HEALTHY GREEN BUILDINGS AND COMMUNITIES
LINEAR, NETWORKED, 3D GREENING

Serge Salat
Urban Morphology and Complex Systems Institute

The Seventeenth Annual Session of Global Forum on Human Settlements
Life outside buildings is as important as what happens inside them. Green, water, light and earth combine to create a public realm that is rich in natural green life. The well-being of those who live and work can only be enhanced by such a close relationship with nature.

In good urban landscape design the buildings and green landscape are inextricably linked, creating a series of unfolding and everchanging views and vistas as the visitor moves through them.
Nature should be integrated at all scales in the urban fabric of healthy and zero carbon communities

Weaving nature at microscale in the urban fabric in French Dream Town, Hangzhou.

• Green intensification meets climate adaptation and mitigation goals.
• It helps biodiversity to thrive and human settlements to become more resilient.
• Incorporating nature in cities improves their liveability, particularly for vulnerable populations, by reducing temperatures, filtering water and cleaning the air.
LESSONS FROM HISTORIC CITIES: GREEN CITIES AND BLOCKS
EMERGING FROM THE GREEN LANDSCAPE

LINEAR GREEN CONNECTORS FOR URBAN REGENERATION

NETWORKED GREEN FOR URBAN REGENERATION

THREE DIMENSIONAL GREEN
REGREENING MORE THAN 100 % OF THE ORIGINAL PLOT
Topographical urbanism in 16th century Florence
For centuries urban fabric emerged organically from the rural landscape.

Map of the city of Bergues by Jacobus de la Fontaine drawn in 1649 for the Flandria Illustrata by Sanderus.
In historic cities there was no separation between the green landscape fabric and the urban fabric. The urban fabric emerged organically from the shapes of fields, irrigation canals and from the landscape topography.

Blocks were developed around their perimeter and included urban agriculture and gardens within them.

*Paris 16th century*
Amsterdam extension during the 17th century Golden Age followed the fields and irrigation canals pattern.
The spaciousness and shape of the gardens inside Amsterdam blocks provide residents with an interior space they can readily appropriate — in this case, to create an intimate, sociable setting in a French-style garden, bounded by plantings on a human scale. *Photo: Françoise Labbé.*
Community gardens, green blocks and row houses in London

Blocks developed around their perimeter establish a strong and coherent relationship with streets and the green private and public realm.

Urban block in Pembridge square, London. Typical block size is 45 m x 125 m (0.56 ha) with thus a density of 32 buildings per ha. Streets for pedestrians are slow traffic and 13 m wide. Source: Urban Morphology Institute.

Blocks surround and frame a 190 m x 26 m (0.5 ha) community garden offering various children’s playgrounds. Source: Urban Morphology Institute.
Vibrant pocket parks

The block pattern comprises about 18 buildings with an inner green core and is bordered by tree lined streets. Row houses are 18 m high and 14 m wide and each offers a garden at the back.
Green blocks and row houses in London

Urban blocks define the network of streets around their edges, the building plots and green spaces arrangement in the middle.

From Left to right: from outside public green to inside private green

Photo: Françoise Labbé
An example of successful transposition of traditional blocks into contemporary open green forms is Hammarby Sjöstad in Sweden. The blocks are open and organized around large green courtyards.
Planning with green open blocks

The Hammarby Sjöstad open green blocks hold a green common space within, creating a semi-private area to serve the residents social needs.

In Hammarby Sjöstad, the design method integrates modern design elements with the traditional urban morphology and is a good tool to achieve sustainability. Hammarby Sjöstad Design Code. Source: City of Stockholm.

Open composition of buildings. The dense settlement structure comprises four- to five-story constructions around spacious green courtyards. Source: Françoise Labbé.
Creating green connectors: The High Line, New York
Manhattan High Line in New York. This new park interprets its inheritance. It translates the biodiversity that took root after it fell into ruin in a string of the site—specific urban microclimates along the stretch of railway that include sunny, shady, wet, dry, windy, and sheltered spaces. Through a strategy of agri–tecture—part agriculture, part architecture—the High Line surface is digitized into discrete units of paving and planting which are assembled along the entire length into a variety of gradients from 100% paving to 100% soft, richly vegetated biotopes.

Source: Françoise Labbé.
Diverse gradients of green along Manhattan High Line
Integration of built form and green spaces along Manhattan High Line
A network of parks and gardens in Kensington and Chelsea

With an area of 12.13 km² and a population of 156,129, the borough of Kensington and Chelsea has a density of 12,871 people/km². Seventy-eight ha of public green space includes 28 parks, two cemeteries and a further 60 green spaces. They comprise over 3,200 trees of 180 species. To these should be added 235 private open spaces comprising 88 private squares with gardens accessible to surrounding residents only (most often of half ha to 1ha area) totalling 88 ha.

Each park has its individual history, landscape, features, user group profile and local community, all of which contribute to creating its feel or essence. The borough totals 166 ha of green space, that is 14% of the land area and 10.6 m²/inhabitant. When including three nearby parks of metropolitan size altogether 570 ha of green spaces are accessible, that is 36.5 m² per resident.

