Sustainable and Environmental Urban Design

Prepared by Urban Design Staff

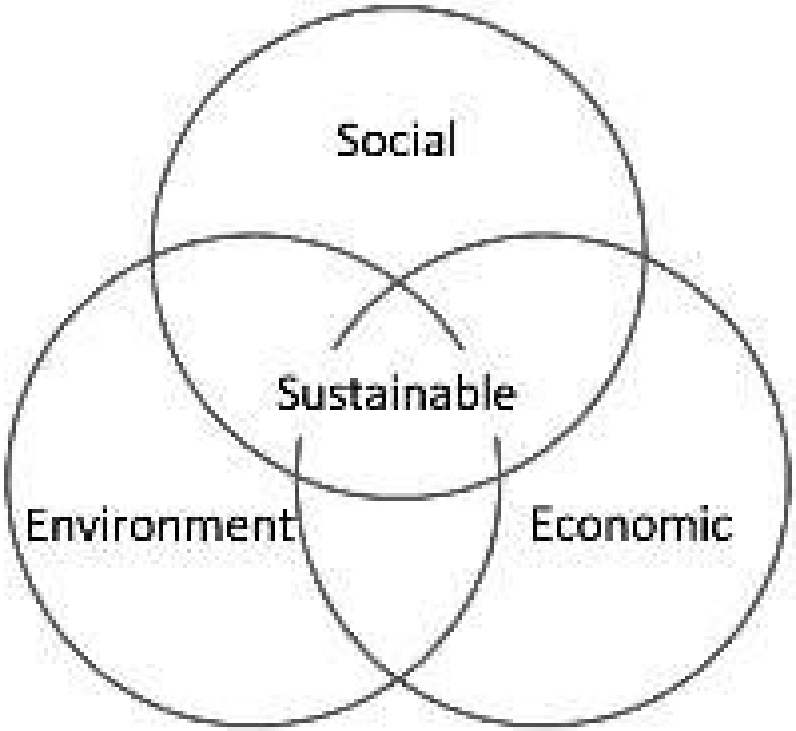
Fifth stage

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."

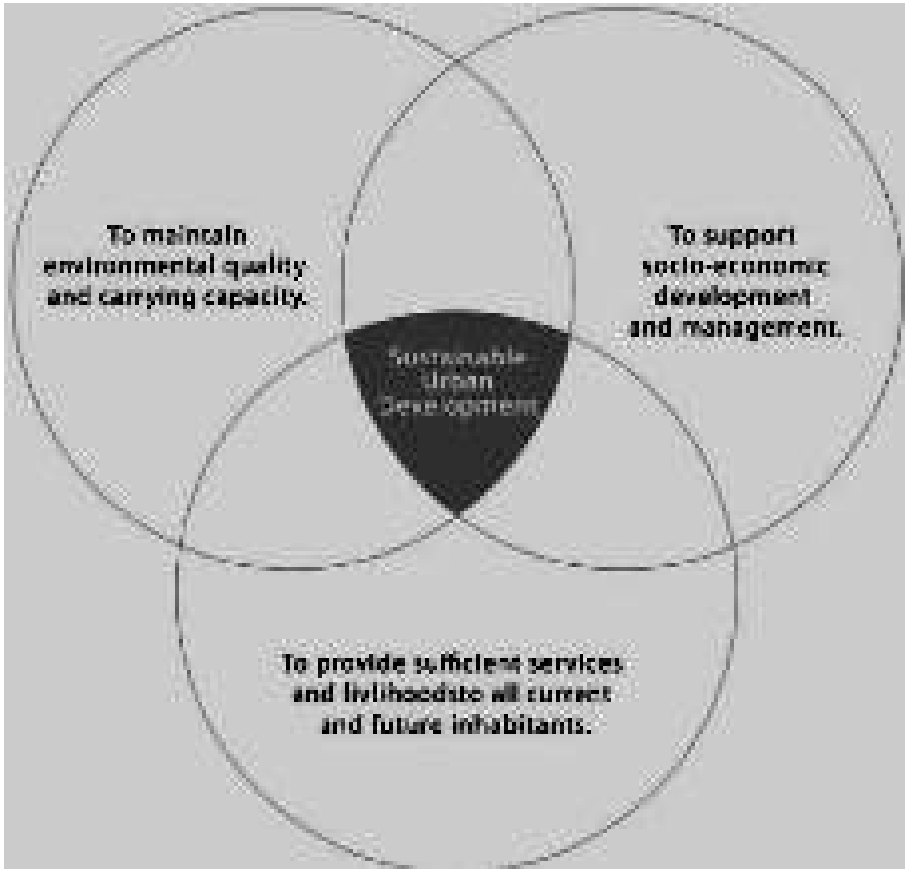
- **Designing for sustainable** development requires awareness of the full short and long-term consequences of any transformation on **the environment, social and economy.**



