

Landscape Excellence Assessment Framework Certified Developments 2014 Living, Learning, and Working Among Gardens

Images as credited

Launched by the National Parks Board of Singapore (NParks) in August 2013, the Landscape Excellence Assessment Framework (LEAF) certification scheme is the first and only one in Singapore dedicated solely to the provision and management of greenery. With LEAF, NParks aims to recognise developers, architects, landscape architects, and maintenance agents for their excellence in greenery provision and management.

Developers and maintenance agents of existing and new (upcoming) developments can apply for LEAF certification. Developments are assessed in two key areas: greenery provision (70%) and landscape management (30%). Bonus points are given for efforts to promote public appreciation of greenery. The LEAF certificate is valid for three years, after which a reassessment can be done. The fulfilment of the Parks and Trees Regulations is a prerequisite for submission.

NParks is pleased to certify 12 projects in 2014. In addition, at the end of every assessment year, before the LEAF certification ceremony, the judging panel will go through all of the successful applicants in that year and choose the best to be awarded with an Outstanding award. In 2014, three were recognised with an Outstanding award: Adana @ Thomson (condominium), Solaris (office building), and Tree House (condominium). They were chosen as the panel felt that they set the benchmark for meeting LEAF's criteria of urban greenery.

The 12 projects comprise 7 upcoming developments, to be completed by 2018, and 5 existing developments. Among them, a large majority were residential projects, but they also included the first educational institution to be LEAF-certified, Yale-NUS College. To date, a total of 21 developments have been certified by LEAF.

For more information: nparks.gov.sg/leaf

LEAF Assessment Criteria Breakdown

PART	CRITERIA	COMPONENT
1. Greenery Provision	<p>Greenery provision</p> <ul style="list-style-type: none"> Green plot ratio Percentage of ground-level greenery Skyrise greenery <p>Plant materials</p> <ul style="list-style-type: none"> Percentage of native plant species (as defined in NParks' Flora & Fauna Web) Diversity of plant species <p>Landscape design</p> <ul style="list-style-type: none"> Integration of greenery with architecture <p>Habitat creation</p> <ul style="list-style-type: none"> Biodiversity-sensitive planting and landscape design 	70%
2. Landscape Management	<p>Plant sourcing</p> <ul style="list-style-type: none"> Sourcing of plants from accredited nurseries <p>Site verification</p> <ul style="list-style-type: none"> Overall impression of maintenance For existing developments, visual assessment of health of greenery <p>Sustainable greenery practices</p> <ul style="list-style-type: none"> Maintenance productivity measures Irrigation system 	30%
3. Bonus	<p>Additional efforts to</p> <ul style="list-style-type: none"> Educate people through information signs, brochures, websites, and so on Promote, encourage or facilitate community gardening Retain suitable on-site trees Any other greenery- or nature-related efforts 	

OUTSTANDING LEAF CERTIFIED DEVELOPMENTS 2014

Existing Developments

name Solaris (office building)
award recipient SB (Solaris) Investment Pte Ltd, a subsidiary of Soilbuild Group Holdings Ltd (developer)
location Singapore
completion date 2010
collaborators CPG Consultants Pte Ltd (architect), Tropical Environment Pte Ltd (landscape architect), TR Hamzah & Yeang Sdn Bhd (design consultant), CPG Consultants Pte Ltd (M&E engineer), and Arup Singapore Pte Ltd (C&S engineer)

Located in the One North business park, Solaris comprises a 15-storey tower and 9-storey tower and the atrium between them. The building façade features sky terraces and a “cloak” of louvres. This greatly reduces solar heat gain while allowing spaces to benefit from landscaping and sunshading. Skylights, actuated louvres, light shafts, light shelves, and sky terraces ensure natural ventilation and daylight from the rooftop to the basement.

A 1.5-kilometre-long landscaped ramp, called the spiral garden, wraps around the building perimeter and connects the basement, ground floor, and roof gardens. It increases the building’s green surfaces by 1.5 times. Designed as a biotope, it provides a haven for wildlife while screening and shading the façade. The many sky terraces provide outdoor breakout spaces. Native species suitable for the microclimate were used to allow organic growth and minimal maintenance while supporting a flourishing eco-system. Tree species were selected for height control and a less aggressive root system.

