

# 11 IMPACT ON CULTURAL HERITAGE (TERRESTRIAL & MARINE ARCHAEOLOGY)

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## 11.1 Introduction

The EIA Study Brief for CKR requires a Cultural Heritage Impact Assessment (CHIA) comprising a Built Heritage Impact Assessment (BHIA) and an Archaeological Impact Assessment (AIA) to be conducted. This Chapter only presents the terrestrial and marine archaeological impact assessments while the BHIA is presented in **Chapter 12** of this EIA Report. The assessment has considered the impacts during both the construction and operational phase of CKR. Any mitigation measures required are recommended for implementation.

## 11.2 Legislation and Standards

### 11.2.1 Terrestrial Archaeology

Legislation, standards, guidelines and criteria relevant to CHIA for terrestrial archaeology include the following:

- Antiquities and Monuments Ordinance;
- Environmental Impact Assessment Ordinance;
- Hong Kong Planning Standards and Guidelines;
- Technical Memorandum on Environmental Impact Assessment Process;
- Guidelines for Cultural Heritage Impact Assessment; and
- DEVB TC(W) No. 6/2009 Heritage Impact Assessment Mechanisms for Capital Works Projects.

#### **Antiquities and Monuments Ordinance**

The Antiquities and Monuments Ordinance provides the statutory framework to provide for the preservation of objects of historical, archaeological and paleontological interest. This ordinance contains the statutory procedures for the Declaration of Monuments. The proposed monument can be any place, building, site or structure, which is considered to be of public interest by reason of its historical, archaeological or paleontological significance.

- Under Section 6 and subject to sub-section (4) of the Ordinance, the following acts are prohibited in relation to certain monuments, except under permit:
- To excavate, carry on building works, plant or fell trees or deposit earth or refuse on or in a proposed monument or monument;
- To demolish, remove, obstruct, deface or interfere with a proposed monument or monument.

The discovery of an Antiquity, as defined in the Ordinance must be reported to the Antiquities Authority (the Authority), or a designated person. The Ordinance also

provides that, the ownership of every relic discovered in Hong Kong after the commencement of this Ordinance shall vest in the Government from the moment of discovery. The Authority on behalf of the Government may disclaim ownership of the relic.

No archaeological excavation may be carried out by any person, other than the Authority and the designated person, without a licence issued by the Authority. A licence will only be issued if the Authority is satisfied that the applicant has sufficient scientific training or experience to enable him to carry out the excavation and search satisfactorily, is able to conduct, or arrange for, a proper scientific study of any antiquities discovered as a result of the excavation and search and has sufficient staff and financial support.

It should also be noted that the discovery of an antiquity under any circumstances must be reported to the authority, i.e. the Secretary for Development or designated person. The authority may require that the antiquity or suspected antiquity is identified to the authority and that any person who has discovered an antiquity or suspected antiquity should take all reasonable measures to protect it.

### **Environmental Impact Assessment Ordinance**

The Environmental Impact Assessment Ordinance (TM-EIAO) was implemented on 1 April 1998. Its purpose is to avoid, minimise and control the adverse impact on the environment of designated projects, through the application of the EIA process and the Environmental Permit (EP) system.

### **Hong Kong Planning Standards and Guidelines**

Chapter 10 of the HKPSG details the planning principles for the conservation of natural landscape and habitats, historical buildings and archaeological sites. The document states that the retention of significant heritage features should be adopted through the creation of conservation zones within which uses should be restricted to ensure the sustainability of the heritage features. The guidelines state that the concept of conservation of heritage features, should not be restricted to individual structures, but should endeavour to embrace the setting of the feature or features in both urban and rural settings.

The guidelines also address the issue of the preparation of plans for the conservation of historical buildings, archaeological sites and other antiquities. It is noted that the existing Declared Monuments and proposed Monuments be listed in the explanatory notes of Statutory Town Plans and that it be stated that prior consultation with AMO is necessary for any redevelopment or rezoning proposals affecting the Monuments and their surrounding environments.

It is also noted that planning intention for non-statutory town plans at the sub-regional level should include the protection of monuments, historical buildings, archaeological sites and other antiquities through the identification of such features on sub-regional layout plans. The appendices list the legislation and administrative controls for conservation, other conservation related measures in Hong Kong, and Government departments involved in conservation.

### **Technical Memorandum on Environmental Impact Assessment Process**

The general criteria and guidelines for evaluating and assessing impacts to Sites of Cultural Heritage are listed in Annexes 10 and 19 of the Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO). It is stated in Annex

10 that all adverse impacts to Sites of Cultural Heritage should be kept to an absolute minimum and that the general presumption of impact assessment should be in favour of the protection and conservation of all Sites of Cultural Heritage. Annex 19 provides the details of scope and methodology for undertaking Cultural Heritage Impact Assessment, including baseline study, impact assessment and mitigation measures.

### **Guidelines for Cultural Heritage Impact Assessment**

This document, as issued by the Antiquities and Monuments Office, outlines the specific technical requirement for conducting terrestrial archaeological and built heritage impact assessments and is based upon the requirements of the Technical Memorandum for Environmental Impact Assessment. It includes the parameters and scope for the Baseline Study, specifically desk-based research and field evaluation. There are also included guidelines encompassing reporting requirements and archive preparation and submission in the form of *Guidelines for Archaeological Reports and Guidelines for the Handling of Archaeological Finds and Archives*.

The prerequisite conditions for conducting impact assessment and mitigation measures are presented in detail, including the prediction and evaluation of impacts based upon five levels of significance (Beneficial, Acceptable, Acceptable with Mitigation Measures, Unacceptable and Undetermined). The guidelines also state that preservation in totality must be taken as the first priority and if this is not feasible due to site constraints or other factors, full justification must be provided.

Mitigation measures will be proposed in cases with identified impacts and shall have the aim of minimising the degree of adverse impact and also where applicable providing enhancement to a heritage site through means such as enhancement of the existing environment or improvement to accessibility of heritage sites. The responsibility for the implementation of any proposed mitigation measures must be clearly stated with details of when and where the measures will be implemented and by whom.

### **Development Bureau Technical Circular (Works) No. 6/2009: Heritage Impact Assessment Mechanism for Capital Works Projects**

The technical circular contains the procedures and requirements for assessing heritage impact arising from the implementation of new capital works projects. It is stated in the document that the works agent will provide a checklist to the AMO of any heritage sites (as defined in the TC) situated within or within the vicinity of the project boundary (usually to be defined as not more than 50 metres measured from the nearest point of the project boundary, including works areas).

