Flood Risk and Drainage Management in a Changing Climate

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September 2016

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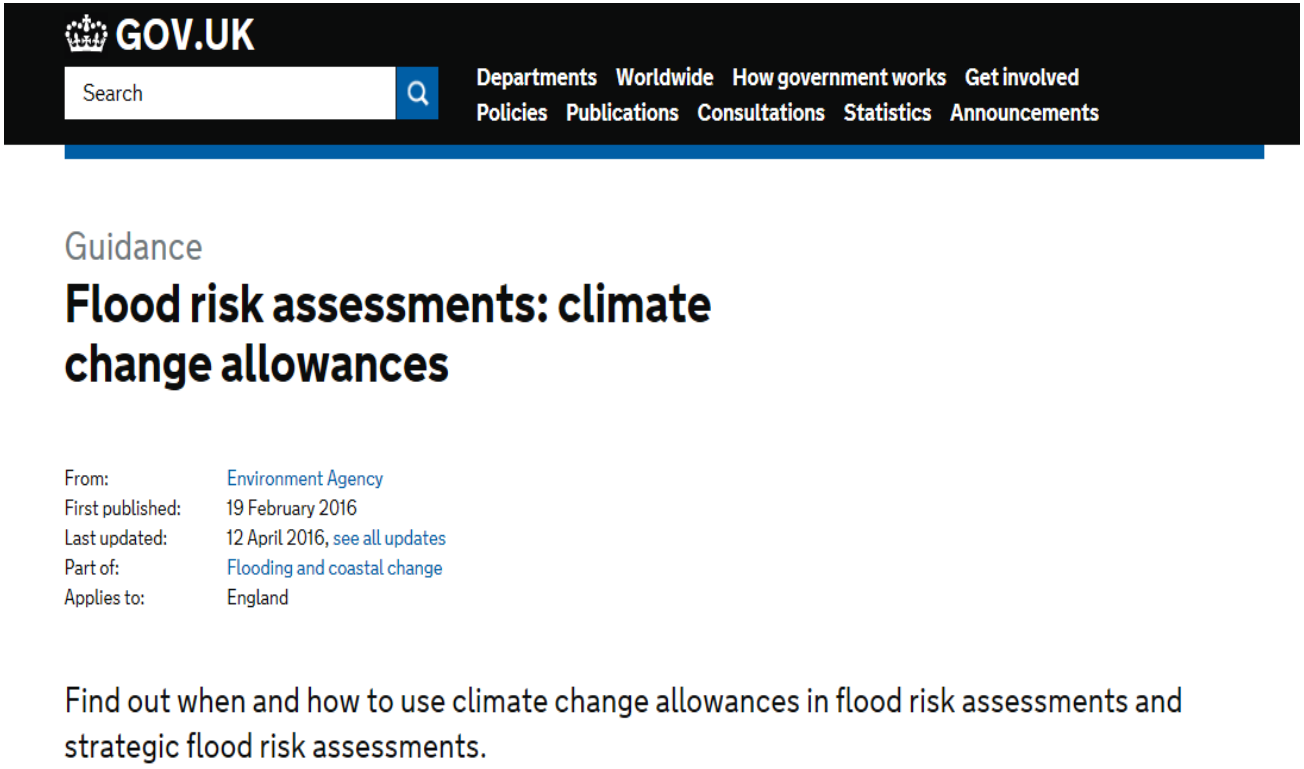
UPDATED CLIMATE CHANGE ALLOWANCES 2016



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Guidance

Flood risk assessments: climate change allowances

From: Environment Agency
First published: 19 February 2016
Last updated: 12 April 2016, see all updates
Part of: Flooding and coastal change
Applies to: England

Find out when and how to use climate change allowances in flood risk assessments and strategic flood risk assessments.

https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

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UPDATED CLIMATE CHANGE ALLOWANCES 2016

River basin district	Allowance category	Total potential change anticipated for '2020s' (2015 to 39)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2115)
Northumbria	Upper end	20%	30%	50%
	Higher central	15%	20%	25%
	Central	10%	15%	20%
Humber	Upper end	20%	30%	50%
	Higher central	15%	20%	30%
	Central	10%	15%	20%
Anglian	Upper end	25%	35%	65%
	Higher central	15%	20%	35%
	Central	10%	15%	25%
South East	Upper end	25%	50%	105%
	Higher central	15%	30%	45%
	Central	10%	20%	35%
Thames	Upper end	25%	35%	70%
	Higher central	15%	25%	35%
	Central	10%	15%	25%
South West	Upper end	25%	40%	85%
	Higher central	20%	30%	40%
	Central	10%	20%	30%
Severn	Upper end	25%	40%	70%
	Higher central	15%	25%	35%
	Central	10%	20%	25%
Dee	Upper end	20%	30%	45%
	Higher central	15%	20%	25%
	Central	10%	15%	20%
North West	Upper end	20%	35%	70%
	Higher central	20%	30%	35%
	Central	15%	25%	30%
Solway	Upper end	20%	30%	60%
	Higher central	15%	25%	30%
	Central	10%	20%	25%
Tweed	Upper end	20%	25%	45%
	Higher central	15%	20%	25%
	Central	10%	15%	20%

→ **Peak River Flow**

Thames	**Upper end**	**25%**	**35%**	**70%**
	Higher central	15%	25%	35%
	Central	10%	15%	25%

Table 1 peak river flow allowances by river basin district (use 1961 to 1990 baseline)

