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## Appendices

# 11 CULTURAL HERITAGE

## 11.1 Legislation, Standards and Guidelines

### 11.1.1 General

**11.1.1.1** Legislation, standards, guidelines and criteria relevant to the consideration of Cultural Heritage Impact Assessment Study under this Project include the following:

- Antiquities and Monuments Ordinance (Cap.53);
- Environmental Impact Assessment Ordinance (EIAO) (Cap.499); including Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and Guidelines for Cultural Heritage Impact Assessment (04 May 2020);
- Hong Kong Planning Standards and Guidelines (HKPSG); and
- Proposed Grading and Graded Historic Buildings Classification.

### 11.1.2 Antiquities and Monuments Ordinance (Cap.53)

**11.1.2.1** The Antiquities and Monuments Ordinance provides the statutory framework to provide for the preservation of objects of historical, archaeological and paleontological 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 paleontological significance.

**11.1.2.2** 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.

**11.1.2.3** 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.

**11.1.2.4** 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.

**11.1.2.5** 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 supposed antiquity is identified to the Authority and that any person who has discovered an antiquity or supposed antiquity should take all reasonable measures to protect it.

## 11.1.3 Environmental Impact Assessment Ordinance (Cap.499)

**Technical Memorandum on Environmental Impact Assessment Process**

**11.1.3.1** The general criteria and guidelines for evaluating and assessing impacts to Sites of Cultural Heritage are listed in Annexes 10 and 19 of the 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.

**Guidelines for Cultural Heritage Impact Assessment**

**11.1.3.2** This document outlines the specific technical requirement for conducting terrestrial archaeological and built heritage impact assessments and is based upon the requirements of the EIAO-TM. It includes the parameters and scope for the Baseline Study, specifically desk-based research and field evaluation. Besides, it also includes 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.

**11.1.3.3** 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.

**11.1.3.4** 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.

### 11.1.4 Hong Kong Planning Standards and Guidelines

**11.1.4.1** Chapter 10 of the HKPSG details the planning principles for the conservation of natural landscape and habitats, historic buildings and Sites of Archaeological Interest (SAI). 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.

**11.1.4.2** The guidelines also address the issue of the preparation of plans for the conservation of historic buildings, SAI 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 it is stated that prior consultation with Antiquities and Monuments Office is necessary for any redevelopment or rezoning proposals affecting the Monuments and their surrounding environments.

**11.1.4.3** It is also noted that planning intention for non-statutory town plans at the sub-regional level should include the protection of monuments, historic buildings, SAI 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.

### 11.1.5 Proposed Grading and Graded Historic Buildings Classification

**11.1.5.1** A grading system has been in place as a Government administration mechanism for classifying historic buildings based on heritage significance since the 1980's. Currently the Antiquities Advisory Board (AAB) is completing the task of assessing 1,444 historic buildings. There are three grades which are defined as follows:

- **Grade 1 Buildings are those of outstanding merits, of which every effort should be made for preservation if possible;**
- **Grade 2 Buildings are those of special merits, of which efforts should be made for selective preservation; and**
- **Grade 3 Buildings are those of some merits, of which preservation in some form would be desirable and alternative means could be considered if preservation is not practicable.**

**11.1.5.2** It should be noted that the above grading is not established under any legislation and hence graded buildings are not under any statutory protection unlike Declared Monuments.

**11.1.5.3** Other than the assessment of the 1,444 historic buildings listed above, the AAB will also consider the heritage value and grading of the New Items proposed by the

public for assessment. Antiquities and Monuments Office will review all submissions and if it is determined that they have heritage value, the AAB panel will conduct further assessment to determine the grading.

## 11.2 Overview of Construction Works

**11.2.1.1** As discussed in **Section 2**, the construction works for the Project consist of 3 main parts including the following:

- Tung Chung East (TCE) Station and at-grade track realignment;
- Barging facility at the north of Tung Chung Waterfront Road; and
- Tung Chung West (TCW) Station and the tunnel section connecting existing Tung Chung Station and TCW Station.

**11.2.1.2** The TCE Station and the at-grade track realignment are located on reclaimed land which would be formed as part of the Tung Chung New Town Extension (TCNTE) project. The barging facility would be required to support the transportation of spoils during the construction period. The design of this barging point has avoided the need for any marine dredging. For the section between existing Tung Chung Station (TUC) and the TCW Station, it would involve 3 key elements as summarised below.

**Tunnel Between Existing Tung Chung Station and TCW Station**

**11.2.1.3** This tunnel section is approximately 1.3km long and TBM would be deployed for the construction. The tunnel alignment would avoid the SAIs in Ma Wan Chung and Sha Tsui Tau and would be mainly running within rock stratum. The tunnel diameter is approximately 7.5m.

**11.2.1.4** Starting from existing TUC, the tunnels pass beneath an artificial slope west of Shun Tung Road. After passing the Rocky Lion Hill along Shun Tung Road, the alignment runs along the nearshore at Ma Wan Chung below seabed level and terminates to the west of Yat Tung Estate.

**11.2.1.5** Other than the TBM launching/ retrieval shaft near Tung Chung Crescent, a tunnel grout block would be constructed at the underground stratum at least 10m below ground to the immediate north of the TCW Station box. The TBM launching/ retrieval shafts would be constructed by cut-&-cover method. Subject to actual site circumstances, hoarding erection, site clearance and water barrier installation may be conducted, and workers may inspect the site within the western end of the Ma Wan Chung SAI. No excavation works would be conducted within the Ma Wan Chung SAI and the engineering works would be conducted at least 10m below ground, which would be the granite layer.

**11.2.1.6** The TBM tunnelling would be designed to ensure any vibration experienced by neighbouring buildings and structures would comply Buildings Department Guidelines on acceptable vibration limits (APP-137 2012).

**EAP/ EEP and the Shafts connecting to the Tunnel**

**11.2.1.7** The upper portion of EAP/ EEP will be mainly in mixed ground and would be excavated by using pipe piles as the retaining system until reaching the rock head. The lower portion of EAP/EEP is in rock and would be excavated by either mechanical excavation or drill-&-blasting, depending on detailed design.

**TCW Station**

**11.2.1.8** The TCW Station is an underground station located to the west of Yat Tung Estate While the station would be underground, there would be above-ground structures including station entrances and vent shaft structures. The station and these above-ground structures would totally avoid SAIs in Ma Wan Chung and Sha Tsui Tau. Prior to the excavation of the station box, D-walls would need to be constructed, and then followed by top-down excavation. Subject to further studies, some drill-&-blasting may be required when the excavation hits rock layers at the bottom of the TCW Station.

**11.2.1.9** Among all the key construction works discussed above, only the TBM tunnelling for the tunnel section between existing TUC and TCW Station, and the potential drill-&-blasting within TCW Station may generate higher vibration levels. Other construction works only involve the use of typical construction plant and would not generate excessive vibration levels.

## 11.3 Assessment Area

**11.3.1.1** According to Clause 3.4.12 of the EIA Study Brief (SB) No.: ESB-329/2020, the assessment area for the cultural heritage will be defined by a distance of 300m from the boundary of the Project, as shown in **Figure 11.1**.

## 11.4 Baseline Conditions

### 11.4.1 Background Review of the Works Sites/ Areas

**TCE**

**11.4.1.1** The works in TCE would be constructed on a reclaimed land under the Tung Chung New Town Extension (TCNTE) (**Figure 11.1**). It therefore has no terrestrial archaeological potential and are excluded from this assessment.

Barging Facility

**11.4.1.2** The barging facility would be constructed on a reclaimed land. It therefore has no terrestrial archaeological potential and are excluded from this assessment.

**TCW**

**11.4.1.3** The latest railway alignment and construction of TCW Station works and operation of the Project are located within the eastern part of Tung Chung Valley which includes a number of recognized and potential cultural heritage resources. The baseline conditions aim to identify all known and possible heritage sites, including archaeology and built heritage which may be affected by the Project. The baseline review includes information on geology, topography, published and unpublished existing information on archaeology and history or other information relevant to conduct an informed assessment.

## 11.4.2 Geological and Topographical Background

**11.4.2.1** Tung Chung is situated in the middle of the western North Lantau shoreline. The Tung Chung Valley is bounded by hills and mountains on three sides and opens to the sea. The two streams which run from the southeast to the northeast through the valley and flow into the bay in the north provided stable fresh water supply. In the past the area was named "Tung Sai Chung", meaning the East and West Streams (Siu 2015).

**11.4.2.2** The valley is somewhat sheltered due to the position of Chek Lap Kok Island in front of its mouth. The proximity of the island creates a narrow sea channel and a safe harbour. Tung Chung hence had strategic significance regarding maritime traveling since the ancient time and ships sailing to and from the Pearl River Estuarine used to stop here and obtain supplies.

**11.4.2.3** The assessment area covers the eastern part of Tung Chung Bay. The north-eastern section of the works run through Rocky Lion Hill hillock along Shun Tung Road and connect to the new Tung Chung Town area. The feldsparphyric rhyolite and granite hillock with veins of microgranite has elevations between 1.9 to 5mPD at the low-lying coastal areas and ascends to peak at 74.7mPD. The central section of the works will traverse below low-lying Holocene beach, alluvium and estuarine deposits which are bordered by Pleistocene terraced alluvial deposits (**Figure 11.2**).

**11.4.2.4** Ma Wan Chung SAI which is located on the east side of Tung Chung Bay is sheltered by the low hillock/ headland to the north. Two stream distributaries flow divergently into the Bay in the area and form a low-lying estuary which lays in between 2.9 to 9.5mPD. The SAI principally sits on Pleistocene terraced alluvial deposits and Holocene beach deposits bordered by Pleistocene and Holocene slope debris, Holocene estuarine and alluvial deposits (**Figure 11.2**). The latest alignment will run in a tunnel adjacent to the SAI and there will not be any at-grade works within this SAI.

**11.4.2.5** Sha Tsui Tau SAI is located on the west side of Tung Chung Bay on mainly Pleistocene terraced alluvium with some estuarine deposits in the northeast. The elevations range from 2.8 (on estuarine deposits) to 4.5mPD (terraced alluvial

fields). The SAI is outside of the works but may be representative in topographical and geological situation to some of the associated work areas and the TCW Station.

**11.4.2.6** In the 1990s, the reclamation and construction of the town have altered the natural landscape of the area. Part of the alteration also took place within the assessment area, as seen in road works, drainage, slope remodeling and housing development.

## 11.4.3 Historical Background

**11.4.3.1** In Tang dynasty, Tung Chung was already on a busy maritime traveling route (Atha 2011) with a vibrant coastal occupation as evidenced by the associated discoveries of limekilns (HKAS 1998), settlement (Drewett 1996), and a cemetery buried with non-locals (Atha 2011 and 2013) along the coast of Tung Chung Bay.

**11.4.3.2** Historical records further add to the understanding of the history of Tung Chung during the Ming-Qing dynasties. According to a map in *Yue Da Ji* (Guo 1595) which was drawn in the Ming dynasty, a settlement marked as Tung Sai Chung already existed on Lantau (Siu 1985 and 2015). The Qing government however, in order to cut off supplies to the Ming loyalists ordered in 1661 Coastal Evacuation Order. The settlement in Tung Chung was abandoned as all people on Lantau were forced to move 50 li (25km) inland. Sharply reduced numbers of the population subsequently returned since 1683 and the Hakkas from Dongjiang River of Lingnan region moved into the area along with the remaining locals (Jin 1688; Siu 1990 and 2015). Together they rebuilt settlements and cultivated lands in Tung Chung. A stone plaque dated 1777 in Hau Wong Temple in Sha Tsui Tau recorded quarrels over rents between tenant farmers and landlords. The Qing government often needed to intervene and reconcile the two parties (Siu 1990).

