

**Agreement No. CE 52/2007 (HY)  
Tuen Mun – Chek Lap Kok Link – Investigation**

**EIA Report  
Section 11 – Cultural Heritage**

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## 11. CULTURAL HERITAGE IMPACT ASSESSMENT

### 11.1 Project Background

- 11.1.1.1 In the north, the landing site is close to Pillar Point next to the River Trade Terminal. The layout plan of the proposed works can be found in **Figure 3.1**. Permanent reclamation is required adjacent to Tuen Mun River Trade Terminal to form the northern landfall for the submarine tunnel, as shown in **Figure 3.2**. From the tunnel, the road alignment heads northward between Pillar Point Fire Station and Sunhing Hungkai Tuen Mun Godown and crosses over Lung Mun Road on elevated structure, before turning north eastward and connecting with the proposed Tuen Mun Western By-pass (TMWB). The proposed toll plaza is situated in Area 46. (**Figure 3.4**) There are also existing slip road connections to Lung Mun Road in the area. As such, the area is already affected by the Lung Mun Road, as well as smaller secondary roads and streets and other industrial uses.
- 11.1.1.2 From the northern landing site the alignment heads south eastward in tunnel under the Urmston Road Navigation Channel and the waters west of the proposed contaminated mud pits at south of the Brothers. The tunnel makes landfall on the southern reclamation which is attached to the HKBCF reclamation, east of the airport island, as shown in **Figure 3.3**.
- 11.1.1.3 In the south, after crossing the southern waters on elevated marine viaduct, the alignment connects to the existing North Lantau Highway Transport Corridor, which also contains the Airport Express and Tung Chung Line railways. The works will include construction of piers for the viaduct connections in the area, both in the sea and on land, at-grade work and some minor slope works, required as a result of the realignment of the Cheung Tung Road. The layout of the southern landing site can be seen in **Figure 3.1**.
- 11.1.1.4 A total of six temporary works areas are, also, proposed for use as office sites and material storage during the construction of the project. The locations of the works areas are shown in **Figures 3.8a and 3.8b**. The designated works areas will be used for offices, material storage and casting yard for fabrication of precast units and are located on already disturbed, developed or reclaimed land.

### 11.2 Environmental Legislation

#### 11.2.1 *Environmental Impact Assessment Ordinance*

- 11.2.1.1 The Environmental Impact Assessment Ordinance (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.

- 11.2.1.2 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 (EIAO-TM). 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.

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

- 11.2.2.1 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 heritage conservation is the protection of monuments, historical, buildings, archaeological sites and other antiquities, and in a wider sense implies respect for local activities, customs and traditions. 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.
- 11.2.2.2 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 listed in the explanatory statements of Statutory Town Plans and that it is stated that prior consultation with AMO is necessary for any development or rezoning proposals affecting the Monuments and their immediate environments.
- 11.2.2.3 Non-statutory town plans and supporting planning documents should be used to express the planning intention to protect monuments, historical buildings, archaeological sites, and other antiquities. At the sub-regional level, monuments, historical buildings and archaeological sites should be identified and an overall framework of conservation should be reflected in the sub-regional plans. The appendices list the legislation and administrative controls for conservation, other conservation related measures in Hong Kong, and Government departments involved in conservation.

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

- 11.2.3.1 The Antiquities and Monuments Ordinance (the Ordinance) provides the statutory framework to provide for the preservation of objects of historical, archaeological and palaeontological interest. The 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 palaeontological significance.

- 11.2.3.2 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; and
  - To demolish, remove, obstruct, deface or interfere with a proposed monument or monument.
- 11.2.3.3 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.
- 11.2.3.4 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.
- 11.2.3.5 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.

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

- 11.2.4.1 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*.
- 11.2.4.2 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.

- 11.2.4.3 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 which party.

### **11.2.5 Marine Archaeology**

- 11.2.5.1 The AMO issue Guidelines for Marine Archaeological Investigation (MAI) which details the standard practice, procedures and methodology which must be undertaken in determining the marine archaeological potential, presence of archaeological artefacts and defining suitable mitigation measures.

## **11.3 Objectives of the Cultural Heritage Impact Assessment**

- 11.3.1.1 A Cultural Heritage Impact Assessment (CHIA) must be undertaken in order to identify the impact that the proposed project construction may have on the cultural heritage of the Study Area. The specific objectives of the CHIA include the following:

- to identify and highlight the known archaeological resources, including those under the seabed, and historical buildings and structures;
- to identify and map the potential for archaeological remains in the works area;
- to identify any additional heritage resources in the Study Area;
- to identify any negative impacts on the sites of cultural heritage; and
- to propose measures to mitigate these impacts.

## **11.4 Assessment Methodology**

### **11.4.1 Background**

- 11.4.1.1 The cultural heritage impact assessment has been broadly divided into the identification of marine and terrestrial cultural heritage impacts and the assessment methodology for each of these tasks is highlighted below. The Terrestrial cultural heritage is divided into terrestrial archaeology and built heritage.

### **11.4.2 Terrestrial Archaeology**

### **Baseline Study**

11.4.2.1 As stated in the *Guidelines for Cultural Heritage Impact Assessment*, 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, which for this project will be all works areas and an area of 50 metres around the boundary of the works areas (**Figures 11.1a and 11.1b**). The results are then presented in a report that provides both clear evidence that the required processes have been satisfactorily completed as well as a detailed inventory of all identified sites of archaeological interest, which includes a full description of their cultural significance.

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

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

11.4.2.3 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: the Antiquities and Monuments Office 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**

11.4.2.4 In order 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)**

11.4.2.5 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:

11.4.2.6 *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.

- 11.4.2.7 *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.
- 11.4.2.8 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.
- 11.4.2.9 *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.
- 11.4.2.10 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 practical 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.
- 11.4.2.11 During excavation contexts, finds and features are recorded, soils are described and relevant depths measured. Artefacts are collected, bagged and labelled by context. The position of each test pit, its top and bottom levels and associated temporary benchmark are recorded by a qualified land surveyor and plotted on 1:1000 scale mapping. On completion of all recording test pits are backfilled.

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



- 11.4.2.12 A report of the findings of the archaeological survey will be compiled following the requirements as outlined in the AMO's *Guidelines for 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**

- 11.4.2.13 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**

- 11.4.2.14 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.

### **11.4.3 Built Heritage**

#### **Baseline Study**

- 11.4.3.1 A desk-based study will be undertaken to determine the presence of built heritage resources in the project Study Area. Information will be gathered from the following sources; the list of Declared Monuments and Graded Buildings and Government Historic Sites as issued by the AMO; published and unpublished papers and studies; publications on relevant historical, anthropological and other cultural studies; unpublished archival, papers, records; collections and libraries of tertiary institutions; historical documents which can be found in Public Records Office, Lands Registry, District Lands Office, District Office, Museum of History; cartographic and pictorial documentation. The desk-based study has also included a review of previous built heritage projects in the study area.