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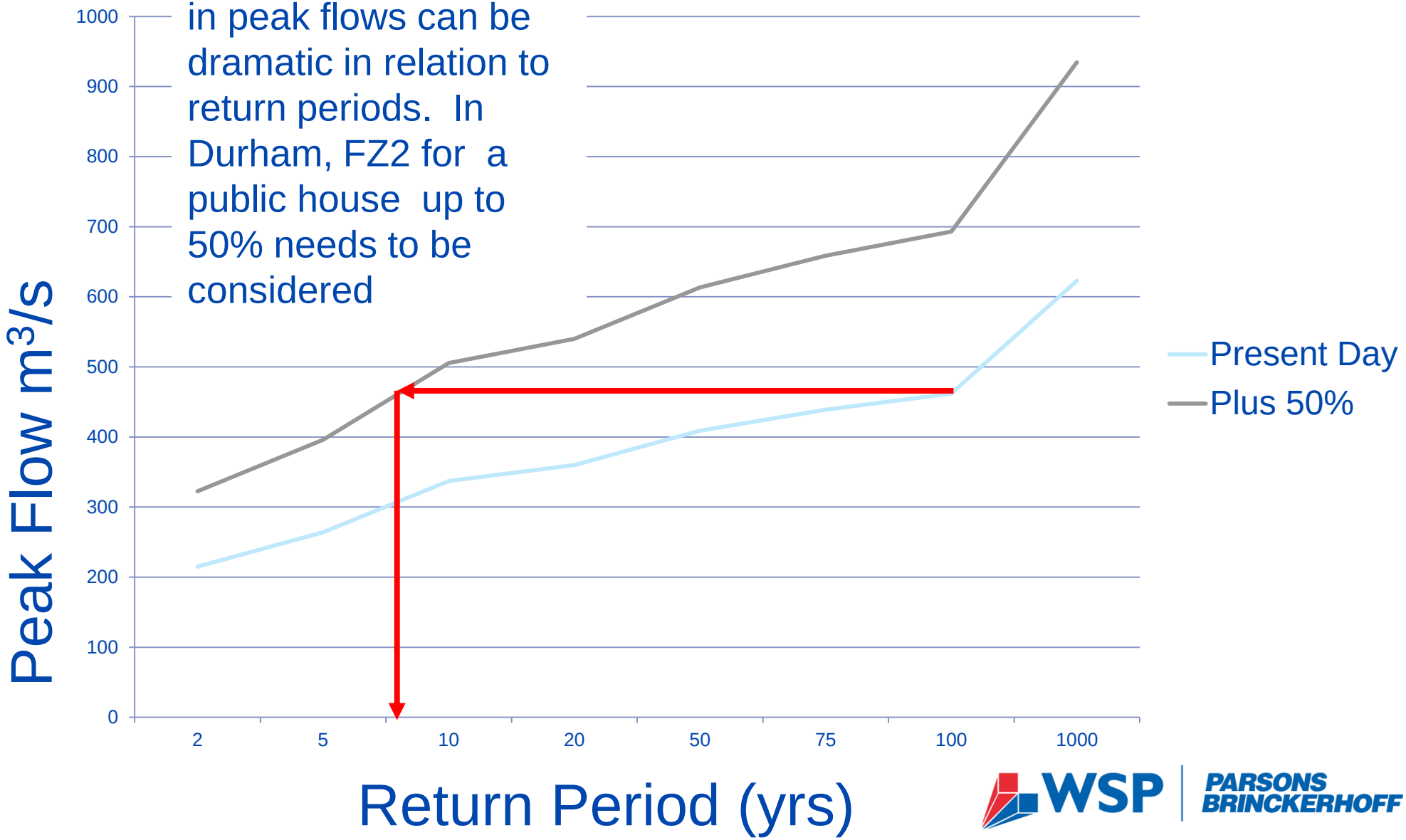
RIVER WEAR @ DURHAM

Applying an increase in peak flows can be dramatic in relation to return periods. In Durham, FZ2 for a public house up to 50% needs to be considered



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STRONG FOCUS ON RISK BASED APPROACH

- **FLUVIAL FLOODING - "***Consider the flood zone and the appropriate flood risk vulnerability classification to decide which allowances apply to your development or plan. This will help you understand the range of impact"*
- **RAINFALL INTENSITY –** *' For flood risk assessments […] assess both the central and upper end allowances to understand the range of impacts*

