

# Managing Resources and Environmental Impact

- Fostering Sustainable Building Design
- Creating a Green Workplace



## UNSDGs

- We have green housekeeping guidelines in place to promote green office practices
- We have established a robust IMS encompasses aspects of environmental protection, occupational health and safety, and quality management to benchmark our environmental performance and ensure it remains at international standards
- We regularly conduct carbon audits to quantify our carbon footprint



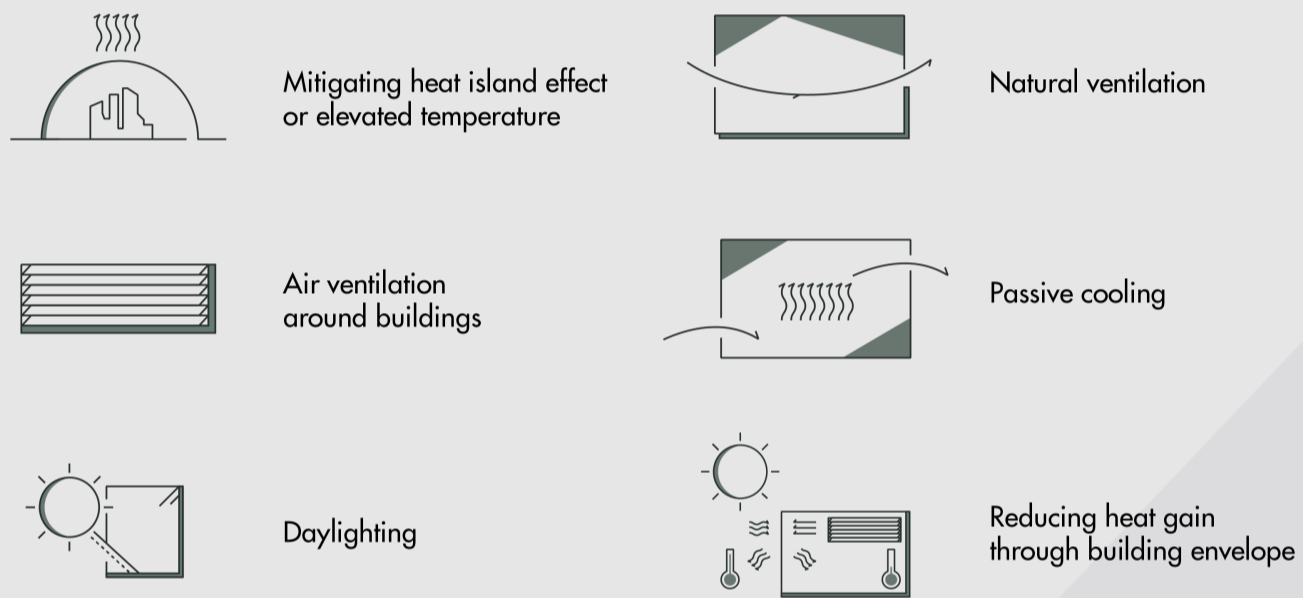
# Fostering Sustainable Building Design

## Sustainable Building Design

Hong Kong buildings account for the majority of city-wide electricity consumption and carbon emissions – over 90% and 60% respectively. Over the years, we have spared no effort to adopt innovative sustainable and smart building designs which efficiently use energy, materials and land resources.

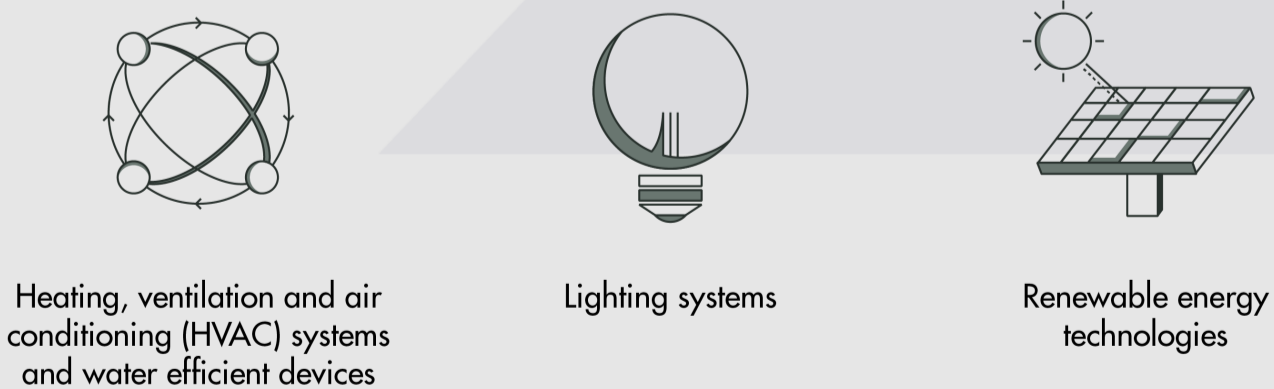
## Passive Design Approaches

Passive design approaches use the architecture of a building to minimise energy consumption and improve thermal comfort. These approaches adopt suitable planning, disposition, orientation, building form and material selection measures to optimise a building’s interaction with the local microclimate. The aspects considered include:



## Active Design Approaches

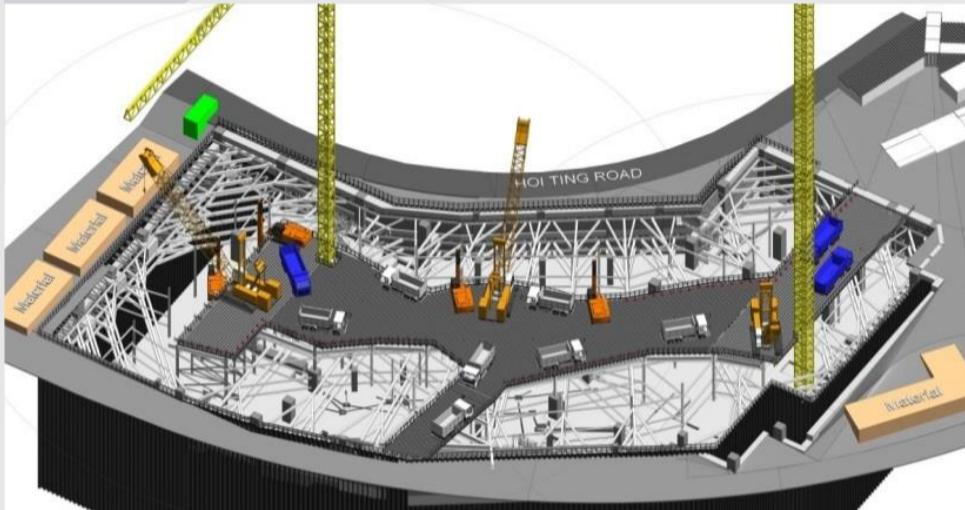
Active design approaches use electrical and mechanical systems to create and maintain comfortable conditions. These installations facilitate energy efficiency and the conservation of water, and improve indoor environmental quality. The aspects considered include:



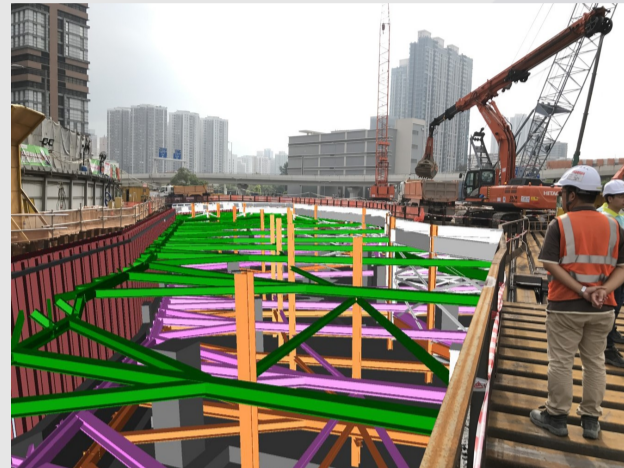
# Innovative Construction Methods

## Building Information Modelling

Building Information Modelling, or BIM, technology is essentially the process of generating a digital visual representation of building data. BIM can effectively improve overall building quality through design optimisation, communication enhancement and waste minimisation. For example, BIM allows the visualisation of designs that enhance the planning process; they can also simulate the entire construction process to facilitate more efficient coordination between stakeholders. The technology has contributed to a significant reduction in aborted works caused by unworkable designs and safety pitfalls.



Visualising designs to enhance planning



Simulating the whole construction process to facilitate coordination

During the reporting year, ArchSD used BIM on several projects. One of these projects was the construction of West Kowloon Government Offices, for which BIM was used to enhance project efficiency.

## Design for Manufacture and Assembly and Modular Integrated Construction

Modular Integrated Construction (MiC) is a catch-all term for an important concept: factory assembly followed by on-site installation. MiC is one example of Design for Manufacture and Assembly (DfMA), which refers to a construction method that uses free-standing volumetric modules with completed finishes, fixtures and fittings. This construction method transfers traditional on-site construction processes to an off-site prefabrication factory; something which can substantially improve construction productivity by minimising site constraints and ensuring a higher degree of quality control. During the year, ArchSD commenced the first pilot public building project to adopt MiC in Hong Kong - The Construction of Disciplined Services Quarters for the Fire Services Department at Pak Shing Kok in Tseung Kwan O.



The construction site of the Disciplined Services Quarters for the Fire Services Department at Pak Shing Kok in Tseung Kwan O



The ground-breaking ceremony for the first MiC public project ever conducted in Hong Kong was held on 24 September 2018. The Director of Architectural Services, Mrs Sylvia LAM, JP, is on the second right

# Selection of Construction Methods and Materials

Another important aspect of sustainable buildings is the selection and use of sustainable construction methods and materials. Common practices include prefabrication, pollution control during construction, and the application of the 3R principles – reduce, reuse and recycle – to manage construction and demolition waste. In terms of using sustainable materials, recycled materials and timber from well-managed sources are widely adopted in ArchSD's new building projects.

## Social Considerations

As a cosmopolitan city, Hong Kong places a high value on the accessibility and quality of public spaces. ArchSD strives to incorporate social considerations into our buildings in a number of ways, including enabling group activities and fostering communication between community members in order to create and sustain a harmonious atmosphere for the city.

## Sustainable Building Projects

### The Expansion and Renovation of the Hong Kong Museum of Art

The existing Hong Kong Museum of Art (HKMA) has been serving the public since 1991. To address a long-standing problem of a shortage of art exhibition space and to enhance the overall visitor experience, an expansion and renovation project is being carried out to upgrade the museum's facilities. The existing building volume is being preserved and redecorated to emphasise its symbolic value as a public museum belonging to all inhabitants of the city. Meanwhile, new cladding provides tangible texture that is reminiscent of a Chinese masonry pattern, while the façade's 'ripple effect' echoes the wave patterns of the waters of the adjacent Victoria Harbour.



**MORE DETAILS** ▾



# Sustainable Building Projects

## The Expansion and Renovation of the Hong Kong Museum of Art



New building canopy



Use of a ventilated façade to improve ventilation, durability, noise insulation and energy saving performance



Maximising the use of natural daylight



New view of the building as seen from the south side of Victoria Harbour

### Sustainable Features

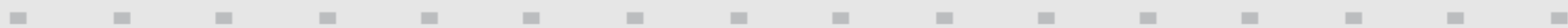
- ▶ Adoption of a passive environmental design strategy to lower the building's energy consumption
- ▶ Use of a ventilated façade to improve ventilation, durability, noise insulation and energy saving performance
- ▶ Selection of recyclable materials for the ventilated façade to lower carbon emissions and reduce energy consumption
- ▶ Substantial reduction in the amount of project construction and demolition waste achieved by keeping the majority of the existing museum wall tiles intact
- ▶ Provision of low-e glass and laminated mesh to filter direct sunlight and ultraviolet (UV) rays
- ▶ Installation of high efficiency air-cooled chillers with variable speed drives
- ▶ Installation of demand controls for fresh air supply, which are aided by carbon dioxide sensors

# Renovation Project for the Policy Innovation and Co-ordination Office on the 26/F of the Central Government Offices at Tamar

The Policy Innovation and Co-ordination Office (PICO) commenced operation in 2018. The aim of PICO is to enhance policy innovation through collaboration on evidence-based policy research, support the senior leadership in the Government to focus on Hong Kong's strategic positioning in the global economic arena, co-ordinate major policies and programmes across bureaux and departments, and provide 'first-stop and one-stop' project consultation and co-ordination services to innovative projects to help maximise benefits to society. To improve the office design and enhance operational efficiency, a comprehensive renovation project was completed at PICO, located on the 26/F of the Central Government Offices at Tamar. The project included renovating the reception area, co-working area and open plan office.



