Lee Kong Chian Natural History Museum

LIVING ENCYCLOPEDIA

Text by Sandhya Naidu Janardhan
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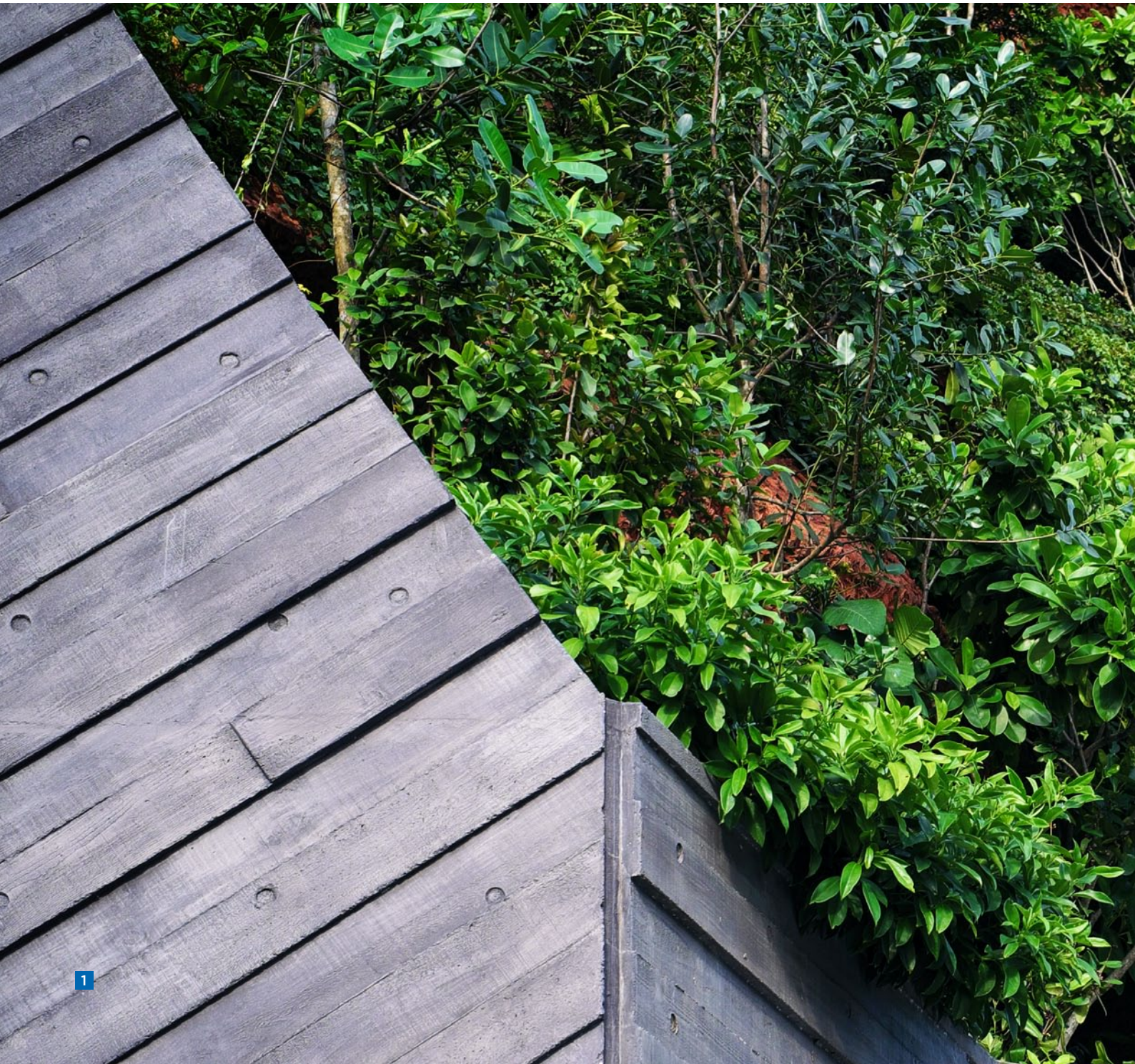