The identification of the heritage sites should be undertaken at the earliest possible stage, preferably as part of the Technical Feasibility Statement. If the works boundary cannot be defined at this stage, the checklist should be provided as soon as the project boundary has been defined. Upon receipt of the above information from the works agent, the AMO will determine if the proposed project will affect the heritage value of any heritage site and decide the necessity of conducting an HIA based upon the submitted information.

If an HIA is required, the works agent shall submit a proposal for the scope of the HIA for AMO approval. Once the scope has been approved it will be the responsibility of the works agent to conduct the HIA.

## 11.2.2 Marine Archaeology

Legislation, standards, guidelines and criteria relevant to the consideration of marine archaeology include the following:

- Antiquities and Monuments Ordinance;
- Environmental Impact Assessment Ordinance;
- Technical Memorandum on Environmental Impact Assessment Process; and
- Guidelines for Marine Archaeological Investigation.

The description for Antiquities and Monuments Ordinance, Environmental Impact Assessment Ordinance and Technical Memorandum on Environmental Impact Assessment Process are given in **Section 11.2.1** and hence are not repeated here.

### **Guidelines for Marine Archaeological Investigation**

The AMO have issued Guidelines for Marine Archaeological Investigation (MAI) which detail the standard practice, procedures and methodology which must be followed for all projects. This methodology has been followed for this EIA.

## 11.3 Methodology and Principles

### 11.3.1 Terrestrial Archaeology

#### **Baseline Study**

As stated in the Guidelines for CHIA, the baseline study is used to compile a comprehensive inventory of all sites of archaeological interest within and in the environs of the project Study Area. The results are then presented to provide a clear evidence that the required processes have been satisfactorily completed and a detailed inventory of all identified sites of archaeological interest, which includes a full description of their cultural significance.

The following tasks are undertaken in order to gather the necessary information for the compilation of the baseline study:

#### *Task 1: Desk-based research*

Firstly, desk-based research is carried out in order to identify any known or potential sites of archaeological interest within the project study area and to evaluate the cultural significance of these sites once identified. The following is a non-exhaustive list of resources that are consulted as part of the research programme:

- Antiquities and Monuments Office's published and unpublished papers and studies;
- publications on relevant historical, anthropological and other cultural studies;
- unpublished archival papers and records;

- collections and libraries of tertiary institutions;
- historical documents held in the Public Records Office, Lands Registry, District Lands Office, District Office and Museum of History;
- cartographic and pictorial documentation; and
- geotechnical information.

#### *Task 2: Site visit*

To supplement the information gathered in the desk-based study, a site visit is undertaken to assess the current status of the Study Area and also to make note of existing impacts.

#### *Task 3: Archaeological Field Investigation (if required)*

If the results of the desk-based study and site visit indicate that there is insufficient data for purposes of identification of sites of archaeological interest, determination of cultural significance and assessment of impacts, an archaeological field investigation programme will be designed and submitted to the AMO for approval. Once approved, a qualified archaeologist must apply for a licence to undertake the archaeological excavation, which must be approved by the Antiquities Authority before issuance. The archaeological field investigation typically consists of some or all of the following steps:

##### Field Scan

Field walking is conducted to identify archaeological deposits on the surface. The scanning of the surface for archaeological material is conducted, under ideal circumstances, in a systematic manner and covers the entire study area. Particular attention is given to areas of land undisturbed in the recent past and to exposed areas such as riverbed cuts, erosion areas, terraces, etc. During the field scanning, concentrations of finds are recorded, bagged and plotted on 1:1000 scale mapping and are retained as part of the archive. Topography, surface conditions and existing impacts are noted during the field walking.

##### Auger Testing Programme

Auger survey will be carried within the study area in order to establish soil sequence, the presence/absence of cultural soils or deposits and their horizontal extent.

The auger tool consists of a bucket, pole and handle and is vertically drilled by hand into the surface. When the bucket is filled with soil the auger is extracted and the soil emptied from the bucket. Soils are described and depth changes are measured inside the hole. The depth and type of any finds recovered are also recorded. The auger hole is abandoned when water table, the end of the auger or rock is reached or the auger bucket fails to hold the soil. The location of each auger hole test is marked on a 1:1000 scale map. The results of the auger tests provide one of the criteria used to position the test pit excavations.

### Test Pit Excavation

Test pit excavations are carried out to verify the archaeological potential within a study area. The choice of location for test pit excavations will depend on various factors such as desk-based information, landforms, field scan and auger test results as well as issues relating to access.

Hand digging of test pits measuring between 1 by 1 and 2 by 2 metres is carried out in order to determine the presence/absence of archaeological deposits and their stratigraphy. The size may depend on close proximity to large trees, narrow terraces or other external factors. Hand excavation will continue until decomposing rock or sterile soils are reached and no potential for further cultural layers exists. A test pit will also be abandoned when the maximum safe working depth is reached or when, despite the use of appropriate and practicable dewatering measures, the effects of ground water prevent further excavation. In cases where sterile deposits or the maximum safe excavation limit cannot be reached, the AMO should be consulted prior to backfilling. During excavation contexts, finds and features are recorded, soils are described and relevant depths measured. Artefacts are collected, bagged and labelled by context. Sections are photographed and drawn and, if required, ground plans are also photographed and/or drawn. The position of each test pit, its top and bottom levels and associated TBM are recorded by a qualified land surveyor and plotted on 1:1000 scale mapping. On completion of all recording and site inspection by the AMO, test pits are backfilled.

### **Reporting and Submission of Archive**

A report of the findings of the archaeological survey will be compiled following the requirements as outlined in the AMO's Guidelines for the Preparation of Archaeological Reports. The processing of recovered archaeological material and preparation of the project archive will follow the AMO's Guidelines for Handling of Archaeological Finds and Archives.

### **Impact Assessment**

The prediction and evaluation of both direct and indirect impacts must be undertaken to identify any potential adverse affects to all identified sites of archaeological interest within a project Study Area. A detailed description of the works and all available plans (with their relationship to the identified resources clearly shown) should be included, to illustrate the nature and degree of potential impacts. The impact assessment must adhere to the detailed requirements of Annexes 10 and 19 of the Technical Memorandum on Environmental Impact Assessment Process.

