Annex

Proposed Recovery Work for Block 4 at

The Central Police Station Compound

ABSTRACT

The Central Police Station ("CPS") Revitalisation Project is a large scale heritage conservation scheme aimed at conserving an important heritage compound for adaptive reuse. The Hong Kong Jockey Club ("HKJC") has been leading the project since 2008. Its objective is to conserve as many of the key heritage features as safely possible while sensitively adding compatible new elements to revitalise the CPS Compound into a heritage and arts centre for public enjoyment. In the process the HKJC has actively engaged stakeholders and the public in project planning, and employed the service of leading international and local experts to carry out development and work. These included conducting detailed studies on the history of the heritage buildings and their character defining elements, and carefully restoring the buildings to meet modern standards for adaptive reuse. Of the 16 historic buildings, 15 have been meticulously renovated and the CPS Compound was opened to the public in May 2018. The remaining building, the Married Inspectors' Quarters ("Block 4"), suffered a partial collapse during work in May 2016. Since then, much effort has been spent on carefully planning for the recovery of the building. Between 2016 and 2018, the HKJC sought the views of the Antiquities Advisory Board ("AAB") and other stakeholders on the conceptual options for recovery, which were then narrowed down to a recovery plan in September 2018. In line with the conservation approach for the whole Compound, the plan is aimed at recovering Block 4 and opening it up for public use sustainably. In view of a reassessment of the physical conditions of the building and new findings made during investigations for detailed work planning in late 2018 and 2019, an updated recovery plan has been developed and is presented in this Paper. The updated plan includes a series of structural strengthening measures which will be necessary for ensuring the safety of workers, staff and the public when recovery work is carried out on Block 4 and when the building is opened for public use in future. The measures will help conserve the building and its key features, most notably the façade of the extant part, while mitigating for the losses by reinstating or reusing salvaged materials to facilitate the interpretation of Block 4 history in future. The recovery plan is an optimal solution for the recovery of Block 4 and represents a sensitive balance between work and public safety and heritage conservation.

PURPOSE OF PAPER

This Paper briefs Members of the AAB on the progress of the planning for the recovery of Block 4, which partially collapsed on 29 May 2016, in the CPS Compound. The Paper is an update of the recovery plan for Block 4 which was presented to the AAB on 6 September 2018. The AAB is invited to note the project update before recovery work is conducted on Block 4.

BACKGROUND

Block 4 is one of 16 historic buildings in the CPS Compound and situates at a prominent location overlooking the Pottinger Ramp to the north and the Parade Ground to the west. It is a three-storey masonry building with mostly timber floors supported by brick walls. Block 4 consists of two adjoining parts, the north wing and the east wing. It was built as a domestic building in the 1860s and used as police officers' quarters. Over the last one and a half century, major changes to the building were: (a) the demolition of the south wing that housed the kitchens and servants' quarters, reducing the U-shaped building to L-shape; (b) the opening of a doorway on each level to connect the north wing and the east wing; and (c) the enclosure of arches facing Arbuthnot Road on the second floor with timber-framed glazing. When Block 4 was decommissioned in 2005-2006, it was in a dilapidated state.

As part of the revitalisation of the CPS Compound, a renovation scheme was drawn up for Block 4 during 2010-2012. The underlying principles of the scheme, for Block 4 and the whole site, were: (a) the best way to conserve a building is to use it; (b) the building, not the business plan, should inform the new use; and (c) changes should be managed sensitively. The scheme envisaged using the ground floor of Block 4 for retail and the upper floors for offices with a view to limiting public access and containing the physical impacts on the building.

Pre-work surveys conducted by conservation architects and structural engineers from 2009 to 2011 noted a variety of defects in Block 4, including cracks in the brick walls and evidence of termite infestation in some of the floor timber. After works commenced in 2012, more defects were revealed upon removal of internal and external finishes. These showed that the brickwork was in a poor to very poor condition in some areas, notably the roof eaves and some brick piers.

The renovation scheme and the subsequent adjustments to the scheme were approved by the government authorities. The work aimed at repairing the defects and making changes to meet statutory requirements, including the installation of a lift and ramps, lavatories, and associated internal alterations to walls and floors.

All original joinery components were to be repaired or replaced on a like-for-like basis if found beyond repair. Pottery balusters with granite handrails on the verandahs were to be repaired and strengthened. For hand rails on the upper levels, supplementary rails were to be installed. The clay roof covering was to be replaced on a like-for-like basis with the addition of thermal insulation and a vapour barrier.

The main staircase was built of cantilever granite stone steps from the ground floor to the first floor, and timber from the first floor to the second floor. None of the stairs complied with current safety standards but the stone steps and most of the timber stairs were planned to be retained after modifications because of the limited use intended for Block 4. The upper section of timber steps were due for replacement because they were very steep, and in order to comply with fire safety requirements, steel was to be used.

When Block 4 partially collapsed on 29 May 2016, 75% of the planned renovation work had been completed and strengthening work was in progress in the north wing. The incident

resulted in the loss of the northwest corner of that wing, measuring 8 metres by 10 metres, or approximately 15% of the Block 4 footprint. Vertically, the loss extended from roof level down to the top of the granite revetment walls. The associated floor structures on the first and second floors were also lost.

Measures were taken to ensure the stability of Block 4 after the partial collapse. These included removing the damaged parts, making safe the exposed roof structure, erecting extensive propping, horizontal ties and scaffolding, and installing sensors to monitor the stability of the building. Existing building materials including granite stonework, joinery and metal parts of balconies were salvaged and stored for reuse where possible. Protective work was carried out around Block 4 to facilitate safe access to the CPS Compound. Renovation work on Block 4 was then put on hold whilst detailed studies were conducted with the engineers from Arup, and a team of local and international architects including Purcell, Herzog & de Meuron and Rocco Design Architects.

