



**AGREEMENT NO. CE 15/2010 (DS) UPGRADING OF CHEUNG CHAU AND TAI O SEWAGE
COLLECTION, TREATMENT AND DISPOSAL FACILITIES – DESIGN AND CONSTRUCTION**

SERVICE ORDER NO. CE1015-VDS01

MARINE ARCHAEOLOGICAL INVESTIGATION (MAI)

VISUAL DIVER SURVEY

1. INTRODUCTION

In December 2010, Drainage Services Department (DSD) commissioned Atkins China Limited (ACL) to undertake Design and Construction of Upgrading of Cheung Chau and Tai O Sewage Collection, Treatment and Disposal Facilities under Agreement No. CE 15/2010 (DS).

An Environmental Impact Assessment (EIA) Study Brief No. ESB-211/2009 was issued to cover the *Outlying Island Sewerage Stage 2 - Upgrading of Tai O Sewage Collection, Treatment and Disposal Facilities* (hereinafter referred as the “Project”).

The sewerage works proposed under this Project were recommended under Agreement No. CE 31/2007 (DS) Upgrading of Cheung Chau and Tai O Sewage Collection, Treatment and Disposal Facilities– Investigation. The Marine Archaeological Investigation was carried out as part of this study.

Atkins China Limited contracted SDA Marine Ltd in July 2012 to complete the MAI - Visual Diver Survey.

2. STUDY AREA

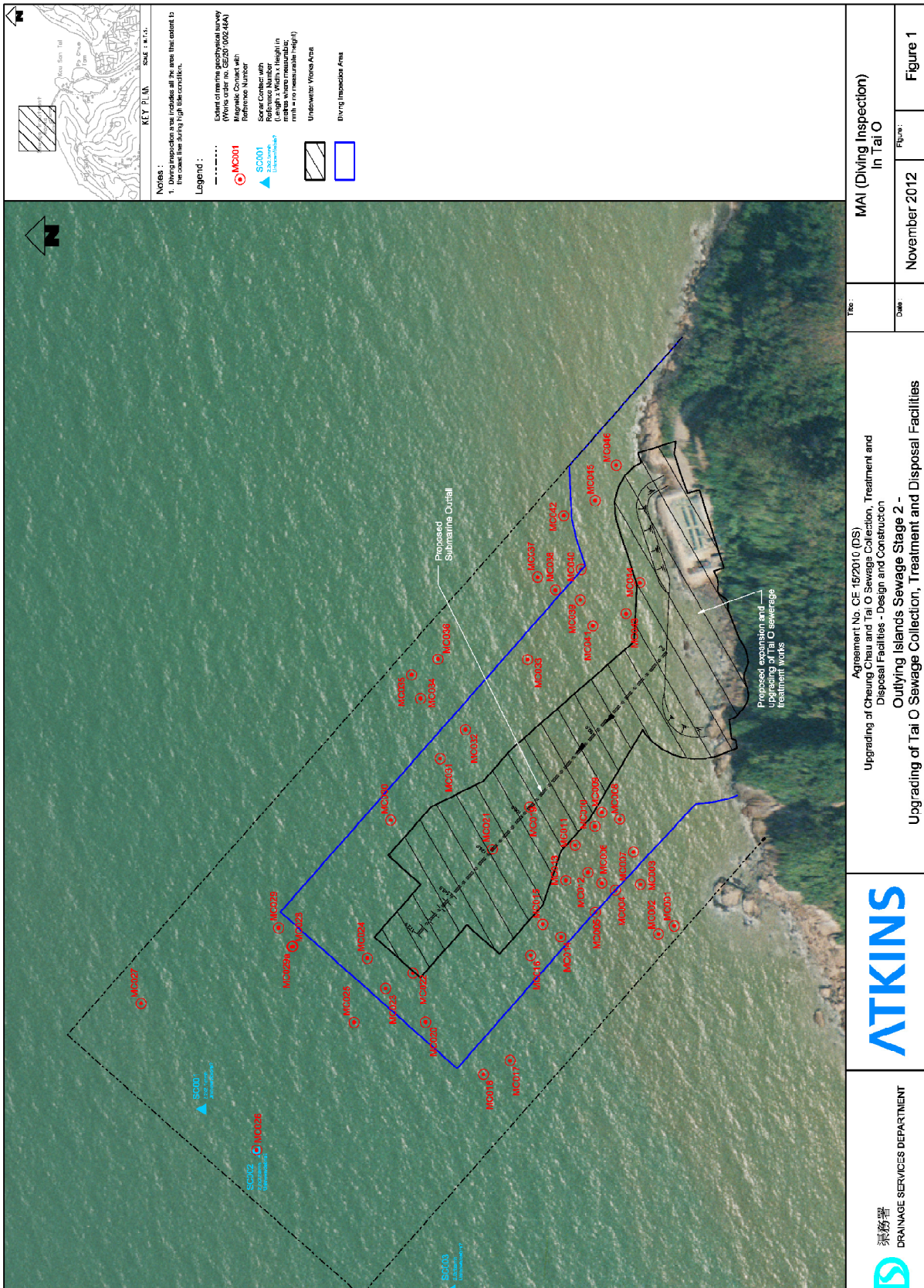
The study area was designed to provide a cover footprint of the 0.34ha Tai O Sewage Treatment Works (STW) site, twin sewage outfalls and all marine works areas.