#### **Built Heritage Field Survey (if required)**

- 11.4.3.2 The results of previous surveys undertaken in the recent past will be used

to identify resources in the project study area. If any parts of the study area are not surveyed in the recent past, a built heritage field survey will be undertaken to identify all built heritage resources. The survey will follow the requirements of the Guidelines for Cultural Heritage Impact Assessment, including the scope of resources, methodology and recording and report preparation processes

### **Definition of Built Heritage Resources**

- 11.4.3.3 All pre-1950 structures, these include all built features, such as; domestic structures, ancestral halls, temples, shrines, monasteries and nunneries, village gates, village walls, sections of historical stone paving, wells, schools, any post-1950 structure deemed to possess features containing architectural or cultural merit; all pre-war clan graves and cultural and historical landscape features, such as *fung shui* woods and ponds, historical tracks and pathways, stone walls and terraces, ponds and other agricultural features.

### **Evaluation of Heritage Significance of Built Heritage Resources**

- 11.4.3.4 There is currently no official standard for the evaluation of heritage resources in Hong Kong, and thus, the practice of categorising resources must be seen as an on-going process that will be updated and improved as refinements and additional features are added to the existing information base. As such the following guide will be used for the current impact assessment:

- Declared or Proposed Monuments: **High**;
- Graded Historic Buildings: **Moderate**;
- Government Historic Sites: **Moderate**; and
- Non-Graded Historical Buildings and Sites: **Low** (with potential to be evaluated to higher level if previously unknown significant features are identified).

### **Impact Assessment and Mitigation Recommendations**

- 11.4.3.5 Prediction and identification of both direct and indirect impacts that may affect the built heritage resources within the project study area will be undertaken, with special attention paid to the built heritage resources identified in the project study brief. Preservation in-situ will always be the first priority for sites of Cultural Heritage. If preservation in totality is not possible, mitigation will be proposed to minimise the degree of adverse impact to the greatest possible extent. Also, any disturbance to sites of built heritage that may cause physical damage should be avoided wherever possible through alteration of design, construction method or protective measures as appropriate.

## **11.4.4 Marine Archaeology**

- 11.4.4.1 A Marine Archaeological Investigation (MAI) comprises four main tasks as detailed below.

#### **Baseline Review**

- 11.4.4.2 The research establishes if there are records of shipwrecks occurring within the Study Area and its immediate vicinity, including Hong Kong archives, reports held by the AMO, examination of old navigation charts, archaeological, historical and geological publications. It will also include examination of archives held by the UK Hydrographic Office. Since marine archaeology is a new research discipline in Hong Kong, there is little existing collated information to draw upon and it is therefore necessary to examine primary reference material.

#### **Marine Geophysical Survey**

- 11.4.4.3 A geophysical survey is the most effective method to assess the seabed and subsurface for archaeological material. The following equipment is required:

- a marine seismic profiler (high resolution boomer);
- dual channel side scan sonar;
- High resolution multi beam sonar;
- Single frequency survey echo sounder; and
- DGPS positioning system with navigation software.

#### **Establishment of Archaeological Potential**

- 11.4.4.4 Detailed analysis of the geophysical data sets and integration with the results of the Baseline Review to map features and anomalies with archaeological potential. This enables the design of a strategy for their investigation and evaluation.

#### **Remote Operated Vehicle (ROV) and/or Visual Diver Survey**

- 11.4.4.5 Visual inspection and assessment of all anomalies identified in the geophysical survey data. A DGPS system is required to locate each dive target and accurately record its position and both still and video cameras used to record features with archaeological potential. Hand held probes and an airlift are used to inspect buried features. If archaeological material is found, the significance will be determined and appropriate mitigation measures will be prepared.

## 11.5 Terrestrial Archaeological Impact Assessment

### 11.5.1 *Geological and Topographical Background*

11.5.1.1 As described in Section 3 and Section 11.1 of this Report, the alignment of the proposed TM-CLKL is largely marine based and as such, the areas relevant to potential terrestrial archaeology impacts relate to the areas where the project makes landfall, namely in the north at Tuen Mun and on Lantau at Tai Ho Wan, and also the works areas that are being proposed.

#### **Northern Landing Site and Works Areas**

11.5.1.2 The geology and topography on the land based parts of the project in Tuen Mun consists of reclaimed land, former beach and raised beach deposits, alluvium, debris flow and also in a section of solid geology consisting of medium to fine grained granite, as shown in **Figure 11.2b**. Based upon the geological information collected, there are only two areas that have the potential to contain archaeological material based on superficial geology which would interface with road works or works areas for the proposed project, as shown on the geological map in **Figure 11.3a**.

11.5.1.3 Area 1 on **Figure 11.3a** is alluvial in nature and would have originally been situated directly behind a coastal beach. The area would have had high levels of water movement in the past and, therefore, the likelihood of undisturbed archaeological material being present is low. However, the potential for isolated and disturbed material to be present remains. Area 2 consists of raised Holocene beach deposits and has the potential to contain both prehistoric and historic archaeological material. The study area has an existing road running the length of the deposit and this would have caused disturbance to any archaeological deposits that may have existed in the area.

11.5.1.4 The areas of archaeological potential as they relate to the proposed works area based upon the geological mapping in **Figure 11.2b** are identified in **Figure 11.3b**.

#### **Southern Landing Site and Works Areas**

11.5.1.5 As noted above, the southern landing site is situated within the boundaries of the NLH Transport Corridor on reclaimed land at the edge of highly modified former coastline.

11.5.1.6 There are four works areas associated with the southern landing site, WA4, WA5, WA6 and WA23 (**Figure 3.8b**). All of the areas are situated on former coastline and have undergone extensive reclamation and site formation works. The geological maps available are dated previous to these works and it is not possible to locate the sites of the works areas on these maps.

- 11.5.1.7 Works Area WA4 is situated on reclaimed land and has no archaeological potential. WA5 and WA6 are situated at the base of steep hill slopes that formerly made up the coastline before the construction of the North Lantau Highway and both areas have been heavily modified by the construction works associated with the highway and their use as works sites for previous projects. Neither of these works areas has archaeological potential. Works Area WA23 is located at Wok Tai Wan on Tsing Yi and is situated on the coast at the base of a steep rocky hillside, on reclamation and, as such has no archaeological potential.
- 11.5.1.8 As such, there are no areas of archaeological potential identified at the Lantau end of the project.

### **11.5.2 Historical Background**

- 11.5.2.1 Prior to British annexation of the New Territories, the land was part of the administrative district of Xin'an County of Guangdong Province under the Qing Dynasty. The 1819 edition of a Gazetteer includes lists of villages within what is now the New Territories of Hong Kong. There are no village settlements listed in the current project study area in this edition of the Gazetteer (Ng 1983).
- 11.5.2.2 There are no known historical villages in the vicinity of the northern landing site or proposed Works Areas WA18 and WA19. There are no archaeological sites in the project study area and there are no historical villages located in the vicinity of any of the proposed works, as can be seen in the following historical maps: 1905-1909 map (**Figure 11.2a**) and map of San On County from 1866 (**Figure 11.2c**), both taken from Mapping Hong Kong by Empson 1997, and a map from 1896 (**Figure 11.2d**) taken from The Tourists' Guides to Hong Kong with Short Trips to the Mainland of China (Hurley 1896).