PLANNING FOR RECOVERY

The partial collapse triggered a rethink of the renovation scheme for Block 4. Planning for the recovery of Block 4 was carried out with careful reviews of the engineering issues, assessment of the impacts of these issues on the building, and discussions and consultations with Government. The views of the AAB, the Advisory Committee, Heritage Working Group and Art Working Group of the Jockey Club CPS Limited, the Central and Western District Council, and other stakeholders were taken into account.

The key principles guiding the discussions were summarised as follows: (a) safety is of paramount importance in any recovery plan; (b) Block 4 should be retained for a beneficial use, if possible; (c) the collapsed part should be reinstated, if possible; and (d) a cautious approach of changing as much as necessary but as little as possible (as embodied in Article 3.1 of the Burra Charter) should be adopted.

In the course of deliberations from 2016 to 2018, additional considerations emerged. The key ones were: (a) the rebuilt part should be in harmony with the extant part but discernible from each other to avoid an impression of creating "fake heritage"; (b) the recovery is an opportunity to add new community and social values to the building, mitigating the value lost due to the partial collapse; and (c) the partial collapse and the resultant changes are a part of the history of Block 4 and should not be hidden.

Based on these views, an initial list of eight possible options was presented to the AAB in 2016, namely (A) Restoration; (B) Reconstruction; (C) Adaptation; (D) Preservation; (E) Facade Retention; (F) Facade and interior retention (G) Total reconstruction; and (H) Demolition. In 2017, three shortlisted options were presented – i.e. (B) Reconstruction; (C) Adaptation; (D) Preservation. From that meeting the AAB concluded that options (B) and (C) were generally acceptable whereas option (D) was least supported. On 6 September 2018, the HKJC evaluated the merits of both options (B) and (C) and presented a hybrid option known as the Adaptation Scheme which was then accepted by the AAB to a recovery plan. Incorporating the key considerations outlined above, the plan called for recovering Block 4 for adaptive reuse for the benefit of the public. This is in line with the objective of the entire

CPS Revitalisation Project, which is to conserve and revitalise the heritage site to meet modern standards so that it can be opened up safely for sustainable public benefits.

The 2018 recovery plan aimed at revitalising Block 4 as a medium scale venue for public activities, befitting the ambience of the CPS Compound and benefitting a broad audience. It was envisaged that the ground floor will be reserved for a visitor centre and heritage galleries, whilst the upper floors will be used for public activities and events. This reflected the majority view received from cultural groups which was that they would like to see more spaces for exhibitions and public activities in the Compound so that more groups and a bigger audience could benefit. The plan called for rebuilding the collapsed part in the original footprint with function rooms that meet the demands of local groups, which will be linked to the extant part to form an architecturally and functionally connected building. With a double layered Chinese style pan-and-roll tile roof, light colour brick walls and a glazed balcony on the second floor, the new annex will be a modest and contemporary expression of Block 4 that is both respectful to and compatible with the historic context of the Compound.

The plan acknowledged that the extant part will largely maintain the current internal configuration but require extensive structural strengthening with steel and reinforced concrete. Eight percent of the extant part adjacent to the collapsed part will be removed to facilitate safe construction, resulting in a rectilinear room that is more efficient structurally and architecturally. The plan also called for improving public circulation by opening up the verandahs of the extant part. To maintain the stability of the existing main staircase, it would require extensive support but this would block public circulation and fire exits. The recovery plan therefore proposed rebuilding the stair with concrete. The granite stones salvaged from the stair will be reused in the new stair and timber floor boards will be reused as far as practicable.

REASSESSMENT OF CONDITIONS AND NEW FINDINGS

In line with the practice adopted in previous rounds of planning, the Project Team engaged overseas masonry specialists to carry out inspections of the brickwork when it proceeded to detailed planning of the recovery plan in late 2018. The inspections confirmed that the brickwork was barely able to hold its own weight and could not stand additional load. The bonding quality of the masonry, as revealed by the knowledge gained as a result of the partial collapse, was low. There were hidden cracks and voids in the brickwork and some bricks were seemingly unfired. The specialists concluded that the building is considered to have a very low margin of safety. [1]

In April 2019, overseas timber structure specialists were commissioned to carry out detailed inspections of the timber roof trusses to ascertain the extent of the weaknesses. Their findings confirmed that the bottom ties of the trusses were sagging and the scarf joints had opened up. Some of the trusses were not performing correctly due to the failure of the tie beams. The sizes of the timber trusses were found smaller than modern design and code requirements, and the truss connections had insufficient strengths to support the applied forces.

[1] The overseas experts also advised upgrading the temporary propping, which was implemented.

The poor conditions of Block 4 presented several construction issues: (a) the complexity of strengthening the structure, including the roof, of the extant part of Block 4; (b) the need to strengthen the retaining wall that supports Block 4; (c) the need to ensure that the extant part and the new annex will sit on a uniform foundation to prevent uneven settlement; (d) the challenge of managing work and operating the equipment safely in confined work spaces bordered by very weak walls and floors which are held by extensive propping; and (e) the challenge of carrying out work safely in a site under operation, where visitors and staff will be using the buildings and passageways near Block 4.

UPDATED RECOVERY PLAN

Structural frame: In order to safely recover Block 4, priority must be given to retaining the exterior walls of the extant part as they are the façade of the building. The prerequisite to strengthening the exterior walls is to create a structural frame inside the building, thus taking the load away from the external walls (Refer to Appendix II for plan and sections). The existing brick walls cannot be relied upon for strengthening because they, too, are very weak and supported with props. Reinforced concrete frame was selected as the optimal solution as it is easier to adapt to the uneven profile of the building and offers the best protection with the lowest risk. The new concrete frame will comprise new concrete floors, columns and walls. The concrete walls will also act as stiff shear walls to reduce wind loads transferred to the weak brickwork. [2] The concrete frame will be tied to the external brick walls with stainless steel bolts. Vertical sliding joints will be added between the concrete frame and the brickwork to take away vertical loads from the brickwork. In addition, brick arches will be supported by stainless steel arches underneath, which can prevent the bricks from falling and thereby enable it to function (Refer to Appendix III).

