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Editorial Board

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Editorial

A battle for mapping and conserving Hong Kong's World War II military built heritage

The Battle of Hong Kong fought from 8 December to 25/26 December 1941 and the ensuing Japanese occupation of Hong Kong has conferred great cultural and historical values to a vast amount of neglected WW2 relics that dot the countryside of Hong Kong. These relics, include both Hong Kong and Japanese defence structures. They are all government properties and hence free from complications due to private ownership as far as conservation is concerned. Squatting is not a key issue either.

While some of these have been graded by Antiquities Advisory Board, most have remained officially unnoticed albeit they have been well published in enthusiasts' websites and local tourist guide books. Some of these, like the battery range finding cells/observation posts of Pine Wood Battery at Lung Fu Shan, were integral parts of original facilities but left out from any active management catchment.

Unless there is a top down policy to systematically to map and annotate them by experts, conservation planning and development of these built heritage is impossible.

Surveyors of various branches can play a useful role in this regard[1].

However, several hurdles need to be overcome in this regard. One hurdle is institutional barriers and bureaucratic mindset[2]. Another is physical: the uncontrolled growth of wild plants in the countryside inside and around unmanaged military sites have concealed and threatened the structural integrity of buildings[3].

In December 2011, *Surveying and Built Environment* published a special issue in commemoration of the 70th anniversary of the Battle of Hong Kong. The journal welcomes contributions to a special issue on the 80th anniversary again in the form of research papers, technical notes or memoirs with a focus on the mapping and built heritage aspects of this drama of human conflicts (the Battle and the occupation period) with a view for better conservation of historical heritage of this part of China.

[1] See Lai, L.W.C. 2016 "The Surveyor and Built Heritage Conservation," this journal, pp.147-149.

[2] For instance, in 2015, a proposed contract research by the University of Hong Kong (HKU) in collaboration with HAB to annotate these on survey maps for public information was frustrated at an advanced stage of contractual process by a Department of Justice's legal advice to HAB to require a HKU research supported by a registered professional land surveyor and a historian to bear unlimited liability for research findings – a requirement unintelligible to the development and construction industry where liquidated damage is the norm.

[3] See editorial of Vol. 28, this journal.

The recollection of pillbox hunting experiences by Rob Weir and the surveying of Bokhara and D'Aguilar Batteries in this issue may be treated as the curtain raiser of this special issue.

Surveying & Built Environment

The Diffusion of Employment Practices from Global Investment Banks to their Subsidiaries in Hong Kong after the Global Recession: Case Studies of HSBC and Citibank

Teresa Shuk-Ching Poon[*] and Russell D Lansbury[**]

ABSTRACT

This paper examines the diffusion of employment practices between two global investment banks, HSBC and Citibank and their subsidiaries in Hong Kong, following the 2007 global financial crisis. During the 2007 global financial crisis, the US-based Citibank took a more centralised approach compared with the UK-based HBSC, which allowed more autonomy to its Hong Kong management in regard to employment practices. These differences arose partly from the greater impact of the global financial crisis on the financial viability of Citibank as well as from the more significant role which the Hong Kong subsidiary plays in HSBC. However, while there were differences in the means by which each bank disseminated their employment practices, both sought to exercise greater cost controls over their subsidiaries in Hong Kong. The relationships between the head office and subsidiary of each bank can be viewed as a negotiated process influenced by a number of interacting factors, both within and external to the firm.

It is useful to revisit the experience of these banks during the 2007 global financial crisis as there are likely to be similar pressures exerted on major financial institutions by the COVID-19 pandemic, which the World Bank predicts will cause the most severe economic recession since the Great Depression.

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KEYWORDS

HSBC, Citibank, Global Financial Crisis, Employment Practices, Headquarters-Subsidiary Relationship

INTRODUCTION

This paper examines the diffusion of employment practices between two global investment banks, HSBC and Citibank and their subsidiaries in Hong Kong, following the 2007 global financial crisis (GFC). While GFC happened more than a decade ago, the topic which we examined is still relevant today as we are facing yet another global recession, as a result of the outbreak of the coronavirus pandemic. In June 2020, the World Bank was of the view that the COVID-19 pandemic would bring about the deepest global recession since WWII, hitting both advanced and developing countries hard (World Bank Group 2020).

Parallels can be drawn between the 2007 GFC and the 2020 COVID-19 pandemic crisis. Both crises share a high degree of uncertainty which is a non-quantifiable risk (Knight 1921) as problems originated from two leading economies had quickly escalated to become a global issue. In the 2007 GFC, financial problems in the US emerged as a result of the subprime mortgage crisis and significant depreciation of toxic mortgage-based securities and structural assets, challenging the survival of even the most well-established investment banks and financial institutions worldwide. In the 2020 COVID-19 pandemic crisis, the coronavirus, which was first found in China by the end of 2019, has quickly spread to almost all countries in the world, turning into both a pandemic and public health crisis. In both crises, stock market indexes of the major countries in the world significantly dropped (up to one-fourth of the stock markets' valuation), triggering the onset of global recessions which have been described as the largest since the 1929 Great Depression (World Bank Group 2020).

The 2007 GFC was related to the "Global Systemic Important Banks" (G-SIB) that were too big to fail, with contagion across borders. Bursting of the housing bubble in the U.S. first shrank the demand side, followed by the supply side of the US and then the global economy. The COVID-19 pandemic revealed the advanced economies' dependence on the supply of parts and components manufactured in developing countries, particularly China, the first of which initiated the 'great lockdown', seriously jeopardized the supply side, followed by the demand side of the world economy (Strauss-Kahn 2020). Whether the supply side or the demand side of the global economy was first adversely affected, the central banks of major advanced industrialized countries quickly put in place quantitative easing (QE) programmes and implemented targeted stimulus measures during both crises to infuse liquidity into the much-stressed

economy, operated already within an ultra-low interest environment, hoping that the financial turmoil could be temporarily relieved (World Bank Group 2020).

The aftermath of the 2007 GFC resulted in the tightening up of compliance regulations, putting banks and financial institutions under stricter control. It is expected that the aftermath of the COVID-19 pandemic will also usher in more stringent controls on international banks and financial institutions. The critical role played by the banking sector to enact emergency measures to support the flow of credit to the real economy, in mitigating the unprecedented global recession emerged as a result of the COVID-19 pandemic, has been well-acknowledged by the World Bank (World Bank, 2020). However, national bank regulators and supervisors were recommended to ensure that sound credit risk management practices be followed to minimize moral hazard opportunities (The World Bank, 2020). The U.S. Banking regulators, for instance, issued several report changes effective from June 2020, including the first reporting of the Systemic Risk Report for combined US operations of foreign banking organizations. The US's Federal Reserve has also proposed Capital Assessment and Stress Testing Reports revisions, effective from September 2020 (Delotte, 2020). Financial firms, large banking organizations in particular, will be requested by regulators to fill reports more frequently because market trends will need to be monitored more closely as the economic effects from COVID-19 continue to evolve (Deloitte, 2020). International investment banks faced a major crisis following the global recession of 2007-08. The future outlook for these banks after the COVID-19 pandemic crisis is clouded by uncertainty. Following the 2007 GFC, multinational banks operating in Hong Kong were seriously affected because they had operations in the US and other countries that were entering a period of severe financial turmoil. As a result of global business restructuring, large international investment banks such as HSBC and Citibank reduced their global workforce, including those in Hong Kong. After the Lehman Brothers' bankruptcy, structured investment products (known as minibonds) offered by Lehman Brothers and sold to customers through 13 Hong Kong banks' retail distribution channels, were rendered almost worthless. This was a period of great uncertainty and a huge loss of public confidence in the banking system (Wang 2008).

The 2020 COVID-19 pandemic crisis has contributed to the continuing decline in financial performance of international banks. Even before the onset of the pandemic, both HSBC and the Citigroup (comprising Citibank) were under tremendous pressure to cut costs, and implemented corporate restructuring programmes which included massive job cuts. Increasing use of robotics and artificial intelligence in market trading has disrupted the operations of trading divisions. To

save costs, banking and financial corporations have 'near-shored' and 'off-shored' many of their employees to lower-cost cities in the US and other countries (Kelly 2019). HSBC planned to reduce their 'headcount' by about 35,000, slashing the number of its employees from 235,000 to 200,000, with the aim of achieving US$4.5 billion of cost savings by 2022. HSBC hopes to achieve staff reductions by shrinking its investment banks in the US and Europe, and cutting its American retail branches (Bray 2020). While the targeted number of staff cuts in the Citigroup had not been disclosed, layoffs were mainly found in the group's fixed-income and stock-trading divisions in 2019 (Kelly 2019). In February 2020, both HSBC and the Citigroup temporarily suspended their layoff plans due to the COVID-19 pandemic, but quickly resumed the plan just a few months later in June 2020 (BBC 2020; Pymnts 2020).

The growing significance of multinational corporations (MNCs) in the world economy is well documented (Bartlett and Ghoshal, 1998). However, in recent years, there have been changes in the way that MNCs operate. In the past, subsidiaries of MNCs in other countries were often treated as independent operations, but the growth of global supply chains and the extension of information technology systems and other factors have led to greater integration of management systems and centralisation of decision making. These changes have an impact on employment practices of MNCs due to diffusion of systems from head office as well as 'spillover' effects to countries in which they operate (Edwards and Rees 2011). Although the concept of diffusion has been applied in studies of human resource and employment practices of MNCs in North America and Europe (Ferner et al 2001; Edwards et al 2011), it has not been used in relation to global investment banks operating in Asia.

This study focuses on the diffusion of employment practices by two global investment banks in Hong Kong. In particular, our study closely examines of how attempts by these banks to diffuse their employment practices across their subsidiaries were influenced not only by firm-specific factors but also by the institutional context in both the home and host countries where these banks operate. Whitley (1992) has argued that there are a number of significant differences between Western and Asian business systems on a wide range of variables including forms of property law, capital market structures, cultural patterns and beliefs. Asian market economies, according to Yeung (2000) are characterised by strong business networks, a heightened role played by personal relationships and close involvement of the state in economic activity. Japanese multinationals operating in the UK were reported to rely on personal control internalised within the senior management of their subsidiaries. Hence, while Japanese subsidiaries might appear to have considerable formal discretion over employment practices within their

overseas operations, their practices were often likely to be closer to parent company practices compared with MNCs of most other nationalities (Kranias 2000).

This paper examines the results of a study of the diffusion of employment practices by two major multinational investment banks, HSBC and the Citibank, operating in Hong Kong, following the global recession of 2007-08. Global investment banks, such as HSBC and Citibank, play an important role in Hong Kong's economy. Hong Kong has been fully exposed to changes in the global economy and was seriously affected by the Asian Financial Crisis of 1997. Examining the diffusion of employment practices since the global recession of 2007-08 also provided an opportunity to examine how two global investment banks have adapted to Hong Kong's particular brand of capitalism (Poon 2015). Hong Kong is a particularly interesting locus to undertake this research because it has been undergoing a transition from its colonial status under Britain to Special Administrative Region (SAR) under the People's Republic of China (PRC) since 1 July 1997. Under Hong Kong's Basic Law, it was guaranteed that the PRC's socialist doctrine will not be applied to Hong Kong for a period of 50 years after the handover of sovereignty from Britain to the PRC. Nevertheless there has been significant political and economic transformation of Hong Kong during the past two decades.

The past two years have seen the outbreak of a series of democratic protests staged by millions of Hong Kong residents, triggered by the Fugitive Offenders and Mutual Legal Assistance in Criminal Matters Legislation (Amendment) Ordinance 2019 (commonly known as the Extradition Bill) proposed in February 2019 and the National Security Law passed in June 2020. The proposed Extradition Bill, withdrawn ultimately in September 2019, allowed for criminal suspects to be extradited to Mainland China under certain circumstances, arousing serious concerns about potential unfair trials of dissidents and judicial independence (Buddle 2020). The passing of Hong Kong's National Security Law, approved by the PRC's National People's Congress Standing Committee on 30 June 2020, triggered yet another round of grave concern about the loss of freedoms (of expression), autonomy and judicial independence in Hong Kong (Tsoi and Lam 2020). While it is the tradition of HSBC to stay as a neutral enterprise on PRC's policies and actions, it has been somewhat surprising to see the group's Asia-Pacific CEO signing a petition supporting the new National Security Law in Hong Kong (Mok 2020).

CONCEPTUAL FRAMEWORK

The objective of this study is to examine the diffusion of employment practices of two global investment banks to their subsidiaries in Hong Kong, focusing on three key variables: the institutional,

sectoral and organisational. It seeks to answer the following questions:

(i) To what extent do global investment banks apply corporate level policies on employment practices at the operational level of their Hong Kong operations?

(ii) Is the diffusion of some employment practices more evident in regard to certain issues (e.g. performance management and remuneration) than others (e.g. recruitment and skills development)?

(iii) To what extent is the diffusion of employment practices by global investment banks affected by the prevailing economic and political environment in Hong Kong?

(iv) How do organisational factors, such as the strategies and structures of each bank, influence the diffusion of employment practices to their operations in Hong Kong?

Figure 1 shows a simple relationship between employment practices developed at headquarters level by each global investment bank, and their diffusion to their Hong Kong subsidiary.

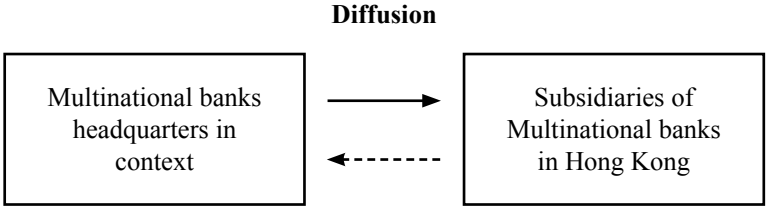

Figure 1: A Simple Model of Diffusion of Employment Practices from Multinational Banks Headquarters to Subsidiaries in Hong Kong

Figure 2 shows how the three key variables may interact and influence the diffusion of each bank's employment practices to their Hong Kong subsidiaries. Institutional variables refer to the different home country and host country effects. Sectoral variables refer to the global investment banking industry. Organisational variables refer to the various strategies and structures adopted by each of the global investment banks. The employment practices refer to the four key policies and practices within the investment banks and subsidiaries which are examined in this study. By examining how the policies of global investment companies impact on these variables, the study not only highlights employment practices at the enterprise level but also provides the basis for reconceptualising how international practices of multinational enterprises can impact on individual countries or regions.

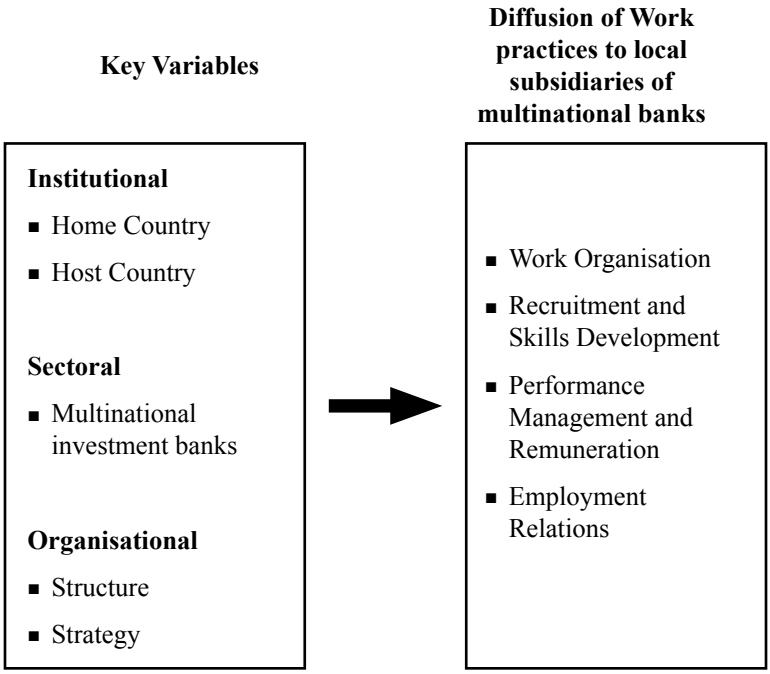

Figure 2: A Complex Model of Diffusion Employment Practices from Multinational Headquarters to Subsidiaries in Hong Kong

THEORETICAL APPROACHES

There are several competing explanations in the literature about how MNCs transfer or diffuse employment practices from their headquarters to overseas subsidiaries and what factors account for either the transfer or non-transfer of these practices. These can be summarised as the institutional, sectoral and organisational approaches.

The institutional approach to the transfer or diffusion of employment practises by MNCs ascribes enduring differences in the structure and behaviour of firms from country to country as being shaped by national institutions. This approach emphasizes the importance of the country of origin and the national business system in which global companies are embedded (Whitley 1992; Ferner 1997). Similarly, the 'varieties of capitalism' approach (Hall and Soskice 2001; Thelen 2001) emphasizes the idea that national systems of business comprise combinations of institutions that shape national markets, competition and business activity (Ferner and Tempel 2006). Hence, the spread of

MNCs promotes capitalist diversity. However, the varieties of capitalism approach has been criticised for arguing that there are only two varieties: liberal and coordinated market economies. Furthermore, comparative institutionalism fails to account for variation within the two categories of market economies as well as within particular national business systems (Edwards and Kuruvilla 2005). It is also argued that with globalisation, national institutional arrangements are becoming less constraining and the increasingly international character of capital is eroding the significance of national boundaries (Deeg and Jackson 2007). This argument has been well supported by recent sustainable human resource management (HRM) research which highlights the impact of global factors such as change, scarcity, and plurality on corporations, particularly international ones, and the adoption of HRM strategies and practices to achieve simultaneously financial, social, environmental, and HR regeneration goals as demanded by competing stakeholders (Poon and Law, 2021). Hence it is important to study the role which MNCs play in diffusing work practices across their subsidiaries.

A second set of explanations focuses on the nature of the industry or sector in which the MNC operates. It has been suggested that MNCs operating in industries in which individual firms can differentiate their products and services are more likely to pursue diffusion of firm-specific employment relations and work practices across their subsidiaries, compared with firms which operate in industries which have common technologies and forms of work organisation (Cooke 2007). Studies of the impact of globalisation on employment relations in the automotive and retail banking industries across a range of countries reveal some interesting differences between these two industries (see Lansbury et al 2008, Wailes 2007). The automotive industry tends to operate on a standardised model of production which has had a strong influence on work practices. For many years, mass production was emphasized with centralised controls and narrowly defined tasks. But the Japanese auto companies, led by Toyota, introduced a new production system, known as 'lean production' which emphasized continuous process improvement of quality and production as well as close integration of suppliers and final assembly of vehicles. While there has been a diffusion of lean production principles around the world in the auto industry, there has been considerable variation between countries resulting in various 'hybrid' approaches (see Kochan et al 1997).

Similar observations have been made in relation to retail banking in which there has been widespread diffusion of a standard business model which has been called 'lean banking'. This model has sought to reduce the costs of banking services through the use of technology. However, like the auto industry, the introduction of the new banking systems have varied between both banking companies and the

countries in which they operate (Wailes et al 2008). As Macduffie (1995) noted in relation to the auto industry, 'it may make sense to first examine company-level factors affecting the adoption and diffusion of new approaches to work organisation and then turn to national level explanation for residual variations'. Hence it is important to focus not only on the role of industry factors on work practices but also the role of the nature of industry or sector.

Finally, there are studies which focus on how the organisational structure of MNCs influence the diffusion of management practices from corporate headquarters to subsidiaries (e.g. Almond and Tempel 2006). According to this view, the extent to which local subsidiaries adopt corporate-level policies in relation to employment practices is shaped by the power of corporate headquarters in relation to local management. This, in turn, is influenced by the relative size of the subsidiary, the extent to which its operations are integrated into local operations and the power resources on which local-level managers can draw. However, subsidiaries do not necessarily respond passively to pressures exerted by the headquarters. Given the complexity of modern MNCs which have operations spanning nations and with multifaceted internal structures, the transfer of practices from headquarters located in one country to a subsidiary located in another is likely to be complex and contested (Almond and Tempel 2006; Morgan and Kristensen 2006). Edwards et al (2007:210) argued that, within the constraints imposed by institutional and market forces, there exists a 'range of indeterminancy' in which actors may choose from numerous available courses. Ferner et al (2007) described this as a 'complex interplay of formal and informal power and authority relations'.

As noted previously, US MNCs have been characterised as tending to exercise central control of employment practices in subsidiaries (Clark and Almond 2006). According to Harzing et al (2002), they primarily achieved this through direct impersonal means such as standardised formal policies but these can be supplemented with indirect impersonal means such as socialisation via informal communication and training of key managers. Some US MNCs have been found to use coercive comparisons whereby headquarters management uses internal comparisons between subsidiaries which are in competition for investment. Yet there is evidence of subsidiaries resisting headquarter's attempts to limit their autonomy by engaging in internal politics. Local subsidiary managers, for example, can invoke legal requirements which may override attempts by headquarters to impose certain work practices which conflict with local labour laws (Clibborn 2012). Glover and Wilkinson (2007) argued that the transfer of management practices within MNCs can be understood as a 'negotiated process' between organisational actors.

THE CONTEXT OF MULTINATIONAL BANKS OPERATING IN HONG KONG

This paper examines the subsidiaries of two major global investment banks in Hong Kong: The global headquarters of HSBC are located in the United Kingdom while Citibank has its headquarters in the United States. Both banks experienced major restructuring after the global recession of 2007-08 when they undertook major reductions in their worldwide workforce, including employees in their Hong Kong operations. Given the significance of restructuring activities by these investment banks, and their impact on employment practices within their Hong Kong subsidiaries, it is useful to briefly outline the origins and aftermath of the global recession.

Early signs of distress in global financial markets emerged during 2007 in the US as the result of the subprime mortgage crisis and significant depreciation of toxic mortgage-based securities and structural assets. The US based financial company Bears Stearns announced serious problems with their holdings of mortgage-based securities. These were particularly acute in the case of securities containing subprime mortgages which had been made to individuals with a poor credit history or were on low incomes and likely to have difficulties meeting their mortgage repayments.

The collapse of Lehman Brothers exposed three major weaknesses in the US financial system. First, the surge in debt, particularly in the financial sector, brought on by a housing bubble. Second, the complex interconnections of securitized finance wherein few people understood what assets were worth and who owned what. Third, confusion about whether governments could or would step into rescue stricken companies as the financial system failed. This had a flow-on to Hong Kong. Multinational banks operating in Hong Kong were seriously affected because of their global nature as they had businesses in the US and other foreign countries that were in great financial turmoil.

Since 2008 there has been an overhaul of financial regulations in the major industrial economies in order to prevent a similar situation to the global recession in the future. Under new Basel capital standards, banks are now required to hold more and better capital relative to their assets. Another strand of reforms has been introduced to improve transparency. While there has been some progress on establishing new global rules which would force banks to issue bonds that could be 'bailed in' in the event of failure in the system, the long term effects of the global recession are still evident in relation to changes in work practices in the banking sector.

The two banks have both similar and different characteristics. Citibank is a global financial services holding company with headquarters in New York, USA. During the early 2000s,

Citibank employed approximately 375,000 staff but reduced these numbers to 260,000 when it made huge financial losses during the global recession of 2007-08. Citibank narrowly avoided bankruptcy when it was rescued by the US government which provided $306 billion in loans and securities, invested $20 billion in the bank and absorbed 90 per cent of the bank's losses. To control operating costs, the Citigroup has trimmed down globally the number of full-time staff over the years since the global recession, employing around 200,000 in 2019 (Citigroup, 2019). In Hong Kong, Citibank employed more than 4,500 staff and operates over 25 retail branches, offering a range of financial products and services to both corporate and retail customers. Financial services offered by Citibank in Hong Kong include corporate and investment banking, consumer banking and credit, securities brokerage and trading services, and wealth management (Citibank, 2020).

HSBC is one of the largest banking and financial services organizations in the world. In 2019, HSBC operates an international network covering five geographical regions, employing around 235,000 full-time staff in 64 countries (HSBC, 2020). Although HSBC managed to survive the global recession without requiring a bailout from any government, it suffered reputational damage and undertook a number of internal reforms. In 2012, the bank reduced the number of employees by 10 per cent and announced that it would sell off some of its businesses as well as further cutting costs. By contrast with Citibank, HSBC has maintained a strong presence as a retail bank in Hong Kong with a network of around 200 local branches in 2019. It also offers a range of services to personal, commercial as well as to corporate and institutional customers.

METHODOLOGY

The methodology used in the study was guided by the conceptual framework which focussed on four aspects of diffusion and spill-over of employment practices between the two banks' global headquarters and their subsidiaries in Hong Kong. Four research questions, outlined in the conceptual framework, were examined through interviews with bank officials and employees in Hong Kong as well as at the regional and head offices. The study sought to ascertain the relative influence of institutional, sectoral and organisational factors on the diffusion and spill-over of employment practices in each bank. Approximately 25 semi-structured interviews of about one hour duration were conducted by the researchers with key line managers and specialist staff, such as human resource experts, in each bank in Hong Kong. Interviews were also conducted with senior managers with global and regional responsibilities in the UK and Australia in each of the banks. Unfortunately it was not possible to interview Citibank officials in the US, but the CEO of Citibank in

Australia, who had worked in the global head office, was able to comment on the role of headquarters in New York on subsidiaries.

The interview schedule contained a series of thematic questions which were aimed at obtaining information about key business strategies of each bank and how these influenced employment strategies within the subsidiaries. As will be noted below, the interview questions focussed on how policies and practices in relation to work organisation, skill formation, remuneration, staffing arrangements and employment relations in the Hong Kong subsidiaries had changed in recent years, particularly since the global recession, and how these had been influenced by decisions made at the headquarters level.

The influence of legal and other institutional factors in Hong Kong on employment practices of the multinational banks was also investigated. Data obtained from the interviews were then combined with secondary data obtained from publicly available documents, such as company annual reports, articles in the media and general business commentaries. Utilising information from a variety of sources helped to create a more reliable basis of information for our study, although the interview data may include respondent bias.

DIFFUSION OF EMPLOYMENT PRACTICES BETWEEN HEAD OFFICE AND SUBSIDIARIES OF CITIBANK AND HSBC IN HONG KONG

(i) Work Organisation

Since the global recession, multinational banks have increased global controls over country subsidiaries as well as strengthening regional coordination. Citibank has a long history of centralised power exercised by head office in New York, although HSBC has also undergone recent restructuring which was driven from headquarters in London. According to a senior international executive of HSBC: 'there has been more intrusion by headquarters since the global recession due to the increased regulation of banks—the regulators have been concerned about policies related to prudential capital, remuneration, incentives, lending ratios and country risk'. However, another HSBC executive based in Hong Kong noted that 'some lines of business are more London-centric—and more subject to control by headquarters—while others, such as retail banking adapted more to the local environment'.

Within HSBC, there was an 'efficiency drive' led by the CEO which involved the issuing of 'blueprints' and 'streamlining of processes' to ensure greater consistency of operations around the world. The global headquarters set objectives and targets which were 'cascaded down'

to all subsidiaries, although there was some flexibility when implementing changes so that they fitted local conditions and circumstances. There was also a program of 'de-layering' the organisation of the bank to reduce the number of employees at both headquarters and subsidiaries. A senior HR manager at HSBC's head office in London explained that the bank had previously taken a 'soft' approach to such matters but were increasingly emphasizing targets and exercising greater controls over subsidiaries to reduce costs. However, the Hong Kong subsidiary of HSBC occupies an important strategic position due to its proximity to the growing Chinese market and is in a stronger negotiating position with headquarters compared with other subsidiaries in the Asia-Pacific region. Hence, the Hong Kong subsidiary has been able to tailor certain employment practices to suit its particular needs rather than strictly following directives from London.