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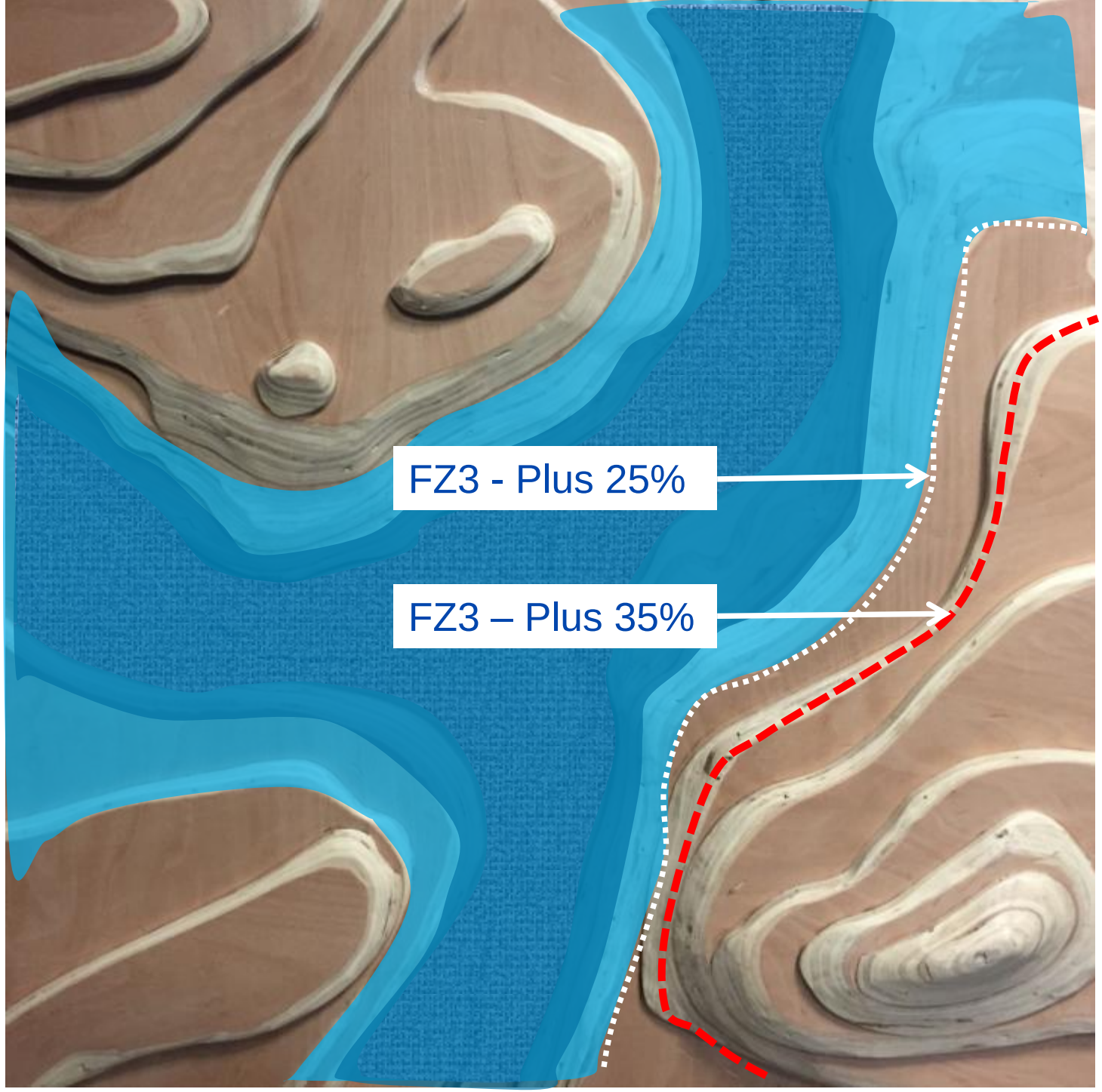

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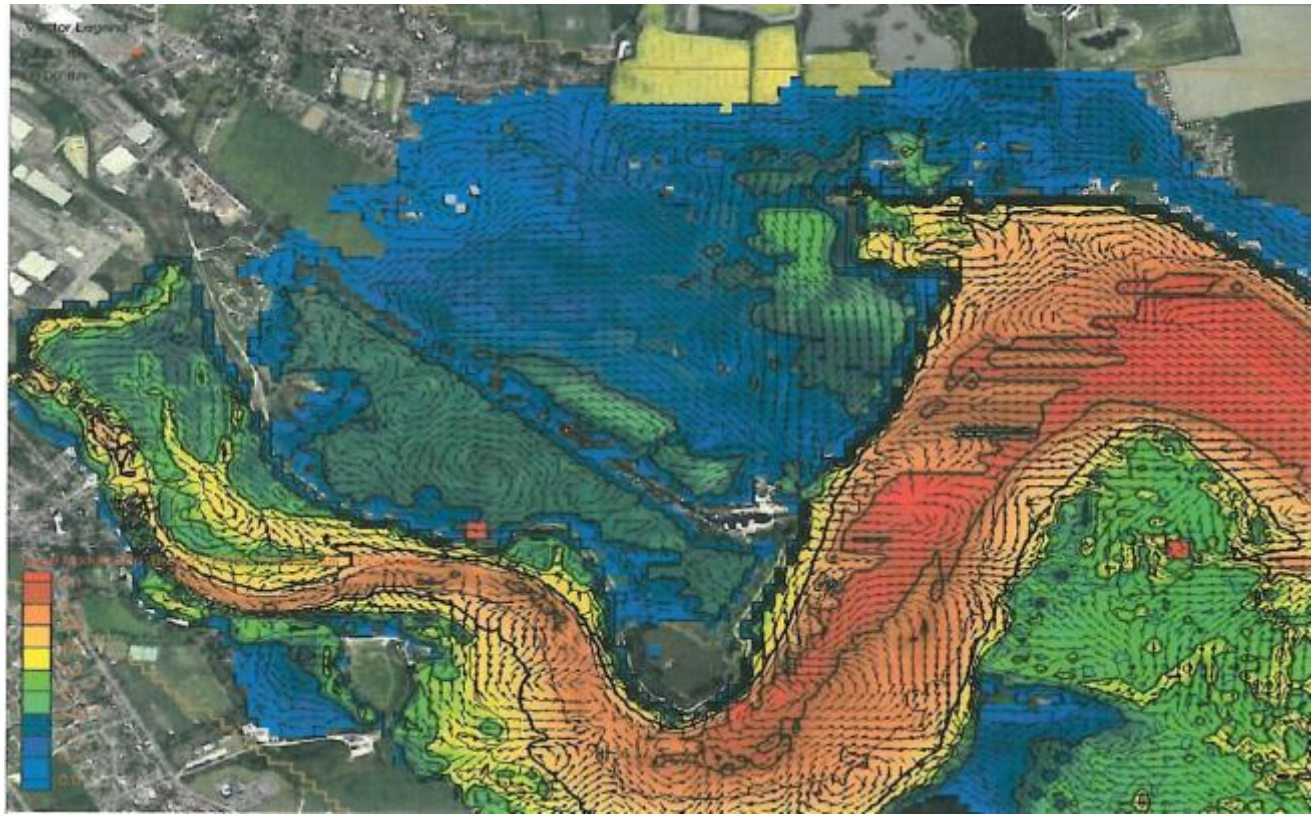
Sequential Approach - Within a flood zone give precedence to areas at lower probability of flooding and where the expected depth/velocity is lower