The spiral garden is also integrated with a bioswale, collecting rainwater from the rooftop, which is used for irrigating the landscaping. Harvested rainwater is stored at the eco-cell, where the ramp ends. The eco-cell punctures the basement car park levels and allows natural light, ventilation, and greenery to enter those levels. The spiral garden is designed for maintenance and access from every floor. A fertigation system with rain detectors ensures efficient water usage.



1. A 1.5-kilometre-long landscaped ramp, the spiral garden, around Solaris is designed as a habitat for flora and fauna (Photo: SB (Solaris) Investment Pte Ltd).
2. Roof garden of Solaris (Photo: SB (Solaris) Investment Pte Ltd).
3. Automated louvres above the skylit atrium of Solaris encourage natural ventilation and lighting (Photo: SB (Solaris) Investment Pte Ltd).

name Tree House (condominium)
award recipient City Developments Limited (developer)

location Singapore

completion date 2013

collaborators ADDP Architects LLP (architect), COEN Design International Pte Ltd (landscape architect), Tiong Seng Contractors (main contractor), and Scenic Landscape (landscape contractor)

Tree House's stunning façade entered the Guinness World Records in April 2014 for the largest vertical garden, which stands 24 storeys tall and 2,289 square metres large. Located at Chestnut Avenue, the condominium was designed to promote harmonious and tranquil living with nature in Singapore's built-up urban environment. Residents enjoy fresh air and picturesque views of the nearby parks and nature reserves.

More than an architectural feature, Tree House's vertical garden functions as a "bio-shield" that filters pollutants and carbon dioxide out of the air. It also offers natural insulation, reducing heat absorption in the indoor spaces. This is expected to achieve annual energy savings in air-conditioning of at least 15 percent for the 48 west-facing (sun-facing) master bedrooms. The base of the vertical garden extends into a green canopy, which aids in channeling surface water. Throughout the site, rainwater is harvested and used to irrigate the landscaping. Leveraging the natural sloped terrain, bioswales were also incorporated into the drainage system to aid rainwater harvesting.

At all four apartment blocks, communal sky gardens on the 7th, 13th, and 19th floors offer shade for internal spaces. Various recreational amenities, including outdoor chestnut-shaped pavilions and a community herb garden, promote healthy living and bonding within nature. Instead of chlorine, water in the Discovery Pond is treated with a bio-filter to support the biodiversity in the pond.



New Developments

name Adana @ Thomson (condominium)

award recipient

Fortune Properties Pte Ltd (developer)

location Singapore

completion date 2018

collaborators JGP Architecture (S) Pte Ltd (architect), PDAA Design Pte Ltd (landscape architect), EPM Consultants (C&S engineer), and Elead Associates Private (M&E engineer)

To be completed in March 2018, Adana @ Thomson is conceived as three five-storey blocks, interlinked to free up more space for landscape and lifestyle provisions on the 3,716-square-metre site. Located near Lower Peirce Reservoir, the condominium seeks to inspire a healthy outdoor lifestyle close to nature among residents. All 74 apartments will enjoy views of the surroundings or internal courtyards. The entire rooftop will be greened and interweaved with walkways, a jogging track, a culinary garden, and barbecue areas.

From the ground to the roof, the condominium's landscaping will use only native plants sourced locally and from Malaysia. For example, native trees *Alstonia angustiloba* (Common Pulai) and *Fagraea fragrans* (Tembusu) will grace the front and back. Creepers will envelop the west elevation for sun-screening and soften the concrete roof edges. As only native plants will be used, their availability and maintenance will not be a major issue. However, conscientious maintenance procedures will still be implemented. Composting and recycling bins will collect composted materials for landscape maintenance and soil conditioning.

Forest-edge animals from the nearby nature reserve, such as butterflies and birds, are expected to visit the new habitat within this development. Although it sits on concrete, the rooftop's playful juxtaposition of shrubs, trees, water, stones or rocks, and composite timber will mimic the natural forms of the local environment and seamlessly extend the fauna habitat.



4. The 24-storeys-tall vertical garden on Tree House's façade set a world record for the largest vertical garden (Photo: City Developments Limited).

5, 6. Tree House's vertical garden naturally filters pollutants out of the air and reduces heat absorption in the indoor spaces (Photo: Ashraf Hamzah).

7. Adana @ Thomson is conceived as three interlinked blocks to free up more space for the landscape (Image: Fortune Properties Pte Ltd).

