

SKYRISE GREENERY SHOWCASE

Second Edition



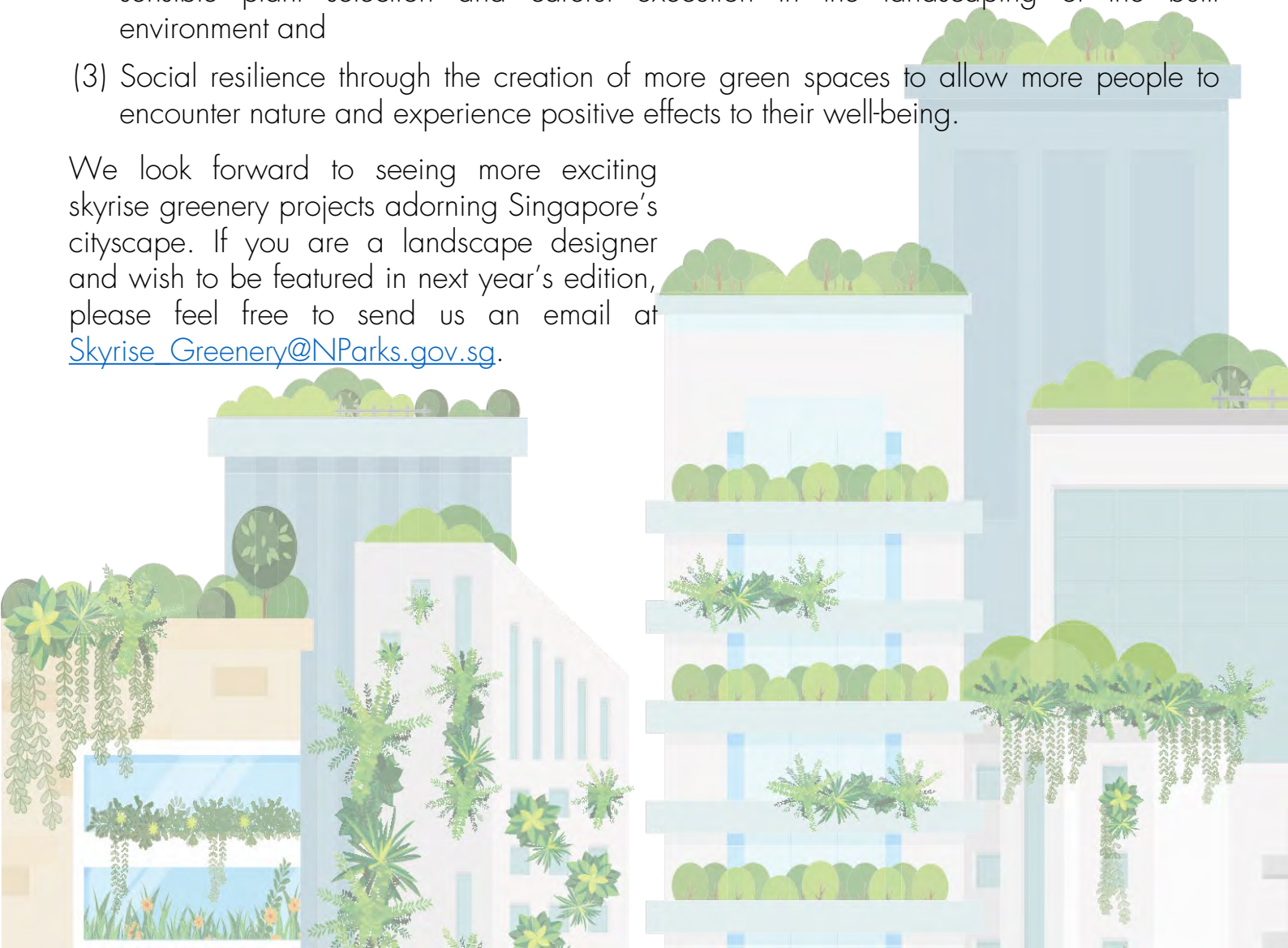
FOREWORD

In Singapore, the multi-layered skyrise greening strategy has played a pivotal role in restoring nature in the built environment, enhancing the distinctiveness of buildings' architecture and cooling the urban environment. Through a strong collective effort by all stakeholders from policymakers to implementers, we now have a wide spectrum of skyrise greenery typologies ranging from spacious sky terraces for relaxation, to rooftop edible farms which supports food production and to lush indoor green walls which brings greenery closer to urban occupants, raising the therapeutic effects of greenery directly to homes and workplaces.

We will continue to highlight skyrise greenery as one of the drivers of nature based solutions for the built environment, and we urge the industry to continue to push boundaries and re-align efforts by adopting the three guiding pillars of City in Nature in every project. This will help us achieve greater sustainability, better livability and enhance well-being of users.

- (1) Climate resilience through pervasive and more naturalistic greening which uses less resources, helps to purify the air and lower ambient temperature.
- (2) Ecological resilience by protecting our native biodiversity through mindful planning, sensible plant selection and careful execution in the landscaping of the built environment and
- (3) Social resilience through the creation of more green spaces to allow more people to encounter nature and experience positive effects to their well-being.

We look forward to seeing more exciting skyrise greenery projects adorning Singapore's cityscape. If you are a landscape designer and wish to be featured in next year's edition, please feel free to send us an email at Skyrise_Greenery@NParks.gov.sg.



FEATURED PROJECTS

Note: Projects featured in this newsletter are contribution pieces by landscape designers and/or building owners. NParks does not endorse, recommend nor guarantee the quality of product or services offered.