Following the global recession, which hit Citibank hard, there were major changes aimed at improving efficiencies and cutting costs around the world. The new CEO introduced a 'transformational initiative' which required greater consistency of operations throughout the bank. Various routine activities were outsourced and off-shored to locations where labour and other costs were lower, such as India and the Philippines. Shared services were introduced for the processing of forms and records. The human resource activities within subsidiaries were particularly affected by the headquarters' program of 'a drive to the common' which aimed at getting consistency of operations between various subsidiaries.

(ii) Recruitment and Skills Development

Both HSBC and Citibank have been competing for scarce supplies of qualified and experienced banking personnel. According to a senior manager at Citibank: "It's all about talent—and then there is everything else", indicating the strong focus of the bank on attracting and retaining highly skilled employees. Both banks undertake 'talent management' through recruiting the 'best employees' available, providing them with training and development and promising quick promotion for the highest achievers. Both banks have extensive internal training and educational programs at both global and local levels. HSBC provides educational subsidies to assist local staff to acquire bank-related qualifications but have also recruited external staff who already have appropriate qualification and offered them 'banker traineeships' during which they receive the training required to become effective employees.

There had already been a reduction in the number of employees in banking at all levels in Hong Kong due to merger and acquisition activities conducted by parent companies during the early 2000s. One senior HSBC manager commented that the bank

shifted its focus from the 'war for talent' to restructuring the business and reducing costs, including employees. Surplus staff were usually reduced by redeployment before being retrenched and made redundant. However, while the oversupply of clerical and support staff was reduced, there was a shortage of qualified personnel with requisite knowledge to fill new vacancies such as customer service managers and financial consultants, for whom there was a growing demand.

The global recession also led to increased head office controls over hiring, particularly at Citibank which shed hundreds of staff in Hong Kong. As one Citibank manager explained: 'You always tend to get this with an American company. At one point we had the global CEO saying that we could not have any new hires unless he signed off'. Another Citibank manager complained: 'headcount is now absolutely controlled at group level and decisions (on hiring) have been taken out of our hands.... we can't even replace (anyone) in an existing role unless it is approved at group level'.

During and after the global recession, many banks were criticised for 'over selling' and contributing to the financial crisis around the world. One HSBC manager noted that management training programs were amended to place greater emphasis on 'values' and 'ethics' and changing leadership behaviour in order to improve the image of banks which had suffered reputational damage during the global recession. Whether this marked a major change in the kind of training and education of managers is difficult to determine.

Another change in training and development since the global recession has been greater centralisation of the curriculum by the headquarters. Both banks appear to follow an 80:20 'rule of thumb' whereby 80 per cent of training material is produced at the global level and 'rolled out' to subsidiaries in each region and country. They leave 20 per cent to be produced by local management to suit their requirements. HSBC has a 'global learning management system' which ensures that all training programs adhere to global requirements. Citibank produces generic programs which are delivered by regional and country training personnel. A training manager at HSBC claimed that it was difficult to introduce any skills development programs which were 'outside the target operating model' laid down by head office. The exception was in relation to educating local managers about country specific laws and regulations which apply to Hong Kong.

Job security in both banks has declined since the global recession although the impact has been greater on middle to lower level employees who been subjected to continuous cost reductions, competitive performance evaluations and have seen more of their work off-shored than senior managers. Older workers have also been made redundant as younger employees with more

relevant or up to date skills have been recruited. This has shattered the image of banks as providing long term secure career paths. As noted by one HSBC executive: "The bank's commitment to job security was put to the test last year when we had to shed staff. People who had been working here for 20 to 30 years felt that this was a company that looked after you. They weren't used to change and constant restructuring like some other banks".

Compared with the global investment banks, local retails banks in Hong Kong were not as seriously affected by the global recession. By 2009, Hong Kong's economy had substantially recovered and redundancy programs were being wound back. Furthermore, as a consequence of the global recession, the Hong Kong Monetary Authority (HKMA), which acts as a de facto central bank to ensure prudential operation and stability in the banking sector, strengthened its 'continuous supervision' policy and issued new supervisory policies and practices to banks. However, the increased emphasis on corporate governance by the HKMA contributed to labour shortages in some categories of work related to regulatory compliance and risk management. Hence, retail banks in Hong Kong have had to continuously adjust their corporate strategies and workforces in order to remain competitive and survive. There has been some spill-over from the multinational banks to the local banks in terms of recruitment and skills development. Retail banks in Hong Kong have adopted similar policies to the multinationals in order to minimise costs, enhance revenue, improve revenue and develop new high growth markets and business areas. This has resulted in mergers between local banks and a rationalisation of some positions within the banks. It has also meant that local banks have had to compete with multinationals in recruiting employees in specialised fields who are in short supply.

(iii) Performance Management and Remuneration

Since the global recession, both multinational banks have been under increased scrutiny, particularly in relation to bonuses. HSBC conducts mid-year and end of year performance reviews of staff. A 'balanced scorecard' is used to evaluate employees' performance on four dimensions including financial aspects, customer relations, internal business processes and learning. Different weightings as assigned to various jobs. However, following the global recession, criticisms of the banks' approach to maximising sales caused a change of focus from sales volumes to other aspects such as the quality of sales and customer service. Staff at HSBC are required to set both quantitative and qualitative goals, which are then subject of discussion with their managers. At Citibank, three performance criteria are used, including: their sales target, level of service provided and compliance with regulations. However, since the global recession, incentive bonuses have been replaced with discretionary

bonuses at Citibank. These are calculated according to different metrics adopted for individual, business and group levels.

Both multinational banks reported that since the global recession there has been increased standardisation of remuneration practices. For example, at HSBC, salaries for particular roles in Hong Kong are calibrated against those paid to employees in other countries within the same region. In both banks there is stronger oversight of remuneration levels than was previously the case. Salaries paid to the top levels of HSBC management in Hong Kong are reviewed at a global level and will be challenged by global headquarters if they vary too much from the norm in their region.

Both banks claimed to pay 'at the middle of the market rate' although high performers can earn more. According to one Citibank HR manager: "We pay at the market rate for average performers but at the higher quartile for top performers". Similarly, an HR manager at HSBC commented that "the base pay at HSBC is at the market rate but the bank likes to position itself as an 'employer of choice' and is a market leader for (pay for) high performers". However, it was noted by a Citibank manager that during the global recession US regulators became concerned about the levels of compensation and benefit packages paid by banks which were 'bloated and out of control'. Hence, global banks are now facing government regulations in many countries, including Hong Kong, which seek to exercise greater controls over how remuneration is structured, particularly in regard to bonuses and incentive payments. Some governments are also introducing greater regulation to reduce excessive risk taking by banks.

(iv) Employment Relations

In HSBC and Citibank few employees are members of unions in Hong Kong. The Hong Kong Banking Employees Association (HKBEA) was formed in 2002 during an economic recession when there were a number of bank mergers and acquisitions resulting in large scale employee retrenchment on a scale which was unprecedented. The union grew to a membership of around 8,000, most of whom are employed in low to medium level roles in locally-owned and operated banks. Neither HSBC nor Citibank have recognised the union and have not engaged with it in collective bargaining. As one HSBC manager commented: "we have over 20,000 employees in Hong Kong compared with the union's total membership of 8,000. How could anyone say that HKBEA could represent our staff"?

The multinational banks provide wages and conditions which are better than average for comparable work in Hong Kong banks, which reduces the incentive for employees to join the union. As one HSBC manager commented: "our employees possess high levels of skills, so that they can find another job easily if they are not

satisfied with the bank". However, there are also a number of employment practices which make it difficult for the union to pursue a collective approach to representing employees of multinational banks. These include: individualised performance-based bonus payments, the growth of 'at risk' remuneration, increasing use of precarious forms of employment and the threat of outsourcing and 'off–shoring' of certain banking activities.

Both multinational banks have also sought to increase communications with their employees. HSBC conducts regular employee attitude surveys to collect staff opinions about the bank's operations. It has also established a 'staff association' to promote social and recreational activities among employees but not collective representation or voice on work-related issues. HSBC also conducts 'town hall' type meetings to provide the opportunity for bank staff to meet and question the CEO about a wide range of issues. Citibank has similar activities such as inviting employees to have breakfast with senior management where grievances can be raised. Citibank also uses an annual 'Voice of Employees' survey to solicit feedback towards management and to gauge the overall levels of job satisfaction among its employees.

DISCUSSION OF FINDINGS

The case studies of the diffusion of employment practices in two multinational investment banks and their Hong Kong subsidiaries have revealed that since the global recession of 2007-08, the headquarters of both banks have increased their controls over their subsidiaries as well as strengthening regional coordination in their Asian operations. The main drivers of greater control being exercised by the global head offices over their subsidiaries in Hong Kong appeared to be a combination of cost pressures flowing from the global recession and stricter standards being imposed on multinational banks following an overhaul of financial regulations in the major industrial economies. Many governments are seeking to improve transparency in the banking systems and avoid another global recession in the future to which banks' lending practices contributed. After the global recession, Citibank restructured to separate its core businesses from its non-core ones and reduce its debts. HSBC changed its strategy from pursuing growth as its primary goal to exiting its business in countries which were not as profitable as others.

Following the GFC, both banks reduced their workforce around the world. Citibank was hit harder than HSBC and narrowly survived bankruptcy due to the US government providing it with loans and investment. Citibank cut its workforce numbers more deeply than HSBC and had fewer employees in Hong Kong. While HSBC reduced its global workforce by 10 per cent, it maintained a strong presence in Hong Kong due to its large retail banking business as well as its extensive

activities in China. There has also been a trend towards standardisation of structure and practices in both banks. Citibank embarked on an "efficiency drive" in which all subsidiaries were required to follow a 'blueprint', while HSBC's 'drive to the common' aimed at achieving consistency of operations across all lines of businesses and within its subsidiaries.

Greater control by headquarters over subsidiaries can be observed across a range of employment practices including work organisation, recruitment and skills development, performance management and remuneration and in employment relations. In both banks, various routine tasks were outsourced or off-shored to locations where labour and other costs were lower. Controls were instituted by headquarters over recruitment of new employees, even though this led to a shortage of some key personnel. Skills development was also subject to greater centralisation with training programs having to adhere to global requirements. Performance management and remuneration systems were driven more from head office in both banks. This was partly in response to criticisms of incentive bonuses which were regarded as having become 'bloated and out of control' and having encouraged excessive lending and risk taking, contributing to the banks' financial problems. Employment relations are normally the province of local subsidiaries. Neither HSBC nor Citibank recognises the union in Hong Kong for collective bargaining purposes. Both banks undertake regular employee attitude surveys to gauge levels of satisfaction among their employees and use various mechanisms to foster communications at the local level.

A number of managers in the Hong Kong subsidiaries of both banks complained about frustrations arising from excessive head office control over certain issues. One manager argued that the trend towards greater standardisation and control lead to the lowest common denominator of policies and practices being implemented in the subsidiaries. As expressed by an HSBC manager in Hong Kong: "Head office put us under pressure to restructure and set unrealistic deadlines which do not allow us time to consult and seek feedback from employees". A Citibank employee complained that: "I tried to warn against the change model which was being introduced by consultants from the US but without success". However, it appeared that HSBC was able to exercise more autonomy and independence from head office, mainly because they are such an important region and contribute such a high proportion of the bank's profits. By contrast, a Citibank manager explained that strong direction from headquarters was accepted because this was part of "an established modus operandi" for a US bank. However, it may also be due to the less important role which the Hong Kong subsidiary played in Citibank and that the economic problems were much greater and more urgent than at HSBC.

CONCLUSIONS

The case studies of HSBC and Citibank in Hong Kong demonstrate that there is diffusion of employment practices between the head office and subsidiaries for both banks. However, the strategies adopted by each bank can be viewed as a reaction to global pressures which forced them to cut costs and comply with more stringent banking regulations imposed by various regulatory bodies following the global recession. While there were similarities between HSBC and Citibank in the way they sought to exercise greater controls over their subsidiaries, there were differences arising from the differential impact of the GFC on their financial viability as well as the role which the Hong Kong subsidiary played in each of the respective banks.

It is difficult to isolate the effects of the three key variables shown in Figure 2 on the employment practices in the Hong Kong subsidiaries of each bank. First, the institutional factors include the business systems operating in the home country of each bank as well as the regulatory systems in the host country. The US-based Citibank had a more centralised approach to how it managed its subsidiary in Hong Kong, compared with HSBC, which appeared to allow more autonomy to the management of its Hong Kong operations. However, this may also be due to the fact that HSBC has a much stronger presence in Hong Kong and China than Citibank and also has extensive retail banking operations there. The regulatory framework in Hong Kong did not appear to have a significant influence on the way the two banks operated in Hong Kong. Despite the fact that there is a Hong Kong Monetary Authority (HKMA) which oversees the prudential operations of the banking sector and a Minimum Wage Ordinance in Hong Kong, neither seemed to impede the activities of the multinational banks.

Second, the nature of the investment banking sector had an influence on the diffusion of employment practices by the multinationals to their Hong Kong subsidiaries. The trend towards 'lean banking' was evident in HSBC and Citibank as both sought to reduce the costs of services through standardisation and the application of technology. The strategies pursued by both banks appeared to support the argument that firms which operate in sectors which have common technologies and forms of work organisation are more likely to pursue diffusion of industry specific employment practices (Cooke 2007). While there are differences in the means by which HSBC and Citibank diffused their employment practices from head office to subsidiary, the nature of the investment banking industry required each to follow a similar set of business procedures thereby limiting the degree of differences between the operations of investment banks.

Third, organisational structures and strategies pursued by the two multinational investment banks also influenced the diffusion of employment

practices to their Hong Kong subsidiaries. The results of the case studies supported the theory that firms which have a multi-domestic strategy, like HSBC, are more likely to adopt a polycentric approach and grant greater autonomy to their subsidiary firms. By contrast, firms which adopt a more transnational strategy, like Citibank, are likely have a more centralised policies and seek greater compliance by their subsidiary firms (see De Cieri and Dowling 1999). Hence, Citibank adopted a more aggressive transformation of its business in order to overcome its significant losses and near bankruptcy following the global recession. This led Citibank to require stricter adherence to its employment practices by its Hong Kong subsidiary than HSBC, as exemplified by greater standardisation of recruitment and training as well as remuneration.

In reality, these three factors interact to create a dynamic process of diffusion from multinational investment banks to the Hong Kong subsidiaries, particularly in relation to employment practices. The interaction of institutional, sectoral and organisational variables results in a constantly changing set of relationships between the headquarters and subsidiaries of multinational enterprises. The examples of HSBC and Citibank reveal that the power of subsidiaries relative to the headquarters is continuously changing and there are various means by which the local management can resist attempts by head office to require them to adhere to corporate level policies and practices. Hence, the diffusion and spill-over of employment practices from headquarters to subsidiary in each of the multinational investment banks in this study can be viewed as negotiated process which is influenced by a number of interacting factors within and external to the firm.

It is possible that the diffusion of employment practices between head office and the subsidiaries of Citibank and HSBC in Hong Kong, which are reported in this paper, were similar to the experiences of other multinational banks following the GFC. It is beyond the scope of this paper to judge whether this was the case and we do not claim that Citibank and HSBC were unique in the way that they adapted to the crisis. However, our study demonstrated that there were important differences between these two major international banks in the way in which their corporate head offices exerted control and strengthened regional coordination in relation to employment practices in their Asian operations.

The outbreak of the COVID-19 pandemic has exacerbated the problems facing the financial sector as physical lockdown in almost all countries in the world has cut short the production supply within the web of highly integrated supply chains, seriously affecting the financial sector and the demand side including trade and tourism (Strauss-Kahn, 2020). Our study has demonstrated how the GFC had a very significant impact on employment practices and the relationship between

the headquarters and subsidiaries of HSBC and Citibank in Hong Kong. The ability of each bank to respond to their changed circumstances after the GFC and the changes which they made to adapt to the post GFC era may provide an indication of their long-term survival after COVID-19 eventually is suppressed or eliminated.

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Surveying & Built Environment

Price Dynamics of Properties of Different Classes with Similar Uses: A Cross-sectoral Study of Industrial and Office Premises

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ABSTRACT

On the back of evolving economic structures, land use regulations are fine tuned to make more efficient use of land resources by allowing mixed uses. Real estate markets are no longer segmented as different classes of properties share similar demand drivers, sophisticating real estate price dynamics. This paper develops a model of the price determination of two related property markets where the price of one market serves as the upper bound of the other. The markets of new industrial premises and budget offices in Hong Kong are used as case studies for empirical testing and model calibration. The rational expectation hypothesis is empirically verified albeit the presence of information frictions. It is also found that the presence of the upper bound exerts a stabilising effect on property prices by making them less sensitive to market fundamentals. The findings contribute to an understanding of price determination of related property markets as well as the development of cross-sectoral studies.

KEYWORDS: Industrial Property; Commercial Property; Target Zone; Nonlinear Dynamic; Rational Expectation

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INTRODUCTION

While land control policies and regulations help promote economic growth by making efficient use of land, land may still be used sub-optimally amid evolving economic structures as conventional land use measures can fail to accommodate new economic activities. As a response, new land control policies emerge to allow better use of land, including mixed-use developments that allow different types of occupiers using land and premises for multiple purposes. In Hong Kong, for instance, the government introduced the new land use zoning "Other Uses (Business)" ("OU(B)") in 2001 that allows a mix of office, commercial, and non-polluting industrial uses in an area. Zoning regulations in Japan largely allow mixed land uses. Instead of restricting each zone to an exclusive use like in the US and the UK, Japan's land use policies tend to follow the principle that any uses are allowed unless they are not permitted by law. Mixed uses can also arise in the form of unauthorised usage. It is not uncommon to see that occupiers save cost by using the premises for purposes not permitted under land and building regulations. In other cases, occupiers no longer use the premises for original legitimate purposes amid operation restructuring. For example, in Singapore and Hong Kong (Chau and Chan 2008) some industrial premises are misused for non-industrial purposes. Consequently, markets of different property classes are not segmented as they share similar demand drivers.

The presence of mixed-uses added a new dimension to the research paradigm of real estate economics as it sophisticates the structure and price dynamic of the property market. Unfortunately, cross-sectoral studies remain scant with most research concerns markets of the same property type, Tse (1998) for housing market and Dunse and Jones (1998) for office market, to name some. In addition, while multivariate analysis such as vector autoregressive (VAR) models remains a possible methodology to study price determination processes, new theoretical models are needed to discover market behaviours that only occur in related markets. For market participants, the results of the present work allow them to understand the price dynamics of two markets that share similar demand drivers. For example, the price of budget office sets the upper bound of the price of new industrial buildings. Sellers of industrial properties should take this into account when setting the asking price.

By using Hong Kong as case studies, this paper aims to promote cross-sectoral research as well as to fill the gap by proposing a theoretical model of the price determination of two related properties based on Krugman's exchange rate target zone framework. This paper is constructed as follows. The next two sections provide a brief review of Hong Kong's industrial property market and Krugman's target zone model, respectively, with the latter

aiming to highlight statistical tests that can be used in the later sections. The section after gives the theoretical basis of the model. The final two sections present empirical test results and the conclusion.

DEVELOPMENT OF HONG KONG'S INDUSTRIAL PROPERTY MARKET

While industrial and office premises are transacted in two different markets, some of them have become substitute goods as many industrial premises are being used for office amid Hong Kong's economic restructuring from industrial to financial. On the demand side, high office rents driven by limited new supply and tight vacancy draw greater demand for new and high-quality industrial premises for office use. On the supply side, relaxation in land use and urban planning regulations encourage the production of industrial space for office use. Consequently, the interaction of the price discovering process between the two markets emerged.

Hong Kong's manufacturing sector became the driving force of the city's economy between the 1960s and 1970s amid the influx of low-cost labour offered by the Mainland Chinese migrants. On the back of the Chinese economic reform in the end of 1970s, many locally owned factories relocated to Shenzhen for lower labour costs but with their offices remained in Hong Kong for supporting roles such as administration and marketing. Meanwhile, Hong Kong developed itself to an international financial centre and a regional trading hub. In the end of 2000, imports/exports trade, banking, finance and other business services accounted for about 44% of the city's GDP. While high quality office buildings in core areas mainly house banking and finance companies, trading and manufacturing companies operate business in budget office buildings as well as new and refurbished industrial buildings. Unlike traditional industrial buildings that aim to accommodate manufacturing processes, many new and refurbished industrial buildings have construction specification similar to budget office buildings. To some extent, some of them cannot be distinguished by their appearances as they are equipped with central air-conditioning, curtain walls and property management services.

On the supply side, two government policies have further promoted industrial buildings used for office. In 2001, the Hong Kong Government introduced the new zoning "Other Uses (Business)" ("OU(B)") allowing a mix of office, commercial, and non-polluting industrial uses in the area. Many "Industrial" ("I") zones have been rezoned to OU(B) zones since then. As of 2014, warehouse and storage remained the largest user in "OU(B)" and "I" zones, followed by office, accounting for about 25% of the total gross floor area. Revitalisation schemes, another government policy that aims to encourage industrial

buildings for non-industrial uses, was launched in 2010 and 2018. Under these schemes, industrial buildings with age 15 years or above are eligible for wholesale conversion for non-industrial uses, provided that the new uses are allowed under planning and building regulations. As of end of 2008, 40.8% of all industrial buildings in Hong Kong were built before 1980. Given the nature of refurbishment and the restriction of no increase in the total gross floor area after the conversion, most of these revitalised office buildings still have construction specifications like industrial buildings, limiting the potential growth of their values.

Empirically, Tang and Ho (2015) found that the industrial and office property market in Hong Kong are closely related. With the use of an error correction VAR model, the authors found that policies allowing industrial premises for non-industrial uses led to private market to generate more new industrial supply. According to their theoretical adjustment model, the increase in industrial supply should put downward pressure on the price of industrial property while a reduction in the incentives for new office development further constrains office supply, driving up the price of office space. In another paper, Tang and Ho (2014) investigate the price relationship between industrial and office premises, concluding that the two are integrated, as suggested by the error correction VAR model.

This paper contributes to the literature not simply by studying the interaction between the price dynamics of new industrial and budget office premises in a time series analysis setting. Recognising that budget office premises house purpose-built office units, they should command higher price and should serve as an upper bound of the price of new industrial premises. Market forces should prevent the price of budget office from falling below that of new industrial premises. However, we do not expect the price of industrial premises to be driven by market fundamentals until it hits the price of budget office premises. This is because the presence of the budget office premises constrains future possible paths of the price of new industrial premises, suggesting the role of forward-looking expectation in the price determination of the two related markets. This paper then aims to propose a theoretical model that describes how expectation can affect the price dynamics of the two related markets. Despite its origination in exchange rate finance, Krugman's target zone model (Krugman 1991) is employed as the framework for analysis as it lays down the theoretical groundwork for the model proposed in this paper.

KRUGMAN'S TARGET ZONE MODEL

Krugman's target zone model originates from modelling the exchange rate behaviour within the band (also

called the target zone) under the fixed exchange rate regime. Under this regime, the exchange rate is allowed to move freely within a predetermined band and the central bank intervenes by buying or selling currencies if the exchange rate moves close to the boundaries of the band so as to keep the exchange rate within the band. The band may be one- or two-sided. For instance, the Swiss National Bank enforced a one-sided band between 2011 and 2015 with the upper bound of 1 Euro to 1.2 Swiss Franc, limiting further appreciation of the currency yet no limit for depreciation. The linked exchange rate system in Hong Kong is an example of a two-sided band with the exchange rate between the Hong Kong dollar and US dollar being fixed between 7.75 and 7.85 HKD per USD.

Assume that the exchange rate movement under the free-floating regime is linearly driven by market fundamentals in the absence of central bank's intervention, Krugman's model shows that the dynamic of exchange rate is nonlinear within the band under the fixed exchange rate regime. This is due to the forward-looking expectation that the central bank is expected to intervene when the exchange rate is approaching the boundaries of the band.

Its basic form is given by (Krugman 1991),

$$s = m + v + \alpha E[ds]/dt \quad (1)$$

where the log of the exchange rate (s) is the sum of the log of money supply (m) used by the central bank for monetary policies, expected change in exchange rate ($E[ds]/dt$) as suggested by the rational expectation hypothesis with scaling constant a, and v the log of exogenous velocity shocks such as economic and geopolitical events affecting s that cannot be controlled by the central bank (Lera and Sornette 2016), an "include-all" variable. α is interpreted as the semi-elasticity of the exchange rate with respect to its expectation of change. Furthermore, v is assumed to follow a continuous-time random walk and represented by Brownian motion $dv = \beta dW$ with a scaling constant β where W is a Wiener process. $f = m + v$ is therefore considered as the fundamental value of s. Assuming a fully credible target zone that the central bank must intervene to keep s within the band, $E[ds]/dt$ must be negative when s is near, say, the upper bound $\bar{s}$ since it is expected that the probability s dropping is higher than growing amid central bank's intervention to suppress the growth in s. Consequently, s grows at a rate that is slower than it should be in the absence of the band, a phenomenon known as the honeymoon effect. This also means that $E[ds]/dt$ plays a role in stabilising the exchange rate.

As $E[ds]/dt$ also determines the value of s as shown in Equation (1), the negative adjustment driven by $E[ds]/dt$ must also affect s at other levels, not just when it is close to $\bar{s}$. The magnitude of the negative adjustment

gets smaller and s deviates less from f as s moves away from $\bar{s}$, resulting in a nonlinear relationship between s and f, known as the smooth pasting condition. This is graphically illustrated in Figure 1. Similar reasoning applied to the lower bound of the band, resulting in a S-shaped curve depicting the relationship between s and f.

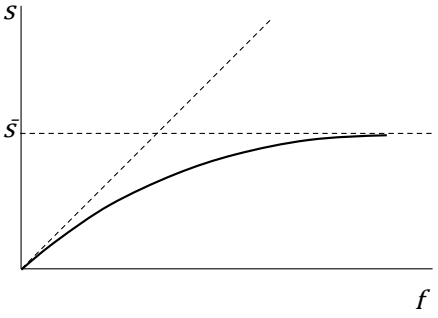

Figure 1: Graphical illustration of Krugman's target zone model

Although Krugman's model remains the benchmark for modelling target zones, empirical support has been sparse with empirical tests often leading to rejection of the model (Hui et al 2017). Direct empirical tests are not available as market fundamentals in the foreign exchange market are not observable. Different methodologies have been used in literature to test the empiricism of the model, including regression and time series models. The remaining of this section aims to provide a brief review on methodologies used to test the empiricism of Krugman's model.