**MORE DETAILS** ▾



# Sustainable Building Projects

## Renovation Project for the Policy Innovation Co-ordination Office on the 26/F of the Central Government Offices at Tamar



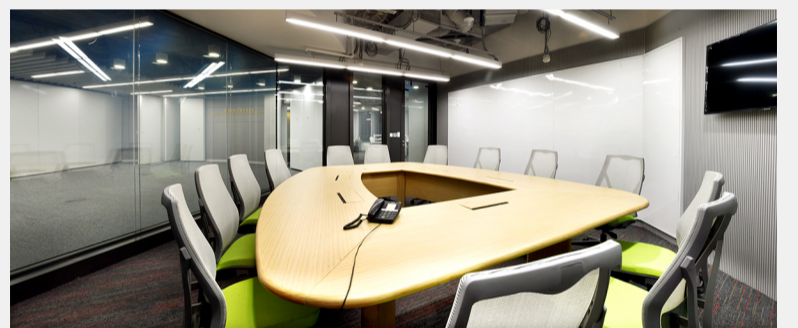
Open plan office design with pendant lighting and a glass partitions to improve natural lighting penetration into the space



Use of energy efficient LED lighting in the reception area is improved by motion sensors



LED down light and lighting panel in the co-working area creates a more modern office design



Conference Room

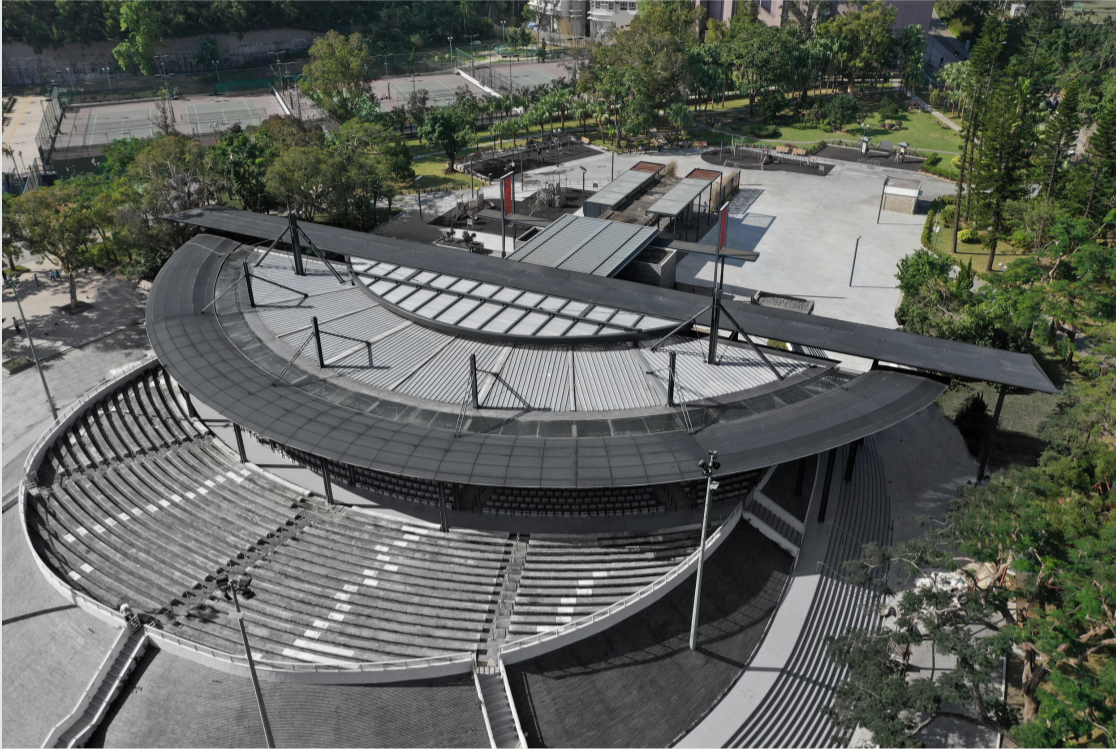


### Sustainable Features

- ▶ Open office design with glass partitions to improve the penetration of natural light into the space
- ▶ Use of pendant lighting to create a more modern office design
- ▶ Use of energy efficient LED lighting, aided by motion sensors, lighting sensors and a lighting control system
- ▶ Fixed partitions are minimised for the spatial flexibility

# Signature Project for Wong Tai Sin District – The Enhancement of the Leisure Facilities at Morse Park

Covering a total area of 15.8 hectares, Morse Park in Wong Tai Sin includes the Morse Park Sports Centre and Morse Park Swimming Pool. Serving the community since 1967, the park facilities have been continuously improved and upgraded over the years, with new facilities added to maintain an excellent standard of service and meet the emerging needs of the public. This project, conducted during the reporting year, is typical of these upgrades – enhancing the park’s amphitheatre, including extending the cover at the stage and spectator areas, enlarging the stage area and rearranging the spectator area, to accommodate events of today allowing sustainable development of the amphitheatre as well as the park and the district.