8. A lush rooftop at Adana @ Thomson extends the habitat for surrounding fauna (Image: Fortune Properties Pte Ltd).

SELECTED LEAF CERTIFIED DEVELOPMENTS 2014

Existing Developments

name Casa Clementi
award recipient Housing and Development Board (developer)
location Singapore
completion date 2012
collaborators Surbana International Consultants Pte Ltd (architect/ landscape architect/ M&E engineer/ C&S engineer) and Straits Construction Singapore Pte Ltd (main contractor)

Casa Clementi is one of the largest Housing and Development Board (HDB) developments, with 2,234 residential units in 10 blocks of various heights of 20, 28 and 40 storeys. Residents enjoy generous green spaces, a myriad of recreational facilities, and a landscaped deck on the multistorey car park's roof.

The large landscape deck of about 15,460 square metres on the car park is a key design feature. It connects to all the residential blocks. A large spiral ramp designed as a "tree-top walk" in the middle connects the east and west zones. Several playgrounds and adult and elderly fitness corners are spread across the two zones, along with paved open plazas and trellised seats. A footpath about 660 metres long looping around the entire roof garden doubles as a jogging route. The elevated roof garden functions like the ground level and provides more community spaces.

About 48 percent of the roof garden is devoted to planters of various soil depths. Durable and long-lasting shrubs, such as the *Sansevieria trifasciata*, *Caesalpinia pulcherrima*, and *Philodendron eruibescens*, were selected for their drought resistance and aesthetic merits. Trees that require minimal maintenance such as *Hopea Odorata* and *Bucida molinetti* were provided to create canopy and shade.



9. Trellised seats at Casa Clementi's landscape deck (Photo: Housing and Development Board).

10. Casa Clement's landscape deck is marked by a large spiral ramp designed as a "tree-top walk" (Photo: Housing and Development Board).

11. Playgrounds, fitness corners, paved open plazas, and trellised seats are spread across Casa Clementi's landscape deck (Photo: Ashraf Hamzah).

New Developments

name Sky Habitat (condominium)

award recipient CapitaLand Singapore, Mitsubishi Estate Asia, and Shimizu Corporation (developers)

