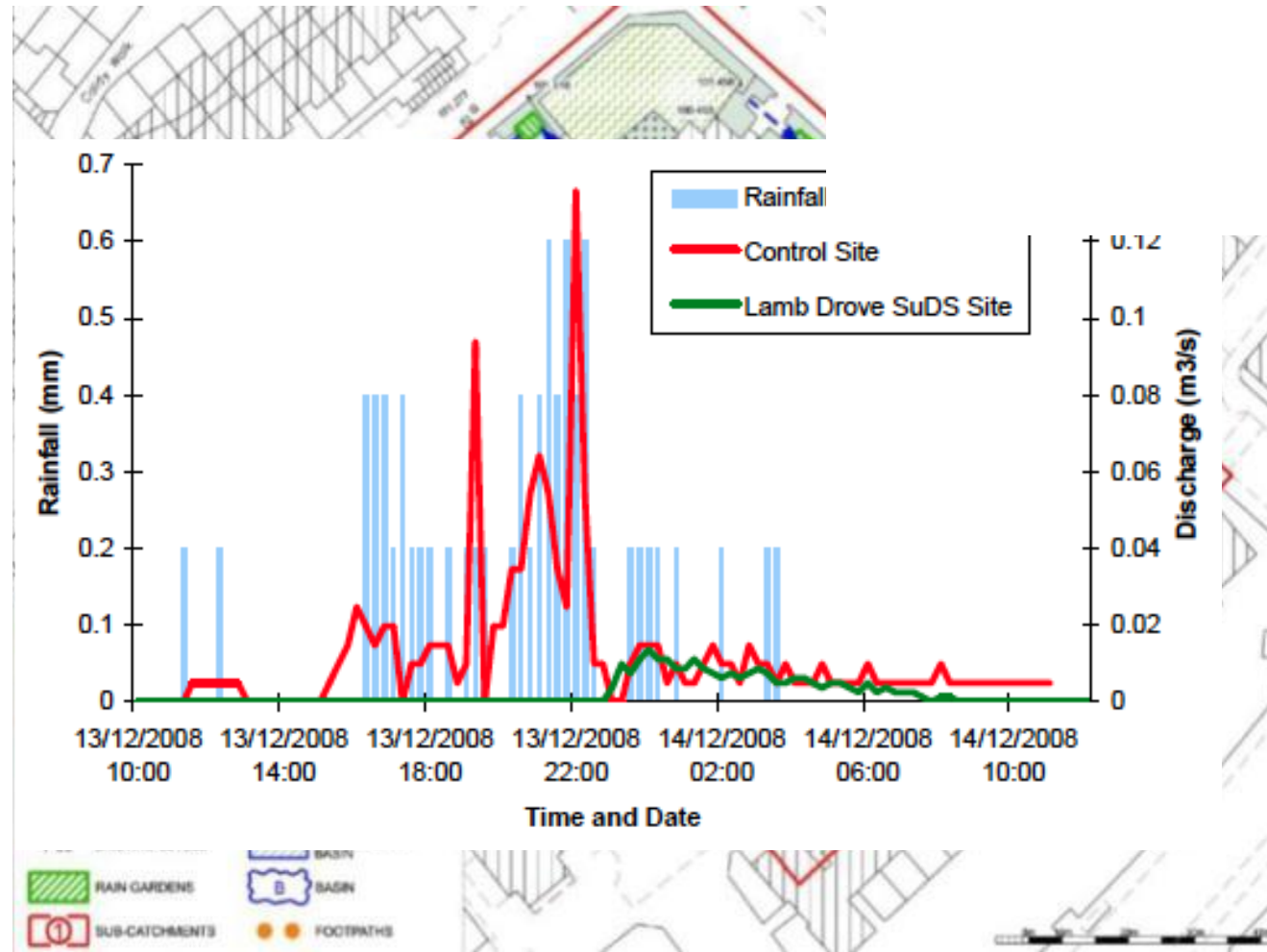
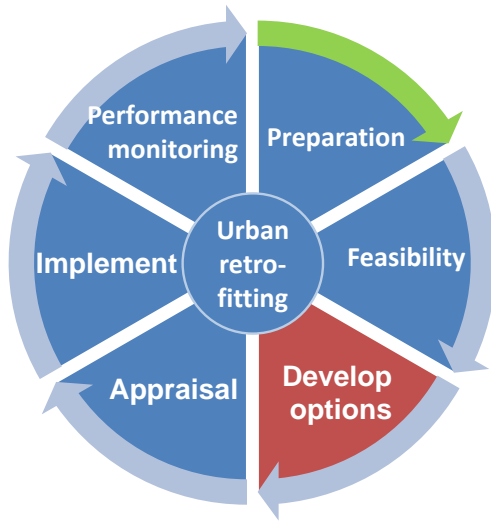
Identify retrofit strategies