### **11.5.3 Existing Impacts**

- 11.5.3.1 Areas that have been evaluated as having archaeological potential based on the geographical and topographical information have also been examined with respect to the existing impacts from previous construction works and utility installations and plans showing the locations of the utilities can be found in **Figures 11.17a and 11.17b**.

11.5.3.2 The section that interfaces with Area 1, in **Figure 11.3b**, contains the existing Lung Mun Road as well as smaller secondary roads. In addition, underground utility installations are located in this area including China Light and Power's (CLP) high voltage cables, Drainage Services Department's (DSD) stormwater pipes/manholes and sewer pipes/ manholes, Highways Department's (HyD) lighting cables, telecommunication cables and Water Supplies Department's (WSD) freshwater and saltwater mains.

11.5.3.3 The section that interfaces with Area 2, in **Figure 11.3b**, contains the existing Lung Fung and Lung Mun Roads as well as smaller secondary roads. Various underground utility installations are located in this area including DSD's stormwater pipes and manholes and sewer pipes and manholes, HyD's lighting cables, telecommunication cables and WSD's freshwater and saltwater mains.

#### **11.5.4 Evaluation of Archaeological Potential**

11.5.4.1 As noted above, two areas of archaeological potential have been identified in the Tuen Mun area, shown in **Figure 11.3b**. No areas of archaeological potential have been identified in the southern landing area or associated Works Areas.

#### **11.5.5 Impact Assessment**

11.5.5.1 There are no areas of archaeological resources in the southern landing area and as such no archaeological impacts are predicted.

11.5.5.2 In Tuen Mun, excavation works for the viaducts, at grade connection and toll plaza will disturb the ground in this area and either damage or destroy archaeological deposits and material. The works in identified Areas 1 and 2 will consist of utility installation and road finishes, both of which will damage or destroy any intact archaeological deposits. As highlighted in Section 11.5.3, both areas have extensive previous ground disturbance from road construction and utility installation which form the existing roads and utilities in the area. As such, the likelihood for the presence of archaeological material is very low. In addition, any such material would have been disturbed or destroyed in the past.

11.5.5.3 Based upon the above, no further investigation is recommended for archaeological resources as the proposed works are limited to areas where existing impacts that would have damaged or destroyed any existing archaeological material.

### **11.6 Built Heritage Impact Assessment**

#### **11.6.1 Results of the Desk-based Study**

11.6.1.1 The study area for built heritage is 100m around the works boundary, as shown in **Figures 11.1a and 11.1b**. There are no Declared Monuments,

Graded Historic Buildings, Government Historic Sites or Historical villages in the project study area either at Pillar Point or on Lantau. Grave sites, however, were identified in the vicinity of the study area on Lantau and Tuen Mun.

## **11.6.2 Results of the Field Survey**

- 11.6.2.1 Four graves have been identified in the Tuen Mun area in vicinity to the works. The location of the graves G1 to G4, are show on **Figure 11.4a** and a description of the graves is provided in the catalogue in **Appendix II**. While Graves G2 to G4 are some distance from the proposed works, Grave G1 is situated in the middle of the proposed site for the toll plaza, as shown in **Figure 11.4a**, and dates back to 1904.
- 11.6.2.2 The area around the south landing site to the east of Pak Mong village contains a number of burials and one grave was found to be historical. A map showing the location of the grave (G5) can be found in **Figure 11.5**. A shrine (TH-1) was also identified in the Lantau study area and its location can also be found on **Figure 11.5**. The catalogue containing the description of the grave and shrine is presented in **Appendix II**.

## **11.6.3 Impact Assessment**

- 11.6.3.1 None of the designated works areas are predicted to affect any built heritage resources. However, the proposed works associated with the construction of the toll plaza and road improvements in Tuen Mun and the works associated with the connection to existing roads on Lantau have the potential to directly impact on the identified heritage resources in these areas. In addition, indirect impacts, such as damage to the structural elements of graves or shrine could occur if construction works are undertaken in close proximity.
- 11.6.3.2 The operation of the improved road network and toll plaza, however, is not expected to have any impacts on built heritage resources.
- 11.6.3.3 Details of the graves G1 to G4 in Tuen Mun are presented in **Table 11.1** below. Grave G1 is situated within the site for the proposed toll plaza, see **Figure 11.4b**. Lands Department (LandsD) has advised that the clearance of this grave could be complicated and time consuming, possibly requiring a period of 18 to 22 months to obtain ExCo's order for clearance from the date of authorisation of the scheme. As such, the toll plaza has been specifically designed to avoid the grave and to provide a 1.0m minimum set back. For this purpose, retaining walls are to be provided at the back and two sides around the grave. The existing view from the grave to the south at eye level overlooking the sea will be maintained as much as possible during the construction phase but will be preserved once works have been completed. This is achieved by the use of a short span decking structure for the portion of toll plaza to the south of the grave.
- 11.6.3.4 Notwithstanding, the works will be in close proximity during the construction phase and damage to the grave may occur if not controlled and mitigation will be needed.



11.6.3.5 Graves G2, G3 and G4 are situated near the proposed roundabout at the northern end of the works area on Lung Fu Road but at sufficient distance from the works to avoid significant impacts. The locations of the graves can be seen in **Figure 11.4a**.

**Table 11.1 Impact Assessment for Built Heritage Resources in Tuen Mun**

Resource	Distance to nearest works	Impact Assessment
Grave G1	Within the work site for the proposed toll plaza	The grave may be damaged by the proposed construction works
Grave G2	27.5 m	The graves are situated at sufficient distance from the proposed works so to provide an adequate buffer zone and no adverse impacts have been identified.
Grave G3	17.5 m	
Grave G4	78.9 m	

11.6.3.6 Details of the grave (G5) and shrine (TH-1) identified in the vicinity of works near Tai Ho Wan on Lantau are presented in **Table 11.2** below and shown in **Figure 11.5**. These resources are some distance from the works and would not be expected to be impacted by the works.

**Table 11.2 Impact Assessment for Built Heritage Resources on Lantau**

Resource	Distance to nearest works	Impact Assessment
Grave G5	74.8 m	The grave and shrine are situated at sufficient distance from the proposed works so to provide an adequate buffer zone and no adverse impacts have been identified.
Shrine TH-1	147.3 m	

## 11.7 Marine Archaeological Impact Assessment

### 11.7.1 Baseline Review

11.7.1.1 The study area crosses one of the most historically significant (strategic) waterways in Hong Kong as it was the main route for ships travelling to the Pearl River Estuary and further on to Canton. Both Tuen Mun and Tung Chung have exceptionally rich and well documented maritime histories including sea battles and pirate infestation. The fort and battery are still in-situ at Tung Chung.

11.7.1.2 The aim of the baseline review is to compile the most significant information to establish the archaeological potential of the seabed within the study area. It is not an exhaustive chronological history of the area. Only incidents and information relevant to the current study are included.

#### Archive Search

11.7.1.3 The UK Hydrographic Office (UKHO) holds a database of surveyed

shipwrecks in Hong Kong, including those not shown on Admiralty Charts. These charts are particularly useful as they may show wrecks which have been subsequently buried or broken up. They also show the original shore lines prior to any reclamation. The UKHO holds charts of the study area including the French Admiralty for 1856 (**Figure 11.6**) and 1878 (**Figure 11.7**) and the British Admiralty Chart 1889 (**Figure 11.8**). However, the database contained no records of shipwrecks close to the study area.