Roof: To strengthen the roof, a new system of steel roof trusses will be added to the existing timber truss system to take over the weight of the roof from the timber members. The steel trusses will be connected to the concrete frame, hence taking away the load from the brickwork. Most of the existing timber trusses will be retained and repaired but will not bear structural load.

Retaining wall: Block 4 as a whole will bear new weight after adding the new strengthening materials mentioned above. It is therefore important to ensure that the weight will not create undue load to the granite retaining wall adjacent to Arbuthnot Road, on which Block 4 is sitting. In this respect, a number of possible approaches were explored, including the use of soil nails and building a supplementary retaining wall. It was concluded that the least disruptive solution was to install a cast mass concrete behind the existing retaining walls. This will help stabilise the retaining wall, another important heritage feature of the CPS Compound, without any visual impact on it.

Foundation: On building a new foundation for the extant part of Block 4, a number of methods were considered. These included pile foundation and construction of a shallow raft, a deep raft, or a cellular raft. It was concluded that a cellular raft system was the only viable option as it could even out the load across the footprint of the building and sit well with the

[2] Due to the partial collapse, the load bearing walls of Block 4 suffered damage, triggering a requirement for the building to meet modern wind code, which is much higher than the approved renovation scheme in 2010-2012.

cast mass concrete behind the retaining wall. Furthermore, the system can provide a uniform load platform for the whole building because the new annex will also be built on a cellular raft foundation. This method will also require removing the existing interior walls and floors during work and reinstating them after the construction of the foundation system (Refer to Appendix IV).

Preservation of existing walls and floors is not feasible: Options for preserving the existing internal walls and floors in situ were considered and evaluated carefully. All suggested underpinning or temporarily propping the walls to allow construction of the foundation below. However, doing so will destabilise the existing walls and obstruct the excavation and the installation of the new foundation. As noted, work space in Block 4 is limited and is obstructed by temporary propping. Such work will create a severe risk of dislodging the props and affect the stability of the walls, and threaten the safety of construction workers and people nearby. The above assessment of the construction options and their limitations showed that removing the existing interior walls and floors of the extant part of Block 4 is necessary for restoring the building safely for adaptive reuse.

The building of the new annex and the intended use of the restored Block 4 will not be affected by this updated recovery plan; they remain the same as outlined in the submission to the AAB on 6 September 2018.

HERITAGE CONSIDERATIONS

The updated recovery plan was made necessary by a review of the conditions of the extant part of Block 4, which denotes a shift from strengthening the internal structure with steel and concrete, to replacing the internal structure with reinforced concrete.

The partial collapse of Block 4 has already caused a substantial loss of the historic fabric, or the character defining elements ("CDE"), of the building. The updated plan will inevitably result in a further loss, the notable ones being timber floor joists, plaster ceilings, brick internal walls and plaster finishes, and the staircases.

However, these elements will be salvaged and reinstated where it is feasible to do so. These include all joinery items such as floor boards, paneled doors, architraves and skirting, the stones and some of the timber on the stairs. The reinstatement will largely follow the original spatial configuration of Block 4 (As outlined in the recovery plan of September 2018, exceptions are the new stairs, lift and lavatories, the opening up of the verandahs and the new annex).

As noted in the previous section of this Paper, the roof structure will be reinforced with steel, and the timber members will be retained and repaired under the updated recovery plan. The clay tile roof coverings, which had already been renewed before the partial collapse, will be removed and replaced on a like-for-like basis.

The 2018 recovery plan proposed rebuilding the steps of the stone staircase with concrete and using the salvaged stones and timber as decorative elements. The updated plan, apart from providing Block 4 with a safe concrete staircase suitable for adaptive reuse, provides an opportunity to improve public circulation.

A list of the CDE of Block 4 and their proposals in this updated recovery plan can be found in an Appendix I.

In a broader context, it should be pointed out that the updated recovery plan enables the Project Team to preserve the brick façade, which is a significant heritage element of the extant part of Block 4. It also provides a solid foundation for the whole building and removes the need for visible interventions to the retaining wall which is also of high heritage value. In addition, building a new structural frame will substantially reduce risks caused by any weak masonry and ensure that the recovered building will be safe for public use for decades to come; on the contrary, partial strengthening may leave low-strength materials untreated, creating residual safety risks.

A natural question is whether the internal structures of the building can be preserved in situ if the recovery planning process can be rolled back and the future use of Block 4 is reopened for discussion. It should be noted that the scale of strengthening work is not driven by considerations on the use of the building but by considerations on public and work safety. Block 4 is in a dilapidated state and will require very extensive structural reinforcement. The updated recovery plan is the most viable solution to keep Block 4 safe, no matter how it may be used in future.

Block 4 has experienced a partial collapse. The building cannot afford to go through another collapse or a similar incident. It must be recovered in a manner that members of the public, future users of the building facilities, visitors to the CPS Compound, and staff, tenants and programme partners who work there will have full confidence in its safety in the long term.

CONCLUDING REMARKS

The partial collapse of Block 4 was an unfortunate setback, resulting in a substantial loss of historic fabric and, at the same time, underscoring the challenges facing conservation and revitalisation projects. It should be reiterated that heritage revitalisation is not merely about preserving a historic building that is no longer needed for its original purpose, but is about revitalising it for modern use in a sustainable manner. Public safety should carry an overarching weight in the equation.

In the case of Block 4, the updated plan has been arrived at after lengthy consideration and review. Other options which might be able to reduce the loss of historic fabric were also examined carefully but they did not meet safety requirements. Although the updated recovery plan will result in a loss of historic fabric which will be mitigated by sensitive reinstatement, it comes with the prospect of safely opening Block 4 as a cultural space for public benefits. The updated recovery plan is a manifestation of the cautious approach of changing as much as necessary but as little as possible.