By considering nonlinearity as a form of regime switching linear data generating processes, Crespo-Cuaresma et al (2005) applied a three-regime self-exciting threshold autoregressive (SETAR) model to test the linearity in the lower and upper bounds of the band. In light of the distribution of the bootstrapped likelihood ratio test statistic, nonlinear exchange rate behaviour was found in selected currencies in the Exchange Rate Mechanism (ERM) of the European Monetary System and in the ERM II. Flood et al (1991) examined nonlinearity by directly observing the relationship between s and f where the latter was derived based on Equation (1) with α being estimated by regressing the discretised form of Equation (1) and $E[ds]/dt$ was derived under uncovered interest rate parity. The authors found limited support for the presence of linearity in the currencies in the European Monetary System. In contrast, Iannizzotto and Taylor (1999) estimated Equation (1) using the method of simulated moments. Hansen tests of over-identifying restrictions demonstrated mixed results with nonlinearity found only at the very edges of the band for three ERM exchange rates. Lera and Sornette (2016) took a very different approach. Derived by using Taylor approximation and the inversion between s and f, the conditional volatility and probability of s are estimated and tested with likelihood ratio tests. They found that the Euro/Swiss franc exchange rate between 2011 and 2015 was well fitted with Krugman's model. Lindberg and Söderlind (1994) tested nonlinearity

on the Swedish data from 1982 to 1990. Nonlinearity was rejected by comparing the in-the-sample prediction errors and out-of-sample predictions yielded by fitting s with the locally weighted regression (LWR) model and conventional linear models. Other forms of empirical tests have also been employed in existing literature, yet they are largely modifications of the above-mentioned ones. For instance, Parikh and Bhattacharya (1996) largely followed that in Flood et al (1991) but with different expectation formation. While Krugman's model has been rejected in many empirical studies, a number of extensions and modifications have been developed, for instance Naszodi (2010), Hertrich (2016), Utsunomiya (2013) and Bauer et al (2009).

To recapitulate, Krugman (1991) developed a model of exchange rate behaviour under the fixed rate regime. The model assumes that (i) the exchange rate is a function of fundamentals and time and (ii) the fundamental process is bounded within the band. Krugman's model can be generalised to the context of the price of new industrial premises and budget office premises with the latter acting as the upper bound of the former. The upper bound can then be viewed as the analogue of the target zone boundary in the exchange rate context. Against this backdrop, a similar model is proposed in the subsequent section to understand price determination in two related property markets.

THE MODEL

Let X and Y be the price of new industrial premises and budget office premises respectively. Also let $V = ln(X/Y)$. It is then expected that $V \leq 0$ since the price of new industrial premises should be below that of budget offices. At this point, V should be reminiscent of s in the previous section with a one-sided band similar to the Euro/Swiss franc exchange rate between 2011 and 2015. Similarly, we consider V being driven by some market fundamentals following a Wiener process. That is, any factors including policies that affect the demand for and supply of new industrial and budget office premises. Then following Krugman's target zone model, assume that V is driven by unobservable market fundamentals Z following a random walk, such that $dZ = \sigma dW$. This also implies that Z follows arithmetic Brownian motion with no drift. A non-zero drift suggests that X diverges from Y, violating the assumption that new industrial and budget office premises share similar demand drivers and that the price dynamics of these two property types are closely related. Despite being a simple model, it does not assume any specific data generating process, allowing generality. The assumption is not strong as we simply assume a random walk model, commonly assumed in many economic models.

The proposed model differs from Krugman's model that X is not a fixed target. It would be unreasonable to

assume a fixed X. Nevertheless, the reasoning behind this model still holds because the focus is V that has a fixed target at zero and is able to describe the relationship between the two prices. To see this, consider two difference scenarios. If there is a positive demand shock for new industrial buildings, Y increases and X should prevent V from further increasing if V is close to zero. But if there is a positive demand shock for both new industrial and budget office buildings, both X and Y should increase in response, and V generally remains unchanged (or slightly decreases or increases depending on the magnitude of the increase in X and Y). Therefore, V is still bound by the target of zero.

Take into consideration the rational expectation hypothesis, the relationship between V and Z is given by,

$$V = Z + \gamma \frac{E(dV)}{dt} \quad (2)$$

where γ is the semi-elasticity of V with respect to the change in its expectation and Z is the fundamental value of $ln\left(\frac{X}{Y}\right)$, an "include-all" variable including shocks. That is, without the presence of rational expectation, $\ln\left(\frac{X}{Y}\right)$ would simply be equal to Z. At the edge of the boundary, the market expects that the price of new industrial premises cannot be above that of budget offices and that $\frac{E(dV)}{dt}$ is negative when V is close to zero. This is because of the higher chance V moving away from 0 than going towards it, resulting in $E[dV]$. However, this does not mean that V goes linearly with Z and stays at zero when it hits the upper bound. Knowing that the existence of the upper bound constrains the possible future paths of V, the dynamic of V should behave differently than it should if there was no upper bound. This means that the upper bound should have some impact on the dynamic of V even V is not hitting the upper bound. This is shown in Equation (2) in which the expectation term affects V itself. To see this in detail, solve Equation (2) for V by applying Ito's lemma such that

$$dV = \frac{\partial V}{\partial t}dt + \frac{\partial V}{\partial Z}dZ + \frac{1}{2}\frac{\partial^2 V}{\partial Z^2}(dZ)^2 + O(Z^3)$$

Have the right-hand side simplified then take the mathematical expectation to obtain,

$$\frac{E[dV]}{dt} = \frac{\sigma^2}{2}\frac{\partial^2 V}{\partial Z^2} \quad (3)$$

Substitute Equation (3) into Equation (2) to get,

$$V = Z + \frac{\gamma\sigma^2}{2}\frac{\partial^2 V}{\partial Z^2}$$

The solution of this second order differential equation is then $V = Z + Ae^{-\lambda Z} + Be^{\lambda Z}$ where A and B are constants and $\lambda = \sqrt{\frac{2}{\gamma\sigma^2}}$. To solve for A and B, consider that the impact of $\frac{E(dV)}{dt}$ should reduce gradually as V moves away from zero and that V should eventually move linearly with Z, as suggested by Equation (2). This implies that $\lim_{Z\to-\infty}\frac{\partial V}{\partial Z} = 1$ hence $A = 0$. At the other end, smooth pasting condition suggests that $\frac{\partial V}{\partial Z}\Big|_{Z=Z_0} = 0$ where Z_o corresponds to the upper bound. This gives $B = \frac{-1}{\lambda e^{\lambda Z_0}}$ and therefore,

(4) $$V = Z - \frac{e^{\lambda(Z-Z_0)}}{\lambda}$$

The immediate implication is that the price of new industrial premises is strictly below, not even on a par with, the price of budget office as suggested by the nonlinear term $\frac{e^{\lambda(Z-Z_0)}}{\lambda}$ driven by expectations.

METHODOLOGY AND RESULTS

To test the empirical validity of Equation (4), we adopt the approach in Crespo-Cuaresma et al (2005) that nonlinearity can be tested with a SETAR model in which nonlinearity is considered as multiple regimes of local linearity. After testing for stationarity and heteroskedasticity, the below AR(p) model representing the null hypothesis of linearity is fitted to the data with the lag order determined by the lowest AIC.

(5) $$V_t = \delta_0 + \sum_{i=1}^{p} \delta_i V_{t-i} + \varepsilon_t$$

The alternative hypothesis of nonlinearity is given by the SETAR model with an embedded AR(p) process and is given by,

(6) $$V_t = \begin{cases} \alpha_0 + \sum_{i=1}^{p} \alpha_i V_{t-i} + \varepsilon_t & \text{if } V_{t-1} \le \phi_q \\ \beta_0 + \sum_{i=1}^{p} \beta_i V_{t-i} + \varepsilon_t & \text{if } V_{t-1} > \phi_q \end{cases}$$

where ϕ_q is the $q\%$ quantile of V_t. q is not known and we estimate Model (6) with different quantiles, from 5% to 95% with 1% steps. The model that yields the lowest AIC is selected. If nonlinear behaviour exists, we expect that nonlinearity as displayed by Equation (2) and (4) can be described by a combination of linear data generating processes. This does not mean that the SETAR model resemble the true data generating process, as in Equation (2) and (4). The likelihood ratio test is used to determine if the SETAR model provides a better fit and "closer" to the true model, similar to Vuong's closeness test (Vuong 1989). The test statistic is then $LR = 2(ln(L_{SETAR}) - ln(L_{AR}))$ where L_{SETAR} and L_{AR} are the likelihood obtained from estimating Model (5) and (6), respectively. Given that the AR and SETAR model are not nested, LR is not Chi-squared distributed and does not have a standard limiting distribution. Therefore, the bootstrap approach is employed.

The estimated coefficients and the residuals are used to generate 5000 bootstrap samples under the null hypothesis of linearity. Each of these samples is fitted with the SETAR and AR model to obtain the likelihood ratio test statistic, LR_n^B where $= 1, \ldots, 5000$. The p-value of is then computed as,

(7) $$\frac{1}{5000} \sum_{n=1}^{5000} I(LR > LR_n^B)$$

where I is the indicator function yielding the value of one if the condition in parentheses is true.

If the likelihood ratio test validates our hypothesis of linearity behaviour, we further estimate the model by

discretising Equation (4). Solving for Z yields,

$$Z = \frac{\lambda V - \omega(-e^{\lambda(Z-Z_0)})}{\lambda}$$

where ω is the Lambert W function and is defined as $x = \omega(xe^x)$ where x is any real or complex number. To further understand the differences between the three submarkets from the rational expectation perspective, the estimates of γ, σ and Z_0 are obtained with maximum likelihood estimation assuming normally distributed ΔZ_t with mean zero and standard deviation σ, where ΔZ_t is given by,

$$(8)\,\Delta Z_t = \frac{\lambda V_t - \omega(-e^{\lambda(Z_t-Z_0)})}{\lambda} - \frac{\lambda V_{t-1} - \omega(-e^{\lambda(Z_{t-1}-Z_0)})}{\lambda}$$

To further test the presence of honeymoon effect, a paired t-test is performed on V and Z. In light Equation (4), the honeymoon effect should stabilise V relative to Z. Then for every Z, V should be below Z. The paired t-test has the null hypothesis of $V \leq Z$ against the hypothesis of $V < Z$.

Price data of new industrial premises and budget office premises are gathered from the Hong Kong Property Review, a series of annual government publication published by the Rating and Valuation Department (RVD). The series publishes the price and rent data of different classes of properties. We considered the price data that best fits our interest of study, i.e. the prices of new industrial premises and budget office premises. We chose the average price of industrial buildings built in or after 1992 as well as the average price of Grade C office buildings, the lowest grade of office buildings under the definition of the RVD. Although both data series are reported at the district level, not all districts are included in each of the series. The only overlapped district in both series is the Eastern District that is traditionally an industrial area but now in the transition to a commercial area, making it ideal for our analysis. Similarly, Kowloon West is a commercial area, not identified as a district, previously dominated by industrial buildings. The area comprises four districts yet only the Grade C office price in Yau Tsim Mong district and the price of new industrial buildings in Sham Shui Po district are available. As adjoining districts sharing similar demand drivers, their prices are used in our analysis as another case study. As such, unlike the Eastern District, budget office buildings and new industrial buildings in Kowloon West distributed in two separate geographical clusters. To further provide another case study, we have also chosen the Grade C office price in Sheung Wan and the price of new industrial buildings in Kwun Tong. These two districts are located in separate parts of Hong Kong with the former on the Hong Kong Island and the latter in the Kowloon Peninsula. Unlike the case of the Eastern District and Kowloon West, this case study considers two geographically separate submarkets. While they may not share similar demand drivers, the price of Grade C office in Sheung Wan should

still form an upper bound of the price of new industrial buildings in Kwun Tong as the former is expected to command higher pricing not just due to its building specification but also its location near Central, Hong Kong's CBD with a high concentration with Grade A office buildings. This can be observed in Figure 2 that shows the log price difference of new industrial premises and budget offices.

Although the log price difference in all three cases stay below zero most of the time, it is rare to see the log price difference above zero in the Eastern District, implying weaker market frictions that delay market clearing. In contrast, market frictions are stronger in the other two cases as industrial and office buildings sit in separate geographical clusters. Literature suggests different explanations to the causes of spatial market frictions. First, properties within a submarket exhibit high degree of homogeneity and are highly substitutable with similar implicit attributes' prices (Liu 2013). This is particularly true in Hong Kong given the relatively short economic life of building structures that make transacted properties within a submarket less heterogeneous (Brown and Chau 1997). In other words, dispersed prices are seen across different submarkets, preventing the market equilibrium to emerge at the inter-submarket level. Second, unlike quantitative attributes such as property size, spatial heterogeneity is generally intangible and qualitative in nature, leading to more dispersed opinions about the property price. Finally, market frictions can be caused by sticky information. Information diffuses slowly through the population because the cost of acquiring information (Mankiw and Reis 2002) which is typical in the real estate market.

Non-existent data remains an issue as no transactions were recorded in some periods. Data between January 2002 and December 2018 were included in this study, totalling 177, 198 and 200 observations in the Eastern District, Kowloon West, and Sheung Wan and Kwun Tong, respectively. In addition, the data are subject to two other limitations. First, certain months saw low transaction volume, creating variation to the data. Second, because of the small sample size of each month, difference in the property quality cannot be averaged out, leading to another source of variation to the data. The summary statistics are exhibited in Table 1.

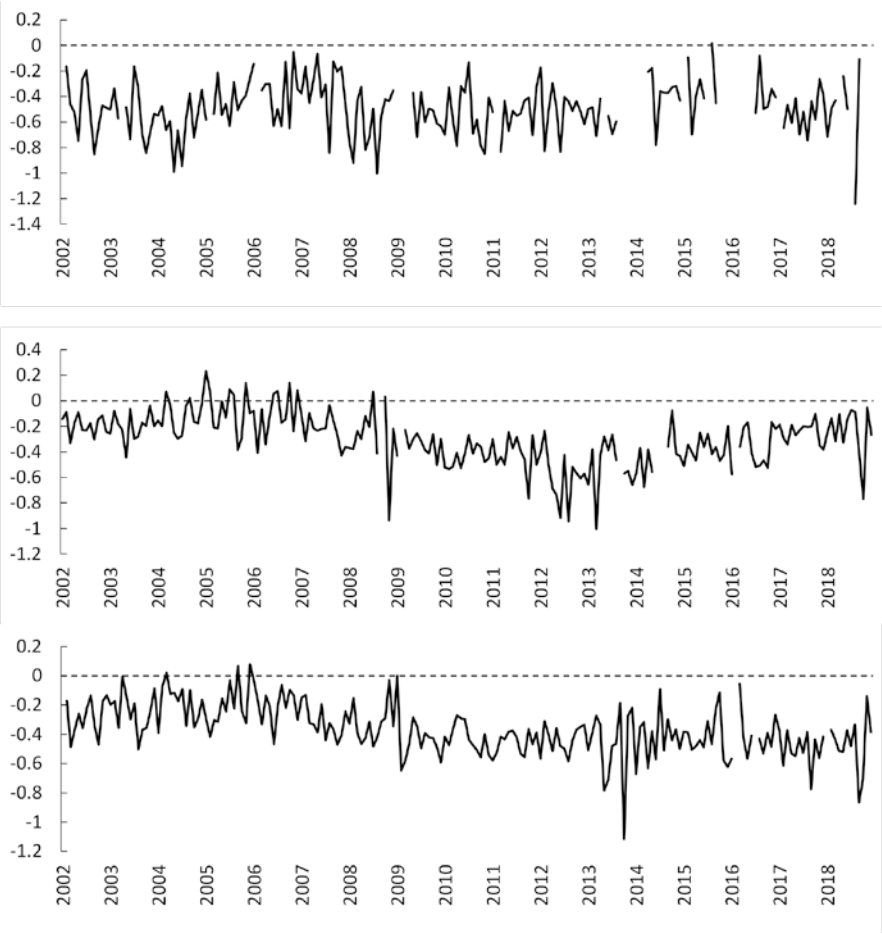

Figure 2: Log price difference of new industrial buildings and budget offices in the Eastern District (upper panel), Kowloon West (middle panel), and Sheung Wan and Kwun Tong (lower panel).

Table 1: Descriptive statistics of the data used

	Eastern District			Kowloon West		
	New industrial (HKD, sqm)	Budget office (HKD, sqm)	V	New industrial (HKD, sqm)	Budget office (HKD, sqm)	V
Mean	55267	88321	-0.4843	63029	88256	-0.3014
Median	39875	66365	-0.4805	47966	74215	-0.2825
Minimum	8738	18296	-1.2402	11976	17648	-1.0039
Maximum	167925	278816	0.0163	161503	190125	0.2301
Standard deviation	38439	59822	0.2112	39402	55376	0.2082
Number of observations	177	177	177	198	198	198

	Sheung Wan and Kwun Tong		
	New industrial (HKD, sqm)	Budget office (HKD, sqm)	V
Mean	59597	90695	-0.3633
Median	47095	71312	-0.3736
Minimum	10503	13578	-1.1145
Maximum	133472	283728	0.0764
Standard deviation	36922	61599	0.1758
Number of observations	200	200	200

As for econometric analysis, we do not impute the non-existent data since, as a matter of fact, they do not exist due to the lack of transactions. Consequently, an AR model is estimated with the available data. Let x_t be the data set with non-existent observations x_t where $j \epsilon J$. Model (5) and (6) are fitted to x_t with $t \neq j$.

The AIC selected 0.64, 0.41 and 0.31 for q for the Eastern District, Kowloon West, and Sheung Wan and Kwun Tong, respectively. Augmented Dickey-Fuller tests confirmed stationarity and no sign of heteroskedasticity was found in ARCH tests. The estimate of Model (5) and (6) as well as the result of the likelihood ratio test are shown in Table 2 below. The difference in AIC in each case demonstrates that the SETAR does provide a better fit to the data, suggesting another linear data generating process above the 64%, 41% and 31% quantile for the three cases. That is, the price of new industrial premises is above 66.5%, 71.0% and 64.3% of that of budget offices in the Eastern District, Kowloon West, and Sheung Wan and Kwun Tong,

respectively. Nevertheless, the result confirms Krugman's target zone model hence rational expectation hypothesis in the real estate context. The empirical validity of the rational expectation hypothesis suggests that market participants generally possess price information of budget office and new industrial premises and they know that the two markets share similar demand drivers.

Table 2: Results of linear and nonlinear models, and likelihood ratio test

Eastern District	AR	SETAR	
		$V_{t-1} \leq \phi_{0.64}$	$V_{t-1} > \phi_{0.64}$
Constant	-0.4713*** (0.0400)	-0.6292** (0.2848)	-0.4920** (0.2658)
Lag 1	0.0410 (0.0743)	-0.1719 (0.4507)	-0.1649 (0.9213)
AIC	-43.848	-59.972	
LR test statistic	6.1240**		

Significant at ***1% **5% *10%; standard error in parentheses

Kowloon West	AR	SETAR	
		$V_{t-1} \leq \phi_{0.41}$	$V_{t-1} > \phi_{0.41}$
Constant	-0.1003*** (0.0238)	-0.2817 (0.3219)	-0.1132 (0.1286)
Lag 1	0.3079*** (0.0663)	-0.0007 (0.5686)	0.2105 (0.5696)
Lag 2	0.3583*** (0.0663)	0.3620 (0.4281)	0.2914 (0.3827)
AIC	-114.788	-139.730	
LR test statistic	10.9418**		

Significant at ***1% **5% *10%; standard error in parentheses

Sheung Wan-Kwun Tong	AR	SETAR	
		$V_{t-1} \leq \phi_{0.31}$	$V_{t-1} > \phi_{0.31}$
Constant	-0.2554*** (0.0273)	-0.3269 (0.5915)	-0.1018 (0.1779)
Lag 1	0.3045*** (0.0678)	0.2325 (0.8118)	0.1171 (0.5542)
Lag 2		-0.0117 (0.6089)	0.2467 (0.3845)
Lag 3		-0.0840 (0.5786)	0.3656 (0.3899)
AIC	-127.990	-156.244	
LR test statistic	26.2535***		

Significant at ***1% **5% *10%; standard error in parentheses

The estimates of Model (8) are shown in Table 3 below. The estimate of γ refers to the expectation sensitivity, the percentage change in V with respect to a unit change in its expectation. It is observed that the greater value of γ the stronger the market friction. This is likely due to the presence of unrealistic expectations. Given that frictions prevent the free flow of market information, some not so well-informed buyers such as those perceive

delayed information may hold positive expectation, $E[dV] > 0$, even when V is very close to zero, suggesting $V > 0$. Consequently, these buyers decide to buy in anticipation of future price increases. In contrast, well informed buyers in a market with less friction are aware of the dynamic of V. Their expectations are relatively realistic, i.e. $E[dV]$ is close to zero when V is very close to zero, therefore they are not in a hurry to buy. In other words, unrealistic expectations have stronger impacts on price determination. While positive expectations play an important role in property buyers' decisions (Armona et al 2019), empirical data suggest that unrealistic expectations have greater impacts on house price movements than realistic expectations do (Towbin and Weber 2015).

The paired t-tests show the presence of honeymoon effect in all three submarkets. This means that the fundamental value of $ln(\frac{X}{Y})$ could have been higher than it appears to be. For instance, a new industrial building could have been transacted at a higher price without the existence of a budget office nearby.

Table 3: Results of Model (8)

	Eastern District	Kowloon West	Sheung Wan-Kwun Tong
	Estimates (standard error)		
γ	2.688*** (0.195)	3.287*** (0.168)	3.843*** (0.005)
σ	0.286*** (0.016)	0.219*** (0.011)	0.207*** (0.010)
Z_o	9.182*** (0.308)	7.579*** (0.213)	9.534*** (0.021)
AIC	58.472	-32.010	-55.058
Paired t-test statistic	-20.502***	-18.296***	-21.352***

Significant at ***1% **5% *10%; standard error in parentheses

Coupled with the LR test result, we conclude that market participants in the budget office and new industrial markets are rational but subject to information frictions. This finding provides an explanation to the common rejection of the rational expectation hypothesis in literature (Clayton 1996 and Li and Chand 2015). It suggests in the real estate context that the hypothesis of full-information rational expectation is rejected most likely due to the deviation from full-information rather than the departure from rational expectations (Coibion and Gorodnichenko 2015). Similar finding was observed in Hong Kong's private housing market. Using an error correction model, Hui and Lui (2002) found that market fundamentals are rationally capitalised into house prices over the long run only with irrational and biased information, and irrational expectations resulting in slow adjustments to equilibrium in the short run. This suggests that future research on the rationality of real estate markets should take into account the role information frictions play in expectation formation.

Another implication of our results is that the presence of the nonlinear term in Equation (4) suggests that market participants are always aware of the upper bound set by the price of office premises. In consequence, market expectations driven by the upper bound stabilise the price of industrial premises, making it less sensitive to market fundamentals. While the stabilising effect is desirable from the real estate policy maker's perspective, it means that the policy maker can never determine the true value of the property based on observed supply and demand, making it difficult to judge the impact of land and real estate policies. For example, since stamp duties can suppress property price and turnover through economic incidence (Davidoff and Leigh 2013), the nonlinear relationship between market fundamentals and price makes stamp duty rates determination difficult.

CONCLUSION

On the back of shifting economic structures, evolving land control policies that aim to make better use of land lead to more sophisticated real estate markets. In particular, markets of different asset classes are no longer segmented amid mixed uses of land. Against the lack of cross-sectoral studies in real estate economics, this paper contributes to the literature by proposing a theoretical model that describes the price dynamics of two related markets where the price of one sector serves as the upper bound of the price of another sector. Drawing on Krugman's target zone framework, the model can be used to understand the role expectations play in price determination.

The new industrial and budget office markets in Hong Kong are used as a case study for empirical analysis. The two markets are closely related as they share similar demand drivers amid structural economic transition from manufacturing to financial. The result of the bootstrap statistical test confirms the empirical validity of the model, suggesting that the new industrial and budget office markets in Hong Kong are rational albeit information frictions do exist. While the rational expectation hypothesis is commonly rejected, our finding provides some insights on how rationality in real estate markets should be assessed in the presence of market frictions. The impact of rationality should not be overlooked.

The proposed theoretical model demonstrates that rational expectations make property price less sensitive to market fundamentals. There are two implications. First, sellers of new industrial properties should notice the upper bound set by budget offices. Sellers should take into account the prices of budget office in vicinity for their price setting strategies. Second, real estate policy makers may be misled by the transacted prices because the true value of new industrial properties are now suppressed by the upper bound set by budget offices.

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Surveying & Built Environment

Marine Protected Areas in Hong Kong

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ABSTRACT

Marine Protected Areas (MPAs) were first established in Hong Kong in 1996 following the enactment of the *Marine Parks and Reserves Ordinance*. Currently, there are six Marine Parks and one Marine Reserve in Hong Kong. These have been designated for the conservation of the coral communities, mangrove stands, spawning and nursery grounds of commercially important fish species and the vulnerable Chinese White Dolphin. However, these MPAs are facing serious challenges arising from town planning issues in the vicinity of MPAs and the lack of proper management. Further, the conservation of the Chinese White Dolphins is threatened because not all of their core habitats are protected. To ensure the effectiveness of these MPAs in conserving marine biodiversity in Hong Kong, it is recommended that the shortcomings in MPA management should be addressed, an MPA network comprising 30% of the marine areas in Hong Kong should be created by 2030, that there should be more control over the development in the areas surrounding Marine Parks and that there should be more collaboration with Mainland China on environmental management. The future of Hong Kong's marine life lies in the hands of the government and the public. The question is which will have priority: the drive for more urban development to position Hong Kong as Asia's World City or the long-term goal of ensuring sustainability and the future well-being of the people.

KEYWORDS

Marine Protected Areas (MPAs), Marine Parks, Marine Reserves, Hong Kong, marine conservation, marine biodiversity, urban planning, Chinese White Dolphin

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INTRODUCTION

Marine protected areas (MPAs) are increasingly being established to restore coastal and marine ecosystems, conserve marine biodiversity and facilitate the recovery of over-exploited stocks. The first MPA was Glacier Bay, Alaska, which was designated in 1910 as a national monument (Morton 1996), but it was only in 1962, at the World Congress on National Parks, that the subject was accorded special attention at an international conservation meeting and it was not until 1982 that there was a call to incorporate marine, coastal and freshwater sites into a worldwide network of protected sites (Gubbay 1995). By the end of 2013, more than 6,000 MPAs globally, covering around 3.27% (12 million km^2) of the oceans had been designated, as estimated by the database maintained by Sea Around Us (Boonzaier and Pauly 2016).

This paper begins with an overview of Hong Kong marine life and the various threats to it. Then it goes on to discuss the current status of MPAs in Hong Kong, the present challenges facing these MPAs and their future prospects. How the urgency for marine conservation and Hong Kong's pressing need for economic development can be balanced will also be considered.

HONG KONG MARINE LIFE

Hong Kong has 1827 km^2 of territorial waters. The western waters are estuarine, being under the influence of the Pearl River while the eastern waters are oceanic. Between these two areas of water is a central transition zone of intermediate hydrography but high pollution load (Morton 2000).

The biogeographic location of Hong Kong, the subtropical climate, the varied influence of sea currents in close proximity to the Pearl River, the extensive and deeply incised coastline, numerous islands, wide variations in the degree of exposure to wave action and a broad, shallow continental shelf all contribute to a wide diversity of marine habitats and as a consequence, a highly diverse marine life (Morton 2000).

