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
Water-sensitive Urban Design

A healthy natural environment

Not just Sustainable Urban Drainage

Store rain water and/or drain it away slowly
Different scales of WSUD

‘Macro’ scale – entire city

‘Meso’ scale – urban block / neighbourhood

‘Micro’ scale – individual building
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

<table>
<thead>
<tr>
<th>Development A</th>
<th>Development B</th>
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<tbody>
<tr>
<td>Lower budget homes</td>
<td>2\textsuperscript{nd}/3\textsuperscript{rd} time buyers</td>
</tr>
<tr>
<td>Located in floodplain</td>
<td>Located close to floodplain, adjacent to river</td>
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<tr>
<td>WSUD considered before planning approval</td>
<td>WSUD considered before planning approval</td>
</tr>
<tr>
<td>Use of rhynes, swales</td>
<td>Use of rhynes, swales, attenuation ponds, hydro-brake, pre-fab manholes</td>
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<tr>
<td>Cistern size limited, encourage showers, water butts</td>
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</tbody>
</table>
Summary of Findings

Main advocates

Environment Agency

CITY OR COUNTY COUNCIL

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]

Building Regulations

Document H

The Building Regulations 2010

Drainage and waste disposal

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
Recommendations

The future of WSUD

Improvement to regulations – individual house & for building professionals

More detailed guidance for local authorities

Government incentives & funding – e.g. maintenance