Figure 1 presents:

- The proposed location of the twin outfalls,
- The Tai O STW site,
- The extent of the marine geophysical survey area,
- Underwater works area,
- MAI diver inspection area,
- Magnetic and sonar contacts from December 2011 geophysical survey.



Figure 1: Study area of Visual Diver Survey





3. ASSESSMENT METHODOLOGY

In accordance with the Antiquities and Monuments Office (AMO) Guidelines, the MAI comprised 6 tasks:

- Task 1: Marine Archaeological Review to establish the extent and value of existing information,
- Task 2: Baseline Review to assess the archaeological potential of the study area from desk based research,
- Task 3: Marine Geophysical Survey to obtain detailed data about the seabed and sub surface sediments,
- Task 4: Data interpretation to identify and assess the location and significance of any underwater archaeological resources,
- Task 5: Diver inspection of seabed features to establish their archaeological value,
- Task 6: Impact Assessment and Mitigation Strategy.

Tasks 1-4 were completed in January 2012 and the results were included in Sections 10.3.9 -10.3.12 of the Draft EIA for Tai O. This report presents the results of Tasks 5 and 6.

Task 4 located 30 magnetic contacts that were within the proposed underwater works area. The original total number of magnetic contacts was 46 and side scan sonar contacts 3. The geophysical survey covered an area of 400m x 180m to allow space for changes to the alignment. Once the proposed works area was defined, the number of magnetic contacts requiring diver inspection was reduced to 30. No side scan sonar contacts required inspection.

The diver survey started on November 7th and took four days on site diving. A team of four divers plus Sarah Heaver as Project Manager completed the survey. A sampan was used as a workboat due to the very shallow water and the divers used surface supplied air. A Differential Global Positioning (DGPS) was used to control the location of the sampan. The boat was positioned above each target and a shot weight was placed on the seabed marked by a buoy on the surface. The drop position was checked against the target position using the DGPS.

Figure 2: Marker Buoy and Surface Unit



The diver was equipped with a hand held video camera to record the unknown objects and associated seabed features. For the magnetic contacts a hand held probe and silt tubes were also used. The video had a remote TV monitor in the boat's wheelhouse, which displayed the video footage in real time. This facilitated managing the diver from the surface via the through water communications.



Figure 3: Diver using surface supplied air



All diving operations followed the Code of Practice – Safety and Health at Work for Industrial Diving (1998), as published by the Occupational Safety and Health Branch of the Hong Kong Labour Department. All diving operations also followed the requirements of the UK Health and Safety Executive Diving at Work Regulations (1997) and the Commercial diving projects inland/inshore: Diving at Work Regulations (1997), Approved Code of Practice.

3.2 SURVEY LICENCE

The diver survey could not start until SDA Marine Ltd was granted a Licence to Excavate and Search for Antiquities issued by the Antiquities Authority, Government of the HKSAR. The application was submitted on 31 August 2012 and the Licence was issued on 29 October 2012.




A copy of the Licence is presented in Appendix 1.

4. RESULTS





Every target was successfully located and inspected. Each one was easily identified as modern debris and construction waste. It is assumed that it is connected to the installation of the existing outfall and Imhoff Tank on the shore. The table below presents the detailed results for each target.

The photographs are of extremely poor quality. Nothing can be done about this. It is due to the high sedimentation in the water caused by the very fine silty sediments on the seabed.