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

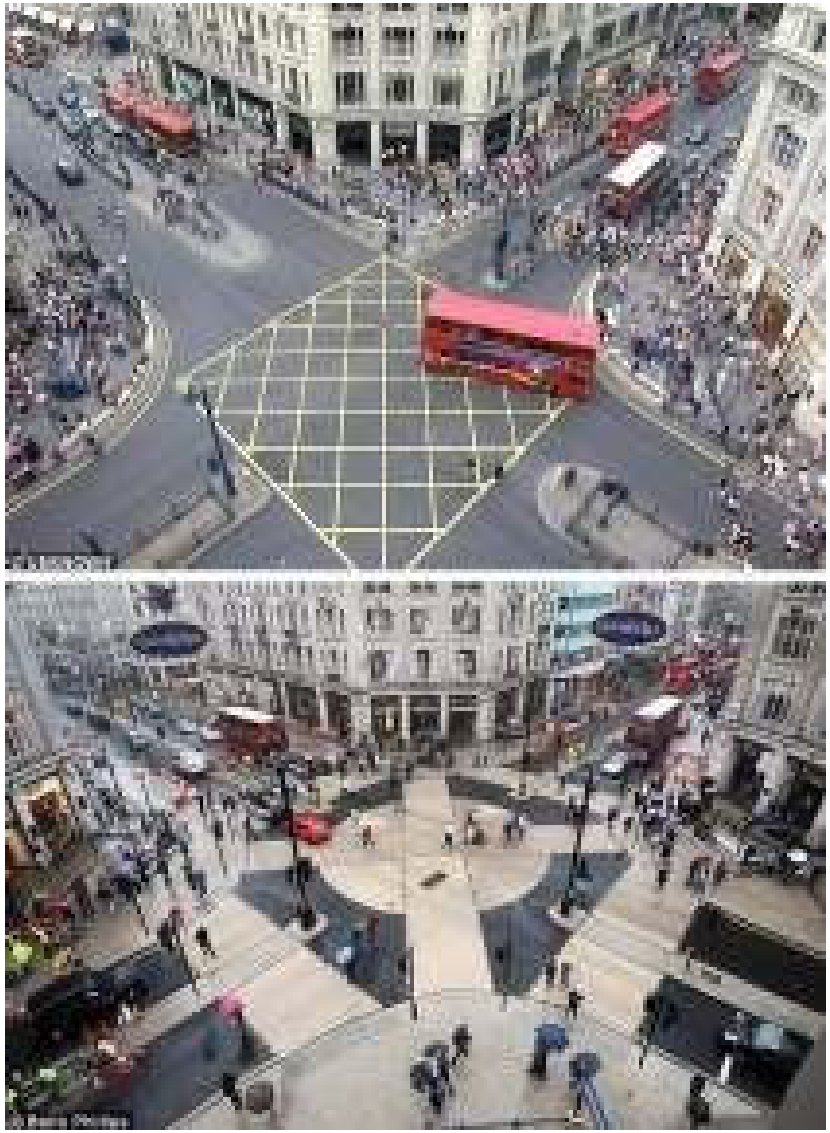
•Has sufficient density to support public transport and services, whilst maintaining privacy and avoiding pollution

•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”.

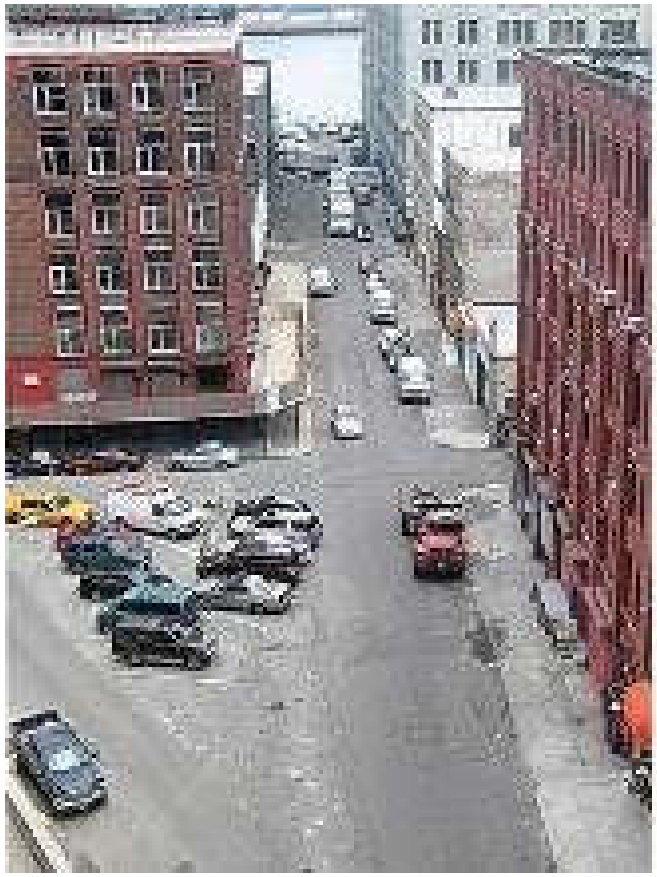
These theories may come with different concerns in different areas, but they all share one central idea and ultimate goal: **“Achieving maximum development with minimum resource consumption and environmental impact to ensure the well-being of both humans and the Earth.”**

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.