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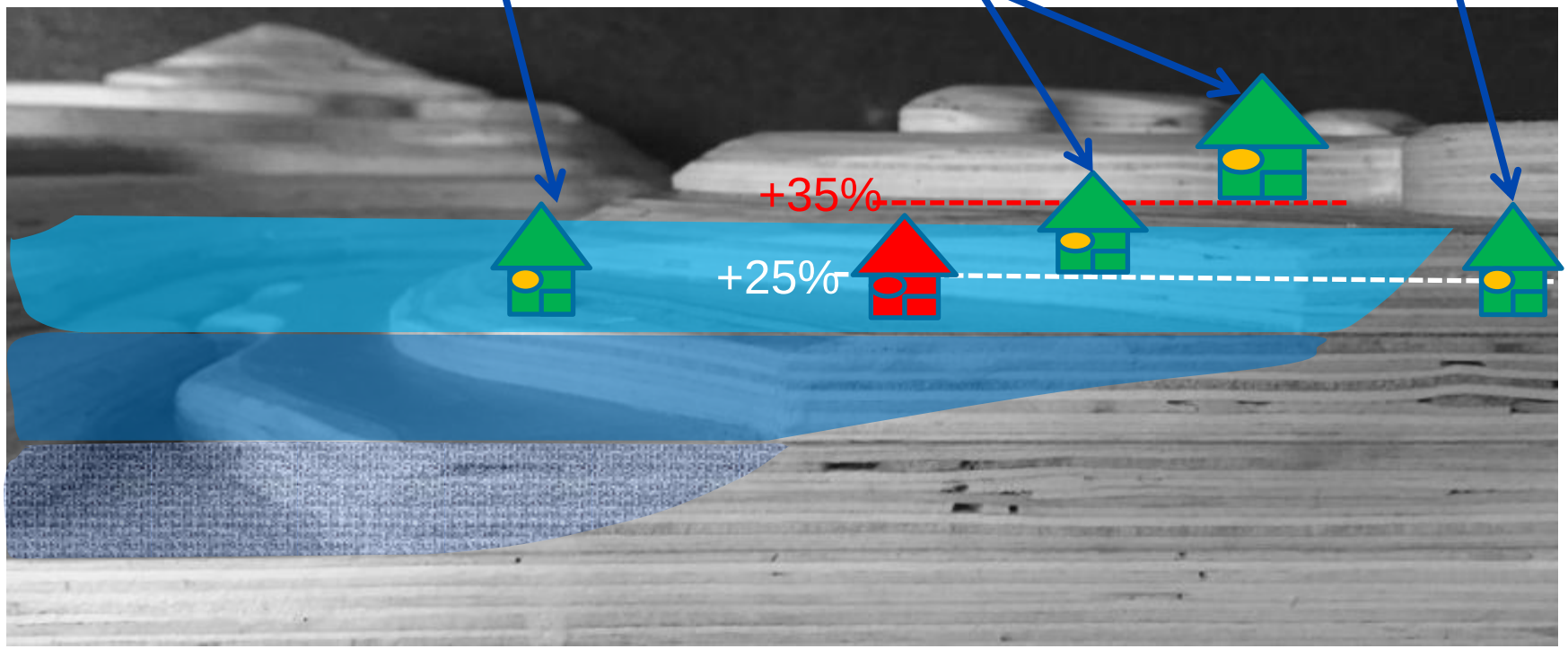
DESIGN PERSPECTIVE - DEFINING THE FLOOD LEVEL

But if you are in Flood Zone 1
this still does not apply apparently!

Before revised guidance

After guidance



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OPTIONS FOR DEVELOPMENT RESILIENCE

Building on stilts

Raise thresholds

Raise finished floor levels

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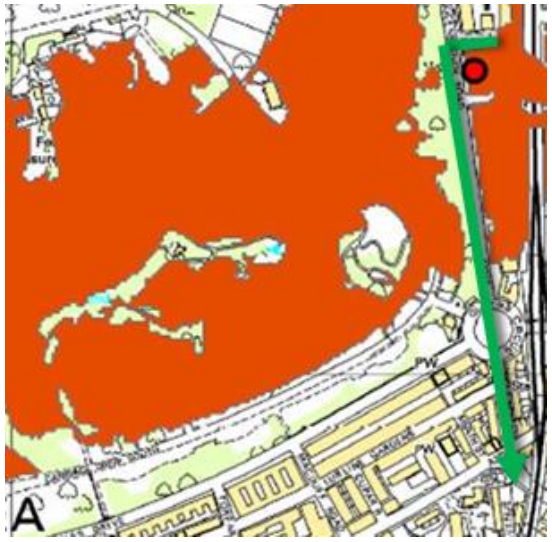
EMERGENCY PLANNING



Flood warnings currently issued for England and Wales

0
Severe Flood Warnings
SEVERE FLOODING
DANGER TO LIFE

0
Flood Warnings
FLOODING IS EXPECTED
IMMEDIATE ACTION REQUIRED

0
Flood Alerts
FLOODING IS POSSIBLE
BE PREPARED

Are you at risk now?