The Hong Kong Jockey Club has been leading the revitalisation of the CPS Compound and the recovery of Block 4 in a responsible, transparent and sensitive manner. The Compound has been put to good use with over 90% of the site opened to public since May 2018. Operating as Tai Kwun - Centre for Arts and Heritage, the Compound has some 3.4 million local and international visitors through more than 750 public programmes and events in the first year of operations, making it the most visited heritage site in Hong Kong. It also

provides an important platform for developing arts and culture talents and learning of community history and heritage. In October 2019, the CPS Revitalisation Project ("the Project") received the Award of Excellence in the Asia-Pacific Awards for Cultural Heritage Conservation from the United Nations Educational, Scientific and Cultural Organization (UNESCO) (Appendix V). This UNESCO award is the highest honour in cultural heritage conservation, and CPS was chosen to receive this award out of 57 entries from 14 countries and territories. The UNESCO jury also cited, that "The technical quality of the restoration work is a standard-setting on an international level, ensuring the authentic and integrity of the historic fabric." This prestigious international recognition of the outstanding achievement in conservation and revitalisation is the latest acknowledgement amongst a host of awards and commendations received by the Project since 2018.

It is with an unwavering commitment to the success of the Project that the HKJC presents the updated recovery plan on Block 4. The HKJC aims to recover Block 4 safely and as soon as possible so that it will join the other buildings and facilities in the CPS Compound to provide excellent value to Hong Kong.

Members of the AAB are invited to note the project update before recovery work is conducted on Block 4.

The Hong Kong Jockey Club

December 2019

APPENDIX I

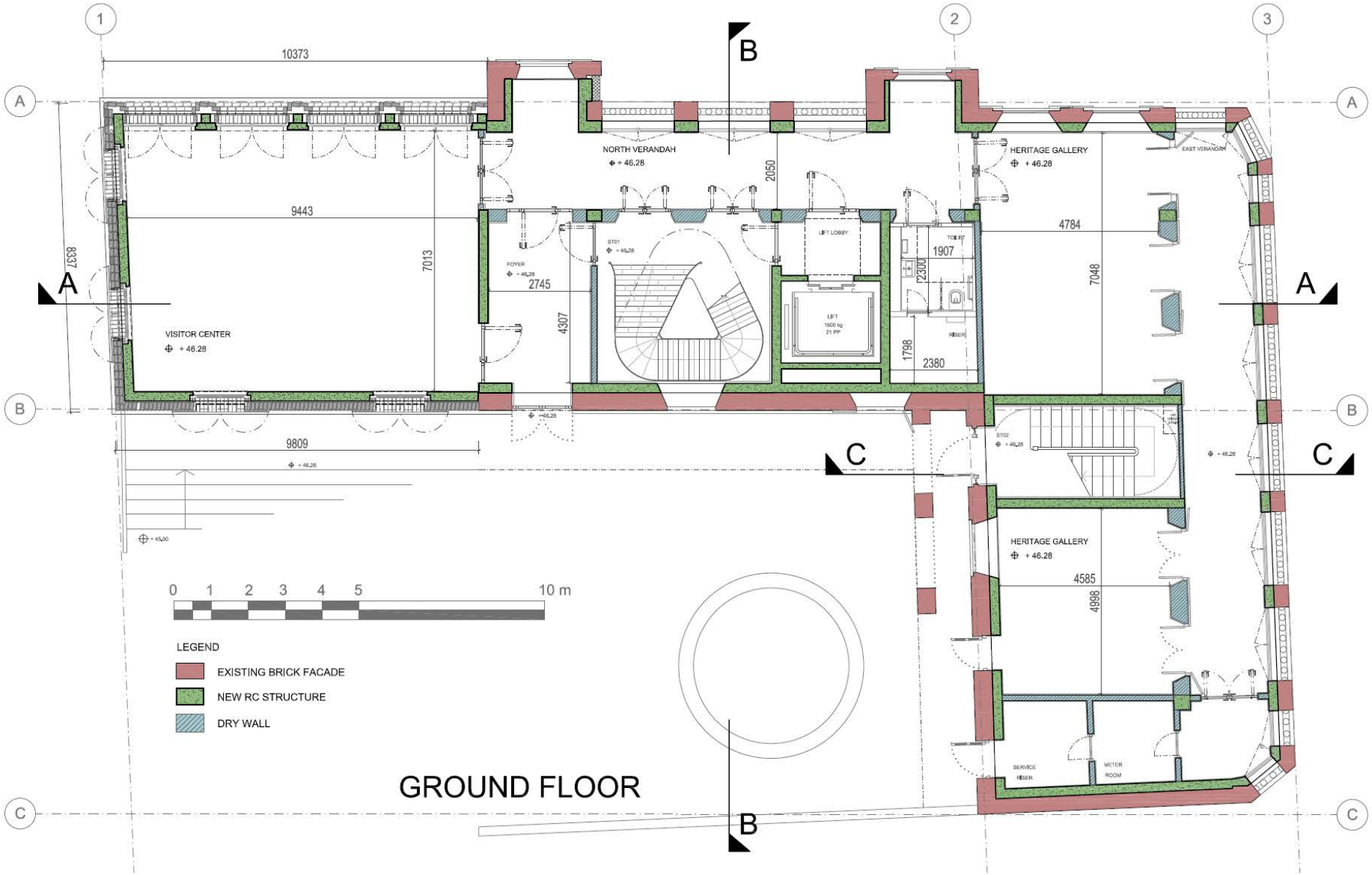
Character Defining Elements ("CDE") of Block 4

