

Sustainable and Environmental Urban Design

Prepared by Urban Design Staff

Fifth stage

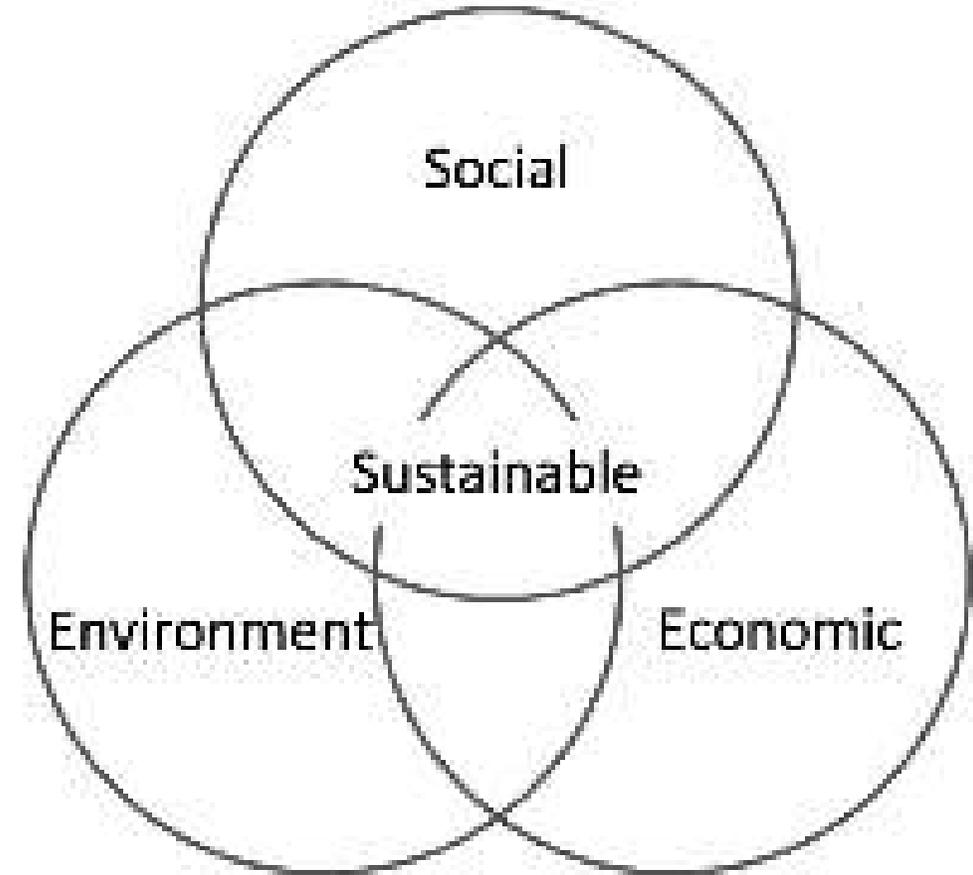
2022-2023

Sustainable design

- Modern use of the term "sustainability" was strongly influenced by the 1983 UN Commission on Environment and Development:

"Meeting the needs of the present without compromising the ability of future generations to meet their own needs."

