Living with water………..  
...SuDS and beyond

CIWEM  
May 2017

SuDS Research

- Illman Young in partnership with the University of Gloucestershire  
- Completed 2 year research project into the design of SuDS that are functional, attractive and ecologically sound  
- Investigation of existing schemes within the UK and abroad  
- Development of Good Practice Guidelines and SuDS Training  
- Work with CIRIA and co-author of the SuDS Manual  
- Lead author for SuDS Construction Guidance to be published this autumn

The problem

WE ALL UNDERSTAND THE PROBLEMS

- Changing weather patterns - more extreme and prolonged rainfall events  
- Effect of land management and overland flows from agricultural land  
- Groundwater  
- Coastal flooding  
- Towns and cities historically located on rivers  
- Urban creep and upstream development  
- Combine sewers have limited capacity

THE CONSEQUENCES

- 1 in 5 homes and businesses at risk  
- Huge financial and social cost of flood damage and reinstatement  
- The problem is increasing

The problem varies

- Problems vary with location  
  - Upstream: over-grazing & poaching of river banks, nutrient runoff, ploughing against contours, land drainage, deforestation  
  - Downstream: siltation from upstream causes, upstream flood flows, coastal surges and erosion  
  - Urban areas: increasing urbanisation through multiple causes, lack of piped drainage capacity  
- Towns and cities are located throughout the catchment  
- Multiple causes = wide range of solutions

No simple solution

The government’s position

- Reactive not proactive  
- Funding by disaster  
- No clear policy or long term strategy  
- Policy driven by ‘economic growth’  
- Dream of 1,000,000 new homes  
- But disasters have forced some changes

CONSEQUENCES

- Mandatory SuDS for all development abandoned  
- Development in areas of high and medium flood risk continues  
- Missed opportunities for delivering multiple benefits  
- The situation isn’t improving – much…..

...do they have one?

Illman Young Landscape Design Ltd

- A landscape and environmental practice specialising in:  
  - Masterplanning and site design  
  - Landscape appraisals and environmental assessments  
  - Project planning through to site inspection

- Our ambition:  
  - To create innovative, practical and sustainable landscapes

Illman Young Landscape Design Ltd

Our practice
Current opportunities for change

- Development of the CC Adaptation Plan from the CCRA
- National Infrastructure Assessment
- Various government reviews on SuDS policy into practice
- Acceptance of need for integrated land management
- Potential to develop a system for adoption
- Communities are becoming more active
- Public is more aware/informed
- Developers are learning...!

...it’s not all bad news

How can we do it now?

POLICY AND PLANNING
- Core Strategies, unitary and local plans
- Flood risk, GI, POS, amenity and biodiversity policies and targets
- SPDs and SWMPs
- Collaboration and understanding
- Pre-app advice

OPPORTUNITIES TO DELIVER
- New build – anything
- Regeneration
- Retrofitting

COMMUNITY LED PLANNING
- Neighbourhood plans
- Urban rethinking - flooding

Through planning and development

Are we delivering it through planning?

STILL A MIXED PICTURE
- Unitary authorities often better informed and coordinated
- Disconnect between Counties and Boroughs/Districts
- LLFA not always consulted
- A ‘factor in the planning mix’
- Inadequate schemes at outline
- Difficult to condition adequately
- Variable requirements between authorities
- Some restrictions on SuDS components approved
- Adoption a major problem

Not working well everywhere....

How well are we delivering it?

STILL A MIXED PICTURE
- Good quality SWMP only slowly being developed
- Many planning applications inadequate
- SuDS generally not well integrated within development
- Frequently only designed (and assessed) for quantity
- Emphasis on ‘grey engineering’
- Concept of WSUD rarely embraced

BUT
- Need to manage development in flood zones 2 and 3 understood

Not working well everywhere.....

CIWEM – Big SuDS Survey

‘A Place for SuDS’

Numerous regional and regional initiatives

- CaBA well established
- Basis for new initiatives
- Local partnerships formed in a wide range of circumstances both urban and rural
- Commercial organisations greater understanding of how it can benefit them
- Growth of community-based initiatives
- Many demonstration projects
- Collaboration delivering cross-funding

...it’s not all bad news
Widely varying solutions required

- Appropriate solutions are similarly varied
  - **Upstream:** planting field margins, stock management, leaky dams, woodland planting, retention areas, reservoirs, peat rewetting, removal of modern drainage schemes
  - **Downstream:** dredging, alleviation schemes, coastal defences, realignment, managed retreat
  - **Urban areas:** require their own response with an even more varied range of solutions

Multiple approaches builds resilience

Coastal defences

**GENERAL ISSUES**

- Have received relatively little attention by the public to date
- Great opportunities for creative design and regeneration
- Equally good opportunities to support habitats or habitat creation
- Robust schemes that are publically acceptable
- Risk to life is currently underestimated
- Long term impacts on land
- The public have to live with these schemes 365 days per annum