COMMUNITY FACILITIES & INFRASTRUCTURE

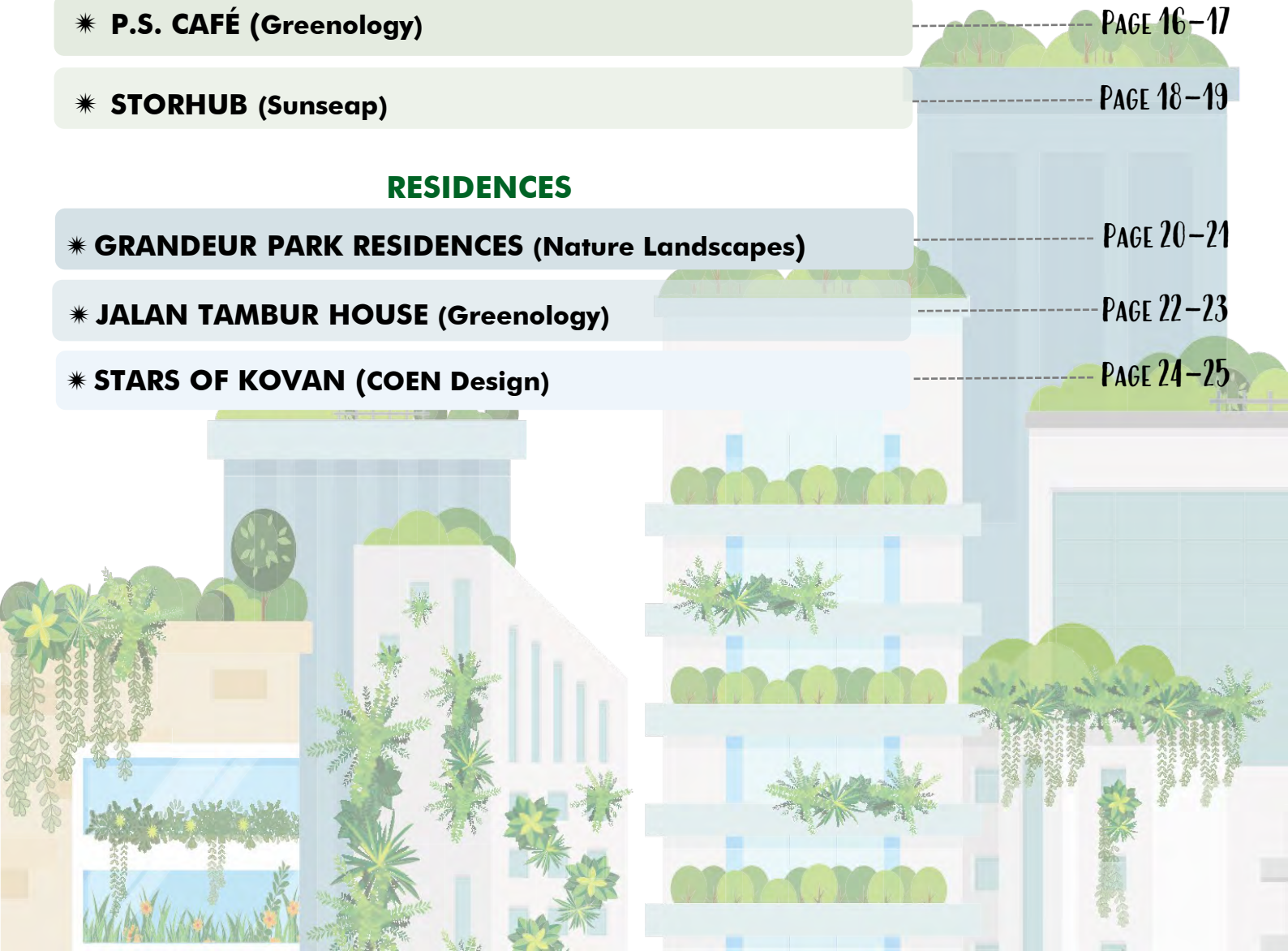
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Church of Saint Alphonsus

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Vertical Greenery by PRINCE'S LANDSCAPE