**11.4.3.3** Throughout the Qing period, piracy posed a severe threat to the security of coastal China. Tung Chung Bay shielded by Chek Lap Kok Island provided a hide out for pirates. Added to piracy problem was the increasing number of European ships seeking trade and a foothold in China (Coates 1957). This resulted in open water conflicts between pirates and foreign ships (Coates 1957). In 1810, the Qing Navy—with assistance from the Portuguese warships—defeated the notorious Cheung Pao Tsai piracy based in Tung Chung (Coates 1957).

**11.4.3.4** Since then, the Qing authorities saw the need to strengthen the coastal defense in Tung Chung. *Guangdong Annals* (Ruan 1822) records a number of coastal fortifications on Lantau, as well as the construction of naval outpost facilities and batteries (including the Tung Chung Battery which can still be seen today) in Tung Chung in 1817. In 1832, a walled fort of the naval headquarters of the Right Battalion of Dapeng, now referred as Tung Chung Fort, was built at Ha Ling Pei of Tung Chung (AMO 2017). The fort was in charge of all naval outposts based on Lantau and along the coastline of Hong Kong (Siu 1990). In 1898, when Britain took over the New Territories, all fortifications set by the Qing authorities in Tung Chung were evacuated.

**11.4.3.5** The villagers of Ma Wan Chung share a major surname Fung (Siu 1985). The village was likely established around 1880s and due to the village's proximity to Qing's fortifications, no wall was ever built (Siu 1990). A recent survey conducted at Tung Chung identified 24 graves situated on the low hillock near the village, and none dates older than 100 years (Golder Associates 2015).

## 11.4.4 Archaeological Background

**11.4.4.1** Archaeological evidence suggests that human occupation in Tung Chung dates back to the Late Neolithic (GZIA 1998; Peacock and Nixon 1985-86; CUHK 1992). Occasional presence of Tang/Song dynasties and a small quantity of Ming/Qing dynasties ceramics were also identified in the area (GZIA 1998; Golder Associates 2015). The archaeological findings no doubt hint at the rich unrecorded history of Tung Chung.

**11.4.4.2** There are a number of SAIs in or around the Project where previous archaeological investigation relevant to the current assessment area were undertaken. The areas and locations of previous investigation are mapped on **Figure 11.3a** and **Figure 11.3b** and the results are briefly described below.

**Ma Wan Chung Site of Archaeological Interest (AM96-0762)**

**11.4.4.3** The SAI was first identified during an archaeological investigation conducted by the Hong Kong Archaeological Society in 1992 to 1993. Surface inspection, ten auger tests (X26, X28 and X30 to X37) and seven test pits (A to G) were conducted (HKAS 1993**; Figure 11.3a**). The results show presence of Tang/Song dynasty cultural materials including kiln debris and some Neolithic pottery. Remains of two *in situ* kilns were observed on the surface of a strip of cultivated land, possibly of Tang dynasty date (**Figure 11.3a**). The two kilns were also sighted in a 1997 survey commissioned by the Territory Development Department (TDD 1999; Golder Associates 2015: 11).

**11.4.4.4** As part of the Second Territory-wide Survey, the Guangzhou Institute of Archaeology conducted in 1997 an archaeological survey on Lantau. According to the report, field scan and auger tests were conducted within Ma Wan Chung, including locations of cultivated land, Ma Wan, Wong Nai Uk and Tung Chung Old Pier. Artefacts identified in the cultivated land in Ma Wan Chung include blue and white porcelain sherds dated to the Ming/Qing period alongside pottery and tile fragments of more recent date (AMO 1998:12). Thirty-two auger tests however, failed to identify cultural deposits in the area (AMO 1998:13). According to an area highlighted in a recent survey report (Golder Associates 2015: Appendix C Inset 3), the 1997 survey covered an area now known as Yat Tung Estate.

**11.4.4.5** In 2014, an archaeological survey conducted for the Tung Chung New Town Development project covered an extensive area in Tung Chung and presented an archaeological predictive model based on the local landscape, previously identified

sites of archaeological interest and recognised landforms/ landscapes associated with archaeological deposits.

**Sha Shui Tau Site of Archaeological Interest (AM78-0220)**

**11.4.4.6** Since 1970s, large quantities of kiln debris have been observed at the surface of a sand terrace at the site of the current football ground and surrounding areas (HKAS 1993). Despite various attempts to locate the original source of the kiln debris in the past few decades, no definite *in situ* kiln structure was identified. Cultural layers dated to the Late Neolithic, Tang (as early as Southern Dynasties), Song and Qing dynasties were however, excavated. Summaries of findings of each period are provided below and mapped on **Figure 11.3a**.

*Late Neolithic*

**11.4.4.7** Although prehistoric materials including a stone adze and a small number of pottery sherds dated to both Late Neolithic and Bronze Age were recorded in the modern beach, area to the south of the football ground and at the terrace further south of the Sha Tsui Tau SAI (Peacock & Nixon 1986, HKAS 1993, Drewett 1996, Golder Associates 2015), the only evidence of *in situ* prehistoric deposit was identified in the south-western corner of the SAI: in 1993, a very sparse in situ Late Neolithic deposit was confirmed in a test pit (Test Square C) carried out in response to the discovery of one Neolithic coarse ware sherd found in an auger test located in the south-western corner of the SAI. Eight coarse corded sherds possibly of the same pot were recorded in this deposit, which probably indicates a brief activity on the spot (HKAS 1993).

*Tang Dynasty*

**11.4.4.8** The focus of Tang findings was primarily located near the football ground and between the two Youth Camp structures (Peacock 1986, CUHK 1991, AMO 1995, Drewett 1996, AMO 1998), and also to the south-east of the Camp structure (HKAS 1993). Although rich Tang dynasty cultural layer with abundant kiln debris and pottery was recorded in various investigations, no definite in situ kiln structure was identified. Hints of the proximity of a kiln(s), however, was reflected in the heat-reddened sand layer that produced intense kiln debris (Context 8, Trench 6, AMO 1995 excavation), and the intense spread of post-abandonment kiln debris (Layer 3, AMO 1995).

**11.4.4.9** Other Tang dynasty features such as postholes and pits were also recorded in the 1995 research excavation (AMO 1995). A total of five postholes of random distribution were identified in Trench Ab, whilst three Tang dynasty pit features were recorded and according to the interpretation, two adjoining pit features located in Trench Bd and Cc are the site of an abandoned kiln or a rubbish pit (AMO 1995).

**11.4.4.10** The range of kiln related materials include kiln furniture such as kiln bars and flat-ended props, and kiln structural remains such as kiln bricks, kiln wall fragment and

burnt clay fragment, while Tang dynasty pottery was dominated by green glazed and slipped ware of low-fired domestic ware. Apart from pottery, iron tools such as cha, fishhooks, axe and chisels, and copper alloy coins were also excavated. Based on the analysis of the pottery, the 'Tang cultural layer' could be dated to as early as late Southern dynasties and up to mid-late Tang dynasty (AMO 1995).

*Song Dynasty*

**11.4.4.11** A Song dynasty cultural layer was recorded across the SAI, particularly behind the football ground and in the south-eastern part of the site (HKAS 1993, AMO 1995, Drewett 1996, Golder Associates 2015). Apart from the typical Song dynasty pottery such as pottery of clay fabric, celadon and black glazed porcelain, some Six Dynasties to Tang dynasty kiln debris, pottery and coins were also found in this layer (HKAS 1993, AMO 1995, Drewett 1996). Identified Song dynasty features include a Song/Yuan dynasty rubbish pit and a Southern Song dynasty burial (AMO 1995).

*Qing Dynasty*

**11.4.4.12** Significant Qing dynasty findings include the discoveries of several Qing dynasty burials identified behind the football ground during two excavations conducted in 1995. A total of twenty-one late Qing dynasty burials with some evidence of intercutting were identified. In general, most of the skeletal remains were well preserved, which allows the identification of age and gender (AMO 1995, Drewett 1996).

**11.4.4.13** The archaeological survey conducted for the Tung Chung New Town Development project in 2014, mentions widely recorded Ming/Qing dynasty materials on the fringe of the SAI (Golder Associates 2015).

**Fu Tei Wan Kiln (Relocated to Tung Chung) Site of Archaeological Interest (AM98-0912)**

**11.4.4.14** The Tang dynasty kiln was found at Fu Tei Wan on Chek Lap Kok Island in 1960. The Hong Kong Archaeological Society conducted a brief excavation in 1982. Carbon(C-14) dating charcoal from the base of the kiln provided a date of 610-880 CE (1280 ± 70BP) (Cameron 1984). The kiln was used to burn seashells into lime, which was a widely used waterproofing material for caulking boats, sealing seams of baskets and construction works (Atha and Yip 2016; Mcgrail 2014; AFCD, IDO and INHT no date). Prior to the development of the Hong Kong International Airport, the Antiquities and Monuments Office, with help from the Gurkha Engineers, relocated the kiln to Tung Chung for preservation (AMO 2020) (**Figure 11.3a**). The kiln and kiln furniture discovered along the coast of the valley (CUHK 1992) are testimony to a vibrant Tang dynasty lime production industry in Tung Chung.

**Tung Chung Game Board Rock Carving Site of Archaeological Interest (AM88-0406)**

**11.4.4.15** The Tung Chung Game Board Carving, previously known as Tung Chung Rock Carving, was discovered in 1976 and is included in the *List of Site of Archaeological Interest* (AMO 2004). The game board, which comprises a simple square grid and concentric squares with radiating lines, was carved on a horizontal rock face situated at the hillside of Rocky Lion Hill along Shun Tung Road at c.73mPD overlooking Tung Chung valley (**Figure 11.3a**). Similar rock carvings can be found in Shek Pik, Ting Kok Village an Hoi Ha Beach and they are probably historic (Bard 1988).

**Pak Mong Site of Archaeological Interest (AM90-0429)**

**11.4.4.16** The site was first identified in 1980 with the observation of abundant kiln debris at the back beach deposit around 3 to 5mPD. According to local informant, an earlier backfilled kiln was located further inland (Peacock & Nixon 1986). A two-stage investigation carried out by CUHK between 1991-1992 identified four cultural layers dated to the later part of Late Neolithic, Bronze Age, Western Han and Jin to Tang Dynasties (**Figure 11.3b**). Significant findings include a Late Neolithic burial, Bronze Age quartz workshop and possible stone structural remains, and a Jin dynasty burial (CUHK 1991, CUHK 1992, Tang *et al* 1997).

**11.4.4.17** During the Second Territory-wide Survey, a series of auger hole tests were conducted in Pak Mong to further establish the extent and nature of the site, with a focus on the central, southern and north-western part of the terrace: in Area I (K14-21), the discovery of intense kiln debris and burnt clay indicated the presence of a kiln in the proximity, prehistoric to Han cultural layer was also recorded; while in Area II, sixty-six auger hole tests and three test pits revealed cultural layers dated to prehistoric, Han, Jin-Tang, and Song to Qing dynasties (AMO 1998).