- 11.7.1.4 Other early maps of the study area were also reviewed. Tuen Mun is shown on a late 16th century coastal map of Kwang Tung by Kwok Fei (**Figure 11.9**). Although it is drawn in panoramic style looking from land to sea, many of the names are still in use today. There are numerous ships on the sea which could be either junks or Portuguese carracks.

### **Maritime Activity in the Vicinity of Tuen Mun**

- 11.7.1.5 As early as the Tang Dynasty (618-907), Tuen Mun was regarded as strategically important by the imperial government which had expanded central control over south China and Vietnam in the 7th century. The inward swing of the sea, forming Castle Peak Bay is sheltered to the west by Castle Peak Mountain and by the island of Lantau to the south, making it an excellent harbour and typhoon shelter. At various times, the bay was an important harbour for Persian, Indian, Arab and other merchants. They would gather at Tuen Mun before entering the Pearl River to do business in China (Lo, 1963)
- 11.7.1.6 Before the invention of steam-propelled boats, sea voyages were largely determined by the prevailing winds. In summer, when the southwest monsoon arrived, trading vessels from Arabia, Persia, India, Indochina and the East Indies set a northeasterly course for China backed by the prevailing winds. Ships would converge on Tuen Mun before proceeding to Canton and elsewhere. Chinese ships bound for foreign countries and foreign ships on their return journey had to wait for the northeast winter monsoon. Leaving Canton, they would also call at Tuen Mun before setting sail for distant lands. Tuen Mun had been an outer port for Canton from the Tang down to the Ming Dynasty. Because of this important connection it is much talked about by contemporary scholars, yet very little of its former glory and bustling activity remain. Current knowledge is almost totally derived from written accounts.
- 11.7.1.7 It is impossible to know with any certainty when Tuen Mun first served as a centre for overseas communication but it seems to have become very active during the Tang Dynasty (618-907). This is demonstrated by the Tang authorities special introduction of the military defence unit called the *Chên*. An account is given of the military administration under the jurisdiction of Canton in the *Hsin T'ang-shu*, in *chüan* 43, part 1, under *Ti-li Chih* which says:

*“There are two fu, namely Sui-nan and P’an-yu, and a body of regular troops in addition to the garrison stationed at T’un-Mên Chên.”*

- 11.7.1.8 The so-called *fu* was one of the units for training recruits and is an abbreviation for *Chê-ch’ung-fu*, a fundamental element in the conscription system. The *Chên* troops were members of a garrison stationed at strategic positions. Since Tuen Mun was made a *Chên* with a garrison commanded by an officer, it is obvious that numerous ships had been passing through Tuen Mun. This can be verified from both the *Chiu T’ang shu* and the *Hsin T’ang shu*. During the reign of T’ang Hsüan Tsung, a prefect of Nan-hai called Liu Chü-lin had once led the troops of T’un-Mên Chên northwards by sea to destroy the piratical band headed by Wu Ling-kuang who used to ravage the area of Yung chia in Chekiang.
- 11.7.1.9 As traffic increased, more travellers passed through Tuen Mun and literary men began to learn of the place and its trading activities. Of the literature written about Tuen Mun, mostly ballads and poems, the works of Han Yü and Liu Yü-hsi are most prominent. The latter gave a detailed description of the place in his poem ‘*the surging tide*’ which he wrote after a typhoon had struck (Lo, 1963).
- 11.7.1.10 After the collapse of the Tang, Mount Pei-tu at Tuen Mun was re-named Jui-ying Mountain by the authority of King Liu, founder of the Nan Han. On the northern slope of the mountain, barracks were constructed to lodge a garrison, while a special naval unit was created to maintain security in the offshore areas. The T’un-Mên Chên was under the joint jurisdiction of the heads of the garrison and naval unit. The sovereign of Nan Han, who seized power during the disintegration of the Tang and established himself in southern China, made it his policy to secure the support of outlaws. By doing this he aimed to extend his sway to the non-Chinese people and derive maximum profit from trade with foreign countries. Consequently, special attention was paid to Tuen Mun.
- 11.7.1.11 In 736, the Tang government set up a 2,000-strong garrison at Tuen Mun, called the Tuen Mun Battalion (Tuen-Mun chen). The garrison was led by “Commander” Sau-chuck-shih, who belonged to the Annam prefecture based at Nam Tau. The region of present day Hong Kong including Hong Kong Island, the Kowloon Peninsular, the outlying islands and the New Territories all came under the military protection of this garrison.
- 11.7.1.12 When the Song (960-1279) emperors assumed power, government control in the area was extended. In addition to the royal garrison, an officer was installed whose duty it was to pursue and arrest bandits. A system of administration for the land-locked waters and more remote seas was put into force at Tuen Mun.
- 11.7.1.13 During the Yuan Dynasty (1279-1368), corruption prevailed within the government bureaucracy. The former brisk trade along the coast of

Kwantung declined and the garrison at Tuen Mun seems to have been discontinued. With the rise of the Ming (1368-1644), the defence of the country's sea bases was re-organised, with *Wei* (military bases) being established at various places along the coast. The defence unit responsible for the Tung-can area was stationed at what is now the country town of Pa-an Hsien, while only an insignificant watch tower for giving alarm signals was posted at Tuen Mun. One reason for the neglect of Tuen Mun is that it was no longer acting as the outer port of Canton, its place having been taken by Nan-t'ou in the present Pai-an Hsien. In addition, foreign ships also came in smaller numbers and with less frequency. The most important commercial powers, Arabia and Persia were then very much under the sway of the newly risen Turkish Empire, a situation which did not encourage trade and navigation. Tuen Mun therefore lost its importance (Lo, 1963).

- 11.7.1.14 In the Song Dynasty (960-1279) the name of the battalion was changed from Tuen-Mun chen to Tuen Mun chai; apart from the change of name the garrison seems to have retained its function in both dynasties (Siu, 1985).