## **Mitigation Measures**

As stated in the Guidelines for Cultural Heritage Impact Assessment “Preservation in totality must be taken as the first priority”. If such preservation is not feasible, as in the case where the need for a particular development can be shown to have benefits that outweigh the significance of the site of archaeological interest, a programme of mitigation measures must be designed and submitted to the AMO for approval. The mitigation measures must be clearly listed and the party responsible for implementation and timing of the measures must also be included. Examples of mitigation measures include; rescue excavation and archaeological watching brief.

### **11.3.2 Marine Archaeology**

In accordance with AMO Guidelines, the MAI included the following seven tasks:

- |         |   |
|---------|---|
| Phase 1 | Marine Archaeological Review to establish the extent and value of existing information;                                 |
| Phase 2 | Baseline Review to assess the archaeological potential of the study area;   |
| Phase 3 | Geophysical Survey to obtain detailed data about the seabed and sub surface sediments;                                  |
| Phase 4 | Data interpretation to identify and assess the location and significance of any potential underwater cultural heritage; |
| Phase 5 | Underwater survey to assess the archaeological significance of unknown seabed features;                                 |
| Phase 6 | Assessment of the impact of the development on underwater cultural heritage;  |
| Phase 7 | Recommendations for Mitigation.   |

## **11.4 Terrestrial Archaeological Assessment**

### **11.4.1 Results of the Desk-Based Assessment**

This section presents the results of the desk-based assessment that provide background information on the study area in terms of its geology, topography, historical development and known archaeological resource.

#### **Geology and Topography**

The Central Kowloon Route Study Area comprises the general areas at Yau Ma Tei, Ho Man Tin (including King’s Park), To Kwa Wan (including Ma Tau Kok) and Kai Tak. The basic geology of the Kowloon Peninsula is medium grained granite. The peninsula has large alluvial plains footing relatively low to moderately high hills. To Kwa Wan is located on one of these alluvial plains in large bay on the east side of the peninsula and is surrounded by hills rising up to a maximum height of 400 metres. The original topography of Yau Ma Tei comprised a rocky coastline fringing hills, which rose steeply to over 200 metres.

The proposed bored tunnel is situated on solid geology comprises mainly of fine to medium-grained granite. Small sections of the tunnel located near Ho Man Tin are situated on fill over Holocene debris flow deposits and alluvium. All of the proposed elevated/ at-grade roads and depressed road are located on reclaimed land. For the two proposed Cut-and-Cover Tunnels, they are largely situated on reclaimed land with the exception of one small areas the section located at To Kwa Wan Road/ San Ma Tau Street is situated on coastal alluvium. Moreover, the proposed underwater tunnel is located at Kowloon Bay (see **Inset 1 of Appendix 11.1** for the geological map).

### **Terrestrial Archaeological Background**

There are no known archaeological sites located within the boundary of both Study Areas. However, some known archaeological materials were found in a DSD work site in Mong Kok in the vicinity of the proposed Central Kowloon Route.

In May 2004, over 100 pieces of archaeological materials, including Tang kiln debris and associated furniture, Han Dynasty pottery cauldron sherds and four complete pottery pots (possible burial objects) dated to Jin Dynasty were discovered at a DSD work site at the junction of Soy Street and Tung Choi Street. All of the archaeological materials were collected from a working trench covered with pipes and piles. It is believed that the materials were deposited in a brownish sandy layer between the modern disturbed layer and the greyish sand of marine deposit (AMO web site).

### **Impacts**

The Study Area is located in urban area with extensive disturbance from urban development. The impacts at the impacted areas can be summarised as existing roads and highways, utility provisions (such as water, sewer, electricity, phone lines, gas, etc.), residential development and development of public spaces. All of the proposed impacts areas are currently under concrete, occupied with existing buildings or on reclaimed land.

#### **11.4.2 Assessment of Terrestrial Archaeological Potential**

The alluvial plains along the former coastline at To Kwa Wan have the potential for archaeological deposits spanning the prehistoric and historic periods. However, these areas are already highly urbanised and have experienced significant landscape modification as a result of development. Nevertheless, the discovery of complete prehistoric pots and associated materials at Mong Kok in 2004 has shown that, despite significant development, well-preserved pockets of archaeological deposits can survive along the ancient coastline. In contrast, the rocky nature of the original shoreline at Yau Ma Tei would indicate a much lower archaeological potential with respect to prehistoric activity.

The assessment of terrestrial archaeological potential in different sections of the CKR Project is summarized in the table below:



**Table 11.1:** Summary of assessment of terrestrial archaeological potential

Project Element (From East to West)	Archaeological Potential
Proposed Underwater Tunnel	<b>No archaeological potential</b> – the entire proposed alignment is located at Kowloon Bay, and therefore, has no impacts on terrestrial archaeology.
Proposed Elevated/ At-Grade Road	<b>No archaeological potential</b> – Both sections at Yau Ma Tei and Kai Tak are situated on reclaimed land.
Proposed Administration Building	<b>No archaeological potential</b> – the proposed building site at Kai Tak is situated on reclaimed land of Kowloon Bay.
Proposed Ventilation Buildings	<b>No archaeological potential</b> – both proposed building sites at Kai Tak and Yau Ma Tei are located on reclaimed land, whilst the one located at Ho Man Tin is situated on fill over debris flow deposits with extensive disturbance from development.
Proposed Tunnel Portal	<b>No archaeological potential</b> – the proposed alignment is situated on reclaimed land of Kowloon Bay and Ma Tau Kok.
Proposed Bored Tunnel	<b>No archaeological potential</b> – the proposed deep-laying bored tunnel section will have no archaeological implications and therefore, no potential archaeological deposits will be affected. In addition, the proposed tunnel is largely situated on granite.
Proposed Cut-And-Cover Tunnel <i>Yau Ma Tei Section</i>	<b>No archaeological potential</b> – Prior to the arrival of the British, Yau Ma Tei was a shallow anchorage sheltering used by the boat people, with a Tin Hau Temple and a small scale settlement scattered along the sandy coast. In 1864 the British Government relocated residents affected by the development of Tsim Sha Tau and Kowloon Kok to the sand-bank near the Tin Hau Temple at Yau Ma Tei and the area developed rapidly thereafter into a market town (RASHKB 1999, Cheng & Tung 2000). <b>Inset 2 of Appendix 11.1</b> is a photograph taken around 1875, which shows the first market town existing at that time (RASHKB 1999). The original Yau Ma Tei market town (1864-1876) and the Tin Hau Temple were believed to located on sand-spit near the junction of today's Pak Hoi Street and Temple Street (RASHKB 1999). According to the surviving restoration tablet, the temple was restored (rebuilt?) in 1870 and was then further restored in 1875-1876 following the temple's destruction by a typhoon in 1874 (RASHKB 1999). The redevelopment of Yau Ma Tei market town was launched in 1876: the sand-bank was filled, new streets were laid-out, and the Tin Hau Temple was relocated to its current position at Public Square Street. Yau Ma Tei town was further shaped by new development on reclamations. The early shallow anchorage was entirely filled and the Yau Ma Tei Typhoon Shelter, which was constructed in 1915, was filled in and reclaimed in 1992 (Ho 2004). The entire alignment of the proposed cut-and-cover tunnel (Yau Ma Tei section) is situated on fill. As a result of a series of reclamations carried out between the early 20th century and recent times, two-thirds of