Other previous Archaeological Testing within the current Assessment Area

**11.4.4.18** The Guangzhou Institute of Archaeology conducted an auger test as part of the Second Territory-wide Survey inside the current assessment area (AMO 1998). A few additional auger tests were located in close proximity of the TCW Station. None of the auger tests, all on Holocene alluvium, yielded any evidence for archaeological deposit, material or feature.

**11.4.4.19** The archaeological investigation undertaken as part of the TCNTE (Golder Associates 2015) was conducted within the current assessment area; three auger holes (AH-11-13) and one test pit (TP-2) were conducted within the current assessment area (**Figure 11.3a**). On Rocky Lion Hill along Shun Tung Road, AH-6, an auger hole had been proposed but was not conducted within the current railway alignment due to dogs. AH11, 12 and AH-13 (later excavated as TP-2) were set on the open land west of Yat Tung Estate within the TCW Station on Holocene alluvium.

**11.4.4.20** The auger hole tests did not produce any archaeological results (Golder Associates 2015: Appendix E 2, 6 and 10). Result of TP-2 located within the TCW Station only yielded on disturbed topsoil findings, including a Ming/Qing dynasty Wun Yiu blue and white porcelain rim, a Tang dynasty pottery rim, undiagnostic tile fragments, and a black polishing pebble (Golder Associates 2015: Appendix F 4). The authors determined that the likelihood of *in situ* substantial archaeological deposits within the TCW Station footprint were unlikely with exception of potential (Tang dynasty) kilns. It has to be pointed out that the previous testing within the TCW Station footprint only occurred on Holocene alluvial deposits. In comparison the archaeological deposits of Ma Wan Chung and Sha Tsui Tau SAIs are located mainly on Pleistocene terraced alluvium.

## 11.4.5 Background of Declared Monuments

**11.4.5.1** There are two declared monuments located within the assessment area (**Figure 11.4**), including Tung Chung Fort and Tung Chung Battery as summarized below.

*Tung Chung Fort (AM77-0063)*

**11.4.5.2** Tung Chung Fort was declared a monument in 1979. The Fort, originally known as Tung Chung Suocheng (Tung Chung Battalion), was the naval headquarters of the Right Battalion of Dapeng (AMO 2004). It is a large walled enclosure of dressed granite with gate towers, barracks, three gateways and gun emplacements. The Fort was probably constructed in 1832 according to a carved granite slab above the main entrance (Siu 1997). The site was initially transformed into a police station after the evacuation of the Qing troops in 1898 when the New Territories was leased to Britain, and later occupied by Wah Ying Secondary School, Tung Chung Rural Committee and Tung Chung Public School (AMO 2004, Siu 1997).

*Tung Chung Battery (AM81-0280)*

**11.4.5.3** Tung Chung Battery was discovered in 1980 and was declared a monument in 1983 (Bard 1988, AMO 2004). It is believed that this Battery is one of the two 1817 constructed forts located at the foot of the Rocky Lion Hill along Shun Tung Road mentioned in the Qing dynasty *Guangdong Annals* (AMO 2004). The ruin consists of an L-shaped wall with a platform at the corner, which could be a gun emplacement. According to historical document, the original compound probably also included seven soldiers' quarters and a gunpowder magazine (Siu 1997). It is also believed that the remains of the Battery are partially buried underneath the road leading to Tung Chung Pier (Peacock & Nixon 1986).

## 11.4.6 Built Heritage Background

### Graded Historic Building

**11.4.6.1** In addition to the declared monuments there is one Grade 2 Historic Building, namely Hau Wong Temple (Tung Chung) within the assessment area.

*Hau Wong Temple (Tung Chung), Tung Chung, Lantau Island, Grade 2*

**11.4.6.2** The Temple is one of three Hau Wong temples on Lantau. Hau Wong was a patron deity of the military officials and soldiers in the Qing dynasty or earlier. The temple bell is dated 1765 and the temple was built by wealthy indigenous villagers while Lei Kau Yuen Tong donated the land. A plaque in the temple also records the dispute of land among the landlord and the tenant in the Qianlong years in 1768-1777.

**11.4.6.3** Cantonese opera performance, lion dance and others are normally held to celebrate the festival and to thank the deity for his blessing throughout the year. With the construction of the new airport and new town in Tung Chung, easy access to the temple has attracted more people to visit the temple. (AMO 2010).

**Non-Graded Built Heritage**

**11.4.6.4** Four previously recorded heritage items identified in the approved EIA report for TCNTE (AEIAR-196/2016) are located within the current assessment area (**Figure 11.4**). The items have not been graded or assessed to be graded. A brief description is presented as follow.

*Broken bridge in Ma Wan Chung*

**11.4.6.5** The bridge is located at the mouth of Ma Wan Chung river. The 1973 aerial photo and photo of the bridge is shown in **Appendix 11.1**. It is an old footbridge made of moulded concrete blocks and decked by wooden planks. It used to connect a nearby jetty but now in ruined status. (Golder Associates 2014: Appendix B 2). (**Figure 11.4**).

*Earth Shrine in Ma Wan Chung*

**11.4.6.6** The earth shrine sets in the coast front of Ma Wan Chung village. The photo of the earth shrine is shown in **Appendix 11.1**. It is mainly made of concrete but with built in wooden shutters in front, which resembles a temple. The walls are painted in red colour while the pitched roof in green. Wooden altar is seen placed inside in front of a ceramic statue of Earth God (Golder Associates 2014: Appendix B 3) (**Figure 11.4**).

*Earth Shrine in Sha Tsui Tau*

**11.4.6.7** The earth shrine is located near waterfront in Sha Tsui Tau. The photo of the earth shrine is shown in **Appendix 11.1**. The shrine has a freestanding concrete doorframe. Three elongated round stones resemble the Gods of Earth are placed in the main altar. The sides are accompanied with two stone plaques with small altars (Golder Associates 2014: Appendix B 6) (**Figure 11.4**).

*Shrine in Sha Tsui Tau*

**11.4.6.8** The shrine closely accompanies the Earth Shrine mentioned right above. The photo of the shrine is shown in **Appendix 11.1**. It has an overhead shelter made of

concrete, timber and metal. The altar appears in semi-circular shape with ascending steps, on where several ceramic statues are placed (Golder Associates 2014: Appendix B 7) (**Figure 11.4**).

**11.4.6.9** Further non-graded heritage items were recorded during field visit, these are two boundary stones on Rocky Lion Hill and a Stele within the TCW Station footprint.

*Boundary stones*

**11.4.6.10** Two boundary stones are located on the hillock north of Ma Wan Chung Village. Chinese inscriptions "盧宅地界" are carved on them. The photo of the boundary stones is shown in **Appendix 11.1**. The boundary stones possibly marked the area of grave lands of local villagers (**Figure 11.4**).

*Kadoorie Agricultural Aid Association (KAAA) stele*

**11.4.6.11** The stele is located near a water channel within the TCW Station footprint (**Figure 11.4**). The photo of the KAAA stele is shown in **Appendix 11.1**. The water channel was originally a stream tributary of the East Chung (East river or stream) and flows into Tung Chung Bay (Lands Department 1924 and 1945). With the construction of Yat Tung Estate, most part of the tributary was built over, only the outlet section left and paved over. The stele bears the mark of KAAA in English and Wing Lok Bridge (永樂橋) in Chinese, indicating a bridge, likely providing the connection between Ma Wan Chung with Sha Tsui Tau communities. The smaller Chinese characters at sides mark the bridge's construction date as 7th March 1959 and a person's name Chan Po Wai (陳步煒).

**11.4.6.12** The English inscription KAAA stands for Kadoorie Agricultural Aid Association. It was established by the Kadoorie brothers, Sir Horace and Lord Lawrence, as well as by Norman Wright and Woo Ting Sang in 1951. After 1945, a flood of immigrants fleeing the Civil War on the Mainland arrived Hong Kong and caused a sharp increase in population. As most of the newcomers were farmers, the association thus aimed to provide help to the farmers adopting a 'Helping People Help Themselves' philosophy (KFBG Website 2020a). In doing so, KAAA provided training, interest-free loans and agricultural inputs in forms of livestock, houses, pig pens and cattle sheds to the farmers. KAAA also donated cement to the farmers for the construction of their community paths, roads, bridges, dams and jettys (KFBG Website 2020b). These days, the KAAA marks can still be seen on many infrastructure facilities in the New Territories (KFBG Website 2020b).

*Other Historic Buildings*

**11.4.6.13** Other than those listed old buildings/structures within 300m of the project boundary in section 11.4.5 of the report, historic buildings such as the building behind 3A Lung Tseng Tau, 8, 11 and the building next to 25 Wong Kai Wai, 2 and 4 Ha Ling Pei, 2, 3, the building between 7B and 7D, 43, 62, the building beside 66 and 66 Sheung Ling Pei, 6-7, 8 Tung Chung Shan Ha and 2, 16, 75, 108, the

building next to 109 and 110 Ma Wan Chung, Tung Chung Tao Yan Youth Camp The Evangelical Lutheran Church of Hong Kong, Former Tung Chung Vegetable Depot, No. 16 and No. 29 at Ma Wan Chung, Former Tung Chung Public School within Tung Chung Fort and AMS Tung Chung Office at Ha Ling Pei (**Figure 11.4**). The descriptions and plates of the additional historic buildings are provided in **Appendix 11.1.** If there are any buildings / structures both at grade level and underground which were built on or before 1969 found within the works sites/ works areas during the construction, the project proponent will alert AMO in an early stage or once identified.

## 11.4.7 Existing Impacts

**EAP/ EEP Area near Shun Tung Road**

**11.4.7.1** The EAP/ EEP is located on an artificial slope of Rocky Lion Hill along Shun Tung Road and the west of Shun Tung Road. There is plantation on the artificial slope where the EAP / EEP is located.

**TCW Station**

**11.4.7.2** Review of aerial photographs since 1924 indicate that Tung Chung Valley remained largely untouched until the mid-1990s. The area has been mainly in use for agriculture and some of the area have been occupied by uses such as open storage and commercial activities. The main disturbance is the site formation and construction of nearby Yat Tung Estate. The site formation is visible on 1996 aerial photograph (Lands Department Ref. A43926; **Appendix 11.2**) first at the northern end and on the 1998 aerial photograph (Lands Department Ref. A47708; **Appendix 11.3**) covers the entire future estate. At the same time in 1998, the Wong Lung Hang Stream to the west of the TCW Station was channelled. Despite the extensive construction to the east and west of the TCW Station, the extent of existing impact in the TCW Station area seems to be limited and some archaeological potential may remain.

**Associated Works Area A**

**11.4.7.3** The aerial photographs (pre-1998) indicate that this area consisted of agricultural fields and geological map indicates a palaeo stream bed. The above-described area of high archaeological potential (Golder Associates 2015) extends into Associated Area A near Chung Mun Road Sewage Pumping Station. The 1998 aerial photograph (Lands Department Ref. A47708; **Appendix 11.3**) however, showed major site formation within the Associated Works Area A. The area of interest is now a landscaped area around the pumping station. The remainder of Associated Area A is equally affected by either site formation and landscape or paved.

**Associated Works Area B**

**11.4.7.4** Associated Works Area B is a narrow area located near Ma Wan Chung Village. It is bordered by cut hill slopes and the village. Geologically it is partially on top of

another palaeo stream bed and adjacent Pleistocene debris flow and terraced alluvial deposits. The 1996 and 1998 aerial photographs (Lands Department Ref. A43926 and A47708; **Appendix 11.2** and **Appendix 11.3**) showed the area was included in the site formation for the new village and surrounding development. This would have adversely affected the archaeological potential of the area and therefore this area is considered to have no archaeological potential.