- 11.7.1.15 The Nan Han Emperor is known to have been interested in the Hong Kong area. He visited Tuen Mun in 955, and proclaimed Castle Peak to be the Holy Mountain of his empire. At the same time, he began re-organising and strengthening the local garrisons (Lo, 1963).
- 11.7.1.16 For a brief interval in the first quarter of the sixteenth century (1514-1521), Tuen Mun was occupied by the Portuguese. The early Portuguese presence at Lintin and Tuen Mun is well documented. The first European navigator known to have reached the China coast, a Portuguese named Jorge Alvares, made his landfall in 1513. Alvares commenced his mission in Malacca, now in Malaysia, which the Portuguese had captured in 1511. Merchandise brought from China, especially porcelain, sold for extremely high prices, with good quality ceramics fetching twice their weight in silver when re-sold at Goa. Instead of relying on Chinese traders, the Portuguese intended to establish a sea-route to China and purchase for themselves at source (Boxer, 1942).
- 11.7.1.17 The local mandarin state at Tuen Mun anchorage, based at nearby Nam Tau, received the Portuguese in a friendly manner and trade commenced. A padrao (stone carved with the Portuguese cross and crest) was erected by Alvares at Lintin, though nothing of it now survives. These stones functioned more as a marker of passage for later seafarers than as a territorial claim. Such stones were erected wherever the Portuguese mariners sailed from Mombassa and Ormuz to western India and the Moluccas (Boxer, 1969).
- 11.7.1.18 Alvares' flotilla remained at Tuen Mun for ten months, finally returning to Malacca when the change in monsoon winds permitted them to sail. While not given much freedom of movement, early traders visiting Lin Tin were not as confined in their activities by the Chinese authorities as they were in later centuries.
- 11.7.1.19 Jorge Alvares made two more voyages to China, in 1519 and again in 1521. On his last voyage to the China coast, he died on 8th July 1521 (Braga, 1955). Ming Dynasty gazetteers record that in 1516 the Portuguese came again under the command of Simao d'Andrade with a warship and three unarmed sailing vessels. Simao was stern and impudent. He established enclosures on nearby islands for the execution of prisoners; he resisted the payment of customs duties on goods, and allowed his men to rob the Chinese inhabitants. His behaviour aroused the indignation of both the peasantry and the local Chinese government officials. In 1521, a considerable force was led against them by Wan Hung, superintendent of the patrol guards for the sea frontier of Kwantung. After heavy fighting around Tuen Mun, the Portuguese were decisively beaten. In an essay describing the Memorial Chapel of General Wang by Ch'en Wên-fu he describes the battle:

*“some strangers who called themselves Franks (Portuguese) suddenly*

*appeared. The set themselves up along the shores of Tuen Mun and Kuei-yung mingling with other foreign scoundrels... Bitterness and enmity were aroused among the local inhabitants. Dreading the atrocious acts of the Franks, there was much talk of migrating elsewhere to be out of the way. But most people could not tolerate the thought of leaving their homes and the burial places of their ancestors. When the tale of their distress was told to the worthy Wang Hung, his wrath was terribly roused. Ordering his men to make all preparations for fighting, he himself led them to battle to assault the Franks....*

*The warships of the Franks were bulky, and could only be propelled by the wind, but just then the south wind was blowing furiously. Fearless yet shrewd, General Wang decided to take advantage of the wind and ordered the exterminating of the pirates and the destruction of their vessels. Small boats were prepared to be loaded with firewood and dried reeds, over which oils were to be sprayed. These were set on fire and launched towards the enemy. Fanned by wind, the mass of flame and smoke rushed furiously towards the enemy's fleet. This unexpected action dismayed the Franks, and consequently they could do nothing to avert their dreadful fate. Presently the threatening flames of fire were raging among their vessels. The warriors of Wang then advanced, shouting battle-cries, and crushed the enemies, killing every one of them."*

- 11.7.1.20 After this battle, no more Portuguese resided in the Tuen Mun area.
- 11.7.1.21 After the reign of Chia-ching (1522-1566), the maritime districts along the coasts of Kiangsu, Chekiang, Fukien and Kwantung were frequently attacked by Japanese pirates. Wars of extermination were vigorously waged against them and Yü Ta-yu and Ch'i Chi-kuang, two Ming commanders, after twenty years succeeded in breaking down their power. Yet such were the inroads made by the pirates that the maritime districts never recovered their former wealth and busy sea traffic (Lo, 1963).
- 11.7.1.22 The breakdown in coastal law and order was such during the reign of Emperor K'ang Hsi (1662-1720) (Siu, K.K ) a 'scorched earth policy' was introduced which was disastrous for the coastal areas of Hong Kong. The entire population was evacuated behind a line of walls and watch towers 50 li (25-32km) from the coast. Those who did not comply were executed and villages were destroyed. The devastation caused enough lasting problems in terms of resentments and divisions that the consequence was the escalating pirate problem of the 18th century.
- 11.7.1.23 Wang Ch'ung-his, who edited the *Hsin-an Hsien-chih* wrote an account of the geography of the region stretching from present day Nan-t'ou to Tuen Mun and the important events that had taken place there since the Ming Dynasty. The book describes that during the Ming Dynasty, traffic in the estuary of the Pearl River no longer centered on Tuen Mun and that the coast from Nan-t'ou to Tuen Mun was the constant prey of Japanese pirates and outlaws (Lo, 1963). Tuen Mun never re-gained its importance as port and most of the harbour has now been reclaimed.

### **Maritime Activity in the Vicinity of Tung Chung**

- 11.7.1.24 During the 12<sup>th</sup> century, Government interest and presence in Lantau increased which in turn resulted in a 50 year rebellion on the Island as the Government sought to control fishing and salt working activities. It is recorded in the 1819 gazetteer of Xin'an that there was an attempt in 1197 to stop private salt trading in Lantau. The islanders successfully repulsed a government invasion force by mining their harbours with stakes and engaging them in a sea battle. They captured merchant ships and killed more than three hundred people (Plate 1, **Figure 11.10**). Tung Chung is very likely to have been one of the harbours involved in the battle (Murray, 1987).
- 11.7.1.25 Tung Chung is also associated with one of the most famous pirate battles in the history of Hong Kong (Murray, 1987). Extensive documentary evidence records a nine day battle in the Bay of Tung Chung which took place between the 20<sup>th</sup> to the 29<sup>th</sup> November 1809. Exactly what happened is a matter of some dispute as the accounts are from sources such as Official Qing historians and Portuguese records have very different biases. For example, the official account talks of 1,400 pirates being killed and many pirate ships sunk or damaged, The Portuguese account is similarly inflated with claims of having destroyed a third of the pirate fleet by fire ships. There is one remarkable eye witness account by Richard Glasspoole, an officer from the British East Indiaman the Marquis of Ely which was stationed about twelve miles off Macau at the time. Glasspoole says that the combined Chinese and Portuguese fleet inflicted no significant damage at all.
- 11.7.1.26 Glasspoole had been captured on 7th September 1809 while returning to his ship from a trip to Macau to fetch a pilot. Beset by heavy weather, he escaped one set of pirates only to fall into the hands of Cheung Po Tsai. Eventually, some two days after the battle, he and his shipmate's ransom were paid. It consisted of goods to the value of about \$4,000 including two bales of superfine cloth, two chests of opium, two casks of gunpowder, a telescope and the rest in dollars. When Cheung Po Tsai objected that the telescope wasn't new, he was given a further \$100.
- 11.7.1.27 Glasspoole's account was written shortly afterwards for his local masters, the Select Committee of Supercargoes of the East India Company in Macau, and published in London in 1815. He describes the Qing government fleet as comprising ninety three war junks, six Portuguese ships, a brig and a schooner.
- 11.7.1.28 There is another contemporary description of the battle which was translated in 1831 and published in London (Neumann, 1831). It includes the following description of the fighting:

*“ ... In consequence of this determination all commanders and officers of the different vessels were ordered to meet on the seventeenth at Chek Lap Kok, to blockade the pirates in Ta Yu Shan, and to cut off all supplies of*

*provisions that might be sent to them. To annoy them yet more, the officers were ordered to prepare the materials for the fire-vessels. These fire-vessels were filled with gunpowder, nitrate and other combustibles; after being filled, they were set on fire by a match from the stern, and were instantly all in a blaze. The Major of Heang Shan, Pang Noo, asked permission to bring soldiers with him, in order that they might go ashore and make an attack under the sound of martial music, during the time the mariners made their preparation.*