Feature no.	Description	Location	Impact (Original Design)	Impact (Recovery Plan 2019)
East Block				
1	Boarded floor	1/F, 2/F	Reinstated	Reinstated
2	Moulded skirting board	G/F, 1/F, 2/F	Reinstated/Renewed	Renewed
3	Wooden staircase complete with balustrade and ornamental newel post	G/F to 1/F, 1/F to 2/F	Reinstated	Salvaged and reused in new configuration
4	Moulded cornice	G/F, 1/F, 2/F	Reinstated/Renewed	Removed, and shall be Renewed at 2/F only*
5	Matchboarded ceiling with ventilation grilles	2/F	Reinstated/Renewed	Reinstated/Renewed
6	Moulded plaster roundels for light fittings/ceiling fans	1/F	Reinstated/Renewed	Removed
A	Old Timber door	G/F, 1/F, 2/F	Reinstated	Reinstated
B	Timber window cill	G/F, 1/F, 2/F	Reinstated	Reinstated
West Block				
1	Granite slab floor	G/F	Reinstated	Reinstated
2	Boarded floor	G/F, 1/F, 2/F	Reinstated	Reinstated at 1/F, 2/F only
3	Canton tiled floor	1/F	Reinstated	Removed
4	Moulded skirting	G/F, 1/F, 2/F	Reinstated/Renewed	Renewed
5	Granite staircase with simple metal balusters and moulded hardwood handrail	G/F to 1/F	Reinstated	Salvaged and reused in new configuration
6	Timber staircase	1/F to 2/F	Renewed	Salvaged and reused in new configuration
7	Moulded cornice	G/F, 1/F, 2/F	Reinstated/Renewed	Removed and shall be Renewed at 2/F only*
8	Ceiling roses	G/F, 1/F	Reinstated/Renewed	Removed
9	Matchboard ceiling/ventilation grilles	2/F	Reinstated/Renewed	Reinstated/Renewed
A	Old timber door	G/F, 1/F, 2/F	Reinstated	Reinstated
C	Timber window cill	G/F, 1/F, 2/F	Reinstated	Reinstated
B	Wood casement window	1/F, 2/F	Reinstated	Reinstated

*The moulded cornices in Feature nos 4 (East Block) and 7 (West Block) shall only be renewed in the extant part of the building on 2/F where practicable. These cornices form part of the ceiling which has matchboarding (which only exists on 2/F), and ventilation grilles, which shall also be reinstated/renewed on the 2/F in the extant part where practicable.

Impact	Definition
Reinstated	Existing materials have/ or shall be, Salvaged as part of the Revitalisation Project/ Recovery Project, and shall be reinstalled in the same configuration where practicable.
Renewed	Existing materials have/ or will be Removed, as part of the Revitalisation Project/ Recovery Project, and shall be replaced in like for like materials as far as practicable.
Salvaged and re-used in new configuration	Existing materials shall be Salvaged as part of the Recovery Project and re-used in a new configuration or for a new purpose as part of the Recovery Project.
Removed	Existing materials have/ or will be Removed, as part of the Revitalisation Project/ Recovery Project and shall not be Reinstated/ Renewed. This is because they were/are not practicable to Reinstate/ Renew in the new layout, or not salvageable, or they have been disposed of during the salvaging work. (Full cartographic and photographic record surveys were carried out to all CDE's in 2012 before any works started on the Revitalisation Project.)