Project Element (From East to West)	Archaeological Potential
	the alignment is located on fill over the marine mud of the former bay of Yau Ma Tei. The eastern end of the proposed cut-and-cover tunnel is situated on the edge of a fan of marine sand marking the original coastline of Yau Ma Tei. Although the first Yau Ma Tei market town (1864-1876) and the original Tin Hau Temple were believed to located on the sand-bank, it is very likely that the sand-spit was subject to tidal action in pre-historic periods due to higher sea-level. The probability of there being in situ (pre-) historic remains in that area is therefore extremely low. In addition, as the impacted area is located in a highly urbanised area, there will have been extensive disturbance from previous development works, such as reclamations, road construction works, utility groundworks and various phases of housing development. The proposed alignment is situated on reclaimed land.
<i>Ma Tau Kok Section</i>	<b>No/ Very limited archaeological potential</b> – most of this proposed alignment is located on reclaimed land and has no archaeological potential. A small area located at To Kwa Wan Road/ San Ma Tau Road is situated on coastal alluvium. However, that area is currently occupied by a high-rise industrial building. Any possible archaeological deposits would have had disturbed by the construction of the building, and therefore, the potential of finding in situ archaeological deposits is very limited.

### 11.4.3 Identification and Evaluation of Impacts

#### Construction Phase

The impact of different sections of the CKR Project during construction phase is summarized in the table below:

**Table 11.2:** Summary of terrestrial archaeological impacts during construction phase

Project Element (From East to West)	Impact Assessment
Proposed Underwater Tunnel	The proposed alignment is located at Kowloon Bay and has no impacts on terrestrial archaeological
Proposed Elevated/ At-Grade Road	There will be direct impacts from the supporting columns of the proposed elevated roads and the proposed at-grade roads. However, all of the proposed works areas are situated on reclaimed land with no archaeological potential.
Proposed Administration Building	There will be direct impacts from the proposed works. However, the proposed sites are either located on reclaimed land or on granite with extensive disturbance from development.
Proposed Ventilation Building	There will be direct impacts from the proposed works. However, the proposed site is situated on reclaimed land with no archaeological potential.
Proposed Tunnel Portal	There will be direct impacts from the proposed works. However, the proposed alignment is situated on reclaimed land with no archaeological potential.

Project Element (From East to West)	Impact Assessment
Proposed Bored Tunnel	The proposed deep-lying bored tunnel section will have no archaeological implications and therefore, no potential archaeological deposits will be affected.
Proposed Cut-And-Cover Tunnel	There will be direct impacts from the proposed works. The alignment is located on reclaimed land and though a small area is situated on coastal alluvium, the area has been extensively disturbed by urban development and has thus no archaeological potential.

### **Operational Phase**

There will be no impacts to archaeological resources during the operational phase in the Study Area.

#### **11.4.4 Mitigation Recommendations**

Any development encroaching on sites of archaeological interest should be avoided as far as possible. As a precautionary measure, the Antiquities and Monuments Office should be informed immediately in case of discovery of antiquities or supposed antiquities during the construction.

### **Construction Phase**

Based upon the findings of the baseline study (see **Table 11.2**), no mitigation measures are required. However, contractor should be alerted during the construction on the possibility of locating archaeological remains and AMO shall be informed immediately in case of discovery of antiquities or supposed antiquities in the subject sites.

### **Operational Phase**

No mitigation will be required during the operational phase.

## **11.5 Marine Archaeological Assessment**

A significant section of the study area was covered by an MAI for the same project completed in 2008. An increase in the proposed dredging area required the undertaking of additional MAI to ensure 100% coverage of the study area. The current MAI is therefore composed of two sets of results: the 2008 MAI and the 2012 MAI. The coverage of the two MAIs is set out in **Figure 11.5.5**.

The other 6 MAI projects described below are also relevant to the current study as the Baseline Review for each project covered the same area as the 2012 MAI.

### **11.5.1 Marine Archaeological Review**

A number of MAIs for the area of concern has been conducted under different studies over the years. The relevant findings from these studies have been collated and are summarised below. **Figure 11.5.1** shows the extents of MAIs for these studies.

ProjectsFindings

South East Kowloon  
Reclamation (2000)

The report presents the results of a comprehensive desktop Baseline Review for the proposed reclamation work around Kai Tak. The study area covered a section of the current project area and it can therefore be assumed that the results of the previous study are directly applied to the current project. The results have been included within the Baseline Review below.

The Baseline Review indicated a high marine archaeological potential.

South East Kowloon  
Development – Final  
Report (2001)

In 2001, a GI contractor was instructed to survey three areas within South East Kowloon. The aim of the survey was to collect data for the MAI. The survey was therefore planned to optimise archaeological data acquisition. The following equipment was deployed: echo sounder, single-channel seismic reflection, side scan sonar and marine magnetic surveys. The detailed results were presented in a full report.

The data was of consistently high standard. The seismic profiler was not able to differentiate some of the deeper geological horizons but this did not compromise the archaeological analysis. Similarly, the magnetic survey suffered interference from anchored vessels but this did not affect the quality of the conclusions. A total of 66 potential side scan sonar targets were recorded.

Projects

Agreement No. CE 32/99 Comprehensive Feasibility Study for the Revised Scheme of South East Kowloon Development (2002)

Agreement No. CE 32/99 Comprehensive Feasibility Study for the Revised Scheme of South East Kowloon Development (2003)

Findings

The raw data was collected by the GI contractor for marine archaeological potential analysis. The archaeological objectives of examining the data were:

- To map shipwrecks and anomalous features;
- To determine the underlying significant geological horizons to assess the preservation potential of the seabed sediments.

