

# Integrated Water Sensitive Design: Opportunities and Barriers to implementation

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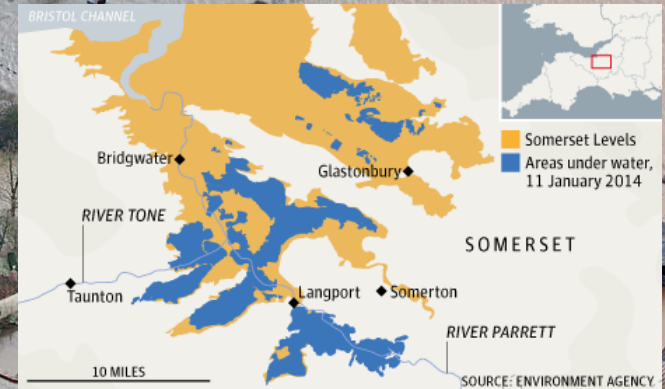
# Introduction

Climate change – more summer rainfall in Northern Europe

One of wettest winters 2013/14

Resilience now a Government focus

Sustainable flood-risk management



# Introduction

## *Resilience*



The ability to withstand and rapidly recover from a flood



## Objectives

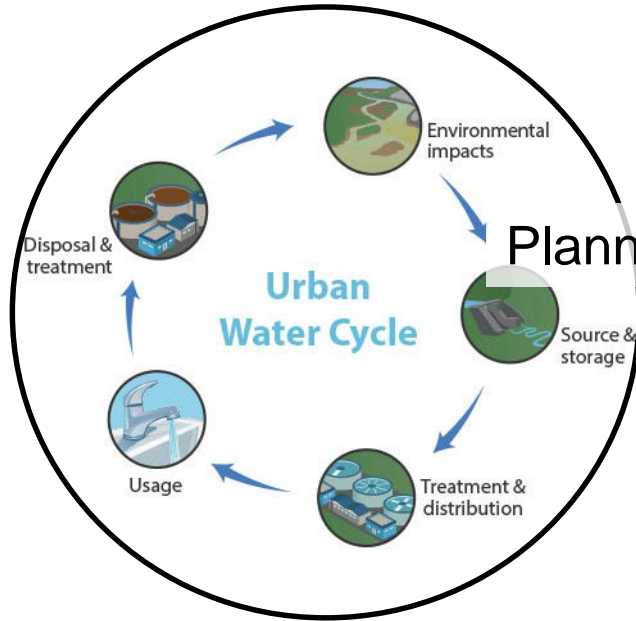
REVIEW: definitions, characteristics, types & methods

PRESENT: the context, current practise & key drivers in UK

INVESTIGATE: opportunities & barriers to WSUD in the UK

CONSOLIDATE: recommendations for wider implementation in current / new housing schemes

# Water-sensitive Urban Design



Planning & Design



# Water-sensitive Urban Design



## Different scales of WSUD

‘Macro’ scale – entire city

‘Meso’ scale – urban block / neighbourhood

‘Micro’ scale – individual building

# Methodology: Overview



## Qualitative interviews for data collection

3 types:

- Informal conversational interview
- **General interview**
- Standardised open-ended interview