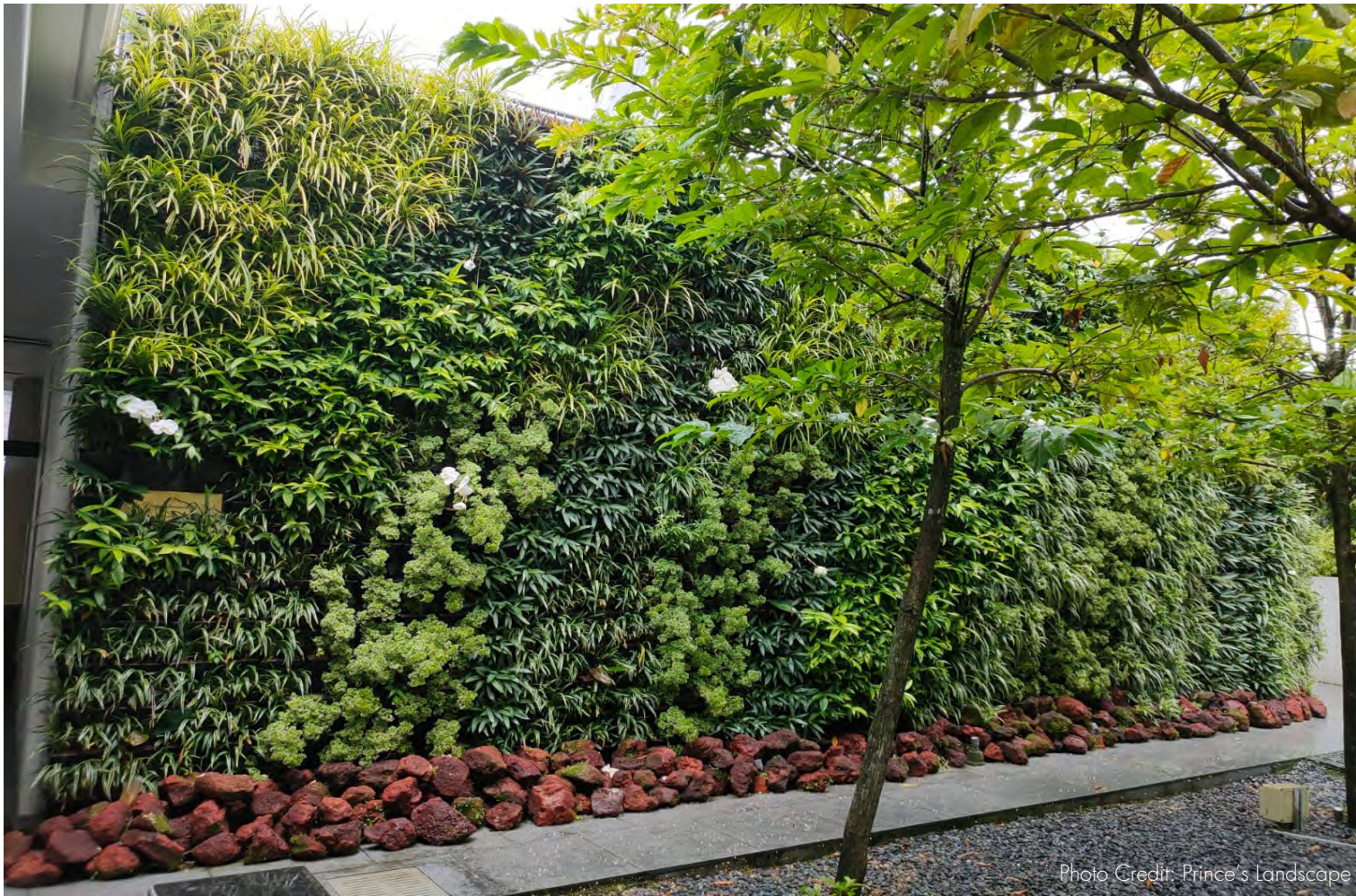


Photo Credit: Prince's Landscape



Photo Credit: Prince's Landscape

Designer's Commentary

The Church of Saint Alphonsus (Novena) appointed us to implement a 139m² green wall which doubles up as a sound barrier. This gorgeous green wall weighs about 62kg/m², including the weight of plants.

To ensure that the green wall is sustainable, we chose low maintenance plant species and installed Elmic's VGP tray system together with an irrigation system, online emitters and battery operator controllers.

Also, to further enhance the attractiveness of the wall, we have added white *Phalaenopsis* as embellishments and these orchids will be replaced with new ones every month.

HortPark

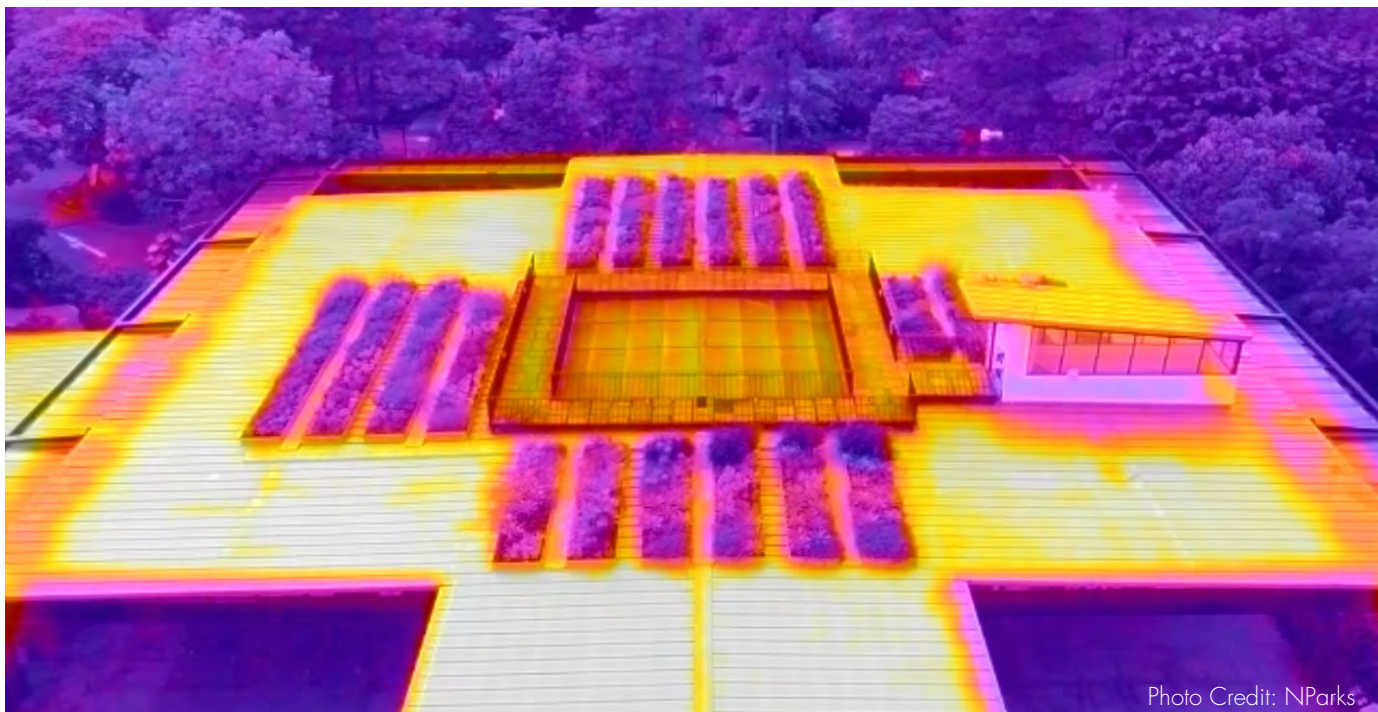
Rooftop Greenery by Consis Engineering

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Building Owner's Commentary

In line with Singapore's City in Nature vision, we have installed a naturalistic-themed rooftop garden on HortPark's roof, designed with intent to promote naturalistic planting and showcase technology that helps to enhance sustainability of rooftop greenery installation. Infra-red images (example below) have shown that roof temperatures are lowered by almost 10°C due to the presence of plants.



Furthermore, the wide array of plants supports biodiversity through careful planning of planting palette. In this demonstration project alone, we test-bedded HortPark's roof with a diverse range of 43 plant species neatly divided into **4 zones**:

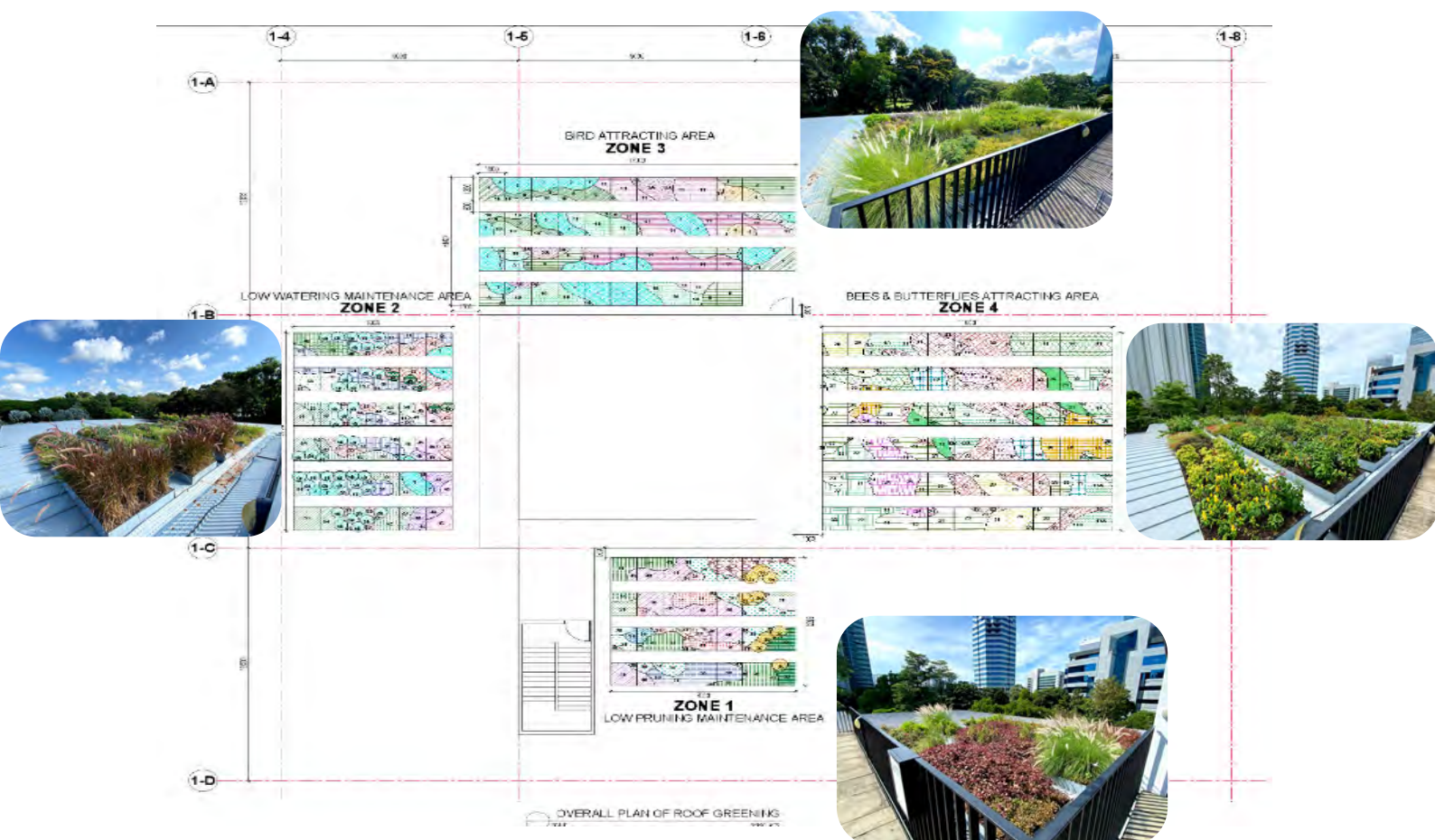
Zone 1: Low pruning maintenance

Zone 2: Low watering maintenance

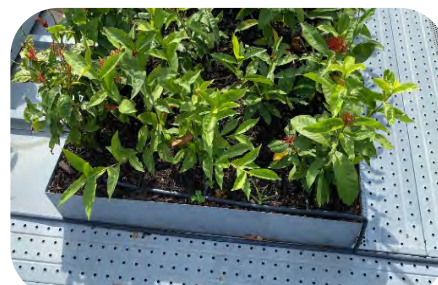
Zone 3: Bird attracting

Zone 4: Bees & Butterflies attracting

Since project completion, we have spotted sunbirds, bees and butterflies enjoying the garden and pollinating the flowers, contributing to Singapore's ecological resilience.



The naturalistic green roof is also equipped with smart irrigation controller, weather sensor and drip irrigation system to minimize water wastage and promote resource conservation.



HomeTeamNS Khatib

Rooftop Greenery by DP Green & DP Architects

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Photo Credit: DP Architects

Designer's Commentary

HomeTeamNS at Khatib has built a shared environment in the form of family-friendly clubhouse for NSmen, comprising of Singapore Police Force (SPF) and Singapore Civil Defence Force (SCDF), to network and bond through social, recreational and sporting activities.

The clubhouse promotes pro-family lifestyle and caters to the multi-generational family structure in Singapore. With well-integrated skyrise greenery, the clubhouse experience has been elevated to the status of an Urban Retreat. Shades of greenery contrasts and complements the grey concrete architecture, creating a lush oasis that promotes well-being as members get refreshed and rejuvenated when immersed in Nature.



Photo Credit: DP Architects

The arrival plaza and swimming pool are surrounded by lush planting, inspired by tropical jungle and fern forest. Navigating into the building, verandah gardens are present at almost every level, each showcasing different planting palettes such as grassland or arid garden.



Photo Credit: DP Architects



Photo Credit: DP Architects

In a bid to cool down ambient temperature of building and reduce energy consumption, DP Green and DP Architects (DP) incorporated eye-catching skyrise greenery design into its verandahs, naturally ventilated corridors and rooftop, where a soil-less green roof system of approximately 600m² is installed. The landscaping's varied colours and textures offer a delightful setting for one to enjoy the borrowed view of adjacent public parks while encouraging habitat-creation and attracting biodiversity from surrounding greenery.



Photo Credit: DP Architects

The building's water usage for irrigation is optimised through the use of drought-tolerant plants and implementation of rainwater harvesting system. DP also installed an eco-filtration system for a more sustainable approach in designing developments.

Incorporating such systems and adopting good landscape strategies will go a long way in shaping an energy efficient built environment.

Keppel MEDP

Rooftop Greenery by NATURE LANDSCAPES

Designer's Commentary

Singapore's fourth desalination plant, The Keppel Marina East Desalination Plant, is a vital national water-sufficiency infrastructure project. The architecture and landscape design of Keppel MEDP differs from the traditional industrial look of preceding desalination plants as it features a 20,000 sqm open green space atop an oval rooftop that serves as an observation deck for the underground treatment facilities. Its well-thought-out design has won it several accolades, such as the Global Water Award (Top Prize), 'Desalination Plant of the Year' recognition and ABC Waters Certification (Gold),

Nature Landscapes is very proud to be appointed landscape implementer of this lush green rooftop which also doubles up as a communal space and cycling pitstop in Singapore's Park Connector Network.