Table 1: Results of Diver Inspection				
Target Number	Contact number	Latitude Longitude	Easting Northing	Description
1	MC004	22° 15.7415' N 113° 51.3444' E	803419.8E 813657.3N	 Construction Debris: Metal cable and wire.
2	MC005	22° 15.7464' N 113° 51.3387' E	803409.9E 813666.5N	 Metal Rod
3	MC006	22° 15.7448' N 113° 51.3463' E	803423.1E 813663.5N	 Modern Debris







4	MC007	22° 15.7370' N 113° 51.3547' E	803437.3E 813649.0N	 Modern Debris
5	MC008	22° 15.7404' N 113° 51.3634' E	803452.4E 813655.3N	 Modern Debris
6	MC009	22° 15.7449' N 113° 51.3652' E	803455.5E 813663.5N	 Modern Debris
7	MC010	22° 15.7466' N 113° 51.3616' E	803449.2E 813666.7N	 Modern Debris






8	MC011	22° 15.7515' N 113° 51.3565' E	803440.5E 813675.8N	 Modern Debris
9	MC012	22° 15.7483' N 113° 51.3493' E	803428.1E 813669.9N	 Construction waste
10	MC013	22° 15.7538' N 113° 51.3471' E	803424.4E 813680.0N	Construction waste
11	MC014	22° 15.7550' N 113° 51.3321' E	803398.6E 813682.3N	 Modern debris
12	MC015	22° 15.7595' N 113° 51.3354' E	803404.3E 813690.6N	 Construction waste



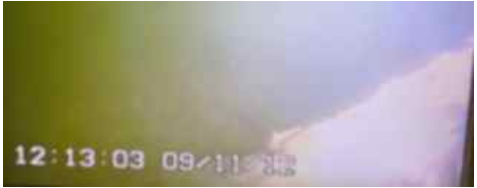



13	MC016	22° 15.7625' N 113° 51.3271' E	803390.0E 813696.2N	 Modern Debris
14	MC019	22° 15.7628' N 113° 51.3667' E	803458.1E 813696.6N	 Metal rod
15	MC020	22° 15.7886' N 113° 51.3093' E	803359.6E 813744.3N	 Construction waste
16	MC021	22° 15.7721' N 113° 51.3554' E	803438.6E 813713.8N	 Metal Rope Wire

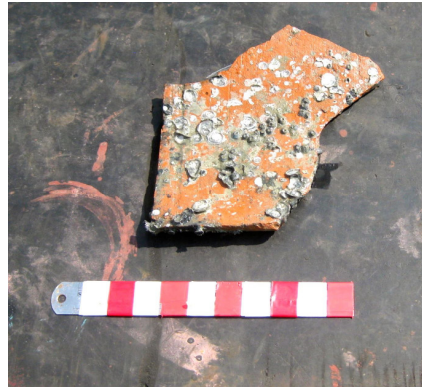




17	MC022	22° 15.7917' N 113° 51.3224' E	803382.1E 813750.1N	 Construction waste
18	MC023	22° 15.7985' N 113° 51.3182' E	803375.0E 813762.6N	 Modern Debris
19	MC024	22° 15.8031' N 113° 51.3263' E	803388.8E 813771.0N	 Construction waste
20	MC030	22° 15.7973' N 113° 51.3630' E	803451.9E 813760.3N	Existing sewage pipe
21	MC031	22° 15.7850' N 113° 51.3794' E	803480.1E 813737.6N	Existing sewage pipe
22	MC032	22° 15.7789' N 113° 51.3872' E	803493.3E 813726.1N	Existing sewage pipe
23	MC033	22° 15.7634' N 113° 51.4058' E	803525.3E 813697.6N	Existing sewage pipe



24	MC039	22° 15.7503' N 113° 51.4217' E	803552.5E 813673.4N	 <p>Metal Rod</p>
25	MC040	22° 15.7501' N 113° 51.4300' E	803566.8E 813673.0N	 <p>Modern Debris</p>
26	MC041	22° 15.7472' N 113° 51.4153' E	803541.5E 813667.6N	 <p>Construction Waste</p>
27	MC043	22° 15.7390' N 113° 51.4182' E	803546.4E 813652.4N	 <p>Modern debris</p>



28	MC044	22° 15.7356' N 113° 51.4264' E	803560.5E 813646.1N	 Modern building tile
29	MC045	22° 15.7467' N 113° 51.4482' E	803598.1E 813666.6N	 Modern Debris
30	MC046	22° 15.7415' N 113° 51.4576' E	803614.2E 813656.9N	 Modern debris

5. IMPACT ASSESSMENT

Twin outfalls of 300mm diameter will be constructed approximately 1.5m to 4m below the seabed. Marine dredging between 2m and 9m will be carried out to ensure the burial depth of the outfalls.

The upgrading of the Tai O STW will require about 0.34ha of land of which 0.26 will be reclamation.