**MORE DETAILS** ▼



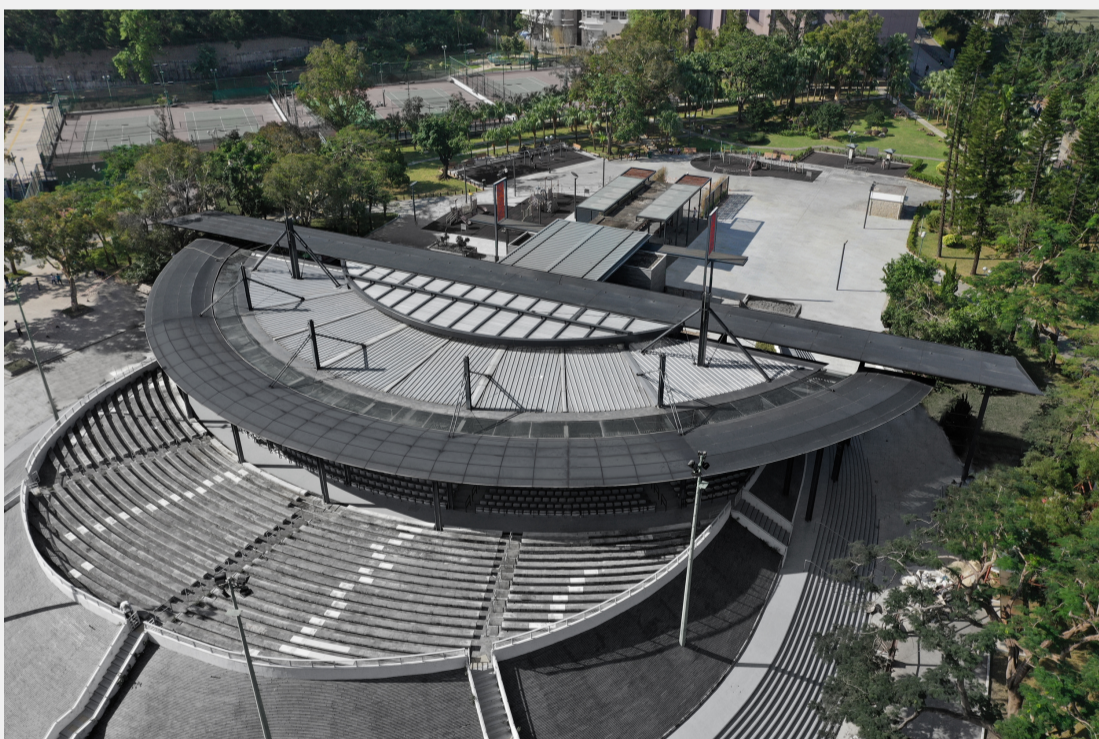


# Sustainable Building Projects

## Signature Project for Wong Tai Sin District – The Enhancement of the Leisure Facilities at Morse Park



Open sides of the amphitheatre



Enhancement project

### Sustainable Features

- ▶ Extending the shelters over the amphitheatre and incorporating trellis and vertical greening for sun shading
- ▶ Open sides of the amphitheatre is maintained to let in natural lighting and ventilation
- ▶ Skylight is introduced to enhance the effect of natural daylight
- ▶ Use of LED lighting to reduce carbon emissions and save energy



Extension of the shelter



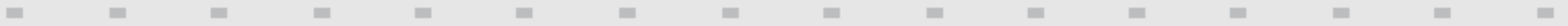
Skylight to enhance natural daylight

# The Church of Christ in China Mongkok Church Kai Oi School

Under the Government's policy to improve the physical conditions of sub-standard school premises, ArchSD has carried out the construction of the new special school for children for the re-provisioning of The Church of Christ in China Mongkok Church Kai Oi School at a site near Hoi Lai Estate, Sham Shui Po. Located on an around 4,400 meter-square site, the newly built 4-storey building is equipped with multi-purpose facilities and designed to adopt extensive friendly and inclusive features for the special-needed students. For example, low-rise approach is adopted to ensure staff can maintain sight inspection of all students and easily accessible pocket spaces are available at different levels as calm-down spaces for students with special emotional needs.



**MORE DETAILS** ▼



# Sustainable Building Projects

## The Church of Christ in China Mongkok Church Kai Oi School



Building set back from the main street to create a green and calm campus



Low-rise approach with central courtyard to ensure imminent visual connections of staff and students



Oasis-like setting in a urban context



View of the school farm

### Sustainable Features

- ▶ Adoption of green roofs, green terraces and vertical greening on its building façade to maximise the green landscape coverage of the school
- ▶ Use of 3 sky lights to make use of natural daylight and save energy
- ▶ Use of photovoltaic system and rainwater harvesting system for landscape irrigation to conserve energy and water resources

# The Construction of a New Refuse Collection Point at Site 1J4 at the Kai Tak Development

The objective of this project is to design and construct a refuse collection point (RCP) for the Kai Tak Development in Kowloon, located on the eastern corner of an existing pumping station. The site was bound by Kai Tak Second Lane to the northeast and Shing Kai Road to the southeast. The project provides basic facilities like a refuse collection vehicle parking and loading area, a material recovery store, an office, staff toilets and changing rooms to accommodate the daily operations of a typical RCP.



**MORE DETAILS** ▾



# Sustainable Building Projects

## The Construction of a New Refuse Collection Point at Site 1J4 at the Kai Tak Development



Aluminium fins with cut-out graphics representing the Kai Tak area



Aerial view of the new RCP



The full-height glass wall brings in natural light



The site's different functions are separated by greenery and courtyard

### Sustainable Features

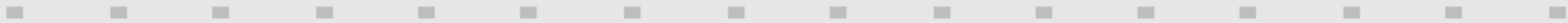
- ▶ Adoption of a 'dry construction' method minimised the duration of site works and lowered the amount of manpower necessary, resulting in better overall site management
- ▶ Use of BIM to integrate precast elements into the project, like external block walls, sandwich panels and aluminium fins, to achieve a lean construction process
- ▶ Inclusion of a full-height glass wall to bring natural light into the Refuse Collection Vehicle (RCV) parking and loading area, resulting in lower energy consumption

# Redevelopment of Kwai Chung Hospital – Phase 1

Phase 1 of the redevelopment of Kwai Chung Hospital (KCH) comprises the construction of a decantation building and renovation works at existing premises of KCH for decanting purposes, so as to facilitate the next phases of the hospital redevelopment. The decantation building is a 5-storey building located at the existing car park area of Princess Margaret Hospital, accommodates facilities decanted from the existing KCH including rehabilitation facilities, ambulatory care facilities, administrative & supporting services, and other ancillary facilities.



