What is urban greening?

Urban green space, the urban forest, green infrastructure, green cities, city gardens!...These are all terms that relate to the same thing; the plants and vegetation in our urban and city environments, including urban parks, public squares and thoroughfares, street trees, green walls and roofs, water-sensitive urban gardens, residential gardens and even remnant bushland.

Why is urban greening important?

It is well known that the majority of the global population live in cities. In Australia, more than 70% of our population lives in an urban environment, which is predicted to rise to 80% by 2050. Large urban areas can create their own climates, seen as the urban heat island effect, as well as having generally poor air and water quality. Many urban areas are considered to have low ‘liveability’, that is the quality of life for their residents is low. On top of these challenges is climate change – creating even hotter, and in many regions drier climates in urban areas.

So, what is the solution to these urban challenges? It turns out that urban greening is probably the simplest and cheapest solution to making our cities more liveable!

Over the past few decades, it has been recognised that the integration of green space into the planning, building and operation of our cities is not only a very effective solution to easing some of these challenges, but has also proven to generate a myriad of economic, social and environmental benefits, both on an individual human level and for the city as a whole.

Green spaces can mitigate urban heat through the shade and evaporative cooling provided by plants. They can provide co-benefits or services such as trapping air pollutants and reducing stormwater flooding and of course they provide biodiversity benefits, supporting many animals with food and housing. Importantly, access to urban green spaces has been shown to improve human well-being, through increased physical exercise and reduced mental health stress. Urban green spaces can even increase community safety by limiting vehicle speeds and deterring crime, and they can bring vibrancy to a community by activating otherwise ‘dead’ or ‘unutilised’ spaces.

The road map to urban greening projects

In Australia, the importance of urban greening is recognised through the introduction of specific urban greening targets at the local (CoS, CoM, BCC), state (NSW, SA, ACT) and national level (20 million tree program). But will this be enough to meet the future challenges our cities face?
To ensure we have enough effective green urban spaces in our cities it is imperative that urban greening projects are instigated through collaborative partnerships of government, industry, researchers and community stakeholders.

To ensure the success of an urban greening project and to reap the multiple economic, social and environmental benefits, projects need to be underpinned by evidence-based research and employ the following strategic planning principles:

- **Identify the problem** that needs to be solved
- Develop **collaborative and multi-disciplinary partnerships**
- Implement a **robust design and planning phase** that includes all stakeholders
- Undertake **community engagement early on in the planning phase**
- Ensure **multi-level stakeholder engagement and consultation throughout** the life of the project to ensure acceptance, buy-in and adoption.

Far too often the design of urban development projects is dictated by short-term financial returns, but if the above-mentioned strategic planning principles are embedded in the beginning the advantages are widespread and long-term.

**Inspirational examples of urban greening projects**

Here are some exemplary examples of how the international community has integrated different kinds of urban greening initiatives into urban typologies, whilst demonstrating the importance of adopting strategic planning principles.

**Gardens by the Bay**, Singapore National Parks Board

**Overview**

Gardens by the Bay is a world-class, sustainably designed ‘garden city’. Spanning 101 ha, the Gardens is designed as a symbiotic ecosystem of lakes and forest with over 1.5 million plants, birds, dragonflies and other insects across multiple conservatories of varying climates.

Chief Executive Officer Dr Kiat W. Tan states their vision was to create a “city in a garden” to be enjoyed by all as well as “making Singapore green and liveable” *(Construction Global)*.
The ‘Supertree’ observatory presents 50 m tall trees that provide canopy shade cover in the day and display lights and sounds at night. The cloud forest is a 35 m tall mountain covered in lush vegetation blanketing a waterfall and showcases the unique biodiversity and geology of cloud forests.

**Realised benefits**

Opened in 2012, the Gardens by the Bay is the number one tourist attraction in Singapore, with 12 million people visiting a year. The Gardens also generate many environmental and socio-economic benefits to the local community including offering a place of respite from the heat and congestion of the city as well as placemaking opportunities with displays of art and sculptures, places for play for children, and facilities to host a variety of festivals and other events.

The Gardens by the Bay embodies the future of urban greening by “fusing nature, architecture and technology” to create a tranquil urban oasis in a bustling city (Construction Global). The Gardens also hold significant cultural value by linking people with Singaporean culture and countries worldwide. The Gardens’ sustainable design has put Singapore on the map as frontiers in sustainable and innovative design.

**Planning strategy**

One of most notable achievements of the Gardens was bringing together an international, multi-disciplinary team of skilled landscape designers, horticulturists, arborists, engineers, plant health, garden and turf management experts, as well as plant research and orchid breeding professionals to deliver an innovative and sustainable design.

The masterplan was inspired by the physiology of the orchid, the national flower of Singapore. The orchid's sophisticated infrastructure for managing energy, water and waste was woven into the design to provide an integrated and sustainable operating system for the Gardens where rainwater collected in the lakes irrigate the gardens, horticultural waste from the Gardens is used to generate bio-energy for conservatory cooling and materials such as glass panels in the conservatory conserve energy by letting in light but not heat.
The Highline, City of New York

Overview

New York’s High Line is a 1.45-mile (2.33 km) long linear public park built on a historic freight rail line elevated above the streets on Manhattan’s West Side. Opened in 2009 it was designed as an urban walking track to connect the neighbourhood and visitors to nature and to activate an otherwise unutilised space.

