

HK Tai Kwun Yesterday, Today & Tomorrow

The Kernowkid



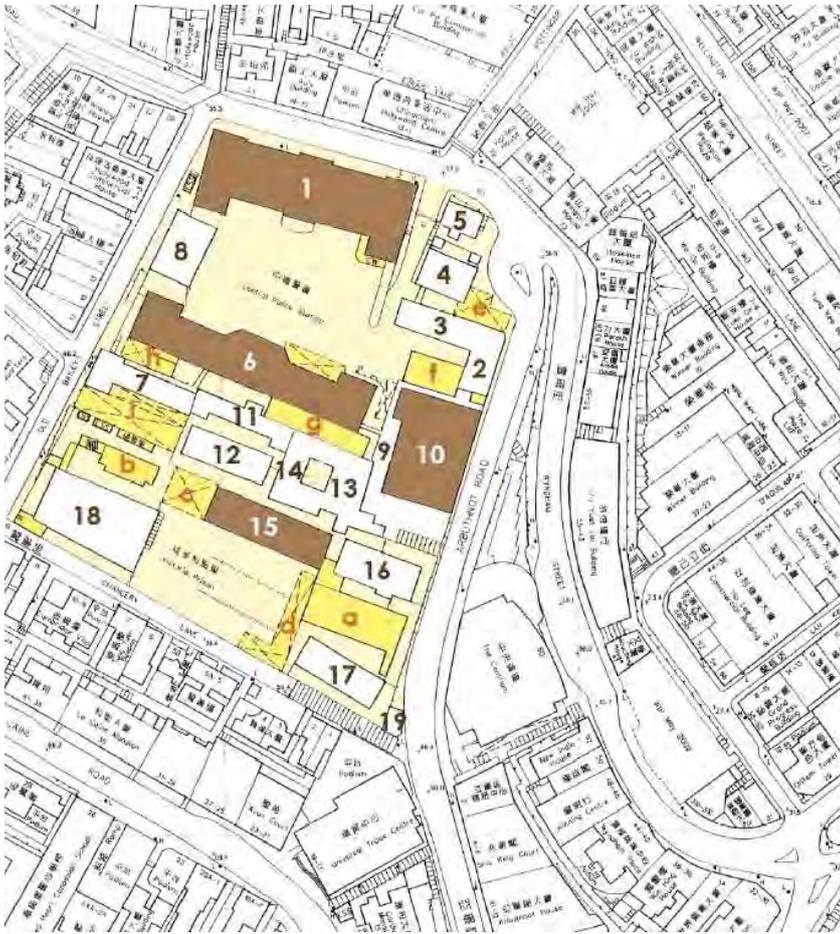
Yesterday

Central Police Station with Victoria Prison and the Magistracy together are one of the oldest heritage compounds in Hong Kong imbued with rich Victorian, Edwardian and Oriental architectural styles.

The oldest structure within the compound is the police barrack block built in 1864. A storey was later added to the block in 1905. The three-storey building was constructed adjacent to Victoria Prison. The Magistracy dates to 1914. The Police Headquarters Block facing Hollywood Road was constructed in 1919. Subsequently in 1925, the two-storey Stable Block was constructed at the north-west end of the parade ground and later used as an armoury.

The Central Police Station (traditional Chinese: 中區警署) is located at the eastern end of Hollywood Road, in Central, Hong Kong.





Central Police Station Compound

1. Headquarters Block
2. Block A
3. Block B
4. Block C
5. Block D
6. Barracks Block
7. Sanitary Block
8. Stable Block
9. Gateway
10. Former Central Magistracy

Victory Prison

11. A Hall
12. B Hall
13. C Hall (East Wing)
14. C Hall (West Wing)
15. D Hall (West Wing)
16. D Hall (East Wing)
17. E Hall
18. F Hall
19. Bauhinia House (Watch Tower)

Buildings allowed to be demolished

- a. Duty Office
- b. General Office
- c. Temporary Office
- d. Workshop
- e. Temporary Structure
- f. Garage
- g. Rear Annex of Barrack Block
- h. Temporary Structure
- i. Temporary Structure

Legend

- Type "A" Buildings & Walls
- Type "B" Buildings & Walls
- Buildings & Walls which may be demolished

Barrack Block 1864



Victoria Prison D Hall 1858



Central Magistracy 1914



Central Police Station HQ 1919



Police Ancillary Old Blocks 1910



Today

Central Police Station Compound has been declared a Monument.

