

HERITAGE IMPACT ASSESSMENT FOR

REPROVISIONING OF HARCOURT ROAD
FRESH WATER PUMPING STATION



Client:
Water Supplies Department

Heritage Consultant:

AGC architects
landscape
interior
DESIGN LTD

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Applicant: Water Supplies Department

Heritage Consultant: AGC Design Ltd.

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List of Abbreviations

AMO	Antiquities and Monuments Office
FWPS	Fresh Water Pumping Station
HIA	Heritage Impact Assessment
HRFWPS	Harcourt Road Fresh Water Pumping Station
LCSD	Leisure and Cultural Services Department

1.0 INTRODUCTION

1.1 Purpose of the Report

This report presents an Heritage Impact Assessment (HIA) for the Project “Reprovisioning of Harcourt Road Fresh Water Pumping Station” based on the guidelines for Built Heritage Impact Assessment set forth by the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department (LCSD) together with Annexes 18 and 19 of the Technical Memorandum on Environmental Impact Assessment Process published by the Environmental Protection Department.

1.2 Description of Project

The existing site for the Harcourt Road Fresh Water Pumping Station (HRFWPS) is located at the harbourfront area adjacent to the Hong Kong Academy for Performing Arts (see Figure 1). The site has been identified as a potential site for other land uses in the Victoria Harbourfront developments according to “Urban Design Study for the New Central Harbourfront” completed by Planning Department in 2011. The objective of the Project “Reprovisioning of Harcourt Road Fresh Water Pumping Station” is to relocate the existing HRFWPS to a site adjacent to the Central Fire Station at Cotton Tree Drive (see Figure 1 for the location of the proposed Cotton Tree Drive Fresh Water Pumping Station). The Project comprises construction of the proposed Cotton Tree Drive Fresh Water Pumping Station (FWPS) within an existing slope of Hong Kong Park adjacent to the Central Fire Station and Flagstaff House, together with the supply and installation of associated mechanical and electrical equipment for the Cotton Tree Drive FWPS; demolition of the existing HRFWPS upon commissioning of the Cotton Tree Drive FWPS, laying of fresh water mains along Queensway, Hennessy Road and the slip road of Cotton Tree Drive and associated architectural, drainage, geotechnical and landscaping works. The boundary of the Site for the proposed Cotton Tree Drive FWPS is shown as a blue dotted line in Figure 2.

HERITAGE IMPACT ASSESSMENT FOR REPROVISIONING OF HARCOURT ROAD FRESH WATER PUMPING STATION

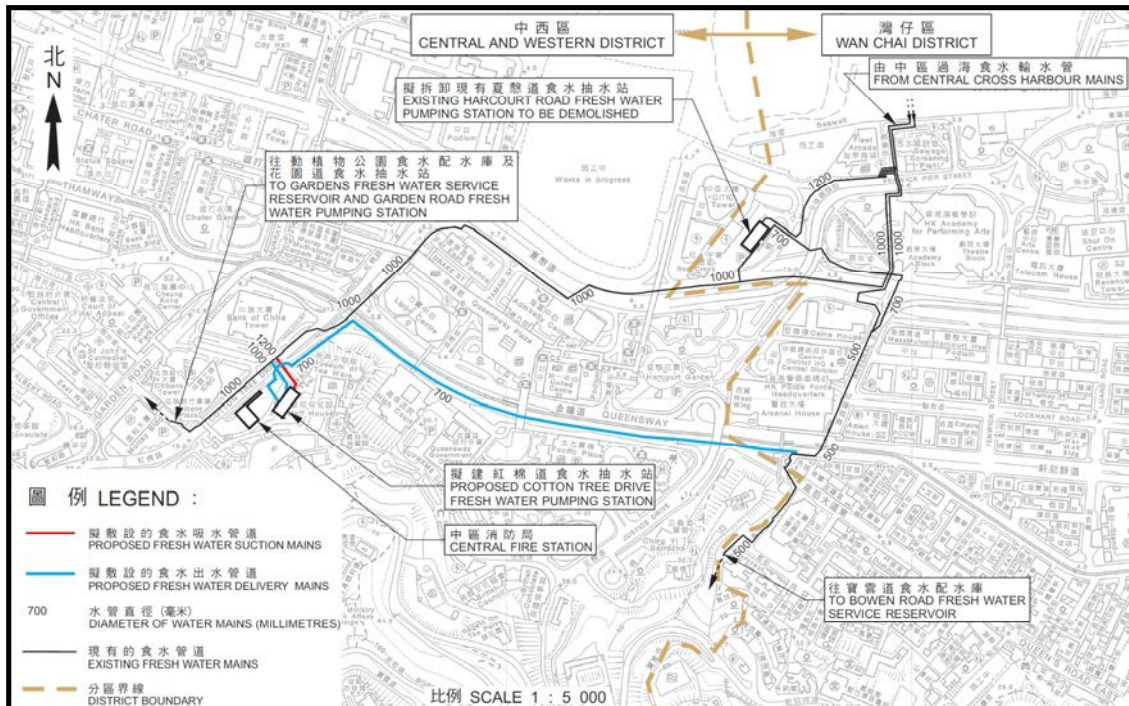


Figure 1: Layout Plan of the Project
Source: provided by WSD, modified by author



Figure 2: Site for proposed Cotton Tree Drive FWPS and Study Area for HIA
Source: provided by WSD, modified by author

1.3 Study Area for HIA

The Site for the proposed Cotton Tree Drive FWPS lies adjacent to Flagstaff House which is a declared monument protected by the Antiquities and Monuments Ordinance (Chapter 53). Hence the Study Area for the HIA has included both the Site and Flagstaff House. Boundary of the Study Area, which has been agreed with the Antiquities and Monuments Office (AMO) for use in the study brief for the HIA, is indicated by the red line shown in Figure 2. Only two heritage items within the Study Area, namely the Flagstaff House (marked by the black dotted line in Figure 3), and the old stone wall along the crest of the slope (marked by the red line in Figure 3), have been identified.

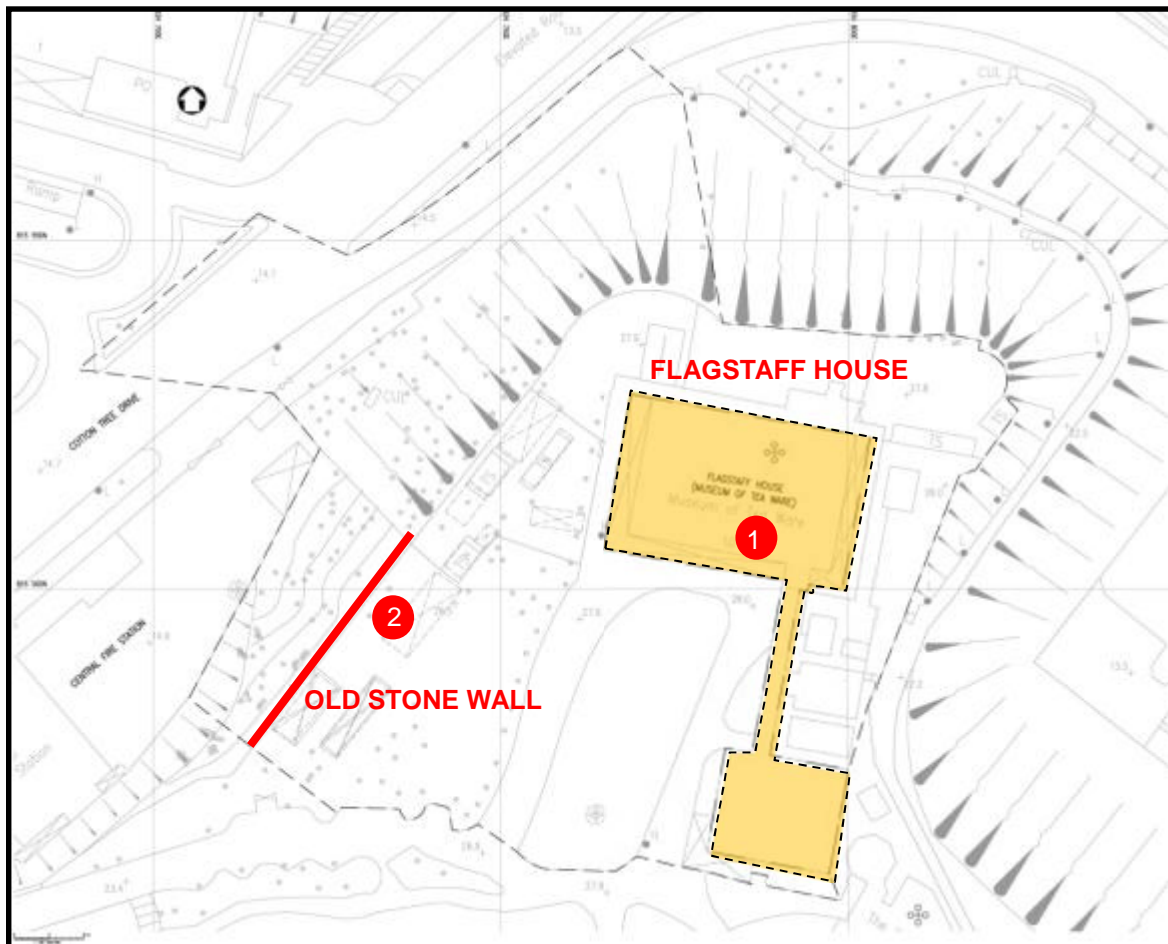


Figure 3: Layout plan showing heritage items within the Study Area
Source: provided by WSD, modified by the author

1.4 Scope of HIA

The scope of the HIA would include a comprehensive inventory of the heritage items within the Study Area, identification of the impact on the heritage items and mitigation measures for due protection of the heritage items. The HIA will make reference to the proposed design scheme, and the following issues will be

assessed and addressed in the HIA:

- 1) Understanding of the levels of significance of all the heritage items within the Study Area
- 2) Identification of all the heritage items required to be preserved and/or protected
- 3) Assessment of the impact on the heritage items due to the Project
- 4) Development of conservation policy and mitigation measures

1.5 Methodology of HIA

Though the HIA is based on the two-stage approach of Dr. J. Kerr's Conservation Plan, Stage 1 of the process for understanding the place has been modified by the use of the more comprehensive Historic Places Initiative approach.

The Venice Charter (ICOMOS), the Burra Charter (ICOMOS Australia) and the Principles for the Conservation of Heritage Sites in China (China ICOMOS), which give the established international principles in heritage conservation, will be used as the guidelines and standards for the HIA. The framework of the HIA has adopted the format of the Conservation Plan by Dr. J. Kerr, Sidney, National Trust of Australia (NSW), 7th edition (2013) with modification.

The HIA comprises the following two parts:

Part I – Baseline Study

Gather documentary, physical evidence and oral information through the following primary sources and secondary sources for assessing the significance or heritage value of the heritage items and identifying the Character Defining Elements (CDEs):

- Primary Sources
 - Site inspection with photographic records and comprehensive surveys conducted by consultants
 - Organise interview with key personnel who know the background history and operation of the buildings where applicable
- Secondary Sources
 - List of declared monuments protected by the Antiquities and Monuments Ordinance (Chapter 53)
 - List of graded historic buildings and sites
 - Government historic sites identified by the AMO
 - Proposed monument and deemed monuments

- Lists and archives kept in the Reference Library of AMO of LCSD including declared monuments and recorded historical building and structures identified by the AMO
- Publications on local historical, architectural, anthropological and other cultural studies
- Other unpublished papers, records, archival and historical documents through public libraries, archives, and the tertiary institutions such as the Hong Kong Collection and libraries of the Department of Architecture of the University of Hong Kong and the Chinese University of Hong Kong, Public Records Office, photographic library of the Information Services Department and so forth
- Historical documents in the Public Records Office, the Land Registry, District Lands Office, District Office and the Hong Kong Museum of the History and so forth
- Cartographic and photographic documents. Old and recent maps and aerial photos searched in the Maps and Aerial Photo Library of the Lands Department
- Discussion with local informants

Part II – Impact Assessment Study

- Gather information of identified issues and requirements for retention of the significance or heritage value of the heritage items, which include client's requirement, physical condition and external requirements for Impact Assessment and Mitigation Measures if necessary.
- Identify the potential impact on the heritage items due to the Project.
- Develop conservation policy and mitigation measures.

2.0 PROPOSED PUMPING STATION

2.1 Location

The proposed pumping station site is located in the Hong Kong Park, Admiralty, Hong Kong and its boundary is indicated by the dotted blue line shown in Figure 2. It is adjacent to the Cotton Tree Drive on the west, Queensway on the north, Flagstaff House on the east and the Hong Kong Park on the south.

2.2 Choice of the Site

The existing HRFWPS receives fresh water supply from Kowloon side and transfers water to the Gardens Fresh Water Service Reservoir and Garden Road

Fresh Water Pumping Station via a trunk water main running westward along Harcourt Road and Cotton Tree Drive and also to Bowen Road Fresh Water Service Reservoir via another trunk water main running eastward along Arsenal Street. The location of HRFWPS and the routings of these two trunk water mains are shown in Figure 4.