The number of potential targets was refined from 66 to 24. Previous experience of interpreting similar records enabled 42 targets to be dismissed as modern debris. The remaining targets comprised both isolated features and clusters of smaller material. The data also indicated that there was a high volume of dumped material on the seabed. There was evidence the seabed had also been disturbed by trawling and anchoring activity. The combination of these activities would have served to significantly reduce the archaeological potential. The report recommended diver inspection of the 24 targets.

The consultant archaeologist was recruited in order to 'ground truth' the 24 targets identified during the geophysical survey. Diving was conducted between 29.09.02 and 28.09.02. All of the targets were located using hand held DGPS and easily identified as modern material. In addition, they mapped the remains of six towers erected on the seabed, which are presumed to have supported the landing lights on the approach to Kai Tak airport. These structures have minimal archaeological significance. The remains of a wooden sampan were found within the typhoon shelter. Kowloon Rock was positively identified as a hazard to shipping but no wrecks were found in its vicinity. Section 4.2.2 of the report provides a summary of the diver inspection for Zone C.

The report recommended that the dredging contractors should be briefed about the possible presence of marine archaeological artefacts and a procedure for handling them.

Projects

Kai Tak Planning Review, Twin 40mm Submarine Gas Mains Laid in 1977/1978 Identification of Pipeline Position. Final Report (2006)

Site investigation and contamination assessment at remaining area of former Kai Tak airport and proposed cruise terminal (2007)

Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development in 2010.

Findings

The purpose of this study was to:

- Map the alignment and burial depth of the existing twin gas pipelines;
- To survey the existing seabed level over a 100m corridor centred on the main gas main route.

The survey was carried out in February 2006. The survey objectives were to:

A marine seismic system, marine magnetic system, swath system and navigation system was mobilised. The survey successfully located and delineated the existing twin gas pipelines. It was only possible to provide reliable burial depth on six traverses as data was adversely affected by the presence of raw sewage on the seabed. The data set was designed to obtain information about the pipelines and cannot be applied to the MAI. The only relevance it has to the current study is providing accurate information about the location of the twin gas pipelines.

A full MAI was conducted. The Baseline Review indicated high archaeological potential. The geophysical survey carried out comprised side scan sonar, seismic profiler and echo sounding. 19 sonar contacts were positively identified. Subsequent analysis accurately identified each contact as directly relating to features such as mooring buoys or modern debris. A monitoring brief was recommended for the dredging operation.

A full MAI was completed including two phases of geophysical survey as the alignment was changed during the course of the project. Three sonar contact were within 50m of the alignment.

In January 2009 a diver inspection of the 3 sonar contacts was carried out. Each contact was successfully located and inspected. Each of them was identified as modern debris and a mooring block. building materials. It was therefore concluded that none of the sonar contacts were underwater cultural heritage resources. However, some sections of the geophysical survey were affected by 'gas masking' which prevented 100% seabed coverage. It was therefore recommended that a monitoring brief was conducted in these areas.

## 11.5.2 Baseline Review

A comprehensive review was carried out to determine the archaeological potential of the study area. This included examination of AMO records and archaeological and historical academic publications.

### Physical Evidence

In November 1957 a cannon was dredged from Kowloon Bay during construction of the Kai Tak runway (Eather, 1996). The cannon was cast in the 4th year of the Wing Uk Reign of the Ming Dynasty (1368-1644). It bears the following inscription:

*“Commissioned by Choi Governor of Waiboi and created by Ting Hoi General of Imperial Command - To by Imperial Command appointed Governor General of Kwanung and Kwangsi Provinces Fan, General Officer Commanding Kwantung and Guardian of the Imperial Heir. Colonel Siu Lei-Yan directed the casting for Ho Hing Cheung, Commander of the Ordinance Depot, Sixth Moon of the Fourth Year of Wing Lik. Weight 500 catties.”*

The chance discovery of the cannon is very significant and suggests that there may be other similar cultural heritage resources on the seabed within the study area.

### Archive Search

The UK Hydrographic Office (UKHO), Taunton holds a database of surveyed shipwrecks in Hong Kong, including many not shown on Admiralty Charts. The database does not contain any records of shipwrecks within the study area. However, the Hydrographic Office only charts wrecks which are a potential hazard to navigation. It is therefore possible that there are other wrecks within the study area which are partially or totally buried and thus not recorded.

### Historical Background: South East Kowloon Pre-British Times

The first reference to the sea passage and waters in what later became called Victoria Harbour are found in the Cheng Ho navigation map of the China coast dated c.1425 AD. This map was published in a book called *Mo Pei Chi* (Notes on Military Preparation), published in 1621 (Empson, 1992).

Kowloon waters are also charted in a coastal map of Kwangtung appearing in a book by Ying Ka called *Chong Ng Chung Tuk Kwan Mun Chi*, first published in 1553. There are references to Kowloon waters in a 1723 map of Kwang Tung produced by Chiang Ting Sik in his book called *Ku Kam to Shu Chap Shing*. These maps are particularly important as they demonstrates that Kowloon Bay was established as a known coastal settlement from the 15th century

The first map which clearly depicts Hong Kong harbour in detail is an 1810 marine chart (**Figure 11.5.2**). It is recorded on the map that Kowloon Bay was ‘*apparently populous*’ suggesting it was a well used anchorage at this time.

## **Opium War Period**

In the build up to the First Anglo-Chinese (Opium) War the entire British community living at Macao embarked and sailed to Hong Kong harbour. This was because the Governor of Macao, owing to pressure from the Chinese authorities, could no longer guarantee their safety. They arrived in Hong Kong waters on 26th August 1839, and once there lived on board ship for several months, mainly in Kowloon Bay.

On the 30th August, H.M.S. *Volage* under the command of Captain Smith arrived in Kowloon Bay. On 4th September 1839, having failed in peaceable efforts to obtain supplies from nearby villages, Captain Charles Elliot opened fire from H.M.S *Volage* on the Chinese war-junks anchored off Kowloon City. The junks were there for the express purpose of obliging the local inhabitants to take back food-stuffs that had already been bought and paid for. It is not recorded whether or not he inflicted serious damage on the Chinese vessels (Sayer, 1975).