*On the twentieth it began to blow very fresh from the north, and the commander ordered twenty fire-vessels to be sent off, when they took driven by the wind, an easterly direction; but the pirates' entrenchments being protected by a mountain, the wind ceased, and they could not move father on in that direction; they turned about and set on fire two men of war. The pirates knew our design and were well prepared for it; they had bars with very long pincers, by which they took hold of the fire-vessels and kept them off, they that they could not come near. Our commander, however, would not leave the place; and being very eager to fight, he ordered that an attack should be made, and it is presumed that about three hundred pirates were killed. Pao (i.e. Cheung Pao Tsai) now began to be afraid, and asked the Spirit of the Three Po, or old Mothers to give a prognostic. The Puh, or lot for fighting was disastrous; the Puh, or lot to remain in the easterly entrenchment, was to be happy. The Puh, or lot for knowing if he might force the blockade or not on leaving his station tomorrow, was also happy, three times one after another.*

*There arose with the daylight on the twenty-second a light southerly breeze; all the squadrons began to move, and the pirates prepared themselves to joyfully leave their station. About noon, there was a strong southerly wind, and a very rough sea on. As soon as it became dark the pirates made sail, with a good deal of noise, and broke through the blockade, favoured by the southerly wind. About a hundred vessels were upset, when the pirates left Ta Yu Shan. But our commander being unaware that the pirates would leave their entrenchments, was not prepared to withstand them. The foreign vessels fired their guns and surrounded about ten leaky vessels, but could not hurt the pirates themselves; the pirates left the leaky vessels behind and ran away”*

- 11.7.1.29 Whatever the truth of the details of the battle, there is no question that at the end of the nine day battle the pirates were not defeated. However Cheung Po Tsai eventually surrendered in 1810 to the Viceroy Bailing of the Qing Government. At the time of surrender he had over 270 junks, 16,000 men, 5,000 women, 7,000 swords and 1,200 guns (Cortese, A. 1944.). These figures clearly indicate the scale of the pirate activities in the region.
- 11.7.1.30 A remarkable 18m long Qing scroll painted on silk depicts the actions of the Viceroy Bailing (c.1748-1816) from his assumption to office in 1809 to the successful solution to the piracy problem in the summer of 1810. It is divided into twenty ‘episodes’ and includes the pirate battle at Tung Chung.



The scroll is currently displayed in the Hong Kong Maritime Museum at Stanley (Plate 2, **Figure 11.10**).

- 11.7.1.31 Also, during the dredging of the seabed between Chek Lap Kok and Tung Chung for the new airport in 1993, part of a cannon and a cannon ball were discovered and reported to the Provisional Airport Authority (Plate 2, **Figure 11.11**). An inscription on the cannon reveals that it was manufactured around 1808 in China (Meacham, 1994). There is no way of knowing its exact origin but it is the only evidence that has been found for the above battle.

- 11.7.1.32 With the surrender of the pirates in 1810, the inhabitants of Lantau were able to live in peace and continue their intensive farming and quarrying. The large amount of granite produced on the island favoured the development of granite quarrying. The products were used to build roads and houses in the developing city of Hong Kong (Meacham, 1994).
- 11.7.1.33 The modern period saw the northern part of Lantau remain relatively undeveloped. The advent of steam power meant that fewer trading vessels needed to take refuge in the safe anchorage provided by Tung Chung. Additionally the ever increasing draft of modern vessels meant that the shallow waters of the approach to Tung Chung and the bay itself precluded the settlement from becoming a port of call and commercial centre. The incorporation of Lantau into the New Territories in 1898 resulted in the departure of the garrison and seven or eight war junks as well as their supply vessels.

### **Chek Lap Kok**

#### **Historical Background**

- 11.7.1.34 The island of Chek Lap Kok first appears in late Ming historical documents under the name ‘Chek Lap Chau’. The name apparently derives from a fish formerly ‘chek lap’ (now known as ‘lap yue’) that was abundant in the waters around the island. The first reference to the island in western sources is a brief mention in a British naval reconnaissance report by Lt. H.W. Parrish in 1794. He was part of a small survey expedition on a quest to identify suitable anchorages:

*‘intended to protect the large and valuable ships of the China Trade’.*

- 11.7.1.35 Bad weather restricted their movements but they made a brief reconnaissance of Chek Lap Kok the details of which are recorded in the log of the voyage:

*‘The Island of Shatlapko we found to extend towards the shore of Lantau; by which it appears, that the whole of this bay is sheltered from westerly winds.’*

- 11.7.1.36 The officer who sounded in the boat, reported his having seen boats pass through the Tung Chung channel and that the land in its neighbourhood on Lantau was ‘low and cultivated’ (Cranmer-Byng & Shepherd 1964). This is a very valuable contemporary description of Chek Lap Kok as it indicates that it was not a well known anchorage in 1794 and that there was evidence of coastal occupation on Lantau.
- 11.7.1.37 The first detailed evidence of human occupation on the island from written sources is the land use survey carried out in 1904-5 by British Army Indian surveyors, as part of the general registration of land ownership in the New Territories. This record reveals an elaborate and

complicated web of ownership and land use.

11.7.1.38 Some fishermen made use of the coastal area for repairing their boats and for drying their fishing nets. On the north coast of the island there was a Tin Hau temple built in 1823. The temple was built of granite with money donated by some quarry companies. After World War II, the quarrying activity declined and many people moved to the city for better employment. By the 1950s, only about two hundred people lived on the island.

### **Archaeological Investigation**

11.7.1.39 The first archaeologist to examine sites on the island was Walter Schofield, whose notebooks recorded that he visited Chek Lap Kok on at least four occasions in 1923, 1925, 1931 and 1933. Additional Neolithic stone and pottery artefacts were found during the 1950's by members of the University Archaeological Team, the predecessor of the Hong Kong Archaeological Society.

11.7.1.40 When the possibility of opening a new airport was first discussed in 1979, the Archaeological Society began a series of excavations on the sand bar site at Sham Wan Tsuen. This work yielded evidence of occupation during the late Tang and Sung Dynasties and also during the Neolithic (Meacham, 1994).

11.7.1.41 After the final decision was made to proceed with the airport, the Hong Kong Archaeological Society was commissioned to organise a major archaeological rescue project with funds provided by the Royal Hong Kong Jockey Club. A sixteen month study of the history and archaeology of the island was completed including ten months of survey and excavation followed by analysis of the materials discovered and research on the history of the island. During the project four major sites were excavated:-

- Fu Tei Wan: main deposit on a plateau with occupation during the Middle Neolithic Period dating to 4000-3300 BC;
- Ha Law Wan: discovery of a Yuan Dynasty kiln complex probably associated with the smelting of iron ore;
- Kwo Lo Wan: middle Neolithic deposit on hill slope and Bronze Age material with burials just behind the beach; and
- Sham Wan Tsuen: a major Tang Dynasty lime kiln site was excavated. Late Neolithic and Han Dynasty materials were also recovered.