Photo Credit: Nature Landscapes

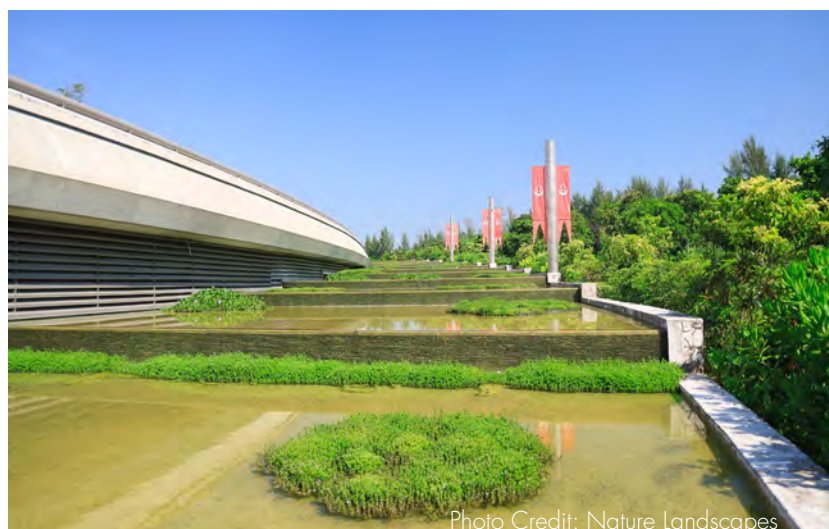


Photo Credit: Nature Landscapes

The green roof aims to reduce energy costs as it absorbs heat, reduce ambient temperature and provide natural insulation for buildings.



Photo Credit: Nature Landscapes

The green roof is designed to safely accommodate 500 people and citizens are welcomed to use the space for recreational activities such as weekend picnics or indulgence in panoramic sunset views.

AMEX (Marina Boulevard)

Vertical Greenery by VERTICAL GREEN

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Designer's Commentary

Designing and constructing AMEX's green wall was both challenging and monumental for Vertical Green. It is the tallest 4-sided green wall ever made by us and is easily our company's favourite showcase project. The indoor green wall spans over 3 floor levels.



Photo Credit: Vertical Green



Photo Credit: Vertical Green

Maintenance of AMEX's green wall is no easy feat. Our maintenance team uses industrial ladders to prune and care for the plants every month to ensure the wall stays lush and majestic for all office users.

As the green wall is situated in the middle of AMEX's spiral staircase, it faces heavy day to day human traffic. Hence, our plant selection took into consideration species that (i) require less maintenance and (ii) are less bushy to minimize physical discomfort to passers-bys, lest they accidentally brush against the plants.

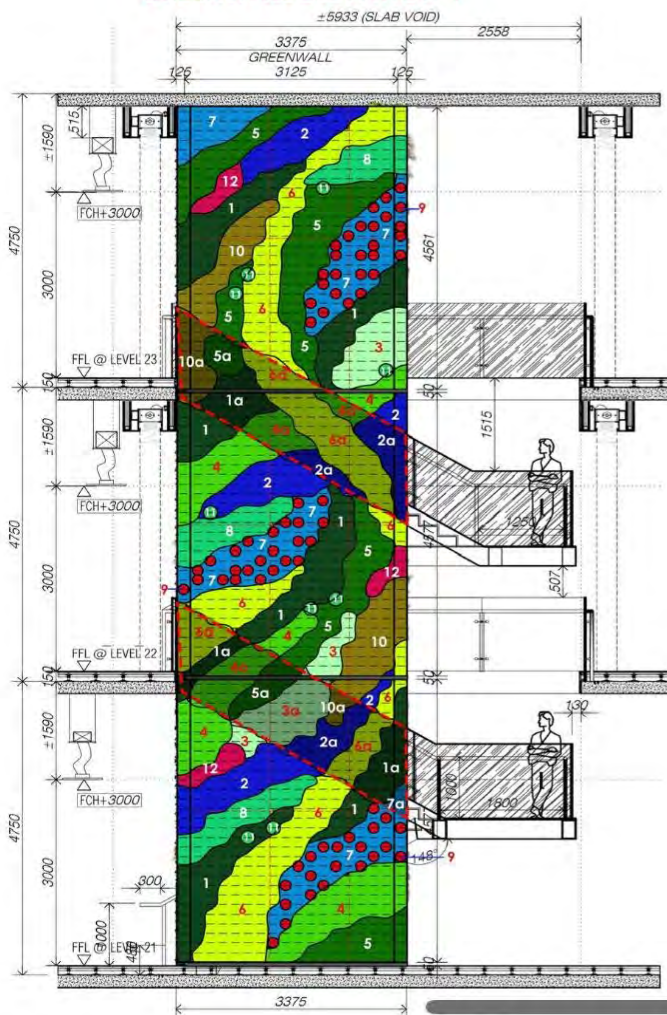


Photo Credit: Vertical Green

There are multiple challenges faced during implementation of this project. Besides the need for scaffolding and additional manpower for construction, we had to resolve the greater challenge of where to install the growth lights efficiently in a tight vertical space.

We noticed that certain sections of the green wall (especially behind the railings and glass windows) lack sufficient space and oxygen for plants to flourish. Thus, to mitigate this, we had to pursue alternative solution for small areas unsuited for plant growth.

GREENWALL ELEVATION 1



LIVE PLANT LIST

- | | | | |
|---|---|---|---|
|  |  |  |  |
| 1 Schefflera arboricola | 2 Syngonium 'white butterfly' | 3 Aglaonema 'spring snow white' | 4 Dracaena 'song of jamaica' |
|  |  |  |  |
| 5 Philodendron scandens green | 6 Philodendron scandens yellow | 7 Murraya paniculata | 8 Chlorophytum comosum |
|  |  |  |  |
| 9 Aglaonema Red | 10 Calathea Makoyana | 11 Bird nest fern | 12 Aglaonema pink valentine |

ARTIFICIAL PLANT LIST

- | | | | |
|--|---|---|---|
|  |  |  |  |
| 1a Schefflera arboricola (AP92) | 2a Syngonium 'white butterfly' (AP84) | 3a Aglaonema 'spring snow white' (AP102) | 4a Dracaena sp (AP13) |
|  |  |  |  |
| 5a Philodendron scandens green (AP82) | 6a Philodendron scandens yellow (AP103) | 7a Murraya paniculata (AP111) | 10a Calathea sp (AP35) |

DBS Asia Treasure Lounge

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Vertical Greenery by PRINCE'S LANDSCAPE

Designer's Commentary

Green walls contribute numerous benefits, such as sound insulation, lower energy consumption and air purification. In view of these benefits, we have installed a 13sqm² indoor green wall at DBS Asia Treasure Lounge (Changi Airport), purposefully choosing plants that are suited for indoor climate and the result is beautiful.