Two different approaches

**HOLD THE LINE**

- Generally in urban or developed areas
- Potential for creative hard defences in seaside walks and promenades
- Hard defences required for key infrastructure wherever located

**RETREAT THE LINE**

- Managed retreat/realignment
- Mainly in rural areas
- Working with natural processes

Hard defences and promenades

- Usually at an urban settlement
- Seaside and nostalgia
- Major regeneration opportunity
- But some properties may be lost
- Potential for positive integration with townscape, local character and urban design
- Must be robust to withstand the forces of nature

Managed realignment

- Typically a rural, coastal setting
- Likely pre-existing habitat interests
- Habitat loss through coastal squeeze often a key driver
- More functional in character
- Work with the natural coastal processes
- Tend to operate across a shore-line system
Tees estuary and Redcar flood alleviation

- RAMSAR site & SPA
- Loss of intertidal flats
- Managed realignment
- 77ha land for habitat recreation

Images courtesy of Stuart Ryder

Managing water in our cities, towns and villages

- Good planning policies to support local needs
- Flood alleviation
- Flood protection
- Realignment/routing through the urban environment
- Reconsidering land planning within urban space
- Managing surface water from all new development and redevelopment
- Comprehensive retrofitting of SuDS
- Property level resilience

Integrate the water within development

- As the future becomes more uncertain, manage water-based risks more effectively
- Reduce the need for potable water
- Clean and recycle grey water on site
- Potential to manage black water
- Reduce risk from flooding
- Provides longer term cost certainty

"Water Sensitive Urban Design is the process of integrating water cycle management with the built environment through planning and urban design"

... but may be seen as a step too far... for now.

Rethinking our towns and cities

- Historically sited on rivers for power and transport
- Very intensive land-use
- Consider how to re-model our towns and cities
- Rivers and frontages have potential to become prized assets
- Increased property prices and investment
- Develop opportunities for social use, access and health
- Understand the character of the town
- Maxime the opportunities and synergies

Strategy for Derby

- Derwent Valley World Heritage Site
- Re-visioning of the city centre
- Blue corridor vision – 120m wide
- Major urban masterplanning
- Considering land swaps
- Challenges town planning principles
- Makes a city consider resilience
- Engineer led, but visioned through urban design
- SuDS and WSUD principles to lead all new development
- Need for retrofitting SuDS

Surface water flooding

Having the imagination to rethink
Rethinking our towns

Arrival and connections

Quality of place

Land use and destinations

Major opportunities

SuDS retrofitting...

- 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

... the need to Nibble!
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 and people

Conceptual approach

How's retrofitting different?

Objectives

- Develop a ‘catchment-wide’ approach to drainage improvements across the Metropolitan Glasgow area.
- Support the selection of the most sustainable choices for drainage from:
  - managing surface water at source
  - improving sewerage capacity
  - improving watercourse capacity
  - managing surface water above ground
- Identify locations for pilot studies of surface water management approaches.

High Level Risk Assessment

Development of integrated above and below ground models for the Glasgow area covering north and south of the Clyde
Assessed flooding strategically using 30 and 100 year rainfall events on coarse above ground mesh
40 drainage communities identified 'at risk'

Glasgow SWMP

Glasgow SWMP

Glasgow SWMP
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

Any building
• Rainwater harvesting for internal use
• Water butts or tanks for external re-use
• Consider green/brown/blue roofs when flat roofs need repair or renewal
• De-pave drives or disconnect downpipes to raingardens

Flats and apartments
• Disconnect downpipes and
• Redesign the communal space
• Green roofs to garages, cycle sheds or bin stores
• Disconnect downpipes to raingardens ponds or other garden features

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

School grounds
• Redesign for creative play/use
• Often extensive hard surfaces
• ‘Spare’ green space invariably available
• Soft SuDS especially align with the curriculum

What you can do - use trees!
• Uptake of water through SuDS
• Interception of water
• Water quality improvements
• Air quality improvements
• Urban heat island effect
• Increase in biodiversity and opportunities for wildlife
• Species migration and GI networks
• Visual quality in the environment
• Health and wellbeing – physical and mental

...and in urban environments trees have greater all-round acceptability
...it’s not just about water
The Cheonggyecheon stream

Any questions?
Revision the land?

Sutcliffe repurposed

Extensive regrading and new engineering

A new local role

Current schemes – LIFE project

Groundwork for Hammersmith & Fulham Council

Ashford ring road

Sutcliffe Park

Sutcliffe repurposed

A new local role

Current schemes – LIFE project
Current schemes – original condition

Any questions?