Hong Kong waters are home to some 6,000 marine species, including almost 1,000 marine fish species, some endangered species like the Indo-Pacific Humpbacked Dolphin *(Sousa chinensis)* locally called the Chinese White Dolphin, green turtle, horseshoe crab, Chinese bahaba (giant yellow croaker) and a rich diversity of coral types. Associated with the corals are abundant and diverse animals including bivalves, gastropods, crustaceans, echinoderms, worms and fish (Kao 2016, Marine fauna database 2017, Ng et al. 2017).

Although Hong Kong's marine area is only ~0.03% that of China, the number of marine species recorded in Hong Kong amounts to ~26% that totally recorded in China (Ng et al. 2017). Hong Kong has a rich marine biota.

THREATS TO HONG KONG MARINE LIFE

With a land area of more than 1,106 km^2 and a population of over 7.5 million, pressure on the Hong Kong environment is high. There is a never-ending demand for more land for a wide range of needs generated by a growing population and a flourishing economy. Over the years, Hong Kong has embarked on an ambitious programme of infrastructural development. Marine reclamation has created many hundreds of hectares of flat land for the construction of the new airport at Chek Lap Kok, port facilities, landfills for refuse disposal, housing, new roads and railways. Reclamation, dredging and marine dumping have resulted in habitat loss and disturbance and deterioration in water quality (Wilson et al. 2002). In addition, intensive and highly destructive fishing practices, marine traffic and pollution are also having adverse effects on the marine environment.

To cite some specific examples:

- In 1976, the total reclaimed land in Hong Kong was around 2,000 hectares but in 2003, the total reclaimed land amounted to more than 6,000 hectares. And the drive to reclaim more land continues, first, because the government aims to enhance the role of Hong Kong as an international city and as a consequence, needs new land to expand its hub functions, and second, because the government sees reclamation projects as being badly needed to house the anticipated increase of population (Ng and Cook 1997).

- Reclamation for the new port and airport facilities at Chek Lap Kok caused extensive damage to the seabed community and led to the destruction of part of the habitat of the already endangered species, the Chinese White Dolphin (Leung 1997).

- Reclamation for the development of new cities in the New Territories, e.g. Shatin and Tin Shui Wai in the 1970s, and of the new airport at Chek Lap Kok in the 1990s, resulted in the near total extirpation of mangroves at Tolo Harbour and on northern Lantau. The growth of agriculture/aquacultural practices and casual, often unapproved village house developments have damaged the mangrove stands at Mai Po and Ting Kok SSSI (Site of Special Scientific Interest) (Leung 1997; Morton 2016).

- In May 1992, sediment plumes from marine sand borrowing for reclamation resulted in more than 50% mortality of corals at Ninepin Islands (Wilson and Wong 1996).

- In 1993, 27,500 hectares of inshore fishing grounds and the livelihood of 4,000 fishermen operating 1,500 small fishing boats were adversely affected by dredging, reclamation and mud-dumping (Chiu 1995).

- The starfish *(Archaster typicus)*,

once common at clean sandy beaches throughout Hong Kong, has now virtually disappeared as a consequence of domestic sewage discharges (Wilson and Wong 1996).

- Heavy marine traffic in South Lantau waters is affecting the Chinese White Dolphin and the finless porpoise's movement and feeding patterns. Fast moving boats and ferries can inhibit their ability to locate food and increase stress levels. Chronic exposure to high noise levels from vessels can cause desensitization to vessel presence leading to more ship strikes (Ng 2017; Pine et al. 2016; WWF 2017b).
- Over the past decade, the Chinese White Dolphin in Hong Kong's Pearl River Estuary has suffered a 60% decrease in population due to the constant marine traffic, bridge construction, pollution and overfishing (Agdeppa et al. 2016).
- Occurrence of the Chinese White Dolphin and the finless porpoise greatly diminished in the North Lantau region with no apparent signs of recovery after the completion of the Hong Kong-Zhuhai-Macau Bridge (HKZMB) (Chan 2016; Hung 2020).

The economic development of Hong Kong has come at an enormous environmental cost.

MARINE PROTECTED AREAS IN HONG KONG

The need to protect Hong Kong's marine environment by the establishment of MPAs has been recognized since the mid-1970s (Morton 1976).

MPAs are areas of the sea where human activity is restricted in order to protect and conserve marine life and habitats. At present, only 2% of Hong Kong's marine area have been designated as MPAs, in contrast to the 40% of the SAR's land-mass that is contained in country parks and reserves (Focus on marine conservation 2020).

In Hong Kong, MPAs include non-anchoring areas in coral communities, a Ramsar Site, Fisheries Protection Areas, Marine Parks and a Marine Reserve.

Non-anchoring areas in coral communities are situated at Port Island, Bluff Island, South Ninepin, Shelter Island and Sharp Island (HK AFCD 2020e).

Approximately 1500 ha of wetland in the Mai Po and Inner Deep Bay region was listed as a Ramsar Site on September 4, 1995. The Ramsar Site includes a shallow bay with extensive intertidal mudflats backed by mangals, the largest in Hong Kong, reedbeds, the largest in Hong Kong and Guangdong Province, tidal shrimp ponds *(gei wais)* and fishponds. The wetland supports over 100,000 water birds migrating along the East Asian-Australasian

Flyway every year and serves as an important over-wintering and refueling ground for them. Included among the migratory birds are the globally threatened Black-faced Spoonbill, Saunder's Gull and Nordmann's Greenshank (HK AFCD 2020c).

Fisheries Protection Areas are areas in Hong Kong waters designated as such to protect important spawning and nursery grounds of important fish species, thereby helping to restore fisheries resources and promote their sustainable growth in the long run. Fisheries management measures may include fishing methods or gear restrictions, catch size restrictions, designation of "no-take" zones and implementation of closed seasons. Proposed Fisheries Protection Areas are found in Port Shelter, Tolo Harbour and Channel (including Long Harbour) (Legislative Council 2016, Sumaila et al. 2007). The locations of non-anchoring areas in coral communities, the Mai Po Ramsar Site and the proposed Fisheries Protection Areas in Hong Kong are shown in Figure 1.

A marine park is a relatively large area of sea which is set aside for conservation and recreation. By comparison, a marine reserve is a smaller area of sea which has high conservation value, and is reserved mainly for scientific and conservation study (HK AFCD 2001, Wong 1998).

In Hong Kong, it was only in May 1995, that the *Marine Parks Ordinance* (Cap. 476) was enacted. This provided the legal framework for designating marine parks and marine reserves in Hong Kong.

The *Marine Parks and Reserves Ordinance* aims at:

a) Protecting, restoring and enhancing the marine life in, and the environment of, any marine park or reserve

b) Managing the resources of the marine parks to meet the needs and aspirations of present and future generations

c) Facilitating recreational activities in marine parks

d) Providing opportunities for educational and scientific studies on local marine life in the marine parks and reserves (Morton 1996)

Management of the marine parks and reserves is the responsibility of the Country and Marine Parks Authority (Director of the Agriculture, Fisheries and Conservation Department of the Government of the Hong Kong SAR) who is advised by the Country and Marine Parks Board, which in turn, is advised by the Marine Parks and Reserves Committee (Morton 1996).

A multiple-use approach is adopted within the marine parks and reserves so that those existing activities which are not destructive to the marine environment are allowed to continue. For example, existing fishing activities which are considered sustainable is

permitted in marine parks. All fishing activities are, however, prohibited in marine reserves. Incompatible fishing activities, such as bottom trawling and spear fishing are banned in both marine parks and reserves (Morton 1996). Educational and recreational activities, such as nature studies, diving, snorkeling, swimming, canoeing, sailing and underwater photography may be carried out in marine parks while scientific studies and educational activities are encouraged in marine reserves (Wilson and Wong 1996).

At present, there are six existing Marine Parks and one Marine Reserve in Hong Kong. These are Hoi Ha Wan Marine Park, Yan Chau Tong Marine Park, Sha Chau and Lung Kwu Chau Marine Park, Tung Ping Chau Marine Park, The Brothers Marine Park, Southwest Lantau Marine Park and Cape d' Aguilar Marine Reserve (Table 1).

Table 1: Marine Parks and Reserve in Hong Kong, the date of their designation, their total sea surface area and their key features (HK AFCD 2001; HK AFCD 2020a; Morton 2000; Wilson and Wong 1996). Their locations are shown in Figure 2.

MPA	Designated in	Sea area (ha)	Key features
1 Hoi Ha Wan Marine Park	July 1996	260	• fringing coral reefs • 64 of the 84 stony coral species recorded in HK • 6 of the 8 true mangrove species recorded in HK • more than 120 species of coral-associated fish • an Education Centre (the Jockey Club HSBC WWF HK Hoi Ha Marine Life Centre) managed by the World Wide Fund for Nature HK is used by more than 7,000 primary and secondary students

2 Yan Chau Tong Marine Park	July 1996	680	• includes the highly indented bay of Yan Chau Tong and a smaller area east of the village of Lai Chi Wo • fringing coral reefs • all 8 true mangrove species recorded in HK in Lai Chi Wo • thriving seagrass (*Zostera nana* = *Z. japonica*) beds. • Both mangrove stands and seagrass beds act as spawning and nursery ground of commercially important fishes • Yan Chau Tong supports the common starfish *Archaster typicus* which was once abundant on most Hong Kong sandflats
3 Cape D'Aguilar Marine Reserve	July 1996	18	• a small sea area with a variety of marine intertidal/ subtidal habitats, ranging from high energy exposed rocky shore to sandy beach and intertidal rock pools inhabited by gorgonian and stony corals and other rare species • spawning and nursery ground of fisheries resources e.g. rockfish and cuttlefish • The Swire Institute of Marine Science (University of Hong Kong) located at Cape D'Aguilar is noted for its marine biological studies
4 Sha Chau and Lung Kwu Chau Marine Park	November 1996	1,200	• designated as Marine Park for the protection of the endangered Chinese White Dolphin • important feeding, breeding and nursery grounds for these dolphins • rich in fisheries resources • important spawning grounds of some commercially important fish species

5 Tung Ping Chau Marine Park	November 2001	270	• best coverage and diversity of stony coral in Hong Kong • coral formation measures 1.8 sq. km and is one of the largest in Hong Kong • over 130 reef-associated fishes • more than 200 marine invertebrate species • extensive seaweed beds with over 65 marine algae species
6 The Brothers Marine Park	December 2016	970	• designated for the protection of the endangered Chinese White Dolphin • important feeding, breeding and nursery grounds for these dolphins • rich in fisheries resources • important spawning grounds of some commercially important fish species • includes a core area of 80 hectares of no-take zone
7 Southwest Lantau Marine Park	April 2020	650	• designated for the protection of the endangered Chinese White Dolphin • important feeding, breeding and nursery grounds for these dolphins • rich in fisheries resources • important spawning grounds of some commercially important fish species • highest density of the Chinese White Dolphins and where consistent and frequent occurrence of dolphins have been recorded in all seasons

MPAs AND THE CONVENTION ON BIOLOGICAL DIVERSITY

The Convention on Biological Diversity (CBD) is an international treaty which originated from the United Nation's Earth Summit held in Rio de Janeiro in 1992. Its aims are to conserve biodiversity, utilize its components in a sustainable way and ensure fair and equitable sharing of the benefits resulting from the use of genetic resources. The People's Republic of China became a Party to the Convention of Biological Diversity in 1993 and the Central People's Government extended the CBD to the Hong Kong Special Administrative Region in 2011 (Environment Bureau 2016). The Convention on Biological Diversity obliges countries to protect the marine environment. This protection can be achieved through the creation and effective management of MPAs.

According to the International Union for the Conservation of Nature and Natural Resources (IUCN), the goal of MPAs is to conserve biological diversity and to help rebuild and maintain the productivity of the oceans, especially of fish stocks for sustainable use (Kelleher 1999). By designating a number of MPAs, Hong Kong has made a significant initial response to the CBD. Further, the government has created the first city-level Biodiversity Strategy Action Plan 2016 - 2021 which aims, among other things, to incorporate biodiversity considerations in planning and development process (Action 9) and promote sustainable fisheries (Action 11) (Environment Bureau 2016). The proposal to designate Fisheries Protection Areas and more marine parks, the deployment of artificial reefs in marine parks and fisheries protection sites, the banning of commercial fishing in marine parks and other fisheries management measures all contribute to the implementation of these action plans and are all steps towards helping to fulfill Hong Kong's obligation under the Convention of Biological Diversity.

FURTHER STEPS TOWARDS MARINE CONSERVATION

In addition to designating certain areas in Hong Kong as MPAs, the government has, through the Agriculture, Fisheries and Conservation Department, been implementing other conservation measures to protect the marine environment. These include the artificial reefs programme and other fisheries management measures to build up fisheries resources in MPAs.

Artificial Reefs

The government has, since 1996, been implementing an artificial reef (AR) project in Hong Kong to enhance fisheries resources and promote marine biodiversity. Artificial reefs' ability to encourage growth and development of a large number and variety of marine organisms, which in turn provide food, shelter and protection for fish, has been recognized worldwide (HK AFCD

2020d, Wilson and Cook 1998).

From January 1998 to August 1999, 28,000 m^3 vessels, tyre, quarry rock and concrete artificial reef units were positioned in the two northeastern marine parks at Yan Chau Tong and Hoi Ha Wan. The Agriculture, Fisheries and Conservation Department (AFCD) of the Hong Kong SAR further made a voluntary "no fishing on AR" agreement with fishers who hold permits to fish in these marine parks. Shortly after the deployment of the artificial reefs, juveniles of many high-value reef fish, including several species of sea breams, snappers and groupers, have started to increase (Wilson et al. 2002).

The restoration programme to revive Hong Kong's marine ecosystem and fisheries through the placement of artificial reefs was further extended to other Fisheries Protection Areas (Wilson et al. 2002). Underwater monitoring survey of these areas revealed that the deployed artificial reefs supported a higher diversity and abundance of fish species as compared with natural habitats (HK AFCD 2020d).

Ecosystem simulations have forecasted that a 10-20% MPA / AR system could provide significant benefits within 10 years and could reverse the shift to low-value short-lived pelagic fish, back to long-lived high-value demersal fish (Pitcher et al. 2000).

Other Fisheries Management Measures

Other fisheries management measures pursued by the government to conserve the fisheries resources in Hong Kong waters and to promote the sustainable development of the Hong Kong fisheries industry include banning trawling in Hong Kong waters in order to restore damaged seabed and depleted fisheries resources, controlling fishing effort, protecting important fish spawning and nursery grounds, fish fry restocking and requiring fisheries impact assessments on development projects.

A new fisheries management strategy in marine parks which took effect on April 1, 2020, now bans commercial fishing in the Hoi Ha Wan Marine Park, Yan Chau Tong Marine Park, Tung Ping Chau Marine Park and the Sha Chau and Lung Kwu Chau Marine Park. New fishing permits in these marine parks will not be granted and existing fishing permits will not be renewed beyond the two-year transitional period, viz. March 31, 2022. The affected permit holders will be granted an ex-gratia allowance. However, commercial fishing by registered local fishing vessels continues to be allowed in The Brothers Marine Park through the marine park fishing permit system (Marine Parks and Marine Reserves (Amendment) Regulation 2019).

PRESENT CHALLENGES FACING MPAs

Designating MPAs in Hong Kong has been an important step towards marine conservation. However, currently,

there are many challenges facing these MPAs, threatening the effectiveness of their conservation effort. For one, there are town planning issues because of plans for development in the vicinity of the marine parks which would impact significantly on the marine life there. Secondly, three marine parks have been designated for the conservation of the Chinese White Dolphins but these are insufficient as not all of the dolphins' core habitats and buffer areas are protected. Thirdly, the management of MPAs has many shortcomings which diminish their effectiveness in conserving marine biodiversity.

Town Planning Issues

Under the Town Planning Ordinance, the hinterland around MPAs in Hong Kong can be zoned in different ways, for instance, conservation-related zones (Coastal Protection Area, Green Belt, Conservation Area, Site of Special Scientific Interest, Country Park) and non-conservation-related zones (including Village Type Development, Commercial, Agriculture, Industrial, Residential, Government, Institution or Community and other zones). Each of these zones lists uses always permitted (found in column 1 in the notes for each zone in the statutory plan) and uses that may be permitted with or without conditions on application to the Town Planning Board (found in column 2 in the notes for each zone in the statutory plan). For the conservation-related zones, uses under column 1 could include agriculture use, barbecue spot, country park, nature reserve, nature trail and wild animals protection area while uses under column 2 could include field study/ education/ visitor centre, house (redevelopment only), public convenience, public utility installation, marina, pier, golf course, holiday camp, government refuse collection point and other uses. Specific zones in the developmental plans near existing MPAs are given in Table 2.

Table 2: Statutory plans near MPAs and their corresponding zones (Press Releases 2016, Town Planning Board 2005a, b, 2008, 2016, 2017a, b, 2018a, b, 2020a).

Statutory Plan	Nearby MPA	Zones
Tai Tam & Shek O (HPA 18) Outline Zoning Plan No. S/H18/10	Cape d' Aguilar Marine Reserve	Commercial Residential Village Type Development Government, Institution or Community Open Spaces Other Specified Uses Green Belt* Coastal Protection Area Site of Special Scientific Interest Country Park*

Ping Chau Outline Zoning Plan No. S/NE-PC/1	Tung Ping Chau Marine Park	Village Type Development Government, Institution or Community Other Specified Uses Green Belt* Coastal Protection Area Site of Special Scientific Interest
Hoi Ha Outline Zoning Plan (Amendment to draft Plan No. S/NE-HH/3)	Hoi Ha Marine Park	Village Type Development Government Institution or Community Other Specified Uses Green Belt (1)* Conservation Area Coastal Protection Area
Lai Chi Wo, Siu Tan and Sam A Tsuen Outline Zoning Plan No. S/NE-LCW/2	Yan Chau Tong Marine Park	Village Type Development Government Institution or Community Agriculture Green Belt Conservation Area
Mai Po & Fairview Park Outline Zoning Plan No. S/YL-MP/6	Mai Po Ramsar Site	Commercial Residential Village Type Development Open Storage Government, Institution, or Community Recreation Open Space Comprehensive development Wetland Protection/ Restoration Area Conservation Area* Site of Special Scientific Interest *
South Lantau Coast Outline Zoning Plan No. S/SLC/21	Southwest Lantau Marine Park	Residential Village Type Development Government, Institution, Community, Other Specified Uses Green Belt Coastal Protection Area Country Park

Tuen Mun Outline Zoning Plan No. S/TM/35	Sha Chau & Lung Kwu Chau Marine Park	Commercial Comprehensive Development Area Residential Village Type Development Industrial Government, Institution or Community Open Space Recreation Other Specified Uses Green Belt* Site of Specific Scientific Interest
North-east Lantau Outline Zoning Plan No. S/ I-NEL/12	The Brothers Marine Park	Other Specified Uses* Government, Institution or Community Open Space Green Belt* Conservation Area
Tung Chung Extension Area Outline Zoning Plan No. S/ I-TCE/2	The Brothers Marine Park	Commercial Residential* Government, Institution or Community Open Space* Other Specified Uses Green Belt
Chek Lap Kok Outline Zoning Plan No. S/ I-CLK/14	The Brothers Marine Park	Commercial Government, Institution or Community Other Specified Uses* Green Belt*

The Hong Kong Planning Standards Guidelines (HKPSG), which bind all government departments policywise, states explicitly that "there is a general presumption against development within areas designated for conservation use. ... Development in ... Marine Parks and Marine Reserve will be carefully considered by both the Country and Marine Parks Authority and the Land Authority" (Planning Department 2020, n. 3.7.2). "Where conservation zones are involved, the compatibility of the proposed development with the planning intention of the zoning of development site and that of the adjoining land, as well as biodiversity in the local area, should all be taken into consideration." (Planning Department 2020, n. 3.7.3).

The HKPSG are clear. However, its actual implementation can be problematic. Often these guidelines may be glossed over and the town planning decisions may not give

enough importance to conservation. An example is the statutory planning for Hoi Ha in Saikung. The *draft Hoi Ha Outline Zoning Plan (OZP) No. S/NE-HH1* was exhibited for public inspection on September 27, 2013 and drew 10,824 valid representations and 3,671 valid comments from the public during the statutory exhibition periods, all of which were related to the designation of "Village Type Development" ("V") zone (Town Planning Board 2020b). Major concerns include the following: The extensive V zone, located less than 500 m from the Hoi Ha Marine Park, is largely owned by developers so that the housing built there will not be occupied by indigenous villages. According to conservation groups (Living Seas Hong Kong and the Professional Commons), the demand for small houses has been considerably exaggerated by the village representative and has not been audited. The environmental impact of the V zone has not been assessed, especially with regard to the handling of sewage. No consideration has been given in the plans for the increased infrastructure needs for the village expansion. Hoi Ha is at the head of the Pak Sha O Valley and any development along the Pak Sha O River would have a significant water pollution impact on the Hoi Ha Wan Marine Park (Hong Kong Birdwatching Society 2013, O'Dwyer 2013, 2014, Professional Commons 2013, 2016).

On April 3, 2020, the Town Planning Board (TPB) announced the publication of the amended *draft Hoi Ha OZP No. S/NE-HH/3*. The amendments were made in response to the Court of First Instance's ruling on a judicial review against the decision of the Town Planning Board to submit the draft OZP to the Chief Executive in Council for approval and against the decision of the Chief Executive in Council to approve the draft OZP. The amendments mainly involve rezoning of an area to the west of the village cluster at Hoi Ha from a "Village Type Development" (V) zone to "Green Belt (1) (GB1)" and an area to the east of the village cluster at Hoi Ha from a V zone to "Coastal Protection Area" (CPA). As required by the Court's ruling, application of the amended OZP also needed reviewing the issues on the genuine need for small house development and the accuracy of the base map in respect of the Hoi Ha OZP (Press Releases 2020, Town Planning Board 2020b).

However, Ng (2020) of The Conservancy Association objected to the amended Hoi Ha OZP on four grounds. First, the TPB had still not ascertained the genuine need for small house development when designating the size of the V zone since the amended draft OZP states "there is no practical means available for determining the genuine need for small house development at the planning stage" (Town Planning Board 2020b, Section 4.9.2(d)). Second, the amended V zone which is next to the GB(1) zone is partly covered by secondary woodland, habitat for a high diversity of butterfly species, and modified woodland which provides a buffer between the secondary woodland and the developed village area. Third, there is a natural stream flowing within

the amended V zone and downstream to Hoi Ha Wan Marine Park. Any village development close to this natural stream would have an adverse environmental impact on the Marine Park. Septic tank and soakaway system (STS) built in the V zone close to this natural stream would result in overflow of septic materials to this natural stream and to the Marine Park. Fourth, the proposed V zone does not satisfy a genuine need for small houses for the use of the indigenous villagers because several land lots within the proposed V zone are owned by developers who will construct small houses for profit-making purposes. Therefore, Ng (2020) recommended the amended GB(1) zone should be further expanded. The public consultation on the *draft Hoi Ha OZP No. S/NE-HH/3,* with the amendments incorporated, continues.

Similar to Hoi Ha, developers have been secretly buying up plots of lands in the village enclaves at Lai Chi Wo for use as land banks for future developments. There is pressure by both indigenous (often non-resident) villagers and developers to develop their ancestral villages and to fill the village enclaves with much larger, even tower developments. With inadequate road accesses and no centralised system of sewerage or foul water treatment, the increase in population will impact the unique environment of Hong Kong's country and marine parks and lessen not only their popular appeal but also their conservation value. Mangrove stands at the village of Lai Chi Wo, situated within the Yan Chau Tong Marine Park could disappear (Morton 2016, Ng 2016). The *approved Lai Chi Wo, Siu Tan and Sam A Tsuen OZP No. S/NE-LCW/2* was made available for public inspection in 2016 (Press Releases 2016a).

There are other developmental plans that may impact Hong Kong's marine environment, such as the *draft Ping Chau OZP No. S/NE-PC/1,* the *approved South Lantau Coast OZP No. S/SLC/21* and the *draft Chek Lap Kok OZP No. S/I-CLK/14* which includes the proposed reclamation for the third runway of the Hong Kong International Airport and the Hong Kong Boundary Crossing Facilities, part of the link road with the Hong Kong-Zhuhai-Macau Bridge and the Tuen Mun-Chek Lap Kok Link (Press Releases 2016b, 2017, 2018). Public inspection of these and other Outline Zoning Plans is ongoing and there is an urgent need for the public to make its voice heard.

Chinese White Dolphin

The Chinese White Dolphin is listed as vulnerable in the IUCN Red List of Threatened Species. Although the population of the Chinese White Dolphin that resides in the Pearl River Estuary (PRE) is the largest one that remains along China's coastline, the dolphins there are under enormous stress. The major threats facing the Chinese White Dolphin population in Hong Kong and the PRE are:

1) Habitat loss from coastal development. Extensive reclamation

for many past, current and future projects such as the Hong Kong International Airport, the Hong Kong-Zhuhai-Macau Bridge and the third airport runway has resulted in a physical reduction of dolphin core habitats, important as breeding, nursery and foraging grounds. Dolphins are being forced to move towards less suitable habitats. Reclamation may also block ecological corridors between important habitats.

2) Water pollution. Dredging works increase the amount of suspended solids and decrease the amount of dissolved oxygen in the water column. These are detrimental to fish and crustaceans, the major food source of dolphins. Sewage and industrial effluents discharged into the PRE and organochlorines and heavy metals dissolving into the water column from dumping of contaminated mud at the existing East Sha Chau mud pit facility and the future South Brothers facility threaten the health of the Chinese White Dolphins.

3) Underwater noise pollution. Underwater construction works involving techniques such as percussive piling and increasing marine traffic interfere with the dolphins' echolocation and communication capability, affecting their ability to find prey and their ability to avoid ship strikes.

4) Vessel collision. Marine traffic has increased in western waters with more high-speed ferries running between Hong Kong, Macau and other cities in the Pearl River area every day. The current high-speed ferry routes cross the main dolphin habitats around Lantau waters, resulting in more vehicle collision with more dolphins being hit, injured or killed.

5) Overfishing. A continued decline in fisheries resources has been observed in Hong Kong waters. Fishermen and dolphins are competing for the same fishery resources. The decline in fishery resources will lead to diminished food supply for the dolphins (HK AFCD 2000; Wilson et al. 2008; WWF n.d. a).

The government has directed much attention towards the conservation of the vulnerable Chinese White Dolphin. The Sha Chau and Lung Kwu Chau Marine Park, the Brothers Marine Park and the Southwest Lantau Marine Park have been designated to protect the habitats important for these dolphins. Artificial reefs have been deployed in some marine parks and in other Fisheries Protection Areas to rebuild the local fish stock thereby enhancing the availability of the dolphins' prey. Sewage treatment facilities have been built or upgraded to improve the seawater quality for the dolphins' health. Bubble curtains are being used in underwater construction works to minimize the noise damage and disturbance to the dolphins caused

by underwater blasting and percussive piling. For any coastal development close to important dolphin habitats, an environmental impact assessment is required as stipulated by the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499) and it should be approved in accordance with statutory procedure (HK AFCD 2000; HK AFCD 2020b).