Enter a postcode or place in England or Wales

Check a location ›

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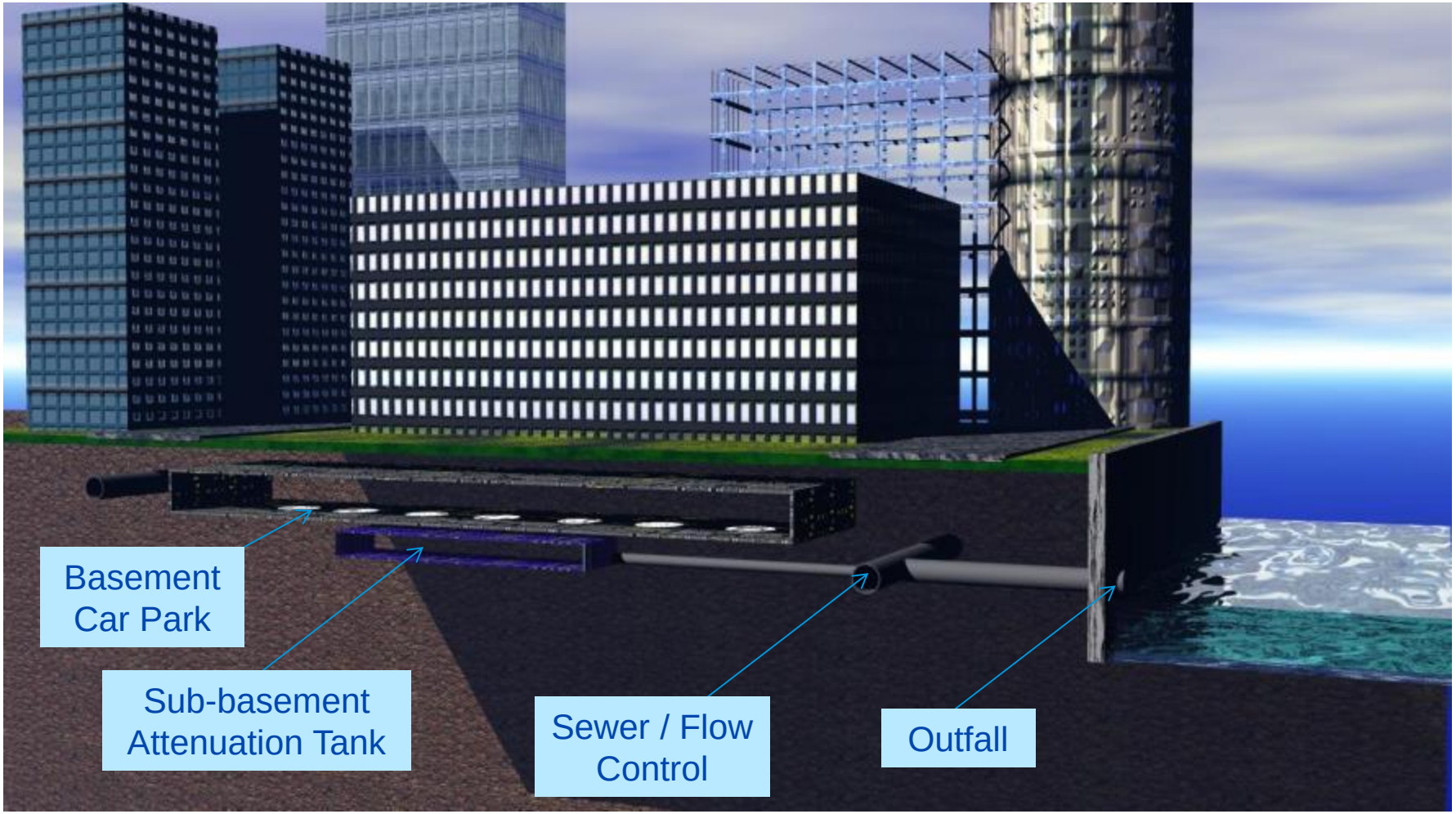
DESIGN PERSPECTIVE – SURFACE WATER