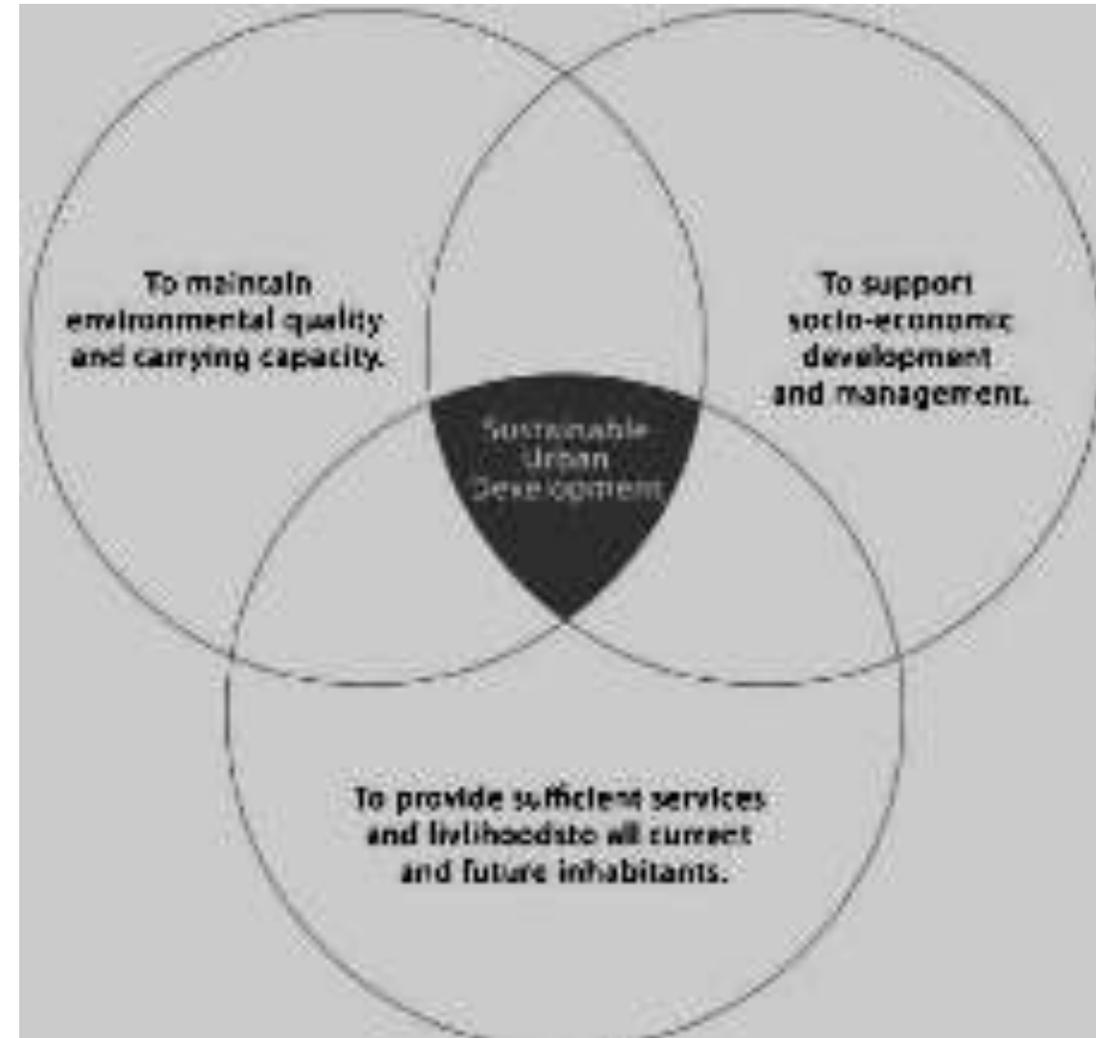
- **Designing for sustainable** development requires awareness of the full short and long-term consequences of any transformation on **the environment, social and economy.**



Sustainable urban development –defined as capability in three aspects

processes of urban maintenance, traffic management, town center management, renewal, planning and conservation, and individuals personalizing their own properties, **all impact on the quality and therefore collective public perceptions of particular places.**

In this regard, **sustainable places** are those where at all scales of development, these ongoing processes of **adaptation and change** are positively channeled in an integrated manner towards **achieving a better quality built environment.**



Sustainable Urban design

- The EU argued that “**sustainable urban design** is a **process** whereby **all the actors** involved work together through partnerships and effective participatory processes to integrate functional, environmental, and quality considerations to design, plan and manage a **built environment**” that
- Is **beautiful, distinctive, secure, healthy** and which fosters a strong sense of pride, social equity, unity, and identity
- Supports a **active, balances, inclusive** and equitable economy
- Treats land as a **precious resource; reusing land, promoting compactness** at a human scale and concentrated decentralization regionally.
- Supports city regions as a functioning **integrated networks and systems**, with an integrated view of the urban and regional landscape.