However, the proposed reclamation for the third runway of the Hong Kong International Airport is threatening to destroy more dolphin habitats. Core areas and buffer areas of the dolphin's habitats need to be protected. Core areas are areas critical for feeding, mating, nursery and socializing by the dolphins. Buffer areas are ecological corridors that provide low-disturbance links for Chinese White Dolphins and their prey to move between discrete key habitats (WWF. n.d. b). The current designation of three marine parks to serve as dolphin sanctuaries is insufficient. More marine parks need to be designated to protect the dolphins' core habitats and buffer areas so as to ensure the dolphins' survival. Potential areas for designation as marine parks include South Lantau, West Lantau, 3RS, Soko Islands and Fan Lau.

Management of the MPAs

Designating MPAs is not the end of the story. For these MPAs to be successful in conserving marine biodiversity and regenerating local fisheries, they must be properly managed.

According to a review on marine parks and reserve, commissioned by WWF and undertaken by the Simon F.S. Li Marine Science Laboratory, The Chinese University of Hong Kong, the management of the MPAs in Hong Kong has numerous shortcomings. Twenty years after MPAs were first designated in Hong Kong, there is still no clear holistic conservation plan for existing MPAs and lack of well-founded scientific guiding principles for MPA management. In addition, there is no transparent ongoing MPA "health check" data such as long-term monitoring plans. Although the Agriculture, Fisheries and Conservation Department of the Hong Kong SAR has been conducting annual population surveys of the Chinese White Dolphin since 1995, the results of their surveys are very different from those undertaken by the Hong Kong Airport Authority (Hung 2020, Low 2020,). Further, endocrine disrupting chemicals, released from shipping activities, partially treated sewage effluent and contaminated surface runoff, were consistently detected in environmental samples and biota from Hoi Ha Marine Park, Yan Chau Tong Marine Park, Tung Ping Chau Marine Park and Cape d'Aguilar Marine Reserve, posing an ecological risk to the resident organisms in these four MPAs but there is no monitoring of this ecological risk (Xu et al. 2016). Neither are there any integrated long-term ecological and water quality monitoring programs (e.g. surveys on species abundance, diversity and composition,

and monitoring on persistent organic pollutants and phytoplankton) within and around MPAs (Xu et al. 2015a). A third shortcoming is that fishing with permits is still allowed in many MPAs, for example, in the Brothers Marine Park. Currently, less than 0.1% of Hong Kong's marine waters are true no-take zones. There are also problems with enforcement of the environmental and conservation measures under the Marine Parks Ordinance such as those relating to illegal fishing (Liu and Hills 1997). As for expanding the area of protection, there is no proactive MPA selection process and no clear target or date for future total MPA area. Moreover, academics, fishermen, conservationists and other stakeholders have minimal involvement in the existing MPA management system so that management plans are not carried out to maximum effect and using the best possible science (Gomersall, 2020, WWF 2017a, WWF 2017c, WWF 2020).

Xu et al. (2015a) pointed out other shortcomings in the management of the MPAs in Hong Kong. He noted that threats arising outside the protection boundaries of MPAs are not being addressed since the existing legislation only deals with activities within an MPA. Thus land-originated pollutants may enter the MPAs through a variety of channels, affecting the marine species there. Elevated levels of nonylphenols and bisphenol A were found in seawater, sediment and biota samples from Cape d' Aguilar Marine Reserve due to the influence of partially treated wastewater from adjacent sewage treatment plants (STP) (Xu et al. 2015b). Another threat arising outside the protection boundaries of MPAs is the intensive fishing at the boundaries. This can defeat the MPAs' initiative of species conservation as, whenever marine organisms recruit and spill over successfully, they are caught by fishers. MPA edges actually act as magnets for fishing efforts.

PROSPECTS FOR CONSERVING HONG KONG'S MARINE LIFE BY MPAs

MPAs can play a vital role in conserving Hong Kong's marine life. However, more things need to be done before this can be realized. First, the number of MPAs needs to be increased. Currently, Hong Kong has six Marine Parks and one Marine Reserve. These comprise only 2% of Hong Kong's marine waters. The IUCN recommends increasing MPAs to at least 30% of the region's marine waters by 2030 so that there could be an ecologically representative and well-connected network of MPAs to protect marine life. Second, the shortcomings in the management of MPAs in Hong Kong should be addressed. Only when the MPAs are properly managed can the goals of establishing them be achieved. Third, more integration of land-sea development near MPAs is needed as well as more collaboration with Mainland China on environmental issues affecting MPAs.

MPA Network Covering 30% of Hong Kong Sea Waters

The IUCN World Parks Congress 2014 Promise of Sydney, which is supported by over 6,000 participants from 170 countries, has urgently recommended to increase the ocean area that is effectively and equitably managed in ecologically representative and well-connected systems of MPAs to at least 30% of the region's marine waters by 2030 (Reuchlin-Hugenholtz and McKenzie 2015).

As a consequence, WWF is following through on this and is urging the government to designate at least 30% of Hong Kong waters as MPAs by 2030, including no-take zones, in order to respond to the global campaign to address human threats, improve marine ecosystems and bring socio-economic benefits to local communities. WWF says that the government's aim of designating less than 5% of our waters as MPAs by 2023 is not enough (Lee and Lam 2018; Reuchlin-Hugenholtz and McKenzie 2015; WWF calls for 2018).

To this end, WWF has, in close collaboration with local academics, fishermen and experts, identified seven conservation priority sites for Hong Kong which could form the first 10% of an MPA network in the territory. These seven sites are: 1) West Lantau, 2) South Lamma, 3) Shui Hau, 4) Sharp Island and Shelter Island (in Port Shelter), 5) Ninepin Group, 6) Tolo Channel and Harbour, and 7) Pak Nai. The locations of these seven conservation priority sites are shown in Figure 2.

These sites are conservation priority sites either because they are the spawning and nursery ground for many commercially important fish and crustacean species, or because they support large seagrass beds or large mangrove stands or large coral cover with a high diversity of hard coral species, or because they are important habitats of many local marine species including many endangered ones. Named in the IUCN Red List of Threatened Species are the Chinese bahaba listed as Critically Endangered, the green turtle, threadfin porgy, the Chinese horseshoe crab and the Hong Kong grouper listed as Endangered and the Chinese White Dolphin, the Indo-Pacific finless porpoise and the spotted seahorse listed as Vulnerable. The conservation status of these species is a critical indicator of the health of the marine biodiversity. They have international conservation significance and they are an urgent call for more conservation action.

Conservation measures for each of these sites have also been proposed. These include banning non-selective fishing methods, restricting vessel speeds, regulating human activities such as clam-digging, diving, dolphin watching with statutory code of conduct and adopting a co-management approach. In addition, different management zonings can be employed, for example, designating the outer fringe of

mangroves at Pak Nai as a horseshoe crab conservation zone, designating no-take zones in the Fisheries Protection Areas at Tolo Harbour and at Port Shelter, setting up practice zones for beginner divers to minimize disturbance to coral communities, designating conservation management zones at Ting Kok allowing regulated clam digging only in the outer zone, setting up conservation zones in Shiu Hau Wan that give the most ecologically sensitive area strict protection and allow regulated activities only in the outer zone, and establishing a core dolphin conservation zone around Tai O with no coastal development and restriction on marine traffic and human activities (Lee and Lam 2018; WWF calls for 2018).

Working with more than 30 marine experts and leading academics in Hong Kong, WWF has also come up with a Marine Ecological Hotspot Map, showing areas in Hong Kong which house representative, rare or threatened species and habitats that call for conservation and scientific research. Aside from those already declared as Marine Parks / Reserve and the above-mentioned conservation priority sites, these hotspots include : Bluff Island, Crescent Island, Crooked Island, Lai Chi Chong, Long Ke Wan to Pak Lap, Port Island, Po Toi Islands, Sham Wan, Shek Ngau Chau and Breaker Reef, Soko Islands, Southern Waters, Starfish Bay, Starling Inlet, Tai Long Wan, Tai Tam Harbour, Three Fathoms Cove, Ting Kok, Tung Chung Bay and Victor Rock - a total of 31 ecological hotspots which have potential for designation as Marine Parks or Reserves. These hotspots were chosen based on the criteria of 1) uniqueness or rarity (areas that contain species that is one of its kind or occurs in only a few locations); 2) special importance for life-history stages of species; 3) importance for threatened, endangered or declining species and/or habitats; 4) vulnerability, fragility, sensitivity or slow recovery (areas with high proportion of sensitive habitats or species highly susceptible to depletion by human activities and that have slow recovery); 5) biological diversity (areas with higher biodiversity); and 6) naturalness (areas with low level of human induced disturbance) (WWW 2016). The locations of these marine ecological hotspots are shown in Figure 3.

The government, however, seems uncommitted to marine conservation as reflected in the Chief Executive's Policy Address for 2019 - 2020. Protective measures of safeguarding the marine ecosystems were not considered in the policy address while in contrast, the reclamation plan is reiterated (WWF's response to 2019). WWF continues to urge the Government for more positive action in this area.

Improving the management of MPAs

When properly managed, MPAs can restore marine habitats and increase the abundance and diversity of species within them, including endangered and commercially important ones. Often large numbers of fish will disperse

outside the MPAs and regenerate local fisheries.

In view of the shortcomings noted in the management of the MPAs in Hong Kong, the study, conducted by the Simon F.S. Li Marine Science Laboratory, The Chinese University of Hong Kong and commissioned by WWF, put forward the following recommendations: 1) designating 10% of Hong Kong's waters as MPAs for habitat and species protection by 2020 and 30% by 2030; 2) formulating conservation plans with clear vision and solid timeframes for all marine ecological hotspots in Hong Kong; 3) setting up an open, transparent and long-term monitoring programme for the marine environment within MPAs; 4) developing holistic MPA conservation plans that adapt and respond to ensure that the health of the MPA improves; 5) early and transparent involvement of all stakeholders for any conservation or management plans (WWF 2017a, WWF 2017c, WWF 2020).

Xu (2015a) proposed an integrated environmental risk assessment and management (IERAM) framework for developing, integrating and analyzing a set of environmental, social and economic indicators for MPA management. These indicators include demographic and gross domestic product (GDP) increases, fishing, climatological characteristics, wastewater generation, maritime transport, red tides, water quality of bathing beaches, sewage treatment plants, laws and legislation, scientific support and public involvement. Applying this framework to the Cape d' Aguilar Marine Reserve, Xu (2015a) concluded with the following recommendations: 1) employing a multiple-use zoning approach to provide high levels of protection while allowing reasonable uses; 2) conducting regular monitoring in both sea and land areas linked to the protected area; 3) setting up a long-term water quality monitoring program inside the MPA, e.g. monitoring algal blooms and trace toxic organic pollutants; 4) forming coordinating committees between the protected area management authority (e.g. Agriculture, Fisheries and Conservation Department) and other authorities managing activities outside the protected areas (e.g. Environmental Protection Department and Drainage Services Department); and 5) conducting continuous scientific research to establish a clear biodiversity and biomass database.

Strategic Urban Planning Near MPAs

The government plays a dual role. On the one hand, it is responsible for the provision of land for urban development in a cost-effective way, often, through reclamation. On the other hand, it is the guardian of the environment and is responsible for nature conservation. These two roles are often in conflict unless there is good long-term strategic environmental planning, which has been wanting. A major landmark for the latter role was the enactment of

the *Marine Parks Ordinance* which provided the legal framework for the establishment of marine parks and reserves. However, designating certain areas as marine parks and reserves is not enough to protect marine biodiversity. For these MPAs to be successful in conserving the marine life there, there must be a control on the development in the land adjacent to these marine parks and reserves. The reason for this is that these MPAs are not isolated units. They are linked to the land areas surrounding them ecologically, economically, politically and culturally (Leung 1997). An integrated land-sea development is needed (Kelleher 1999, Morton 2000).

The government recognizes the need for strategic land use planning. However, this is less than strategic environmental planning. In town planning decisions, the balance is often tipped towards further development. There is an acute shortage of land and housing in Hong Kong and developmental pressure is high but the government needs to have a perspective to preserve the environment for a sustainable future. WWF's brochure "Marine Protected Areas: Smart Investments in Ocean Health" (Reuchlin-Hugenholtz and McKenzie 2015) can give a better perspective on this issue and may also get more public support for marine conservation. The brochure puts marine conservation issues in economic terms and shows how efforts made towards marine conservation is a smart investment for the future and can reap huge economic benefits as well as many social and other benefits for all human life.

Marine biodiversity is key for the healthy functioning of marine ecosystems which in turn is essential for providing goods and services for human life and well-being, e.g. production of oxygen, production of fish and shellfish for food, production of important ingredients for the development of (new) medicine, nutrient recycling, waste decomposition, coastal protection, carbon sequestration to mitigate climate change, recreational opportunities and spiritual appreciation of the beauty and variety of ocean life (Beaumont et al. 2007, Böhnke-Henrichs et al. 2013, Reuchlin-Hugenholtz and McKenzie 2015). MPAs that effectively protect marine biodiversity secure these benefits for current and future generations.

Aside from sustaining goods and services that benefit mankind, marine biodiversity has a value of its own: so many marine species and habitats have been part of this planet for millions of years (Reuchlin-Hugenholtz and McKenzie 2015).

Brander et al. (2015) shows there are strong economic reasons for protecting ocean assets through expanding MPAs globally. MPAs can contribute to building food security, lessening poverty, creating jobs and protecting coastal communities (Brander et al. 2015; FAO 2014). The net benefits of increasing MPAs to 30% range from a conservative estimate of US$490 billion and 150,000 full-time jobs in MPA management to an optimistic estimate of US$920 billion and over 180,000

jobs by 2050. The benefit-to-cost ratio of expanding MPAs can be as high as 20:1 (Brander et al. 2015, Reuchlin-Hugenholtz and McKenzie 2015).

In December 2016, the government formulated the first city-level *Biodiversity Strategy and Action Plan* (BSAP) to step up biodiversity conservation and support sustainable development in the years 2016 - 2021. Among the Action Plans set down in the BSAP 2016-2021 are: maintain and enhance the management of protected areas, conserve ecologically important habitats outside the existing protected areas, incorporate biodiversity considerations in planning and development process, promote sustainable fisheries (Environment Bureau 2016). Following through on these Action Plans will ensure an integrated land-sea management in the areas around the MPAs and effectively conserve the marine life there.

Need for collaboration with Mainland China

Because of the geography of the Hong Kong SAR, Hong Kong's environment is under threat not just from local development but also from the rapid development taking place in neighbouring Guangdong Province. Thus, the environmental management of Hong Kong must be integrated with that of Southern China (Liu et al. 1997). The first contact of the Hong Kong Environmental Protection Department (then called Environmental Protection Agency) with the Guangdong authorities was in 1979 with the aim of establishing channels of communication and providing the basis for joint action in tackling cross-border environmental problems. In 1990, the Hong Kong-Guangdong Environmental Protection Liaison Group was set up. Under its auspices, a joint monitoring of air and water quality in Deep Bay was completed in 1995, a joint environmental management strategy and action plan for Mirs Bay was set out in 1997, information on water quality and pollution loads in the Pearl River Estuary was collected in 1998 and a study group for the conservation of the Chinese White Dolphin and the Hong Kong-Guangdong Fisheries Resources Environmental Protection Group were set up in 1998 (Morton 2000).

However, Morton (2000) holds that more should be done and cross-border co-operation needs to be increased significantly. The rapid industrial development in Shenzhen and Zhuhai in Guangdong Province is causing serious water, air and land pollution and is adversely affecting the territory (Liu and Hills 1997). Sha Chau and Lung Kwu Chau in northwestern Hong Kong have been designated as a Marine Park but its effectiveness as a sanctuary for the Chinese White Dolphin is under threat because of increasing marine traffic between Hong Kong and Guangdong and because of industrial wastewater discharge from Southern China into the Pearl River. Because of this discharge, concentrations of DDT and other persistent organic pollutants

and heavy metals in the tissues of the resident Chinese White Dolphins were found to be among the highest in the world causing, in part, the increasing number of dolphins stranded (Lam 2008; Parsons and Chan 1998).

Recent governance arrangements for the management of coastal and marine areas of southern mainland China has included recommendations for the integration of marine management between the Hong Kong SAR and the surrounding Guangdong Province. In the past, monitoring programmes have often been a response to development proposals, such as the construction of the Hong Kong-Zhuhai-Macau Bridge and the major expansion of the Hong Kong International Airport. As these constructions have been situated in the western waters of Hong Kong, monitoring has been restricted to this area. It is recognized that a broader, more systematic and representative monitoring across the region is necessary (McCook et al. 2019). More collaborative work on conservation action for the endangered Chinese White Dolphin especially in the Pearl River Estuary is called for (Wang 2008). More extensive and focused liaison between the Hong Kong and Chinese authorities for marine conservation would benefit the MPAs in Hong Kong.

CONCLUSION

A major milestone for marine conservation in Hong Kong has been the enactment of the *Marine Parks Ordinance* and the designation of six marine parks and a marine reserve. However, much still remains to be done, to expand the network of MPAs and to improve the management of these MPAs, while at the same time, the keen demand for land for housing, economic growth, quality public space, infrastructure and facilities continues unrelentlessly as the government strives to make Hong Kong Asia's World City (Planning Department 2018). What will be the priority in the face of these competing demands? Will the MPAs in Hong Kong be effective and achieve their goals of conserving marine biodiversity and restoring fisheries? The question rests on whether the focus is on the goals for the near or the far future, on whether the balance is tipped towards short-term, developmental goals or towards the long-term vision of ensuring sustainability and the future well-being of the people. In this, both the government and the public, working in collaboration with each other, have a vital role to play in achieving a balance and in shaping the future of the MPAs in Hong Kong.

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Ong Che

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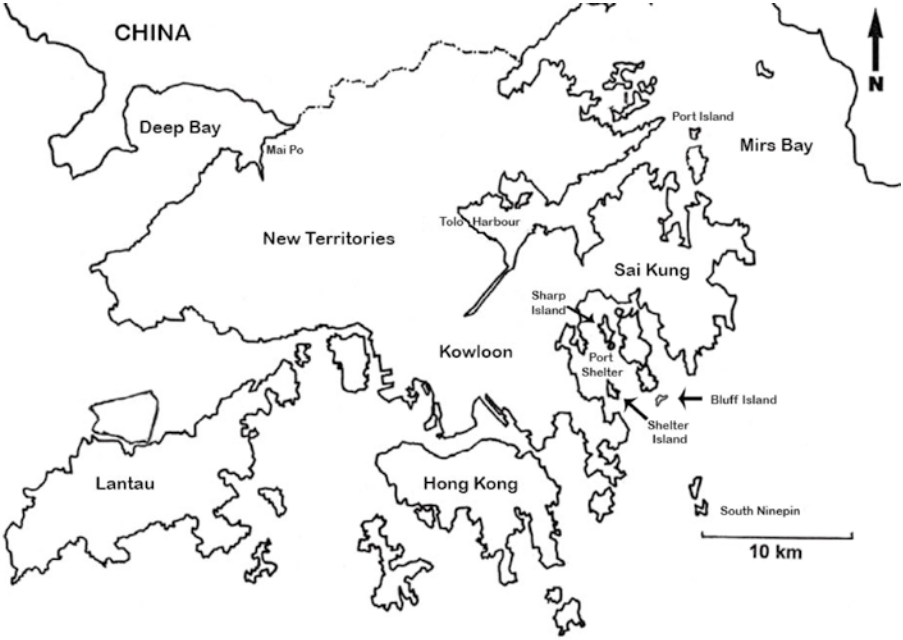

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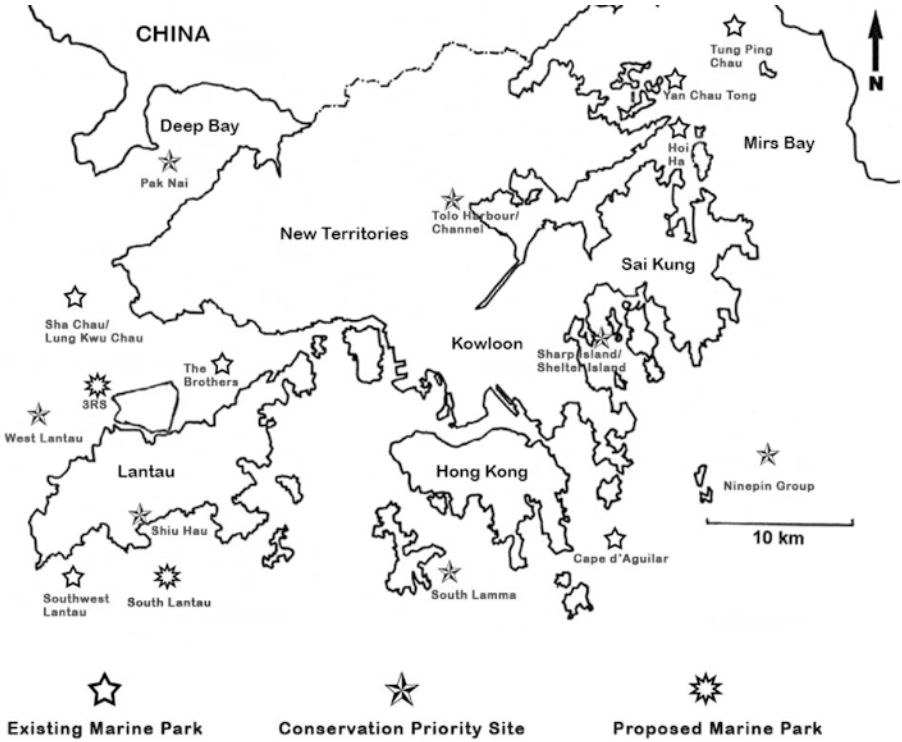

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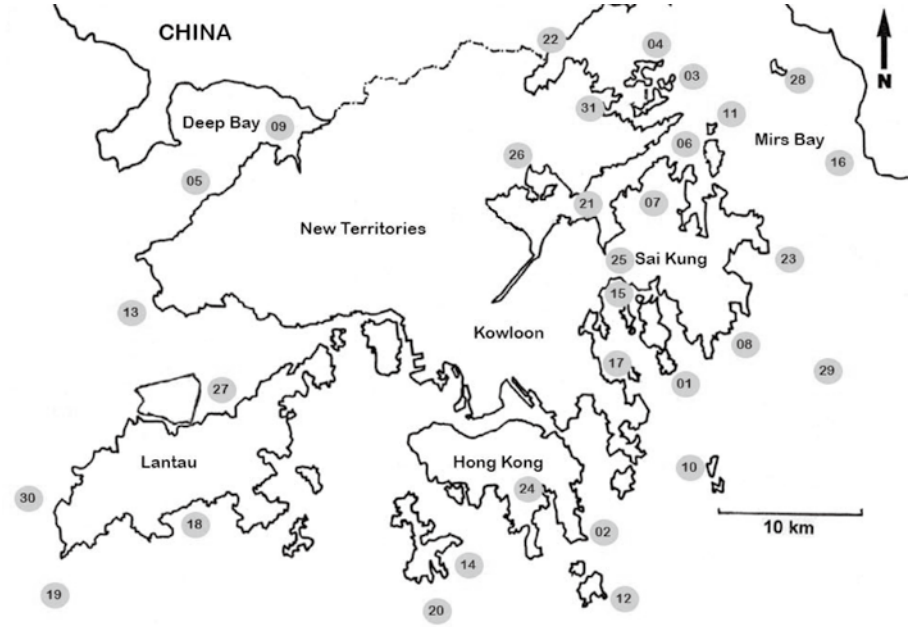

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Surveying & Built Environment

Bokhara Battery and D'Aguilar Battery: Survey Findings

Stephen N.G. Davies[*], Lawrence W.C. Lai[**], Daniel C.W. Ho[***], and Y.K. Tan[+]

ABSTRACT

This short essay provides the historical background, compares the conditions, and reports the land survey findings of Bokhara and D'Aguilar Batteries, which the Hong Kong SAR Government has classified and protected administratively as "Grade 2" heritage buildings. The survey for the former, funded by the Lord Wilson Heritage Trust, was conducted in June 2006, while that for the latter, sponsored by the University of Hong Kong, took place in February 2020. Some further research areas are identified.

KEYWORDS

Pottinger Battery, Bokhara Battery, D'Aguilar Battery, land surveying, heritage buildings

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INTRODUCTION

During the 17-day Battle of Hong Kong fought in December 1941, the two 9.2-inch guns at Bokhara Battery,[1] Cape D'Aguilar, engaged in night firings at land targets between 9th and 19th December (**Cracknell 2019**).[2] It also fired at Japanese vessels twice on 8th and 16th December[3] (a "large destroyer" during the second engagement) "at extreme range" (**Banham 2005**). These actual combat firings from a Hong Kong battery were rare instances of Allied counter-naval bombardment in the entire military history of this part of the South China Sea.

Bokhara's fixed guns, covertly relocated from Pottinger Battery[4] on Devil's Peak shortly before the invasion, were destroyed after the fall of Wong Nai Chung Gap in the middle of Hong Kong Island to deny their use to the Japanese.

Little has been known of the fate of these guns[5] since then and there has been no post-war attempt to systematically survey or conserve these or other Hong Kong batteries as part of the city's rich and diverse heritage. This is so even though **Rollo (1992)** took the first step in documenting all of Hong Kong's batteries.

Another battery in Cape D'Aguilar was the 2 X 4inch D'Aguilar Battery, which was built on a southern spur of D'Aguilar Peak during 1939 (completed in July[6]) as an "emergency battery" using surplus naval guns. (**Empson 1992**) There was a third half-battery, a 3" anti-aircraft gun, in an emplacement about 150m south of the main Bokhara Battery now mostly occupied by a submarine cable landing station.[7]

This short article reports on the surveying findings and compares the present conditions of Bokhara and D'Aguilar Batteries. This comparison should be interesting, as both batteries were connected in terms of their military history but have been subject to two different regimes of access after the

[1] The name of the site originated from the P&O Liner *SS Bokhara*, which was stuck on rocks below the high water mark off Cape D'Aguilar in 1873. For the historical origins of Cape D'Aguilar's place names, see **Davies (2019)**. **Lowson (1903)** gave an account of Bokhara's tragic wrecking in 1892 on Gupo Yu (Sand Island) in the Penghu Archipelago, Taiwan.

[2] **Cracknell (2019, p.111)** cites the personal diary of the Commanding Officer, Major Robert Templer, "The period 8 December to 19 December was fairly uneventful. We had one shoot at extreme range at a Japanese trawler. … From 12 December, onwards we engaged land targets mostly at night in Customs Pass area with unobserved fire. On 16 December, a large Japanese destroyer came just within our range. We engaged her and fired about ten salvoes. Immediately on opening fire, she started to zigzag and put out a smoke screen. … The last round fired at extreme range 20,000 yards fell right behind her counter. I saw her stern lift in the air, and she proceeded much slower but still out of range."

[3] These occurred at 10:00 on 8 December and 16 December 1941.

[4] It was probably named after Governor Henry Pottinger, who fought in the Anglo-Chinese War. For a detailed survey of the findings, see **Lai, Ho, and Yung (2007).**

[5] The two destroyed guns were most likely shipped to Japan as scrap metal.

[6] ADM 116/4356 (https://gwulo.com/node/11003#13/22.2045/114.2526/Map_by_ESRI-Markers/100)

[7] No trace of this now remains and almost no documentation apart from a little-known Japanese wartime map of Hong Kong's defences, made after the Battle of Hong Kong.

war. The first, in place since 1940, has been under open access since the end of the war, while the second, completed at an uncertain date within a few months of the simultaneous Japanese attacks on Pearl Harbour, Hong Kong, Malaya and the Philippines, was fenced off as a restricted area.