## 11.5 Archaeological Impact Assessment

### 11.5.1 Archaeological Impact Assessment Methodology

**11.5.1.1** The methodology for the cultural heritage impact assessment is based on TM Annexes 10 and 19 of the EIAO and *Guidelines for Cultural Heritage Impact Assessment*. The impact assessment approach described in the Guidelines covers both construction and operational phases of project and consists of a number of steps including a baseline study, field works if necessary, assessment and mitigation recommendations.

**11.5.1.2** As stated in the Guidelines for Cultural Heritage Impact Assessment, the baseline study is used to compile a comprehensive inventory of all SAIs within and in the environs of the assessment area. 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 SAIs.

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

**Task 1: Desk-based research**

**11.5.1.4** Firstly, desk-based research is carried out in order to identify any known or potential SAIs within the assessment 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 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**

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

**Task 3: Archaeological Field Investigation**

**11.5.1.6** The results of the desk-based study and site visit indicate that there is insufficient data for purposes of identification of archaeological potential, determination of cultural significance and assessment of impacts at TCW Station area, and an archaeological field investigation programme was designed and agreed with Antiquities and Monuments Office. An application by a qualified archaeologist to undertake the archaeological excavation was approved and the archaeological field investigation was carried out in March 2021. The agreed archaeological field investigation consisted of the following steps:

*Field Scan*

**11.5.1.7** Field walking was 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 assessment area. Particular attention was given to exposed areas such as riverbed cuts, erosion areas, terraces, etc. Material and concentrations of finds if present were recorded, mapped at 1:1000 scale and collected during the field scanning and form part of the archive. Topography, surface conditions and existing impacts are noted during the field walking. A summary of the field walking results is presented in **Section 11.5.2**.

*Auger Survey*

**11.5.1.8** Auger survey of forty auger tests within the TCW Station were conducted in order to establish soil sequence, the presence/absence of cultural soils or deposits and their horizontal extent. The area of auger survey is shown in **Figure 11.5**. 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 of any material found is also measured. 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 was marked on a 1:1000 scale map. A summary of the auger survey results is presented in **Section 11.5.2**.

*Test Pit Excavation*

**11.5.1.9** Eight test pit excavations were carried out to verify the archaeological potential within TCW Station area. The locations for the test pit excavations are marked in **Figure 11.5**.

**11.5.1.10** Hand digging of test pits measuring between 1m x 1m and 1.5m x 1.5m were carried out in order to determine the presence/absence of archaeological deposits

and their stratigraphy. The size varied to suit actual circumstance such as close proximity to large trees, narrow terraces or other external factors. The test pit was hand excavated, contexts, finds and features were recorded, soils described and relevant depths measured. Artefacts were recorded and collected. Photographs of sections and other relevant information were taken and section and ground plans, if required, were drawn.

**11.5.1.11** Hand excavation was continued until rock or decomposing rock was reached and/or no potential for archaeological soils or deposits existed. Additionally, the test pit was abandoned when the water table was reached or when the depth of excavation posed safety problems (i.e. deeper than 1.2m vertical section).

**11.5.1.12** The hand excavated test pit was backfilled after full recording. Field records containing information regarding the physical location of the test pit, weather conditions, size and benchmark, description of the soils and their measured depths, artefact and feature finds were kept for each pit. Photographs were taken and drawings and plans produced, finds were bagged, labelled and stored for transport. The location of the test pit was mapped on a 1:1000 scale map. A summary of the test pit excavations results is presented in **Section 11.5.2**.

**Task 4: Impact Assessment**

**11.5.1.13** The prediction and evaluation of both direct and indirect impacts is undertaken to identify any potential adverse effects to all identified SAIs and areas of archaeological potential within the assessment area. A detailed description of the works and all available plans (with their relationship to the identified resources clearly shown) are included, to illustrate the nature and degree of potential impacts. The impact assessment will adhere to the detailed requirements of Annexes 10 and 19 of the EIAO-TM.

**Task 5: Mitigation Measures**

**11.5.1.14** 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 SAI or area of archaeological potential, a programme of mitigation measures will be designed and submitted to the Antiquities and Monuments Office for approval. The mitigation measures will be clearly listed and the party responsible for implementation and timing of the measures will also be included. Examples of mitigation measures include rescue excavation and archaeological watching brief (AWB).

## 11.5.2 Summary of archaeological field works and results

**11.5.2.1** The fieldworks under this project were divided into a Northern and Southern Area (**Figure 11.5**). The field scan indicates that the Northern Area is mostly covered in concrete, except for a small patch of existing orchard located at the southern edge;

while in the Southern Area there are more areas with exposed soil. No archaeological materials beyond modern rubbish (not kept) were recorded in both areas.

**11.5.2.2** The auger survey (40 tests) indicates that stratigraphy in both areas is very rocky which limits the efficacy of the tests. In Northern Area, six auger holes conducted along the concrete path (AH26-28, AH38-40) were shallow due to rocky fill layers. Eight auger holes (AH18-25) conducted within the orchard west of the concrete footpath indicated a modern topsoil followed by rocky fill layers. According to local informants, approximately 0.5m fill was dumped in this area in the 1990s. The auger tests did not include archaeological materials or deposits.

**11.5.2.3** Similar to the Northern Area, the Southern Area proved to be very rocky near the surface and most of the auger tests were shallow due to rocks. Exceptions were AH17 and AH31, where soil sequences over 1m in depth were recorded.

**11.5.2.4** AH17 comprised a modern topsoil and original (buried) topsoil, followed by sterile alluvial deposits. The lowest recorded layer at 2.09-2.29mPD included a few decayed wood fragments, which was reflected in the dark/ organic rich appearance. The water table was encountered at 1.10m below surface. AH31 comprised a modern topsoil and fill layers over a possible original topsoil (around 2.7 to 3mPD) and sterile alluvial deposits. Again, no archaeological materials or deposits were recorded within the auger tests.

**11.5.2.5** A total of eight test pits (TP) were excavated of which three in the Northern Area (TP1 to TP3) and five in the Southern Area (TP4 to TP8). All measured 1.5 by 1.5m in size and each was excavated either down to sterile natural deposits or to safety limit of 1.2m below the surface.

**Northern Area**

**11.5.2.6** A similar stratigraphical sequence was recorded in the three test pits (TP1-TP3) excavated in the Northern Area, which comprised modern fill overlying original topsoil and sterile/ natural alluvial deposits. Two of the three test pits indicated that the original topsoil was modern in date. Indeed, as seen in aerial photos or maps dated to the early 1990s (e.g., GEO 1992, 1:1000 9-SE-8D, Ed 1992-08), the coastal area west of Yat Tung Estate was used for cultivation prior to housing development. Based on the known history of Ma Wan Chung, the agricultural activity is associated with the settlement of the village in late Qing period.

**11.5.2.7** All three test pits revealed a basal deposit of alluvial boulder layers, which is to be expected given their location close to a river course. Among the three test pits, the original topsoil in TP3 seemed rockier with frequent boulders, which also makes sense given its close proximity to the rocky nullah.

**11.5.2.8** Although no pre-modern cultural deposits were identified, a few older materials were recorded in the modern layers, including one prehistoric stone adze fragment from context [301], one prehistoric pebble tool from context [302], a possible Tang

body sherd from context [301], a few Song celadon sherds from context [202], and a possible Bronze Age high-fired sherd from context [201]. Given the nature of sediment movement on an alluvial plain and the proximity to previous discoveries in nearby Ma Wan Chung SAI, it is not surprising to find early historical and prehistoric materials in the disturbed layers.

**Southern Area**

**11.5.2.9** A similar stratigraphical sequence was recorded in the five test pits (TP4-TP8) excavated in the Southern Area comprised of a modern topsoil/fill over (thin) original topsoil and sterile/natural alluvial deposits. The findings of the original topsoil elevations are the same as the mPD levels on the 1984 topographical map prior to housing development in this area. The disturbance in TP8 was recorded to below the 1984 topsoil level (c.4mPD) which is confirmed in nearby borehole data results. This suggests the potential for finding substantial pre-Qing cultural deposits is very low.

**11.5.2.10** The borehole test conducted near TP6, provides the same stratigraphy (fill, topsoil and alluvial deposits) as recorded within the TP6 excavation. The borehole and excavation results indicate that the lowest excavation layer should be interpreted as the bottom of topsoil on top of sterile alluvium; the latter was recorded and confirmed when rock was reached in excavation auger test at 2.6mPD. No *in situ* cultural layers were recorded in TP6-8.

**11.5.2.11** Within TP7, one possible Tang dynasty sherd with lug scar was recorded mixed with later Qing-C20 materials. The few Qing or later materials recovered from the upper layers can either be interpreted as modern fill or original topsoil of Qing-C20 data and are associated with agricultural activities of later historical to modern date.

**11.5.2.12** The report includes an evaluation of archaeological potential of the Study Area and surrounding area based on previous and current findings. It concludes that within the Southern Area there is an absence of pre-Qing cultural deposits with the exception of one possible redeposited Tang dynasty sherd and that the potential for finding substantial or *in situ* cultural layers is low. Regarding the Northern Area it state that the findings indicate redeposition of artefact in a low-lying Holocene alluvial environment at the mouth of an ancient river; the archaeological potential is therefore deemed limited for *in situ* cultural deposits within the TCW Station area.

**11.5.2.13** The untested area to the north of the TCW Station area in contrast while equally on Holocene alluvium are at similar levels (3.3 to 3.6mPD) as the occurrence of the two Tang kilns recorded in 1992-1993. Tang kilns are known to occur in multiples and in (parallel) rows. The report concludes that based on the existing information it cannot exclude that such kiln structures continue towards north of the tested area (i.e. the proposed tunnel alignment north of TCW Station). Due to site accessibility, an area with archaeological potential is untested as shown in **Figure 11.6**.

### 11.5.3 Evaluation of Archaeological Potential

**11.5.3.1** There are five sites of archaeological interest and an archaeological potential area (identified in the TCNTE EIA Report) within or near the Project. The SAIs concerned are Ma Wan Chung, Sha Tsui Tau, Fu Tei Wan Kiln (relocated to Tung Chung), Tung Chung Game Board Carving and Pak Mong and a medium archaeological potential area was determined between Tung Chung Road (north) and Rocky Lion Hill along Shun Tung Road (TCW-2) near the railway alignment and within the Assessment Area (see **Figures 11.3a** and **11.3b**).

**11.5.3.2** The works at (1) TCE Station and associated works, (2) TBM tunnelling between existing TUC and TCW Station, (3) EAP/EEP and the shafts connected to the main tunnel, and (4) TCW Station and associated works are reviewed to assess potential to affect above-identified archaeology:

**TCE Station and associated works near Pak Mong SAI**

**11.5.3.3** Pak Mong SAI is within the Assessment Area at the eastern end of the works but outside of the works site/ area (at distance of 220m) and hence will not be impacted by the Project.

**TBM tunnelling between Existing TUC and TCW Station**

**11.5.3.4** Twin underground TBM tunnels are to be constructed mainly in rock stratum and will not cause direct impact on Ma Wan Chung SAI which is located adjacent to the works and have a maximum of 50m separation distances of the works. Furthermore, the TBM tunnel alignment is at least 10m below surface. The TBM tunnelling and operation of the train has the potential to indirectly impact on, through vibration, tilting and settlement of archaeological deposits or features within or near Ma Wan Chung SAI.