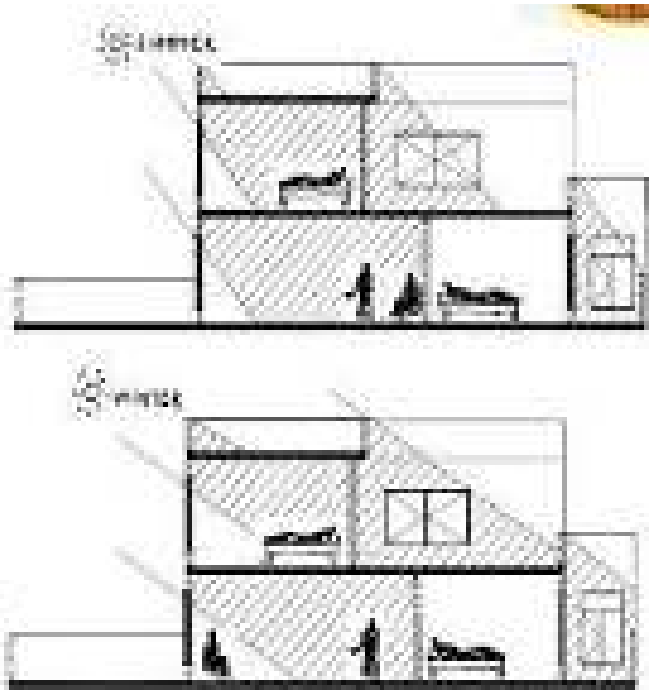


ENVIRONMENTAL DESIGN TO LOCAL CLIMATE

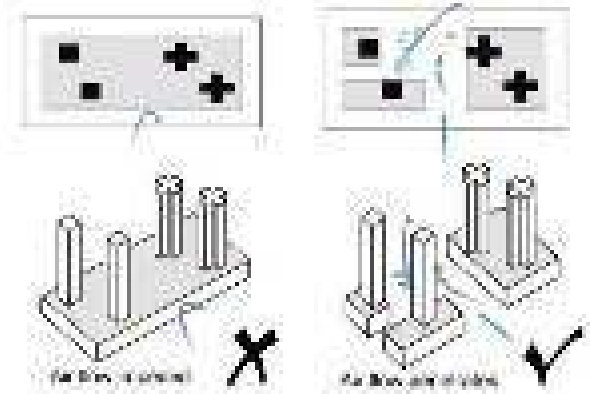
- Designing for Sun and Shade
- The Wind Environment
- Water Environment
- Green Environment
- Lighting

Heat island effects

- **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.

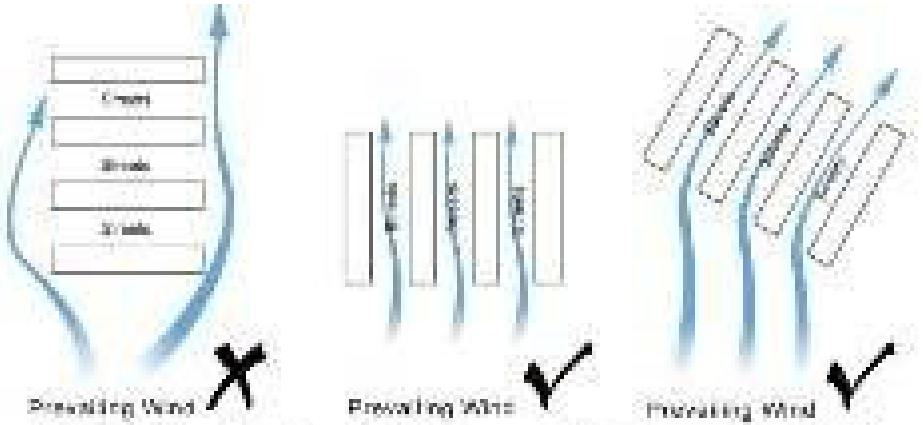


- **AIR MOVEMENT THE WIND ENVIRONMENT**
- Wind flow has a major effect on the comfort of **pedestrians**, the **environmental conditions** within public spaces and around building entrances and the activities that might occur.



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



HKPSG Urban Design Guidelines on Air Ventilation - Orientation of Street Grids

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