HISTORICAL CONTEXT

In terms of military history, Bokhara Battery, located in a more open and southerly location than most batteries in Hong Kong, replaced the function of Pottinger Battery by inheriting its two 9.2-inch Mark X guns. Situated in the New Territories, Pottinger Battery, together with Gough Battery[8] further uphill (equipped with one 9.2-inch gun and one six-inch quick-firing gun) and a machine gun redoubt on the summit of Devil's Peak, guarded the eastern approaches to Victoria Harbour. The redoubt served as "Fire Command East" for colonial Hong Kong's artillery defences.

Pottinger and Gough Batteries suffered from problems of a restricted field of vision and reliance on a forward observation post (OP) on Tung Lung Chau (Island) that lay in their direct line of sight. Thus, in a careful interpretation of Article XIX of the Washington Naval Treaty of 1922 that capped defensive systems as they were in that year, shortly before World War II the British decided to relocate all guns on Devil's Peak to Southern Hong Kong Island. When Bokhara Battery received the guns from Pottinger, it also took over the role of Fire Command East. **Figure 1** is a pre-war photograph that shows a firing practice at Pottinger Battery, while **Figure 2** shows the loading of one of the Devil's Peak guns onto a lighter during the subsequent move.

Bokhara Battery, upon its completion, turned Cape D'Aguilar Peninsula into a major defence area[9] in Southeastern Hong Kong. This comprised the long range cover of Bokhara Battery's twin 9.2" guns, which had extensive firing arcs right round from firing at long range inland to the east of Kai Tak through east in a c.240º arc to approximately south-west. Supplementing that was close defence, covering a smaller arc provided by the 4" guns of D'Aguilar Battery. The upper gun covered about east-north-east to south-south west, the lower gun roughly south-south-east to west-south-west. Finally, to provide vestigial cover against aerial attack there was the 3" AA gun as noted **(TNA WO 172/1687).**

Figure 1: Relocating a Pottinger gun (Source: Mr. Tim Ko)

[8] It was probably named after Major General Gough.

[9] The other bases to the west were Stanley Fort, Chung Hom Kok Fort, and Aberdeen (Ap Lei Chau) Island.

Figure 2: Loading a Devil's Peak gun onto a lighter (Source: Mr. Tim Ko)

The relocation of the guns from the New Territories to a remote corner of Hong Kong Island may have been a success from an intelligence point of view. One Japanese intelligence map shown in **Empson (1992:146),** though it is unknown to what extent its intelligence picture may subsequently have been updated, suggests that before they invaded the Japanese may wrongly have believed that the Devil's Peak site was still a heavily fortified stronghold with its guns in place. If that was the case, then they may not have been aware of the existence of Bokhara Battery.

Careful analysis suggests a more nuanced picture. Moving three twenty-tonne guns by man-handling and sea transport cannot be a hidden operation. The Japanese intelligence system in Hong Kong is known to have been good, though always not well-focussed on the detail of military infrastructure **(Kotani, 2009)**. Not surprisingly, therefore, the Japanese intelligence map shows that the invasion forces were aware of some sort of enhancement of the seaward defences at the south-eastern tip of Hong Kong. A 14 inch gun battery is shown at the location of D'Aguilar Battery. It is therefore possible that by the time battle commenced on 8th December, the final intelligence picture may have included further updates with some indication that the Devil's Peak area was no longer a major defence system and that the defences at Cape D'Aguilar had been enhanced.[10]

Against this is our knowledge that Bokhara Battery only opened fire on a Japanese naval vessel on 8th and 16th December aforesaid. A possible solution reflecting known deficiencies in intelligence sharing as between the Japanese Army and Navy, is that the navy's minimal gesture towards Cape D'Aguilar may have reflected a fuller appreciation of the defences any feint would be facing. That is, whilst the army may have known that Hong Kong Island's southern defences had been enhanced, only the navy may have

[10] An account put together by the US Army in occupied Japan post-war by ex-serving officers of the Imperial Japanese Army who had fought in the Battle of Hong Kong, supports the idea that the Japanese intelligence may have been only partial. Their narrative notes "On a day predetermined-for landing, the Navy will stage a demonstration movement along the southern coast of Hong Kong Island in order to deceive the enemy into thinking that the landing will be carried out there." They go on to claim, quite counter to any evidence in the accounts from Bokhara Battery, that on 18th December when the invasion assaults were mounted, "At dusk on 18 December, the Navy began to maneuver as though they intended to land on the southwestern coast of Hong Kong." **(Army Operations in China, 1956, p.45)**

known by how much.

After the battle, Japanese surveyors attached to the 1st Artillery Regiment, the siege artillery unit responsible for counter-battery bombardment during the battle, surveyed all British batteries and drew sketches of almost all pillboxes along the Gin Drinker's Line **(Japan Centre for Asian Historical Records)**. They also mapped all batteries and most of the pillboxes on the mainland and Hong Kong Island.

What as yet is not known exactly is what the Japanese intelligence picture of Hong Kong's fixed artillery defences was on 8th December, in what way that may have been modified during the course of the battle via aerial reconnaissance and counter-battery observation and thus how well it did or did not match the post-battle analysis by the 1st Artillery Regiment's surveyors. This is an area in which much work has yet to be done.

During the Battle of Hong Kong, the Devil's Peak area was the defenders' last foothold on the mainland portion of Hong Kong before they evacuated to Hong Kong Island. After the Japanese took over the area, they used it as an artillery platform to pound Hong Kong Island, effectively defending the assembly area in the Lei Yue Mun/Yau Tong area for the subsequent invasion across Victoria Harbour.

Ironically, as we can see from what the Japanese actually did, the island's strong coastal gun defences performed the deterrent role they were intended to play. The invasion was mainly an infantry-artillery charge from the landward (north) side of the colony. Had the British forces been of the strength intended by the design of the main defensive system, the Gin Drinker's Line, the invasion would have proved even more costly to the Japanese than the resolute defence of the under-garrisoned colony exacted.

The 9.2-inch coastal guns at Bokhara Battery, Stanley Fort, and Mount Davis outgunned and outranged those on the obsolete Imperial Japanese Navy Cruiser *Isuzu* and destroyers *Ikanzuma, Ikanzuchi,* and *Tsuga,* which supported the invasion. Indeed, the Battle of Hong Kong saw little naval activity. With the main bulk of the Japanese fleet moored in Mirs Bay, the invasion crossings were made by commandeered sampans and small military rafts, which for a time became easy victims of machine gun fire from the defender's pillboxes (along the Gin Drinker's Line at Shatin Cove and the north-eastern shore of Hong Kong Island) and obsolescent torpedo boat flotilla.

Figure 3 is a photo that shows one of the relocated guns at Bokhara in the left emplacement spiked by the defenders (1st Battery, Hong Kong Volunteer Defence Corps) at 1000 hours on 19 December 1941. Shortly afterwards, the Japanese occupied the battery.

> Templer at Bokhara: 'Lomaz and Master Gunner Berry destroyed guns with one round (1010

pounds) in muzzle and one fired from breech end. Plotting room and table destroyed with Gun Cotton slabs. Searchlights thrown down cliff. Instruments in BOP (Battery Observation Post) broken up with sledgehammers. Battery marched into Stanley' **(Banham 2005:135)**.

Figure 3: Bokhara Battery's spiked left gun (Source: Mr. Tim Ko)

[In Figure 3, The first two Japanese kanji characters, "dragon back," on the map refer to Dragon's Back (which is identical in Chinese writing "Dragon Back"), the ridge that runs along the southeastern part of Hong Kong Island and, after dipping down to the pass that leads across the peninsula down to Shek O, rises again to Hok Tsui Shan (hill) before tailing off to form Cape D'Aguilar.]

After the return of the British Administration in August 1945, the subsequent history of the two gun battery sites is far from clear. Cape D'Aguilar seems to have been demilitarized, though only parts of it and all at different dates. Bokhara Battery was retained as a military site and turned over to the Royal Air Force, becoming an annex to RAF Little Sai Wan and being used for air traffic control and fighter control radar. When it was finally decommissioned has not yet been established but probably in the late 1950s following the 1956 British Defence Review, which began the process of downsizing British forces in Asia. Today the whole Bokhara Battery site remains a restricted area within the area reserved for a Maritime Mobile Service medium and high frequency radio transmitting station and, more recently an international submarine cable landing site.

Two of the three batteries mentioned above can be inferred from post-war RAF and Hong Kong Government aerial photos and their general outlines (without identifying their names) recorded on imperial (1:600) and metric (1:1000) scale survey maps. However, according to the research, no detailed professional site survey of the layouts or vertical sections has been carried out by a government body.

DETAILED SURVEY FINDINGS OF BOKHARA BATTERY

The Devil's Peak military site was quickly superseded by illegal burial activities due to its excellent sea views. But it witnessed its first major post-war human disturbance during the late 1970s when the last phase of extension of Kai Tak Airport's runway was extended. Needing reclamation

material, the government defined the part of the mountain above Pottinger Battery and a complicated system of concrete firing trenches and anti-aircraft positions as a "borrow area". A cut platform was created as a result. Aerial photo evidence shows that to hasten the process of transferring the fill materials, the contractor simply pushed the materials over to Pottinger's right gun emplacement and from there down the cliff to a pier near Lei Yue Mun Point. From there, the fill was transferred by barge to a designated location in Kowloon Bay. Wild vegetation soon overran the platform and the top of the gun emplacement, making access to Pottinger very difficult. Then demand for private burials necessitated the creation of a "Chinese Permanent Cemetery" to the northeast – a task that led to the broadening of the old military trail, Anderson Road, into a two lane carriageway. This modern road link severed the remaining pedestrian links between Pottinger and Gough Batteries. Eventually, nature all but covered the site. Pottinger's existence was quickly forgotten except by dedicated military history enthusiasts, who still had no way to inspect the buried parts. To reach the searchlight positions below the cliff, whose roofs were gone, was even more difficult and dangerous. Occasionally, a hill fire would uncover Pottinger, but nature's recuperative power soon returned the vegetation.

With funding from the Lord Wilson Heritage Trust (2005-2007), the first two authors carried out excavation and vegetation clearing work on Pottinger during summer 2006. Then a registered professional land surveyor, Mr. Ken S.T. Ching, helped survey Pottinger and Bokhara before producing detailed plans for conservation purposes. The detailed survey findings for the former were shown in **Lai, Ho, and Yung (2007)**, while a theoretical discussion of the issues concerning accessing and managing both batteries and other sites can be found in **Lai and Ho (2016)**. The left gun emplacement, the paths to the power generation plant and the search lights were cleared by staff, students and friends of the Department Real Estate & Construction of the University of Hong Kong in April 2020 for photo recording of a common core course[11] field trip in October of the same year.

The Bokhara site has so far enjoyed a less-worse fate, as road access to it is blocked by the fenced-off Cable and Wireless (C&W) (now PCCW) restricted area. At least one of its two gun emplacements, the left gun, was converted into a now abandoned omni-directional radio antenna, the other, which would seem to have housed a mobile radar antenna in the early 1950s, has more recently housed a variety of research equipment for one of Hong Kong's universities, and there was regular weeding and tidying up there until about 2006. **Figure 4** shows a photo taken during the 1950s of Bokhara, as seen from D'Aguilar Battery. Back then, the vegetation and buildings, which were under RAF

[11] Course code CCCH9031.

jurisdiction, were neatly maintained. Since 2006, however, the standards of both plant and building management have deteriorated.

Figure 4: Bokhara during the 1950s

Figure 5 is a photo taken in 2006 that shows the use of the left gun emplacement during a land survey of this battery. **Figure 6** is a photo taken during a Common Core[12] field trip of the University of Hong Kong in 2019 that shows the research installations of the Hong Kong Polytechnic University inside the right gun emplacement.

[12] In 2012, the first two authors introduced the CCCH9031 course, titled Property Rights, Built Heritage and Sustainable Development, to the HKU undergraduate curriculum.

Figure 5: Communications installation at the left gun emplacement in 2006 during the land survey

Figure 6: Research installation at the right gun emplacement in 2019

Also within the restricted area of Cape D'Aguilar are HKU's Swire Institute of Marine Science, a few quarters for postgraduate students, and a coastal ecology park associated with a marine protected area, the Cape D'Aguilar Marine Reserve of the government's Agricultural, Fisheries and Conservation Department. The only vehicular access to this restricted area is the single-lane Cape D'Aguilar Road, dating from the 1920s, which passes the sparsely populated Chinese village of Hok Tsui Tsuen. The last section of the

road from just outside the Radio Station gates allows only vehicles with special permits. A 19th Century lighthouse tower, now carrying a late 20th century lantern to form today's Cape D'Aguilar Light, is a declared monument and located close to Bokhara Battery, although with the Cape D'Aguilar Cable Landing Station between them.

The surveyor who surveyed Pottinger Battery also surveyed Bokhara Battery. Summaries of both surveys are shown in **Figures 7** and **8.** **Figure 7** presents the survey drawings of the left gun emplacement, searchlight shelter, and a shelter for Bokhara Battery. **Figure 8** contains drawings of the right gun emplacement, searchlight shelter, BOP, and a shelter for Bokhara Battery.

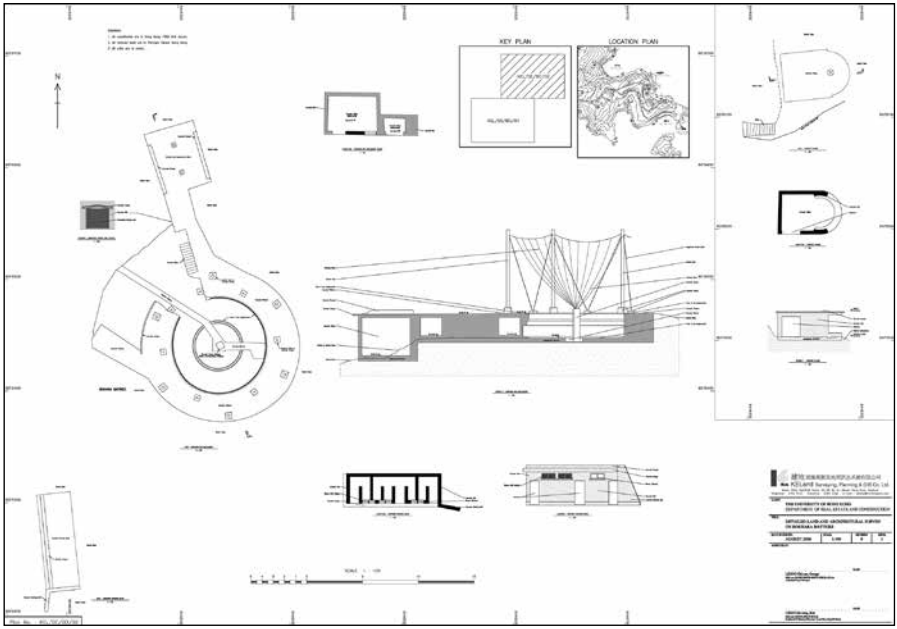


Figure 7: Survey drawings of the left gun emplacement, searchlight shelter, and shelter for Bokhara Battery

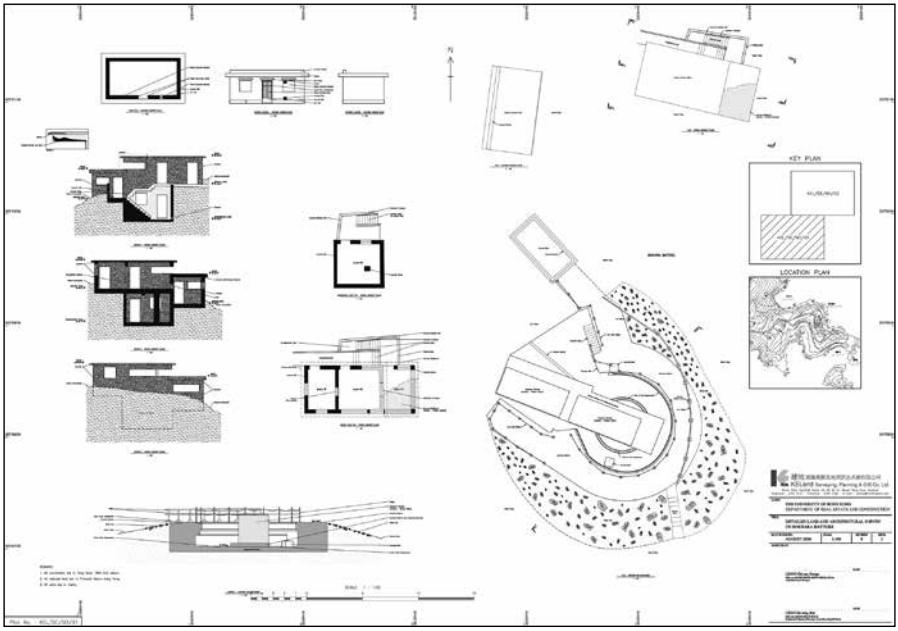


Figure 8: Survey drawings of the right gun emplacement, searchlight shelter, Battery Observation Post, and shelter for Bokhara Battery

Figures 9 and 11 show the two searchlight positions below Bokhara Battery with roofs. Indeed, all bunkers and Bokhara's OP retained their roofs until as late as 2002. Due to neglect, the roofs of the BOP **(Figure 10)** and the left searchlight shelter have collapsed since 2003. Yet the shelters have remained intact. In contrast, all the shelters on Devil's Peak have lost their roofs.

Figure 9: The left searchlight position below Bokhara Battery, 2003

Figure 10: Battery Observation Post, Bokhara Battery, 2003

Figure 11: The right searchlight position below Bokhara Battery, 2006

Some interesting comparisons can be made between Pottinger and Bokhara Batteries. Like Gough Battery, as reported in **Lai, Ho, and Leung (2003)**, Pottinger Battery has an underground magazine, but does not have any lift shaft for delivering ammunition to the gun emplacement above. Bokhara had no underground magazine. Thus, just how the guns there were resupplied is an interesting question. Perhaps the ammunition was transported by a small railway and hoisted by a hydraulic lift, although there are no on-the-ground traces of any such system. Indeed, when the topography of the site is considered, ammunition re-supply must have been a significant problem. Underground magazines and ammunition hoists would have been ruled out by engineering and time constraints. The solid rock on which the emplacements are built would have required time consuming engineering work to excavate sufficiently to create an underground bunker complex. Given the very short time period within which the battery was relocated and brought up to an operational state, clearly no such site preparation was feasible. However, the guns are on top of a steep rise with what would appear to be the main ammunition bunkers set into the hillside some distance below. This is an aspect of the battery operations that research has yet to clarify.

Working on the only image of the whole battery dating from 1941, and as shown in **Figure 12,** it seems probable that resupply was via a graded trackway (**Figure 13**), perhaps paved, that allowed either mechanized or hand drawn carts to carry ammunition from the bunkers to the expense lockers at each emplacement.

Figure 12: Bokhara Battery c.1941

Figure 13: Detail from Figure 12 showing probable ammunition resupply route by graded trackway

Traces of scavenging were evident in both batteries. Their expense lockers' steel doors were gone, but there was no sign of Bokhara's structures having been scavenged for their bricks and steel reinforcement.

Neither Pottinger nor Bokhara were protected by any local, close support pillbox system. However, unlike Pottinger, Bokhara and its associated batteries were protected from an assault from the rear by a nest of pillboxes where the Cape D'Aguilar road joined the Shek O road. None of these four pillboxes survives. They were also protected from flanking attack via landings through the nearest coastal pillboxes in Hong Kong Island's coastal pillbox defence system: three commanding the beaches either side of Shek O and three commanding the beaches on the west coast of the Cape D'Aguilar Peninsula in Tai Tam Bay. A still existing pillbox (PB 33a), a combined pillbox and searchlight position on the southwestern tip of the Cape D'Aguilar Peninsula, is shown in **Figure 14.** Beside this pillbox stands a metalic plate that refers to the D'Aguilar Battery. It may mislead the public to take the pillbox as the battery itself.

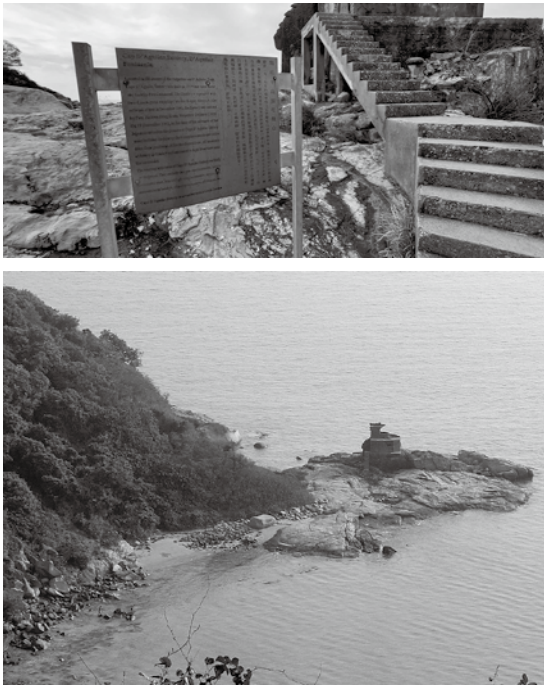


Figure 14: Pillbox 33a near Hok Tsui Lower Village, Tai Tam Harbour

Currently, there is no plan to conserve either battery site, although both were assessed by the government's Antiquities Advisory Board (AAB) as "Grade 2" heritage buildings.

THE REDISCOVERY AND SURVEY FINDINGS OF D'AGUILAR BATTERY

> "D' Aguilar-Grid 166586
>
> This Battery was one of three "Improvised Batteries" provided for by the Defence Plan for which guns were made available by the Navy. The battery named D' Aguilar was erected in 1941 with 2 x 4 inch naval guns. Manned by First Battery HKVDC as part of the Eastern Fire Command. On 19 December in the face of extreme pressure from the Japanese the guns were destroyed and the personnel withdrawn to Stanley." **(Rollo 1992: p.184)**

The actual location of the gun sites is inside grid KK165587.

The reason why **Rollo (1992)** did not provide any photographic information on D'Aguilar Battery was probably because by the time he conducted his survey, the battery area had been concealed by dense vegetation that prevented both easy aerial photography or field research. Rollo used an RHKAAF helicopter to survey the batteries, but it is not known to what extent he had access to or used archival drawings that may then still have existed.

The persistent field work of the last author has made it possible to identify the whereabouts of a large and several smaller OPs near Hok Tsui Road. This data was collated with 1949 RAF and 1963 R.C. Hunting aerial photos, and with government survey maps on which the battery was not marked as such. What could be identified were two circular places linked by a flight of steps that went up the hillside connecting the large OP and various shelter sites. This was sufficient information to allow the research team to locate the gun positions (the circular places) and their supporting building sites, although tall grass and thick bush initially blocked access to the site.

After several abortive attempts, the team finally reached the gun emplacements in the Fall of 2019. During their first field trip, they met a search party from the Antiquities Advisory Board that had made no progress in identifying elements of the site. Pushing ahead nonetheless, with a view to reaching the circular places, the team discovered two iron rings[13] **(Figure 15)** on the western side of the steps. These were typical in pre-war British batteries as strong points for manhandling the guns and other heavy equipment into position. They indicated that the team was on the right track. With the assistance of two teaching assistants, who had the right equipment and experience in removing thick vegetation, the team finally succeeded in reaching the emergency gun emplacements (photos in **Figures 16-17**).

[13] Elsewhere, these rings can still be found at Gough, Chung Hom Kok, and Mount Davis Batteries.

Figure 15: One of the iron rings found along the steps leading to the gun emplacements of D'Aguilar Battery

The shape of each gun emplacement is interesting. It has no gun apron like that at Gough Battery for its sole 6 inch gun or any semi-circular concrete cover like those at Jubilee and Chung Hom Kok Batteries. Although the official map shows circular places, neither is in fact circular. Each is cut into the slope of the hill so that the back of the emplacement abuts against a short, vertical rock face.

Each emplacement is an irregularly shaped platform with a central part, in the centre of which some of the mounting bolts for the guns still remain, forming an irregular circle approximately 12m in diameter. The two emplacements are stepped about 72m apart up the line of the hill, separated vertically by 10 metres and laterally, from what are approximately their central axes of orientation (L c.130ºT, R c.135ºT), by about 40m.

Offset from the front-to-back centreline, the back of each emplacement has a roughly shoulder height, two part, asymmetrical blast wall behind which are expense lockers set into the rock face. The upper (L) emplacement has three expense lockers; the lower (R) emplacement has four.

The blast walls are separated by an entrance to the access corridor between the rears of the blast walls and the expense lockers. The ratios (R) wall: entrance: (L) wall are approximately 3:1:6. The right side of the lower (R) emplacement blast wall is closed off at its outer end. Both ends of the upper (L) emplacement blast wall are open. The blast walls have the plan form of asymmetrical curves.

The forward edge of each emplacement has a low parados with two elongated wing pieces either side of a small semi-circular central part. The 'wings' slant forwards in relation to the N-S axis of the semi-circular central part, extending from the mid points of its lateral diameter. Neither parados is exactly symmetrical, but the upper (L) emplacement parados is markedly more symmetrical than that of the lower (R).

It is possible to infer from this that the intended arcs of fire for each emplacement were indicated by the lines of the parados wings. This would make the arc of fire of the lower (R) emplacement 080ºT through south to 228ºT and the arc of fire of the upper (L) emplacement 065ºT through south to 220ºT. The overlap of arcs would have been considerable although evidently the upper gun was tasked with the eastern end of the Shing Sze Mun channel and its approaches and the

lower gun to the western end.

The lower gun would have been subject to what naval artillery calls 'superfire' by the upper gun. However, the vertical separation would have ensured that adverse blast wave effects would have been slight.