11.7.1.42 An unexpected result of the investigation was the discovery of remains of almost every phase of Hong Kong's known occupation, from the earliest phase of the Middle Neolithic, estimated at 4,000 BC. Equally unexpected was the complete absence of Ming and early Ching materials, ruins or graves. The detailed results of the excavation are presented in a detailed publication (Meacham, 1994).

11.7.1.43 Although construction of the airport resulted in the destruction of most

of the archaeological sites the kiln complex at Ha Law Wan was preserved within the conservation area of the airport. The Tang Dynasty lime kiln at Fu Tei Wan was re-located to Tung Chung by the Gurkha Engineers where it is accessible to the public.

### **The Tung Chung Walled City**

- 11.7.1.44 The disruption and danger posed by the pirates led to the building of the Tung Chung walled city, also called the Tung Chung Fort (Bard, 1988). It was built on a piece of land between Sheung Ling Pei and Ha Ling Pei villages in the Tung Chung Valley. It was built in 1832 by Ho Chun-lung a captain from the Chin Shan Battalion of the Heung Shan Brigade.
- 11.7.1.45 The walled city backs up against the Tai Tung mountain. Its four rubble filled walls enclose an area of 225 feet by 265 feet and the more formidable front wall runs to about 15 feet thick. Along the main wall can be seen six old muzzle loading cannons each fixed to a cement base. There are two on the western side and four on the eastern side. They bear inscriptions but only four out of the six are still legible. They detail the casting of each cannon: for example the inscription on the second one from the east states that it was cast in the 8<sup>th</sup> moon of the 14th year of the Chia-ching reign (1809), serial number Ching 80, weighing 1,000 catties and was cast by the master of the Man Shing Furnace.
- 11.7.1.46 At this time the pirate Cheung Po Tsai had a very strong influence on Lantau Island. The governor-general of Kwangtung and Kwangsi, Pa-Ling, was responsible for suppressing Cheung and his colleagues. He organised the casting of cannons and had them mounted throughout the coastal regions so that the area become more strongly fortified against Cheung's attacks. All the cannons that he cast bore serial numbers (Lui, 1999).
- 11.7.1.47 Two cannons are dated to 1841 and were probably used for defence against the British and the opium traders (Plate 1, **Figure 11.11**). On the eastern side of the main gate one of the cannons was cast in the 1st moon of the 10th year of the Chia-ch'ing reign (1805) and weighs 1,200 catties. It is highly likely that this cannon was also used for the defence of the region against piracy (Plate 3, **Figure 11.10**). The cannon lying next to the one above has been severely weathered and its inscription is illegible. It is clear from the differing casting dates that the cannons were cast elsewhere and transported. Although they have been cast over a period of 4 decades they all shared the same purpose of defending the region against pirates and foreign invaders. The walled city has been declared a monument and has been extensively repaired (Lui, 1999).

### **Tung Chung Battery**

- 11.7.1.48 Further evidence for the severity of the pirate threat is demonstrated by the presence of Tung Chung Battery (Plate 3, **Figure 11.11**). Tung Chung is in a valley surrounded by hills on three sides and faces the sea

to the north. The valley is well drained by streams and provides fertile land for farming. At the entrance to Tung Chung a low lying hill known as the Shek She Shan (the rocky lion mountain) is situated. The Battery is located on the mountain's north slope.

- 11.7.1.49 The Battery was built in 1817 in order to strengthen defences on the northern coast of Lantau Island and to guard the Tuen Mun waterway. It had two cannon places, 7 guard houses and an ammunition store. To its south at the entrance to Tung Chung was the Tung Chung Hau Shuen (with 8 guard houses) built in the same year. The fort and the guard houses together had a garrison of 30 soldiers under the command of a *patsung* sent from the Tai Pang Battalion. There is little documented evidence about the fort after 1877 and its existence seemingly was forgotten. Recently, rubble walls were found on a knoll near the Tung Chung ferry pier. They are completely ruined but likely to form one to two cannon places of the Battery. The remains of the Battery are protected under the Antiquities and Monuments Ordinance as a declared monument (Liu,1990).

## 11.7.2 Geophysical Surveys

- 11.7.2.1 In order to achieve 100% survey coverage of the study area a combination of new and archive data was used where appropriate. The data reviewed was from the geophysical surveys undertaken for Hong Kong Section of Hong Kong - Zhuhai - Macao Bridge and Connection with North Lantau Highway EIA (HK Section of HZMB) (now renamed as the Hong Kong Link Road) and some project specific surveys. The scope of these surveys is shown in the **Figure 11.12**.
- 11.7.2.2 The 2004 geophysical survey data was undertaken for CEDD and the results presented in Report Number HK186804 (September 2004 Volumes 1-4 and HK 186804 (October 2004) Volumes 1-5. **Figure 11.12** shows the scope and coverage of the previous surveys. It also demonstrates that, in combination with the 2008 additional geophysical survey, there is 100% seabed coverage for the present study. A detailed analysis of the results has been included in the MAI for the “Hong Kong-Zhuhai-Macao Bridge: Hong Kong Section and North Lantau Highway Connection”, prepared by Archaeo-Environments in 2006. It was, therefore, not relevant to duplicate the previous MAI and only the data relevant to the current study have been extracted.
- 11.7.2.3 In addition to the above, an additional project specific geophysical survey was commissioned. The survey was carried out during the period of 13<sup>th</sup> November to 19<sup>th</sup> December 2008. The marine geophysical survey was carried out as part of the ground investigation works and the objectives of the survey were:

- to map sea bed levels in detail;
- to map the texture and features on the sea bed such as shipwrecks, rock

outcrops and debris;

- to map the geological succession over the water mains corridor; and
- to locate the position of the existing utilities.

11.7.2.4 The detailed methodology and results of the 2008 survey is presented in **Appendix I2** and the main results of the surveys are presented below. The findings of the 2004 survey are, also, presented below.

#### **Sonar Contacts with Archaeological Potential from the 2008 Survey**

11.7.2.5 In total, 12 sonar contacts with archaeological potential were identified from the survey data, the details of which are provided in **Appendix I2**. However, only 3 of the sonar contacts detailed in **Table 11.3** below have been identified as being close enough to the alignment to be potentially affected by the proposed works. All 3 contacts, SC003, SC004 and SC005 are close to the western side of the northern reclamation.

**Table 11.3 Location of Sonar Contacts from 2008 Geophysical Survey**

Contact Number	Easting Northing	Dimensions (m)	Distance from Alignment (m)
SC003	812736.4E 824639.9N	4.3 x 0.9 x 0.9	107.1
SC004	812731.2E 824632.3N	2.4 x 0.5 x 0.9	92.8
SC005	812728.0E 824626.5N	0.8 x 0.5 x 0.9	101.3

11.7.2.6 **Figure 11.13** presents the data showing each of the sonar contacts and **Figure 11.14** shows the location of the contacts in relation to the proposed TM-CLKL alignment.

#### **Sonar Contacts with Archaeological Potential from the 2004 Survey**

11.7.2.7 A total of five sonar contacts of archaeological potential (TH-1 to TH-5) were identified in the 2004 survey. Details of the seabed features for the 2004 survey are provided in **Appendix I2** for reference. However, only two sonar contacts, listed in **Table 11.4** below and shown in **Figure 11.15**, were identified to be in the vicinity of the proposed TM-CLKL alignment. The location of the 2004 sonar contacts in **Table 11.4** below are shown in **Figure 11.14**.