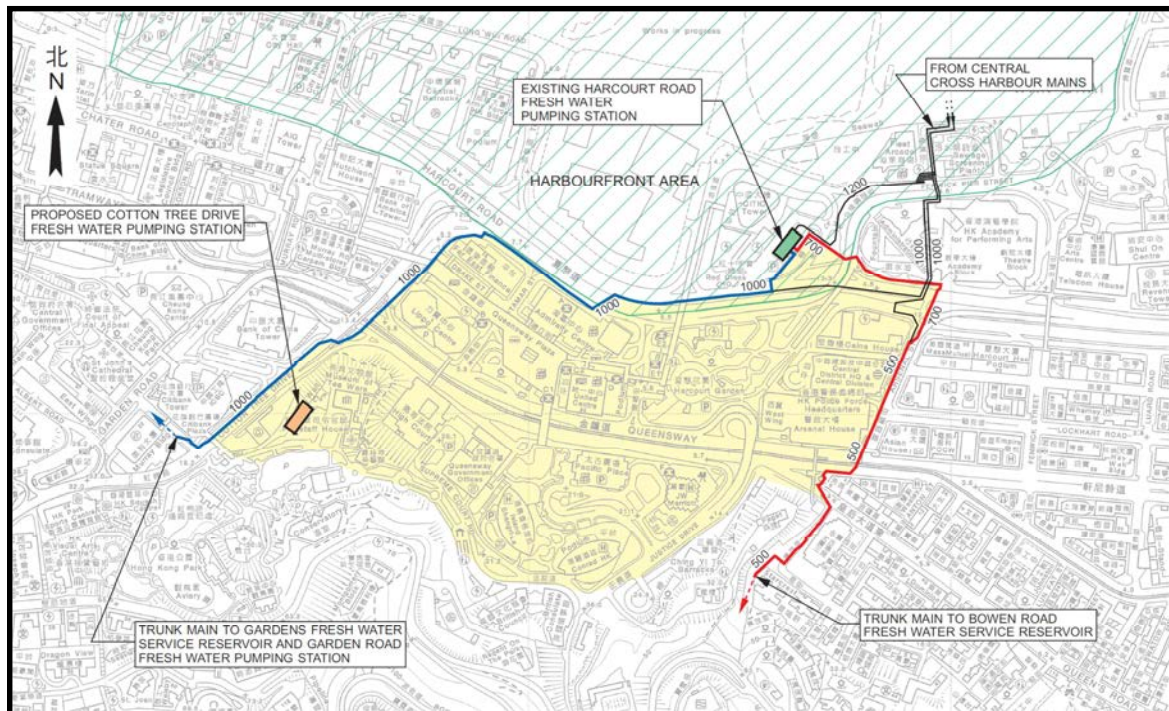


Figure 4: Location plan for existing pumping station and associated trunk mains
Source: provided by WSD, modified by author

The choice of a suitable site for the new pumping station has the following constraints:

- (a) Constraint 1 - the level of the pumping station should not be too high, otherwise, water from Kowloon side will not have enough water pressure to reach the new pumping station;
- (b) Constraint 2 - the delivery mains of the new pumping station should be connected to the above-mentioned trunk mains in order to provide water supply to the existing service reservoirs while the suction mains from the Kowloon side should be connected to the new pumping station; and
- (c) Constraint 3 – the pumping station cannot be relocated to the harbourfront area as the area will have other developments.

In view of Constraint 1, the new pumping station cannot be relocated to the peak level or mid-level. Taking Constraints 2 and 3 into account, the areas suitable for the new pumping station are limited to the areas in the Central and Wan Chai

districts between mid-level and harbourfront area. However, the above areas in Central and Wan Chai districts are all well-developed with congested commercial and/or residential buildings. As the minimum area required for the new pumping station is 1,000 m², the possible area available is only the open space at the existing Hong Kong Park. It is not recommended to locate the new pumping station within the central part of the existing park as the amenity areas available to the public will be greatly reduced and strong objection from the public will be expected.

The proposed site recommended for relocating HRFWPS as shown in Figure 2 (area coloured blue) and Figure 4 (area coloured orange) is considered ideal in fulfilling the above constraints because the site is currently a slope which forms part of the outside perimeter of the Hong Kong Park and is not accessible to the public. Also the new pumping station will not affect any current public uses within the Hong Kong Park during both construction and operation stages and will not reduce the overall amenity areas available to the public in Hong Kong Park.

2.3 Existing Topography and Site Constraint

The Site for the proposed Cotton Tree Drive FWPS slopes steeply upwards from approximately 14.20 mPD at the ingress/egress to Cotton Tree Drive at the north to 27.30 mPD along the southwest side. The topography of the Site, together with a longitudinal profile of the existing boundary wall at the crest of the slope within the Site, is shown on the drawing attached in Appendix I.

The slope within the Site abutting Cotton Tree Drive has extensive tree cover. Among the 135 trees found within the Site, 91 trees and 1 dead one are to be felled while another 26 trees are to be transplanted.

At the top of the slope, there is an existing nursery managed by LCSD to service the Hong Kong Park. This nursery is not opened to the public.

The Site for the proposed Cotton Tree Drive FWPS is constrained by the following existing features on site (see Figure 2):

- (a) the Cotton Tree Drive at the north-western edge of the Site;
- (b) the disused tunnel at the north-eastern side of the Site as shown in pink colour on Figure 5;
- (c) the Flagstaff House (Museum of Tea Ware) on the eastern side;
- (d) the Fire Station at Cotton Tree Drive at the south-western edge of the Site;

- (e) the Old and Valuable Tree within the Fire Station with part of its protection zone falling within the Site; and
- (f) the landscape area of the Hong Kong Park outside the nursery.

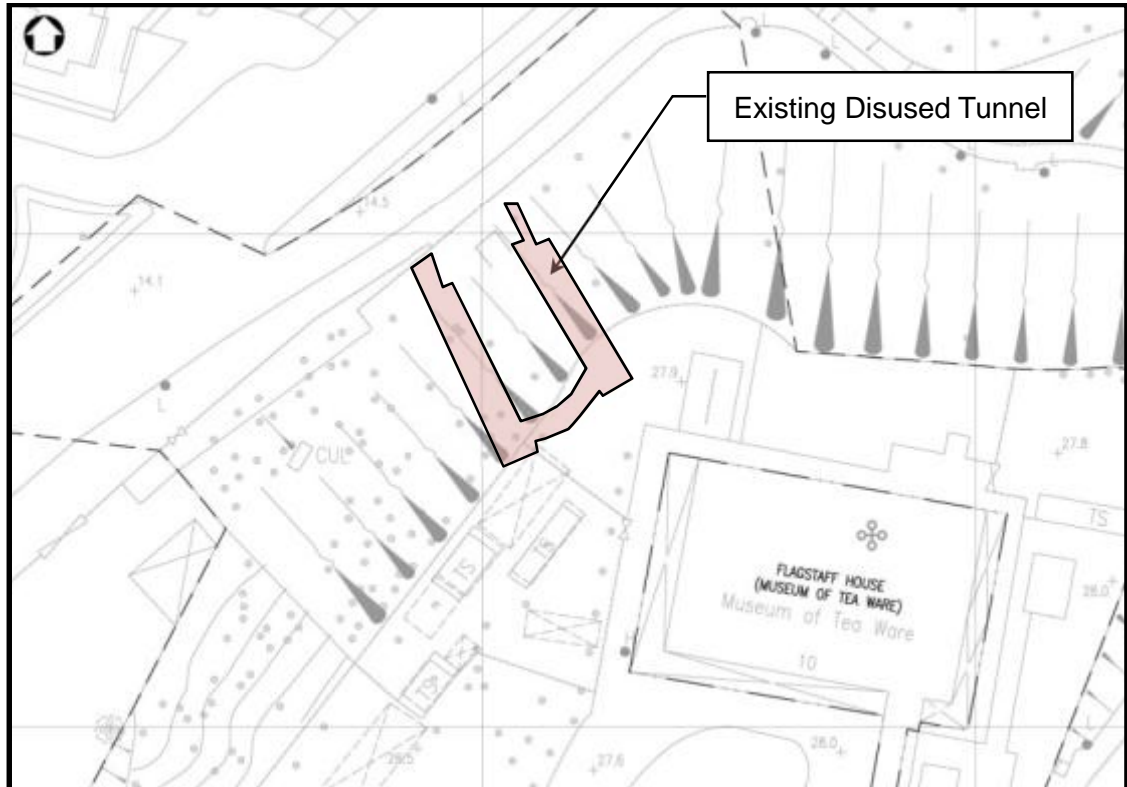


Figure 5: Plan showing the location of the existing disused tunnel
Source: provided by WSD, modified by the author

2.4 Design Scheme

Details of the design scheme for the proposed pumping station are given in the layout plan, sections and elevations in Appendix II.

Despite the site constraints as mentioned in Section 2.3 of the report and the limited space available for maneuvering of maintenance vehicles within the pumping station compound, the FWPS has been designed to be below the ground level of the Hong Kong Park and be sited as far as possible away from the monument, Flagstaff House, with only a corner of the site being at a minimum distance of 10 metres from Flagstaff House (see Figure 6). Greening is provided as much as possible by planting of trees at ground level, first floor level and on the roof of the FWPS structure and provision of vertical greening on the external façade of the building. The proposed landscape plan and section are shown in Figure 7 and Figure 8. The combination of the underground structure and the proposed planting of trees and provision of greening significantly reduces the

overall visual impact of the propose pumping station. The photomontages for the existing views and future views for the proposed pumping station at the key public viewing points are given in Appendix III.

In order to minimise the ground movement at the Flagstaff House during the construction work for the pumping station, a bored pile wall is proposed to be constructed along the boundary of the Site as shown in Figure 6.

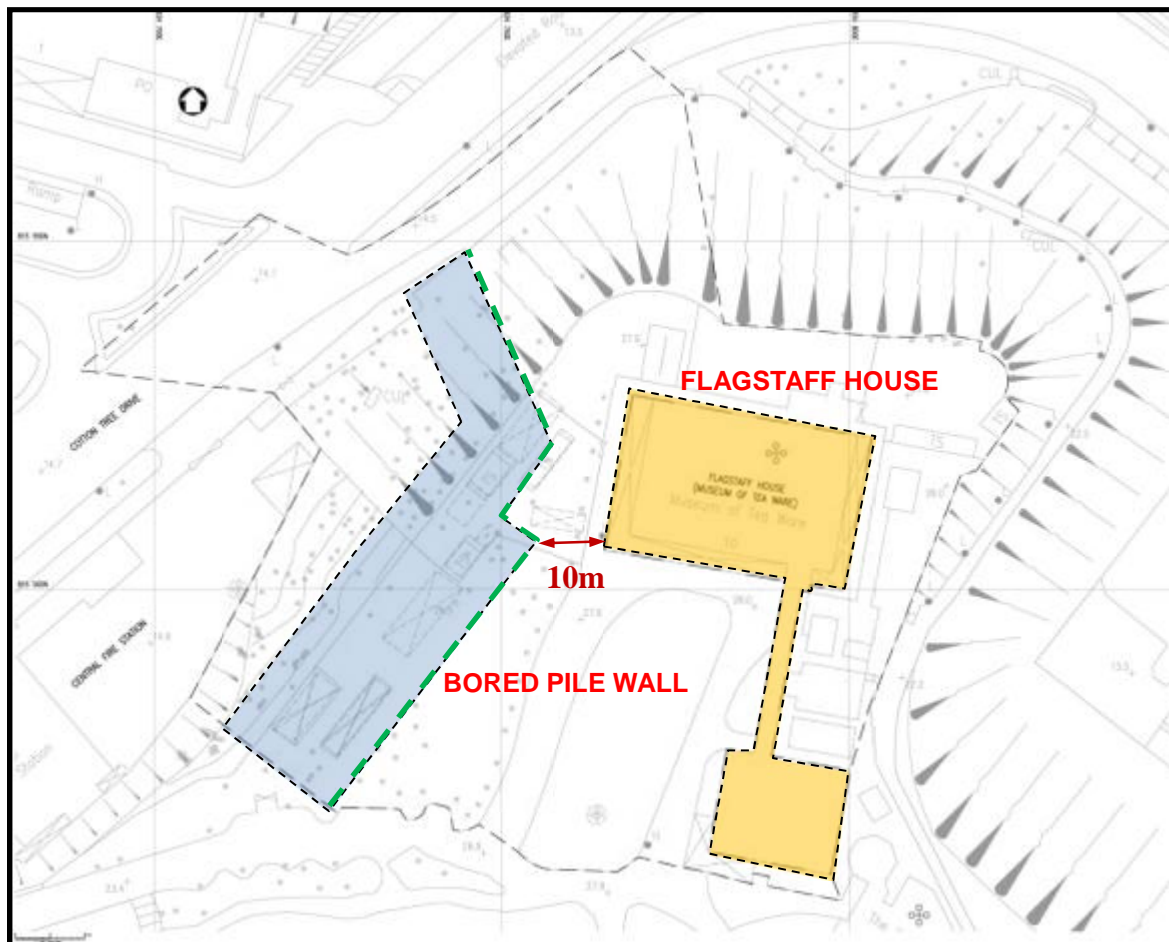


Figure 6: Separation between pumping station and monument
Source: provided by WSD, modified by author

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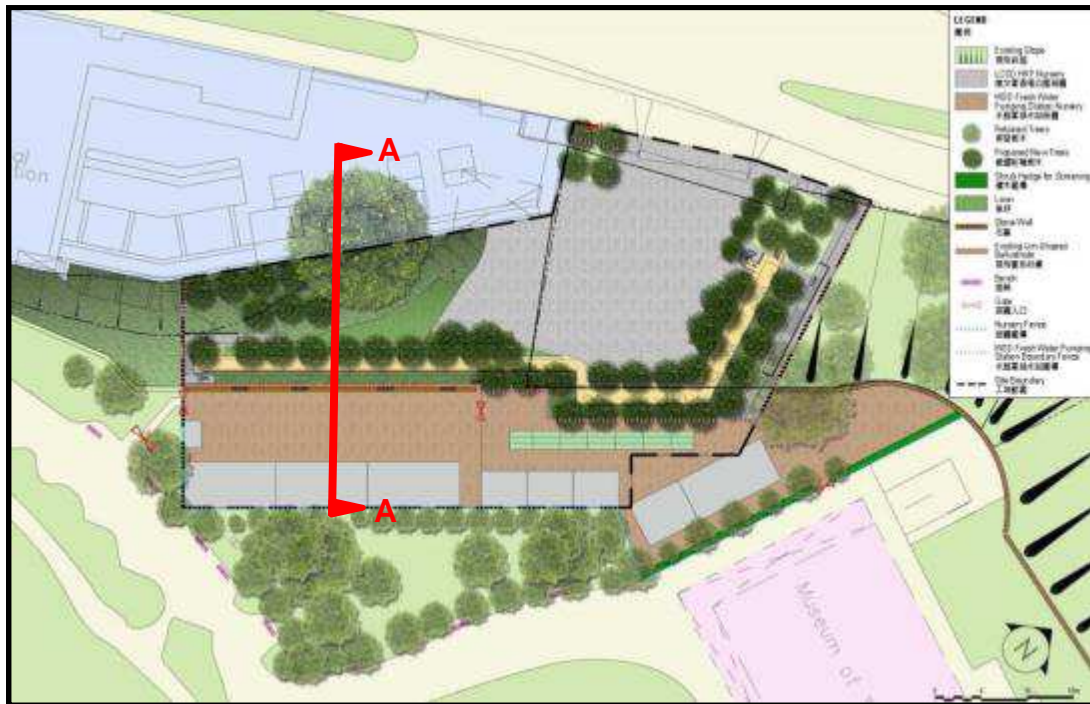


Figure 7: Proposed landscape plan
Source: provided by URBIS



Figure 8: Section of the landscape design scheme
Source: provided by URBIS

2.5 Public Consultation

Public consultation with the Wan Chai District Council and Central and Western District Council on the Project “Reprovisioning of Harcourt Road Fresh Water Pumping Station” had been made on 15 October 2013 and 17 October 2013 respectively. Both Councils did not raise any objection to the Project.