Images

- 1-4 Yorkshire (City of Bradford Metropolitan District Council)
5. The Manor, Sheffield (R. Nowell)
6. Thematic mapping
- 7/8 Blackpool (Gillespies LLP)

Develop options

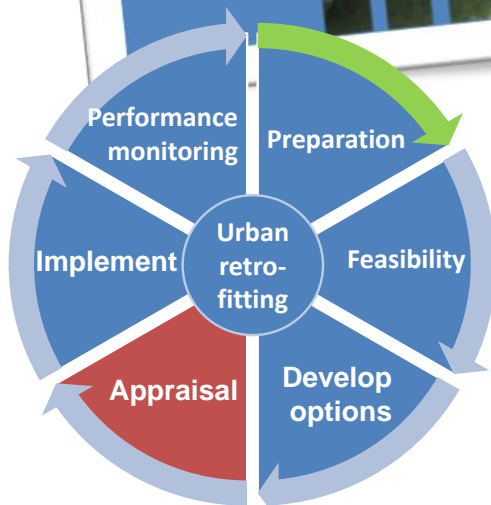
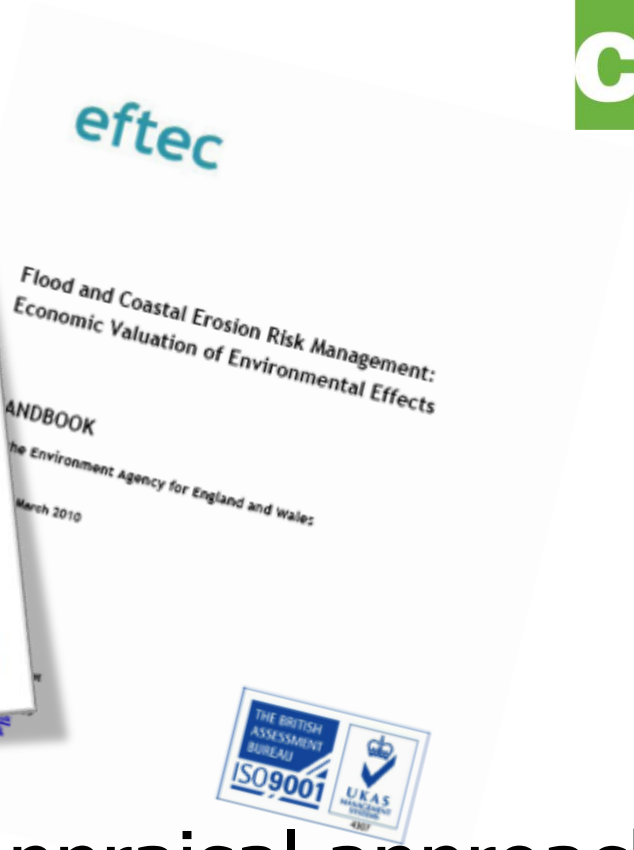