**MORE DETAILS** ▼



# Sustainable Building Projects

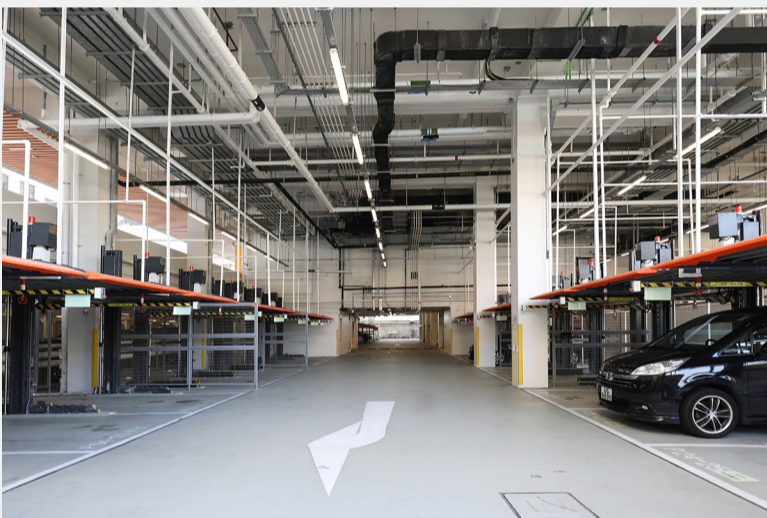
## Redevelopment of Kwai Chung Hospital – Phase 1



Modern design of the decantation building of Redevelopment of Kwai Chung Hospital – Phase 1



Enhanced penetration of natural sunlight with the central courtyard design



Adoption of double-deck car parking units (DDPU) to better utilise space



A specially designed garden at 3/F for horticultural activities and greening purposes

### Sustainable Features

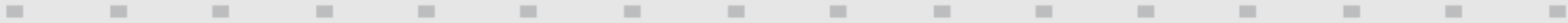
- ▶ Enhancement of natural daylight penetration into the building by the introduction of a central courtyard for 1/F to 3/F
- ▶ Design of a horticultural garden at 3/F for both horticultural activities by patients and greening purposes
- ▶ Retention of existing car park structure and adoption of 44 sets of double-deck car parking units (DDPU) to minimise demolition work on site and enhance efficient use of car parking spaces respectively

# Construction of Staff Quarters for Immigration Department at Heng Lam Street, Kowloon

In order to satisfy the growing demand of departmental quarters for married rank and file staff from the Immigrant Department, ArchSD commenced this project to construct a 15-storey quarters block for provision of a total of 112 units. With a total construction floor area of 8,800 meter square, the project comprises ancillary facilities including a management office, a multi-function room, small-scale outdoor children playing fixtures and facilities, 15 car parking spaces and two motorcycle parking spaces.



**MORE DETAILS** ▾





# Sustainable Building Projects

## Construction of Staff Quarters for Immigration Department at Heng Lam Street, Kowloon



Blend of comfortable contemporary living and the architectural design

Preservation and enhancement of greenery to create pleasant outdoor environment to residents



Utilisation of natural sunlight and facilitation of cross ventilation



Installation of photovoltaic system to adopt renewable energy

### Sustainable Features

- ▶ Adoption of the best possible orientation and view for flats by design
- ▶ Utilisation of natural lighting and cross ventilation by provision of ample windows
- ▶ Reduction of solar heat gain and optimisation of air conditioning by adopting sun-shading architectural features on building facades
- ▶ Use of renewable energy by installing solar photovoltaic system on the roof
- ▶ Preservation and enhancement of greenery to achieve instant shading and visual linkage with the adjacent open space

# INTERVIEW WITH PROFESSIONAL INSTITUTION



Mr. CHEUNG Hau Wai, SBS  
Chairman of the Hong Kong Green Building Council

Building and sustainability, from sustainable development, energy saving, health and wellbeing are important considerations in the planning, construction, management, operation and maintenance of buildings. ArchSD and the Hong Kong Green Building Council have been working closely in developing and using building life cycle approach in the choice of green building materials and building design in minimising the emission of carbon. The department is also one of the pioneers in adopting the Building Environmental Assessment Method (BEAM) in the design, construction and maintenance of buildings.

ArchSD's representatives plays an active role in Green Building Council's committees, participating in discussions and providing expert advice on green building initiatives and the BEAM Plus rating system's certification and development. We are also pleased to see that the department has taken the initiative in adopting new technologies and innovative construction methods for new building developments, including the application of Modular Integrated Construction in a pilot project the Disciplined Services Quarters for the Fire Services Department at Pak Shing Kok, Tseung Kwan O.

We look forward to ArchSD's continuing effort to lead by example and to share experience with professionals in the building industry, and wish to express our appreciation of ArchSD's contributions. ☺☺

## OUR RESPONSE

Apart from new buildings, ArchSD has put great effort to improve the environmental performance of existing buildings through initiatives such as retrofitting and recommissioning. We devote ourselves to promote building sustainability in Hong Kong. We continue to practise sustainable building design and innovative construction methods in our projects. Moreover, we will collaborate with various professional bodies in organising regular briefings and sharing sessions on the latest trends of the building industry in order to raise public awareness and understanding. ☺☺



# Managing Resources and Environmental Impact

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## UNSDGs

- We have green housekeeping guidelines in place to promote green office practices
- We have established a robust IMS encompasses aspects of environmental protection, occupational health and safety, and quality management to benchmark our environmental performance and ensure it remains at international standards
- We regularly conduct carbon audits to quantify our carbon footprint

# Creating a Green Workplace

As a government department, ArchSD is fully aware of our indispensable role in advocating green office management, something which is of paramount importance to the mitigation of climate change. As we move forward, continuously striving to create a more sustainable workplace, we have begun to adopt an integrated management system (IMS) which closely monitors our environmental performance in the areas of energy, waste, water and indoor air quality, thus optimising our sustainability efforts. Apart from actively integrating green practices into our office operations, we are also committed to nurturing environmental awareness among our staff in all branches and all offices.