location Singapore

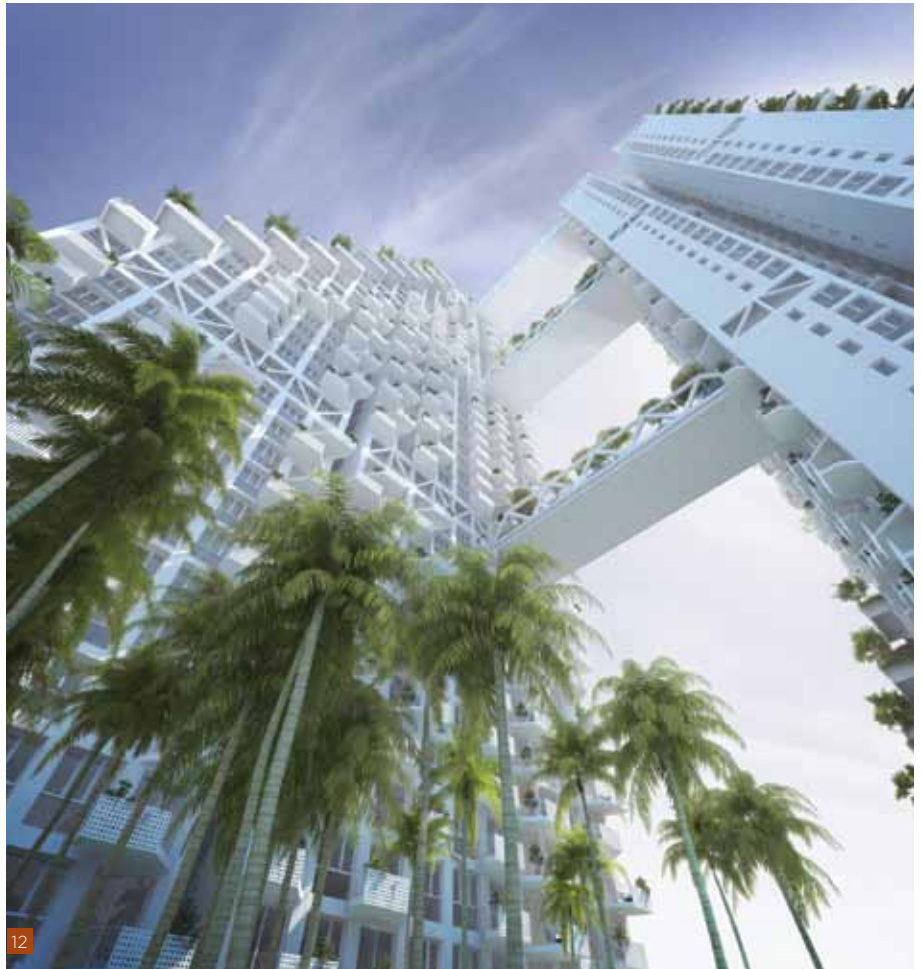
completion date 2016

collaborators COEN Design International Pte Ltd (landscape design architect), Coen + Partners (landscape design architect), DCA Architects Pte Ltd (architect), Safdie Architects (design architect), Shimizu Corporation (main contractor), and Garden Beau Pte Ltd (landscape contractor)

Designed by internationally renowned architect Moshe Safdie, the 38-storey condominium Sky Habitat in Bishan is expected to be completed in early 2016. Its dramatic stepping form is designed to optimise lush vertical greenery, orientations relative to the sun, natural ventilation, and views. Three distinct landscaped sky bridges on the 14th, 28th, and 38th storeys will link the two towers. More than a quarter of the units will come with generous outdoor spaces for private gardens, staggered on floors for taller planting and sunlight.

A landscape deck will be raised above two basements, separate from vehicular traffic, to maximise room for greenery on the ground. More than 65 percent of the ground level is devoted to greenery, swimming pools, and water features—seamlessly blended. A community garden will encourage residents to plant their own vegetables, fruits, and herbs. All landscape features and facilities are designed to be universally accessible. A series of ramps strategically placed will allow residents to enjoy barrier-free and uninterrupted accessibility to all landscape facilities.

Currently undergoing a 24-month pre-grown period in a local nursery, all planting specimens are sourced from sources accredited by National Parks Board. More than 50 percent of the planting areas will be irrigated with an automated drip irrigation system, supplemented by a comprehensive rainwater harvesting system including lily ponds with linear wetland systems and a bio-retention basin.



12. Sky Habitat's dramatic form comprises three landscaped sky bridges on the 14th, 28th, and 38th floors linking two stepped towers (Image: CapitaLand Singapore).

13. More than 65 percent of the ground level at Sky Habitat is devoted to greenery, swimming pools, and water features (Image: CapitaLand Singapore).

14. A bio-retention basin at Sky Habitat will collect run-off for cleansing before discharging it to main drainage networks (Image: CapitaLand Singapore).

15. Lily ponds with linear wetland systems are designed to fit the compact site of Sky Habitat and bring residents closer to nature (Image: CapitaLand Singapore).

name Highline Residences (condominium)
award recipient Keppel Land (developer)
location Singapore
completion date 2018
collaborators Keppel Land Limited (developer), W Architects Pte Ltd (project architect), and COEN Design International Pte Ltd (landscape architect)

Comprising two 36-storey blocks, one 21-storey block, and four 4-storey blocks, Highline Residences is located at Kim Tian Road. The condominium will feature a generous seven-metre-wide green lawn along Kim Pong Road, which will provide a great picnic spot for residents when it is completed in 2018. A heritage-themed spice garden with local plants such as nutmeg and wild betel will add flavour to the experience. Residents can also enjoy panoramic views of the nearby city from two landscaped sky terraces located on levels 12 and 13.

The landscape is designed to integrate seamlessly with the architecture, substation, and bin centre. An elevated green ridge on level five, which will span 180 metres and offer a wide range of recreational facilities, bridges the blocks. The ridge with a cascading water feature will connect seamlessly with the landscape on the ground floor. A rooftop communal garden facility will encourage urban farming.

A proactive approach is adopted for environmental protection and sustainability. An automated irrigation system with timers and rain sensors ensures efficiency in landscape maintenance. Native plant species that fare better in Singapore's hot climate are chosen to ensure ease of maintenance. Horticulture waste produced will also be recycled into compost.