## **Kowloon Walled City**

At the beginning of the Ching Dynasty there was no walled city. It is recorded that in 1668 there was an outpost called the Kowloon Outpost which had 30 guards (Yuen-chung, 1990). Fourteen years later when China was considered quite peaceful the number of guards was reduced to ten and the post was demoted to guard station. It was expanded again in 1811 to become the Kowloon Fort. It was assigned a garrison of 48 men under a sergeant and a corporal.

After Hong Kong Island was ceded to Great Britain following the Treaty of Nanking in 1842, the Ching Government moved to greatly strengthen the previously quite sketchy fortifications in the Kowloon area. In 1847, a walled city was built on the shore of Kowloon Bay, later known as the Kowloon Walled City. It was garrisoned by a full battalion, with a usual complement of 795 men (Lui, 1990). The Walled City was located to the immediate north-west of a small Chinese settlement known as Kau Loung Gai. This town, which could be considered in some respects to comprise the suburbs of Kowloon City, was frequently condemned during the 1890's as an obstacle to law and order. Worthy Hong Kong citizens seeking "rectification" of the colony's boundaries constantly referred to it as an evil that should be overcome.

One of its main industries was gambling, and the tables were a favourite haunt of many prominent Hong Kong residents. Special steam-launches, operating well into the night, provided a free passenger service to gamblers from Hong Kong Island across the harbour, and complimentary coffee and cigars were handed out en route. Representations by the Hong Kong authorities to the viceroy at Canton and to Peking eventually succeeded in having the establishments closed down.

In November 1894, the General Officer Commanding Major-General Digby Barker noted the potential danger to Hong Kong from the large junk traffic associated with Kowloon City that frequented the waters of South East Kowloon and of the periodic visits by the Chinese fleet to its own waters in Kowloon Bay. The Colonial Defence Committee reported in 1896 the need to maintain a considerable military force on the mainland to protect the defence works and



stores from pilferage by Kowloon City residents. No specific complaints were at this time made by Hong Kong against the fort, but the town was identified as a source of potentially dangerous criminal activity.

To the Imperial Chinese Government, the fort was an important centre of civil and military administration for that part of San On County since the Deputy Magistrate, with limited powers of arrest and detention and certain Army officers resided there. The British in Hong Kong found the “*Kowloon Mandarin*” a useful person to have in residence nearby, for he was in constant correspondence with the Hong Kong Police. The military commander had a garrison of more than 500 men and was said to exercise jurisdiction over the 200 civilians living within the walls.

In 1898, the Walled City was about a quarter of a mile from the seashore, although subsequent reclamations have placed it much further inland. Its fortified stone wall was built between 1843 and 1847 with an average height of 13 feet and an average width at the top of 15 feet. In the rough shape of a parallelogram, it enclosed an area of 6.5 acres. Inside were several public buildings, a well-regarded school, two temples and a number of quite substantial residences along the main streets. In contrast, the “suburbs” contained numerous small factories, shops and gambling dens along its narrow roadways. Other landmarks were a defence wall rising to the top of the hill overlooking the city, there was a substantial stone pier, as shown in **Figure 11.5.3** where the road from the Walled City met the sea. It was subsequently buried beneath the western end of the terminal building for Kai Tak airport.

In 1841, at least one Chinese fort on Kowloon peninsula was destroyed by British forces. It is probable that construction of the Kowloon City wall was started as a specific response to the British presence on neighbouring Hong Kong Island. After the cession of Kowloon in 1860, the population of the Walled City grew in terms of population and importance. Hong Kong residents objected strenuously to the very existence of the fort and its suburban area. To the Imperial Chinese Government in Peking, the Walled City was a government installation, a visible symbol of Imperial control constructed for the very purpose of discouraging British interference in the region (Wesley-Smith, 1990).

After 1898, one of the first tasks of the Public Works Department in the New Territories was the repair of the Kowloon City pier. Timber work was repaired at a cost of almost \$6000 and the work was completed in 1900. At this time it was agreed that:

*‘Chinese officials stationed here shall continue to exercise jurisdiction, except so far as may be inconsistent with the military requirements for the defence of Hong Kong. Within the remainder of the newly leased Territory, Great Britain shall have sole jurisdiction ... It is further agreed that the existing landing place, near the Kowloon City shall be reserved for the convenience of Chinese man of war, merchant and passenger vessels, which may come and go and lie there at their*

*pleasure; and for the convenience of movement and people within the city' (Yuen-chung, 1990).*

It can be assumed from the above that at this time Kowloon Bay was a thriving maritime community. However, a year later the situation changed. There was unrest in the New Territories and the British asked for help from the Ching Government and six hundred soldiers were sent to assist. The British however, made a very big mistake and thought that the soldiers were sent to assist the uprising. They proceeded to invade the walled city on 19<sup>th</sup> May 1899 and drove away the imperial officials and the garrison of three hundred soldiers. This ended the Ching military occupation of the Kowloon Walled City.

It was not long before the landing place disappeared when the reclamation of part of Kowloon Bay commenced. The Kai Tak Land Investment Company began development of the area in 1917, and in the 1920's most of the reclaimed land was taken over for construction of the airfield. It was no longer possible for Chinese vessels or Kowloon Walled City residents to use the pier which had existed since before 1898 (Wesley-Smith, 1990).

### **Kowloon Battery**

The Kowloon Battery was located outside the southern gate of the Kowloon Walled City. It was constructed in the 16<sup>th</sup> year of the Jia Qing reign (1811) during the Qing Dynasty (Kwok-Kin, 1997).

The Battery took a square form with walls measuring 103.23 meters long and 3.66 meters high. There were 42 battlements, each of them standing 1 meter high. The top of the wall facing the sea was 4.33 meters wide, while that at the rear was 1.67 metres wide. The Battery had ten barracks and eight cannon, and was manned by a captain and forty two soldiers. It was abandoned in the 24<sup>th</sup> year of the Guang Xu reign (1898). The Battery was demolished due to redevelopment in the area. Today, no more remains can be traced.

**Figure 11.5.4** shows a distant view of the Kowloon Walled City as seen from the Longjin Pier, circa 1910. The photograph also shows the Kowloon Battery on the left.

## **11.5.3 Data Interpretation**

### **Geophysical survey conducted in 2008**

A comprehensive Baseline Review was carried out in 2008-2009 to determine the archaeological potential of the study area. This included examination of AMO records and archaeological and historical academic publications. The review established high archaeological potential.