Our robust IMS, which encompasses aspects of environmental management (ISO 14001), occupational health and safety (ISO 18001), energy management (ISO 50001) and quality management (ISO 9001), was established at ArchSD to benchmark our environmental performance and ensure the management system remains at international standards. The IMS allows us to formulate guidelines, procedures and strategies which ensure that our day-to-day office operations meet and comply with the requirements of management system.

## Energy Use and Carbon Emissions

As we work to prioritise improvement measures and devise strategies to reduce greenhouse gas (GHG) emissions, it is pivotal for us to understand the nature of our direct and indirect GHG emissions.

Energy consumption accounts for a significant part of our carbon footprint, hence we monitor our electricity use and implement energy efficiency measures such as lighting retrofitting works at our offices which echo our commitment to energy reduction. During the reporting year, ArchSD maintained a 'Class of Excellence' Energywi\$e Certificate, awarded by the Hong Kong Green Organisation Certification (HKGOC) scheme in recognition of our outstanding energy saving efforts.



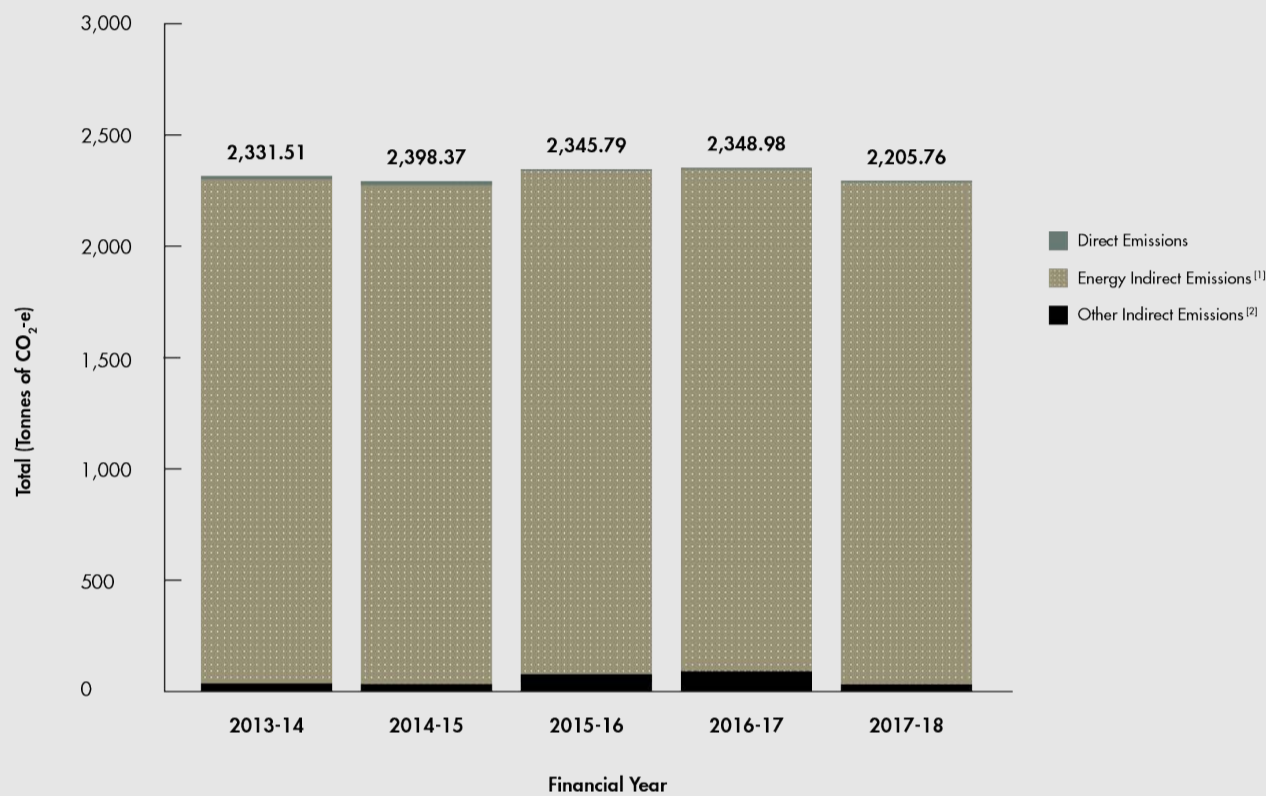
'Class of Excellence' Energywi\$e Certificate

To strive for even greater environmental excellence, we proactively seek to use clean, renewable energy whenever appropriate. For example, during the reporting year, we installed over 100 photovoltaic panels on the rooftop of the APB Centre. These panels cover a portion of our energy needs.

In alignment with the carbon emissions reduction targets set out in the Hong Kong Climate Action Plan 2030+, we regularly conduct carbon audits to quantify our carbon footprint. Our carbon audits are carried out in accordance with the international standard Greenhouse Gas Protocol, while also making reference to guidelines published by the Environmental Protection Department and the Electrical and Mechanical Services Department. These audits take into account three major greenhouse gases: CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. Our electricity and town gas consumption, as well as other operational data, are also regularly tracked for our annual management review to help identify areas for improvement.

## Carbon Emissions Produced by the Queensway Government Offices

The carbon emissions produced by the Queensway Government Offices (QGO) have remained stable over the past five financial years. In fact, a 5.4% reduction in carbon emissions has been realised over this five-year period, the result of increased energy conservation awareness among staff and the adoption of energy-saving measures at QGO.