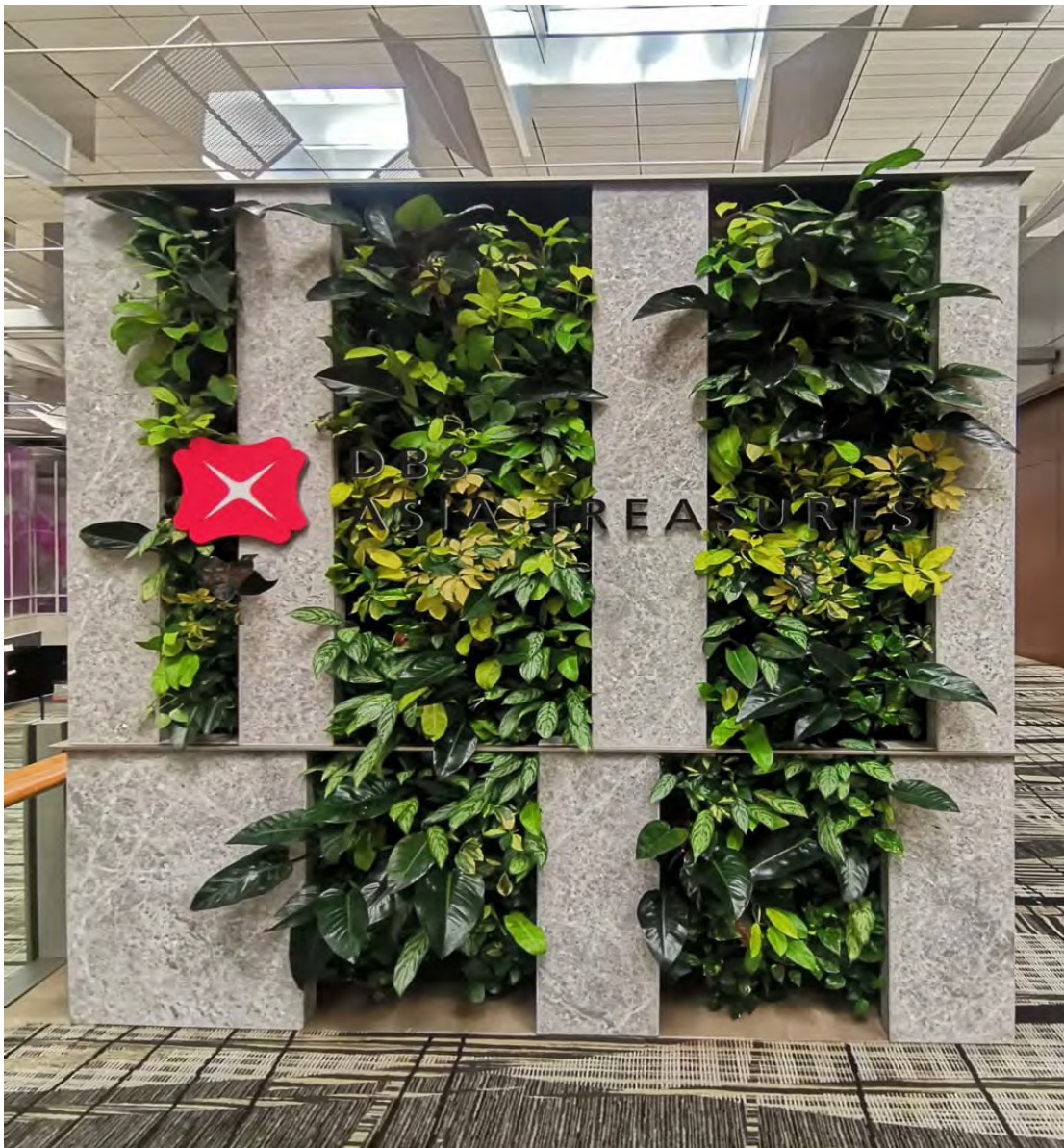


Photo Credit: Prince's Landscape

This wall was installed using the Mobilane live panel, which consist of mainly two parts, i.e. the casset and its aluminum profile. It is designed to be light weight, recyclable and low maintenance. This system also do not require additional water point, drainage line or electrical power point, translating to a neat installation of green wall system without the need for any hacking.

McDonald's at Kallang

Vertical Greenery by VERTICAL GREEN

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Photo Credit: Vertical Green

Designer's Commentary

Similar to their past projects, McDonald's had requested for a green wall in an open seating area to bring greenery close to diners and enhance their experience. For this outlet, a U-Shaped green wall was created and this design is unlike typical green wall projects that are either single stand-alone or double-sided.



Photo Credit: Vertical Green



Photo Credit: Vertical Green

The biggest challenge we faced with this project is working around the toy boxes. We had to figure out a way to irrigate the plants on the live green wall while ensuring that the toy boxes do not sustain any water damage.

Planting design wise, our client prefer the wall to not be overly vibrant in colour as it will clash with the yellow toy boxes. Hence, our plant choice consists of mostly plants in shades of green but with pops of colour representing McDonald's corporate identity, i.e. red and yellow. As McDonald's is family friendly, we have used planting species that are child safe like *Aglaonema 'Red Impresa'* and *Heptapleurum/Schefflera arboricola 'Variegata'* for the red and yellow plants respectively.