In July 2008, a geophysical survey comprising side scan sonar, seismic profiler, echo sounding and magnetic survey was completed. Eight unidentified seabed objects were located in the side scan sonar data. The magnetic data located 6 magnetic contacts, there were two side scan sonar contacts and there were no seismic contacts. A summary of the seabed objects identified is given in below:

**Table 11.3:** Summary of the seabed objects identified

Contact number	Latitude Longitude	Easting Northing	Dimensions (m)	Description
SC001	22° 19.253' N 114° 11.638' E	838282.5E 820038.2N	0.4x0.4x0.2	Unidentified Object
SC002	22° 19.248' N 114° 11.632' E	838272.1E 820029.2N	0.4x0.5x0.2	Unidentified Object
MC002	22° 19.205' N 114° 11.673' E	838341.6E 819949.6N	729nT	Unknown
MC004	22° 19.216' N 114° 11.670' E	838336.7E 819970.7N	448nT	Unknown
MC005	22° 19.223' N 114° 11.678' E	838350.5E 819984.0N	525nT	Unknown
MC006	22° 19.233' N 114° 11.675' E	838344.6E 820002.4N	709nT	Unknown
MC016	22° 19.225' N 114° 11.618' E	838248.0E 819986.4N	79nT	Unknown
MC017	22° 19.253' N 114° 11.637' E	838280.4E 820038.4N	68nT	Unknown

Subsequently in September 2009, a diver inspection of the seabed objects was carried out. Each object was located and identified as modern debris and there was no indication of underwater cultural heritage. No further action was required. The full MAI is presented in **Appendix 11.2**.

### **Geophysical survey conducted in 2012**

A geophysical survey has been conducted in January 2012 to meet the requirements of the supplementary MAI and the following equipment was deployed:

- Side Scan Sonar;
- Seismic Profiler;
- Echo Sounder; and
- Magnetometer.

The survey was carried out by EGS Asia Ltd and the data was made available for the archaeological interpretation. **Figure 11.5.5** shows the extent of the geophysical survey area compared with the previous 2008 MAI coverage. The distribution of the Seabed Features is presented in **Appendix 11.3**.

The interpretation of the side scan sonar records in this area sought to quantify the following elements and features on the seabed:

- Indicators for the presence of intact or broken up shipwrecks;
- Isolated objects which could have archaeological potential;
- Areas of disturbed seabed attributed to anchored vessels;

- Large area of debris or dumped materials ; and
- Seafloor with pipeline/cable related scars.

A detailed description of the survey methodology is presented in **Appendix 11.4** and a summary of the results is presented in the table below. The data showing each of the unknown objects is given in **Appendix 11.5**.

**Table 11.4:** Summary of Marine Geophysical Survey Results

<b>Sonar Contact List</b>				
<b>Contact number</b>	<b>Easting Northing</b>	<b>Latitude Longitude</b>	<b>Dimensions (m)</b>	<b>Description</b>
SC001	838142.9E 819793.6N	22° 19.0854' N 114° 11.5571' E	1.5x0.5x0.2	Unknown object
SC002	838156.0E 819800.5N	22° 19.0891' N 114° 11.5647' E	1.5x0.5x0.1	Unknown object
SC003	838158.3E 819806.1N	22° 19.0922' N 114° 11.5660' E	0.6x0.6x0.2	Tyre
SC004	838166.7E 819798.1N	22° 19.0879' N 114° 11.5709' E	1x0.7x0.2	Unknown object
SC005	838159.6E 819837.0N	22° 19.1089' N 114° 11.5668' E	1x0.6x0.2	Tyre
SC006	838170.2E 819845.4N	22° 19.1135' N 114° 11.5730' E	0.8x0.5x0.2	Unknown object
SC007	838170.7E 819843.1N	22° 19.1123' N 114° 11.5732' E	0.7x0.6x0.2	Unknown object
SC008	838179.6E 819820.1N	22° 19.0998' N 114° 11.5784' E	0.6x0.5x0.2	Unknown object
SC009	838191.7E 819867.5N	22° 19.1255' N 114° 11.5854' E	0.8x0.5x0.2	Unknown object
SC010	838193.6E 819805.8N	22° 19.0920' N 114° 11.5866' E	0.5x0.3x0.1	Unknown object
SC011	838213.7E 819796.2N	22° 19.0869' N 114° 11.5983' E	1x0.7x0.1	Tyre
SC012	838220.9E 819806.0N	22° 19.0922' N 114° 11.6025' E	1.5x1x0.3	Unknown object
SC013	838242.3E 819843.7N	22° 19.1126' N 114° 11.6149' E	1x0.4x0.2	Unknown object
SC014	838251.4E 819853.1N	22° 19.1176' N 114° 11.6202' E	1.2x0.9x0.1	Tyre
SC015	838301.1E 819826.7N	22° 19.1034' N 114° 11.6492' E	1.3x0.5x0.3	Unknown object
SC016	838317.8E 819842.3N	22° 19.1118' N 114° 11.6589' E	2x0.5x0.3	Unknown object
SC017	838307.6E 819852.6N	22° 19.1174' N 114° 11.6530' E	0.6x0.4x0.5	Unknown object
SC018	838307.8E 819865.8N	22° 19.1246' N 114° 11.6531' E	0.7x0.4x0.2	Unknown object
SC019	838316.8E 819867.5N	22° 19.1255' N 114° 11.6583' E	1.1x0.5x0.1	Unknown object
SC020	838320.2E 819900.9N	22° 19.1435' N 114° 11.6603' E	0.7x0.7x0.2	Tyre
SC021	838322.2E 819895.2N	22° 19.1405' N 114° 11.6614' E	2x0.7x0.4	Unknown object
SC022	838327.9E 819888.5N	22° 19.1369' N 114° 11.6648' E	0.8x0.4x0.2	Unknown object
SC023	838335.3E 819880.5N	22° 19.1325' N 114° 11.6691' E	0.8x0.4x0.1	Unknown object
SC024	838353.8E 819869.3N	22° 19.1264' N 114° 11.6799' E	1.2x0.5x0.2	Unknown object