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PROJECT CREDITS

Location: 2 Conservatory Drive, Singapore **Client:** Raffles Museum of Biodiversity Research, National University of Singapore (NUS) **Completion Date:** 2015 **Estate Management:** Office of Estate Development, NUS **Architect:** W Architects Pte Ltd **Landscape Architect:** Tierra Design (S) Pte Ltd **Curator & Interior Designer:** Gsmprjct Creation Pte Ltd **Civil & Structural Engineer:** T.Y. Lin International Pte Ltd **Mechanical & Electrical Engineer:** T.Y. Lin International Pte Ltd **Quantity Surveyor:** Quant Associates **Main Contractor:** Expand Construction Pte Ltd **Landscape Contractor:** Flora Landscape Pte Ltd **Site Area:** 4,424 m^2 **GFA:** 8,500 m^2

There was a constant dialogue and tension between choosing plants for their educational value or for how accurately they expressed a particular habitat over their visual appeal or alternative plants that are more familiar or available commercially.

Envisioned to be a leader in Southeast Asian biodiversity research, education, and outreach, the Lee Kong Chian Natural History Museum plays host to research laboratories and a vast museum with rotating interactive exhibits that celebrate native species and biodiversity. The first natural history museum in Singapore, the museum houses three dinosaur skeletons and over a million specimens of plants and animals. The focal point of the prominent architecture is the main building with its "cleft" sides planted with native species.

With education as the main driving factor behind the project, the landscape design aims to inform people about the native habitats and plants of Singapore through four distinct landscape areas. Three are inspired by native habitats: a six-storey luscious cliff, a beach section, and an interactive exhibit with mangrove and dry land forest plants; they highlight the importance these habitats play in Singapore's ecology and environment. The fourth is a phylogenetic garden with a showcase that narrates the evolution of various plant species.

Representing a typical cliff landscape, the cleft façade is filled with native species of trees as well as smaller shrubs and ferns, with the cascading effect of the cliff contrasted against the rough, dark, and textured building. The strong image of the cliff is the outcome of the design process rather than a means to make this part of the landscape prominent. Unlike most vertical greenery where planters are an added layer onto the architecture, in this project they formed a part of the architecture itself. Without the veil of architecture to cover the planters, one of the initial considerations of having multiple planting layers was the visual effect one would experience standing on the podium: a plain one, of the base of the planter slabs. This pushed the designers to sculpt and texturise the cliff in order to achieve dynamic elevations, irrespective of where the user stood on the podium.

With planting along 10 levels, at every floor and in between floors, the verdant cleft cascades down to the side of the building. Combining native endangered species and some common species in the plant palette, the intent is to introduce the visitors to trees and shrubs that they are unfamiliar with as well as familiar ones that they would easily identify from other parts of the island. Critically endangered trees such as *Calophyllum inophyllum* and *Eurycoma longifolia* known for their medicinal properties are used across various levels of the cliff. While the primary purpose of the design was educational, the aesthetics were enhanced through the introduction of native ornamental trees such as *Fagraea ceilanica* and *Ardisia elliptica*. Native herbaceous shrubs such as *Dianella ensifolia* and *Rhodomyrtus tomentosa* help emulate the physical characteristics of cliff side vegetation.

Between the geodic main building and the supporting laboratory spaces is a series of interactive exhibits of native plant species. Starting from saltwater mangrove plants, the exhibits transition to freshwater plants and then to dry land forest plants. They are integrated with the courtyard landscape design and invite visitors to interact with the flora. Planted in fibreglass pots placed in a bio pond, the plant selection focused on the unique adaptations of the root systems, mainly in the mangrove area. The *Bruguiera gymnorrhiza*, *Rhizophora apiculata*, oval-leaved *Sonneratia ovate*, and *Lumnitzera racemosa* that lends colour with its flowers complete the palette for this area, offering a familiar sight to the visitors who have experienced the mangroves in this region. Continuing along the landscape in the courtyard area, the visitor encounters freshwater swamp forest plants such as *Bruguiera hainesii*, a rare native species, along with some common plants such as *Acrostichum aureum*, *Alpinia aquatica*, and *Lasia spinosa*. The dry land forest plants include rare endangered species such as *Kopsia singapurensis*, found exclusively in Singapore and Malaysia now threatened due to habitat loss, and *Sterculia parviflora*, commonly called *kelumpang burung* because birds love eating its fruit. Completing the palette of the dry land forest habitat are epiphytic ferns, such as *Davallia denticulata*, *Phymatosorus scolopendria*, and *Asplenium nidus*, as well as a pitcher plant, *Nepenthes ampullaria*, which is a vulnerable species in Singapore.

