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For immediate release

Khoo Teck Puat Hospital emerged first among 21 international participants to win the inaugural Stephen R. Kellert Biophilic Design Award

The hospital features innovative design and biophilic elements to facilitate recovery and improve well-being of patients

1. The first ever Stephen R. Kellert Biophilic Design Award organised by the International Living Future Institute (ILFI) has been awarded to Khoo Teck Puat Hospital (KTPH) on 8 November 2017.

2. Held at the Greenbuild Expo in Boston, USA, the award was presented to KTPH and CPG Consultants Pte Ltd, in recognition of the innovative and extensive use of biophilic design in KTPH to promote healing and well-being.

3. Biophilic design is an emerging field that promotes improved health and well-being by creating connections between people and nature in the built environment. Research has shown that the presence of greenery has a therapeutic effect on people and helps reduce depression severity and rumination in clinically depressed patients. Nature-inspired activities such as horticulture also bring about an increase in patients’ psychological well-being. Hence, exposing patients to greenery may be a promising intervention in improving mental health.1

4. KTPH’s win at a prestigious international platform is an example of the Government’s blueprint for sustainable development and complements Singapore’s current efforts to build resilience against climate change.

Creating a Hospital in a Garden, A Garden in a Hospital

5. Central to KTPH’s building design is the idea that ‘nature would nurture’. KTPH aims to build a legacy as a quality healthcare institution with lush greenery incorporated throughout the hospital, completed with eco-friendly designs to maximise energy efficiency.

6. While designing the hospital, KTPH worked with CPG Consultants Pte Ltd to bring together the elements of accessibility, comfort and convenience. Jerry Ong, Senior Vice President, CPG Consultants Pte Ltd said: “The focus from start to end was to design the hospital based on comprehensive understanding of how patients will use the spaces and deliver a

hassle-free experience for them. We put in place intuitive way-finding to logical clustering of clinics and ancillary services, just to name a few, for the patients’ convenience. All the designs are also user-friendly as patient safety is paramount.”

7. “Khoo Teck Puat Hospital surpasses traditional hospitals and opens the door towards a new kind of building type for the healthcare industry, which considers how the built and natural environment can become part of the healing process,” said Amanda Sturgeon FAIA, CEO of ILFI.

8. Mrs Chew Kwee Tiang, CEO, KTPH & Yishun Health shared her belief in creating a friendly and inclusive hospital: “When we designed KTPH, we aspired to create ‘a hospital in a garden and a garden in a hospital’. While the surrounding flora and fauna act as a healing oasis for our patients, they also serve as a shared space for the community at large. Moving forward, KTPH will do more to engage and encourage staff, patients and the community to practise and nurture strong values in environmental sustainability.”

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About Khoo Teck Puat Hospital

Khoo Teck Puat Hospital (KTPH), a 590-bed general and acute care hospital, opened in June 2010. Serving more than 800,000 people living in the northern sector of Singapore, KTPH combines medical expertise with high standards of personalised care, set within a healing environment, to provide care that is good enough for our own loved ones. From intuitive way-finding to logical clustering of services, KTPH's design is focused on providing a hassle-free experience for patients. The hospital has been designed with patients' comfort in mind. Since its opening, the building has garnered numerous awards for its green and energy efficient design. Patients can enjoy comfortable accommodation in different categories of wards with views of greenery and naturally cool air from improved ventilation. KTPH also provides a wide range of outpatient specialist services.

About CPG Consultants Pte Ltd

CPG Corporation (CPG Corp) is the corporatised entity of the former Singapore Public Works Department (PWD). With more than 2,000 talented individuals in the CPG group of companies, we are one of the leading development professionals in the Asia-Pacific region, providing a full spectrum of infrastructure & building development and management services.

Since 1833, we have contributed largely to the development and management of distinguished landmarks in Singapore. Some of our notable projects include the Singapore Changi Airport, Singapore Racecourse, National Gallery Singapore, Gardens by the Bay, Khoo Teck Puat Hospital, the National University of Singapore and Nanyang Technological University campuses, and the Tuas and Woodlands Checkpoints.

