Retrofitting SuDS ..... 

...building resilience in urban areas

CIRIA 
November 2015
Why is it going to get worse?

- Climate change bringing more extreme rainfall events and storm surges
- Towns and cities historically located on rivers
- Urban creep and upstream development
- Combined sewers have limited capacity
- Large number of homes and businesses currently at risk
- Estimated cost flood damage - potentially £10’s-100’s millions per annum depending on level of protection provided

- Requires a comprehensive, long-term approach

*The problem is increasing*
How retrofitting can help

• Incremental but immediate effect
• Multiple interventions inherently build greater resilience
• Flexible application and value for money
• Develop a mindset that considers SuDS first
• Consider its application everywhere
• Integrate with other planned works
• Aligns with other objectives around public health, GI, biodiversity, water quality and place-making

• NEED TO DO..... all the time ....... everywhere!

Portland – 56,000 downspouts  Philadelphia – 25 year ongoing plan

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Let’s get Nibbling!
How’s retrofitting different?

- Different approach to new build SuDS
- Different site constraints – services in particular
- Design criteria decided on site by site basis
- Brownfield site redevelopment
- Engineering (and bioengineering) likely to be a key aspect
- Requires individual approach – frequently linear
- Be opportunistic

But – *can be expensive*

- so align with other outcomes
Work in partnership

• Seek partnership funding with all stakeholders
• Consider – local authorities, water companies, EA, LEPs, BIDs, local commercial organisations, third sector organisations, radio and TV
• Its not just cash!
• You need community champions
• Community engagement is time consuming ......expensive, but essential

• Seek genuine partnerships... and be honest
What you can do and where

FLAT ROOFED BUILDING
- Consider when roofs need repair or renewal
- Green, blue or brown roofs
  - weight loading determines type of green roof

ANY BUILDING
- Rainwater harvesting for internal use
- Water butts or tanks for external re-use
  - overflows back into existing system
  - can be done at any time
What you can do and where

INDIVIDUAL HOUSES
- Repave drives with permeable paving
- Disconnect downpipes
- Create rain gardens
- Green roofs on sheds
- Water butts
  - any loss of parking a key issue

FLATS AND APARTMENTS
- Disconnect downpipes and
- Redesign the communal space
- Green roofs to garages, cycle sheds or bin stores or disconnect their downpipes
What you can do and where

CAR PARKS
• Repave sections with permeable paving and potentially connect to rain gardens
• Reconfigure to introduce stormwater planters
• Collect rain water for recycling on site - any loss of parking a key issue

SCHOOL GROUNDS
• Redesign for creative play/use
• ‘Spare’ green space invariably available
• Soft SuDS especially align with the curriculum
  - be aware of BB98 requirements

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Large paved areas
What you can do and where

TRANSPORT AND HIGHWAYS
- Resurfacing works an ideal opportunity
- Road widening/narrowing schemes
- Traffic management schemes
- Tram routes or light rail
- Parking schemes
- Pedestrianisation
- New cycle routes
- Street tree planters

DOMESTIC STREETS
- Integrate with shared surface schemes
- Consider parking issues
- Tree pit planters very useful
- Create pocket parks in left-over space
  - beware the bin men!
What you can do and where

PARKS AND COUNCIL OWNED LAND
- Parks allow larger scale features
- Can be integrated with play or biodiversity
- Create pocket parks
- Enhance ‘left over’ green space
- Consider verges for shallow swales
- Roundabouts are a great opportunity!

URBAN DESIGN
- Town centre regeneration
- Pedestrianisation schemes
- Commercial projects
- Enhance ‘left over’ urban space
- ‘Meanwhile’ projects
Priors Farm, Oakley – the problem

- Hatherley Brook overflowing
- Overland flows from hill
- Flooding of roads and houses generally
- Surcharging sewers downstream
Priors Farm, Oakley

Where can we do it?
Landscape some green spaces – What do you think?