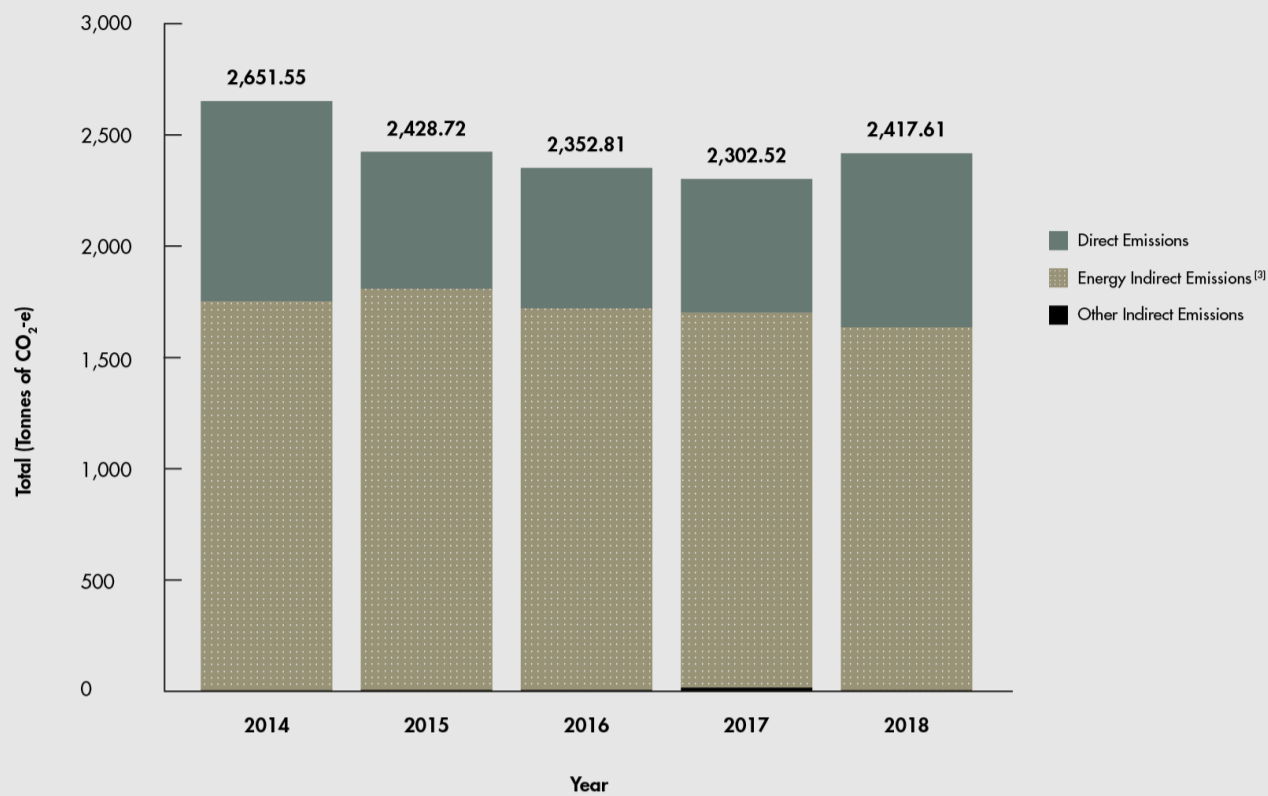
	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18
Direct Emissions (Tonnes of CO <sub>2</sub> -e)	14.90	18.92	6.90	6.87	7.12
Energy Indirect Emissions (Tonnes of CO <sub>2</sub> -e) [1]	2,277.59	2,344.73	2,255.11	2,247.02	2,169.03
Other Indirect Emissions (Tonnes of CO <sub>2</sub> -e) [2]	39.02	34.72	83.78	95.09	29.61
<b>Total (Tonnes of CO<sub>2</sub>-e)<sup>[2]</sup></b>	<b>2,331.51</b>	<b>2,398.37</b>	<b>2,345.79</b>	<b>2,348.98</b>	<b>2,205.76</b>

[1] A territory-wide default emissions factor was used to calculate these emissions.

[2] The figures in FY 2013-14, FY 2014-15, FY 2015-16, FY 2016-17 and FY 2017-18 were calculated by measuring the actual paper consumption (A3 and A4) and waste paper collected for recycling at QGO.

# Carbon Emissions Produced by APB Centre

Upgrades made to the building's air conditioning system, regular maintenance and the application of various energy efficiency features at the APB Centre resulted in a gradual drop in carbon emissions of about 8.8% in 2018 as compared to 2014.



	2014	2015	2016	2017	2018
Direct Emissions (Tonnes of CO <sub>2</sub> -e)	886.29	619.08	628.22	601.86	769.69
Energy Indirect Emissions (Tonnes of CO <sub>2</sub> -e) [3]	1,756.58	1,802.93	1,719.53	1,686.67	1,642.88
Other Indirect Emissions (Tonnes of CO <sub>2</sub> -e)	8.68	6.72	5.05	13.98	5.04
<b>Total (Tonnes of CO<sub>2</sub>-e)</b>	<b>2,651.55</b>	<b>2,428.72</b>	<b>2,352.80</b>	<b>2,302.51</b>	<b>2,417.61</b>

[3] A territory-wide default emissions factor was used to calculate these emissions.

## Waste Management

ArchSD is dedicated to responsibly managing our waste. To ensure that our actions match this dedication, we have introduced a series of measures to reduce waste at source and encourage recycling. For example, we issued green housekeeping guidelines on areas including reduction of paper consumption and waste minimisation to facilitate our staff to adopt best waste management practice. Our recycling efforts are also on display at the APB Centre and QGO, where we have set up various waste collection facilities which collect a vast array of recyclables, including waste paper, plastic bottles, used toner cartridges, aluminium cans, and used CDs.

As we work to continuously improve, every year we set up targets to enhance our waste management practices. During the reporting year, we established various targets such as to increase waste paper recycling. Finally, we successfully recycled around 20,000 kg of A3 and A4 waste paper and were also awarded the 'Class of Excellence' Wastewi\$e Certificate for consecutive years under the Hong Kong Green Organisation Certification Scheme.