The three-storey Barrack Block, Victoria Prison, Central Magistracy, Central Police Station HQ have formed four icons as part of the colonial administration of Justice for over a hundred years.

The buildings of the former Central Police Station Compound (CPS) were declared monuments in 1995 under the Antiquities and Monuments Ordinance (Cap 53). Once a building has been declared as a monument or a proposed monument, the building is legally protected and no person shall undertake building or other works on it without a permit granted by the Authority under section 6 of the A&M Ordinance.

Not all heritage buildings can be adapted into other uses. The selection of an appropriate re-use needs careful consideration to limit any possible conflict between preserving the heritage value and upgrading the building to current code standards to make it suitable for the new use. Through adaptive re-use, a heritage building can be rejuvenated in terms of both physical and economic values such as the Western Market.

The CPS project is supported by The Hong Kong Jockey Club Charities Trust and is intended to transform a collection of historically significant buildings into a centre of heritage, arts and leisure facilities for the local community and visitors. The Hong Kong Jockey Club's Trust agreed to make HK\$1.8 billion capital available to

renovate the century old buildings compound with a view to transform the buildings into a heritage landmark.

Three well known international architectural companies have been appointed. Purcell Miller Triton and Rocco Design to oversee the conservation revitalisation project of the sixteen old buildings covering 13,600 sq.m site. Herzog & de Meuron are to design two new exciting and modern buildings to be constructed.

Arup Engineers was appointed as the project engineering consultant with J Roger Preston being responsible for the building services.

Architects and engineers are among the most fortunate of men since they build their own monuments with public consent, public approval and often public money.
– John Prebble.

We shape our buildings, thereafter they shape us.
– Winston Churchill

Tai Kwun Revitalisation Challenge

“No man putteth a piece of a new garment upon an old; if otherwise, then both the new maketh a rent, and the piece that was taken out of the new agreeth not with the old.”- The Bible.

Generally, most of the heritage old buildings their design and facilities do not comply with current building safety, health standards and statutory requirements. A degree of alterations and additions usually requires new facilities to be installed or if the buildings are to be adapted for re-use other than their original use.