3.0 HISTORY AND DEVELOPMENT

3.1 Flagstaff House

Before Construction of Flagstaff House

The Flagstaff House was originally part of the Victoria Barracks in the Admiralty district of Central on Hong Kong Island, Hong Kong. The barracks were constructed from 1840s to 1874 and situated within the area bounded by Cotton Tree Drive, Kennedy Road and Queensway (see Figure 9). They were named for Queen Victoria, monarch at the time of construction. They were one of the first British military compounds in Hong Kong and were used by the Japanese during the Japanese occupation (1941–1945). They underwent major restoration after World War II. Part of the land was returned to the Hong Kong Government in 1967; and most of the rest of the land was transferred to the government in 1979. The Victoria Barracks together with Murray Barracks, Wellington Barracks and Admiralty Dock formed a British military zone in Central.

The British occupied Hong Kong Island after the Opium War in 1841. Jardine Matheson & Co. erected a house at the location of the present Flagstaff House (see Figure 10). In early 1840s, the land was reserved for military use which became part of the Victoria Barracks. The house erected by Jardine Matheson & Co. was then occupied by Lord Saltoun, Commander of British Forces in China. When Major-General D'Aguilar, the first Commander of the British Forces in Hong Kong visited Hong Kong in 1843, he had to lodge in a hotel. The government decided to demolish the house and built an official residence for the Major-General.

Construction of Flagstaff House

In 1844, Major Edward Aldrich, the Commander Royal Engineers, supervised the drawing up of plans and specifications of the building. The construction work of the building was completed in 1846 (see the 1851 map in Figure 11 and 1868 map in Figure 12). The name of the building at that time was Headquarters House. In 1860s cast-iron posts were added for the verandahs and in 1930s the iron posts were replaced by concrete columns. The name of Flagstaff House was adopted in 1932.

During and After World War II

During the Japanese Occupation in 1941-45, the building was occupied by Japanese admirals. After WWII, the building was resumed to its original use as the office and residence for the Commander of British Forces in Hong Kong. In

1946, a charity garden party was held in Flagstaff House for the Hong Kong Society for the Protection of Children. The Victoria Barracks were returned to the Hong Kong Government in 1978 (see the 1977 map in Figure 13). The Flagstaff House was under the management of former Urban Council in 1981. It was decided to change the use as a special museum. The Flagstaff House Museum of Tea Ware was opened in 1984.

Declaration as Monument

The building was gazetted as a Monument in 1989. It is protected under the Antiquities and Monuments Ordinance. After the opening of the Hong Kong Park in 1991, the Flagstaff House became one of the attractions of the Park. There is no other historical building or element within the Study Area.

The timeline for the history and development of Flagstaff House is summarised below:

- 1841 – British occupied Hong Kong. Jardine Matheson & Co. erected a house at the location of the present Flagstaff House
- 1842 – The land was reserved for military use (Victoria Barracks). The house erected by Jardine was occupied by Lord Saltoun, Commander of British Forces in China
- 1843 – Major-General D'Aguilar, the first Commander of the British Forces in Hong Kong visited Hong Kong. He had to lodge in a hotel
- 1844-46 – Demolished the Jardine's house and constructed Flagstaff House
- 1846 – Completion of Flagstaff House. Original name was Headquarters House
- 1860s – Cast-iron posts were added for the verandahs
- 1930s – Iron posts were replaced by concrete columns
- 1932 – The name of Flagstaff House was adopted
- 1941-45 – Flagstaff House was occupied by Japanese admirals
- 1945 – Flagstaff House resumed to its original use after WWII
- 1946 – Charity garden party was held in Flagstaff House
- 1978 – Return of the site to the Hong Kong Government
- 1981 – Flagstaff House was under the management of former Urban Council
- 1984 – Flagstaff House Museum of Tea Ware was opened
- 1989 – Flagstaff House was gazetted as a Declared Monument
- 1994 – Flagstaff House became part of the Hong Kong Park

All relevant historic plans for Flagstaff House are attached in Appendix IV.

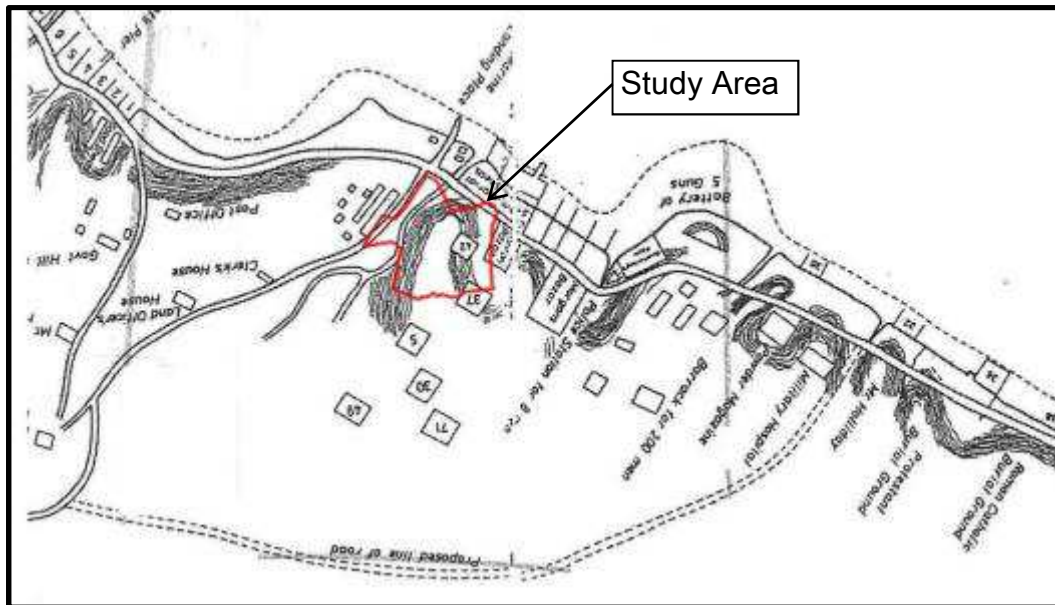


Figure 9: Pottinger's map of 1842 before construction of Flagstaff House
Source: *Mapping Hong Kong: a historical atlas*, modified by the author

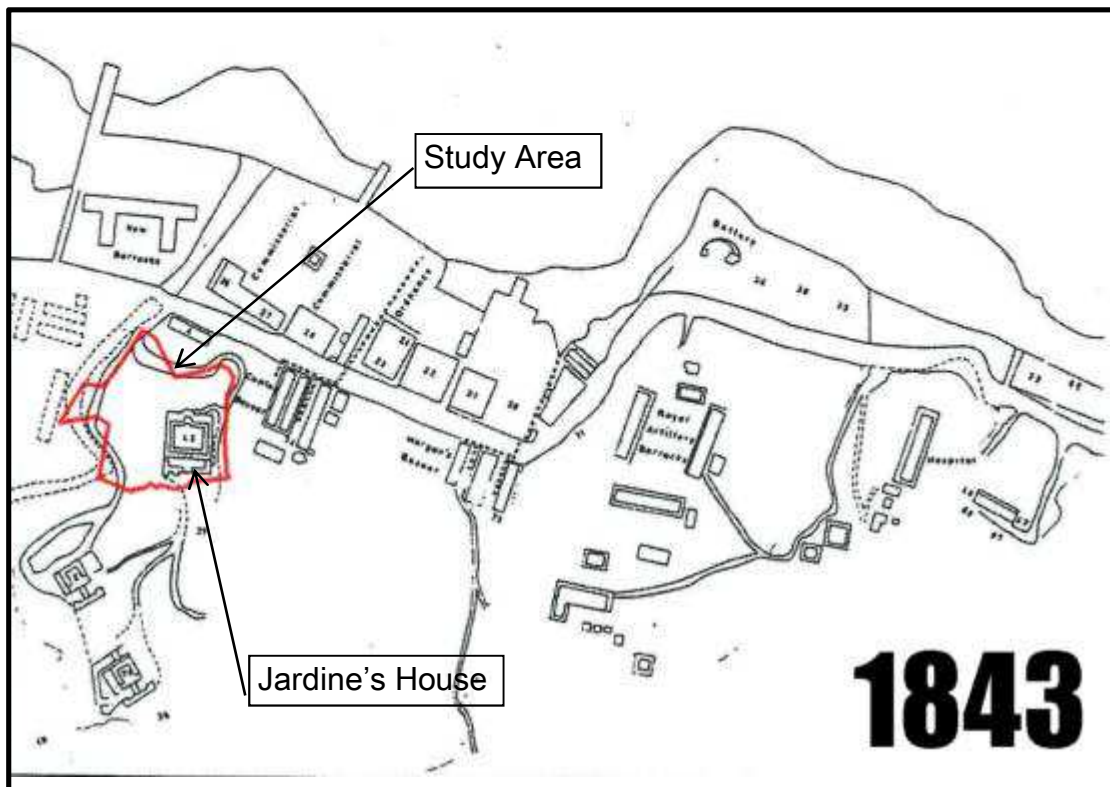


Figure 10: 1843 map of Central with Jardine's House at the location of later Flagstaff House
Source: *Mapping Hong Kong: a historical atlas*, modified by the author

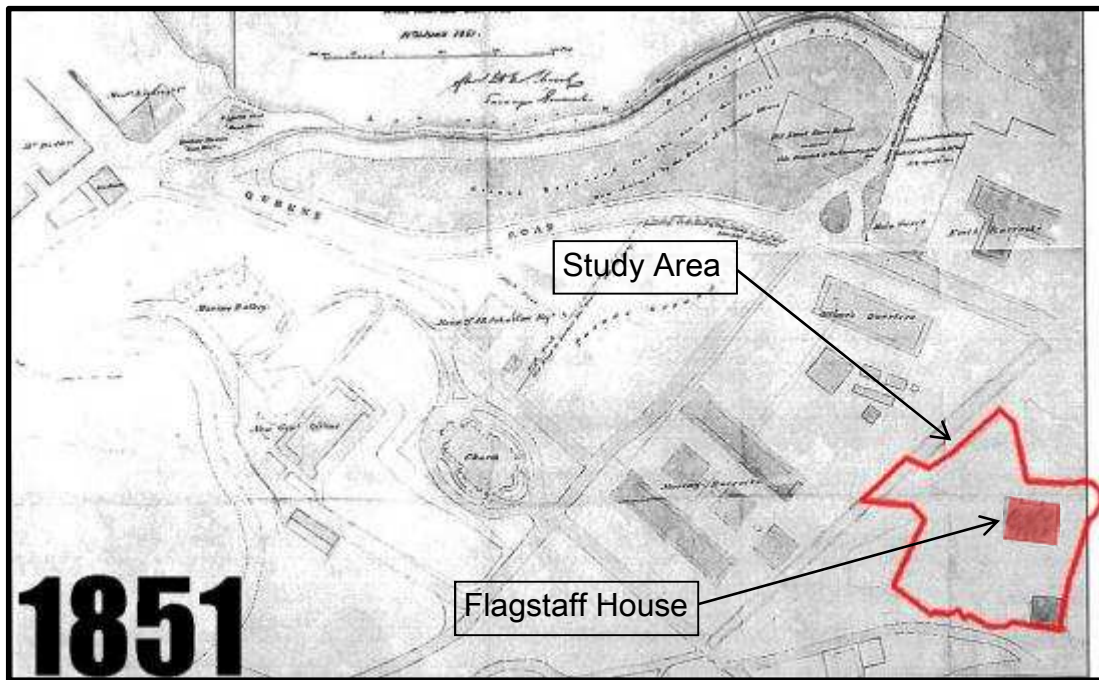


Figure 11: 1851 map of central area with Flagstaff House appearing for the first time
Source: *Mapping Hong Kong: a historical atlas*, modified by the author

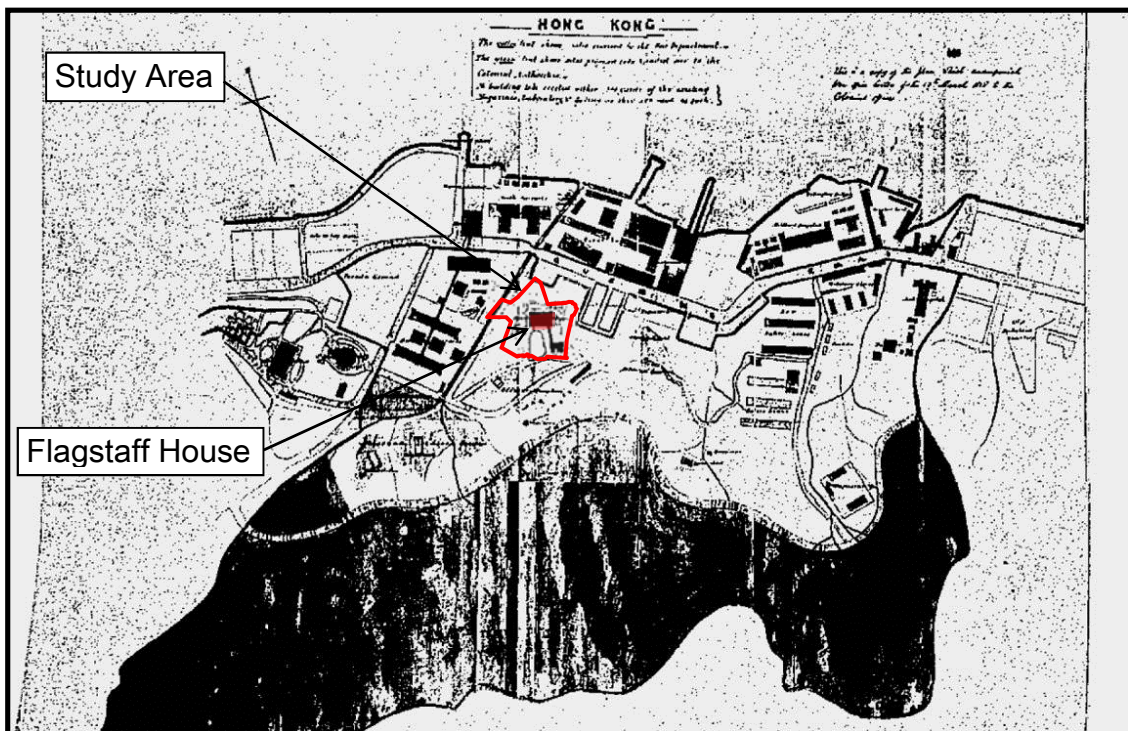


Figure 12: 1868 map of the barracks
Source: *Victoria Barracks, 1842-1979*, modified by the author