**11.5.3.5** The tunnel continues below the hill and an area between Tung Chung Road (north) and Rocky Lion Hill along Shun Tung Road which was determined as an area of moderate potential for archaeology by previous investigators (Golder Associates 2015:85) (**Figure 11.3a**). The current alignment avoids this area of the Youth Camp and the works impacts will be outside the area of archaeological potential (TCW-2) identified in the TCNTE EIA Report.

**11.5.3.6** The tunnel alignment below the Rocky Lion Hill along Shun Tung Road, will also pass below (but not close >150m) Tung Chung Game Board Carving SAI. Due to the nature and distance from the works, no impacts are expected.

**11.5.3.7** Fu Tei Wan Kiln (relocated to Tung Chung) SAI is located 100m from the TBM tunnelling. Although not close, the fragile nature of the kiln may be affected by groundborne vibration arising from the TBM tunnelling and operation of railway.

**EAP/EEP and the shafts connected to the main tunnel**

**11.5.3.8** The location for the EAP/ EEP buildings and shafts connected to the tunnels is situated along the northeast of Rocky Lion Hill along Shun Tung Road and within

an existing artificial slope. The works will hence not affect any potential archaeology within the sites. The EAP/EEP is at a distance of approximate 300m from Tung Chung Battery and Fu Tei Wan Kiln (relocated to Tung Chung) SAI, and approximate 210m from Tung Chung Game Board Carving SAI. The distance between the works areas and the SAIs and Declared Monument is deemed sufficient.

**TCW Station and Associated Works**

*TCW Station*

**11.5.3.9** The TCW Station is to be excavated top down using cut-and-cover excavation. The works are located to the east of Sha Tsui Tau SAI and adjacent to Ma Wan Chung SAI. The works area at Yu Tung Road and the works for TCW Station box are at a distance of about 75m and 130m to Sha Tsui Tau SAI boundary respectively and no direct impact on Sha Tsui Tau SAI from the construction of TCW Station is expected.

**11.5.3.10** The northern part of the TCW Station is adjacent to the Ma Wan Chung SAI and is situated on Holocene alluvium. Previous archaeological investigation indicated Tang/Song dynasty cultural materials and some (redeposited) Neolithic pottery on a geological mix of Holocene alluvium and Pleistocene terraced alluvium area at low elevations. The current field investigation results indicate that within the TCW Station the archaeology exists of redeposited materials with no expectations for *in situ* cultural layers (or kilns). The works area further north (of current tested area) and marked as area of archaeological potential in current field investigation, is situated on Holocene alluvium and is similar (agricultural, elevation) to areas adjacent to Ma Wan Chung SAI. It remains untested with the exception of a single inconclusive auger test. While the current field works results extend the knowledge of archaeology from the boundary of Ma Wan Chung SAI further south and west and indicate these consist of redeposited materials only, the lack of testing to the north of the TCW Station (an area on private lands and currently inaccessible) means some potential for *in situ* kilns cannot be excluded with certainty. The known *in situ* kilns and kiln material are recorded in previous investigations to the east and north east of the additional identified area of archaeological potential (**Figure 11.6**) which may represent the area the kilns are confined to but without archaeological data such cannot be confirmed at this stage.

**11.5.3.11** The TCNTE EIA Report assessed the centre part of the TCW Station (TCW-1) as having low archaeological potential. The remainder of the station was assessed in the TCNTE EIA Report within “Other Development Area” and due to minor proposed works no further action was required. Testing within TCW-1 consisted of three auger tests and a single test pit excavation within Holocene alluvial deposits. The test pit did yield surface archaeological materials dated to Tang, Ming/Qing dynasties and a polished black pebble. The authors concluded the area TCW-1 was of low archaeological potential but that the presence of Tang dynasty

kilns could not be excluded. In addition to testing under TCNTE EIA and HKAS in 1992-93, two further auger tests conducted during Second Territory-wide Survey are known within the TCW Station. Both auger tests did not yield archaeology. The previously conducted four auger tests and test pit excavation confirm the lack of archaeological deposits beyond superficial secondary deposits within the centre of the TCW Station. The centre has therefore been excluded from current archaeological field investigation.

**11.5.3.12** The southern part of the TCW Station is situated on Pleistocene terraced alluvium (similar to other areas of archaeological potential in Hong Kong) and was tested during under the field work of the current project. The results indicated sterile soil and rock strata under artificial fill. Very little archaeological findings (cultural layers or materials) were recorded in the test pit excavations and there is no suggestion of potential for major *in situ* archaeology or redeposited materials from nearby *in situ* archaeology.

*Associated Works Area A and B*

**11.5.3.13** The associated works areas are (1) three areas located to the south of the TCW Station (Associated Works Area A) and (2) single area near Ma Wan New Village (Associated Works Area B) fall outside the approved EIA report for TCNTE. The areas will be used for equipment storage, workshops, offices etc and as such there will be no impact on sub-surface and archaeology. The archaeological potential for the areas is considered in the next two paragraphs.

**11.5.3.14** Associated Works Area A is generally located on topographical and geological area of archaeological interest not yet investigated. TCNTE EIA Report explained the archaeological potential of Sha Tsui Tau SAI with reference to the meandering of Tung Chung River and presence of palaeo stream beds whereby the 'area of Sha Tsui Tau Site of Archaeological Interest formed a kind of peninsula situation between two streams' (Golder Associates 2015:55), i.e. largely to the west of Works Area A. The most eastern palaeo stream bed and part of the 'peninsula' is located partially within Works Area A (below Chung Mun Road Sewage Pumping Station). Existing impacts (mainly road construction and site formation) have however, adversely and irreversibly impacted potential archaeology. The existing impacts at Associated Works Area A included site formation for a series of development such as road, sewage pumping station, and stream channeling construction works with the exception of a small area along the south of the south eastern Associated Works Area A. In general, the existing impacts would have affected adversely archaeological potential of the area and therefore this area is considered to have no or for the small area along the south of the south eastern Associated Works Area A- low archaeological potential. Since there will be no sub-surface works, no impact is expected.

**11.5.3.15** Associated Works Area B is located on a mix of Holocene alluvium, Pleistocene deposits along the base of hill within a narrow valley. There have been no previous

archaeological investigations and the area has been impacted by site formation since mid-1990's (development of new village and surroundings). In general, the existing impacts would have affected adversely archaeological potential of the area and therefore this area is considered to have no archaeological potential.

**11.5.3.16** **Table 11.1** presents the evaluation summary of potential impacts on archaeology.

**Table 11.1** Evaluation summary of potential impacts on archaeology

| Works | | Concerned Heritage | Evaluation for potential impacts |
|---|---|---|---|
| TCE Station and associated works | | Pak Mong SAI | No potential impacts identified |
| Tunnel between Existing Tung Chung Station and TCW Station | | Within and adjacent to Ma Wan Chung SAI | Potential for construction and operation related vibration, settlement and tilting impacts on kilns structures and archaeological deposits |
| | | Tung Chung Game Board Carving SAI | No potential impacts identified |
| | | Fu Tei Wan Kiln (Relocated to Tung Chung) SAI | Potential for construction and operation related vibration impacts on fragile kilns structure |
| | | Area at Youth Camp identified in TCNTE EIA Report as having archaeological potential | No potential impacts identified |
| EAP/ EEP and the shafts connected to the main tunnel<br>Potential drill & blasting for construction of shafts. | | No archaeological potential areas identified within or nearby EAP/ EEP and the shafts connected to the main tunnel | No potential impacts identified |
| | | Tung Chung Battery and Fu Tei Wan Kiln (Relocated to Tung Chung) | No potential impacts identified due to the distance from works (approximate 300m) |
| | | Tung Chung Game Board Carving SAI | No potential impacts identified due to the distance from works (approximate 210m) |
| TCW Station and associated works | TCW Station | Archaeological potential verified during field works as part of current project and previous information:<br><br>Redeposited archaeological material recorded at northern end of TCW Station.<br><br>Nil archaeological potential identified at southern end on Pleistocene terraced alluvium and within centre on Holocene alluvium during field investigations. | Significance of redeposited materials is minimal and no major impacts identified;<br><br>Uncertainty to the east and north east of the additional identified area of archaeological potential |
| | | Sha Tsui Tau SAI is located to the west of the proposed TCW Station | No potential impacts identified due to the distance from works area at Yu Tung Road and works for TCW Station Box |

| Works | | Concerned Heritage | Evaluation for potential impacts |
|---|---|---|---|
| | | | (about 75m and 130m respectively) |
| | Associated Works Area A | No archaeological potential, due to extensive existing disturbance impacts<br><br>and<br><br>low archaeological potential for the small area along the south of the south eastern Associated Works Area A | No potential impacts identified due to no subsurface works |
| | Associated Works Area B | No archaeological potential due to extensive existing disturbance impacts. | No potential impacts identified |

## 11.5.4 Construction Phase Impact Assessment

**11.5.4.1** The construction works at the TCE Station and associated works near Pak Mong SAI, tunnel near Tung Chung Game Board Carving SAI, EAP/ EEP and the shafts connected to the main tunnel, and TCW Station associated works areas are deemed to have no archaeological potential affected by the works.

**11.5.4.2** The construction works which should be considered as having a potential effect on archaeology are twin TBM tunnelling in the vicinity of Ma Wan Chung SAI, and - to a lesser extent- the station box construction for TCW Station. Associated impact may arise from groundwater changes will be addressed in this section.

**Tunnel between Existing Tung Chung Station and TCW Station**

**11.5.4.3** The tunnel alignment has proactively been designed to avoid the Ma Wan Chung SAI and will occur at least 10m below ground. Within the SAI, there are two kiln structures located at about 40 and 60m, respectively from the works boundary and surrounding the two kilns is an associated cultural deposit (**Figure 11.6**). The tunnelling works within rock stratum is designed to be low-vibration and vibration levels within Ma Wan Chung Village will be low. With reference to other similar TBM projects, associated vibration and ground settlement is thus not expected to significantly affect nearby archaeological deposits or features. Significant ground settlement from tunneling on the kiln structures at 40 and 60m from the works boundary is not expected. Some settlement of soil above tunnels is expected outside or adjacent to the boundary of the SAI. The settlement impacts on isolated and redeposited archaeological materials above the tunnels is deemed minimal. If further kilns, however, were located above the tunnel alignment ground settling could affect the structural integrity of kilns. Further field investigation is undertaken to identify if there are kilns structures above the tunnel area (see **Sections 11.5.5.2** to **11.5.5.3**).

**11.5.4.4** Fu Tei Wan Kiln (relocated to Tung Chung) SAI is located over 100m from the underground tunnelling works. The issues are structural fragility of the kiln and possible vibration and settlement generated from tunnelling works. Given the separation distance, vibration and settlement would not be expected to significantly impact on Fu Tei Wan Kiln (relocated to Tung Chung) SAI.

**11.5.4.5** Due to the close proximity of the tunnelling works to the sea, the actual groundwater level is expected to be very close to the sea level. The construction will not significantly affect the groundwater level, resulting in no significant change from the current status and no significant impact on archaeology.