Photo Credit: Vertical Green

A
2503

B
8900

C
3564



PLANT LIST:



Philodendron Scandens
Green



Chlorophytum comosum



Murraya paniculata
'dwarf'



Aglaonema Red



Schefflera Green



Caladium Lindenii



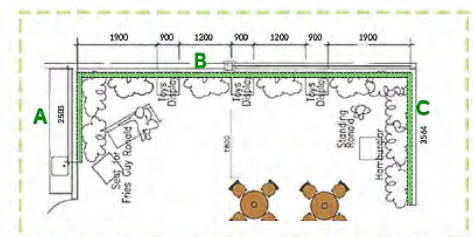
Syngonium
'White Butterfly'



Song of Jamaica



Schefflera variegated



KEY PLAN

Credit: Vertical Green.

P.S. Café

Vertical Greenery by GREENOLOGY

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Photo Credit: Greenology

Designer's Commentary

PS Café has a philosophy of bringing nature closer to all its patrons in all their outlets. We have been involved with PS café for many years. When they were developing their outlet at Great World City, we were asked to create a lush indoor greenery as a backdrop for patrons sitting next to 3 large indoor windows. We installed the Greenology Vertical Greenery with Greenology Grow lights to create an immersive nature experience for their patrons.

We added lush palms in planters to enhance the green enclave for their customers. The plants are in specially developed semi-hydro systems that require very little maintenance.

We incorporated blue tooth technology for the irrigation controllers and fertigation units which schedule water and nutrients at the right time and correct amount. The result was a very luxuriant green ambience that was both immersive and biophilic.



Photo Credit: Greenology

StorHub (Toa Payoh)

Rooftop Greenery by SUNSEAP

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Photo Credit: StorHub

Designer's Commentary

StorHub Self Storage, Singapore's first and largest self storage operator in Singapore with presence across Asia, welcomes their first 760m² green roof located at their head office in Toa Payoh. We are privileged to be involved in the refreshing transformation of the otherwise heat-absorbing, concrete rooftop to vibrant lush greenery as part of StorHub's initiative to go Green.



Photo Credit: StorHub

We made careful consideration of the five plant species that were planted on StorHub's roof, ensuring that our selection fulfilled a wide range of criteria including functionality, aesthetic values, cost-effectiveness and low maintenance.

The plants selected had to be sufficiently resilient to withstand trampling and high human traffic to allow for activities at the rooftop space including outdoor meetings. As such, we chose hardy species such as *Cyanotis cristata*, *Bougainvillea Mrs Eva* and *Euphorbia tithymaloides*.



Photo Credit: Sunseap

To ensure that the property continues to deliver an optimal environment for all StorHub customers, possible factors including flash flood invasion from the roof were considered. As such, together with StorHub, we worked on a weather-proof and low maintenance auto-irrigation system that help to further guarantee zero water leakage. The plants also act as an extra protective layer to reduce the degradation of the waterproof membrane and keep it intact so one can say the only permeating element during a downpour will perhaps, be the sweet petrichor that ripens the air.

Working toward Singapore's Green Plan 2030, green roofs are a sustainable opportunity for all businesses to apply and a great way to make Singapore a fresher community for all Singaporeans. We are proud to partner with StorHub and look forward to growing this initiative with businesses across Singapore and the region.

Grandeur Park Residences

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Skyrise Greenery by NATURE LANDSCAPES

Vertical Greenery



Photo Credit: Nature Landscapes

Designer's Commentary

Grandeur Park Residences aims to integrate a holistic lifestyle into every aspect of its residents' daily life. Nature Landscapes is tasked to create an inviting and attractive entrance with use of live green wall as the backdrop of Grandeur Park's logo. We conceptualised and implemented this beautiful green wall which greets the residents with its different colours and texture variations from the plant palette. The green wall also filters toxins in the air and convert carbon dioxide to oxygen, hence creating a healthier environment for residents.

