

Civil Engineering and Development
Department

**Site Investigation Works for Pier
Improvement at Lai Chi Wo**

Independent Environmental checker
(IEC) Audit Report

262145/REP/05/36

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Franki Chiu
Independent Environmental Checker

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 262145

Ove Arup & Partners Hong Kong Ltd
Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
www.arup.com

ARUP

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1 Introduction

1.1 Background and Project Description

- 1.1.1 A detailed search from the Digital Geotechnical Information Unit (DGIU) of CEDD revealed that there are no existing Site Investigation (SI) records at the area around Lai Chi Wo Pier. There is considerable uncertainty regarding the ground conditions within the area and the ground conditions have significant influences on the design and construction of the proposed pier improvement work, as well as the long-term performance of the pier. In view of the uncertainty and risk associated with this matter, project-specific SI works are inevitable to facilitate the development of a reliable model representing the ground condition for the pier improvement works.
- 1.1.2 In addition, according to the Appendix E – Requirements for Assessment of Waste Management Implications of the Environmental Impact Assessment (EIA) Study Brief (ESB-305/2017) for Pier Improvement at Lai Chi Wo, field investigation, sampling and chemical and biological laboratory tests shall be conducted to characterise and quantify the collected sediment, if any, and incorporated into the EIA Report for approval by the Director of Environmental Protection. Since no SI work/environmental sampling in the vicinity of the pier could be identified, there is a lack of sediment information for estimation of sediment quality and quantity. SI work is considered inevitable to meet the requirements in Section 3 (ii) of Appendix D and Section 3(i) of Appendix E in the EIA Study Brief (ESB-305/2017). The following three major items in the Sediment Sampling and Testing Plan to fulfill the requirements of ESB-305/2017 would be separately submitted to seek agreement from EPD on 1) the proposed locations and schedule of marine sediment sampling; 2) the specification of chemical test and biological toxicity test of marine sediment samples for the evaluation of waste management under the EIAO process; and 3) the specification of elutriate test and pore water test of marine sediment samples for water quality assessment under the EIAO process.

1.2 Type of Designated Project

- 1.2.1 The SI works for pier improvement at Lai Chi Wo (hereinafter referred to as the “Project”) carried out in the vicinity of Lai Chi Wo Pier within the Yan Chau Tong Marine Park.
- 1.2.2 In conjunction with Section 4.1.2 of Technical Circular (Works) No. 13/2003 - Guidelines and Procedures for Environmental Impact Assessment of Government Projects and Proposals promulgated by Environment, Transport and Works Bureau, the proposed SI work is classified as a Designated Project (DP) if it falls within the environmentally sensitive areas listed in Item Q.1, Part I of Schedule 2 of the EIAO and does not fall into any exception works under Item Q.1. Therefore, the Project becomes a DP.
- *Item Q.1 - All projects including new access roads, railways, sewers, sewage treatment facilities, earthworks, dredging works and other building works partly or wholly in an existing or gazetted proposed country park or special area, a conservation area, an existing or gazetted proposed marine park or*

marine reserve, a site of cultural heritage, and a site of special scientific interest

- 1.2.3 The Project Profile was submitted on 4 June 2019 for application for permission to apply directly for permit. The Environmental Permit (EP) (EP No.: EP-569/2019) was granted on 26 June 2019. In addition, the Marine Parks Permit for SI works including vertical boreholes and vibrocores sediment sampling was granted on 12 July 2019.
- 1.2.4 According to the Specific Condition Clause 2.1 of the EP, the Permit Holder shall employ an Independent Environmental Checker (IEC) before commencement of construction of the Project to audit the implementation of all measures recommended in the Project Profile (Register No. PP-581/2019) and confirm full compliance through submission of an Audit Report to the Director.

1.3 Location and Scale of the Project

- 1.3.1 The proposed SI works (including a total of 3 nos. of vertical boreholes and 2 nos. of vibrocores) were carried out in the vicinity of Lai Chi Wo Pier within the Yan Chau Tong Marine Park. Borehole Nos. LCW/BH1 – BH3 were carried out to obtain geotechnical data for the design of pier improvement work, and vibrocore nos. LCW/VC1 and VC2 were carried out to collect geo-environmental data for sediment quality assessment. The work location of the Project is shown in **Figure 1.1**.

