



INSTITUTIONAL

SPECTRA SECONDARY SCHOOL

ECAS was the C&S consultant for a specialised school in Woodlands and was leading a team of appointed consultants. The result was a fully operational 20,000m2 specialised school with indoor sports hall, outdoor soccer pitch, technical rooms, and mechanical and electrical laboratories. Precast beams and hollow core slabs were used at the classroom and workshop blocks. For the multi-purpose hall, composite structure using steel beams and in-situ concrete slabs were adopted for the 27-meter span of the floor.

The school design was the recipient of the BCA Green Mark Platinum Award 2013 and the BCA Construction Excellence Award (Gold) 2015.

CLIENT: Ministry of Education

PROJECT VALUE: S\$35M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2013

AWARDS: BCA Construction Excellence Award 2015,
BCA Green Mark 2013



ST. STEPHEN'S SCHOOL



Additions and alterations to the existing part-4 storey with basement and part-3 storey St Stephen's Primary School development involving the addition of a new 2-storey block with basement.

The foundation adopted for the project is cast-in-situ bored pile and reinforced concrete (RC) micropile. Basement storey is conventional reinforced concrete (RC) ground beam/slab system. Upper basement, 1st storey and 2nd storey consist of both conventional reinforced concrete (RC) beam/slab system and PT slabs & PT beams system. 3rd storey is conventional reinforced concrete (RC) ground beam/slab system with metal roof over classroom.

CLIENT: Ministry of Education

PROJECT VALUE: S\$8.4M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2015

WEST COAST COMMUNITY CENTRE



The project consists of the erection of a new 3-storey community centre and the addition and alteration to the existing 3-storey community centre. The project also includes the Pedestrian Link Bridge connecting West Coast Community Centre and West Coast Plaza.

The structural system adopted is the conventional RC beam and slab system, and flat slab was adopted for the 1st storey. Post tensioned slab and beams are used at the 3rd storey and roof level. Bored and Micro piling was adopted for the foundation system.

CLIENT: People's Association

PROJECT VALUE: S\$10.6M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2016

GEYLANG METHODIST (PRIMARY) SCHOOL



The upgrading of the Geylang Methodist Primary School includes a 4-storey learning block with outdoor learning area, an indoor sports hall, and enhanced rooms for special activity groups.

The structural system adopted for A&A to Administration Block extension include new post-tensioned (PT) slab and beam to replace the existing RC roof. A new metal roof with steel post was erected above this floor.

The structural system adopted for the new indoor sports hall include RC beam/slab system at first storey, post-tensioned (PT) beam and slab at third storey and a metal roof. The columns are tied with perimeter beams at second, fourth and roof levels though there are no physical floors at those levels.

CLIENT: Ministry of Education

PROJECT VALUE: S\$23.9M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2015



INSTITUTIONAL

NANYANG PRIMARY SCHOOL

Indoor sports hall (ISH) is post-tensioned (PT) flat slab with perimeter RC beam and localized conventional reinforced concrete (RC) beam/slab system. Roof is a metal roof with structural steel beam. The semi basement carpark is supported on conventional suspended RC beam/slab.

Kindergarten/administrative block consists of conventional RC beam/slab at 1st and 2nd storey; flat slab with RC perimeter beam from 3rd to 5th storey. 6th storey is a RC roof with conventional beam/slab system. There is an upper roof over the PAL room which consists of a metal roof.

The new blocks are tied laterally with the beams and slabs and RC staircase shear wall and core as well as lift cores of minimum 200mm thk for shear wall and 250mm thk for core wall. There are 4 link bridges to link between the new blocks as well as the existing buildings.

CLIENT: Ministry of Education

PROJECT VALUE: S\$29M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2014

AWARDS: BCA Construction Excellence Award 2017,
SIA Architectural Design Award 2016,
BCA Construction Productivity Award 2016



NURSING HOME AT MARGARET DRIVE



ECAS was appointed C&S consultant in a multidisciplinary services (architectural, civil, and structural engineering and mechanical and electrical engineering) project for the erection of a 290-bed facility with care centre for 100 seniors at Margaret Drive.

The structure system is reinforced concrete beam, precast column, precast prestress slab and cast in-situ slab frame system with RC and metal roof. The foundation adopted is cast-in bored piles and RC piles.

CLIENT: Ministry of Health

PROJECT VALUE: S\$28M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2017

ANGLO-CHINESE SCHOOL (INDEPENDENT)



The project was composed of a new 5-storey building for the International Baccalaureate campus and additions and alterations to existing school.

Structural elements that enabled fast construction such as precast beams, hollow core slabs and flat plates were used. The 3000 seat Auditorium and a 1500 seat Centre for Performing Arts was designed with long span structures in the form of steel trusses. Moreover, post-tensioned beams were used.

CLIENT: Anglo Chinese School

PROJECT VALUE: S\$50M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2007

PUNGGOL COVE PRIMARY SCHOOL



The contract consisted of the erection of Punggol Cove Primary School comprising of one 6-storey and two 7-storey classroom blocks and one-part 2/3-storey administrative building with indoor sport hall (multipurpose hall).