Develop and assess options, sizing the measures and understanding performance

Images

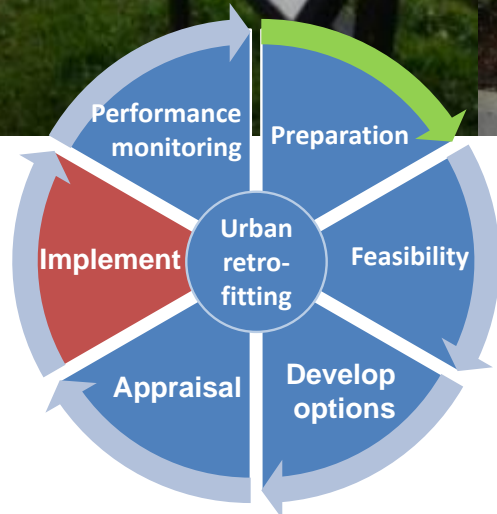
1. Opportunities
2. Scheme plan (Robert Bray Associates)
3. Lamb Drove Monitoring (Royal Haskoning)

Appraisal



- Different appraisal approaches
- Consider a wide range of benefits that can be evaluated and help support scheme value

Implementation



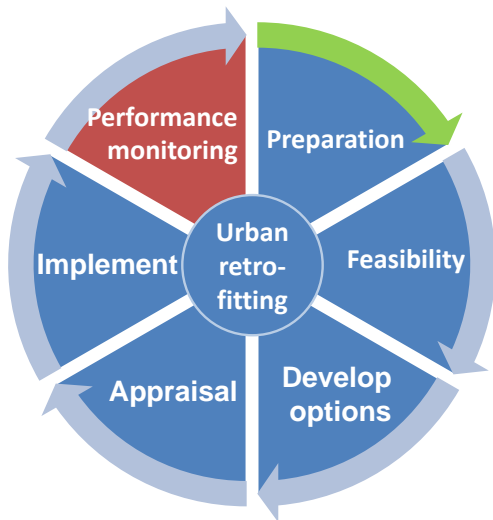
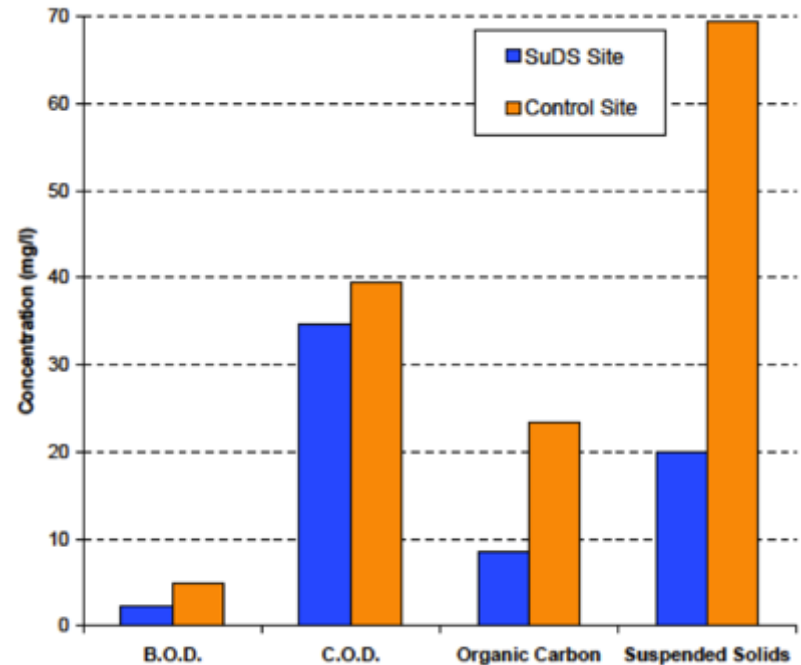
Practical implementation identifies key aspects to address

Images

1. Lamb Drove, Cambridgeshire
3. Toronto (L Sharp)

2. Retrofit park, Seattle
4. Ashby Gardens, Islington

Performance monitoring



- Identifies what and why we should monitor, when and how
- Sharing knowledge

Images

1. Benefits of SuDS Mgt Train (Neil Mclean)
2. Lamb Drove Monitoring (Royal Haskoning)

Case studies and examples

Estimating the multi-value benefits



- Halewood primary school
- Green Infrastructure North West on-line calculator
- Net present value £80,000 over 25 years:
 - Recreation and leisure: £75,000
 - Land and property value increases: £22,000
 - Climate change mitigation: £1,000; carbon sequestered through the new tree planting



Initial SuDS design (Mersey Forest)