1.4 Organisation of the Project

- 1.4.1 The Project Proponent and Permit Holder of the EP is Civil Engineering and Development Department (CEDD). The Project Proponent commissioned Ove Arup and Partners HK Ltd to undertake the administration and supervision of the SI works as well as the Independent Environmental Checker (IEC). Lam Geotechnics Limited was the Contractor of the SI works.

1.5 Purpose of the Report

- 1.5.1 As stipulated in the Special Condition 2.1 under the Environmental Permit (No. EP-569/2019), this IEC Audit Report aims to provide a record of audit on the implementation of all measures recommended in the Project Profile (Register No. PP-581/2019) upon completion of the SI works.

2 Implementation of Mitigation Measures

2.1 Summary of the SI Works

2.1.1 The sampling works were carried out between 26 August 2019 and 20 September 2019. The subsequent laboratory tests were completed on 8 November 2019.

2.2 Summary of Site Audit

2.2.1 Site inspection and audit was carried out by the IEC together with the Contractor throughout the SI process. During the site inspection and audit, all measures recommended in the Project Profile (Register No. PP-581/2019) were properly implemented. The checklist of implementation of measures is provided in **Appendix A** and some site photos are provided in **Appendix B**. Some key measures implemented are listed below:

- To avoid and minimize any potential environmental impacts including water quality and ecological impacts, all cleaning of drilling rig, re-circulation tank and equipment, and the disposal of any sediments and drilling fluid collected shall not be carried out on site or within the boundary of Yan Chau Tong Marine Park, Plover Cove Country Park and any marine environment;
- The power mechanical equipment (PMEs) adopted were functioning as intended;
- PMEs were shut down as soon as practicable when they were not in operation;
- Permit was obtained from the Country and Marine Parks Authority before the commencement of SI works;
- Vessel was travelling at less than 10 knots at any time inside the marine park;
- No discharge of wastewater and disposal of waste to the waterbodies were observed;
- Seawater used as drilling fluid was circulated within the system through the re-circulation tank;
- General refuses were collected and transferred by the work vessel on a daily basis for off-site disposal; and
- No SI works during 7pm to 7am and on Sundays and public holidays.

2.2.2 Based on site observation, no yellowish water was observed throughout the SI works. However, trace of yellowish water was observed on the morning of 29 August 2019 along the shoreline close to the Project before any SI works of that day commenced. In addition, there was a Tropical Storm “PODUL”, which led to Tropical Cyclone Warning Signals No. 1, on 28 August 2019. The yellowish water was likely generated due to the surface runoff during the rainfall event brought by the Tropical Storm “PODUL”. The site photos are provided in **Appendix C** for record.

3 Conclusion






- 3.1.1 The Project is a DP under the EIAO with an EP (EP-569/2019) for its SI works. The sampling works were carried out between 26 August 2019 and 20 September 2019. The subsequent laboratory tests were completed on 8 November 2019. IEC site inspection and audit were conducted throughout the SI process.
- 3.1.2 In accordance with the Specific Condition Clauses 2.1 and 2.2 of EP (EP-569/2019), all measures recommended in the Project Profile (Register No. PP-581/2019) are certified to have been fully implemented.

Figures

Printed by : HKGTRA014
 Filename : G:\env\project\262145\13 Drawing Deliverables\Reports\04 Project Profile\Figure 1.1 - Location of Project_Aerial Photo.dgn



LEGEND

-  PROPOSED BOREHOLE
-  PROPOSED VIBROCORE
-  MARINE PARK
-  COUNTRY PARK
-  SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)



INSET

INSET



Rev	Description	By	Date
B	SECOND ISSUE	GL	02/19
A	FIRST ISSUE	GL	11/18

Consultant
ARUP

Project title
 Site Investigation Works for
 Pier Improvement at Lai Chi Wo

Drawing title
LOCATION OF PROJECT

Drawing no. FIGURE 1.1		Rev. B	
Drawn GL	Date 02/19	Checked LK	Approved FC
Scale 1:1000 @ A3		Status PRELIMINARY	