APPENDIX II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EXISTING BRICK FACADE
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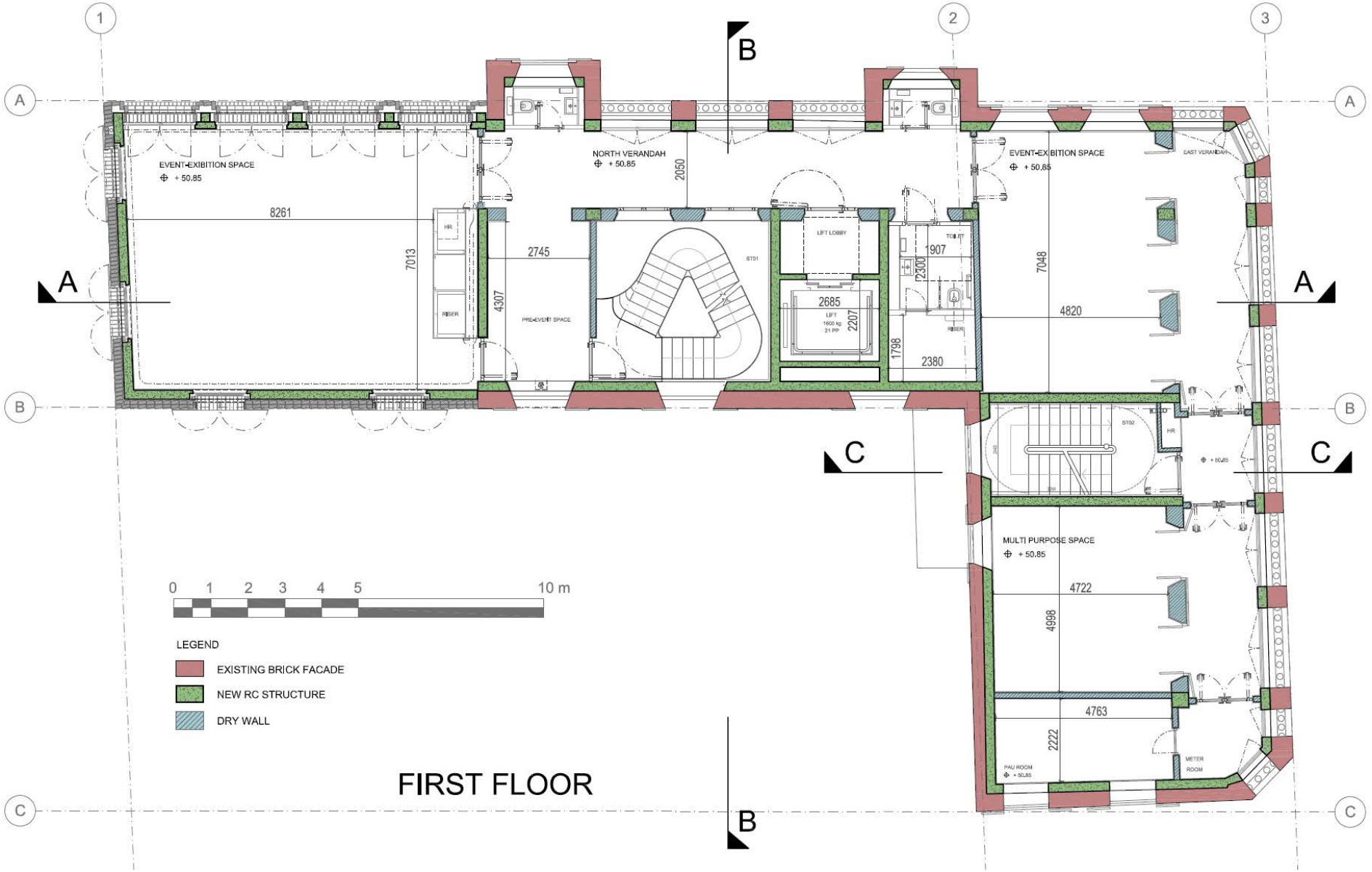
APPENDIX II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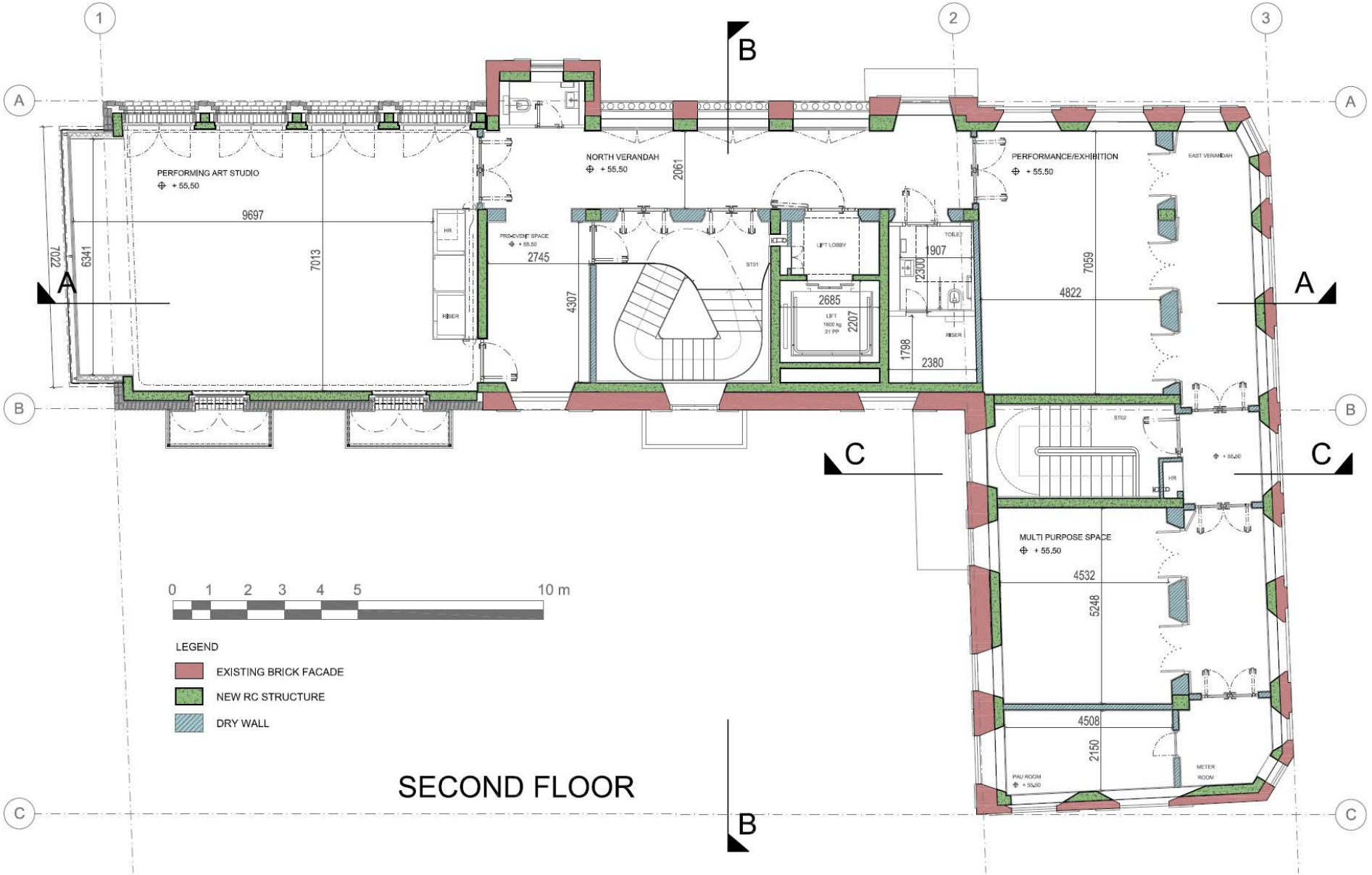
FIRST FLOOR