The structural system adopted for the project include cast-in-situ reinforced concrete beam and slab, cast-in-situ reinforced concrete column and PT beam. The floor for the indoor sports hall secondary building is hollow core slab supported by PT Beam and that for main building is hollow core slab with cast in situ beam. Steel roof truss/beam and metal roofing systems are adopted for the roof structure of ISH. Bored pile was adopted for the foundation.

CLIENT: Ministry of Education

PROJECT VALUE: S\$37.5M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2015

AWARD: BCA Construction Excellence Award 2017



INSTITUTIONAL

SPORTS HALL FOR NANYANG TECHNOLOGICAL UNIVERSITY – THE WAVE

The sports hall for the Nanyang Technological University was designed with sustainable features to reduce energy consumption. It was a 3-storey, 10,000m² facility that can seat up to 1,000 spectators or retract the seating to fit 13 full-sized badminton courts. The building uses environment friendly materials that increase its energy efficiency and water efficiency.

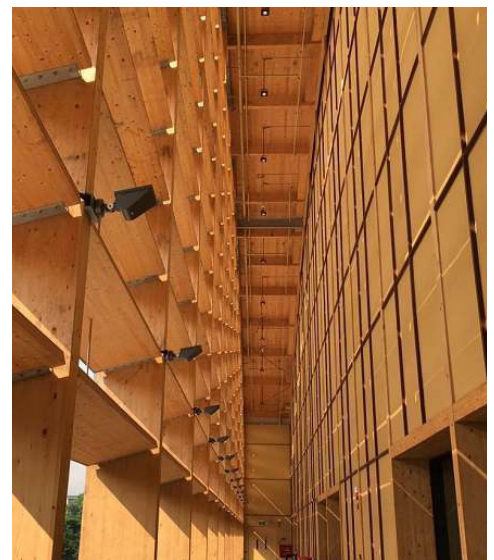
This project is the first large-scale building in Singapore to make use of engineered wood systems including prefabricated cross-laminated timber (CLT). ECAS provided professional engineering services for CLT and other miscellaneous works. The use of these materials provides greater heat insulation than concrete, thus reducing energy consumption.

CLIENT: B19 Technologies Pte Ltd

PROJECT VALUE: S\$35M

ECAS' ROLE: Design Review

COMPLETION DATE: 2016



PUNGGOL COVE PRIMARY SCHOOL



The contract consisted of the erection of Punggol Cove Primary School comprising of one 6-storey and two 7-storey classroom blocks and one-part 2/3-storey administrative building with indoor sport hall (multipurpose hall).

The structural system adopted for the project include cast-in-situ reinforced concrete beam and slab, cast-in-situ reinforced concrete column and PT beam. The floor for the indoor sports hall secondary building is hollow core slab supported by PT Beam and that for main building is hollow core slab with cast in situ beam. Steel roof truss/beam and metal roofing systems are adopted for the roof structure of ISH.

CLIENT: Ministry of Education

PROJECT VALUE: S\$37.5M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2015

AWARD: BCA Construction Excellence Award 2017

QIFA PRIMARY SCHOOL



This project involves additions and alterations to the Qifa Primary School with the provision of 4-storey Indoor Sport Hall.

The structural system adopted is the conventional RC beam and slab system. Post Tensioned Beam and slab is also adopted for the ISH block to cater for the long span. Bored piles were used for the foundation.

The upgrading of the Qifa Primary School was part of a combined contract including East Spring Primary School and Yishun Primary School.

CLIENT: Ministry of Education

PROJECT VALUE: S\$26M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2014

KUO CHUAN PRESBYTERIAN PRIMARY SCHOOL



The project comprises of 2-storey indoor sports hall (ISH) primary and secondary buildings, a 2-storey Chapel building and a 5-storey Main building.

The structural system of the project includes cast-in-situ reinforced concrete beam and slab, cast-in-situ reinforced concrete column, hollow core slab system and PT beams. The floor for the ISH Secondary building consists of hollow core slab supported by PT Beam and the floor for the main building is hollow core slab with cast in situ beam. Steel roof truss/beam and metal roofing systems are proposed for the roof structure of ISH Primary, ISH Secondary and Main building. Cast in situ reinforced concrete roof slab system is proposed for Chapel Building. Bored Pile and Micro Pile was adopted for the foundation.

CLIENT: Ministry of Education

PROJECT VALUE: S\$28M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2014



INSTITUTIONAL

PUNGGOL COVE PRIMARY SCHOOL

The contract consisted of the erection of Punggol Cove Primary School comprising of one 6-storey and two 7-storey classroom blocks and one-part 2/3-storey administrative building with indoor sport hall (multipurpose hall).

The structural system adopted for the project include cast-in-situ reinforced concrete beam and slab, cast-in-situ reinforced concrete column and PT beam. The floor for the indoor sports hall secondary building is hollow core slab supported by PT Beam and that for main building is hollow core slab with cast in situ beam. Steel roof truss/beam and metal roofing systems are adopted for the roof structure of ISH. Bored pile was adopted for the foundation.