Sonar Contact List				
Contact number	Easting Northing	Latitude Longitude	Dimensions (m)	Description
SC025	838360.0E 819855.9N	22° 19.1192' N 114° 11.6835' E	1.1x0.5x0.2	Unknown object
SC026	838360.5E 819824.4N	22° 19.1021' N 114° 11.6837' E	2.5x1.2x0.2	Unknown object
SC027	838372.2E 819893.4N	22° 19.1395' N 114° 11.6906' E	0.9x0.4x0.4	Unknown object
SC028	838389.4E 819901.1N	22° 19.1437' N 114° 11.7006' E	0.7x0.4x0.1	Unknown object
SC029	838372.1E 819928.5N	22° 19.1585' N 114° 11.6905' E	1.5x0.6x0.2	Unknown object
SC030	838405.9E 819944.4N	22° 19.1672' N 114° 11.7102' E	0.9x0.7x0.2	Tyre
SC031	838400.8E 819950.2N	22° 19.1703' N 114° 11.7072' E	0.9x0.8xnmh	Unknown object
SC032	838404.0E 819955.1N	22° 19.1729' N 114° 11.7091' E	1.1x0.7xnmh	Unknown object
SC033	838409.9E 819955.5N	22° 19.1731' N 114° 11.7125' E	1.2x0.5xnmh	Unknown object
SC034	838422.5E 819953.4N	22° 19.1720' N 114° 11.7199' E	1.1x0.7x0.1	Tyre
SC035	838427.1E 819925.2N	22° 19.1567' N 114° 11.7226' E	1x0.7xnmh	Unknown object
SC036	838424.8E 819888.4N	22° 19.1368' N 114° 11.7212' E	0.7x0.6x0.1	Unknown object
SC037	838433.2E 819902.3N	22° 19.1443' N 114° 11.7261' E	1x0.9x0.1	Tyre
SC038	838440.6E 819901.1N	22° 19.1437' N 114° 11.7304' E	1x0.6x0.1	Unknown object
SC039	838416.8E 819873.0N	22° 19.1285' N 114° 11.7165' E	1.1x0.8x1	Mooring buoy sinker
Magnetic Contact List				
MC010	838266.6E 819891.2N	22° 19.1383' N 114° 11.6291' E	42.8nT	Unknown
MC011	838281.8E 819905.5N	22° 19.1461' N 114° 11.6379' E	38.5nT	Unknown
MC012	838301.1E 819922.9N	22° 19.1555' N 114° 11.6492' E	32.5nT	Unknown
MC016	838361E 819823N	22° 19.1014' N 114° 11.6845' E	1588.9nT	Unknown
MC017	838396E 819926N	22° 19.1575' N 114° 11.7048' E	166.2nT	Unknown
MC018	838422E 819895N	22° 19.1405' N 114° 11.7196' E	51.4nT	Unknown

It can be seen from the above table that a total of 39 sonar contacts were identified in the survey. Of these, 8 are identified as being tyres and therefore of no archaeological value. After the survey it was established that a marker buoy sinker was present at the location of SC039. It is not possible to provide an

accurate identification of the remaining 30 sonar contacts. A diver survey is recommended to obtain accurate information about their archaeological value.

A total of 18 magnetic contacts were recorded. Of these, 12 are connected to disused gas pipelines and 6 are unknown. The six unknown will require diver inspection to assess their archaeological value.

The quality of the seismic data is adversely affected by the presence of organic materials on the seabed such as discharge from the water outfall. Only 1 seismic contact was recorded which was associated with the disused gas pipeline.

#### 11.5.4 Diver Survey

The diver survey was completed on the 16<sup>th</sup> and 20<sup>th</sup> April 2012.

The aim of the diver inspection was to locate all of the side scan sonar targets and magnetic contacts and establish their archaeological potential.

A team of four divers worked from a sampan to allow access to the shallow near shore area. Each target was located using Differential Global Positioning (DGPS). The boat was positioned above each target and a shot weight was placed on the seabed marked by a buoy on the surface. The drop position was checked against the target position using the DGPS. The diver then used this shot weight as the centre point of circular searches at 0m, 3m, 5m, 10m, 15m and 20m radius from the shot weight until the object was located.

The diver was equipped with a hand held video camera to record the unknown objects and associated seabed features. For the magnetic contacts a hand held probe and silt tubes were also used. The video had a remote TV monitor in the boat's wheel house which displayed the video footage in real time. This facilitated managing the diver from the surface via the through water communications. Verbal communication with the diver was maintained at all times during the underwater survey.

The diving team successfully located 23 side scan sonar targets and 5 magnetic contacts. A detailed description and photograph of them is presented in **Table 11.5** in **Appendix 11.6**.

Due to large barges moored at the disused fuel dolphin it was not possible to dive on 7 side scan sonar targets (SC016, SC017, SC018, SC019, SC024, SC025, SC026) and 1 magnetic (MC016). It was impossible to locate the sampan near enough to reach these locations and it would have been a hazardous diving location as there was work taking place on the barges.

#### 11.5.5 Impact Assessment

The diver survey established that 23 of the sonar contacts and 5 of the magnetic contacts were modern debris and have no archaeological value. There is therefore no negative impact from the dredging or mitigation requirements.

It is not possible to provide a conclusive assessment of the 7 sonar contacts and 1 magnetic contact which were impossible to reach due to barges moored at the disused fuel dolphin. However, their location near the disused fuel dolphin increases the likelihood that they are modern debris. The barges that were moored on site during the survey were all engaged in deconstructing the dolphin and were

creating a lot of concrete waste in the process. It is therefore unlikely that the objects have any archaeological value and are most likely modern building waste. Additionally there will already have been significant seabed disturbance around the dolphin during its operational phase due to the mooring and movement of vessels.

## 11.6 Conclusion

The findings of the terrestrial archaeology baseline study indicated that the impacted areas are of no or very low archaeological potential. As no adverse impacts are expected to arise from both the construction and operational phase of the project, no mitigation measures will be required. As a precautionary measure, the Antiquities and Monuments Office should be informed immediately in case of discovery of antiquities or supposed antiquities during the construction.

The Marine Archaeological Investigation (MAI) was completed in two phases (The first in 2008 and the second in 2012). The Baseline Review established high marine archaeological potential for Kowloon Bay. The 2008 geophysical survey located 8 unknown seabed objects. Diver inspection of them identified them as modern dumped debris. The 2012 geophysical survey located 36 unknown seabed objects. Diver inspection of 28 of them identified them as modern debris with no archaeological value. The eight objects that were not practicable to inspect were deemed to have low archaeological potential due to their location underneath the disused fuel dolphin which is a current work site creating debris.

A watching brief is not required. However, contractor should be alerted during the construction on the possibility of locating archaeological remains, such as cannon and AMO shall be informed immediately in case of discovery of antiquities or supposed antiquities in the subject sites. No additional mitigation is required.

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