→ **Example with basement**

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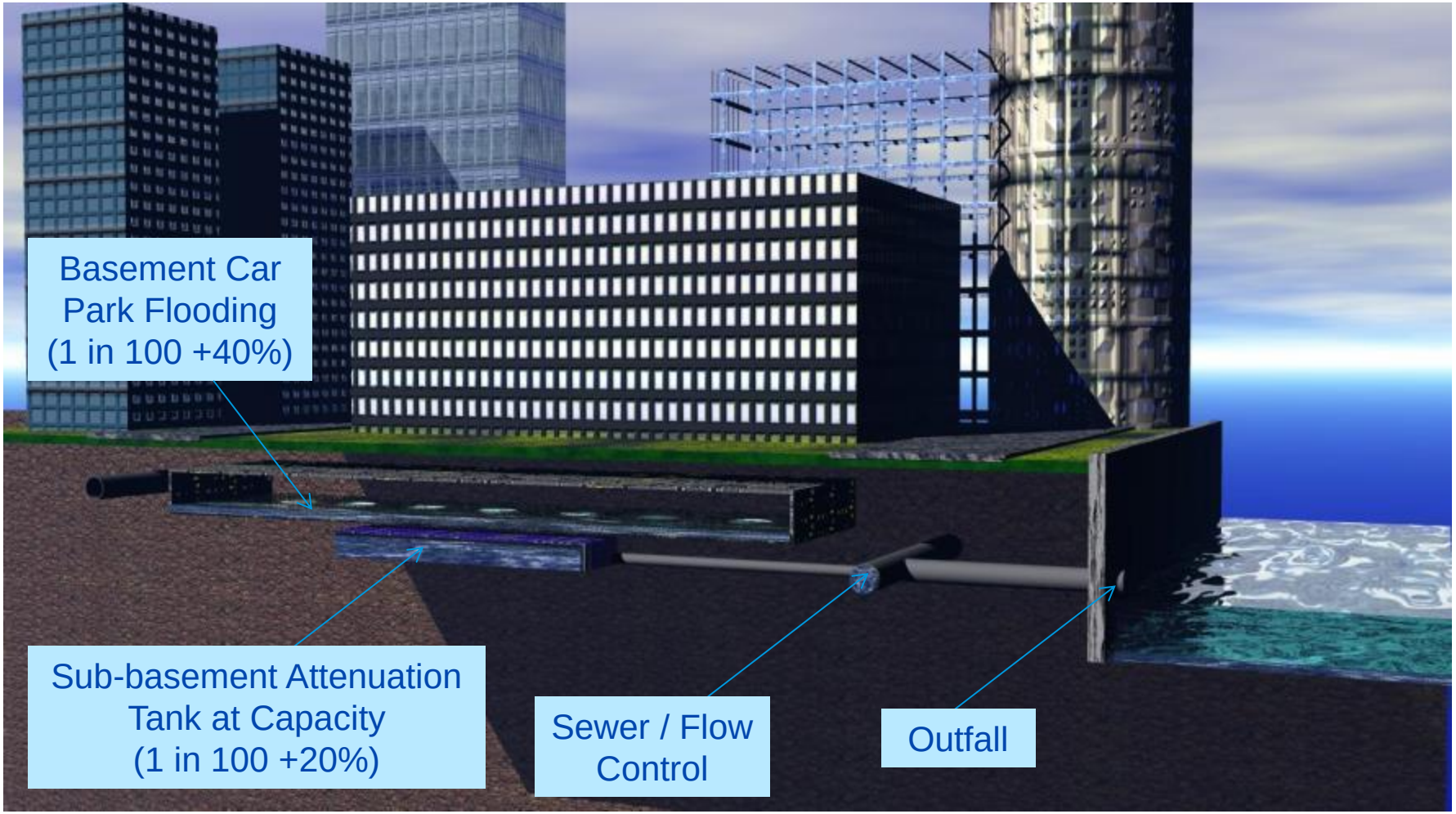
DESIGN PERSPECTIVE – SURFACE WATER