Before and after photographs

- Strategically **locates new development** to address resource conservation, biodiversity, public health needs and public transport efficiency.
- Promotes **mixed use** development to maximize the benefits of proximity, livability, security and adaptability of the built form
- Has **sufficient density** to support public transport and services, whilst maintaining privacy and avoiding pollution
- Has a **green structure** to optimize the environmental quality of urban areas, including their microclimate, and to give access to nature
- Has high **quality public infrastructure**, including public transport services, pedestrian and cycle networks, and an accessible network of streets and spaces
- Makes use of state of the skill resource saving and recycling technology
- **Respects the existing cultural heritage and social capital** of places, whilst avoiding conservation for its own sake.



The aim of sustainable urban development has emerged and produced numerous urban settlement theories, including the

- “Healthy City”,
- “Sustainable City”,
- “Low-Carbon City”,
- “Transit-Oriented City”,
- “Compact City”,
- “Smart City”,
- “Green City”,
- “Livable City”.

These theories may come with different concerns in different areas, but they all share one central idea and ultimate goal: **“Achieving maximum development with minimum resource consumption and environmental impact to ensure the well-being of both humans and the Earth.”**



▲ Pedestrian-friendly central Lyon, on the banks of the River Saône. Photograph: Alamy



Then.....

To achieve a more sustainable urban design, the aim should be

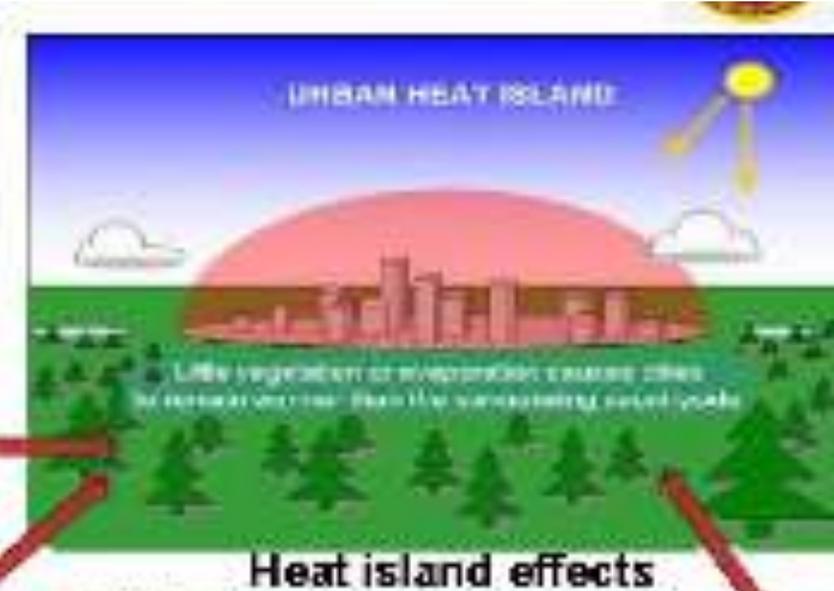
1. to **reduce the lifetime environmental impact** of any development by reducing the energy and resources used and waste produced at each stage of the development life cycle – construction, occupation and, if necessary, demolition.

2. **reducing dependence on the wider environment for resources and reducing pollution** of the wider environment by waste products – in other words by making any development both in its original construction, and throughout its lifetime, as self-sufficient as possible.