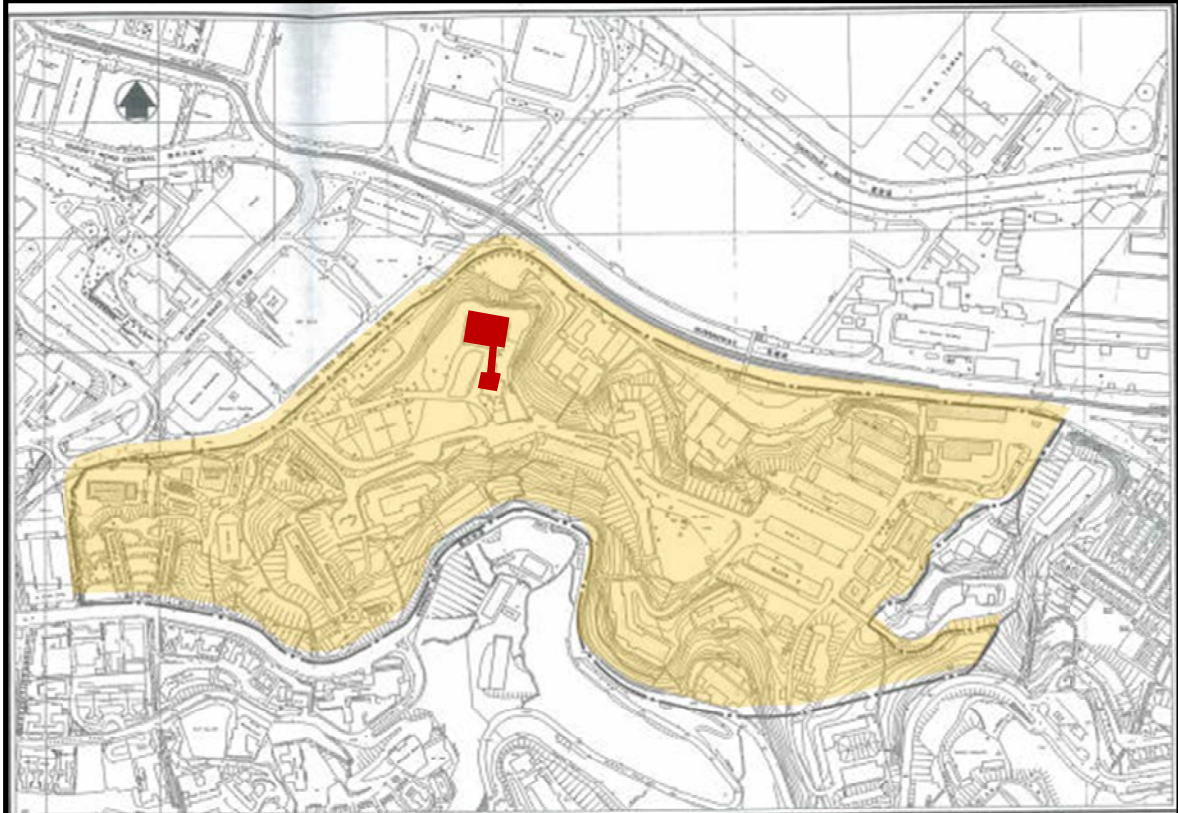


Figure 13: 1977 map of the barracks (the Barracks highlighted in yellow and Flagstaff House in red)
Source: *Victoria Barracks, 1842-1979*, modified by the author

3.2 Boundary walls/balustrade

Along the crest of the slopes surrounding Flagstaff House, there are different types of boundary walls as shown on the 1993 plan in Figure 15. On the eastern side of the Study Area, there is an existing stone wall which lies outside the Site and is unaffected by the project (see the wall coloured in yellow on Figure 15). This part of the stone wall had two parts, with one part looking older than the other (see the photo in Figure 16). As highlighted in blue in Figure 15, there are urn-shaped balustrades (see Figure 17) at the north edge of the Study Area.

Based on the 1993 plan (see Figure 15), the northern part of the boundary wall was to be constructed with urn-shaped balustrades at that time with the existing stone wall remaining on the western and eastern sides. The design of the balustrades complied with the building regulations with a minimum 1.1m height and a spacing between urns of less than 100 mm. In comparison with the 1993 plan and the extent of the stone wall shown in Figure 14, the stone wall was demolished and the balustrades were extended further south.

As highlighted in red in Figure 15, there is a section of the stone wall falling within the Site. The stone laying pattern of this stone wall suggested that this is an old

wall and was a part of the Victoria Barracks (see Figure 18). From the article by Clive Lucas in 1981, the encircling stone wall has been there since at least 1889. With reference to the photo in the 1860s (see Figure 14), there was a stone boundary wall along the crest of the slopes. The wall was much longer than the existing one. It had the same height throughout its length, but the existing wall has sections with different heights. It is lower in height especially at the junction with the balustrade and the stone wall outside the Site (see Appendix I). Thus, it is assumed that the upper part of the stone wall might be damaged over the years and was subsequently repaired, resulting in a lower height of the wall.

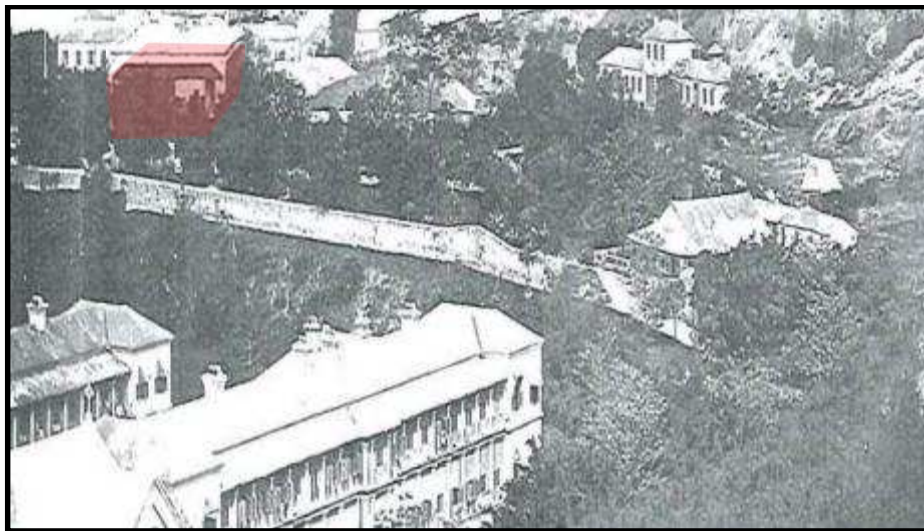


Figure 14: 1860 photo of the neighboring site, from where the stone wall is clearly seen (with Flagstaff House highlighted in red)
Source: *Victoria Barracks, 1842-1979*

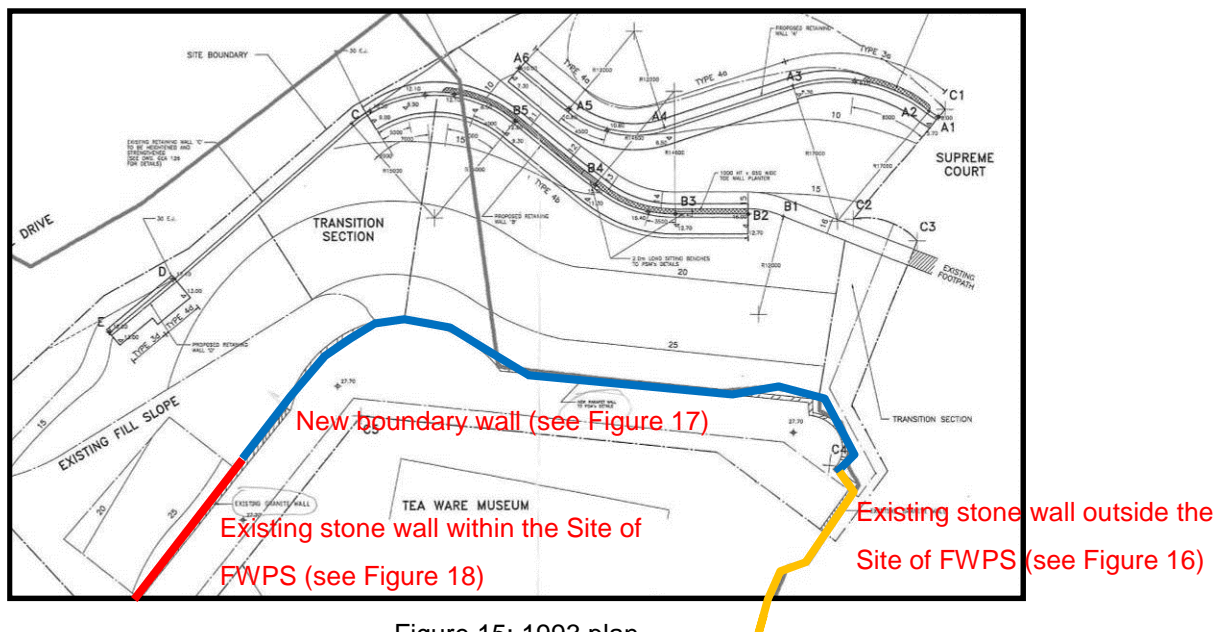




Figure 16: Photo of existing stone wall outside the Site of FWPS
Source: photo by the author



Figure 17: Photo of balustrade
Source: photo by the author



Figure 18: Photo of existing stone wall within the Site of FWPS and a close-up of the damaged capping stone
Source: photo by the author

3.3 Slope abutting Cotton Tree Drive

The slope abutting Cotton Tree Drive within the Study Area will be used for the proposed pumping station. It does not have any building or historic element. According to the historical maps and photo, the slope has been in existence since

early 1840s (see Figure 19 and Figure 20).



Figure 19: Existing slope photo
Source: photo by the author



Figure 20: 1977 slope photo
Source: Public Records Office

3.4 Existing disused tunnel

There is an existing underground disused tunnel at the north-eastern side of the pumping station site as marked in Figure 5. Geotechnical Engineering Office of Civil Engineering and Development Department does not have detailed record of

this disused tunnel. The U-shape disused tunnel is reckoned to be used for shipment of ammunition during the war time and might have been abandoned or filled up after the war time. This tunnel will not be affected by this project.

3.5 Adjoining landscape area

The adjoining landscape area was there since the completion of Flagstaff House. The building is located at the hill top and is surrounded by slopes at the northern side from east to west. A small piece of garden is in front of the building on the north which remains unchanged since then. For the landscape area at the southern side of the building (see Figure 21), from the lithograph in 1847 (see Figure 22), the landscape pattern was similar to that of today. The only difference is that there was a path cutting the landscape area into two parts. From the map in 1874 (see Figure 23), the path disappeared and this pattern has been maintained up to now. The area to the east of Flagstaff House is occupied by the building services for the museum. The north-west corner is used by LCSD as maintenance area and part of the western side as a nursery area which is now not accessible to the public.

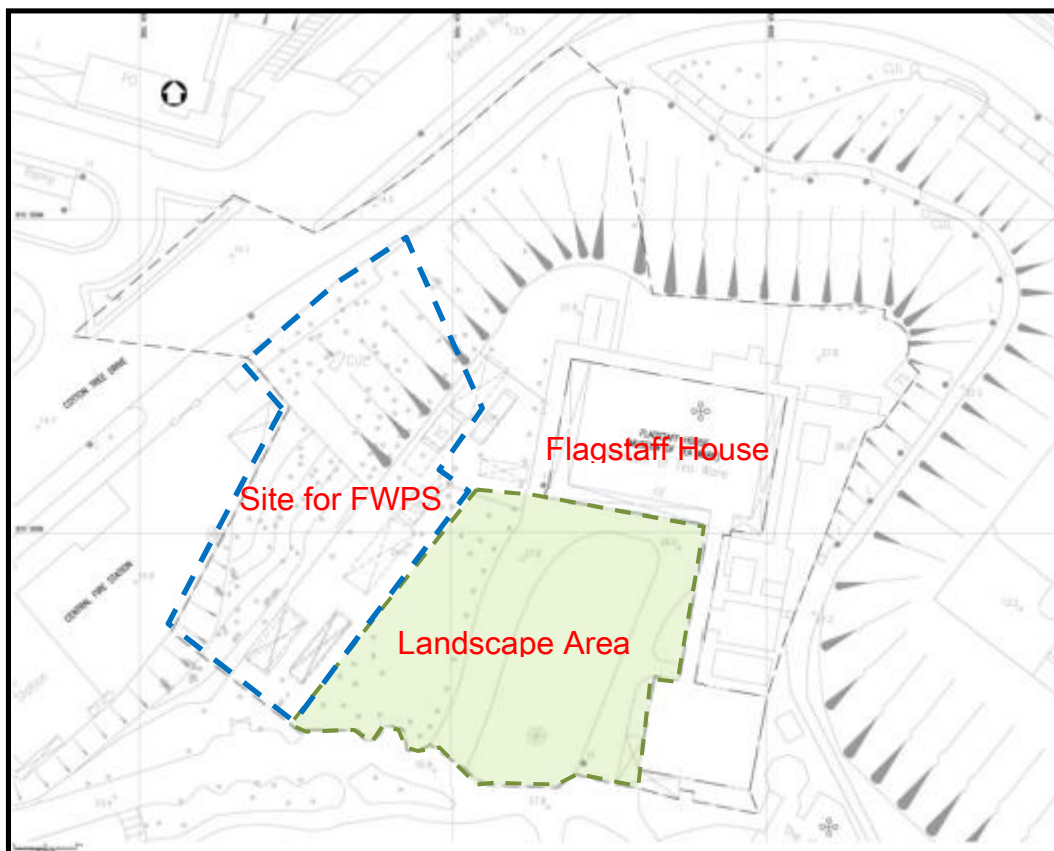


Figure 21: Existing landscape area to the south of Flagstaff House
Source: provided by WSD, modified by author

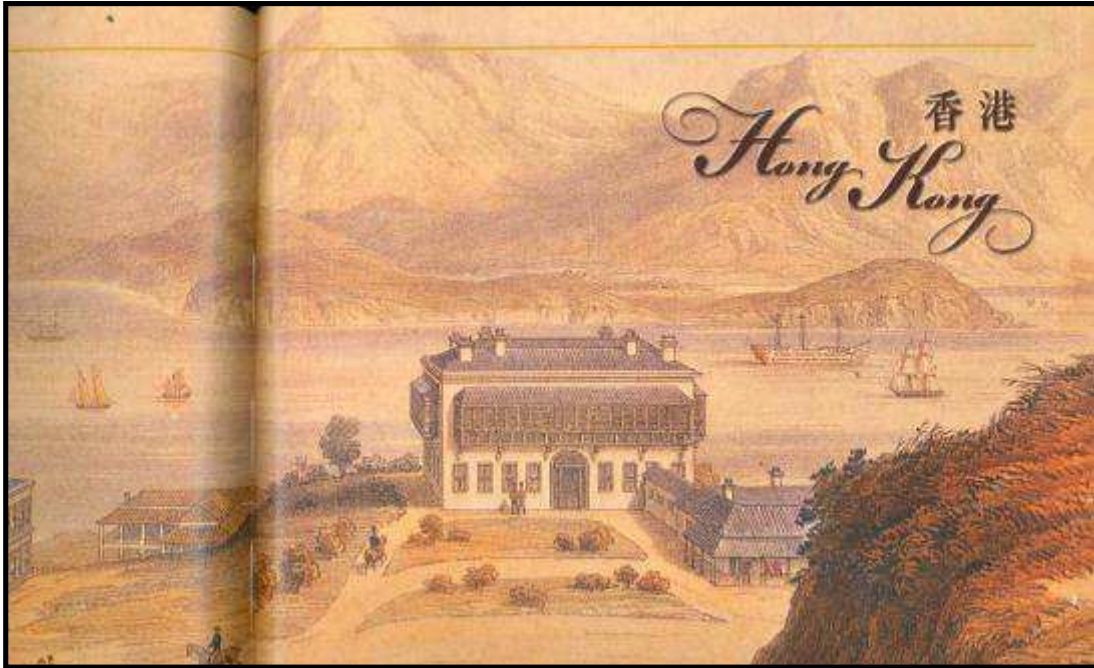


Figure 22: 1847 lithograph
Source: *The Chater Legacy*, a section of the Chater Collection



Figure 23: 1874 map
Source: *Victoria Barracks, 1842-1979*, modified by the author

Just at the southern boundary of the Study Area, a statue, a fountain and a navy stone (see Figure 24) can be found within the landscape area of the HK Park.