A substantial part of Singapore's rich fauna is significantly and symbiotically tied to these habitats. Native plant species are

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1, 3. The sculpted planters on the façade of the main building offer a vibrant and dynamic view to the visitor (Photo: Jordan Bates).
2. With its lush planting along the cliff contrasting with the dark textured architecture, the museum immediately catches one's attention (Photo: Jordan Bates).
4. View of the mangrove exhibits in the courtyard (Photo: Zi Tong Teo).
5. Exhibits from the dry land forest habitat form a backdrop to the investigative bio pond (Photo: Zi Tong Teo).
6. At the phylogenetic garden, modular hexagonal planters built in various sizes offer more flexibility to the researchers to change the exhibits (Photo: Jordan Bates).
7. Labeled tree species in the mangrove interactive exhibit, where one can learn more about this habitat (Photo: Jordan Bates).
8. View of the series of interactive exhibits of native species in the courtyard, transitioning from saltwater mangrove plants to freshwater plants and then to dry land forest plants (Photo: Jordan Bates).

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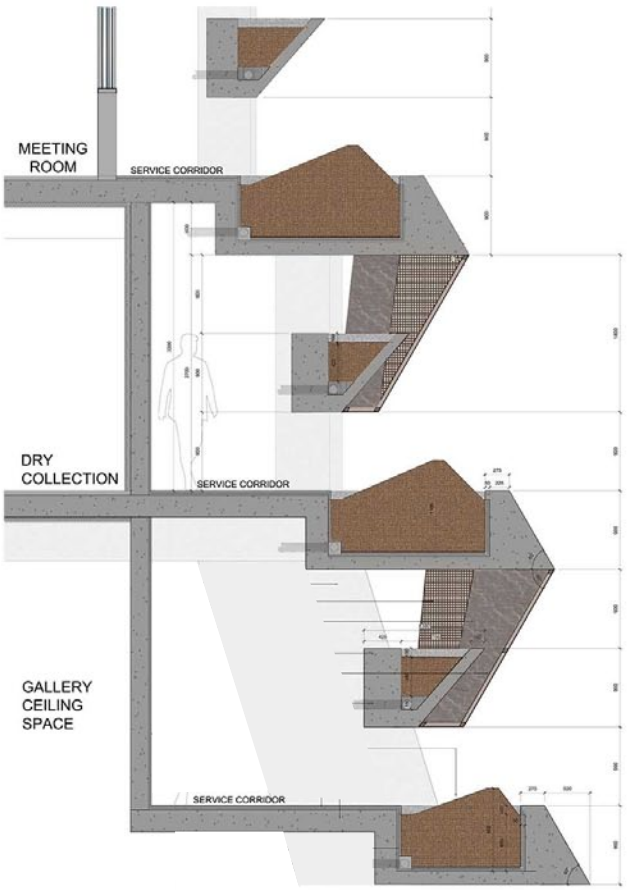
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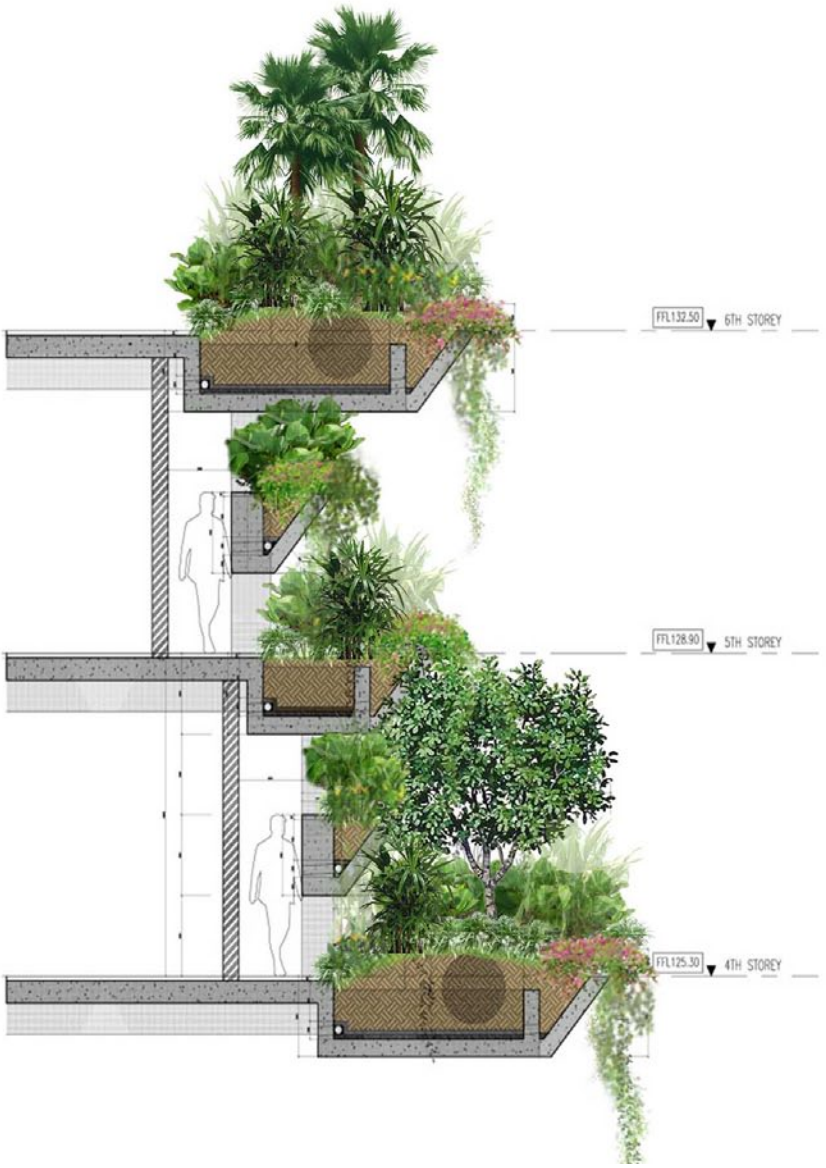
SERVICE CORRIDOR
DRY COLLECTION
SERVICE CORRIDOR
GALLERY CEILING SPACE
SERVICE CORRIDOR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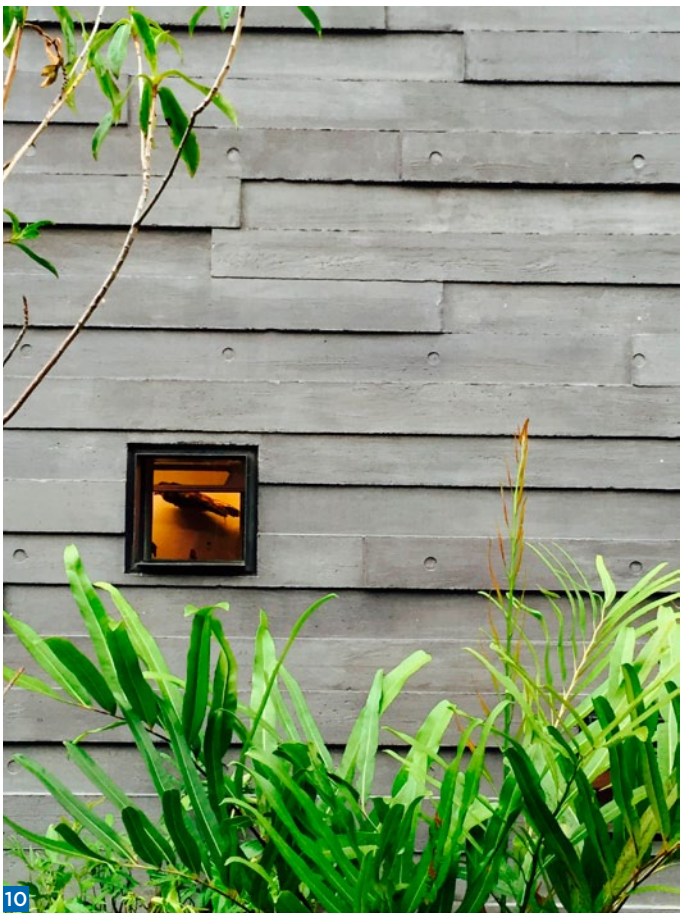
9 Cliff and green wall section show the cascading effect of the cliff contrasted against the textured architecture (Drawing: Tierra Design (S) Pte Ltd).