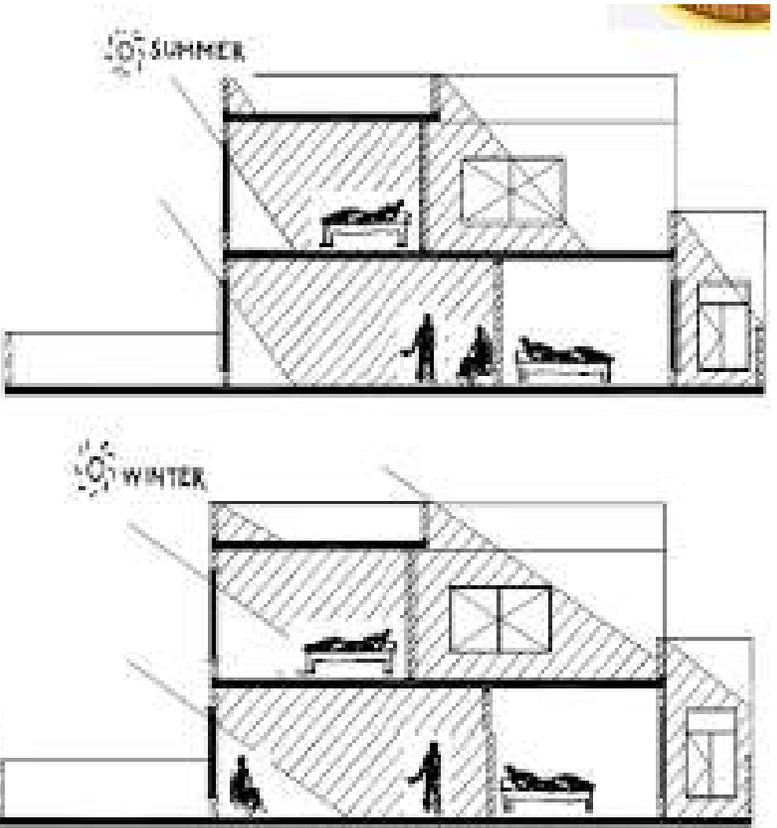
ENVIRONMENTAL DESIGN TO LOCAL CLIMATE

- Designing for Sun and Shade
- The Wind Environment
- Water Environment
- Green Environment
- Lighting



DESIGNING FOR SUN AND SHADE

Sunlight penetration into urban places and into buildings helps to make them **more pleasant places** in **Autumn, Winter** and **Spring**, while places in the sun are **desirable** at some times of the year, at other times shade is preferred.



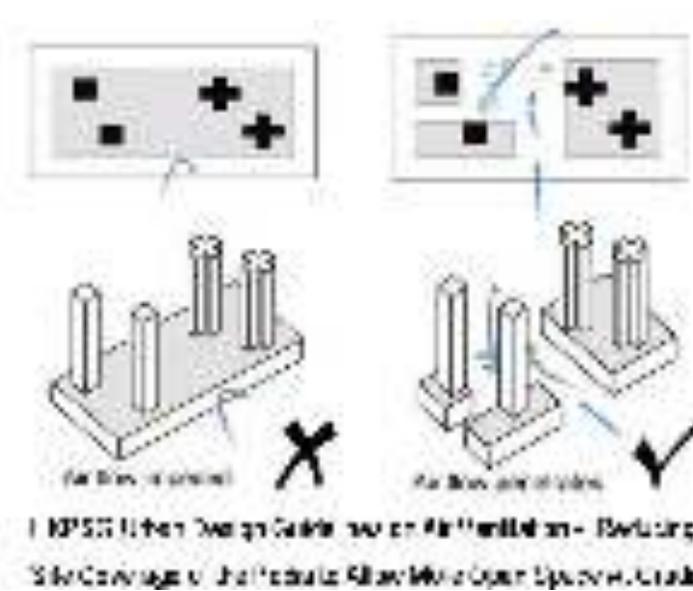
Shading strategies

- 1. Horizontal Shading
- 2. Vertical Shading
- 3. Aerial Shading
- 4. Natural Shading