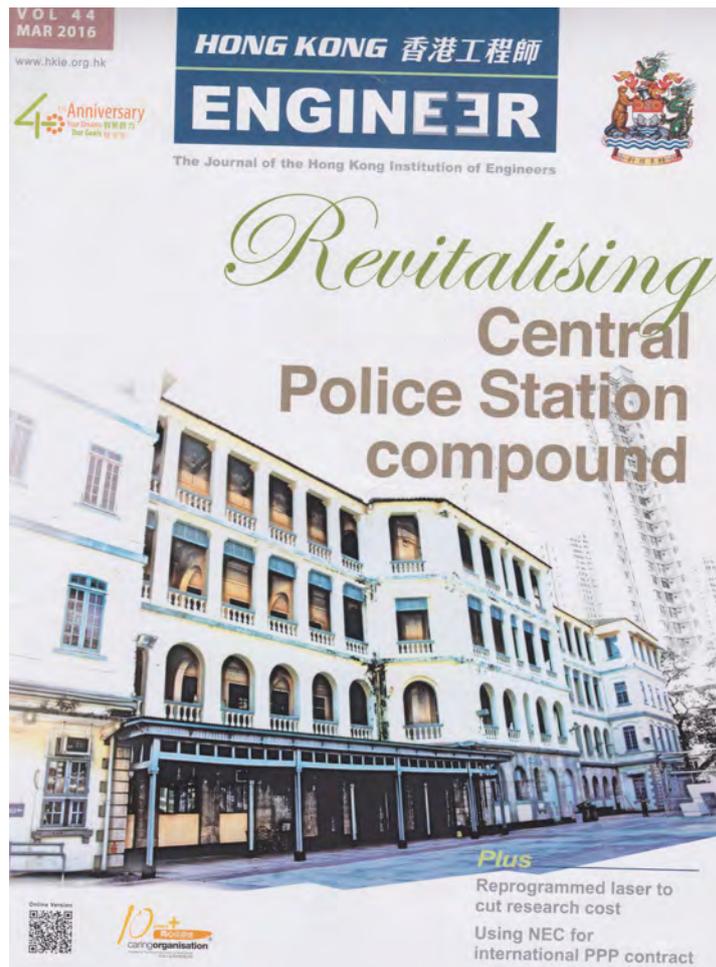
Architects & Engineers Alchemy At Work





(Writer's CPS Site Photos)

See the Complex in Morphosis



(Courtesy of the HK Institution of Engineers & Cover Story by Angela Tam)

Giving a heritage complex a new lease of life

Go to any major city and you would see a mix of new landmarks and heritage buildings jostling for attention. In Hong Kong it has been a little different until recently. Having taken little more than 40 years to make the leap from being a small manufacturing base for basic goods to being a global financial hub, Hong Kong only awakened to the need to preserve its heritage around the turn of the new millennium.

Since then, the art of heritage conservation has been progressively refined. From

preserving the façade of the Sai Ying Pun Community Centre to the delicate restoration of Kom Tong Hall in Mid-Levels and its conversion into the Sun Yat Sen Museum, knowledge of conservation issues, in terms of structural appraisal, use of appropriate materials and building codes, have gradually built up with the help of overseas experts and local professionals.

This process of continuous learning met its biggest challenge in 2007, when a decision was taken to revitalise the historical Central

Police Station (CPS) compound and the Hong Kong Jockey Club assumed the role of funder and project manager. The revitalisation project aims to creatively transform this historic building compound into a culture and leisure landmark for the public to enjoy. The conservation and revitalisation of the cluster will also set the benchmark of excellence in restoration and adaptive reuse of historic buildings and compound in Hong Kong.

Consisting of 16 buildings with historical or architectural



An artist's impression of the revitalised complex.
Image: Herzog & de Meuron

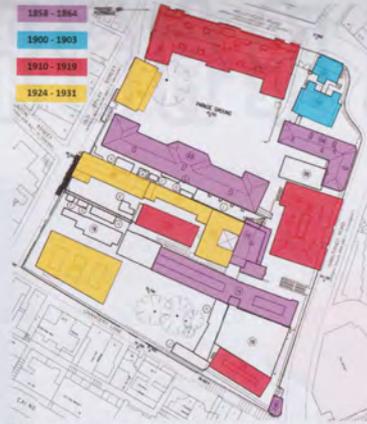
significance and several open spaces covering a 13,600 sq m site, the CPS compound comprises of three declared monuments, namely the former Central Police Station, Central Magistracy and Victoria Prison. The oldest sections of the complex date back to 1864.

Three architectural firms were appointed to oversee the project, with Herzog & de Meuron having responsibility for the design of two new buildings and the site master planning, Purcell being responsible for the conservation aspects of the project and local firm Rocco Design Architects acting as executive architect advising on local building regulations. Arup was appointed as the project's engineering consultant with J Roger Preston having responsibility for its building services.

As the project got underway, the "Practice Guidebook for Adaptive Reuse of and Alteration and Additional Works to Heritage Buildings 2012" was released by the Buildings Department, providing much-needed guidance for the conservation and revitalisation of CPS as well as other heritage projects. Submissions for the project follow the fundamental principles included in the first version of this guidebook.