Making the green landscape the backbone of the master plan in Kings’ Cross, London

27 HA
40% PUBLIC AND GREEN SPACE
20 NEW CONNECTIVE STREETS
10 NEW SQUARES AND PARKS
Streets and footpaths lead through a myriad of parks, leafy squares and other open environments. The public spaces vary from the wild wonder of Camley Street Natural Park to the endlessly flexible heart of King’s Cross at Granary Square, with its one thousand choreographed fountains. All this, though, is at a human scale so visitors, residents, tenants, commuters - everyone - can benefit and enjoy.

PANCRAS SQUARE

Pancras Square. Triangular Pancras Square stepped water terraces framing the historic landmark tower. Photo: Françoise Labbé.
Regent’s Canal. Photo: Françoise Labbé.
Lewis Cubitt Square and Park. Photo: Françoise Labbé.
THE GASHOLDER PARK

Photo: Françoise Labbé.
It is the framework of routes, streets, meeting places, squares and parks which is the lasting legacy of development, not the buildings themselves.

A plan for the garden shows it’s split into a number of different zones, and includes a 200-meter running trail. Image: Google.
THREE DIMENSIONAL GREEN
REGREENING MORE THAN 100 % OF THE ORIGINAL PLOT
Green intensification is a process tailored to different climates and various community cultures.

- In hot and humid climates like Singapore, the outdoor green can expand in three dimensions with sky gardens and lush green roofs and facades within a porous, ‘breathing’ urban fabric.

- Besides increasing the green coverage, green intensification improves the mix of functions, cools the urban fabric, and strengthens the character of a neighbourhood.

Seven Densification Strategies.
Source: Serge Salat Design Workshop at National University of Singapore.
In hot and humid climates, layering, hollowing and greening urban blocks in 3-D has the potential to recreate street life and community space.

These open-air precincts offer new street levels as part of a three-dimensional matrix.

- **Blocks with a 3-D micro urbanism** allow integrating solar energy, urban agriculture, commercial and recreational space, and housing in stacked structures.

- **Three-dimensional greening allows reaching a green plot ratio above 100%**. This mitigates the urban heat island effect, saves cooling energy and provides shading for communal spaces.

Breathing urban fabrics can offer outdoor community spaces at many scales and at multiple levels within a ‘3-dimensional green matrix’. In Kampung Admiralty, the various components are stacked and layered within a single building: markets, shops, food court, plazas, health-care facilities, children’s playground and elderly facilities, sky gardens and a rooftop urban farm are integrated, not segregated.

Source: WOHA Architects
Kampung Admiralty 3D green, WOHA Architects

Community farm from 4th floor to 7th floor

Health care center, 4th floor

Children’s playground, 4th floor

Shaded and breathing public plaza, ground floor
Weaving buildings and green spaces in 3D in Guangzhou Sino Singapore City

Maximize green spaces and site ventilation

- From the experience of Singapore's LUSH program, the combined total of regular greenery and vertical greening is increased to 100% of the original plot.

- Buildings are crafted with a diversity of 3D greeneriness measures, including sky gardens, vertical greening, and green roofs, creating a three-dimensional urban forest.

- Hollow buildings and high-rise green spaces are utilized to allow breezes to infiltrate while providing community areas.

Source: Piloting nature based passive urban cooling options into urban regeneration and new town development. Guangzhou Yong Qing Fang Pilot and China-Singapore Guangzhou Knowledge City
Weaving buildings and green spaces in Guangzhou Sino Singapore City

A topographical approach to design

- Hilly microtopography and low-lying areas are combined to form rain gardens and wetland parks; a tidal landscape of green areas and water is fostered.
- Urban space is combined with natural elements such as ponds, low hills, and vegetation to form knowledge units. The overall layout follows the contours of the hilly topography, and public spaces are planned based on the topography.
- The architectural design takes the connection with hills into full account. The use of stilts, three-dimensional setbacks, and other techniques are integrated with nature.
- Both elevated floors and staggered floors are used, and vertical greening helps to integrate with micro-hills, thus forming a complete, connected, three-dimensional greening system.
- The use of a microtopography design protects the original ecology, utilizes slope to form local breeze circulation, implements low-lying areas to form rain gardens, and creates vertical green spaces.

Source: Piloting nature based passive urban cooling options into urban regeneration and new town development. Guangzhou Yong Qing Fang Pilot and China-Singapore Guangzhou Knowledge City.
THE WAY FORWARD

Green the urban/local planning frameworks

- Create a long-term vision of a green city within the local authority
- Develop master plans around a green landscaping vision
- Integrate green spaces within all infrastructural projects (housing, transport, business parks, community and health facilities) and urban rehabilitation approaches
- Engage the local community as part of the local planning and design process.

Have a long-term perspective and remain flexible

- Green spaces are a long-term investment: they may need some time to establish before they are fully usable, and they require long-term maintenance.
- The benefits of urban green spaces may only become apparent over time.
- Urban green spaces should be planned and designed in a flexible way, making functional adjustments possible to adapt to changing future demands.