→ **Example with basement – controlled flooding of car park**

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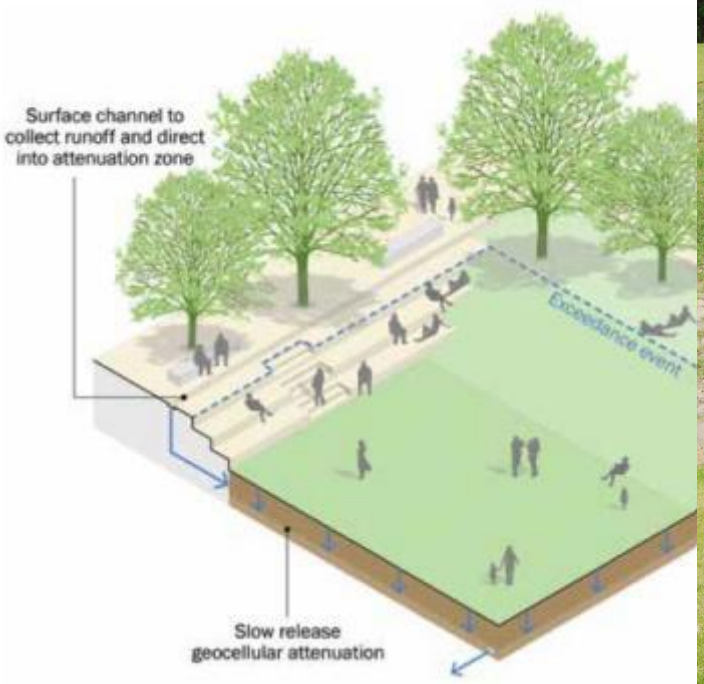
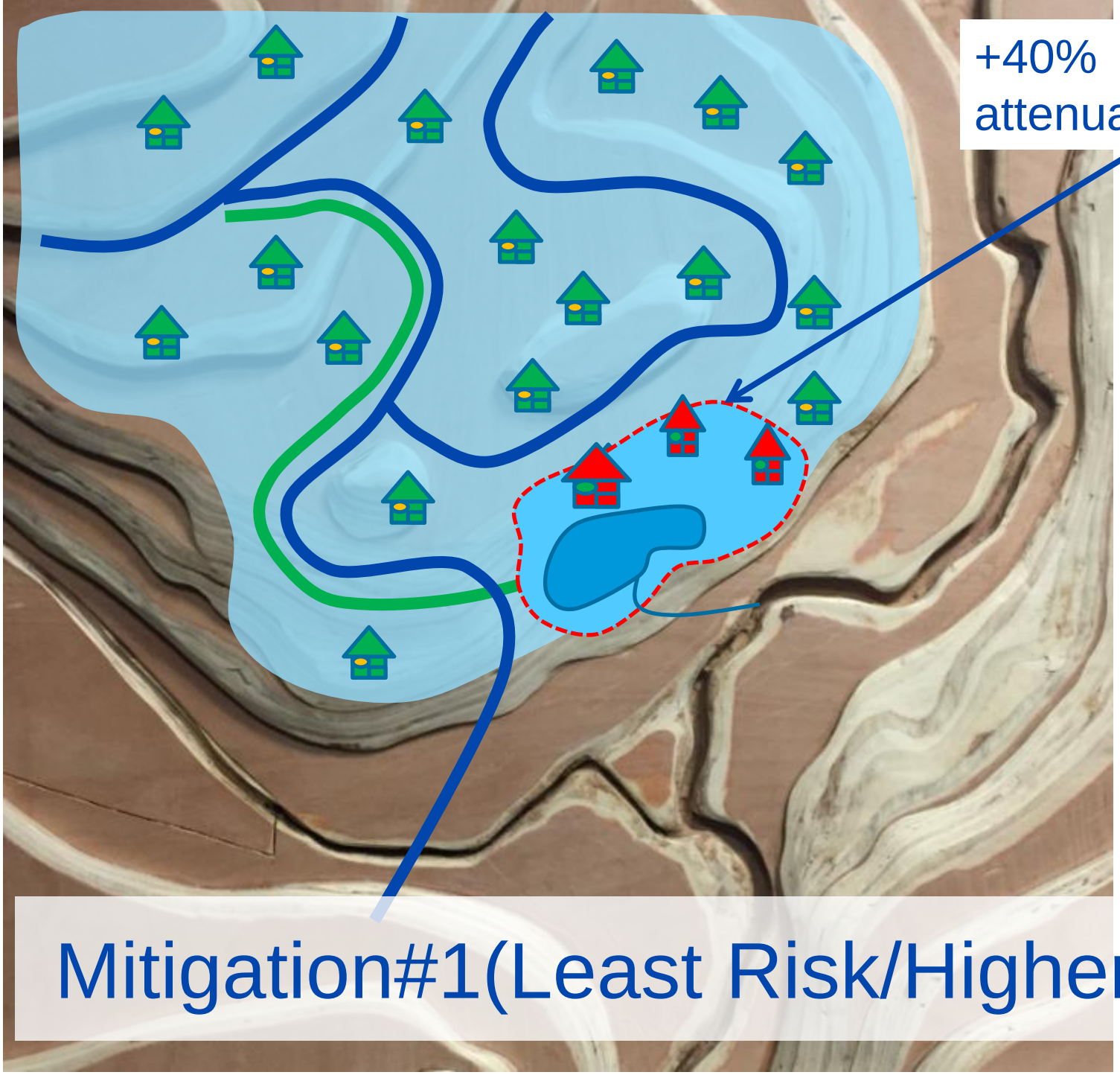
DESIGN PERSPECTIVE – SURFACE WATER

→ **Informal Attenuation / Multi-use Spaces**





Design for less test for more (20% v 40%)

Mitigation#1(Least Risk/Higher Cost)

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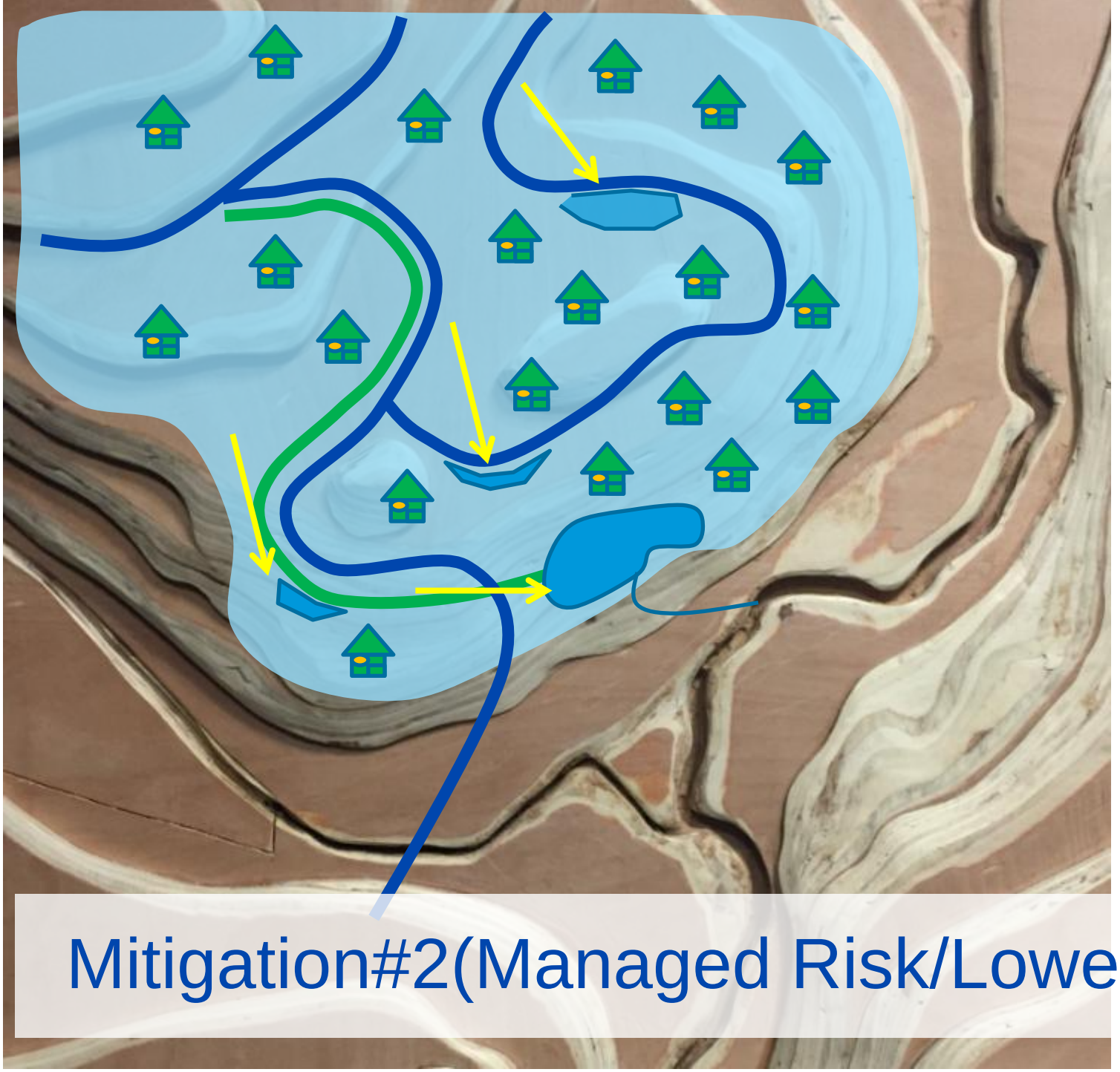

