D4FC Factsheet 39:
Climate Adaptive Neighbourhoods (CAN) Project

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General project information
Name of project: Climate Adaptive Neighbourhoods (CAN) Project
Location of project: Norwich
Type of project: New build residential
Cost of project: £8.3m

Project team
Client: Serruys Property
Designer: Baca Architects
Contractor: TBC
Other organisations involved (and their role): Lanpro (planning), Atelier Pro (masterplan), JBA and Total Flood Solutions (flood risk)

Project description
The Climate Adaptive Neighbourhoods (CAN) project is a holistic design initiative to climate adaptive domestic buildings in flood prone areas.

The study site is part of a major regeneration proposal for a site in Norwich, partly located on the floodplain. An innovative approach to floodrisk has already been adopted, in which the site is allowed to flood. The buildings have been carefully positioned to minimise the risk of flooding and where flood risk still exists the buildings are planned to be resistant to floodwater. The CAN project will assess how future climate will affect the development and how measures to address floodrisk may be combined with other measures to simultaneously address a wider range of climate issues that could emerge in the next 70 years.

Project timescales and dates
Design and assessment period (pre-planning): 2010 to 2012
Construction period (post-consent): TBC
Operation and monitoring period: TBC
Further project details

1. What approach did you take in assessing risks and identifying adaptation measures to mitigate the risks?

The following method was used to assess risks so far:

- **Weather Generator Project**: to assess the future climate for the high emissions in 2030s and the medium emissions for the 2080s between the 10th and 90th percentiles. This was combined with Environment Agency predictions for the Anglian Region. This enabled a range of future predictions and average to be identified all of which were carried forward for assessment of options.

- an initial assessment of adaptation options as given by the TSB was carried out in the context of the climate risks to the site, against previous projects/experience within the team and other literature. These measures were set out in a matrix against the headline issues and further appraised to enable certain options to be ruled out and 18 identified for detailed consideration.

- Appraisal of adaptation measures was then carried out across three sections: site (the layout and orientation of the buildings and the external works), layout (the internal layout and uses of rooms in the building), construction (the materials and construction details). This involved a technical and cost review of products, precedents and options (UK and international).

- From this, three options were identified for most of 18 measures, with about 50 options in total. Multi-criteria analysis of the measures/options was then carried out to identify a suite of best options. A set of assessment criteria was agreed with the team and client and then weightings were contributed by a range of individuals and stakeholders.

2. How have you communicated the risks and recommendations with your client? What methods worked well?

- the client and employers agents are invited to each workshop to participate in and contribute to discussions and progress.

- Additional interim reports have been developed to document the process.

- 3D modelling and graphic representation of options being considered (often just photographs of precedents/examples) is the most effective way of communicating.

3. What tools have you used to assess overheating and flood risks?

- Environment Agency: flood flow predictions to input flows into Tu-flows 2D flood model.

- 2D flood model: used to assess future flood depths, velocity and hazard impacts (ongoing).

- Assessment of daylight and sunlight impacts using BRE guidelines (to be considered).

- Drought was assessed based on the number of events with consecutive days without rain.

- the soil investigation was reviewed against the possible foundation options.

4. What has the client agreed to implement as a result of your adaptation work?

A set of preferred options has yet to be identified, therefore no decisions have been made as to what to include/integrate into the design. Some of the likely considerations will be:

- pile foundations.

- Increased tree cover to provide future shading.

- Deck access to provide solar shading.

- Stairwells to provide flood flow paths.

- Resilient building materials.

- Raised floor levels.

- Ventilated void.

- External shading.

- Below ground storm water attenuation.

5. What were the major challenges so far in doing this adaptation work?

The most difficult challenges have been:

- To rule out options for further consideration and to focus on the key issues for this project.

- Compatibility of regulations, for instance achieving level thresholds where it may be better to raise internal floor levels to provide barriers to water ingress.

- Lack of guidance on drought criteria in UK and duration, therefore capacity of rainwater harvesting/grey water recycling required.

- Providing space at ground level along with parking, access, bin stores etc to increase rainwater harvesting or SuDs storage below ground level.

6. What advice would you give others undertaking adaptation strategies?

- The future climate predictions were far less dramatic than we first anticipated. Some simple changes to the building design to facilitate future control measures to be added.
Climate Adaptive Neighbourhoods (CAN) Technology Strategy Board

Partners:
- Baca Architects Ltd
- University of East Anglia & West of England
- IBA Consulting
- Cyril Sweett
- Lanpro
- Serrys Property Company

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- Solar orientation of buildings is still going to be an important consideration, however, in flood risk sites the orientation and relation to the water environment must take priority.
- It is important to consider adaptation measures in the round so that passive benefits can be taken from active measures required to respond to the environmental conditions, such as access and shading, flood storage and natural ventilation or SuDs storage and green space for cooling.