- Public open space near Somme Road?
- Public open space near Salamanca Road?
- Other shared green spaces?
- Private gardens?

Some areas can be mown less often and be planted with wildflowers.

Gently reshape some areas.

Some species are suited to the bottom of swales or basins.

Planting Wildflowers

Rain garden

Community engagement – drop in session
Retrofitting SuDS in Cheltenham
Design issues

• RAINGARDENS
  • Raingardens to take 1 in 100 storm event
  • Limited infiltration as clay soils
  • Stormwater diverted through raingarden with connection back to surface water system
  • Overflow system
  • Constructed soil
  • Owners participated in design of rain garden and plant choices

• ATTENUATION BASINS
  • Sized to take all road water to 1 in 100 storm event
  • Gullies stopped up and inlet structures constructed
  • Sett paving/rocks to break velocity
  • Banks graded to 1 in 5 to allow gang mowing
  • Simple flow control structure and reconnection back to surface water system
  • Revitalised POS with planting and seating
Design with engineering

Engineering criteria/functions
Raingardens

Rain Gardens for Oakley

Rain Gardens for your local area
- Existing pipes cannot cope with amount of water from roofs and terraces
- Environment Agency would like to build rain gardens in your local area to improve the situation
- Your house is suitable for a rain garden because you have a down pipe and your front garden is either flat or slopes away from your house

What are Rain Gardens?
- Similar to regular garden beds
- Shallow depression in the ground or raised bed
- Designed to capture rain water from your roof
- Your downpipe would be connected into a shallow channel or directed straight into a rain garden
- Layers of sandy soil help to slow down water entering the drainage system

Rain garden will be attractively planted
- Planted with plants that don’t mind getting their “feet wet”
- Ornamental grasses like sedges, snowly moonrosh and Chinese silver grass
- Colourful herbaceous planting like Rudbeckia, Crocosmia and Astar
- Irises

Look at design options overleaf

Design choices

What could they look like in my garden?
The type of rain garden suitable for you, depends on whether your garden is flat or sloping.

Option: Shallow planted depression for flat garden

Option: Sunken Timber Planter for flat garden

Option: Raised Timber Planter for sloping garden
Raingardens

Planting for your Rain Garden

We have created three colour schemes for you to choose from and a variety of plant choices. Please follow the steps below to design the planting for your rain garden.

Step 1: Choose a colour scheme out of three options; red/yellow mix, blue mix or pastel coloured mix. Then go to the relevant mix.

Red/Yellow Planting Mix

Step 2: Choose one species of the following evergreen shrubs to be planted individually.

Step 3: Choose 2 species of the ornamental grasses and ferns to be planted in groups of 2-3.

Step 4: Choose one species of the herbaceous plant to be planted in groups of 2-3.

Step 5: Add 2 species of ground cover planting to be planted in groups of 2-5 along the edges.

Blue/Purple Planting Mix

Step 2: Choose one species of the following evergreen shrubs to be planted individually.

Step 3: Choose 2 species of the ornamental grasses and ferns to be planted in groups of 2-3.

Step 4: Choose one species of the herbaceous plant to be planted in groups of 2-3.

Step 5: Add 2 species of ground cover planting to be planted in groups of 2-5 along the edges.

Plant selection choices

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Raingardens

Fitting within existing gardens
Promoting understanding and SuDS awareness

Information board and raingarden roundel
Current schemes – original condition
Current schemes – one of proposals
Current schemes
Current schemes

Groundwork for Hammersmith & Fulham Council
Current schemes – Barbican
Current schemes – Barbican
Current schemes – Rathbone Market

Chris Churchman Associates
Current schemes – Rathbone Market
Current schemes – Rathbone Market

Chris Churchman Associates
Current schemes – Rathbone Market
We need to nibble...

ALL THE TIME

WHERE

YouTube – ‘Let’s get Nibbling!’
Any questions?