The works will result in possible seabed disturbance. However, as no marine archaeological resources have been identified there will be no negative impact from the work. The impact area has been covered 100% by the MAI.



The diver survey indicated that there has already been extensive seabed disturbance at this location. It is assumed that this has been caused by the installation of the existing outfall and Imhoff Tank on the nearby shore. There is a large volume of modern building debris across the study area and also on the adjacent coast as shown in the photograph below. During the survey it was also observed that there is trawler fishermen at this location which would have further degraded the seabed.



Figure 4: Building Debris on the adjacent coast

6. CONCLUSION

A comprehensive MAI including Baseline Review, Geophysical Survey and Diver inspection has been completed. The study did not locate any marine archaeological resources within the proposed work area. There will be no need for any further investigation or mitigation measures.



Appendix A

FORM II

[s.13 & reg.4]

Licence No. 340

ANTIQUITIES AND MONUMENTS ORDINANCE
(Chapter 53, Section 13)

LICENCE TO EXCAVATE AND SEARCH FOR ANTIQUITIES

LICENCE is this day granted to Ms Sarah Heaver (G/F 13B Hung Shing Yeh, Yung Shue Wan, Lamma Island, Hong Kong) as licensee, to excavate and search for antiquities for Upgrading of Cheung Chau and Tai O Sewage Collection, Treatment and Disposal Facilities as described on the attached plan and edged in red.

THIS LICENCE is subject to the following conditions set out below -

1. This licence may be cancelled at any time at the discretion of the Authority.
2. This licence shall remain in force for 12 months from the date it is granted unless previously cancelled by the Authority.
3. The Authority may refuse to renew this licence or grant any further licence to the licensee.
4. The licensee shall obtain the consent in writing of the owner and any lawful occupier of the relevant area prior to commencing any excavation and search and shall upon reasonable demand produce evidence of such consent to the Authority.
5. A copy of this licence must be displayed or made available on the relevant area for reasonable inspection by the Authority, any member of the Antiquities Advisory Board, a designated person or any police officer on each occasion that the licensee is present and working in such area.
6. The ownership of every antiquity shall vest in the Government of the Hong Kong Special Administrative Region from the moment of discovery.
7. During the currency of this licence, the licensee shall keep the area in a tidy and clean condition to the satisfaction of the Authority.
8. Upon or before the determination of this licence the licensee shall, to the satisfaction of the Authority, restore the relevant area to the condition it would have been in had the licensee not commenced any excavation and search.



9. Within three months of the commencement of the excavation or search and at three monthly intervals thereafter, or at the conclusion of the excavation or search, whichever is the shorter period, the licensee shall furnish the Authority with -
 - (a) a complete list of all discovered material, sufficiently descriptive to make it possible to identify each item, with identifying codes allocated to each item, such codes being legibly and indelibly written on the item or on a label securely attached to it; and
 - (b) a statement explaining the system of identifying codes, accompanied by such measured drawings, sections, written and visual (photographic and video) records and other information in full details as will provide a record of all archaeological/architectural remains and/or of the circumstances attending the discovery of each item, such as its position in the excavated and associated objects.
10. The licensee shall indemnify and keep indemnified the Authority for any damage or accident to any person, property or thing occurring as a consequence of an excavation and search made under this licence.
11. During the currency of this licence, the licensee shall be responsible for the safe custody of all discovered material which shall be deposited at a place to be designated by the Authority where it shall be made available for inspection at all reasonable times by the Authority or by persons designated by the Authority.
12. The Authority, or a person designated by him, may from time to time stipulate specific conditions for the safe custody of discovered material which appears to him to be of special importance.
13. No material discovered under this licence may be removed from the place designated under (11) above without the permission in writing of the Authority or a person designated by him.
14. The Authority may by notice in writing addressed to the licensee amend any condition of this licence or impose such additional conditions as the Authority considers desirable.
15. This licence is granted subject to the marine archaeological investigation being conducted in accordance with the licensee's application dated 28 August 2012. The licensee shall furnish the Authority with the archaeological report in full details together with all field archives, laboratory records and discovered material within 3 years from the date of completion of all the excavation and search, notwithstanding the expiry of this licence. If the licensee is a representative of an organization as indicated in the application, the aforesaid archaeological report to be submitted by the licensee has to be duly signed with the authorized signature of the organization and sealed with the seal of the organization.

Signed _____


(Mr Paul Chan)
(Secretary for Development)

Date _____

29 OCT 2012

(Note: You are advised to make yourself familiar with the provisions of the Antiquities and Monuments Ordinance, Chapter 53, and the Antiquities (Excavation and Search) Regulations.)