CLIENT: Ministry of Education

PROJECT VALUE: S\$37.5M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2015

AWARD: BCA Construction Excellence Award 2017



NANYANG PRIMARY SCHOOL



Indoor sports hall (ISH) is post-tensioned (PT) flat slab with perimeter RC beam and localized conventional reinforced concrete (RC) beam/slab system. Roof is a metal roof with structural steel beam. The semi basement carpark is supported on conventional suspended RC beam/slab. Kindergarten/administrative block consists of conventional RC beam/slab at 1st and 2nd storey; flat slab with RC perimeter beam from 3rd to 5th storey. 6th storey is a RC roof with conventional beam/slab system. There is an upper roof over the PAL room which consists of a metal roof.

CLIENT: Ministry of Education

PROJECT VALUE: S\$29M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2014

AWARDS: BCA Construction Excellence Award 2017, SIA Architectural Design Award 2016, BCA Construction Productivity Award 2016

AHMAD IBRAHIM SECONDARY SCHOOL



The proposed development is located at existing Ahmad Ibrahim secondary school. The development consists of the erection of 2-storey indoor sport hall (ISH). The structural system adopted for the project include Mass Engineered Timber (MET) system for Roof and 2nd storey ISH. The floor comprises cross laminated timber (CLT) panel supported by Glulam beams and PT beam with screw connections. The roof was designed with Glulam beam and glulam purlins supported by RC columns. The upgrading of the Ahmad Ibrahim secondary school was part of a combined contract including Pei Hwa secondary school

CLIENT: Ministry of Education

PROJECT VALUE: S\$8.2M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2018

GEYLANG METHODIST (PRIMARY) SCHOOL



The upgrading of the Geylang Methodist Primary School includes a 4-storey learning block with outdoor learning area, an indoor sports hall, and enhanced rooms for special activity groups.

The structural system adopted for A&A to Administration Block extension include new post-tensioned (PT) slab and beam to replace the existing RC roof. A new metal roof with steel post was erected above this floor. The structural system adopted for the new indoor sports hall include RC beam/slab system at first storey, post-tensioned (PT) beam and slab at third storey and a metal roof. The columns are tied with perimeter beams at second, fourth and roof levels though there are no physical floors at those levels.

CLIENT: Ministry of Education

PROJECT VALUE: S\$23.9M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2015



INSTITUTIONAL

NURSING HOME AT MARGARET DRIVE

ECAS was appointed C&S consultant in a multidisciplinary services (architectural, civil, and structural engineering and mechanical and electrical engineering) project for the erection of a 290-bed facility with care centre for 100 seniors at Margaret Drive.

The structure system is reinforced concrete beam, precast column, precast prestress slab and cast in-situ slab frame system with RC and metal roof. The foundation adopted is cast-in bored piles and RC piles.

CLIENT: Ministry of Health

PROJECT VALUE: S\$28M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2017



SPORTS HALL FOR NTU – THE WAVE



The sports hall for the Nanyang Technological University was designed with sustainable features to reduce energy consumption. It was a 3-storey, 10,000m² facility that can seat up to 1,000 spectators or retract the seating to fit 13 full-sized badminton courts. The building uses environment friendly materials that increase its energy efficiency and water efficiency.

This project is the first large-scale building in Singapore to make use of engineered wood systems including prefabricated cross-laminated timber (CLT). ECAS provided professional engineering services for CLT and other miscellaneous works. The use of these materials provides greater heat insulation than concrete, thus reducing energy consumption.

CLIENT: B19 Technologies Pte Ltd

PROJECT VALUE: S\$35M

ECAS' ROLE: Design Review

COMPLETION DATE: 2016

MARYMOUNT CONVENT SCHOOL



A&A involving erection of 4-storey classroom block, 5-storey classroom block and 3-storey indoor sports hall block to the existing school.

The foundation system consists of Micro-piles and Bored piles. The structural system for indoor sports hall and teaching blocks are generally hollow core slab supported on post-tensioned (PT) beams with localized reinforced concrete (RC) system and structural steel roof. Retaining wall system addresses the terrain difference along one face of the development. Bus shelter consists of structural steel roof with steel rafters and columns.

CLIENT: Ministry of Education

PROJECT VALUE: S\$18.5M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2017

CHIJ (KELLOCK)



A&A to existing CHIJ (Kellock) Primary School including erection of 6-storey building with classroom, dance studio, and indoor sports hall (ISH).

The upgrading works consist of the construction of a new 6-storey Indoor Sport Hall (ISH) and addition of new linkway to the side gate. The foundation adopted for the project is cast-in-situ bored pile, there are 800mm, 900mm, 1000mm and 1100mm diameter bore piles. 1m column stump above ground adopted to match the existing classroom block platform level. 2nd storey to 4th storey consist of both conventional reinforced concrete (RC) beam/slab system and PT beam/Hollow core slab system. 5th storey consists of both conventional reinforced concrete (RC) beam/slab system and composite steel beam/bondeck slab system. 6th storey is conventional reinforced concrete (RC) beam/slab system with steel truss over indoor sport hall (ISH).

CLIENT: Ministry of Education

PROJECT VALUE: S\$9.7M

ECAS' ROLE: Consulting Services

COMPLETION DATE: 2018