**TCW Station**

**11.5.4.6** An archaeological field investigation was conducted to supplement the desk-based review which identified some archaeological potential within the north and south of the TCW Station area. Site formation works and excavations have the potential to directly and adversely affect shallow archaeological deposits within the station. The combined results of the test pit and auger survey at the southern end of the proposed Station on Pleistocene terraced alluvium show mainly thin artificial deposit covers an agricultural layer over rock/pebble deposit. Very few artefacts were retrieved, including a Tang dynasty sherd which suggests redeposition. The untested area to the west is located in very close proximity of a channelled river and is expected to have less potential for archaeology due to river impacts. The impact from the construction of the TCW Station on archaeology at the southern end is thus deemed nil as no archaeological deposits, materials of significance were recorded on the Pleistocene terraced alluvium (similar result was obtained at a previous tested area across from the river towards Sha Tsui Tau SAI (Golder Associates 2015:60)).

**11.5.4.7** The findings at the northern end within the TCW Station area yielded evidence for redeposited materials but no evidence for *in situ* cultural strata within the tested area. Nevertheless, the findings extend the knowledge of archaeology outside of Ma Wan Chung SAI. Due to shallow Holocene alluvial stratigraphy at the end of ancient river mouth, and paucity and value of finds, no further action is recommended within the tested TCW Station area. The extreme northern end of the TCW Station remains untested as it is on private land and due to its closer proximity to the *in situ* kilns and similar topography some potential for further kilns cannot be excluded.

**11.5.4.8** The construction of the TCW Station at its northern end may indirectly affect adjacent archaeological deposits or features in and near Ma Wan Chung SAI by ground movement. The previous and current archaeological investigation findings located near the TCW Station within and near the SAI consists of mainly isolated and redeposited artefacts. Some displacement of isolated or redeposited artefacts due to vibration or settlement is deemed an acceptable impact since the significance of the find is not tied to its surrounding. If kiln structures, however, were located

above the tunnel alignment ground settling could affect the structural integrity of such.

**11.5.4.9** Due to the close proximity of the TCW Station to the sea, the actual groundwater level is expected to be very close to the sea level. The construction will not significantly affect the ground water and as such there will be no significant changes to the current status and no adverse impact on archaeology within the Ma Wan Chung SAI. **Table 11.2** presents the construction works impacts on archaeology.

**Table 11.2** The Construction works impacts on archaeology

| Construction Works | Potential Impacts | Potential Archaeological Resources Affected | Distance to Works Boundary in Metres | Summary of Assessment |
|---|---|---|---|---|
| Construction of TBM tunnels | - Ground movement<br>- Changes in ground water level<br>- Vibration | Ma Wan Chung SAI | Adjacent to SAI and within 50m of the SAI boundary and at least 10m below surface | - Limited ground settlement is expected within Ma Wan Chung village near kiln structures due to tunnelling works are within rock stratum and at a distance of 40 to 60m;<br>- No expected significant vibration level at Ma Wan Chung village near kiln structures due to distance from works (40/60m) and vibration level less than of 3mm/sec for continuous vibration and 7.5mm/sec for transient vibration.<br>- No expected significant changes of ground water level due to proximity of sea;<br>- The works are deemed an ***acceptable impact.*** |
| | | Kiln structures (2) within Ma Wan Chung SAI | About 40m and 60m | |
| | | Potential kiln structures above TBM tunnels within extended area of archaeological interest as marked on **Figure 11.7** | Adjacent to the SAI and within works boundary | - No major archaeology was previously recorded in southwestern end of Ma Wan Chung SAI and within the tested northern part of the TCW Station, and while previous findings were largely on Pleistocene terraced alluvium they cover adjacent Holocene alluvium too. In addition, the kilns and surrounding cultural deposit were located close to the high-water mark. The possibility for further kilns within the geological intersection of Pleistocene and Holocene alluvium and near the high-water mark cannot be discounted. These areas, however, are untested and if kilns were present these could be adversely impacted by ground settlement above the tunnel alignment. (**Figure 11.7**)<br>- The areas which are affected by ground settlement and vibration above the tunnel alignment could contain archaeology, but such deposits are expected to be redeposited and of low archaeological value.<br>- No expected significant ground water changes<br>The works are deemed an ***acceptable impact with mitigation.*** |
| | - Vibration | Tung Chung Game Board Carving SAI | 150m | - Vibrations generated by TBM tunnelling and construction of the tunnel are not expected to extend through the Rocky Lion Hill along Shun Tung Road to Tung Chung Game Board Carving SAI. |

| Construction Works | Potential Impacts | Potential Archaeological Resources Affected | Distance to Works Boundary in Metres | Summary of Assessment |
|---|---|---|---|---|
| | | | | - The works are deemed an ***acceptable impact***. |
| | | Fu Tei Wan Kiln (relocated to Tung Chung) SAI | 100m | - Vibrations generated by TBM tunnelling and construction of the tunnel are not expected to extend to the distance of the Fu Tei Wan Kiln (relocated to Tung Chung) SAI.<br><br>- The works are deemed an ***acceptable impact***. |
| TCW Station | - Cut and cover excavation; and<br>- Drill and blast | Ma Wan Chung SAI and extended area of archaeological interest as marked on **Figure 11.7** | Within works area | - No archaeology and limited potential for archaeology was recorded at the southern end of the TCW Station<br>- Redeposited and isolated materials was recorded at the tested northern end of the TCW Station;<br>- The current archaeological findings suggest the likelihood of finding *in situ* archaeological deposits on Holocene alluvial soils at the mouth of an ancient stream and within the tested area of TCW Station is nil.<br>- The extreme north of the TCW Station is situated on private untested lands similar to those of Ma Wan Chung SAI and some potential for *in situ* kiln structures exist.<br><br>- The works are deemed an ***acceptable impact with mitigation*.** |

### 11.5.5 Archaeological Mitigation Measures

**11.5.5.1** No major archaeological impacts are expected within the whole project area.

**11.5.5.2** Impacts on potential kiln structures within an unexplored area of archaeological interest at the extreme north end of the TCW Station area and above and adjacent to the tunnel alignment (**Figure 11.6**), arising from ground settlement and vibration are uncertain. While the likelihood of kilns extending this far west is unlikely it cannot be excluded without testing. The areas adjacent to the tunnel are private and cannot be accessed as part of this project while the area of interest within the railway alignment and northern end of the TCW Station are private too but will be resumed. The area of archaeological interest will be tested where possible for the presence of kiln structures.

**11.5.5.3** Recommended testing after granting of access or resumption includes field scan, 6 auger tests and 2 test pit excavations within the area of archaeological interest. Tentative locations are marked on **Figure 11.7** and scope should be agreed with AMO prior to implementation. The exact locations of the auger tests and test pits would be subject to site circumstances and constraints. The further archaeological testing should be conducted by a qualified archaeologist who obtains a licence under the Antiquities and Monuments Ordinance (Cap. 53).

**11.5.5.4** Subject to the findings of the further archaeological testing, options for mitigation measures such as in-situ preservation, relocation and preservation by record etc would be fully investigated and agreed with AMO.

**11.5.5.5** AMO should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of the project works in accordance with the Antiquities and Monuments Ordinance (Cap. 53), so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO.

### 11.5.6 Cumulative Impacts with Concurrent Projects

**11.5.6.1** With a review of the concurrent projects identified in **Section 2**, the potential cumulative impacts on the archaeology would be the construction activities of Area 23 and Area 28 of the TCNTE. The TBM tunnelling works would be located adjacent to the western side of the Ma Wan Chung SAI while Area 23 and Area 28 of the TCNTE would be situated on approximate 10m and 40m to the eastern side of the Ma Wan Chung SAI. Neither the current nor the concurrent projects will affect Ma Wan Chung SAI and thus no cumulative impacts are anticipated.

### 11.5.7 Residual Impact

**11.5.7.1** Residual impacts may depend on the survey results of the further investigation on the area of archaeological interest. Overall, no residual impacts are expected due to the fact that the impacts will occur on redeposited material or areas of no

archaeological potential. For the scenario in which kiln structures are identified, the residual impacts are not considered as adverse provided the necessary mitigation measures to be agreed with AMO are timely implemented.

### 11.5.8 Operation Phase Archaeological Impact Assessment

### 11.5.9 Identification and Evaluation of Impact

**11.5.9.1** The main identified potential impact arising from the operation of the Project is train vibration on artefacts and features of Ma Wan Chung SAI and area of archaeological interest.

**11.5.9.2** Artefacts are situated in the soil related to their environment (layer or context) and while no physical harm will occur to the artefacts, the concern would be the displacement. The main archaeological findings within Ma Wan Chung SAI are related to kiln structures (Tang dynasty kiln debris) with surrounding distinct Song and Tang dynasty deposits or consisted of secondary deposited Neolithic pottery fragments and isolated Song dynasty sherds (HKAS 1993). The area of archaeological interest equally has the potential to include Tang dynasty kiln structures in the vicinity or above the ground railway alignment.

**11.5.9.3** The impacts from possible vibration on archaeological information from secondary deposit or isolated finds should be considered low due to the fact that the information they carry is embedded in the object not its surrounding.

**11.5.9.4** The vibration -as mentioned above- is mainly linked to type of track used, but also the speed of the train and the surrounding strata; propagation or absorption of vibration has to be assumed surrounding the tunnel (i.e. not unilinear). While the vibration limits for sensitive and dilapidated building as stipulated in BD's guidelines will be adhered to, the potential effect of vibration due to train movement on the Tang dynasty kiln structures and surrounding cultural layer and potential further kiln structures within the area of archaeological interest from the railway alignment during operation, would be controlled to acceptable level and hence the impact would be considered acceptable.

### 11.5.10 Mitigation Measures

**11.5.10.1** The vibration level of the train during operation within Ma Wan Chung SAI and area of archaeological interest will not exceed maximum peak particle velocity of 3mm/sec for continuous vibration and 7.5mm/sec for transient vibration (APP-137 2012) and will be an acceptable impact on the structural remains of the SAI, i.e. the kilns and the redeposited archaeological materials. No mitigation will be required.

### 11.5.11 Cumulative Impacts with Concurrent Projects

**11.5.11.1** No cumulative impacts with concurrent projects are expected.

### 11.5.12 Residual Impact

**11.5.12.1** No residual impacts are expected on archaeology from the operation of the Project.

## 11.6 Built Heritage Impact Assessment

### 11.6.1 Built Heritage Impact Assessment Methodology

**Baseline Study**

**11.6.1.1** A baseline study which collates available desktop information relevant to this Project, including geological and topographical background, historical and archaeological background, and previous cultural heritage investigations, has been undertaken. Research has been conducted to gather information from the following sources:

- List of Declared Monuments and Graded Buildings as issued by Antiquities and Monuments Office;
- 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; and
- Previous Built Heritage Impact Assessment's (BHIA) in the project assessment area.

**Built Heritage Survey**

**11.6.1.2** The purpose of the built heritage survey is to identify all built heritage resources within or in vicinity of the project boundary. The survey adheres to the above cited guidelines and provide adequate information to fulfil the relevant requirements as set out in Annexes 10 and 19 of the EIAO-TM.

**11.6.1.3** The scope of the survey for this Project will include all areas within 300m assessment area as required in the EIA SB. It would determine indirect impacts such as damage from groundborne vibration, ground settlement and contact with machinery and equipment.