'Class of Excellence' Wastewi\$e Certificate

## Water Management

To conserve water resources, ArchSD is committed to reducing our total potable water usage. In addition to installing water saving devices like sensor taps and dual-flush cisterns, we also keep track of our potable water and flushing water consumption, and carry out regular maintenance on our water supply system. In parallel, we have also issued a general circular entitled 'Measures of Green Housekeeping' to help raise awareness of the importance of water conservation.

## Indoor Air Quality Management

We are fully aware that our staff spend most of their working time indoors. As such, we endeavour to provide a pleasant indoor environment which safeguards their health and well-being. We ensure that we adhere to good indoor air quality (IAQ) management practices by sticking to guidelines published by the Environmental Protection Department. Over the years, we have supported the government's IAQ advocacy by participating in the IAQ Certification Scheme, which works to improve IAQ and engages accredited bodies to conduct IAQ assessments. Upon the completion of various indoor air quality measures, both APB Centre and QGO were awarded 'Basic Level' IAQwi\$e Certificates during the reporting year.

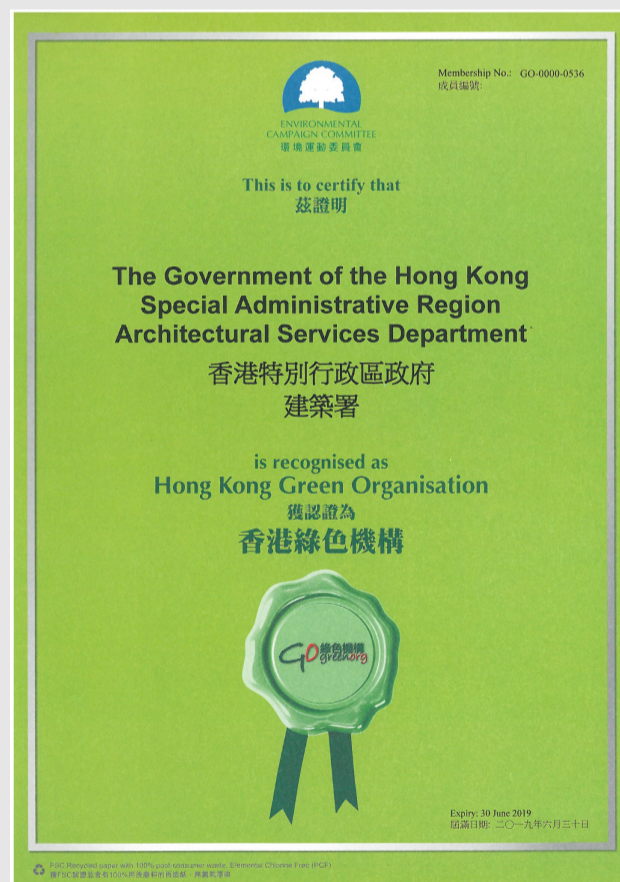




The APB Centre and QGO both received the 'Basic Level' of IAQwi\$e Certificates

## Hong Kong Green Organisation

In 2017/18, ArchSD was once again awarded with a Hong Kong Green Organisation Certificate. We are proud that multiple aspects of our environmental practices have continued to gain recognition.



Hong Kong Green Organisation Certificate

## Cultivating a Green Culture

Our determination to protect the environment is not limited to our office operations. We are a firm believer in promoting environmental awareness at multiple touch points in the workplace, as this allows our staff to gain a deeper understanding of global environmental issues and consequently provide further support to our environmental initiatives.

As such, we are continuously working to encourage a green culture at ArchSD, one which puts environmental principles into practice and disseminates environmental messages to our staff via the intranet, emails and other channels. A designated team of 64 Green Wardens, made up of staff from various branches and divisions, has been appointed to spread green messages



and assist in organising ArchSD's various environmental awareness enhancement programmes and activities. Our staff also proactively participate in environmental activities and training sessions, for instance, Annual International Arboriculture Summit (Hong Kong), Seminar on Strategic Street Tree Planting and Urban Forestry in Hong Kong, and Seminar on Waste Reduction and Recycling in Hong Kong and Environmental Compliance in BEAM Plus Submission, to enhance their environmental awareness and gain professional qualifications in various environmental domains. We also maintain a group of staff members with the BEAM Pro qualification.

## INTERVIEW WITH STAFF



Mr. CHAN Siu Ming  
Chief Technical Officer (Building Services)

☞ In the Building Services Branch, my major responsibilities involve monitoring quality controls over our building services, mainly through conducting site visits and audits on construction sites to ensure that our products and services comply with applicable requirements and standards. As the Chief Technical Officer, I also oversee staff training to promote staff's overall sustainability awareness, career development and promotion matters in the branch.

ArchSD always strives to stay at the forefront of technological innovations with sustainable features, share the latest trends and development of industry insights with the staff, and adopt smart and innovative technologies in practice. A number of new technologies including Building Information Modelling (BIM), Modular Integrated Construction (MiC) and Design for Manufacturing and Assembly (DfMA) have recently been applied in more and more of our projects to enhance site environmental performance and better manage the construction schedule and quality. To enhance staff competence in the relevant areas, we have continuously arranged and provided various trainings courses to equip our colleagues with sufficient knowledge to meet operational needs. Besides, our Knowledge Management Hub, as a centralised online library, provides abundant information and publications to facilitate us in learning continuously at our own paces.

At ArchSD, we have a harmonious working atmosphere that motivates everyone to perform and excel. The management maintains regular and effective communication with all levels of staff through various channels such as meetings, forums, email, intranet, and newsletters. The latest information regarding sustainability initiatives, technology development, staff activities and other department updates would also be shared among our staff in a timely manner. ☞☞

## OUR RESPONSE

☞ We are pleased to know that our efforts are recognised by our staff. We believe that providing professional trainings to promote our staff's environmental awareness and the implementation of sustainability initiatives as well as technologies are crucial in achieving our aspirations in sustainable development. We will continue to monitor latest trends to identify the sustainable development opportunities and enhance the sustainable culture amongst our workplace. ☞☞