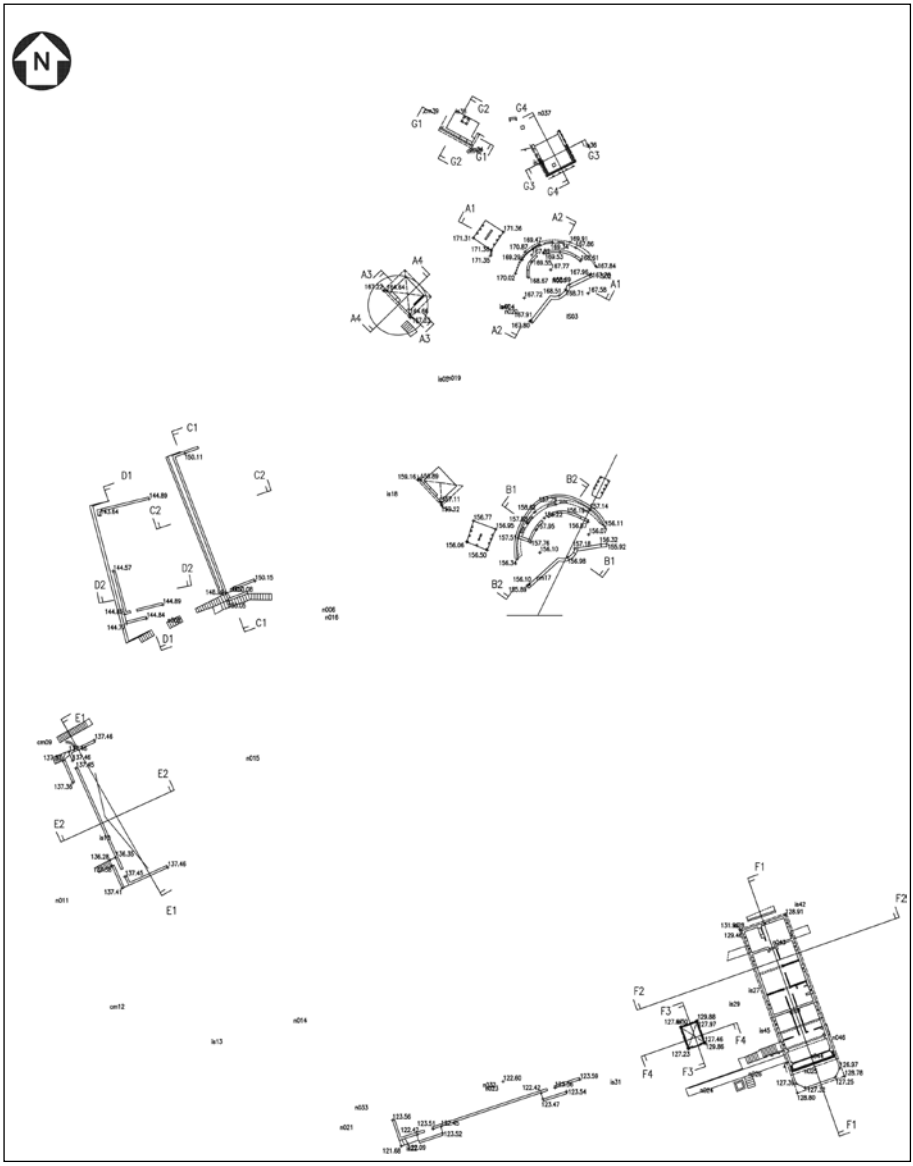
Figure 16: Upper gun emplacement of D'Aguilar Battery

Figure 17: Lower gun emplacement of D'Aguilar Battery

Near the road, above a shelter that a retired civil servant now occupies (since birth, according to him), is a large two-storey BOP. **Figure 18** shows a photo of the pedestals for the plotting room on the ground floor. It is said that a former Cable & Wireless employee, now deceased, once obtained a licence to dwell in the BOP.

Figure 18: Pedestals for the plotting room on the ground floor of the observation post of D'Aguilar Battery

In February 2020, a professional land survey of this area was conducted. **Figure 19** shows the surveyed layout of the key structures of D'Aguilar Battery showing the two gun emplacements, some shelters and the BOP. **Figure 20** shows those for the large OP, while **Figure 21** shows a shelter near the guns.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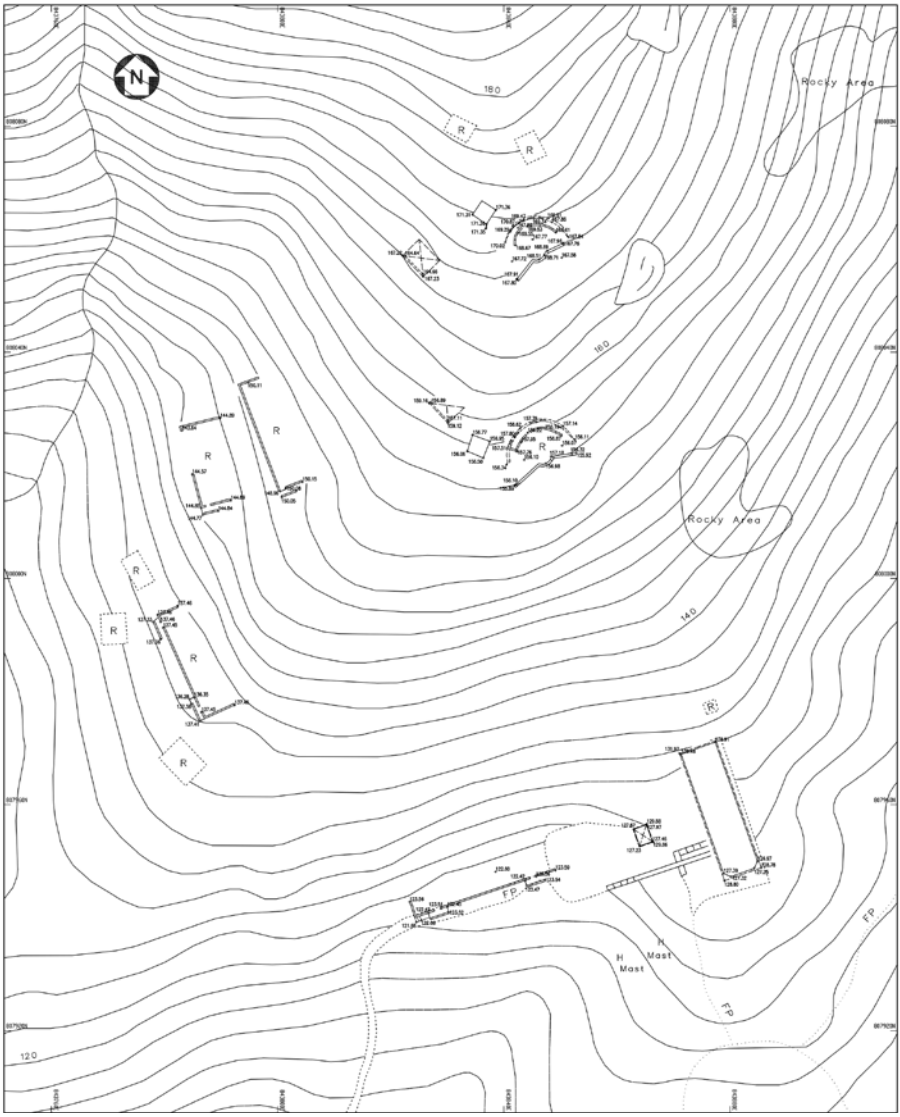

Figure 19: Surveyed layout of the key structures of D'Aguilar Battery

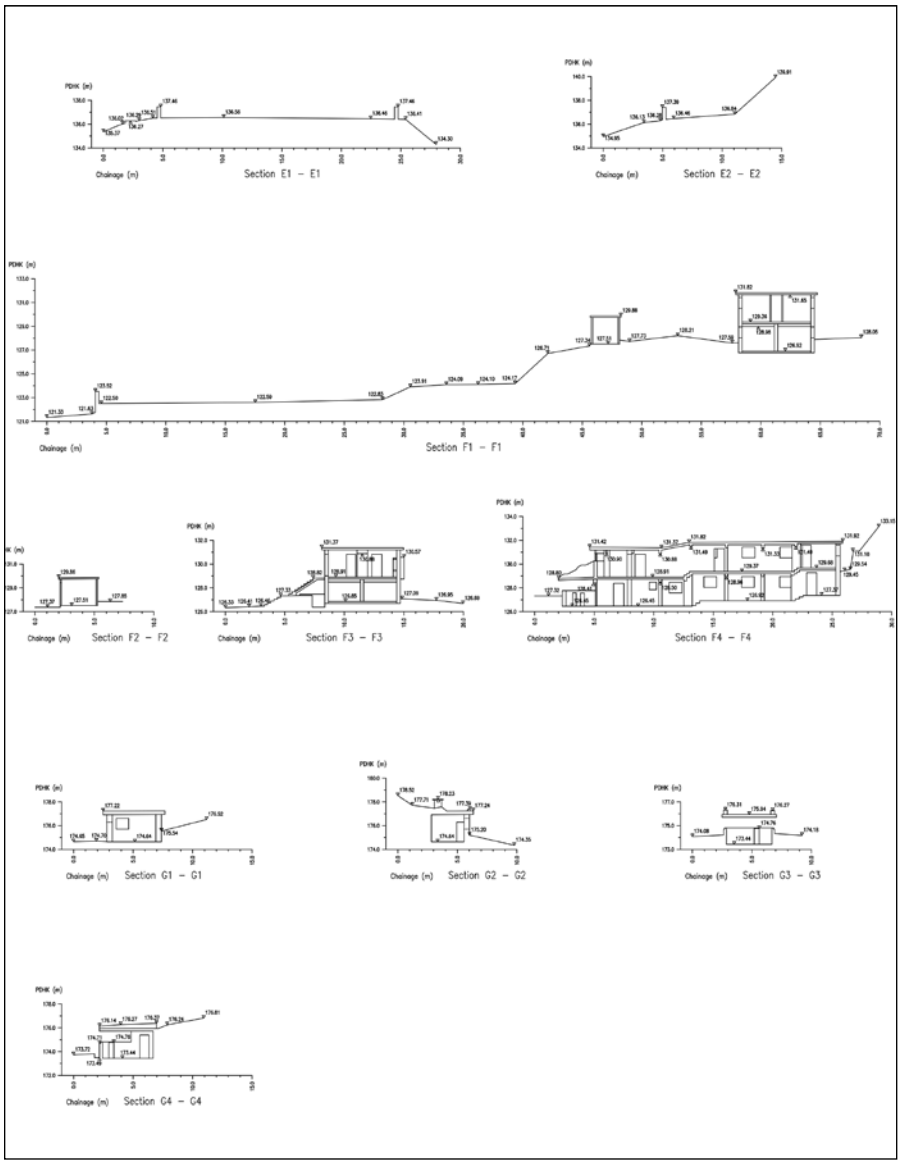

Figure 20: Measured drawings of a two-storey observation post and a shelter of D'Aguilar Battery

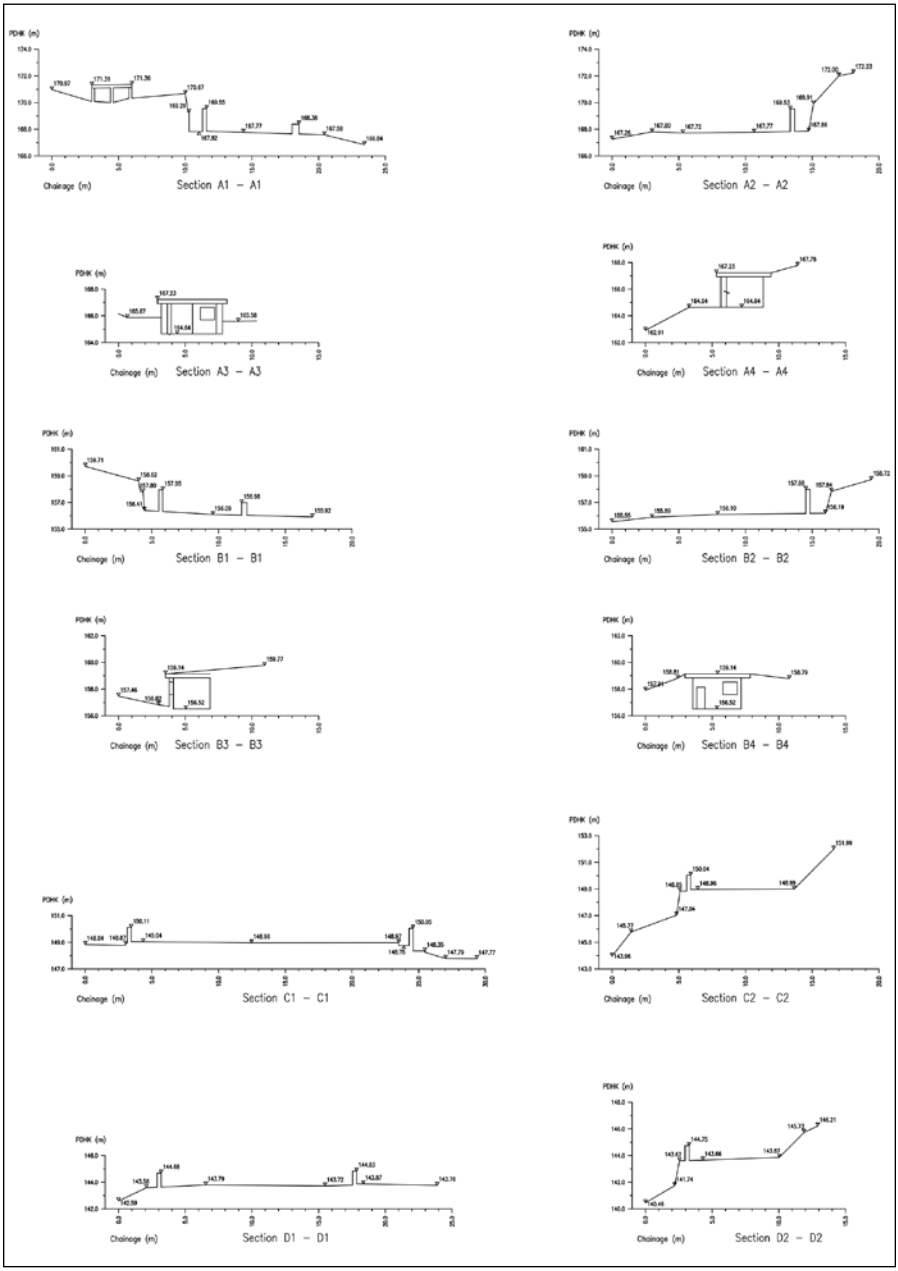

Figure 21: Measured drawings of a shelter near a gun emplacement and a nearby shelter at D'Aguilar Battery

SUMMARY

It is a signal tragedy for Hong Kong and its heritage that a closed-minded understanding of heritage has ensured that such mute witnesses to one of the most significant moments in Hong Kong's modern story as the batteries at Devil's Peak and Cape D'Aguilar should be in so ruinous a state and also so poorly documented.

The emergency of imminent war meant that no as-built plans survived for any of the batteries at Cape D'Aguilar. In such a context few photographs, drawings, sketches or other memorabilia have survived and no effort at all has been made by government agencies to garner either originals or copies of whatever has survived and surfaced.

The British colonial government's indifference to the wartime period and its relics, more or less ensured that whilst the abandoned structures were in good repair, no surveys-for-the-record were contemplated. A blind and literal cleaving to an obtuse definition, once the *Antiquities and Monuments Ordinance* had been passed in 1976, has ensured that no official effort has since been made at least to record such wartime structures as are known. The best that has been done has been a hollow 'grading' and recording the structures so graded on a GIS system.

Because by definition no WW2 military structures are "places, buildings, sites or structures erected, formed or built by human agency before the year 1800 [or] the ruins or remains of any such place, building, site or structure, whether or not the same has been modified, added to or restored after the year 1799", only when it has been almost too late, have the efforts of enthusiastic private groups and individuals rescued such data as recorded above.

To ensure that what can yet be rescued from the oblivion of official and other indifference on the one hand, and the ravages of unchecked nature on the other, more effort to research, document and record the Cape D'Aguilar area batteries is a clear duty owed to Hong Kong's heritage and the memory of those who died fighting for their friends, families and ways of life.

ACKNOWLEDGEMENTS

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Project name: "Detailed Land, Structural and Architectural Survey on Pottinger Battery, Devil's Peak"

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Surveying & Built Environment

Technical Notes

Researching Hong Kong Pillboxes: The Hard Way

Rob Weir*

ABSTRACT

This essay shares the experience and some findings of the author in researching on the pillboxes as defence installations in Hong Kong.

KEYWORDS

Hong Kong, Gin Drinker's Line, pillboxes, tunnel, track marker

INTRODUCTION

The history of the pillboxes (PBs) in Hong Kong (HK) goes back to the early years of the 20th Century, when small raiding parties landing in the New Territories (NT) were a worry for the Authorities. The principal military rationale for HK was the use of its harbour and port facilities as a base for the Royal Navy. To protect against these potential raids, a series of blockhouses was built across the Kowloon Peninsular on the ridgeline to the north of Kowloon itself (Weir 2012). As time moved into the 1930's, Japan became expansionist and was a potentially greater threat than raiders. An "Appreciation from the Japanese Viewpoint" exercise run by the military in 1935 concluded that Japan, "for strategic reasons is virtually compelled to attempt to seize HK as early as possible after the outbreak of hostilities"[1]. The 1935 Defence Plan[2] set down the reasons for the defence of

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[1] The National Archives, Kew: WO 106/5358

[2] The National Archives, Kew: CAB 11/196

HK as (a) a naval base, (b) a base for further operations, and (c) a commercial port. Because of the distances involved, it was considered impractical to defend at the Chinese border, so a plan first suggested in the 1920's was reworked to create a defence line across the peninsular slightly north of the Kowloon Hills, with a small mobile force near the border that would delay the enemy but slowly withdraw to the main line. This line was to be held awaiting the arrival in 90 days of the British Fleet to drive off the attackers. It was originally named the "Inner Line" but became known as The Gin Drinkers Line. (Lai et al. 2011) Work started immediately.

By 1937 the Japanese were in China, German re-armament was concentrating British attention to home, and it was becoming apparent that HK was not going to get much help[3]. The Military Chiefs in Britain assessed the situation and forwarded to Cabinet three possible levels of defence for HK, which were basically: A. Maximum – defend everything (eye-wateringly expensive), B. Intermediate - Protect the harbour for British Naval use and C. Minimum - Retreat and defend only HK Island. As there was little chance of supplying the men and weapons necessary for A or B, standard C was approved in July 1938 and became "The New Policy"[4]. It was received with mixed feelings in HK. The Army considered it to be the only practical approach considering available and potential resources, the Navy considered it defeatist[5].

The Gin Drinkers Line in **Figure 1** was a massive and expensive project. Roughly, 11 miles (18km) in length, it consisted of not only pillboxes, but also lookouts, observation posts, artillery positions, HQ's, and troop shelters, with supporting tunnels and trenches and linked by buried telephone lines. **Figure 2** is a sketch that shows the rough alignment of the Line. With the exception of some of the PBs on the flat coastal areas around Gin Drinkers Bay (Kwai Chung), Tide Cove (Sha Tin) and Port Shelter, they were all on the hills, overlooking valleys and paths through those hills, and mostly in uninhabited areas. Except for some of the smaller lookouts, they were all constructed of reinforced concrete, and dug into the hillside. At that time, there were only two roads (Tai Po Road and Castle Peak Road) through the hills that could carry vehicular traffic to the border from New Kowloon, the railway, and small shipping into Tide Cove, so distribution of all materials and tools necessary to the sites was by horseback, pack mules, and human labour. (Sitting on the ruins of a PB on a hillside many decades later, I watched a helicopter carry a complete High-Tension Power Pylon to a nearby position on the hillside in minutes). Whilst construction was taking place, Hong Kong's defence plans were being reconsidered and local commanders were becoming increasingly concerned that they did not

[3] The National Archives, Kew: CAB 44/173
[4] The National Archives, Kew: WO 106/2392
[5] The National Archives, Kew: ADM 116/4271

have, and were unlikely to get, sufficient troops to fully man the line.

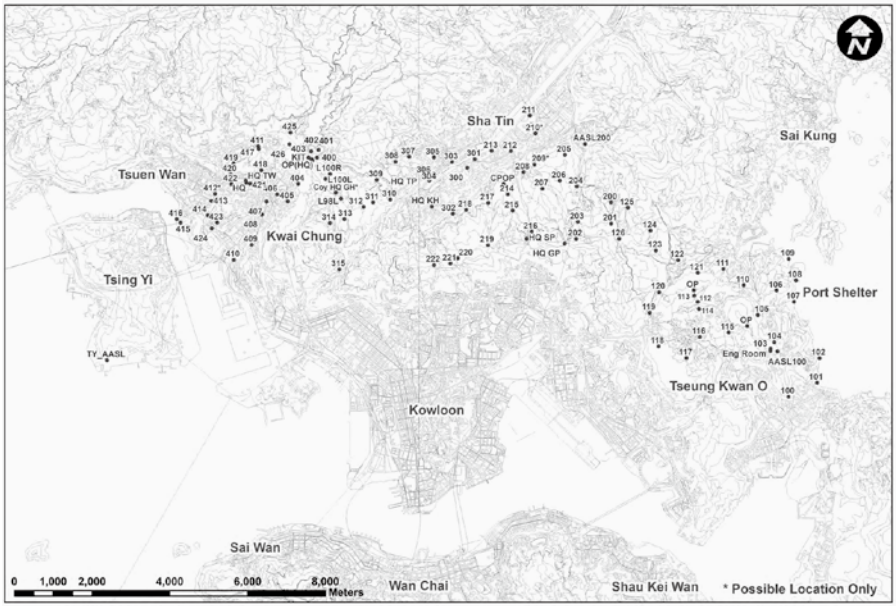

Figure 1: The Locations of Pillboxes and Other Structures of the Gin Drinker's Line Based on Aerial Photo Evidence

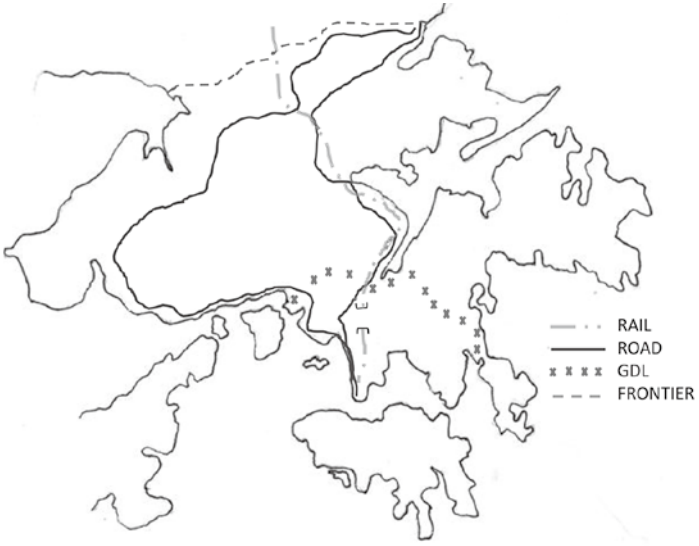

Figure 2: Sketched map of Hong Kong showing the location of the Gin Drinker's Line

With "The New Policy" came instructions that the line was to be completed, even though the Standard C requirement was to defend only HK Island. That was to be kept secret, so the completion was merely to keep up appearances[6]. The immediate effect was money allocated for the line was re-directed to construct Island defences[7]. How much of the Gin Drinkers Line was completed at that point, or afterwards, is unknown. When the original defence plan was re-instated after the arrival of additional Canadian troops in 1941, it was described as requiring much work and material to place it in a tolerable state of defence[8]. Undermanned and uncompleted, it went to war.

SOME PERSONAL EXPERIENCE

I came to Hong Kong to live and work with very little knowledge of any of its military history, other than it had been overrun during the Second World War. I also came with a well-developed curiosity. As time progressed, and I had spare time, I borrowed a neighbour's black Labrador, and started walking the hills of Kowloon. One afternoon, taking a shortcut across a hillside apparently covered in grass, I suddenly found myself flat on my back looking at the sky from the bottom of a trench. I followed the trench a short distance into a man-made cave area, which then opened onto the other side of the hill. What is this about? Another day on a different hill I came across a set of concrete steps with high side walls, on the open hillside. They ran for about 50 metres and terminated against the hill. The curiosity clock was ticking. Next came strange little concrete blocks beside old tracks, with letters such as PB, L, followed by a number, and arrows pointing in a variety of directions.

Beside the road at One Rise More (**Figure 3**), I found the remains of a large concrete structure, obviously of military strength. By now I had taken to reading about the war time, and seen a picture of this ruin labelled as a wartime bunker. Books had mentioned there were pillboxes, but I had only a vague idea of what a pillbox looked like, and that picture was nothing like it. A further walk from Customs Pass to Ho Chung, along an old village path, produced one of the small concrete blocks with **PB 120** on it, and an arrow pointing at a similar military type ruin ten metres away. That gave me the connection, but no explanation as to why one of those things sat by itself beside a path in the middle of nowhere. If this one was number 120, and there was another with unknown number some distance away, how many others existed, where, and why? No one I asked had any idea, or any interest, so I was obviously on my own.

Fortunately, my day job gave me occasional days off in London, and access to the delights of the National

[6] The National Archives, Kew: CAB 11/2427
[7] The National Archives, Kew: WO 106/2370
[8] The National Archives, Kew: CAB 44/173

Archives at Kew. From the myriad documents there I was able, over time, to discover there was a defence line called The Gin Drinkers Line, which ran from the west at Gin Drinkers Bay (now Kwai Chung) to Port Shelter in the east. Unfortunately, there was no fixed plan; each document that showed the line varied from the previous one, but always showed a single line. Text descriptions went the same way "runs in a line from Gin Drinkers Bay to the shores of Tide Cove (Shatin) and on to Junk Bay". From this, I formed my impression of what the line was about, and where it all went. Wrong, very wrong.

Back to Hebe Hill where I had found the original set of steps and track markers. Spending time there eventually produced three sets of PB

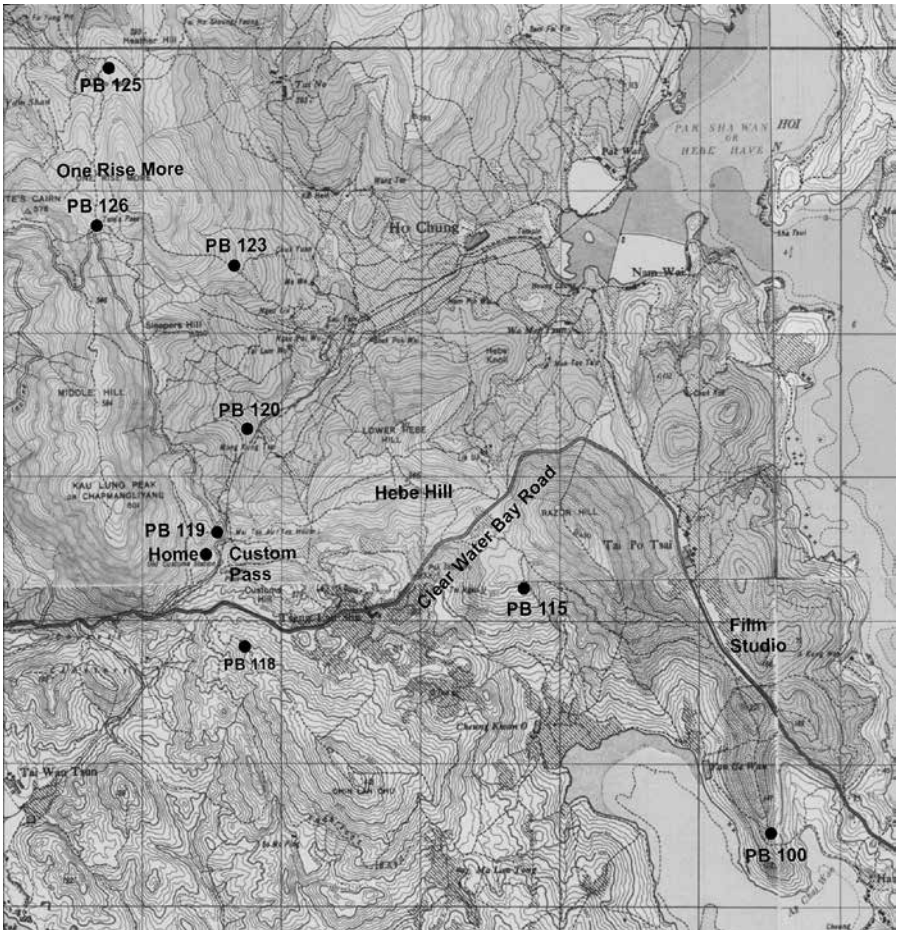

Figure 3: War Office map showing the location of different military structures

ruins (i.e., PBs 112, 113, 114) with collapsed trenches leading to them, but the markers had, in some positions, been defaced and were of little use, or sometimes two markers would show the same PB number but in different directions. Adding to confusion was finding another PB ruin, which was in neither direction from the markers. The hill was covered in old tracks, so it would have been possible that this was (a) the numbered PB but approached from a different track, (b) from an unfound marker, or (c) another PB entirely. So far, I had only found PBs numbered in the 100 series, whereas the Kew documents mentioned attacks on the Shing Mun Redoubt PBs numbered in the 400's. How many of these things were there?