Making most of the opportunities

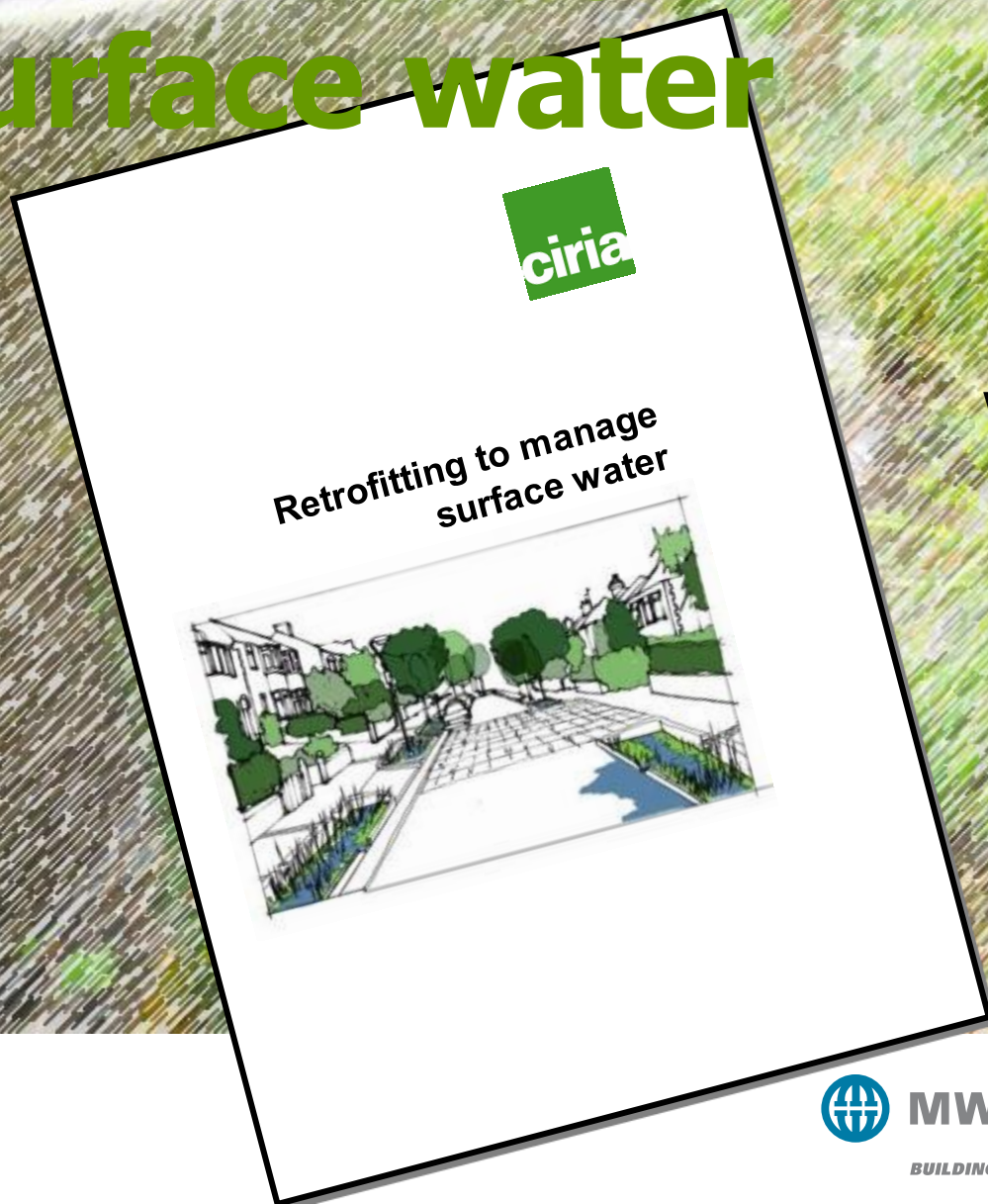


- No space is useless
- Partnership working
- Mix and match measures
- Link disciplines
- Multi functional and multi value land use
- Multiple benefits in a time of austerity



Retrofitting to manage surface water

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Free to download
www.ciria.org



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