Detective work

Conserving historical elements of a complex which is more than 150 years old is no easy task given the



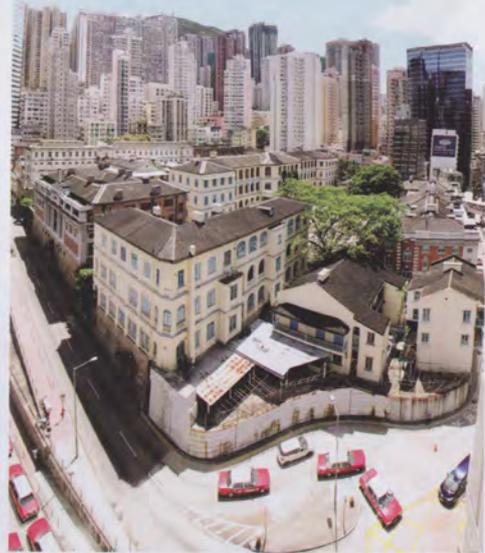
Site plan showing dates when different sections of the compound was built. Image: Arup

absence of records that would give the architects an idea of what the complex looked like and how it had evolved over the years. Since the earliest building regulations in Hong Kong date back only to 1909 and the first formal set of regulations did not appear until 1956, structures that were built in the 19th century conformed to British codes instead. However, the available set of record plans for the existing buildings in the complex was incomplete. In preparing the conservation management plan, Purcell had to look up archives in the UK as well as Hong Kong. In the latter, both the University of Hong Kong's and Antiquities & Monuments Office's archives were searched for information on CPS.

Arup contributed to the detective work with a comprehensive structural survey of the complex that covered its original floor plan, construction details as well as the materials used. The survey revealed that the compound was built over four different periods with the prison blocks being the earliest structures to be built, followed by the staff dormitories, then the magistracy and finally the police station. Although the

compound changed over the years, the aim was always to combine three functions in one place, namely law enforcement, judgement and punishment.

"The footprints revealed that the original prison had a star-shaped radial design with a central tower overlooking the prison blocks," said Arup project manager Gabriel Yam. "Bricks and granite were the main building materials. There were grey bricks as well as red bricks and granite from a Hong Kong quarry. Timber was used for the floors and rafters and steel was used for the floor beams and roof trusses."



Conducting a structural survey of the compound called for detective work. Image: Arup

The structural survey took three months and involved engineers from a variety of disciplines. The work involved excavating trial pits to examine the building footings

and the founding level; taking samples of the wall bricks; testing the composition of the mortar used, taking timber samples to determine whether they were hardwood or softwood, which have different stress grades; and testing the strength of the concrete, which, unlike modern reinforced concrete, was reinforced with 4.8 mm diameter steel wires twisted and bundled in groups of two to three wires that were probably delivered in rolls. A condition survey was also conducted to determine the different levels of wear and tear the complex had gone through. The survey revealed, for example, some hollow timber rafters which were once infested by white ants and therefore needed to be replaced. About 10-20% of rafters were replaced as a result.

Analytic approaches

With the approval of the statutory authorities, a statistical approach was devised to determine the overall level of safety for the complex. Data was gathered from the samples of materials tested from different locations for statistical analysis, an approach that minimised damage to the building fabric. After accounting for outliers, the data was used to establish the characteristic strength of each structural element constructed over 100 years ago. The material strength of the concrete and steel reinforcement of the different historical buildings was estimated based on this approach and in some cases justified reinforcement

yield strengths of over 400 MPa for the steel wires.

Arup also adopted the first-principles approach to estimate the strength of the concrete-encased steel beams in the floor structures. Consistent with best practice in the early 20th century, the complex used imported I beams from the UK that were fully encased in concrete. Analysis of the structural behaviour of these steel beams confirmed their ability to support the required load of up to 5 kPa.

These two analytic approaches combined to justify the strength of the existing structures, thereby enabling the construction team to minimise structural interventions and achieve cost savings through a reduction in the amount of demolition waste and additional construction materials used.