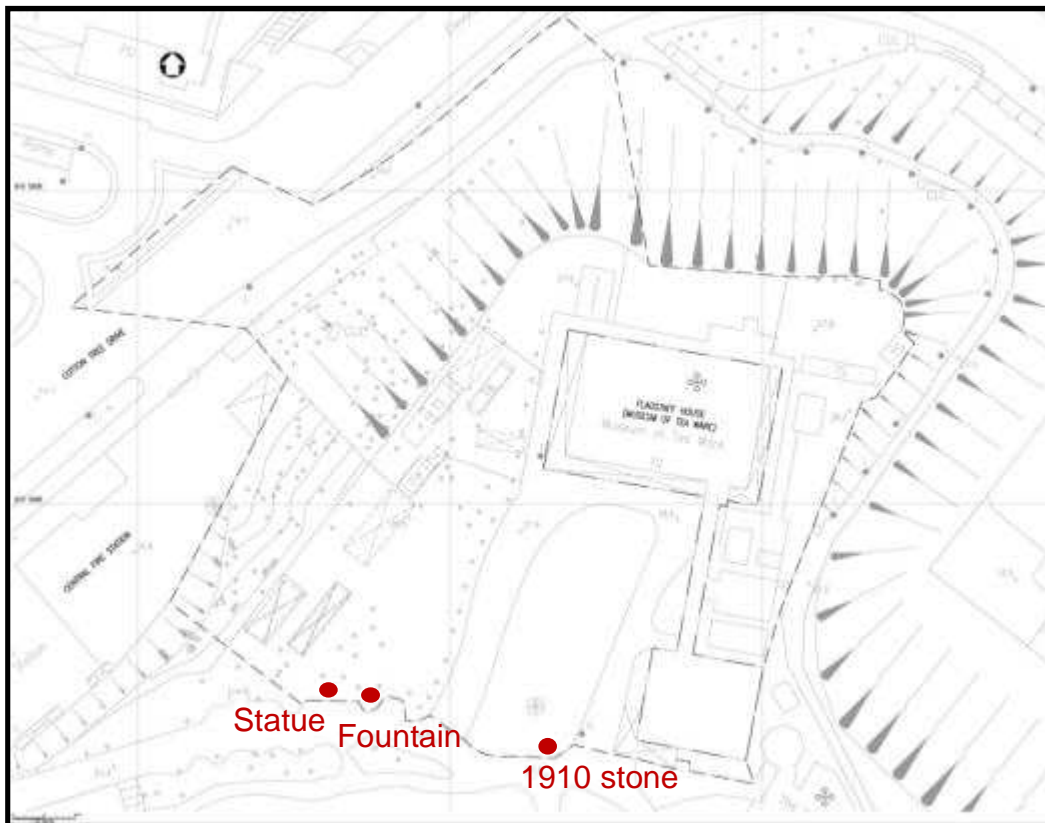


Figure 24: Locations of statue, fountain and navy stone
Source: provided by WSD, modified by the author

Statue

At the southern edge of the Study Area (see Figure 24 for the location plan), there is a statue of a Canadian British Army (see Figure 25) for the First World War. This statue was originally placed in Eucliff of Yu Family, Repulse Bay and was donated by the Yu Family to the British Garrison when Eucliff was demolished in 1980s. The British Garrison erected the statue on this site which was once Victoria Barracks to commemorate the presence of a British Garrison in Hong Kong and in memory of John Robert Osborn and Winnipeg Grenadiers. It forms a reminder of the historic background of the park.



Figure 25: Statue & Plaque
Source: photo by the author

Drinking Fountain

Near the statue (see Figure 24 for the location plan), there is a drinking fountain (see Figure 26) designed by Hans Muhr to commemorate 150 years of water supply in Hong Kong in 2001 next to the Statue.



Figure 26: Drinking Fountain
Source: photo by the author

Navy Stone

There is a navy stone of 1910 (see Figure 27) on the lawn at the south of the landscaped area (see Figure 24 for the location plan). The Stone represented the boundary of the enlarged Royal Naval Dockyard in 1910. It seems that the original location of the stone was not at this position. It was once erected in the Barracks area and relocated to the present location before 2001.



Figure 27: Navy Stone
Source: photo by the author

The statue, drinking foundation and navy stone will not be affected by this project.

4.0 STATEMENT OF SIGNIFICANCE

This is a statement to summarise the heritage values of various elements within the Study Area. The building fabric/elements have different levels of significance. This assessment of significance for the building fabric/elements is to facilitate decisions to be made on the future conservation of the historic place concerning the establishment of conservation guidelines, recommended treatments for the building fabric as well as the interpretation for the historic place. The categories of assessment are based on the Conservation Plan by Dr. J. Kerr.

Level of Significance	Meaning
Exceptional	Where an individual space or element is assessed as displaying a strong contribution to the overall significance of the place. Spaces, elements or fabric exhibit a high degree of intactness and quality, though minor alterations or degradation may be evident.
High	Where an individual space or element is assessed as making a substantial contribution to the overall significance of the place. Space, elements of fabric originally of substantial quality, yet may have undergone considerable alteration or adaptation resulting in presentation, which is either incomplete or ambiguous
Moderate	Where an individual space or element is assessed as making a moderate contribution to the overall significance of the place. Spaces, elements or fabric originally of some intrinsic quality, and may have undergone alteration or degradation. In addition, elements of relatively new construction, where the assessment of significance is difficult, may be included.
Low	Where an individual space or element is assessed as making a minor contribution to the overall significance of the place, especially when compared to other features. Spaces, elements or fabric originally of little intrinsic quality, any may have undergone alteration or degradation. This category also includes original spaces, elements or fabric of any quality which have undergone extensive alteration or adaptation to the extent that only isolated remnants survive.
Neutral	Where an individual space or element is assessed as having an unimportant relationship with the overall significance of the place. Spaces elements or fabric are assessed as having little or no significance
Intrusive	Where an individual space or element detracts from the appreciation of cultural significance, by adversely affecting or obscuring other significant areas, elements or items.

4.1 Historical Value

4.1.1 Flagstaff House

Flagstaff House became a part of the Victoria Barracks since 1846 until 1979. The Victoria Barracks, being a British military zone in the central location of Hong Kong for over 130 years from 1840s to 1979, signify the ruling of British Forces in the British colony. Flagstaff House is the oldest surviving colonial style building in Hong Kong completed in 1846. It was the residence for the highest power in the military, thus indicating the importance of the place in the history of Hong Kong.

4.1.2 Old stone wall

About 35 m length of the existing old stone wall (labeled as (2) in Figure 3) falls within the boundary of the Site for the proposed pumping station. This stone wall forms part of the boundary wall of the Flagstaff House and has a history of over 150 years (see the 1860 photo of the stone wall in Figure 14). Though the top part of the stone wall had collapsed/had been removed in the past, the stone wall is considered to have a moderate level of significance.

4.2 Contextual Value

Flagstaff House is sited on a strategic location of Hong Kong Island, overlooking the center of Victoria harbor. It was located next to the traditional central business district. The building, together with other historical buildings still remaining from the original Victoria Barracks, now becomes a part of the Hong Kong Park (See Figure 28 below). They are (i) **Wavell House**, the former quarters for married British officers, currently accommodating the Education Centre (see Figure 29), (ii) **Rawlinson House**, former residence for the Deputy Commander British Forces, currently accommodating the Park Management Office and the Cotton Tree Drive Marriage Registry (see Figure 30), (iii) **Cassels Block**, former barracks for married British officers, currently accommodating the Hong Kong Visual Arts Centre (see Figure 31), (iv) **Montgomery Block** currently home to Mother's Choice Limited (see Figure 32), and (v) **Roberts Block** currently used as Jockey Club New Life Hostel of the New Life Psychiatric Rehabilitation Association (see Figure 33). The cultural landscape of Flagstaff House is considered to have a high level of significance.

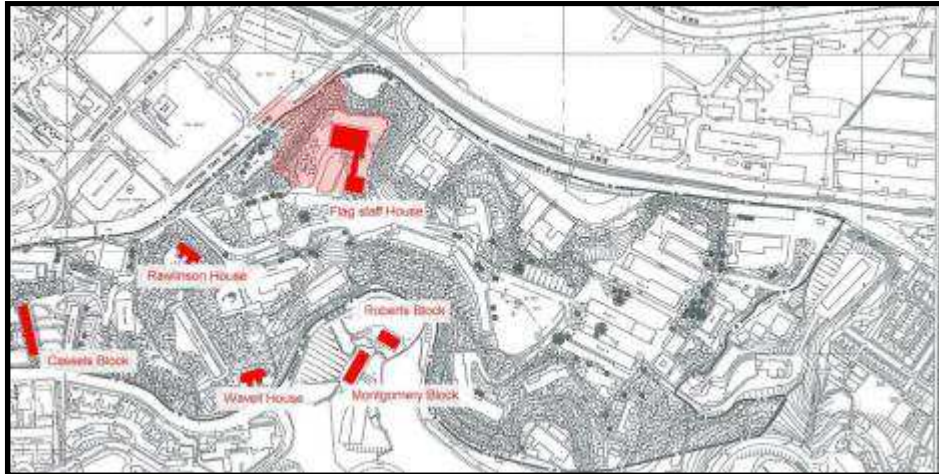


Figure 28: Layout plan of Hong Kong Park
Source: *Victoria Barracks, 1842-1979*, modified by the author



Figure 29: Wavell House (outlook in 2007)
Source: <http://www.lcsd.gov.hk/parks/hkp/en/background.php>



Figure 30: Rawlinson House (outlook in 2007)
Source: <http://www.lcsd.gov.hk/parks/hkp/en/background.php>

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Figure 31: Cassels Block (outlook in 2007)

Source: <http://www.lcsd.gov.hk/parks/hkp/en/background.php>



Figure 32: Montgomery Block (outlook in 2007)

Source: http://en.wikipedia.org/wiki/File:MothersChoice_KennedyRdCentralAdminOffice.jpg



Figure 33: Roberts Block (outlook in 2007)

Source: http://en.wikipedia.org/wiki/File:Old_Victoria_Barracks,_Roberts_Block_2012.jpg

4.3 Social Value

The Flagstaff House as part of the Victoria Barracks was originally used for military purpose. As the residence of the Major-General, it had high security. This was a restricted area. Ordinary people could not enter the place without special permission. A charity garden party was held in Flagstaff House, in aid of the Hong Kong Society for the Protection of Children in 1946. Not until the handover of the building to Hong Kong Government in 1979 and taking-over of the building by former Urban Council for public use in 1984 as the Museum of Tea Ware (see Figure 34), there was no connection to the general public. The change from private to public use started the social connection. It is one of the most famous cultural tourist attractions in Hong Kong.



Figure 34: Tea Ware Museum photo

Source: http://zh.wikipedia.org/wiki/File:HK_Museum_of_Tea_Ware_2012.jpg

4.4 Architectural Value

Flagstaff House has a two-storey main block connected to a single-storey service block by a covered walkway. There are different opinions on who was the designer of the building. According to the original plan drawn in 1844 (see Figure 35), the name of Edward Aldrich, the first Commander Royal Engineer in Hong Kong, was found. Like other colonial building design in the region at that period, it was common that the design was modified from the architectural pattern books. It was similar to the Indigo Jones' elevation drawing of Queen's House at Greenwich, London (see Figure 36 and Figure 37).