Leveraging our strong track record and established Singapore brand name, CPG Corp today has expanded its portfolio to over 25 countries outside Singapore, with China, India and ASEAN being our key markets.

CPG Corp’s portfolio today is the epitome of professionalism and expertise in world-class infrastructure and building management.
APPENDIX A – Khoo Teck Puat Hospital Fact Sheet

KHOO TECK PUAT HOSPITAL, SINGAPORE

PROJECT LOCATION
90 Yishun Central

NAME OF CLIENT
Khoo Teck Puat Hospital

COUNTRY
Singapore

YEAR OF COMPLETION
2010

SITE AREA
34,000 m²

GROSS FLOOR AREA
108,000 m²

PROJECT COST
S$ 500,000,000

AWARDS
- President’s Award for the Environment 2017
- Stephen R Kellert Biophilic Design Award 2017
- LIAS Awards 2015 (Best of Category) (Gold) – Maintenance – Non-Residential
- Cityscape Awards 2014 (Winner – Community & Culture) (Winner – Sustainability)
- WorldGBC – Asia Pacific Leadership in Green Buildings Awards 2014 (Finalist)
- ASEAN Energy Awards 2014 (1st Runner Up)
- PUB WEB Certification Awards 2014 (Gold)
- LEAF Awards 2013
- BCA Construction Excellence Awards 2012
- President's Design Award 2011 (Design of the Year)
- BCA Universal Design Awards 2011 (Gold)
- SIA Architectural Design Awards 2011 (Building of the Year) (Design)
- Design and Health International Academy Awards 2011 (High Commendation – International Health Project Over 40,000sqm) (High Commendation – International Sustainable Design)
- MIPIM Asia Awards 2011 (Silver)
- FuturArc Green Leadership Award 2011 (Winner)
- LIAS Awards of Excellence 2011 (Best of Category) (Gold Award & Best of Show) – Implementation Commercial
- SIA-NParks Skyrise Greenery Awards 2010 (First)
- The Emerson Cup 2010
- BCA Green Mark Awards 2009 (Platinum)
- Urban Planning, Architectural Design Competitions 2006 (1st Prize)
Providing beautiful garden spaces for patients' healing, KTPH brings out the best of its unique legacy – 'a hospital in a garden, a garden in a hospital'.

The opportunity created by the brief and the site next to Yishun Pond was to pursue a design in which nature would nurture – where patient recovery would be faster and general well-being enhanced. One would expect hospitals to look clinical – immaculate box, hygienically white inside and out. KTPH subverts the stereotype while bolstering its therapeutic goals.

KTPH consists of a 4-storey podium, a 6-storey tower for Specialist Outpatient Clinics (SOC), an 8-storey Private Ward Tower (PWT) and a 10-storey Subsidised Ward Tower (SWT). The hospital's distinctive modern aesthetic, featuring different façade designs for the 3 blocks sets it apart from the other government hospitals built in Singapore in the 90s in terms of spatial experience and openness. The hospital appears natural and almost resort-like with a crisply turned-out mien. Aluminium fins, trellises, screens and light shelves enclose and screen exterior walls where daylight, natural ventilation and landscape are brought into its precincts through courtyards, roof gardens and glazed walls.

The hospital in a garden, a garden in a hospital concept has influenced every aspect of the hospital planning. The facilities at KTPH were designed to overlook a central garden courtyard at Basement level 1 and at ground level. The courtyard, the 'heart' of the hospital serves as a way-finding device and brings light and greenery into the basement. The massing of the hospital opens out towards the adjacent Yishun Pond, drawing nature into the hospital.

The interior design is warm and homely, using natural materials to create a relaxed and comfortable feel for patients and visitors. Artistic displays with a nature theme are used to conjure joyful and peaceful feelings.
Constraints and Solutions Achieved

KTPH is a 590-bed replacement hospital for Alexandra Hospital. Alexandra Hospital, an existing 4-storey, 397-bed hospital sits within a site of 13.07ha. In comparison, the site for KTPH is only 3.5ha. Hence the challenge for the new hospital would be to recreate the charm and naturalistic ambience of the existing hospital within a new structure that will enhance staff efficiency so that the aim of providing patient centric care could be achieved.