10, 11. The visual dialogue between the outdoor landscape architecture and the interior fauna exhibit (Photo: Poornima Bargotra).

important for the sustenance of animals both terrestrial and aerial, and creating awareness about the exhibited species in this area of the landscape will potentially help bring back declining fauna to the island. To encourage hands-on learning, children of all ages are allowed to get close to the exhibits in order to interact with the micro-ecosystems. Further, these outdoor-planted areas can be viewed through angled windows by visitors inside the museum while simultaneously observing the native animal specimens.

On the north side, the beach section seeks to demonstrate plant life and development on an equatorial rainforest island. Inspired by a coastal landscape, the species planted "evolve" from basic shrubs to larger and more tropical flora as they "recede" from the "shoreline". The plant species used are similar to the ones used in other habitats created on the project site, with the addition of native endangered species such as *Shorea leprosula*, *Intsia palembanica*, and *Pometia pinnata* and some commonly occurring species such as *Gardenia tubiflora* and *Alstonia angustifolia*.

1 Six-storey cliff
2 Interactive exhibit with mangrove and dry land forest plants
3 Beach section
4 Phylogenetic garden

12 Site plan showing the four key landscape features of the project (Image: Tierra Design (S) Pte Ltd).

On the east side, the phylogenetic garden showcases a number of distinct shrub species, exhibiting the evolutionary relationship between 10 types of plant family groups consisting of 70 plant species. Visitors can observe the exhibited plants to understand the development of important plant species as they have evolved over time. Plant species are exhibited in pots individually to allow for future changes as researchers continue to expand their knowledge from plant taxonomy studies. The modular approach ensured that the plant species can be updated and changed based on the research findings. This led to the design of the hexagonal planters of various sizes to allow for maximum flexibility.

The landscape architecture for the Lee Kong Chian Natural History Museum takes on the role of a life-size laboratory where the plantings are treated and displayed as if they were specimens on a petri dish—somewhat simulating the display inside the museum. While the four landscape features were created to familiarise the visitors with some of the nature-scapes of the island, opportunities for research and learning took precedence. Predominantly native plant species were used in the landscape design, chosen to represent their original habitats.

One of the key criteria of the design brief was "accuracy over aesthetics", which is the exact opposite of what landscape designers usually get in a design brief! The architects and landscape architects worked closely with academics in the field during the design process. The plant selection was done in collaboration with scholars and botanists from National University of Singapore and Raffles Museum of Biodiversity Research as well as experts researching the native biodiversity of Singapore. There was a constant dialogue and tension between choosing plants for their educational value or for how accurately they expressed a particular habitat over their visual appeal or alternative plants that are more familiar or available commercially.

This museum as a platform for native plant species is set to educate and spread awareness about the endangered plants and their effect on the biodiversity and ecological health of Singapore. As to the impact, effectiveness, and outcome of this endeavour, only time will tell. CG