**Table 11.4 Location of Sonar Contacts from 2004 Geophysical Survey**

Contact Number	Easting Northing	Dimensions (m)	Distance from Alignment
TH-4	815007.4E 818193.2N	4.7 x 0.7 x 0.8	57.4

<b>Contact Number</b>	<b>Easting Northing</b>	<b>Dimensions (m)</b>	<b>Distance from Alignment</b>
TH-5	815008.9E 818202.1N	3.3 x 0.5 x 0.3	60.6

### **Summary of Survey Results**

- 11.7.2.8 The combined results of the 2004 and 2008 geophysical surveys provide 100% coverage of the seabed in the study area. The results identified a total of 17 sonar contacts in the vicinity of the alignment. However, when these were plotted in relation to the alignment it was found that only 5 contacts were located about 100m from parts of the TM-CLKL works that could cause seabed disturbance. The 100m setback is defined as a practical area, beyond which significant impacts would not be expected. As SC003 and SC005 are only just beyond the 100m buffer area, they have been included in the assessment.



11.7.2.9 While the survey classification of *debris* for these sonar contacts is reasonable, from an archaeological perspective these targets could be contemporary debris from modern vessels or artefacts of historical significance. As such, an accurate description and evaluation can only be made once a diver inspection is completed. Thus, a diver inspection has been proposed for these 5 contacts of potential marine archaeological value.

### 11.7.3 Visual Diver Survey

#### Methodology

11.7.3.1 A diver inspection of each of the 5 sonar contacts identified as being potentially affected by the project was required in order to accurately identify and assess their archaeological significance or if they were modern debris. The diver survey was completed between the 7 and 12 May 2009.

11.7.3.2 Each target was located using Differential Global Positioning (DGPS) and a boat positioned above each target and a weighted buoy placed on the seabed. The diver then used this as the centre point of a circular search, extending up to 15m from the sinker. The diver was equipped with a helmet mounted video camera to record the contact and associated seabed features. In addition, a metal probe was used to look for buried objects.

#### Results

11.7.3.3 The results of the visual diver survey showed that all the targets were modern debris and not of archaeological potential and, as such, no marine archaeological impacts are predicted as a result of the implementation of the TM-CLKL. The details are set out in **Table 11.5** below.

**Table 11.5 Classification of Sonar Contacts**

Contact Number	Easting Northing	Dimensions (m)	Classification of Sonar Contact
SC003	812736.4E 824639.9N	4.3 x 0.9 x 0.9	Concrete block
SC004	812731.2E 824632.3N	2.4 x 0.5 x 0.9	Concrete block
SC005	812728.0E 824626.5N	0.8 x 0.5 x 0.9	Ladder
TH-4	815007.4E 818193.2N	4.7 x 0.7 x 0.8	Wooden plank
TH-5	815008.9E 818202.1N	3.3 x 0.5 x 0.3	Concrete block

### 11.7.4 Marine Archaeological Potential

11.7.4.1 The Baseline Review established high marine archaeological potential for the seabed within the study area based on its exceptionally intense maritime history. However, this potential is diminished by previous seabed disturbance. **Figure 11.16** sets out the extent and nature of previous installations which will have impacted the seabed. The side scan sonar data presented in **Appendix I2** provides a clear indication of the level and type of disturbance caused by cable installation. The study area is also regularly trawled by fishermen who may have served to damage or redistribute archaeological resources.

11.7.4.2 However, the diver survey established that each of the sonar contacts was of modern origin and there was no indication of archaeological remains on the seabed. The diver survey also confirmed the extent of seabed disturbance.

## **11.8 Mitigation Measures**

### **11.8.1 Terrestrial Archaeology**

11.8.1.1 The identified areas of archaeological potential highlighted in **Figure 11.3b** are limited to areas where existing impacts would have damaged or destroyed any existing archaeological material. As such, no further investigation is recommended for these archaeological resources. However, as a precautionary measure it should be a requirement during the construction works that if any antiquity or supposed antiquity is discovered during the course of the excavation works undertaken by the Contractor, the discovery shall be reported to the AMO immediately and all necessary action taken to preserve it.

### **11.8.2 Built Heritage**

11.8.2.1 Grave G1 is situated near the toll plaza, as shown in **Figure 11.4b**. The design of the toll plaza has been arranged so as to preserve the grave in-situ, with a minimum 1.0m permanent setback provided. With the 1.0m set back of the permanent structure, a minimum of 0.7m clearance from the grave can be maintained during construction. This will be achieved with the adoption of special precautionary measures for working adjacent to the grave, including the deployment of simple-to-erect formwork and falsework systems, the provision of construction access and the bulky components of the falsework support system being designed at locations away from the grave. The required construction clearance and the precautionary measures shall be stipulated in the construction specifications. The detailed design will be audited to ensure inclusion of the buffer zone and the implementation will be audited during construction of the toll plaza. The footpath connection from the adjacent Lung Mun Road to the grave will, also, be maintained during construction and reprovided after the works have been completed. No mitigation will be required during the operational phase.

- 11.8.2.2 Graves G2 (27.5m from the nearest works), G3 (17.5m from the nearest works), G4 (78.9m from the nearest works), G5 (74.8m from the nearest works) and shrine TH-1 (147.3m from the nearest works) are all situated at sufficient distances away and will not be adversely impacted by the project. Therefore, no mitigation measures are required for these resources.

### **11.8.3 Marine Archaeology**

- 11.8.3.1 The dive survey of the identified marine anomalies did not reveal any items of archaeological potential and, therefore, as no impacts are predicted, no mitigation measures are needed.

## **11.9 Residual Impacts**

- 11.9.1.1 No residual terrestrial archaeological and built heritage impacts are predicted after the implementation of the recommended mitigation measures.
- 11.9.1.2 In addition, no marine archaeological impacts are predicted and as such, no residual impacts will occur.

## **11.10 Environmental Monitoring and Audit Requirements**

- 11.10.1.1 In terms of terrestrial archaeology, for the two areas of archaeological potential identified in Tuen Mun (**Figure 11.3b**), while impacts are not expected, as a precautionary measure, it is recommended that if any antiquity or supposed antiquity is discovered during the course of the excavation works undertaken by the contractor, the discovery shall be reported to the AMO immediately and all necessary measures taken to preserve it.
- 11.10.1.2 The design of the toll plaza has been arranged so as to preserve the grave in-situ, with a minimum 1.0m permanent setback provided. In addition, the grave G1 (**Figure 11.4a**), which is within the works boundary for the toll plaza, will need to be protected throughout construction by the provision of a 0.7m setback of the construction works, together with the adoption of special precautionary measures for working adjacent to the grave, including the deployment of simple-to-erect formwork and falsework systems, the provision of construction access and the bulky components of the falsework support system being designed at locations away from the grave. The implementation of these mitigation measures will need to be audited during the detailed design phase to ensure that design has accommodated these requirements fully and, also, periodically audited as part of the EM&A programme during the toll plaza works. Further details are provided in the EM&A Manual, presented under separate cover. EM&A for marine archaeology is not required.

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