**11.6.1.4** The scope of the items to be included in the built heritage survey has followed the Guidelines for Cultural Heritage Impact Assessment to compile a comprehensive inventory of heritage sites within the proposed assessment area. The surveyed resources shall include:

i. all declared monuments;

ii. all proposed monuments;

iii. all pre-1950 buildings/ structures/ sites graded or proposed to be graded by the AAB;

iv. Government historic sites identified by Antiquities and Monuments Office;

v. buildings/ structures/ sites of high architectural / historical significance and interest which are not included in items (i) to (iv) above; and

vi. cultural landscapes include places associated with historic event, activity, or person or exhibiting other cultural or aesthetic values, such as sacred religious sites, battlefields, a setting for buildings or structures of architectural or archaeological importance, historic field patterns, clan graves, old tracks, fung shui woodlands and ponds, and etc.

**11.6.1.5** The information gathered from the built heritage survey has been used to identify impacts and prepared mitigation recommendations (where necessary) for all of the resources identified in the survey.

**11.6.1.6** The coding method for the recording of built heritage resources will be as follows:

- Graded Historic Building (GB);
- Non-Graded Built Heritage Item (HB); and
- Historic Clan Grave (G).

## 11.6.2 Identification of Built Heritage Sites and Potential Impacts

**11.6.2.1** The following recognized built heritage sites have been identified within the assessment area (See **Figure 11.4**):

- Tung Chung Fort, Declared Monument;
- Tung Chung Battery, Declared Monument;
- Hau Wong Temple (Tung Chung), Tung Chung, Lantau Island, Grade 2; and
- Tin Hau Temple (Tung Chung), Grade 2.

**11.6.2.2** In addition, the following heritage sites, non-graded and not necessarily considered heritage sites in a traditional sense but important to the community and as a testimony of the development of the area were recorded; a brief description is provided in Annex A and resources are mapped on **Figure 11.4**:

- Broken bridge in Ma Wan Chung, non-graded (see **Appendix 11.1- Plate 1**);
- Earth Shrine in Ma Wan Chung, non-graded (see **Appendix 11.1- Plate 2**);
- Earth Shrine and Shrine in Sha Tsui Tau, non-graded (see **Appendix 11.1- Plates 3 – 4**);
- Two boundary stones are located on the hillock north of Ma Wan Chung Village, non-graded (see **Appendix 11.1- Plate 5**); and

- Kadoorie Agricultural Aid Association (KAAA) stele, non-graded (see **Appendix 11.1- Plate 6**).
- No historic clan graves were identified.

**11.6.2.3** Further buildings are illustrated and described in **Appendix 11.1** and mapped on **Figure 11.4**:

- 3A Lung Tseng Tau (see **Appendix 11.1- Plate 7**);
- 8, 11 and the building next to 25 Wong Kai Wai (see **Appendix 11.1- Plates 8-10**);
- 2 and 4 Ha Ling Pei (see **Appendix 11.1- Plates 11-12**);
- AMS Tung Chung Office at Ha Ling Pei (see **Appendix 11.1- Plate 13**);
- Former Tung Chung Public School within Tung Chung Fort(see **Appendix 11.1- Plate 14**);
- 2, 3, the building between 7B and 7D, 43, 62, the building beside 66 and 66 Sheung Ling Pei (see **Appendix 11.1- Plates 15-19**)
- 6-7, 8 Tung Chung Shan Ha, (see **Appendix 11.1- Plates 20-21**);
- 2, 16, 29, 75, 108, the building next to 109 and 110 Ma Wan Chung (see **Appendix 11.1- Plates 22-24, 26-29**);
- Former Tung Chung Vegetable Depot at Ma Wan Chung (see **Appendix 11.1- Plate 25**);
- Tung Chung Tao Yan Youth Camp The Evangelical Lutheran Church of Hong Kong (see **Appendix 11.1- Plate 30**);

## 11.6.3 Construction Phase Impact Assessment

**11.6.3.1** The construction works associated with the Project, including TCW Station, EAP/EEP buildings, associated works area, barging facility and tunnel alignment have the potential to directly or indirectly impact on built heritage buildings and structures. No built heritage sites except the KAAA stele would be directly impacted.

**11.6.3.2** For the indirect impact, the construction will include heavy machinery, major earthworks, piling works, blasting or mechanical breaking with possible vibration, settlement and tilting or visual impacts. Given the separation distances between the built heritage resources, such as Declared Monuments, and the works boundary, no impacts are identified from nature of works, ground settlement and vibration. **Table 11.3** summarises construction works impacts on built heritage.

**Table 11.3** Construction works impacts on Declared Monuments and built heritage

| Heritage site | Grading | Construction works | Dist, m | Assessment |
|---|---|---|---|---|
| Declared Monuments | | | | |
| Tung Chung Fort | Declared Monument | TCW Station and associated works sites | 110 | - The TCW Station is situated below ground and will have no visual impacts on Tung Chung Fort.<br>- The associated works sites will be used for placing the associated plants and minor temporary construction works. There will be no significant visual or other impacts on the Fort.<br>- The works are deemed an ***acceptable impact.*** |
| | | Tunnel alignment | >500 | - Given the separation distance to the TBM tunnelling, no adverse impact would be anticipated.<br>- The works are deemed an ***acceptable impact.*** |
| | | Associated works areas | 140 | - The associated works areas will be temporary in use and are located at a distance outside the village and across a road and are not expected to have a significant visual or other impact.<br>- The works are deemed an ***acceptable impact.*** |
| Tung Chung Battery | Declared Monument | Tunnel alignment | 105 | - Vibrations generated by TBM tunnelling and construction of the tunnel are not expected to have vibration impact given the distance from the Tung Chung Battery.<br>- The works are deemed an ***acceptable impact***. |
| Graded Historic Building | | | | |
| Hau Wong Temple (Tung Chung) | Grade 2 | TCW Station and associated works sites | 190 | - Vibrations generated by construction of the TCW Station (piling, D-wall, drill and blast) are not expected to extend to the distance of the Hau Wong Temple which is located across the stream from the TCW Station.<br>- The associated works sites will be used for placing the associated plants and minor temporary construction works. It would not cause significant visual or other impact.<br>- The works are deemed an ***acceptable impact.*** |
| Tin Hau Temple (Tung Chung) | Grade 2 | Associated works site | 248 | - Given the separation distance to associated works site, no adverse impact would be anticipated.<br>- The works are deemed an ***acceptable impact.*** |
| Non-graded Built Heritage | | | | |
| Broken bridge in Ma Wan Chung | Non-Graded | Tunnel alignment | Above works area and tunnels | - The TBM tunnel will be driven through rock below the broken bridge as such ground settling is not expected to be significant on the concrete (second half of 20$^{th}$ century) bridge.<br>- The works are deemed ***acceptable impact.*** |
| Earth Shrine in Ma Wan Chung | Non-Graded | Tunnel alignment | 30 | - With reference to other similar TBM projects, the ground movement and vibrations generated by TBM tunnelling and construction of the tunnel are expected to minimal. |

| Heritage site | Grading | Construction works | Dist, m | Assessment |
|---|---|---|---|---|
| | | | | - The works are deemed an ***acceptable* impact.** |
| Earth Shrine and Shrine in Sha Tsui Tau | Non-Graded | TCW Station | 50 | - The shrines are located across the Wong Lung Hang estuary. Construction of the TCW Station (piling, D-wall) impacts are not expected given the distance from the shrines.<br>- The works are deemed an ***acceptable impact***. |
| Boundary stones (2) at Rocky Lion Hill along Shun Tung Road | Non-Graded | Tunnel alignment | 35 and 55 | - With reference to other similar TBM projects, the boundary stones are located on the surface of Rocky Lion Hill along Shun Tung Road and is not expected to be impacted by tunnelling.<br>- The works are deemed an ***acceptable* impact.** |
| Kadoorie Agricultural Aid Association (KAAA) stele | Non-Graded | TCW Station | Inside works area | - The stele cannot remain in its current position during the construction stage. It should however be noted that the stele does not have recognized heritage value and Antiquities and Monuments Office does not recognize it as a heritage site. Despite this, the stele is a cultural testimony of economic development.<br>- As a good practice, the stele will be relocated/ removed after consultation with the respective stakeholders.<br>- The works are deemed an **acceptable *impact*.** |
| Other historic buildings include building behind 3A Lung Tseng Tau, 8, 11 and the building next to 25 Wong Kai Wai,<br>2 and 4 Ha Ling Pei,<br>2, 3, the building between 7B and 7D, 43, 62, the building beside 66 and 66 Sheung Ling Pei, 6-7, 8 Tung Chung Shan Ha and<br>2, 16, 29, 75, 108, the building next to 109 and 110 Ma Wan Chung,<br>Tung Chung Tao Yan Youth Camp The Evangelical Lutheran Church of Hong Kong, Former Tung Chung | N.A. | Tunnel alignment, TCW Station and associated works sites/ works areas | Above the tunnels, tens to hundreds meters | - For the building above or in the vicinity of the tunnel section (i.e. around Ma Wan Chung village), the TBM tunnels would be running in granite stratum and with a vertical separation distance of at least 10m from the ground surface. In addition, the project engineer has critically reviewed the impact to all buildings in the vicinity due to the construction and operation of the Project. Hence there would not be any adverse impact during construction and operational phases.<br>- For the buildings in the vicinity of the works sites/ works areas (i.e. within the villages around Tung Chung Fort), they have a minimum distance of 50m away from the works sites/ works areas.<br>- The works are deemed an **acceptable *impact*.** |

| Heritage site | Grading | Construction works | Dist, m | Assessment |
|---|---|---|---|---|
| Vegetable Depot, No. 16 and No. 29 at Ma Wan Chung, Former Tung Chung Public School within Tung Chung Fort and AMS Tung Chung Office at Ha Ling Pei | | | | |

### 11.6.4 Built Heritage Mitigation Measures

**11.6.4.1** Due to the separation distances and the TBM tunnel through rock, the graded historic buildings, declared monuments, non-graded heritage sites and additional historic buildings within the assessment area will not be affected by the Project. Thus, no mitigation measures are required.

### 11.6.5 Cumulative Impacts with Concurrent Projects

**11.6.5.1** No cumulative impacts with concurrent projects are anticipated given the separation distance from the Project to the built heritage and the minimal vibration level induced at the built heritage.

### 11.6.6 Residual Impact

**11.6.6.1** No residual impacts are expected on built heritage from the construction of the Project.

### 11.6.7 Operation Phase Built Heritage Impact Assessment

### 11.6.8 Identification and Evaluation of Impact

**11.6.8.1** No direct impact to built heritage due to the Project is anticipated.

**11.6.8.2** The indirect impacts on built heritage are related to TCW Station above-ground associated structures, EAP/ EEP buildings and structures and train movement. The former two include visual impact, and the latter potential ground settlement and vibrations.

**11.6.8.3** There are no built heritage resources near EAP/ EEP buildings and given the separation distances between the railway alignment and building heritage resources such as Tung Chung Battery and Tung Chung Fort, impact on built heritage resources is insignificant. The shrines in Sha Tsui Tau and proposed works, including TCW associated minor above-ground structures and landscaping, are located on opposite sides of the Wong Lung Hang estuary. The visual impacts are considered minimal in comparison with Yat Tung Estate.

**11.6.8.4** The non-graded and additional historic buildings and structures identified in this report are largely located within village zone (mainly in Ma Wan Chung Village and villages near Tung Chung Fort). Works are minimal (associated works areas which are temporary) near Tung Chung Fort villages and significant vibration levels are not expected within Ma Wan Chung village. Expected vibration will not exceed maximum peak particle velocity of 3mm/sec for continuous vibration and 7.5mm/sec for transient vibration (APP-137 2012), as such vibration impacts are not expected. The rail alignment will be below ground near Ma Wan Chung village and will not pose visual impacts.