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Appendix A

Checklist of Implementation of Measures

Appendix A - Checklist of Implementation of Measures

Potential Environmental Impact	Mitigation Measures / Good Site Practices	Site Inspection and Audit
Air Quality	Minimization of boat trips as far as practicable	Boat trips were minimized by proper planning of site investigation works. In general, only two round trips were required per day.
Noise	The number of PME operating shall be kept to a minimum. Only well-maintained plant shall be used;	As the jack-up barge is small, the number of PMEs on the barge was limited. The PMEs were well maintained throughout the site investigation works. No complaint was received by either EPD or the Contractor during the site investigation works.
	Regular maintenance shall be provided to all plant and equipment;	Daily inspection was carried out by the Contractor for all plants and equipment in order to ascertain their functionality. As the PMEs were operating in good condition throughout the site investigation works, no maintenance was required.
	Equipment that may be in intermittent use shall be shut down or throttled down to a minimum between work periods;	The PMEs were shut down when not in operation.
	No construction activities would be allowed during 7pm to 7am, and on Sundays and public holidays; and	There was no site investigation works during 7pm to 7am and on Sundays and public holidays.
	Recommended Pollution Control Clauses for Construction Contracts shall be adopted to undertake environmental protection measures to reduce the environmental impacts arising from the execution of the Works as necessary	The PME were operating in good condition and were shut down when not in operation to prevent excessive noise emission during the site investigation works.
Water Quality	To observe and obey the guidelines stipulated under the Marine Parks Ordinance Cap 476 and the Marine Parks and Marine Reserves Regulation Cap 476A;	A permit (Permit No. (50) in AFGR MPA 08_9 pt.6) was obtained from the Country and Marine Parks Authority in accordance with the Regulation 17(2) of the Marine Parks and Marine Reserves Regulation. The conditions specialised in the permit have been followed.
	The power driven vessel shall not exceed a speed of 10 knots at any time inside the marine park;	Vessel was travelling at less than 10 knots at any time inside the marine park.
	Restrict to anchor or moor except under and in accordance with a permit or at mooring sites provided by the Authority;	Vessel was not anchored nor moored during the site investigation works.
	Obstruct or pollute the water body or discharge of waste;	Wastewater and waste were not discharged to the waterbodies.
	Restrict to collect any marine life and resources in or from the marine park;	No marine life and resources were collected in or from the marine park.

Potential Environmental Impact	Mitigation Measures / Good Site Practices	Site Inspection and Audit
	Before commencement of drilling works, all drill rig, re-circulation tank and equipment shall be thoroughly cleaned off-site;	The drill rig, re-circulation tank and equipment were thoroughly cleaned off-site.
	Throughout the drilling process, seawater shall be used for flushing medium and no lubricant, hydraulic fluid or other additives shall be introduced;	Only seawater was used for flushing medium during the drilling process.
	The drilling fluid shall be circulated within the system through the re-circulation tank, where the recycled fluid with small amount of sediment shall be settled and collected in the tank.;	The seawater used as drilling fluid was circulated within the system through the re-circulation tank.
	Prior to actual sampling, an outer casing shall be placed on the seabed level to avoid the spillage of sediment and water containing SS;	The samples were collected within the outer casing placed on the seabed level.
	After the completion of sampling work, casing shall be cleaned by the recycled water and collected back to the re-circulation tank. The inner and outer casing shall then be extracted slowly to the barge deck and the sediment collected in the tank during the drilling process shall be delivered to the depot of the Contractor.	The casings were cleaned by the recycled water and collected back to the re-circulation tank. The inner and out casing were extracted slowly to the deck of jack-up barge and the sediment collected during the drilling process was delivered to the depot of the Contractor for disposal.
	To ensure all geotechnical and environmental samples will be collected within the casing without any contact with the surrounding waterbodies; and	All geotechnical and environmental samples were collected within the casing without any contact with the surrounding waterbodies.
	Portable toilets shall be installed on the jack-up barges, sewage or wastewater should not be allowed to discharge into the surrounding environment.	Portal toilet was provided on the jack-up barge. No sewage or wastewater were discharged to the surrounding environment.
Wastes	Refuse bins shall be provided on the jack-up barges for effective collection of general refuse from on-site workers.	Refuse bin was provided on the jack-up barge to collect general refuse from the on-site workers.
	Disposal shall also be maintained and carried out by the workers daily after work to avoid unnecessary cumulation of refuse on barges.	The general refuse was collected by the work vessel on a daily basis after work and disposed off-site.
Ecology	Good site practices and mitigation measures to reduce water pollution shall also be implemented to minimise potential impacts on the general environment	The above good site practices and mitigation measures were properly implemented to reduce water pollution.
Landscape and Visual	Night-time sampling works shall be prohibited to prevent light overspill to the nearby VSRs	No night-time site investigation works were carried out.
Cultural Heritage	Not Required	Not applicable.