16, 17. Highline Residences features an elevated green ridge on level five, which will host recreational facilities and connect seamlessly with the landscape on the ground floor (Image: Keppel Land Limited).

name Yale-NUS College (educational institution)

award recipient Yale-NUS College (developer)

location Singapore

completion date 2015

collaborators Forum Architects Pte Ltd (architect), Pelli Clarke Pelli Architects (design consultant), Lekker Design Pte Ltd (landscape architect), SsangYong Engineering & Construction Co. Ltd (main contractor), and Nature Landscapes Pte Ltd (landscape contractor)

To be completed in early 2015, Yale-NUS College is a liberal arts college in Singapore jointly established in 2011 by Yale University and the National University of Singapore (NUS). The campus will feature outdoor gardens and classrooms to encourage learning in nature. The landscape design expands on the concept of an arboretum, with over 200 species cultivated for their botanic and cultural significance.

The college's central green space, Campus Green, is conceptualised as an "evolved tropical forest". Different layers of planting will mimic the multi-layered strata of a tropical forest. Six conserved existing mature trees, 18 to 22 metres tall, form the canopy layer. Smaller regional trees and native shrubs will act as new infill that parallel the understorey and undergrowth layers. Plantings will consist primarily of species native to the region, such as the Malayan Cherry and Common Pulai.

The three Residential Colleges will each have a central courtyard and large central lawn for events. 30 sky gardens and 85 roof gardens will vertically extend the courtyards and help to passively cool the residential blocks.

The innovative stormwater treatment system comprises an eco pond and four bioswales, with ecotope plants used to cleanse water. More than 11 percent of the surface runoff from the campus will be treated before it enters public drains.



OTHER LEAF CERTIFIED DEVELOPMENTS 2014

Existing Developments

- Punggol Breeze (HDB estate) by Housing and Development Board
- Vacanza @ East (condominium) by Hoi Hup Sunway Property Pte Ltd

New Developments


- Eco Sanctuary (condominium) by S P Setia International (Singapore) Pte Ltd
- The Glades (condominium) by Keppel Land and China Vanke
- Clementi Cascadia (HDB estate) by Housing and Development Board

LEAF CERTIFIED DEVELOPMENTS 2013

Existing Developments

- 158 Cecil Street (office building) by Alpha Investment Partners
- Khoo Teck Puat Hospital by Alexandra Health Pte Ltd
- Newton Suites (condominium) by UOL Group Limited
- Pangshan Grove (HDB estate) by Housing and Development Board
- Siloso Beach Resort by Siloso Beach Resort

New Developments

- Corals at Keppel Bay (condominium) by Keppel Bay Pte Ltd
- Senja Parc View (HDB estate) by Housing and Development Board
- The Interlace (condominium) by a consortium of CapitaLand, Hotel Properties Limited, and another shareholder
- The Rainforest (executive condominium) by City Developments Limited and TID Pte Ltd 



Landscape Excellence Assessment Framework (LEAF) in Brief

1. What is LEAF?

The Landscape Excellence Assessment Framework (LEAF) is Singapore's first certification scheme solely dedicated to the provision and management of greenery. With LEAF, we aim to encourage more greenery in Singapore's urban landscape.

2. Who can apply for LEAF?

Developers and maintenance agents of existing and new developments can apply for LEAF.

3. How is the LEAF certification carried out?

We assess developments which are submitted for LEAF certification according to greenery provision and landscape management. The fulfilment of the Parks and Trees Regulations is a pre-requisite for submission.

4. How long is the LEAF certification valid for?

The LEAF Certificate is valid for three years, following which a reassessment can be done.

5. Are there any charges involved?

No charges are involved for LEAF certification.

6. How are applications submitted?

Please contact NParks_LEAF@nparks.gov.sg for the application form.



18. Yale-NUS College's new campus will feature outdoor gardens and classrooms for its students to learn in nature (Image: Pelli Clarke Pelli Architects).

19. At Yale-NUS College's central green space, Campus Green, different layers of planting will mimic the multi-layered strata of a tropical forest (Image: Lekker Design Pte Ltd).

20. Extensive sky gardens and roof gardens give the Residential Colleges unique identities and cool the interior temperatures (Image: Lekker Design Pte Ltd).

21. Terraced landscape decks cascade from the top of the multistorey car park to the ground floor of Clementi Cascadia (Image: Housing and Development Board).