Data reduction to refine information

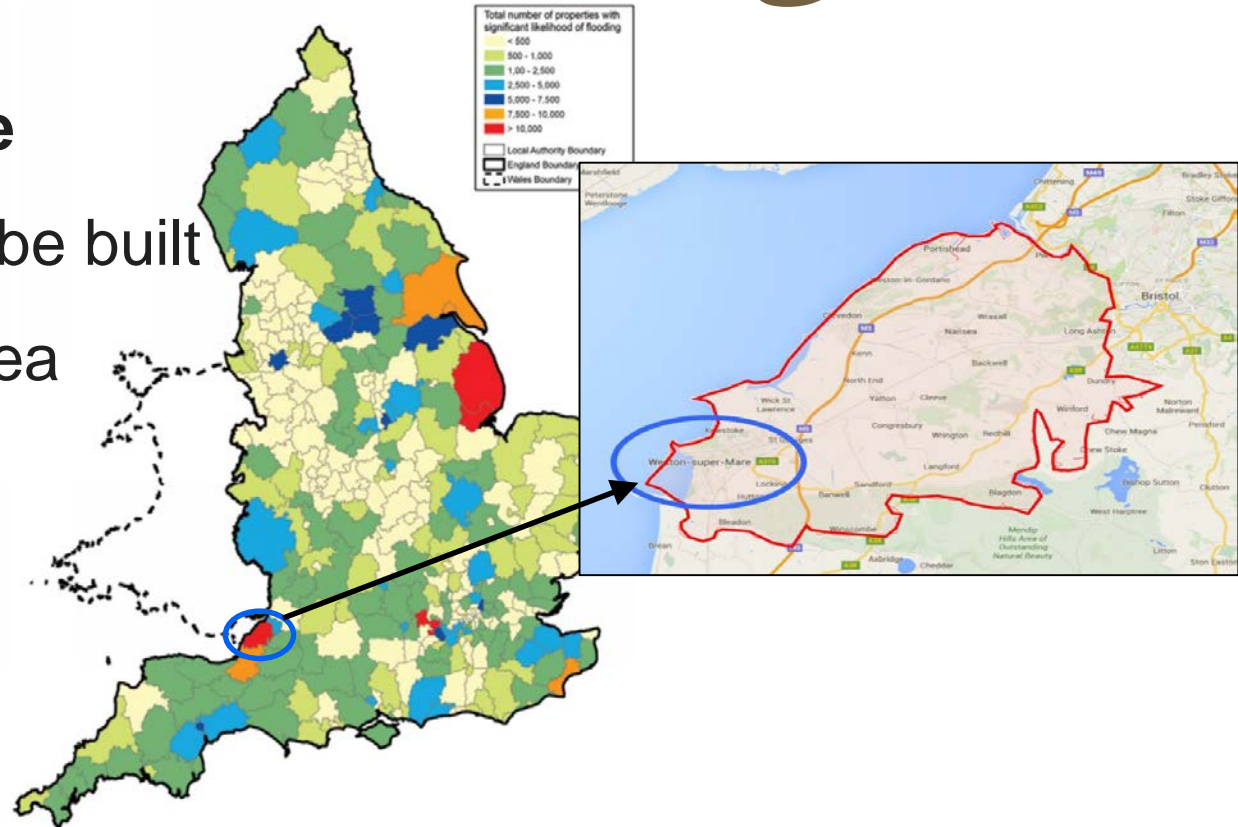


# Methodology: Case Study

## Weston-super-Mare

9000 new homes to be built

High-risk flooding area



# Methodology: Interviews



2 interviews with Project Managers

Biggest developments in Weston-super-Mare

Different target markets

Phone call with NSC Employee



# Summary of Findings: Site photos

## Development B



# Summary of Findings: Comparison



Development A	Development B
Lower budget homes	2 <sup>nd</sup> /3 <sup>rd</sup> time buyers
Located in floodplain	Located close to floodplain, adjacent to river
WSUD considered before planning approval	WSUD considered before planning approval
Use of rhyes, swales	Use of rhyes, swales, attenuation ponds, hydro-brake, pre-fab manholes
Cistern size limited, encourage showers, water butts	Cistern size limited, encourage showers, water butts

# Summary of Findings



Main advocates



## Current Regulations



### Flood and Water Management Act

Flood and Water Management Act 2010

2010 CHAPTER 29

An Act to make provision about water, including provision about the management of risks in connection with flooding and coastal erosion. [8th April 2010]

BE IT ENACTED by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—



The Building Regulations 2010

**Drainage and waste disposal**



## Building Regulations Document H

APPROVED DOCUMENT

- H1 Foul water drainage
- H2 Wastewater treatment systems and cesspools
- H3 Rainwater drainage
- H4 Building over sewers
- H5 Separate systems of drainage
- H6 Solid waste storage

# Summary of Findings



## Some pros and cons

Planning approval process can be slow

>1.5 jobs generated per new home

WSUD features require access and maintenance

# Conclusion



UK made positive changes – WSUD required in housing developments

WSUD approach is growing & much improved

Can improve on individual house WSUD

## The future of WSUD

Improvement to regulations – individual house & for building professionals

More detailed guidance for local authorities

Government incentives & funding – e.g. maintenance