Appendix B

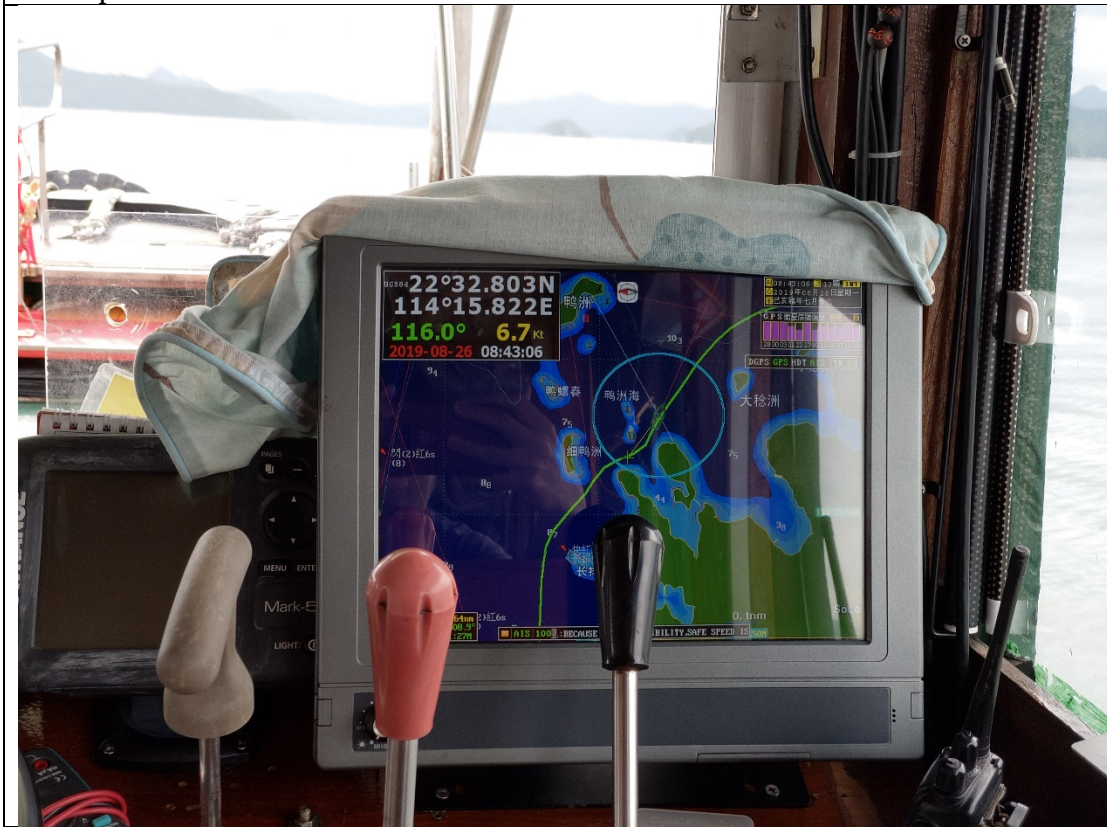
Photos of Implementation of Measures

Photos of Implementation of Measures

Good condition drilling rig and generator



Boat speed at less than 10 knots



PCB inside casing for sampling



Re-circulation tank



Portable toilet



Refuse bins



Appendix C

Site Photos on 29 August 2019
after Tropical Storm “PODUL”

Site Photos on 29 August 2019 after Tropical Storm “PODUL”