REPROVISIONING OF HARCOURT ROAD FRESH WATER PUMPING STATION

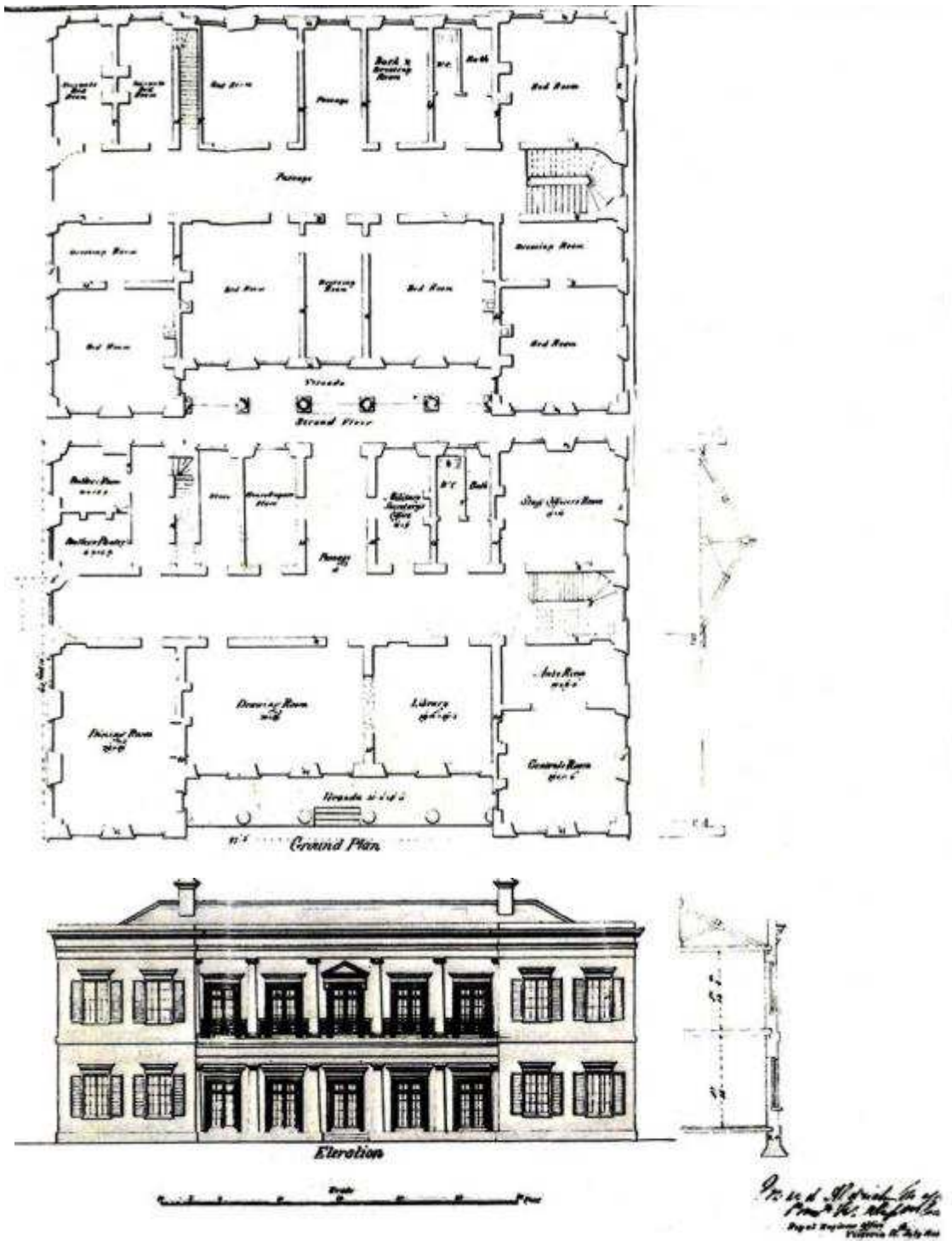


Figure 35: Copy of original plan drawn in 1844 signed by Edward Aldrich
Source: *Victoria Barracks, 1842-1979*



Figure 36: Photo of Queen's House

Source: <http://media.web.britannica.com/eb-media/26/116026-004-892BC4EC.jpg>

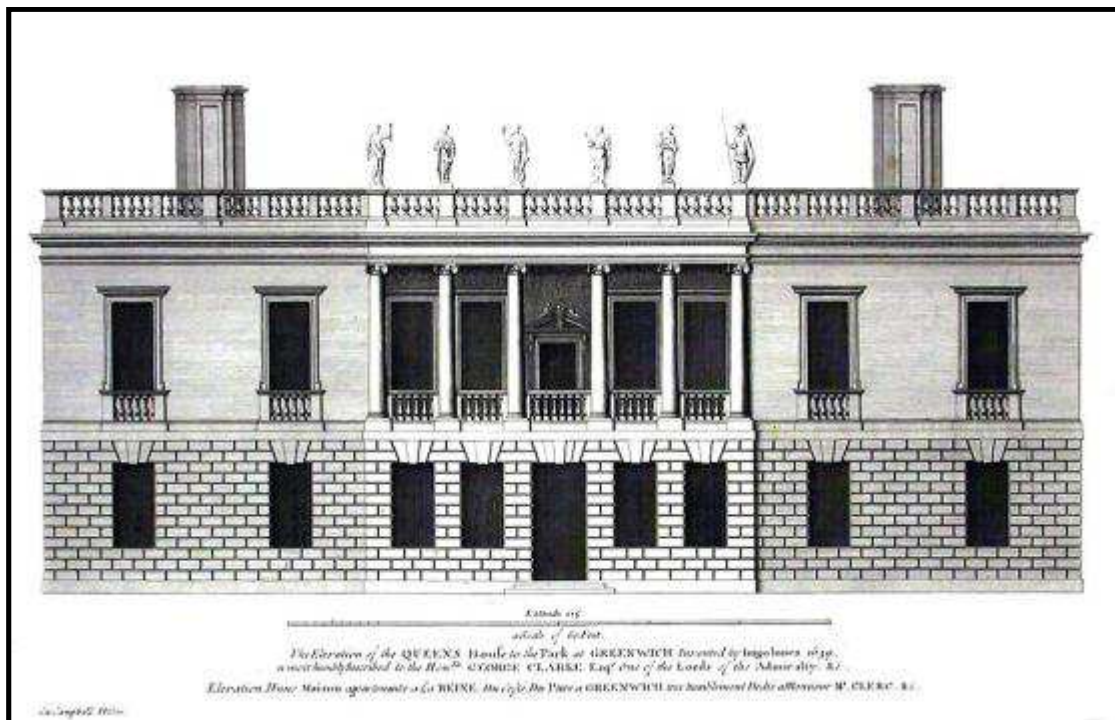


Figure 37: Elevation drawing of Queen's House

Source: provided by Hoyin Lee

The house was modeled on Greek Revival Style. The original design as seen in the early painting (see Figure 38) shows the north side facing the harbour with a central colonnaded verandah on both floors and cantilevered wooden balconies on brackets on the remaining three sides of the building. Horizontal bands of

sun breakers were installed at the top of the first floor verandah and also around the balconies.

From the painting in the 1860s (see Figure 39), the balconies were supported by cast iron posts. The posts can be more clearly seen from photos in the 1890s (see Figure 40). Before 1897, it had been rebuilt as two-storey iron structure incorporating bathrooms. The cast iron posts were replaced by concrete columns in the 1930s (see Figure 41). The main door was shifted one bay to the west and a porch was added. These were restored as far as possible to its original mid-nineteenth-century appearance in the construction work of the Tea Ware museum in 1982 (see Figure 42). Up to present moment, there is no change in the appearance of Flagstaff House (see Figures 43 to 45). The building is the oldest surviving domestic building in colonial style in Hong Kong, representing the early period of Hong Kong city. Although the building was restored in 1982, the authenticity is largely retained and the building elements reflecting the character of the monument are considered to have a high level of architectural significance.



Figure 38: 1846 painting

Source: http://www.archsd.gov.hk/archsd/html/teachingkits/tk3/central/accessibleversion/tc/acc_flagstaff/1844.html



Figure 39: 1860 north-east façade

Source: http://sc.archsd.gov.hk/utf8/www.archsd.gov.hk/archsd/html/teachingkits/tk3/central/accessibleversion/tc/acc_flagstaff/1860s.html



Figure 40: 1890 photo with cast-iron posts clearly seen

Source: http://sc.archsd.gov.hk/utf8/www.archsd.gov.hk/archsd/html/teachingkits/tk3/central/accessibleversion/tc/acc_flagstaff/1860s.html

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Figure 41: 1930s drawing after cast-iron posts were renewed to concrete
Source: <http://hkas.org.uk/membership-offers>



Figure 42: 1981 photo
Source: http://sc.archsd.gov.hk/b5/www.archsd.gov.hk/archsd/html/teachingkits/TK3/central/accessibleversion/tc/acc_flagstaff/1981.html



Figure 43: Current condition of Flagstaff House without the porch at the entrance
Source: <http://www.flickr.com/photos/22956367@N06/2200718531/sizes/z/in/photostream/>



Figure 44: Current condition of Flagstaff House
Source: http://upload.wikimedia.org/wikipedia/commons/5/5d/Museum_of_Tea_Ware.JPG



Figure 45: Current condition of the annex of Flagstaff House
Source: photo by the author

5.0 DEVELOPMENT OF CONSERVATION POLICY AND MITIGATION MEASURES

5.1 User's Requirement

The applicant, WSD, has proposed the construction of Cotton Tree Drive FWPS within an existing slope of Hong Kong Park adjacent to Flagstaff House. The roof of the Cotton Tree Drive FWPS will be flushed with the existing ground level of the Hong Kong Park's nursery managed by LCSD.

5.2 Fabric/Elements to be preserved or protected

Flagstaff House

The declared monument, Flagstaff House, is at a minimum distance of approximately 10 metres away from the site for construction of the pumping station. It is now of good condition and used as the Museum of Tea Ware under the management of LCSD. The Flagstaff House has a beam and column structure with pad footings resting on a reinforced concrete slab.

ArchSD was consulted and their comments are given in their memo attached to Appendix V. The allowable settlement, tilting and vibration for the building are 12.5 mm, 1/500 and 7.5 mm/s respectively. However, AMO has advised that settlement and vibration to the Flagstaff House should be limited to the following alert/alarm/action limits for monitoring check points, which are much more stringent than ArchSD's requirements:

	Alert level	Alarm level	Action level
Building Settlement	6mm	8mm	10mm
Tilting Check Point	1/2000	1/1500	1/1000
Vibration Check Point	2.0mm/s	2.5mm/s	3.0mm/s

The Museum of Tea Ware was also consulted. They did not object to the construction works at the design stage and requested WSD to provide details of the monitoring proposal and mitigation measures at the construction stage.

Boundary wall/balustrade

About 35 m length of the existing historic stone wall located at the crest of the slope falls within the site for construction of the pumping station.

Existing disused tunnel

The existing disused tunnel lying at the north-eastern side of the pumping station site as marked in Figure 5 will be preserved and protected during the course of construction of the pumping station.

Adjoining landscape area

The landscape items including the statue, drinking fountain and navy stone lying at the southern boundary of the Study Area are considered to have a low value for consideration under the HIA. However these landscape items, together with the landscape surrounding the Flagstaff House and the spatial configuration, will be preserved and protected in the design and during the course of construction of the pumping station.

5.3 Potential impact and mitigation measures

The potential impact arising from this project is assessed, based on the following levels of impact:

High	An impact that significantly alters or obliterates significant characteristics of the heritage resource
Medium	An impact that alters the character or surroundings of the heritage resource, but is consistent with existing and emerging trends
Low	An impact capable of measurement but with no alterations of significant characteristics
No	No impact arising from the project

Flagstaff House

Potential Impact

The potential impact on the monument, Flagstaff House, has been assessed for various stages of the project, including planning stage, construction stage and operation stage, and is summarised below:

Stage	Level of impact
Planning stage	No
Construction stage	Medium
Operation stage	Low
Overall	Low

No works will be carried out within the monument boundary. Hence no direct impact to the monument is expected. However the piling and excavation works may cause vibration and ground movement during the construction works. Vibration and ground movement shall be kept minimal and closely monitored in accordance with AMO's requirements (which are much more stringent than ArchSD's requirements) such that effect on the monument building and the artifacts stored within the Museum of Tea Ware during the construction stage will be insignificant. The Museum of Tea Ware shall continue to operate during the construction stage.

Visual impact of the proposed pumping station during operation stage has also been significantly reduced by the combination of the underground structure and the proposed planting of trees and provision of vertical greening. In addition, the concerned slope had been disturbed in the past due to construction of the fire station just adjacent to the pumping station.

Mitigation Measures

The mitigation measures include:

- Design the structure of the pumping station such that it is below the existing ground level of the Hong Kong Park and is not visible from Flagstaff House.
- Restore the existing slope landscape as far as possible by designing the buildings in stepped form with planting of trees at ground level, first floor level and on the roof of the building and vertical greening on the external façade of the building.
- Carry out a condition survey for the existing conditions of the Flagstaff House prior to commencement of the construction works.

- Develop a monitoring proposal for monitoring ground movement and vibration such as installation of tell-tale and settlement markers prior to commencement of the construction work. Conditions of the monument building shall be monitored during both the pre-construction and construction stages.
- Construct a bored piled wall (shown as a green dotted line in Figure 6) to support the ground and minimise the ground movement during the construction in accordance with the requirements of AMO.
- Carry out site monitoring of ground movement and vibration and record any significant change during the course of construction.
- Carry out regular reviews on the condition of the building and artifacts within the building and record any significant change during the course of construction.

Old stone wall

Potential Impact

The potential impact on the old stone wall has been assessed for various stages of the project, including planning stage, construction stage and operation stage, and is summarised below:

Stage	Level of impact
Planning stage	No
Construction stage	High
Operation stage	Medium
Overall	Medium

As the slope will be trimmed off for the construction of the pumping station, it is not possible to preserve in-situ that part of the stone wall falling within the boundary of the Site for construction of the pumping station. About 35 m of the old stone wall will be temporarily removed to facilitate construction of the pumping station and will then be subsequently be reinstated at the original location after completion of the construction work for the pumping station. In addition, this section of the old stone wall had been disturbed in the past, leading to varying heights of the wall and damaged capping stone. During operation, the new railing and security fence for safety and security purpose may also cause visual impact to the old stone wall.

Mitigation Measures

The mitigation measures include:

- Carry out a detailed cartographic and photographic survey for the affected part of the stone wall prior to temporary removal of the wall and commencement of the construction works
- Reinstall the wall on the roof of the new pumping station at its original location to maintain the continuity of the stone wall
- Install railing with simple design to avoid visual impact to the stone wall
- Install security fence with minimal intervention to the stone wall and allowance for future removal.

5.4 Implementation Programme of Mitigation Measures

The construction works for the Project is scheduled to commence in end 2014 for completion in end 2018 tentatively. The proposed mitigation measures will be implemented during both pre-construction and construction stages and funded under the Project.

Pre-construction stage:

Prior to commencement of the construction works on site, the Contractor is required to carry out a condition survey for the existing conditions of the Flagstaff House, and a detailed cartographic and photographic survey for the affected portion of stone wall.

Method statement (e.g. for removal and reinstatement of the stone wall, monitoring of ground movement and vibration, etc.), safety measures (e.g. protection measures to the stone wall during the course of construction works) and alternative proposals (should the situation be found varied from the original detail / design intent) are to be submitted to AMO for approval and agreement prior to commencement of the works. Works for monitoring of ground movement and vibration such as installation of tell-tale and settlement markers shall be completed prior to commencement of the construction works. All records are to be submitted to AMO.