Rooftop Greenery

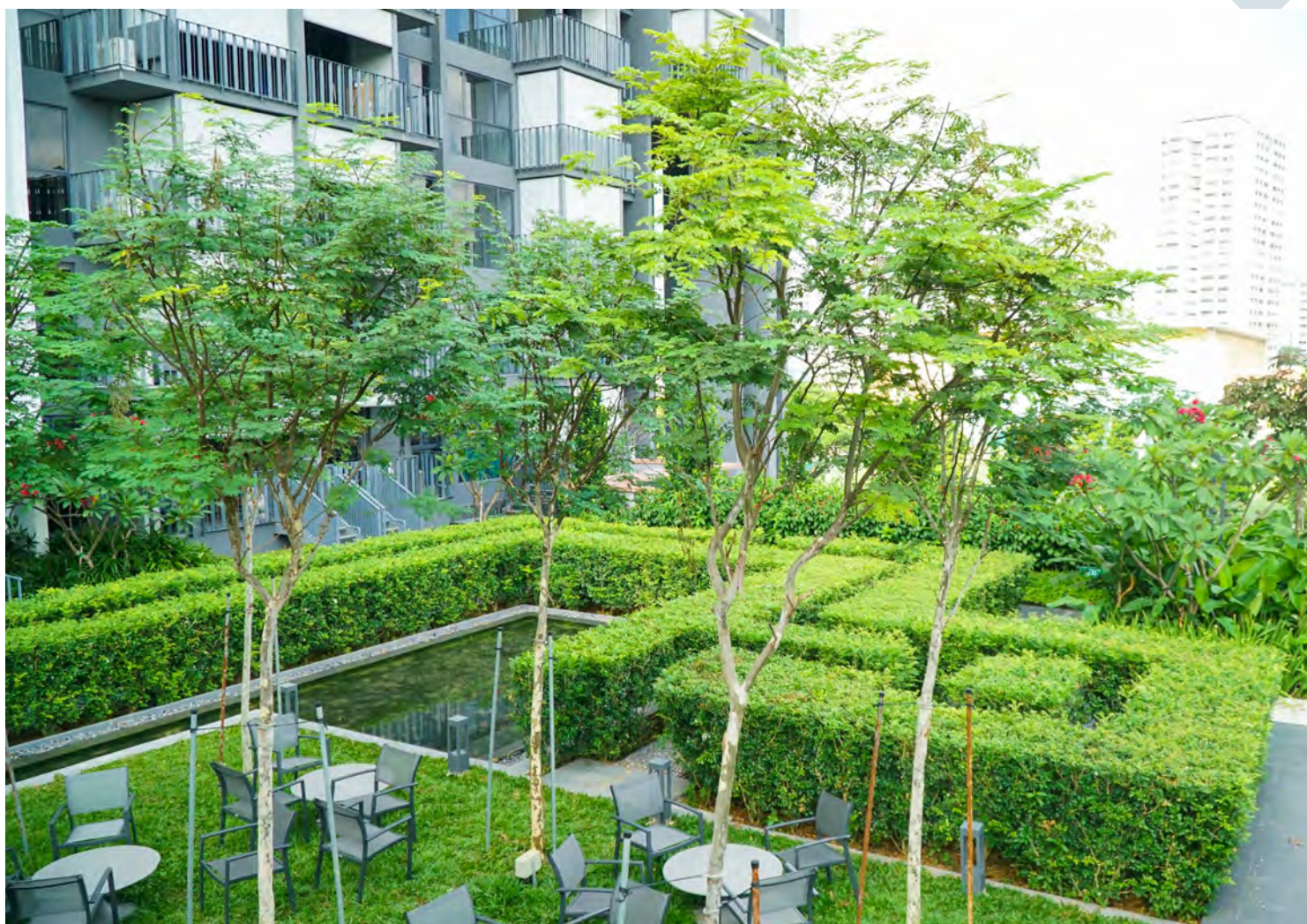


Photo Credit: Nature Landscapes

At Grandeur Park's rooftop garden, residents can meander their way through the unique rooftop maze garden as they head to the floating cabana to enjoy the scenic views. Biophilic design interventions were calibrated while ensuring that the integrating flora is synergistic and complementary to the surrounding residences and forestry.



Photo Credit: Nature Landscapes



Photo Credit: Nature Landscapes

Jalan Tambur House

Vertical Greenery by GREENOLOGY

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Designer's Commentary

The client approached us to create a green oasis in the middle of their new home.

They had an air well that extends to the basement and wanted a continuous indoor green wall that would connect everyone through the 4 levels of their home.

This vertical green wall installation replicates the experience of living with a larger garden in their previous home as well as ensuring that all residents in the household will enjoy view of pervasive greenery from their own room and shared spaces.



Photo Credit: Greenology

We took reference from a natural cave and cliff habitat, where plants and vegetation are typically seen growing on the sides of cliff-face and inside grottos. In replicating this concept, we designed a green wall that is 12 meters high, with a moss wall at the top to artistically represent clouds.



Photo Credit: Greenology



Photo Credit: Greenology

The hand-sculptured backdrop is designed to imitate a cave setting, together with our plant choice of lush shade loving plants and forest-like green wall design.



Photo Credit: Greenology

We have installed Greenology Growlights and a misting system for the green wall. With a sustainable green wall like ours, plants do not need to be changed regularly.

Stars of Kovan

Skyrise Greenery by COEN Design

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Vertical Greenery



Photo Credit: COEN

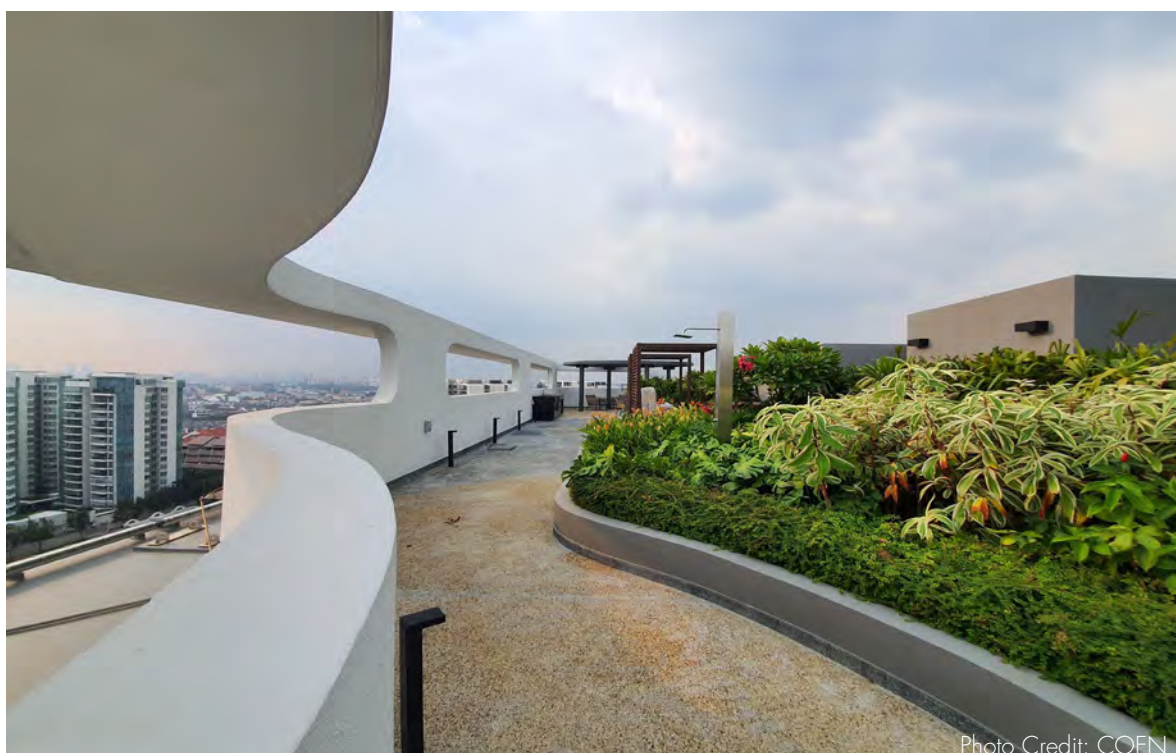
Designer's Commentary

Inspired by the wind carved forms of the Antelope Canyon, the design language of the landscape at Stars of Kovan is a creation of sublime beauty. The organic form and absence of artificiality is at the heart of the building's innovative landscape design, and each facility is a new discovery waiting to be found. Numerous amenities can be found at 3rd storey to rejuvenate the body, such as 50m Sky Pool, Aqua Deck and Island Spa, Children's Oasis Pool, Outdoor Fitness, Reflexology Path and Children's Playground.



Photo Credit: COEN

Rooftop Greenery



Additionally, residents can ascend to the rooftop landscape which provides a holistic relaxation experience. A Contemplation Deck overlooking this serene composition and provides a sanctuary space to gain one's inner poise and momentum. The myriad of facilities provided within the residential development will leave a gratifying impression that captures the senses, offering an unparalleled lifestyle.