It also serves to communicate New York’s culture and history through the art and monuments that visitors find along the way. The gardens are made up of 110,000 plants of carefully chosen species within 15 distinct planting zones to create different moods, and to attract different insects.

Realised benefits

The economic and socio-economic benefits of the Highline project have exceeded expectations, attracting 5 million visitors a year to the area, making it the second most visited cultural attraction in New York. Since its opening in 2009 the local neighboured has experience unprecedented growth in market-rate housing with an increased ‘tax revenue’ from the neighbourhood reaching about $980 million (Pascal Observatory blog) with the New York Times reporting an associated $2 billion in new developments in the area.

Planning strategies

Perhaps one of the High Line’s most admirable qualities is that the project was born out of local neighbourhood residents saving the historic site from demolition. A few local residents led a community group, now called “the friends of the highline” which raised over $220 million in public and private funds and recruited over 200 volunteers to prepare the site and run events at the Highline (Catalyst Review).

As part of the design pre-planning process, the friends of the highline engaged with the local community and ran a design competition to generate ideas on how best to reuse the space.

For the formal design process, a design competition was run which included responses from world experts from the fields of architecture, landscape architecture, engineering, art, urban planning, and horticulture.
The whole planning process prior to the construction phase including community engagement, planning and design work took around 4 years.

**Bosco Verticale (Vertical Forest), Milan, Italy**

**Overview**

Milan’s ‘Vertical Forest’ is two residential apartment towers with 480 large and medium trees, 300 small trees, 15,000 perennials and ground covering plants and 5,000 shrubs built into its infrastructure. This equates to 30,000 square metres (about the size of two football fields!) of woodland and undergrowth compacted down to 3,000 square metres of urban surface area, being the footprint of the buildings.

The green façade of the buildings is spread across staggered white overhanging balconies providing a vibrant, picturesque visual against the fairly bleak backdrop of the browny hues of the surrounding neighbourhood.

With the design concept based on the idea of a “home for trees that also houses humans and birds”, the Vertical Forest offers an innovative perspective to urban planning where nature comes first. The placement of the plants of differing species and heights was carefully considered so that the foliage can work effectively with the environment (e.g., the sunlight) to create a comfortable microclimate for both human and non-human residents (birds and insects!). All vegetation is irrigated by a centralised system that uses grey water from the buildings.

**Realised benefits**

The Vertical Forest offers a new prototype for urban buildings of the future where sustainable, nature-based solutions create comfortable and liveable urban residences.

The design of using greenery in the façade of a building has brought many environmental benefits and has built a comfortable microclimate for residents by regulating humidity, producing oxygen, as well as protecting against noise and air pollution by absorbing harmful CO₂ and microparticles from the surrounding air.

It has also brought increased biodiversity to the area, with the Vertical Forest now being home to about 1,600 species of birds and butterflies (Arch Daily).
Planning strategies

The Vertical forest was designed by the Stefano Boeri Architetti Group (formerly Boeri Studio) for the Hines Investment Group. Stefano Boeri’s guiding principle for their projects is “multidisciplinary”; referring to project themes, geographic areas and the expertise of the project members.

The Vertical Forest project team consisted of a large network of landscape designers, engineering consultants, facility designers, open space designers, social scientists, botanists and ethologists.

The design and horticultural planning on the project took time and involved the right experts. The choice of plant species and the distribution according to the orientation and height of façades was the result of three years of research studies carried out by a group of botanists and ethologists (Arch Daily).

New urban greening projects

Here are some more inspiring urban greening projects that are either in the planning phase or are newly constructed.

The Lowline, City of New York

Following in the pioneering footsteps of New York’s High Line, the Lowline aspires to use technology to improve the lives of city residents by creating a public green space in an underground former trolley terminal using solar technology via a “remote skylight” to create enough sun light for plants to grow.

The idea is to build ‘a new bright spot in a dense urban environment’ (The Lowline Org, 2020) - that of Lower East Side Manhattan.

Set to open to the public in 2021, the Lowline also strives to be a tourist attraction of cultural significance displaying beautiful historical features of the trolley terminal such as remnant cobblestones, crisscrossing rail tracks and vaulted ceilings.

Initial planning studies concluded that, once built, ‘the Lowline would be a dynamic cultural space, featuring a diversity of community programming and youth activities as
well as an ‘innovative display of how technology can transform our cities in the 21st century’ (The Lowline Org, 2020).

**Hudson Yards, New York**

Hudson Yards is a newly built real estate development on the West Side on Manhattan, New York consisting of residences, shops, a hotel and office buildings with a vision of creating a lively neighbourhood where people can live, work and play.

The 6-acre public square and gardens which is built on a platform above a working railyard, brings much needed green infrastructure to the area and is home to 28,000 plants of varying species including those that attract bees and birds and a forest of 200 mature trees.

To combat the limitations of soil depth in the gardens, ‘smart soil’ is used; a sophisticated layering system of soil, sand and gravel that supports root growth and nutrient delivery, regulates temperature and includes provisions for aeration, irrigation and drainage.

Storm water that runs off the public square and water from the 230,000L rainwater storage tank is used to irrigate the gardens and to operate other functions within the neighbourhood.

Opened in 2019, the public square and garden provides a gathering place for the public and residents as well a space to host worldly events and art exhibitions. The neighbour is expected to host 24 million visitors each year.

For more information on urban greening, contact us at **Smart Green Cities**!