### 11.6.9 Mitigation Measures

**11.6.9.1** No significant impacts are identified and no mitigation measures will be required.

### 11.6.10 Cumulative Impacts with Concurrent Projects

**11.6.10.1** No cumulative vibration or visual impact are anticipated from the concurrent projects.

### 11.6.11 Residual Impact

**11.6.11.1** No residual impacts are expected on built heritage from the operation of the Project.

## 11.7 Conclusion

**11.7.1.1** No major archaeological impacts are expected within the whole project area. At the northern end within and north of the TCW Station is an area of unexplored archaeological interest, in particular for *in situ* kiln structures and further archaeological survey including field scan, 6 auger tests and 2 test pit excavations will be conducted by a qualified archaeologist who obtains a licence under the Antiquities and Monuments Ordinance (Cap. 53) to verify presence of any archaeological remains (**Figure 11.7**). Locations and scope should be agreed with AMO prior to implementation. The exact locations of the auger tests and test pits would be subject to site circumstances and constraints. Subject to the findings of the further archaeological testing, options for mitigation measures such as in-situ preservation, relocation and preservation by record etc would be fully investigated and agreed with AMO.

**11.7.1.2** AMO should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of the project works in accordance with the Antiquities and Monuments Ordinance (Cap. 53), so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO.

**11.7.1.3** The graded historic buildings, Hau Wong Temple (Grade 2) and Tin Hau Temple (Tung Chung), and declared monuments, Tung Chung Fort and Tung Chung

Battery are located within the assessment area and will not be affected by the Project.

## 11.8 Reference

Antiquities and Monuments Office (AMO) (1995) Report on archaeological academic exchange program between Hong Kong and China research excavation at Sha Tsui Tau, Tung Chung.

古物古蹟辦事處 (1998) : 香港北大嶼山考古調查 (1997) 工作報告。 (AMO 1998)

AMO (2001) Relics in Tung Chung.

古物古蹟辦事處 (2002) :大嶼山東涌沙咀頭遺址 2002 年考古調查。(AMO 2002)

AMO (2020) AMO GIS website accessed 11.08.2020.

AFCD (Agriculture, Fisheries and Conservation Department), IDO (Islands District Office) and INHT (Islands Nature Heritage Trail) (no date). *Fu Tei Wan Lime Kiln, on signage board of Islands Nature Heritage Trail- Ngong Ping and Tai O Sections*.

Archaeological Assessments Limited (AAL) (2020a-in progress) CE 70/2015 (CE) Tung Chung New Town Extension (West) - Design and Construction, Preliminary Archaeological and Built Heritage Impact Assessment for Coastal Pedestrian Access, Widening of Tung Chung Road North and Site Investigation.

AAL (2020b-in progress) Archaeological Works At Tung Chung Battery, Lantau Island. Ground Penetrating Radar Survey and Archaeological Field Investigation for Coastal Pedestrian Access, Widening of Tung Chung Road North.

APP-137 (2012). Ground-borne Vibrations and Ground Settlements Arising from Pile Driving and Similar Operations. Buildings Department-Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers

ARUP (2015) Tung Chung New Town Extension. Environmental Impact Assessment Report.

Atha Michael (2011) Archaeological Investigation at San Tau, Lantau Island (Oct-Dec 2011).

Atha Michael (2013) Further Archaeological Investigations at San Tau, Lantau Island.

Atha Mick and Kennis Yip (2016) Piecing Together Sha Po: Archaeological Investigations and Landscape Reconstruction. Hong Kong: Hong Kong University Press.
Atkins Arup JV (2020) Tung Chung Line Extension Consultancy Agreement No. C1201 Deliverable No. 1.39 Ground Movement Report December 2020.

Atkins Arup JV (2020a) Deliverable No. 1.45 Draft Preliminary Design Interim Report and Cost Estimate (Tung Chung West) – Part 2 Design Report December 2020

Atkins Arup JV (2021) Tung Chung Line Extension Consultancy Agreement No. C1201 Deliverable 1.40 Site Impact Assessment Report (Tung Chung West) January 2021.

Bard Solomon (1988) In Search of The Past: A Guide to The Antiquities of Hong Kong. Urban Council.

Coates Austin (1957) The Islands, carried in Hong Kong business symposium: a compilation of authoritative views on the administration, commerce and resources of Britain's Far Eastern Outpost / compiled by J.M. Braga.

Cameron Hugh (1984) *Foo Dei Wan*, In: Journal of the Hong Kong Archaeological Society, Vol. 10 1982-1983. Pp.55.

Cameron H. (1993) *Tang Dynasty Lime Kilns*. In: Journal of the Hong Kong Archaeological Society, Vol. 13 1989-1992. Pp.91-94

香港中文大學中國文化研究所中國考古藝術研究中心 (1991)：北大嶼山考古發掘工作報告。(CUHK 1991)

香港中文大學 (1992) ：大嶼山北部考古發掘 1991.12-92.8。(CUHK 1992)

Degrande G., S. Gupta, P. Fiala, and F. Augusztinovicz (2007) A Numerical Model for Ground-borne Vibrations and Reradiated Noise in Buildings from Underground Railways.

Drewett P. L. (1996) Sha Tsui Tau, Lantau Island, Hong Kong-A Tang Settlement and Qing Burial Site.

Geotechnical Engineering Office (GEO) (2014) Ground Control for EPB TBM. Tunnelling GEO Report No. 298. HKIE Geotechnical Division Working Group on Cavern and Tunnel Engineering and Geotechnical Engineering Office, Civil Engineering and Development Department, The Government of the Hong Kong Special Administrative Region.

Golder Associates (HK) Ltd 2009. Ground Control for Slurry TBM Tunnelling. Geo Report No. 249. Geotechnical Engineering Office, Civil Engineering and Development Department, The Government of the Hong Kong Special Administrative Region.

Golder Associates (2014) Built Heritage Survey Planning and Engineering Study on the Remaining Development in Tung Chung.

Golder Associates (2015) Tung Chung New Town Extension: Terrestrial Archaeological Survey Report.

Goo Sam Jee, Huan Ha Nguyen, Seung Yup Jang, Heeyoung Lee, and Wonseok Chung (2018) Key Characteristics of a Floating Slab Track Based on Longitudinal Interaction Analysis. Accessed from https://doi.org/10.1155/2018/3730649

Gupta, S., M.F.M. Hussein, G. Degrande, H.E.M. Hunt, and D. Clouteau (2007) A comparison of two numerical models for the prediction of vibrations from underground railway traffic, Soil Dynamics and Earthquake Engineering 27 (2007) 608–624.

GZIA/ 廣州市文物考古研究所香港大嶼山北區文物調查隊：《1997-1998 年香港文物普查大嶼山北區工作報告》，古物古蹟辦事處，1998 年。

Hong Kong Archaeological Society (HKAS) (1993) Tung Chung Archaeological Survey, Dec 1992 – Jan 1993, Licence No.87.

Kouroussis, G, Connolly, DP, Alexandrou, G et al. (2015) The effect of railway local irregularities on ground vibration. Transportation Research Part D: Transport and Environment, 39. pp. 17-30.

Kouroussis G., D.P. Connolly and O. Verlinden (2014) Railway-induced ground vibrations – a review of vehicle effects, International Journal of Rail Transportation, 2:2, 69-110.

Lands Department (2007) Hong Kong in old times: a collection of aerial photos taken in 1964.

Mcgrail Sean (2014) Ancient Boats in North-West Europe: The Archaeology of Water Transport to AD 1500. London and New York: Routledge.

Meacham William (2009) Rock Carvings in Hong Kong.

Peacock B.A.V. and T.J.P. Nixon (1986) Summary site data sheet of Sha Tsui Tau, site no. 09/07', Report of the Hong Kong Archaeological Survey Volume III.

Peacock, B.A.V. and T.J.P. Nixon (1986) Report of the Hong Kong Archaeological Survey, Summary Site Data Sheet.

Peacock, B.A.V. and Nixon, T.J.P. (1988) *The Hong Kong Archaeological Survey: Subsurface*

*Investigation Reports.* Hong Kong: Antiquities & Monuments Office.

Rogers Pamela R.(1985) Tung Lung Fort: A Qing Dynasty Fortification on Tung Lung Island, Hong Kong. Unpublished.

Ruan Yuan (Qing)/ 阮元(清)：《廣東通志》，道光二年（1822 年）。

Siu Kwo-kin/ 蕭國健：《東涌．屯門》(1990) 香港：現代教育研究社。

Siu Kwo-kin/ 蕭國健：《清代香港之海防與古壘》(1982) 香港：顯朝書室。

Siu Kwo-kin/ 蕭國健：《香港離島史蹟志》(1985) 香港：顯朝書室。

Siu A. (1993) *Chek Lap Kok Island*. In: Journal of the Hong Kong Archaeological Society, Vol. 13 1989-1990. Pp.91-94

Siu Kwo-kin/ 蕭國健：《探本索微：香港早期歷史論集》(2015) 香港：中華書局(香港)有限公司。

Tang, C., Shang, Z.T. and Wong, W.C. (1997) Preliminary Report on the Excavation of Pak Mong Site on Lantau Island. *Kaogu 6* (1997):54-64.

Territory Development Department (TDD) (1999) WP12 - Historical, Archaeological and Cultural Heritage Impact Assessment, Agreement No. CE 1/97. Remaining Development in Tung Chung and Tai Ho. Comprehensive Feasibility Survey, Report No 501/22/B. Prepared by Mott Connell Hong Kong.

The Hong Kong Archaeological Society (HKAS) (1984) Foo Dei Wan, in Journal of the Hong Kong Archaeological Society 1982-83, Vol 10.

The Hong Kong Archaeological Society (HKAS) (1998) Journal of the Hong Kong Archaeological Society 1993-1997, Vol 14.

The Island District Board (IDB) (1993) Heritage of the Islands District.

Guo Fei (Ming) / 郭棐(明):《粵大記》，1595 年。

Jin Wenmo (Qing) / 靳文謨(清) :《新安縣志》，卷十一，防省志遷覆條，1688 年。

Zafiropoulou Dr. Vassiliki, Konstantinos Vogiatzis and Haralampos Mouzakis (2018) A Methodology for Assessing Ground Borne Noise and Vibration Transfer Functions “Tunnel wall-Soil surface” for Metropolitan Rail Networks using the TBM Muck Train as a linear source: Measurements Campaign in the extension of Athens Metro Line 3 towards Piraeus. Euronoise 2018, Crete.

Aerial Photographs references:

Lands Department (1924) Aerial Photo. Photo No. H46-0011, taken on 1924-11-20, no flight height, scale 1: 15042.

Lands Department (1945) Photo No. 681_6-4094, taken on 1945-11-11, Flight Height 20000 ft., scale 1:12000.

Lands Department (1995) Photo No. CN11633, taken on 1995-10-31, Flight Height 5000 ft., scale 1:10000.

Lands Department (1996) Photo No. A43926, taken on 1996-11-11, Flight Height 5000 ft., scale 1:10000.

Lands Department (1998) Photo No. A47708, taken on 1998-02-09, Flight Height 4000 ft., scale 1:8000.