APPENDIX II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APPENDIX II


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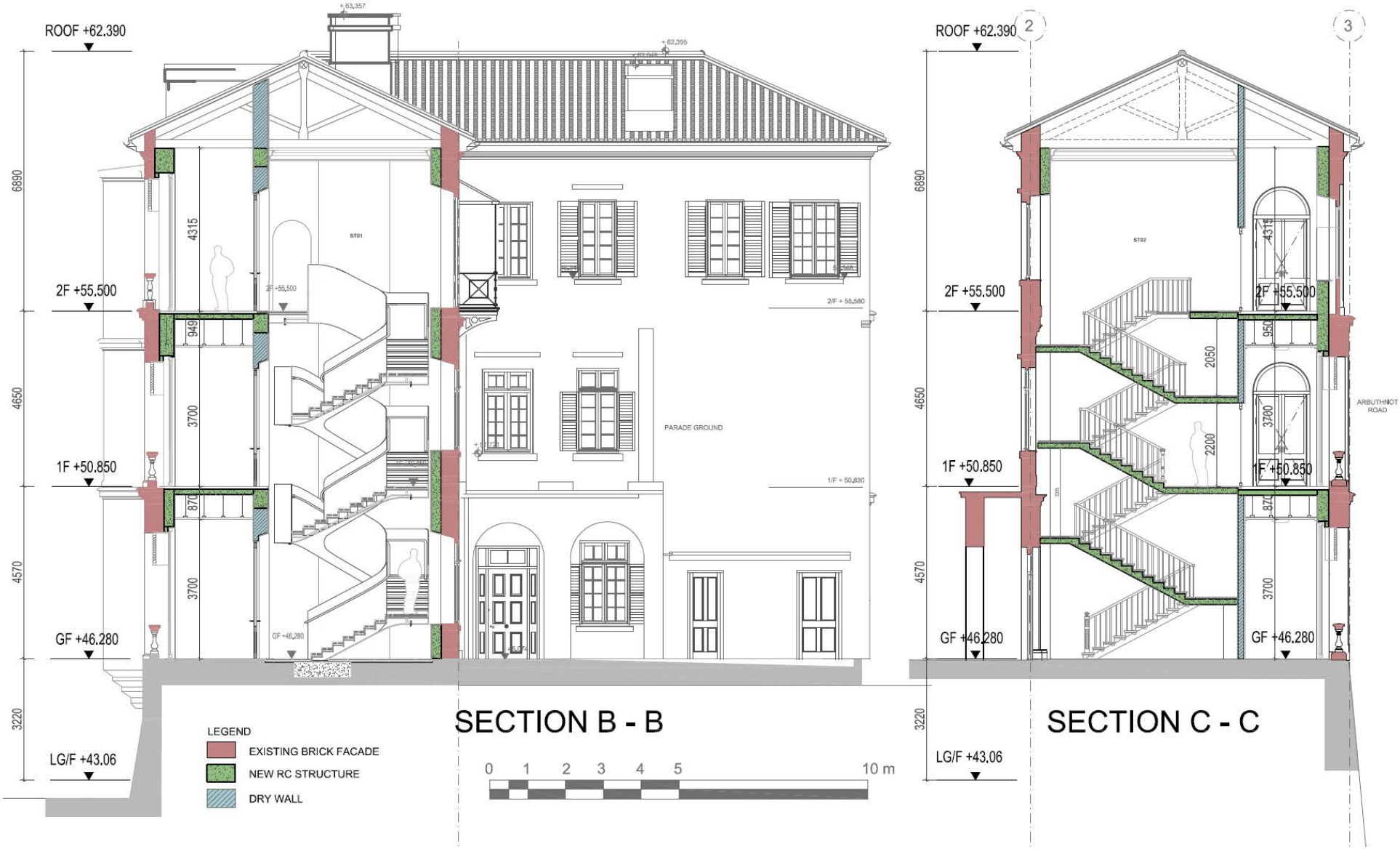
DRY WALL

