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# Problems for Engineers ...

systems in different ownership

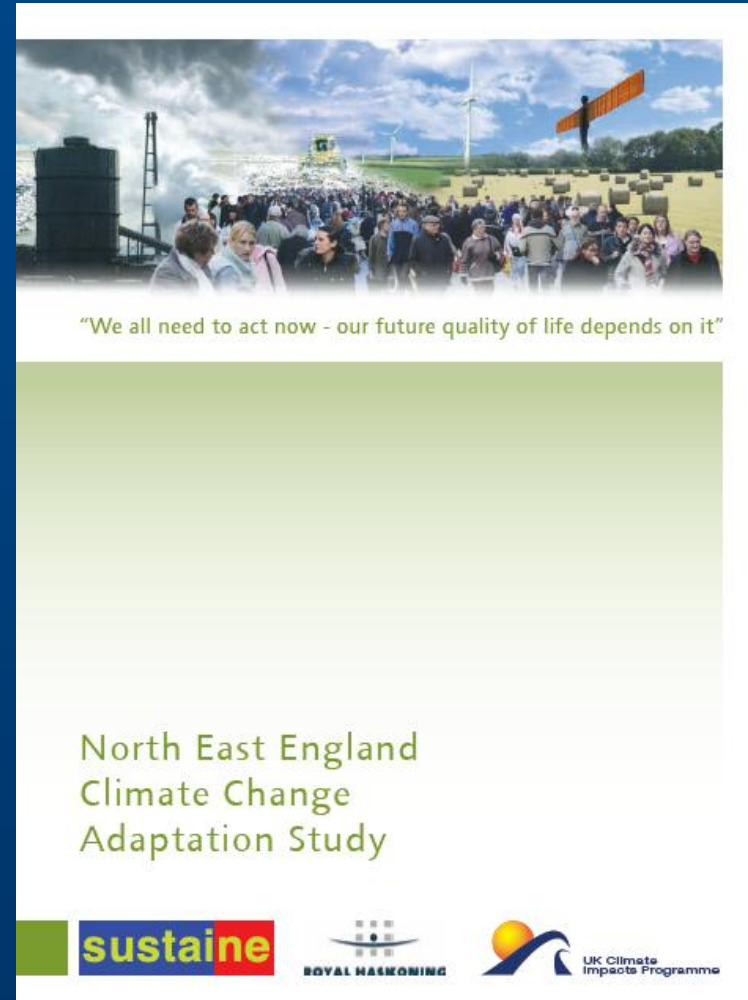
Budgets/Efficiencies

- Quality standards
- Sustainability
- Levels of service
- Population growth



# Demands on systems

- Urban creep.....+20%
- Development.....
  - can add to problems on capacity constrained networks
- Climate change →



"We all need to act now - our future quality of life depends on it"

North East England  
Climate Change  
Adaptation Study

sustaine ROYAL HALKOVING UK Climate Impacts Programme

# Key Messages

- Business as usual is not an option
- Significant challenges ahead... but we have the means to meet them
- Climate change presents significant opportunities **but** ...
- We must take responsibility and work together
- Behaviour and attitudes need to change

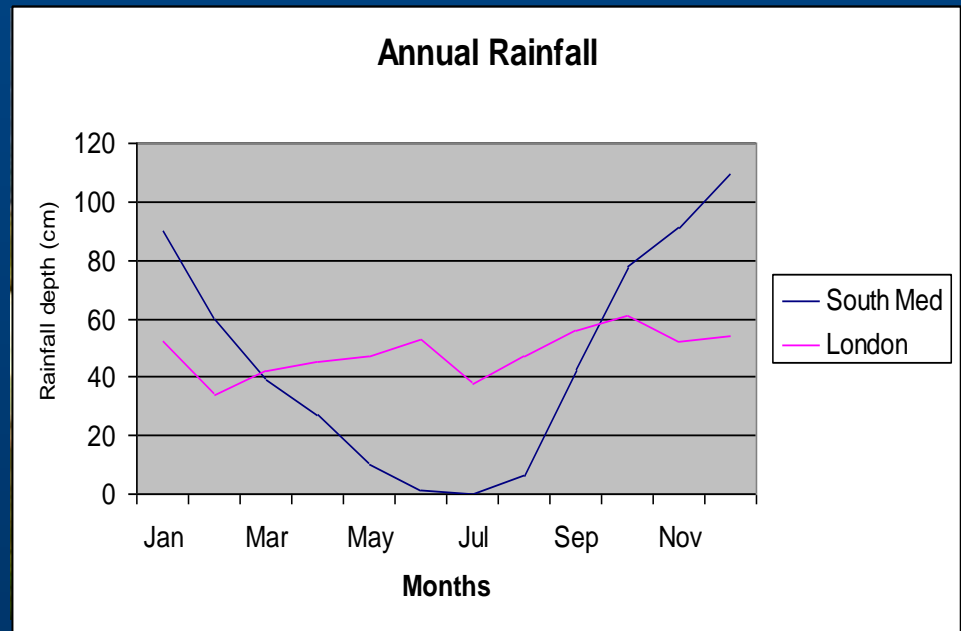
# Meeting the Challenge ?



- 'end-of-pipe' hard engineering solutions – non-preferred ...
- limit input of storm water into existing systems
- Balance risk, cost and benefit
- flooding focus in the UK?
- How about drought resilience ?

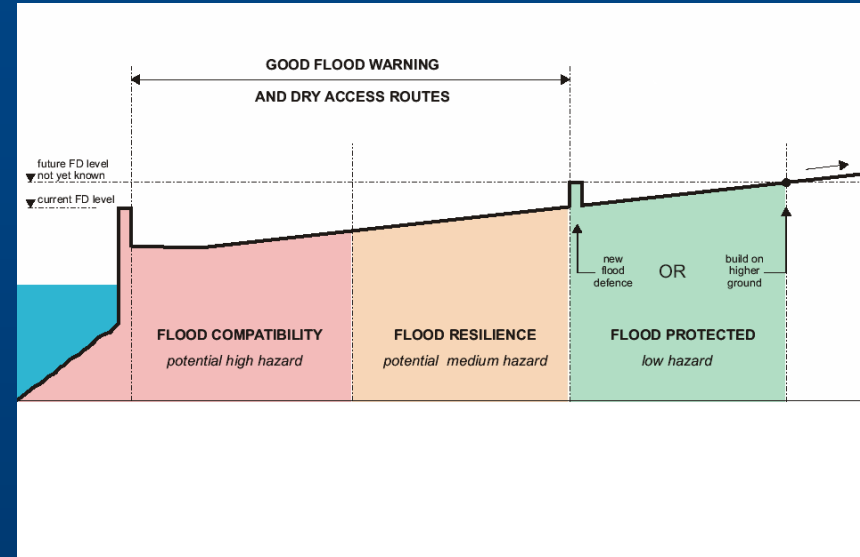
# South Mediterranean redevelopment

- annual rainfall similar to UK
- High intensities
- Whole water cycle considered
- Full strategy required at planning application stage
- rainwater capture on a large scale
- Specific legislation defines need for volume of capture per m<sup>2</sup>
- Challenges of storage/treatment vs end use



# South Tyneside redevelopment....

- Drainage proposals viable ?
  - Previous use/contamination
  - Ground conditions
  - Available space/commercial viability of plots
- Local Authority – consulted widely with developers
- Flood risk shapes development proposals



# Opportunities for Engineers?

- Cost/risk/benefit balance across systems
  - Securing agreement of stakeholders
- Surface water management
  - Commercially viable solutions
  - Facilitate redevelopment