City Centre Sustainable Housing Design Competition

Workshop 3: Sustainable Design Generation

Date: 3 April 2024
Time: 16:00-18:00
Venue: Online hosted by the CIB
Presenter: Jeremy Gibberd

Structure

- Sustainability
- Design
- Sustainable Design Generation

Sustainability
- environmental ceilings
- social floors
Societal transformation

Regeneration and net positive

Generating new ways of thinking

• We cannot solve our problems with the same thinking we used when we created them.

Albert Einstein
**Design**

- **Discover**: Understand the problem – speak to people affected.
- **Define**: Set out the challenge
- **Develop**: Develop alternatives for addressing challenge – draw on methods bank, co-design
- **Deliver**: Test out solutions iteratively

**User requirements**

Understanding users:
- Children
- Old people
- Youth
- Women
- Men
- People with disabilities
- Different cultures
- Livelihoods
- Needs
- Fulfilment

**Working with what works**

Patterns of use and activities on and around the site
- Pedestrian movement
- Informal trade
- Retail
- Playing
- Gathering
Site characteristics and capabilities

Responding to characteristics and capabilities:
- Rainwater
- Runoff
- Sun
- Shade
- Wind
- Vegetation
- Materials
- Noise

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Form generation

Generating form from:
- Topography
- Solar and shade patterns
- Air movement and wind
- Water flows
- Vegetation
- Microclimates
- Views

Arup, ParcBit, Mallorca
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Passive environmental control

- Understand climate throughout the year: max and min temperatures, humidity, rainfall, solar, wind
- Understand occupants: age, clo, Understand activities: mets
- Passive environmental control strategies
- Direct/indirect solar gain
- Night-time cooling
- Thermal mass
- Cross ventilation
**Events and change over time**

Understanding and representing events and change over time
- Rainwater
- Temperature
- Solar and shade patterns
- Air movement and wind
- Water flows
- Vegetation
- Microclimates

**Representing and optimising systems**

Representing and designing systems in and around buildings:
- Water
- Food
- Materials
- Energy
- Sources
- ‘Loopiness’
- Outputs

**Circular built environments**

Moving from linear to circular systems
- Design out waste
- Regenerate natural systems
- Share
- Optimise
- Loop
- Virtualise
- Exchange
Local

- Local materials
- Local skills
- Local manufacturing
- Maintenance and repairs
- Local content standards
- Local diverse resilient economy
- Local enterprises and employment
- Retention

Planning for future change

Planning for change
- Change in the area
- Change in the building
- Stewart Brands’
- Site
- Structure
- Skin
- Services
- Space
- Stuff

New ways of living and working

- 45% less energy
  (3.4kWh/person/day)
- 50% less water
  (87l/person/day)
- 60% waste recycled
  (4.5kg/person/week)
- 86% buy organic food
- 36% grow some of their own food
- 84% better community facilities
- 60% less car ownership


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Optimising for performance

- Define performance standards
- Generate lateral and alternative options
- Select and optimise performance iteratively
- IE Optmise for daylight, energy and views

Thank you, Questions?

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