In response, KTPH was designed to be a high density development. The 8-storey Private Ward Tower and the 10-storey Subsidised Ward Tower sits on a 4-storey podium. Together with a 6-storey tower for the Specialist Outpatient Clinics, the massing of the hospital 'wraps' around a central garden courtyard and opens out to the adjacent Yishun Pond. This capitalises on the views offered and draws nature from the pond into the heart of the hospital.

To make up for the lack of space, every available roof was designed as rooftop gardens. Even the canopy over the main entrance and the roof of the outdoor toilet blocks were landscaped. Planter boxes were also incorporated along the natural ventilated corridors and even outside the 10-storey subsidised wards to bring a garden right outside the window. The result is an extraordinarily green hospital that had been described as a Medical Shangri-La.
A Green Hospital for the Next Generation

Sustainable design has also been an important consideration of the project, where the buildings are carefully organised to minimise solar heat gain, and orientated to maximise cross-ventilation from the prevailing winds. KTPH is designed to be more energy efficient than all the existing hospitals in Singapore.

High performance façade system

In response to the tropical climate, natural ventilation is optimised in the subsidised wards as the key to patient comfort. Common areas and subsidised wards are critically designed for optimal natural ventilation which reduces the requirement for mechanical ventilation and hence reducing energy consumption.

By orientating the subsidised ward tower to ‘capture’ the prevailing North and South East winds, an optimal wind speed of at least 0.6m/s is achieved through natural ventilation which would provide adequate thermal comfort for the patients. This would in turn reduce the requirement for turning on aiding mechanical ventilation by up to 60%, saving energy consumption.

The façade has been critically designed for optimum occupant comfort and minimal heat penetration into the interior to minimise cooling requirements.
Operable, modular jalousies are used to facilitate controlled/enhanced air flow contingent on external climatic factors into the wards. Grey tinted glass is used to reduce glare and these jalousies are angled at 15° for the best airflow and least rain penetration. Fixed louvers called ‘monsoon louvers’ are integrated in the façade at the patient bed height to provide minimum air exchange even during heavy rains.

Aluminium fins along the building's walls called ‘wing walls’ are designed to channel the prevailing winds into the building by increasing the wind pressure build up on the façade. Wind tunnel tests conducted at the National University of Singapore found that these fins would enhance the air flow by 20 to 30%.

Sunshades over the windows protect patients from the direct glare of sunlight and also act as light shelves that re-direct the light towards the ceiling to enhance the brightness of the wards and save on the use of energy.
Renewable energy

KTPH’s commitment to clean and green energy is also evident in the provision of the large photovoltaic system to supplement the grid energy with clean energy sources. It is also a way for KTPH to educate the public on environment sustainability. A total area of 1,276m² of roof area has been utilised for the installation of the PV system. The system is expected to generate 150,000kWh.

This system is provided under Economic Development Board (EDB) Singapore Solar Capability Scheme (SCS) for the use of Renewable Energy through Photovoltaic Technology under the Clean Energy Research & Testbedding Programme (CERT).

The hospital utilises solar vacuum tubes for the generation of hot water to cater for the hot water usage requirements of the hospital. The solar thermal system together with the solar heat pumps produces all the hot water needs of the hospital of approximately 21,000 litres of hot water per day. This results in savings of approximately 781 kWh/day of electricity, with the avoidance of the cost and space for the installation of boilers.

Green Mark Platinum Rating – In 2009, KTPH was awarded a Green Mark Platinum rating, the highest level of certification granted by BCA’s Green Mark, Singapore's sustainable building benchmark. The energy-efficient design aims to reduce energy costs by 30% as well as provides 35% of the gross floor area with natural ventilation. The facade has achieved an External Thermal Transfer Value (ETTV) of 38.2 W/ m². By local standards, this is almost 24% less heat gain through facades.