Back to Kew, and a document[9] from 1936 mentioned that the first of approximately 80 PBs had been started. Another mentioned the two weak points on the Gin Drinkers Line were to the west around Gin Drinkers Bay, and the east around Customs Pass[10]. As I lived in the Customs Pass area, that became the main area to start as both **PB 120** and the ones on Hebe Hill, now tentatively numbered **112**, **113** and **114** from the markers, could be considered in that area, so I only had approximately 75 more to find. As I moved from Hebe Hill though, the grass started to make way to thicker and higher vegetation, and line of sight became restricted. After a few days blundering around in unsociable vegetation I decide to go back to the easier grassed areas, and cross Clearwater Bay Road below what is now Pik Uk Correctional Facility. On the downhill side of a mound was another PB ruin. That should not be there according to the Kew documents. It tentatively became **PB 115**. Kew had given a few more clues in the form of 4-digit grid references for platoon positions along the line. The Defence Plan noted that when there is a PB in the platoon area, it should be used as the HQ. Fine, but the grid was for pre-war maps. Off to the Survey and Mapping Office (SMO) of the Lands Department HK (already relocated to Java Road from Garden Road), where I found they keep old maps of HK as an Historical Series, and they have the same grid. Good news, except a four-digit grid represents a 1,000 metre square. Guessing a PB may be in that area at least gave me aiming points, and I found **PB 118**, but it was back near Anderson Road which is well towards Kowloon, and appears to be creating a line 180 degrees away from where the others had been sited. That turns out not to be true as I discover when all the other PBs are found. As I now have **PB 118** and **PB 120** (**Figure 4**), **PB 119**

Figure 4: PB 120 as found (Author's photo taken 1995)

[9] The National Archives, Kew: WO 106/111
[10] The National Archives, Kew: CAB 44/173

must be around. It was, about 200m from my house. How many times have I passed it without seeing?

I started further out along Clearwater Bay Road. On a small rise just opposite the Film Studios, a trackside marker points to **PB 100**. I searched the hillside, but it had been reshaped during slope stabilisation, and no structures remain, but in this position **PB 100** would have overlooked Junk Bay. But if that is **PB 100**, and the next lowest I know is **PB 112**, I've got a lot of looking to go. Back to SMO to spend many hours over the next years examining through a magnifying glass the post war aerial photographs. The first, in 1945, are from a height of 20,000 feet and show nothing useful. The next, in 1949, are lower but the runs do not cover much of the peninsular or NT. It isn't until 1963 that useful low-level photographs cover the whole of Hong Kong, but by now new town development is in progress and potential PB positions have gone under tower blocks. I also started buying current maps, so I would have some idea where I was, and also to transfer the few old references I have onto the current grid as possible sites to search. This will come back to bite me years later. Unfortunately, the modern maps do not necessarily provide a flood of information. While on some there is an outline of a PB with 'PB' alongside, the adjacent map has nothing although there is an identical PB still on the hillside, and others have a rectangular shape with 'Ruin' alongside. Unfortunately, 'Ruin' appears to be the default for anything the map maker can't identify.

Another visit to London brings to my attention that a public research program has just started run by the Council for British Archaeology, called "The Defence of Britain" project. Its purpose is to find and catalogue 20th Century fortifications, using members of the public as volunteer researchers. That makes me feel slightly better as if the British don't know what they have on their own Island, I'm not on my own. I contact them and am given an insight into what they propose which, apart from using dozens of volunteers, could transfer to HK. I set up a modified data base for my own use. The downside is I now have to revisit all my original findings to get the requisite details. I also now correspond with an officer from the 2nd Bn Royal Scots (2RS) who was in the Gin Drinkers Bay area at the time of the attack, and he gives me some more details of the PBs in his area, which adds three to the total.

Walks start to the Shing Mun Redoubt and area. From there I find the four, or is it five, PBs. **PB 401** is actually two separate PBs, facing in different directions, but connected by a tunnel to each other, and the rest of the Redoubt. Of the approximately 80 PBs on the line, does this count as one, or two? I know that the 2RS had a Company on the Texaco Peninsular, but one visit there immediately cancels any idea that PBs may still exist in that area. Over a few visits several more PB ruins are found in less developed areas, and one intact one (since demolished) sitting by

the side of a road. The last found, **PB 426**, is almost back at the redoubt. The line is actually a loop at this point.

I found more ruins in the general Customs Pass area, and one in particular is interesting. The majority of the PBs on hillsides were constructed by digging a hole, building a PB, then covering it over. This created problems with access, so a protected open trench or covered tunnel was constructed to the entry. Beginning around 1949, PBs on the mainland were explosively demolished by the army. This mostly reduced them to a base outline and a large pile of concrete debris, which as it generally spread downhill, was quite often the first indication there had been a PB in the area. This demolition also collapsed the trenches. In this case, I found an apparent collapsed trench but at one end it had the remains of a brick arch. Following the trench took me to the entry of a ruined PB. The unexplained concrete trench and steps found previously finally had an explanation. In this area I started finding markers with PBs in the 200 series indicated. This led to a long period of confusion as I misidentified one of the 100 series I'd found as a 200. I also found more double PBs, which I categorised as a/b for listing purposes. (I still have no idea which is "a" or "b" for any of those types). Following on the 200's trail I headed in the direction of Shatin, picking up several more in the hills and along the catchwater, until 302 turned up. Confusion. As it turned out, the PBs in this area comprised three lines of which those around the catchwater are the middle line. The next in numerical sequence, **PB 219** to **PB 222**, turn up on the top of the Kowloon Ridge along the – now – MacLehose Trail, where they stop. This is the third line. The first was roughly along the eastern side of the old coastline of Tide Cove, now reclaimed for Shatin. None of those PBs, **PB 209** to **PB 213**, remain.

PB 302 was the eastern end of the 300 series, the next several had generally been on the flat of the Shatin/Tai Wai area but subject to New Town development were unlikely to exist, despite my dreams of finding them. Following along the Shing Mun River I was faced with nothing but heavily overgrown hillsides. Deciding there was no potential in that direction I decided to try my luck going uphill to another road I knew was in the vicinity, and unexpectedly stumbled across a PB. To my delight, this one was only partly demolished with some walls and part of the roof still standing. At last I knew what a PB actually looked like. To get to the road was a struggle through heavy vegetation and as I emerged, I was confronted by two disappointed walkers. They had been listening to my crashing and grunting and were expecting to see a wild boar emerge. Confronted by the rest of the hill being the same as that, I gave up. My next attempts were based around Golden Hill Road, leading up to Smugglers Ridge, a distance of roughly 2 miles (3.2Km). As I had discovered **PB 314** (**Figure 5**) was somewhere above the road from my 2RS correspondent, and Golden

Figure 5: PB 314 is the small light vague stripe in the middle of this picture.

Hill was also covered in vegetation, it was needle in haystack stuff. After a number of unsuccessful attempts from the road, even after finding a marker which pointed vaguely to the PB, I gave up and started following old paths which took me away from the area. One I followed branched into an upper and lower path. Fortunately, I followed the upper as it took me to the somewhat hidden entry to a brick-lined tunnel to **PB 314** (**Figure 6**). The tunnel had collapsed internally, but I followed it from above until it stopped. Looking around, I found I was standing on top of the **PB 314**. All that was exposed, after landslips, was part of one loophole which I managed to clear sufficiently to slide through. Inside, at last, I found an almost undamaged PB. I now had **PB 314** and **PB 313**, on the other side of Golden Hill Road (**Figure 7**), and a tentatively numbered 309 near the river, so it was just a matter of chasing down the missing numbers. More crashing through vegetation, and with the help of time and a couple of marker stones I eventually collected those missing, plus I was able to positively identify the first

Figure 6: Entrance to PB 314 as found (Author's photo taken 1995)

Figure 7: PB 313 entrance undamaged

as **PB 309**. Looking at the placement of these on a map, the oft criticised gap in the line near the Shing Mun Redoubt becomes apparent. The countryside is no more difficult than elsewhere, so could this be a result of the reduced finance available after 1938. The last known PB in this group, **PB 315**, is completely separate, located near Tai Po Road.

The result, to me, is that the Gin Drinkers Line was not just a line on a map between two points as I thought, but loops, wanders and doubles back on itself. An enormous engineering project, finished or not. The ruins of the pillboxes, mostly destroyed by the military after 1949, and marker stones (**Tan 2019**) can often be passed by unnoticed by hikers. (**Figures 8, 9, 10, 11**).

Figure 8: Demolished tunnel entrance PB 123 (Author's photo taken 1995)

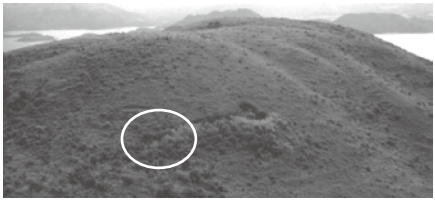

Figure 9: Typical hillside PB remains. PB 106. (Author's photo taken 1995)

Figure 10: PB 119 Track Marker

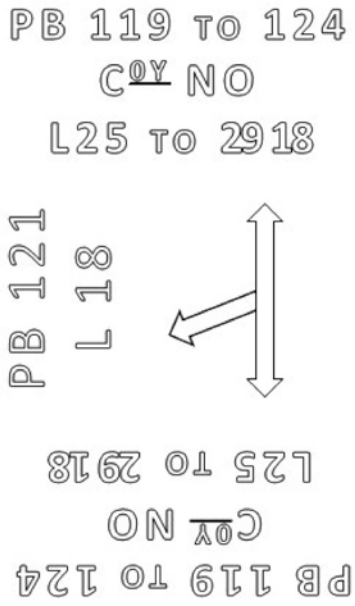

Figure 11: Deciphered text on track marker in Figure 10.

This is a personal story covering 25 years. When I first started, the interest in HK military matters was limited, and even that was as an expatriate. I occasionally managed to encourage friends to accompany me, but there were no repeat walks. All the information I had at this stage was self-generated, and the PBs, and other things I found, were almost always from extensive walking. Over time it became somewhat easier as I was developing a sense of where a PB would be likely to be found. I had little idea of PB numbers at that stage, so was giving them an alphabetical letter based on the sequence I found them. Numbers were occasionally given in documents at Kew, but mostly as a general term "Pillboxes overlooking Tide Cove" as an example. There was also conflict between different Unit War Diaries on the same action. **PB 205**[11] firing on a boat loaded with Japanese troops in one diary becomes **PB 210**[12] in another. Fortunately, the thoughtful constructors of the PBs stamped the numbers into concrete surrounds of tunnel entrances. Where these survive, they are particularly useful confirmation. In time I managed to meet several Hong Kong locals with an interest in the subject, with whom I became friends, and with their help and assistance from research staff at HKU, were able to fill in many of the blanks I had left. I have put the database on the Gwulo web site, so anyone can trace individual PBs on the line. This was the downside connected with the Hong Kong Maps I used. My PB positions were mostly derived from standing on part of the ruin and trying to position myself on the face of the earth using the map and prominent features visible. From this came a 12-digit grid reference which unfortunately had to be converted into digital Latitude and Longitude for the website map. I had never anticipated mobile phones with GPS capability. I now get corrections of the position from visitors, accurate to a degree I never envisaged.

The rural landscape of Hong Kong has changed a lot since the 1930s and the surviving pillboxes, once standing out on grassy backdrops slopes, are now mostly concealed by dense vegetation due to long cessation of grazing, firewood collection, government control of hill fires and tree planting. **Figures 12** and **13** of **PB125** tell the story well.

Figure 12: PB 125 in 1938

Figure 13: PB 125 in 2001

[11] The National Archives, Kew: WO 172/1685
[12] The National Archives, Kew: WO 172/1691

This makes PB hunting increasingly more challenging, though the locations of these war relics have been better mapped.

I was not a model for safe walking advocates. I walked by myself with some walk maps (**Figure 14** shows a sample), often without telling anyone my destination or expected time back. I walked in the heat of the day; I fell over/into/on to immovable objects. At times I was on hands and knees scrambling under vegetation too thick to push through, and I climbed hills so steep I dared not look down. I left a lot of skin and blood around the NT. That I survived still surprises me. On one occasion the ground slipped away underneath me, and I started an uncontrolled slide into a valley. Fortunately, I ended up entangled in a bush which stopped my progress. It gave me a fright, and I was yelling at myself for being so careless when I noticed Tito, the Labrador, sitting watching me. I am certain to this day that he was slowly shaking his head.

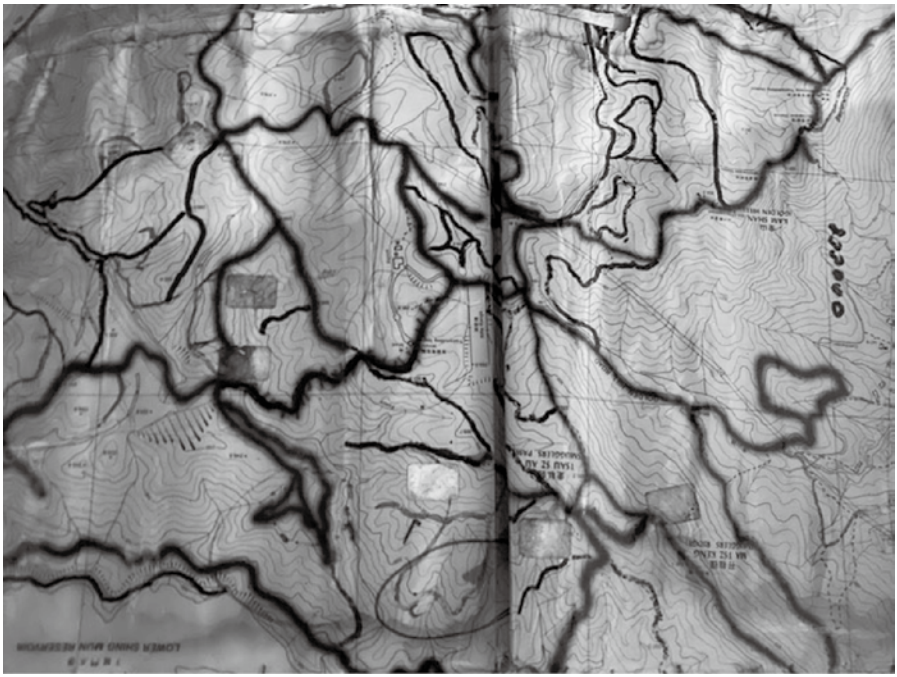

Figure 14: Walk map of areas searched around Golden Hill/Smugglers Ridge

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Surveying & Built Environment

FIELD TRIP NOTES

British Military Defense Lines: The Ma Lau Tong and Hai Wan Lines

Y. K. Tan*

ABSTRACT

This note records some findings about the colonial British defense lines complementing the Gin Drinker's Line known to the author.

KEYWORDS

Gin Drinker's Line, Ma Lau Tong, Hai Wan

INTRODUCTION

The British designed and built the Gin Drinkers Line with the tactical goal of delaying the Japanese Army's advance on Kowloon from the north. As this under-manned line could be overrun by the enemy, the British prepared a withdrawal plan to evacuate their Mainland Brigade via Devil's Peak to Hong Kong Island in case of exigency. Before they were transferred to Hong Kong Island, the 9.2-inch batteries on Devil's Peak needed protection from an enemy attacking from the land side. Two defence lines were thus built across the Devil's Peak peninsula to guard against any enemy that approached from the north. The first line ran from the north end of Junk Bay in a SW direction to the bay of "KUN TONG" – a frontage of about 2,700 yards called the Ma Lau Tong Line. The second line ran from "TIU

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KENG WAN to YAU TONG" – a frontage of about 1,500 yards called the Hai Wan Line.

Because of budget limitations, neither line was not equipped with heavy concrete positions like the Gin Drinkers. Simple field fortifications with barbed-wired fences, sand dugouts, and foxholes were constructed along the two lines. Only the HQ shelters were built as permanent concrete structures.

The Ma Lau Tong Line had a battery (Devil's Peak Battery) with four 3.7-inch howitzers located in Yau Tong and an OP built on Black Hill to guard against an approaching enemy. The details on Devil's Peak Battery and its OP centred on the Mainland Battery and OP section. A brigade, battalion, and company headquarters were also nearby to provide protection for the battery and later organise the retreat.

The Ma Lau Tong and Hai Wan Lines were built at the same time as the Gin Drinkers. Resource limitations and a change in the mainland defence strategy from 1938 to 1941 delayed the construction work. Then the decision came in 1936 to move all 9.2-inch guns from Devil's Peak battery to Hong Kong Island. So far, no document has been found to show that the Ma Lau Tong and Hai Wan Lines were completed according to their original plans.

Both lines finally saw action after the Japanese attacked Hong Kong in December 1941 and overran the Shing Mun Redoubt. On 11 December 1941, the garrison's Punjabi defenders started to take positions along each line and prepared to withdraw from the mainland. All remaining defenders of the mainland withdrew to Devil's Peak to be ferried from Sam Ka Tsun Pier to Hong Kong Island from 11-13 December.

Below is a sketched map **(Figure 1)** from a war daily showing the defences around the Ma Lau Tong Line during the rearguard operation from 11-13 December 1941.

Figure 1: Defence dispositions for the evacuation of the Mainland Brigade from Lee Yue Mun (Courtesy of the National Archives Kew)

The rest of this note will cover three facilities that are now in ruins: the Ma Fui Battalion Headquarters (BN HQ), Centre Company Headquarters (Centre

Coy HQ), and Brigade Headquarters (Bde HQ), as shown in **Figure 1**.

Ma Lau Tong Line

Ma Yau Tong (馬游塘) was originally called Ma Lau Tong (馬騮塘). It was the first defence line built from Kun Tong (Kwun Tong) to Junk Bay around Black Hill and Mau Wu Shan to protect Devil's Peak from an attack from the north.

Centre Company Headquarters

The defence scheme of 1937 mentioned a Centre Company Headquarters at Grid 282577 under Black Hill's north ridge, which was close to Ma Yau Tong Village today. This was the centre of the Ma Lau Tong Line and guarded the only road that connected to Devil's Peak (Anderson Trail). It was a strategic location for a company HQ for the Ma Lau Tong Line. However, after a thorough search of the site remains and aerial photos, I was still unable to find any trace of the HQ. Thus, it remains a mystery where the Centre Company Headquarters was actually located or if it was ever completed.

Ma Fui Battalion Headquarters

GPS position: N22 18 38.8 E114 14 58.1

Mau Wu Shan was once called Ma Fui (Mau Fu or Ma Fu), which housed a Bn HQ (map grid 283572). The HQ was located in a valley above Po Lam Road South (**Figures 2 and 3).** I found only one large shelter with three rooms there (**Figures 4 to 8**). The two large rooms were for command and communications purposes, while a small room probably housed a generator or other equipment.

This HQ was likely used by the 5/7 Rajputs Battalion during the battle. The Rajputs' war diary mentioned that Ma Fui's shelters were death traps for the HQ because the communications cables after installation did not work. A new functional cable was installed by the time the enemy attacked at 1750 on 12 December. Yet the HQ was not well-prepared for the Japanese attack.

The HQ shelter remained intact until the 1960s when it was demolished. Only the base and part of its walls remain today.

Most of the path connecting the shelter to Po Lam Road South was made of concrete (**Figure 9**), which was rarely used for roads in Hong Kong's remote areas before and during the war. That it was used here indicated that it connected some important military sites.

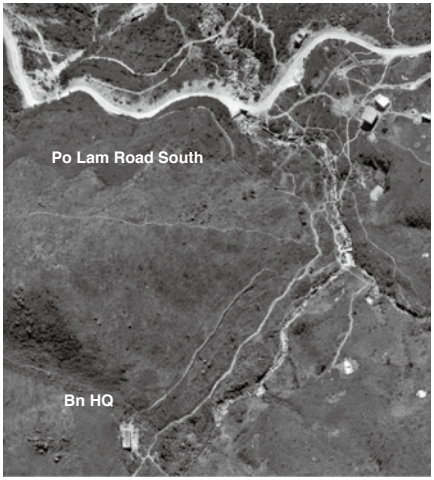

Figure 2: The Bn HQ shelter was still intact in this 1963 photo. The buildings along Po Lam Road South were built after the war (Portion enlargement of R.C. Huntings' aerial photo 6063 of 1963).

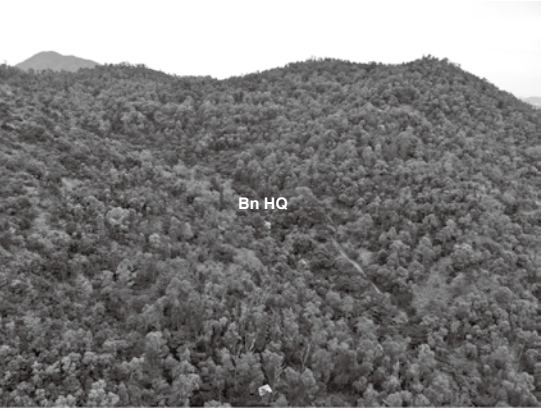

Figure 3: Overview of the Bn HQ site. The HQ is now covered by dense vegetation along the road, which connects to Po Lam Road South. Another road above connects to Ma Yau Tong and Black Hill. Mau Wu Shan is on the right (photo by author in 2019).

Figure 4: The Ma Fui Bn HQ site today. A stream is located downhill to the left. The path to the rear leads up to Mau Wu Shan and Black Hill. Note the small room behind the two main rooms (photo by author in 2019).

Figure 5: The remains of concrete walls mark the original layout of the two-room shelter. The path to the rear connects to Po Lam Road South (photo by author in 2019).

Figure 6: Overview of the Bn HQ site. Note the concrete path that connects to the shelter (photo by author in 2019).

Figure 7: The walls of the small room in the back were made of big rocks that provided less protection than concrete, which probably had to be rationed for more important parts of the structure (photo by author in 2019).

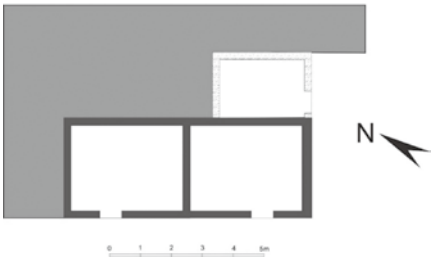

Figure 8: Floor Plan of the Ma Fui Bn HQ (drawn by the author)

Figure 9: A path connecting the shelter to Po Lam Road South made of concrete (photo by author in 2019).

Hai Wan Line

Chu Keng Wan Shan (照鏡環山) was called Hai Wan on British wartime maps. The British built their last line here before Victoria Harbour. The Hai Wan Line started from Yau Tong along the present-day O King Road to Tiu Keng Leng. It completely severed the land connection to Devil's Peak from the north. The gap between Black Hill and Chu Keng Wan Shan is the line's strategic location.

Partially demolished shelters are found on old aerial photos (**Figure 10**) at the gap of today's O King Road below Chiu Keng Wan Shan. Many cutout and structures can be spotted around the gap and on the ridge down to Yau Tong. These should be the remains of Hai Wan Line main section.

The construction of O King Road completely razed this site. The ridge where the HQ was located was reshaped by road works and nothing remains there now (**Figure 11**). No remains of the Hai Wan Line structures can be found today.

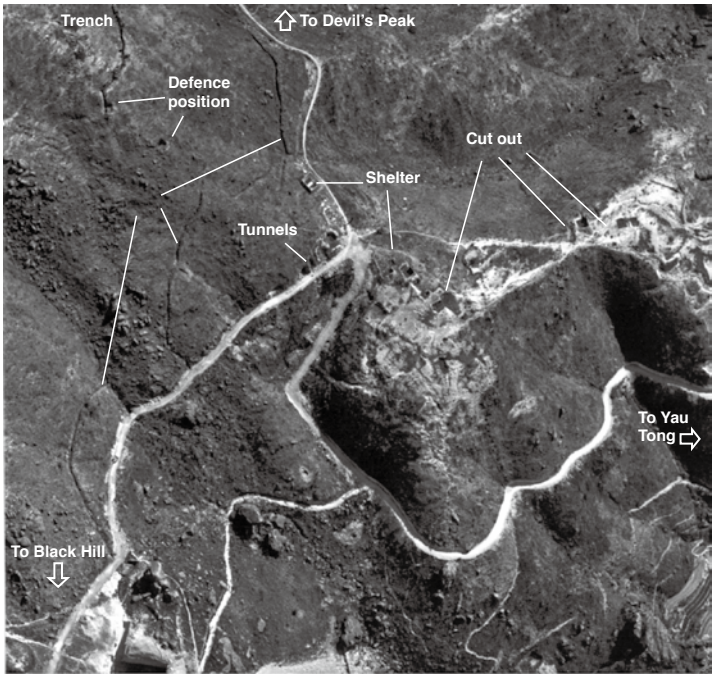

Figure 10: This 1963 photo shows partially demolished shelters and many cutouts nearby on the hillside. Little remains of these shelters. The Japanese might have dug some tunnel-like dugouts along the road during the occupation. Note the old Anderson Trail going down to Ma Yau Tong (Yau Tong today) from here (Portion enlargement of R.C. Huntings aerial photo No. 5858 of 1963).

Figure 11: The rough Bde HQ location marked on today's Chiu Keng Wan Shan. O King Road is below the protective walls. The landscape has been completely reshaped since the war (photo by author in 2019).

The roads from Devil's Peak connected to a jetty built in the Sam Ka Tsuen area during the war. The British used this jetty to evacuate their mainland troops via destroyer HMS *Thracian* to Aberdeen on Hong Kong Island from 12-13 December 1941.

Figure 12: HMS Thracian

According to a sketched map of the defenders' rearguard operations, the British moved their Mainland Brigade Headquarters to the Sam Ka Tsuen area

near the jetty during their evacuation. The Brigade HQ might have used an official building with phone lines located there before the war. The Lei Yue Mun Rural Committee building (**Figure 12**) is currently based at the spot marked on the map in **Figure 1** and marked along with the wartime jetty in the circled area (indicated by a Z) in **Figure 13**. A 1968 survey map (1:600 198-NW-14) of the Sam Ka Tsuen area showed a similar-shaped building there. The rural committee said that few official buildings had already existed here during the war. If this account is true, then it had to be well-concealed, as I could not find this building on any prewar map or aerial photo.

Figure 13: The Lei Yue Mun Rural Committee Building Today (Photo by Author in 2019)

Figure 14: Today's Lei Yue Mun-Sam Ka Tsuen area. Devil's Peak is to the right and the tall buildings behind it are in Yau Tong (photo by author in 2018).