During construction stage:

The removal and reinstatement of the stone wall shall be carried out by the approved Specialist under the Category of "Repair and Restoration of Historic Buildings" under the construction contract.

Site monitoring of ground movement (e.g. installation of tell-tale and settlement markers prior to the commencement of the works) will be carried out to ensure that the construction work will not affect the nearby declared monument, the Flagstaff House. Monitoring records shall be submitted by the Contractor to the Engineer for record and monitoring on the changes during the course of the construction works.

In case the specified settlement and vibration limits are likely to be exceeded, construction method and procedures shall be reviewed by the Contractor and rectification measures shall be provided to the satisfaction of the Engineer prior to proceeding further with the construction work.

6.0 CONCLUSION

Considering the limitation on site selection, the proposed FWPS is to be located at the proposed site at Cotton Tree Drive. A buffer of 10m has been allowed between the declared monument, Flagstaff House and the site to ensure that the construction works would have no direct impact on it. Furthermore, the design scheme for the proposed FWPS has proposed to reinstate the affected old stone wall with adequate landscape and greening to reduce the visual impact. Thus the overall impact of the project should be acceptable with the mitigation measures recommended.

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Website

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- http://en.wikipedia.org/wiki/Flagstaff_House
- <http://www.amo.gov.hk/b5/main.php>
- <http://www.aab.gov.hk/b5/index.php>

APPENDIX I – Topographic survey drawing of affected stone wall



• Figure A1

APPENDIX II – Design Scheme for the proposed pumping station

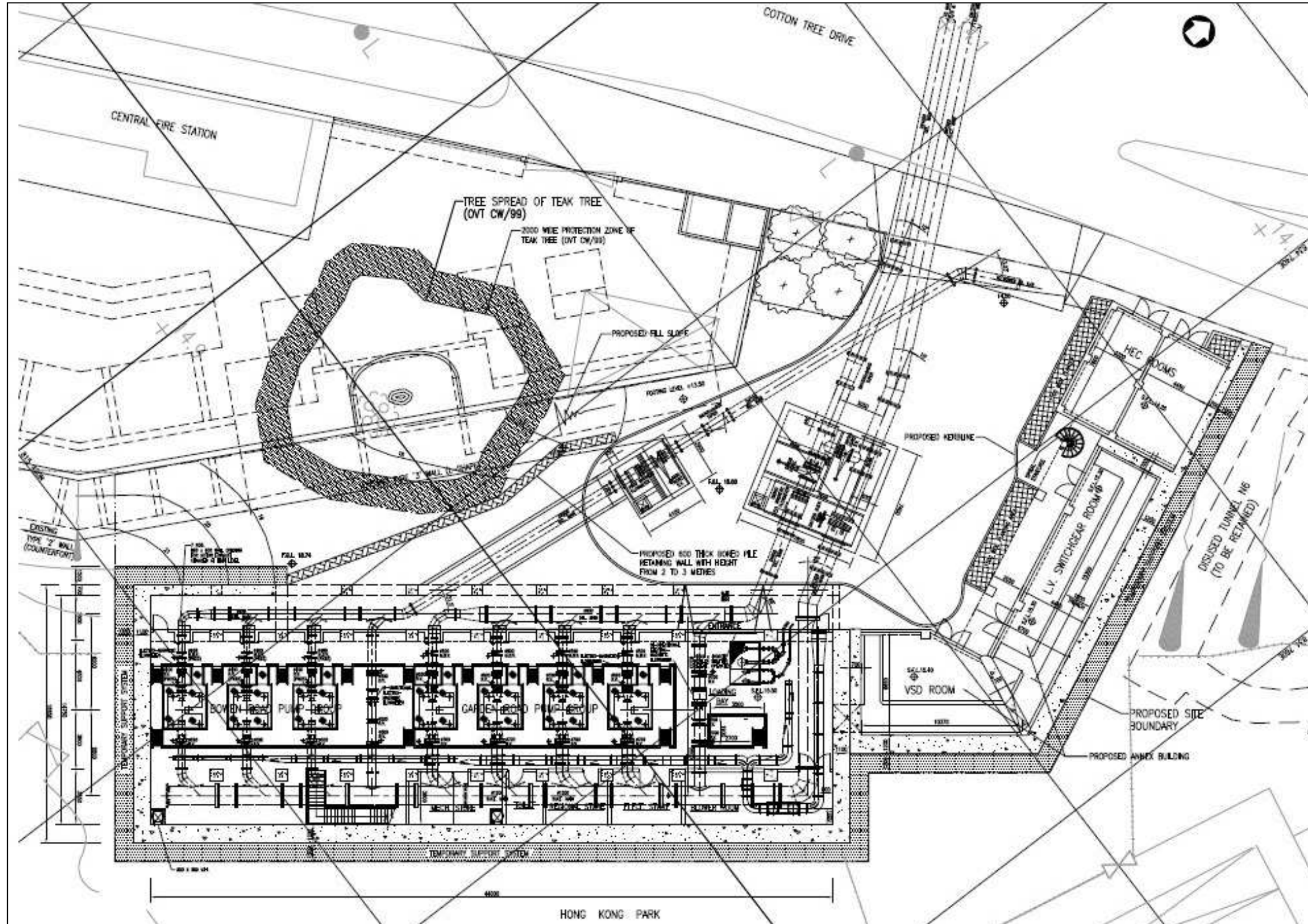


Figure A2.1: Proposed layout plan of the FWPS
Source: provided by WSD

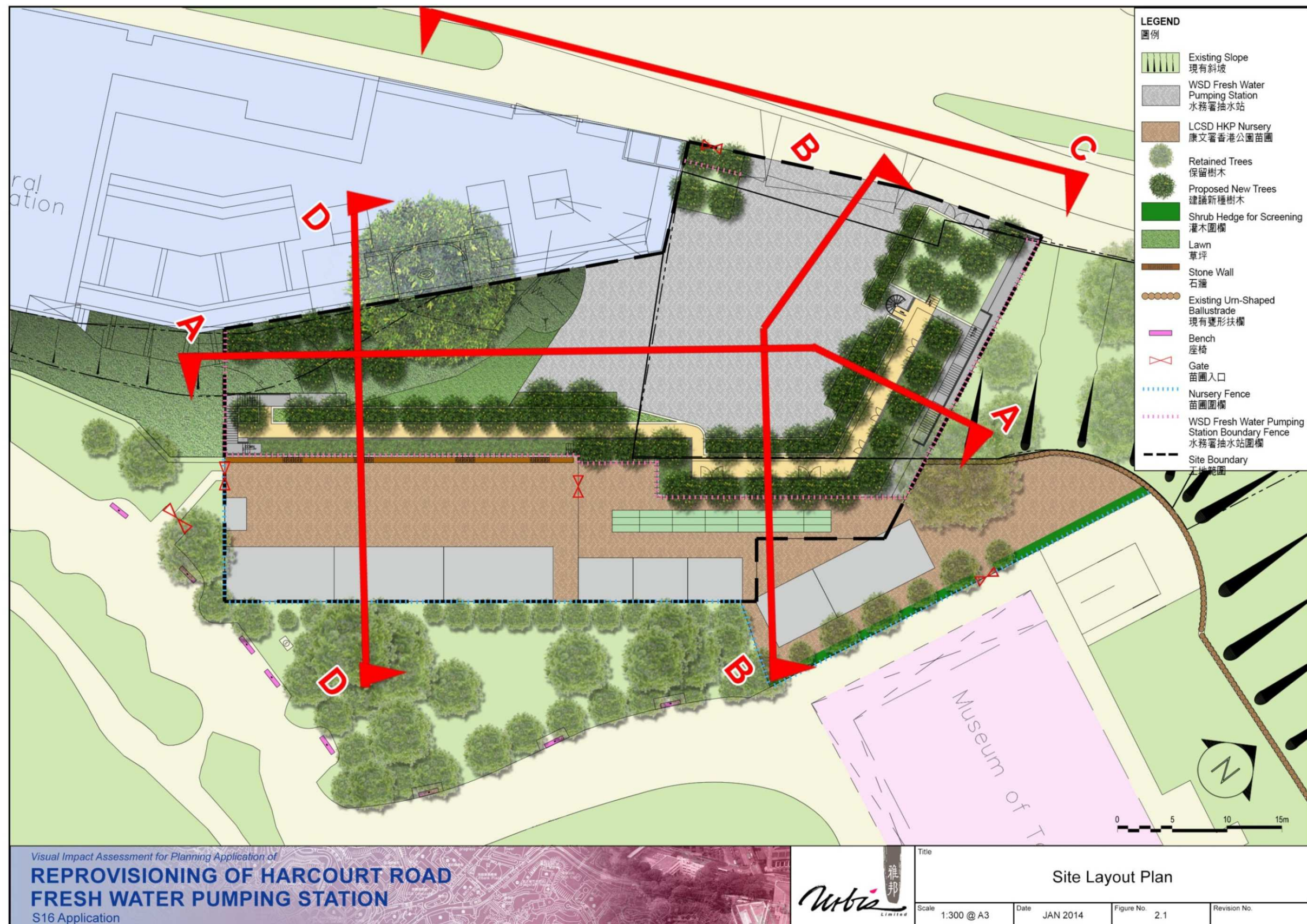


Figure A2.2: Proposed landscape layout plan
Source: provided by URBIS



Figure A2.3: Proposed Elevation A
Source: provided by URBIS



Figure A2.4: Proposed Section B
Source: provided by URBIS



Figure A2.5: Proposed Section D
Source: provided by URBIS



Figure A2.6: Proposed Elevation C

Source: provided by URBIS

APPENDIX III – Photomontages at the key public viewing points



Figure A3.1: View from Queensway Plaza Fairmount House Pedestrian Bridge (existing view), Source: provided by URBIS



Figure A3.2: View from Queensway Plaza Fairmount House Pedestrian Bridge (Future view for the proposed development), Source: provided by URBIS



Figure A3.3: View from the elevated footbridge at the eastern side of Cheung Kong Center (existing view), Source: provided by URBIS



Figure A3.4: View from the elevated footbridge at the eastern side of Cheung Kong Center (Future view for the proposed development)
Source: provided by URBIS



Figure A3.5: View from Hong Kong Park (existing view), Source: provided by URBIS



Figure A3.6: View from Hong Kong Park (Future view for the proposed development), Source: provided by URBIS