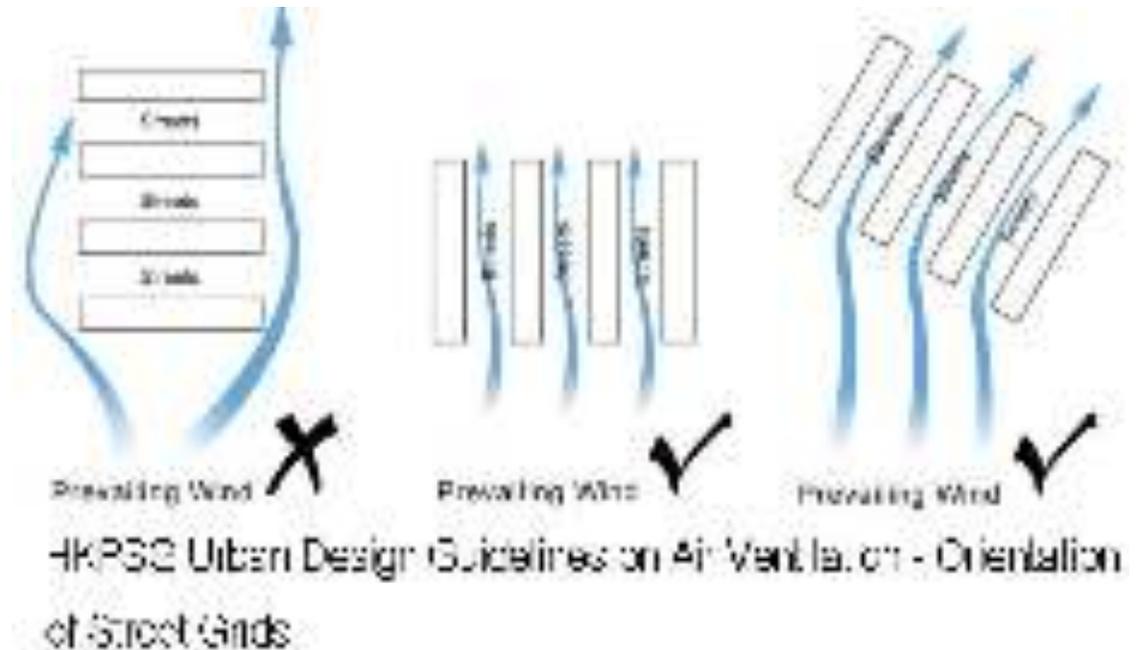
• AIR MOVEMENT THE WIND ENVIRONMENT

- Wind flow has a major effect on the comfort of **pedestrians**, the **environmental conditions** within public spaces and around building entrances and the activities that might occur.



The natural air flow is dependent on:

- Microclimate of the area
- Building orientation to the wind direction
- Sun protection of the space
- Volume of the space
- Neighboring buildings and surrounding vegetation
- Area ratio and arrangement of the openings



WATER ENVIRONMENT/ EVAPORATIVE COOLING

- Positioning fountains and water features in public spaces to cool through the evaporation of water
- Warm/hot air absorbs moisture as it passes over, increasing its humidity and lowering its temperature
- During **evaporative cooling** decrease the temperature of the surrounding



- **GREEN ENVIRONMENT**

- The quality of life in cities is influenced by the green areas. With unbroken growth of cities, the pressure on open space and green area is growing.
- **Green areas** have potential for **social, health, climate** and **building culture**.
- **Urban green** serves the people and the environment, it is a foundation for sustainable development.



• LIGHTING

- Natural lighting makes an important contribution to the **quality and value** of public space.
- The play of light in urban spaces also has **aesthetic** dimensions
- Observes how the **altitude**, **angle** and **colour** of **day lighting** vary with orientation and time of day
- From **north** windows is shadow less, diffuse and neutral or greyish most of the day and year
- From **east** is strongest in the morning, at low altitude, with soft, long shadows, grey-yellow in colour
- From the **south** is dominant from late morning to mid-afternoon, renders colours accurately
- From the **west** is strongest in the late afternoon and early evening, has a rich gold orange



- **Thanks**