APPENDIX II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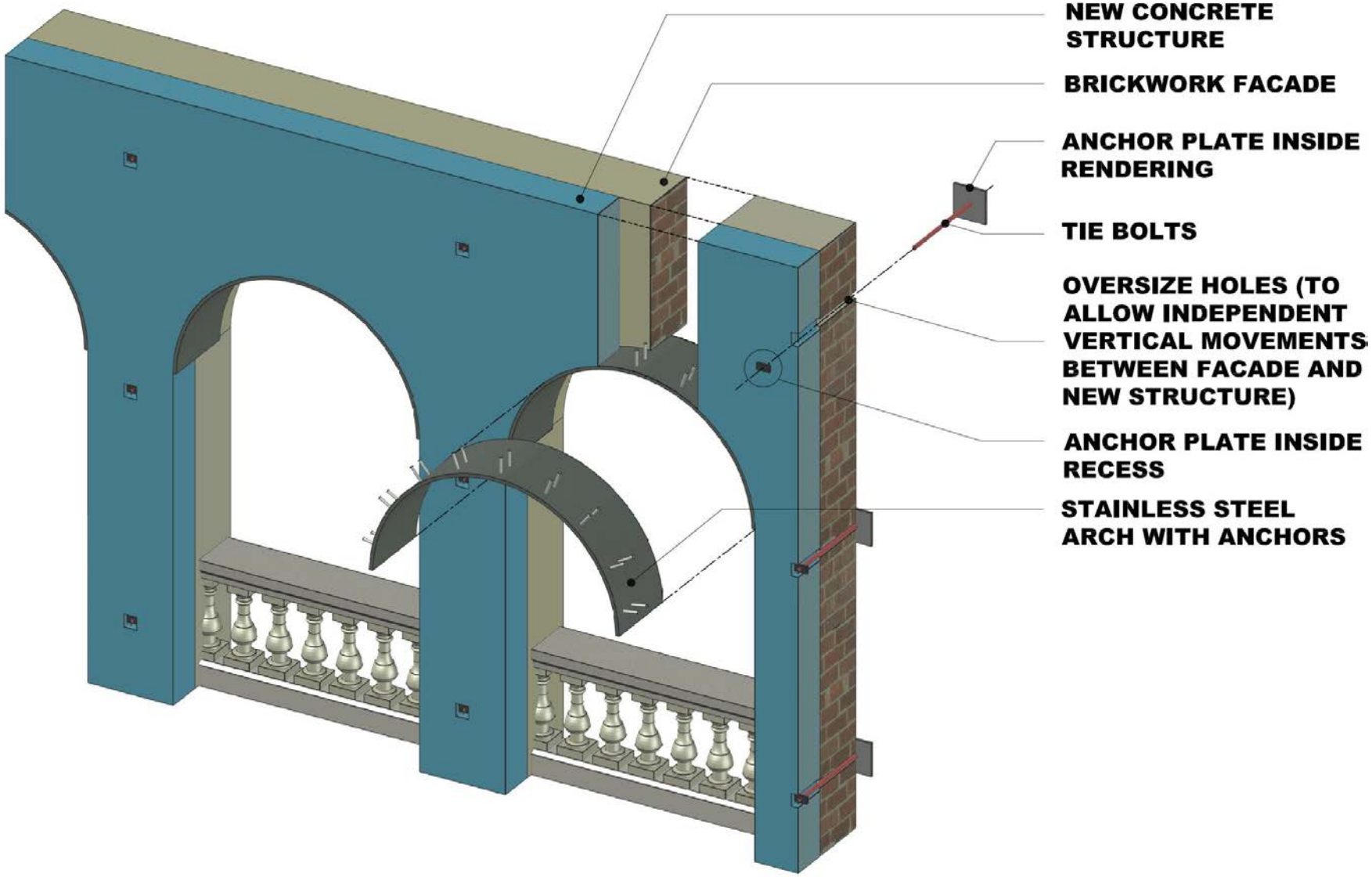
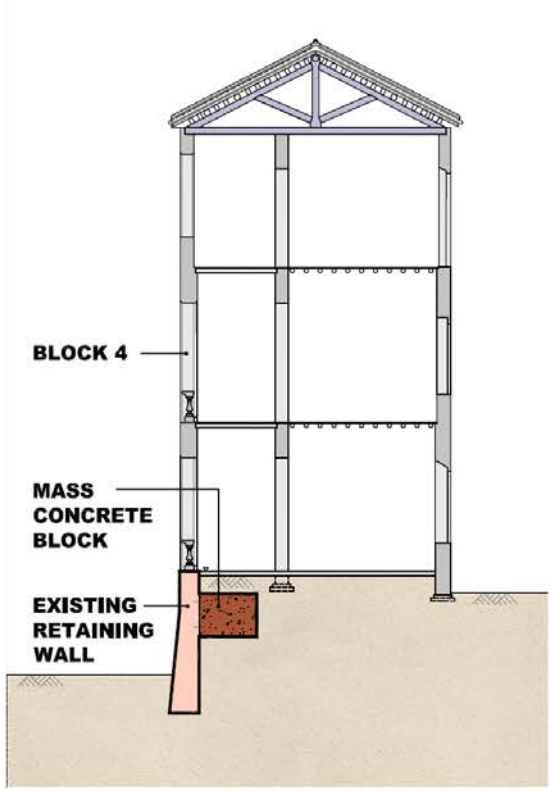
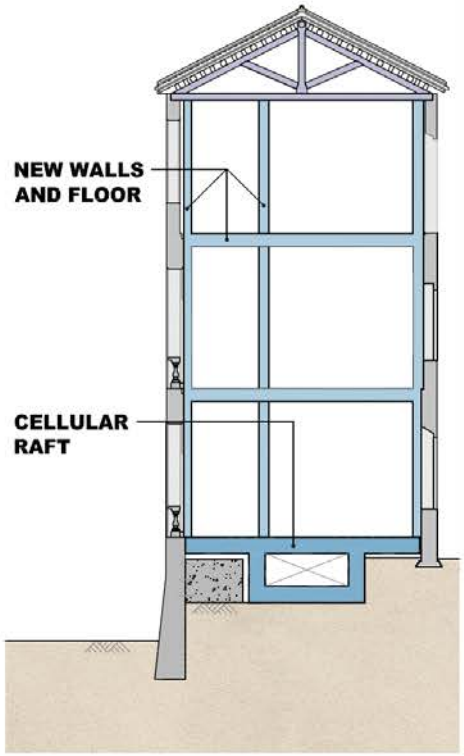


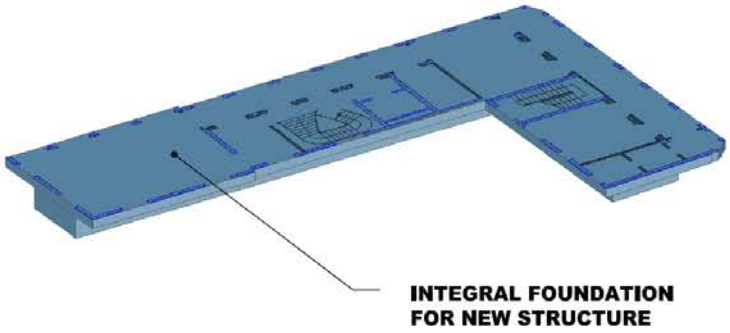
TIE BOLTS AND STEEL ARCH TO SUPPORT BRICKWORK FACADE

APPENDIX IV



RETAINING WALL STABILIZATION





NEW CELLULAR RAFT FOUNDATION

APPENDIX V

UNESCO
Asia-Pacific Awards for
Cultural Heritage Conservation
2019

Award of Excellence

Tai Kwun – Centre for Heritage and Arts
Hong Kong SAR, China

The transformation of the former Central Police Station into a world-class centre for heritage and arts has created a vibrant new civic space in the heart of the city's central business district. The project tackled a complex site with multiple layers of history dating back to the mid-19th century, enhancing its legibility and opening it up to the public. The technical quality of the restoration work is standard-setting on an international level, ensuring the authenticity and integrity of the historic fabric. Innovative architectural and engineering solutions are underpinned by meticulous investigation and rigorous conservation principles. The centre's diverse and creative programming enlivens the historic space with engaging heritage interpretation programmes and contemporary arts and culture. Against tremendous commercial real estate pressures, the successful realization of Tai Kwun stands as a testimony to Hong Kong SAR's commitment to heritage.

Owner:
The Government of the Hong Kong Special Administrative Region

Organizations/Individuals Responsible for the Project:
The Hong Kong Jockey Club
(Michael T H Lee, Winfried Engelbrecht-Bresges,
Leong Cheung, Michael Moir)

Architect / Designer / Consultant:
Purcell (Michael Morrison, Brian Anderson, Gary Sparrow);
ROCCO Design Architects Associates Limited;
Herzog & de Meuron; Arup

General Contractor:
Gammon Construction Limited

UNESCO