**APPENDIX IV – Relevant historic plans for Flagstaff House
(with Study Area highlighted)**

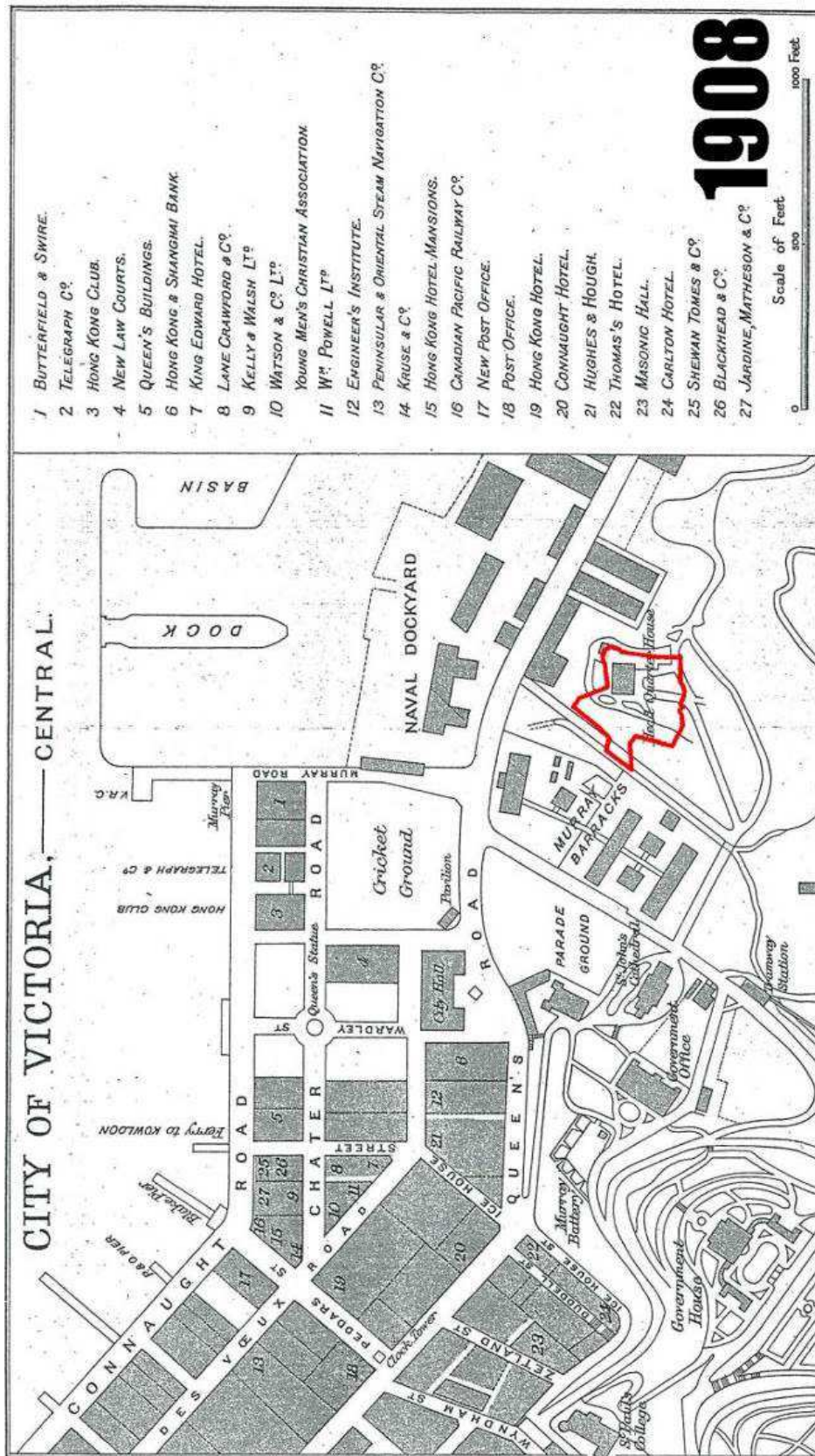


Figure A4.1 1908 historic plan

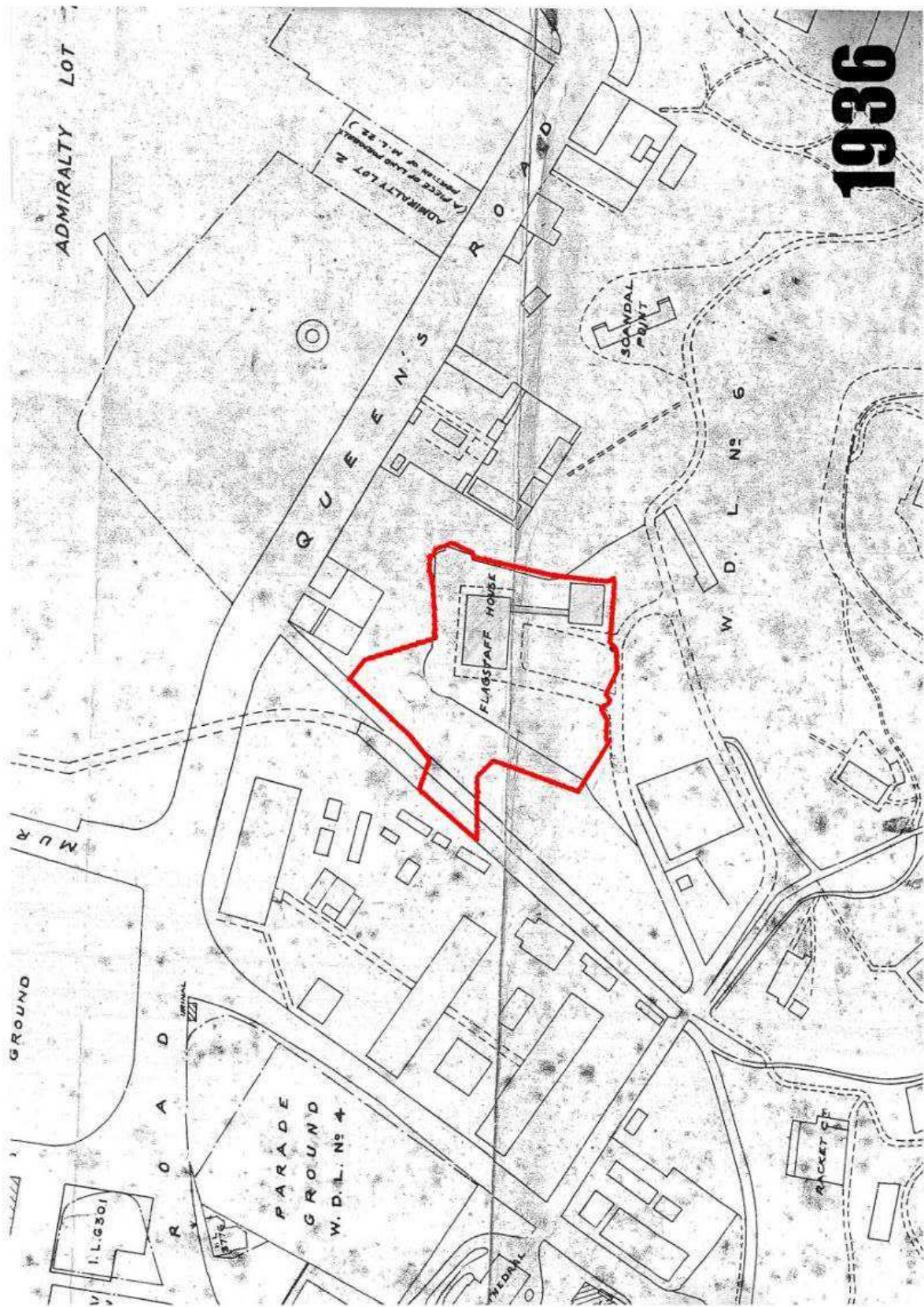


Figure A4.2 1936 historic plan

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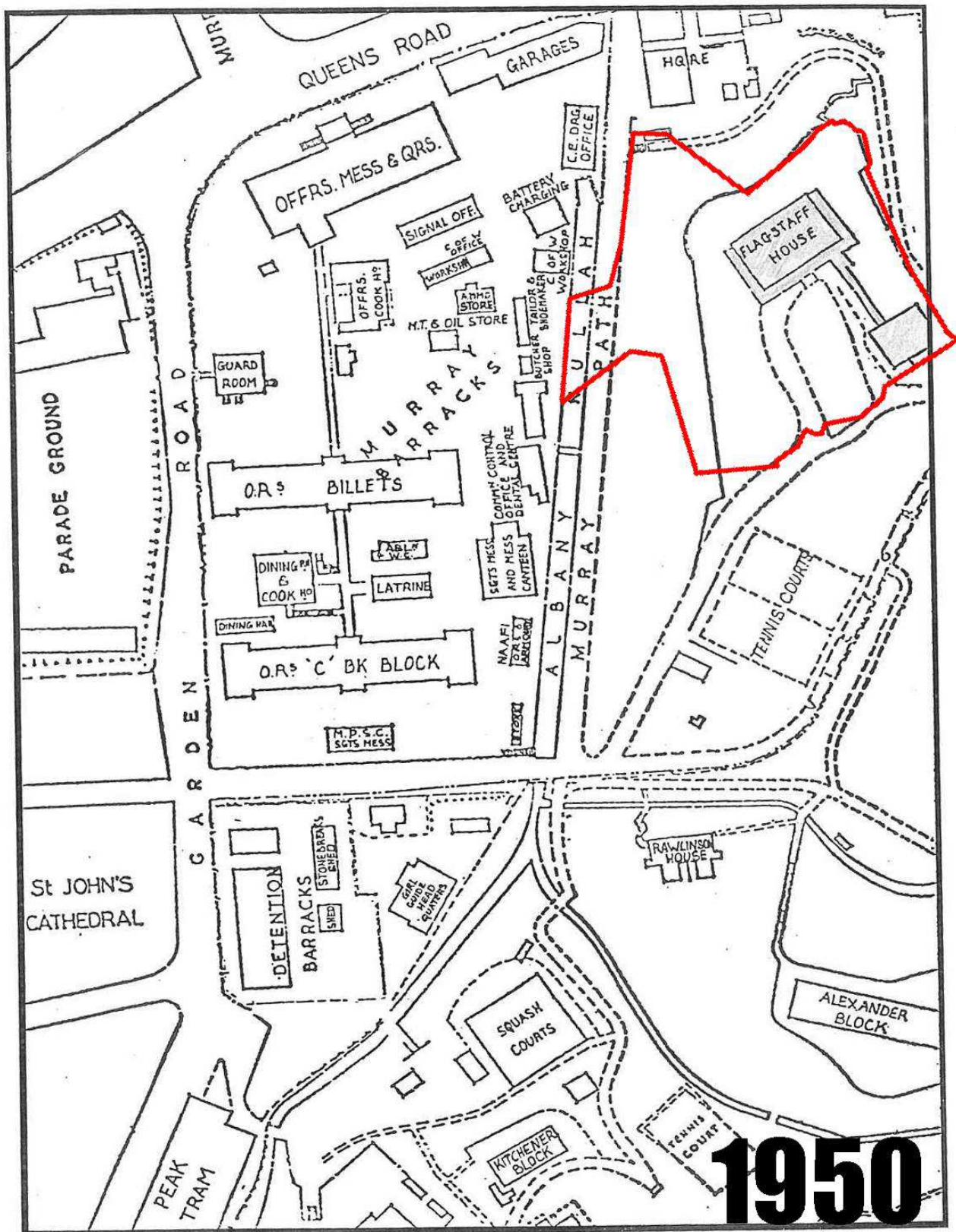


Figure A4.3 1950 historic plan

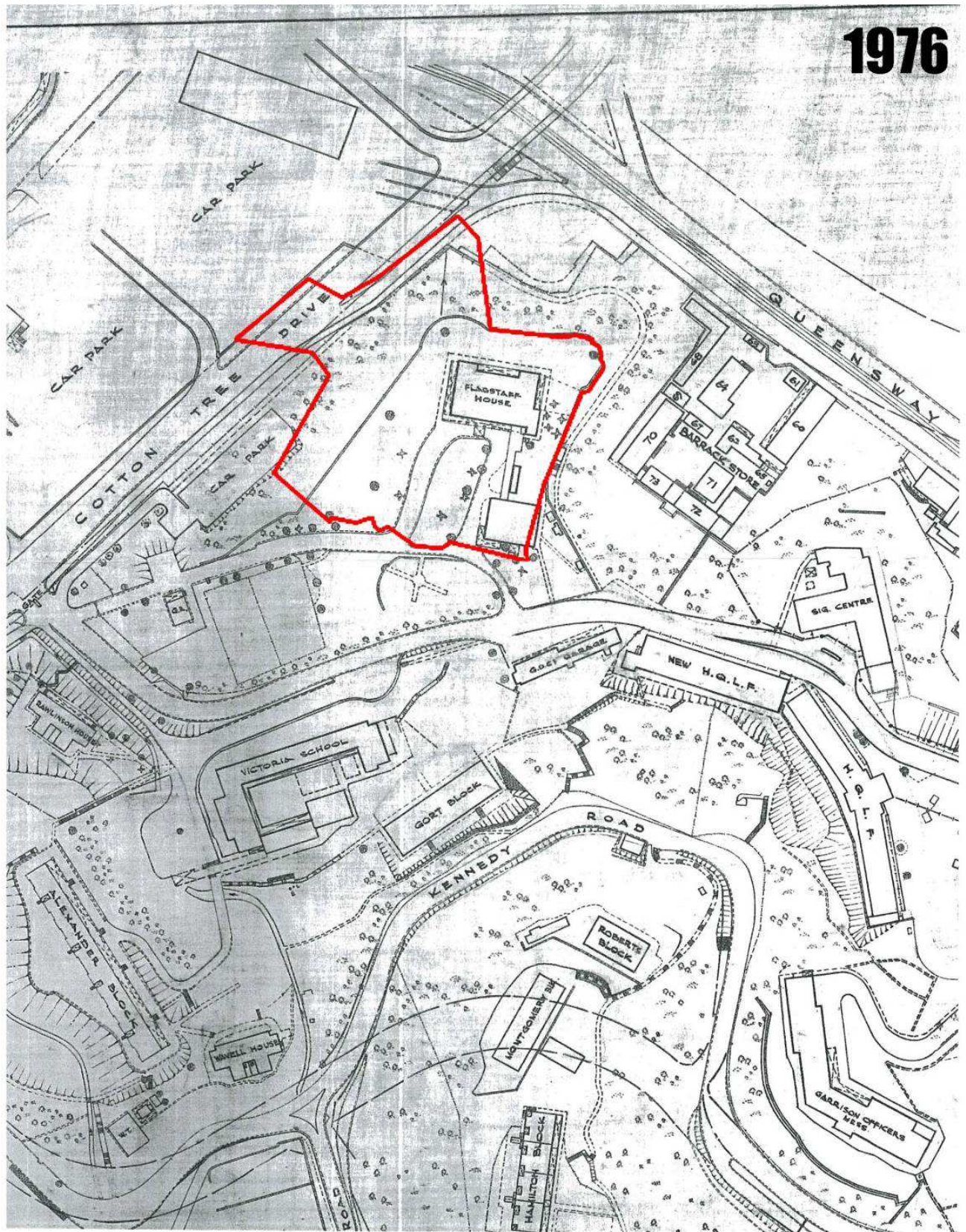
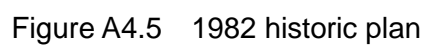


Figure A4.4 1976 historic plan

1982



1993



APPENDIX V – ArchSD Memo on vibration and settlement limits

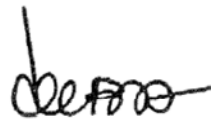
MEMO	
<i>From</i> Assistant Director (Property Services) Architectural Services Department	<i>To</i> CE/Des. WSD
<i>Ref.</i> (33) in ASD.PB.FH-044-00043-000 Pt.6	<i>Attention</i> Mr. Ken M K CHO
<i>Tel. No.</i> 27732202	<i>Your Ref.</i> (9) in WSD 7468/0/42/11 Pt. 1
<i>Fax No.</i> 27656611	<i>Dated</i> 27 May 2011
<i>Date</i> 16 June 2011	<i>Fax No.</i> 2877 0745 <i>Total Page(s)</i> 1

Flagstaff House Museum of Tea Ware
PWP Item No. 9347WF
Reprovisioning of Harcourt Road Fresh Water Pumping Station
Vibration and Settlement Limits

I refer to your above memo and enclose a copy of our CSE/1's memo ref : ASD 9/92501/TEC/APB/11/0343 for your reference. Please formulate the monitoring proposal based on the given allowable limits for our further information.

2. Please also be advised that it is a general practice for the contractor to appoint a competent person to conduct and prepare a condition survey to record the condition of the monument building before commencement of the piling works. You may also consider regular reviews on the building condition and record and significant change during the execution site works.

3. I shall be grateful if you could forward a holistic monitor proposal for our information and comment in due course.



(Ken C K CHUNG)
for Assistant Director (Property Services)
Architectural Services Department

c.c. SSE/APB (Attn : Mr. H Y CHOI)

HERITAGE IMPACT ASSESSMENT FOR
REPROVISIONING OF HARCOURT ROAD FRESH WATER PUMPING STATION

16-JUN-2011 12:00 FROM + 852 2765 6611

TO 28770745

P.02

MEMO

From CSE/1
Ref. ASD 9/92501/TEC/APB/11/0343
Tel. No. 2773 2281
Fax. No. 2774 1745
Date 7th June, 2011

To AD (PS)
Attn.: Mr. Ken C. K. Chung (PSM/Antia)
Your Ref. (31) in ASD.PB FH-044-00043-000 Pt.6
Dated 31/5/2011 Fax. No. _____
Total Pages 1

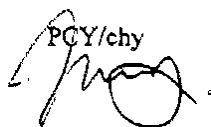
Flagstaff House Museum of Tea Ware
PWP Item No. 9347WF
Reprovisioning of Harcourt Road Fresh Water Pumping Station
Vibration and Settlement Limits

I refer to your request for our advice on the memo from the CE/Des, WSD, ref.: (9) in WSD 7468/0/42/11 Pt. 1 dated 27/5/2011, regarding the captioned subject.

2. We would like to advise that:
 - a. The allowable settlement for the building is 12.5mm;
 - b. The allowable tilting for the building is 1/500;
 - c. The allowable peak particle velocity (PPV) is 7.5mm/s;
3. If there is any query, please feel free to contact the undersigned on tel. 27732281.


H. Y. Choy (SE/APB/5)
For Chief Structural Engineer/1
Architectural Services Department

c.c. CSE/1

PCY/chy


F E R.