Design for less test for more (20% v 40%)

Mitigation#2(Managed Risk/Lower Cost)

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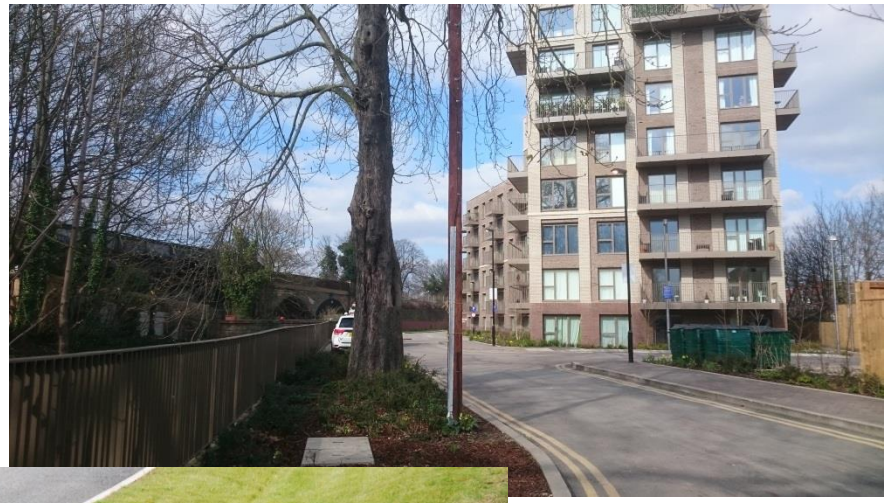
DESIGN FOR EXCEEDANCE



FLEXIBILITY IN THE DESIGN

BUT THERE ARE SOME CONSTRAINTS…

- **Consistent advice?**
- **Cost (real or perceived) – e.g. are permeable pavements expensive?**
- **Lack of incentives – who is driving the SuDS implementation e.g. FWMA missed opportunities**
- **Public sector resources – LLFA in charge of surface water drainage but can they manage it?**
- **Missed opportunities/synergies e.g. rainwater harvesting, green roofs)**
- **Conflicting needs – e.g. stay low for disable access or high for flood risk mitigation?**
- **Unknowns e.g. groundwater**

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The all-electric city

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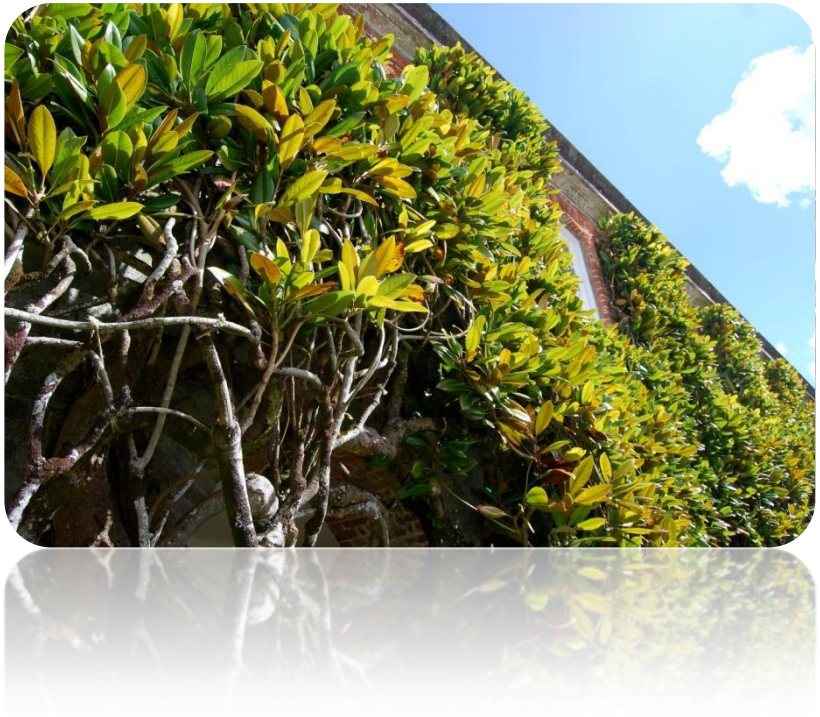

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