Flood resistance and resilience for new buildings

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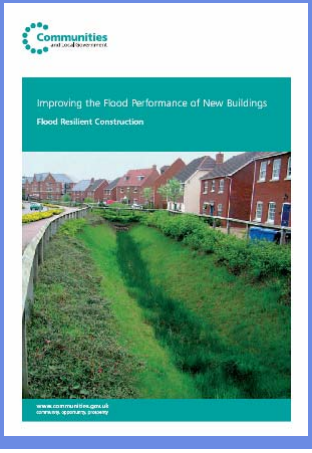
Outputs

- Guidance for developers and designers
- Proposals for incorporating flood resilience in the Building Regulations
  - Part C – Site preparation and resistance to contaminants



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The evidence

- Literature review
- Experiential evidence - collation and analysis of post-flood observational data
- Laboratory testing

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Flood resilience characteristics

- Water penetration – the seepage through the material (different from “water absorption”)
- Drying ability – the capability to regain the original moisture condition
- Retention of pre-flood dimensions, integrity – the lack of deformation or change in form or appearance of the material

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Definitions

Flood avoidance:

Constructing a building and its surrounds (at a site scale) in such a way to avoid it being flooded (e.g. by raising it above flood level, re-siting outside floodplain etc.)

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Flood resistance:

Constructing a building in such a way to prevent floodwater entering the building and damaging its fabric.

Flood resilience:

Constructing a building in such a way that, although floodwater may enter the building, its impact is reduced, i.e. no permanent damage is caused, structural integrity is maintained and drying and cleaning are facilitated.

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Flood repairable:

Constructing a building in such a way that although flood water enters a building, elements that are damaged by flood water can be easily repaired or replaced. This is also a form of flood resilience.

Flood protection products – valuable for existing properties but not advocated for new build

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Flood resilience and planning?

- PPS 25 *Development and flood risk* shows resilience as part of an integrated portfolio of approaches.
- Building level flood resilience should be used when development has been agreed (Sequential and Exception Tests in PPS25) – buildings are located in places of lowest risk

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Key stages

- Determine whether a site specific FRA is required; if not, the following will still be needed:
  - Identify sources of flooding, level, duration, frequency and depth of flooding
  - Any flood risk identified?
  - Can development be designed to be safe and not increase risk to emergency services?
  - Use design strategies to find the best approach

LANDFORM
LOCAL AUTHORITY NETWORK ON DRAINAGE AND FLOOD RISK MANAGEMENT

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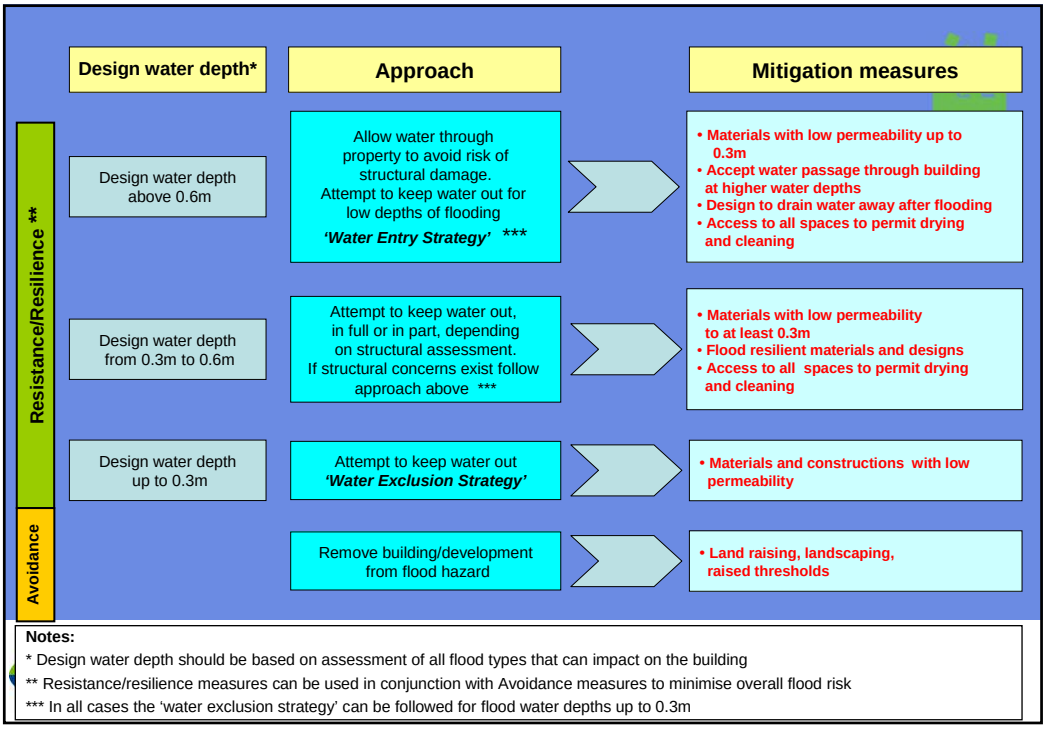

Avoidance

- Build elsewhere
- Site planning
- Raising ground or floor levels
- Local bunds and landscaping
- Boundary walls and fences

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Resistance/resilience
Water exclusion strategy

- ***minimising*** water entry whilst maintaining structural integrity,
- using materials and construction techniques to facilitate drying and cleaning.
- favoured when low flood water depths are involved (up to 0.3m to a maximum of 0.6m).
- can be considered as a resistance measure but it is part of the aim to achieve overall building resilience

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Resistance/resilience
Water entry strategy

- allowing water into the building, facilitating draining and consequent drying.
- Standard masonry buildings are at significant risk of structural damage if there is a water level difference between outside and inside of about 0.6m or more.
- favoured when high flood water depths are involved (greater than 0.6m).

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Guidance in Building Regs

- Flood avoidance to be preferred means of mitigation
- Various forms of flood effect mitigation, dependent upon depth of flooding
- Provision of a refuge above flood level
- Siting food storage, food preparation and useable sanitary accommodation above flood level
- Siting building services (ie. water, electricity, gas and telephone) and heating apparatus above flood level
- Avoiding spillage from vessels containing possible pollutants etc

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Closing the loop between Planning and B Regs

Proposed changes in Building Regulations could:

- Planning system - key responsibility to determine whether flood effect mitigation is required
- Building control - responsible for its application

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Further information

CIRIA	www.ciria.org
CIRIA LANDFORM	www.ciria.org/landform
CIRIA Flooding	www.ciria.org/flooding
CIRIA SUDS	www.ciria.org/suds
Environment Agency	www.environment-agency.gov.uk
National Flood Forum	www.floodforum.org.uk

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