New wings

The first step in the revitalisation project involved gaining Town Planning Board approval for the introduction of new structures to

the complex. In response to public concerns over the original plan in 2007 of adding a 200 m high 'bamboo scaffolding' tower, the design was amended to include two buildings that do not exceed 80 mPD in height.

The new building adjacent Arbutnot Road, the Arbutnot Wing (AW), will accommodate a multi-purpose auditorium as well as roof plant areas. The new building next to Old Bailey Street, the Old Bailey Wing (OBW), will be used for galleries and restaurants. There are two basement levels for plant rooms and loading bays, plus three levels offering 1,500 sq m of gallery and restaurant space. Both AW and OBW have reinforced concrete cores with special treated finishes and architectural exposed structural steel trusses around the building perimeter.

Installing piles to support the new structures was a challenge due to the potential vibrational effects on the surrounding heritage buildings. With percussive piling ruled out and unidentified rockhead over 80 m in the ground, a combination



The Arbutnot Wing under construction next to a heritage building. Image: Arup

of shaft grouted mini piles and shaft grouted H piles were used instead and installed in soil made up of completely decomposed granite up to 60 m deep.

The façades of the new buildings are a modern take on the dominant pattern of the historical façades. The interlocking aluminium bricks echo the granite blocks forming the revetment walls around the compound. The steel moulds for the aluminium bricks were made in Italy and shipped to a caster in Melbourne, Australia, for casting. They were streamlined into four types of modules which were die-cast then shipped to Hong Kong. Each of the two buildings required 4,000 aluminium bricks.

"We adopted a 'Lego' approach: connection between the bricks was carefully detailed so that it is not easily seen by the public, and simplified to make the installation sequence as efficient as possible," Mr Yam said.

Connectivity

The revitalisation scheme calls for the complex to be converted into a hub with construction floor area of 27,900 sq m, 37% of which will be used for heritage and contemporary art, 36% for public circulation and buildings facilities; and 27% for commercial use to provide leisure and entertainment to visitors. To draw people into what was a complex enclosed by high walls designed to hold people in, careful thought was given to the introduction of connectivity with the surrounding entertainment



Skilled labour were brought in to restore the external façades. Image: Arup

districts. The Mid-Levels escalator will play an important role in this as it currently runs across the junction between Old Bailey Street and Hollywood Road at a level just above the CPS walls. By building a new footbridge that connects with the escalator, pedestrian access will be improved without adding to the amount of vehicular traffic in the area.

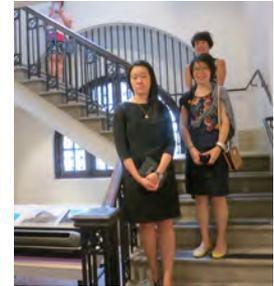
Within the complex itself, the three platforms that make up CPS will be connected via stairs and link bridges. New bridges have been constructed to supplement existing links between the buildings. To facilitate universal access, lifts and ramps have been added where possible. New openings are also made on the revetment walls to provide connectivity between Lan Kwai Fong in the east and the Soho area in the west.

Although CPS is surrounded by roads on four sides, materials can only be brought in through two

loading bays, one on Old Bailey Street and one on Hollywood Road. Three tower cranes are used to expedite materials handling. Some heavy machinery and equipment are delivered at night to minimise the impact of truck movements on traffic in the area. Sourcing materials that match the historical materials, like the window frames, was a challenge for the project team. So was the need to bring in skilled labour from the UK to restore the external façades and pitched roofs. A comprehensive monitoring scheme is also implemented and closely monitored to ensure that the works do not have any adverse impact on the historic buildings and revetment walls.

Structural work is largely completed. The revitalised complex is expected to be open to the public in late 2016. €

Tomorrow



Engineers like to solve problems. If there are no problems handily available, they will create their own problems.

- Scott Adams



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