



土木工程拓展署

Civil Engineering and Development Department
Kowloon Development Office

Agreement No. CE 35/2006 (CE)

Kai Tak Development Engineering Study cum Design and Construction of Advance Works – Investigation, Design and Construction

Dredging Works for Proposed Cruise Terminal at Kai Tak
Environmental Impact Assessment Report
Executive Summary

10 October 2007

Reviewed:

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10/10/07

MAUNSELL CONSULTANTS ASIA LTD

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1 INTRODUCTION

1.1 Project Background

General

- 1.1.1 The former Kai Tak Airport located in the south-eastern part of Kowloon Peninsula was the international airport of Hong Kong. The Kai Tak Airport had come into operations since 1920s. The operation of the Kai Tak Airport was ceased and replaced by the new airport at Chek Lap Kok in July 1998. After closure, the disused airport site has been occupied by various temporary uses, including a golf driving range on the runway area.
- 1.1.2 In 2002, the Chief Executive in Council approved the Kai Tak Outline Zoning Plans (No. S/K19/3 and S/K21/3) to provide the statutory framework to proceed with the South East Kowloon Development at the former Kai Tak Airport. However, following the judgment of the Court of Final Appeal in January 2004 regarding the Harbour reclamation, the originally proposed development which involved reclamation has to be reviewed. The Kai Tak Planning Review (KTPR) has resulted with a Preliminary Outline Development Plan (PODP) for Kai Tak in October 2006. Subsequently, the Administration announced in October 2006 a plan to implement a cruise terminal at Kai Tak, as part of the development.
- 1.1.3 Development of the cruise terminal at Kai Tak would require dredging at the existing seawall at the southern tip of the former Kai Tak Airport runway for construction of a berth structure and transition structures, and dredging the seabed fronting the new berth structure to provide necessary manoeuvring basin. The general layout of the berth structure is provided in **Figure 1.1**.

Phasing of Development

- 1.1.4 It is planned to implement the cruise terminal in two phases. Phase I Berth (the southern portion) of 450m long together with the southern transition structure of approximately 78m long are scheduled for operation and completion by 2012 and the associated dredging for manoeuvring of cruise vessels is scheduled for completion by 2011 (**Figure 1.2**). Phase II Berth (additional 400m) for the longer term together with the northern transition structure are scheduled for operation and completion after 2015 (**Figure 1.3**). The programme for dredging in the manoeuvring basin for Phase II Berth is unconfirmed at this stage but its completion can be extended up to 2020 and the earliest possible time for conducting the dredging for Phase II Berth would be 2013 to 2014 after decommissioning of the existing submarine gas pipelines. The actual program for the required dredging would also depend on the need for the second berth as driven by the cruise market. The berth structure for Phase I and Phase II Berths would be built continuously for completion by 2013.

Manoeuvring Area

- 1.1.5 Provision is required for manoeuvring area of adequate depth for cruise vessels manoeuvring onto and off the berths. The layout and dimensions of the manoeuvring area are shown in **Figure 1.4** and have been confirmed by detailed engineering assessment, to be adequate for safe manoeuvring of cruise vessels.

Dredged Depths

- 1.1.6 For overall cost effectiveness, initial navigation dredging for the operations of Phase I and Phase II Berths should allow for dredging to -12mCD. The area alongside of the berth structure is to be dredged to provide a depth alongside of -13mCD to allow for possible future deepening of the manoeuvring area if future new vessels entail such water depth.

1.2 Project Benefits

- 1.2.1 The Government aims to develop Hong Kong into a leading regional cruise hub through the development of a world-class cruise terminal with state-of-the-art facilities which are user-friendly, and provide efficient and quality services. The facilities and services provided by the New Cruise Terminal should have built-in flexibility to allow for adjustments to meet the need of different types of cruise vessels and different cruise market segments. They form part of an overall experience of a cruise passenger and add value to a cruise vacation. In October 2006, the Government announced its plan to proceed with the development of a New Cruise Terminal on a site of 7.6 hectares at the southern end of the former runway in the Kai Tak Development.
- 1.2.2 One of the key considerations for locating the New Cruise Terminal at Kai Tak is that it is the only site within the Victoria Harbour with the capability to provide two or more berths without reclamation. The proposed location for the New Cruise Terminal at the southern end of the runway has a deep seabed and large manoeuvring space along the former runway for receiving mega cruise vessels. Besides, public consultations on the Kai Tak Planning Review (KTPR) concluded that there was general support in the community for the early implementation of the New Cruise Terminal in the Kai Tak Development.
- 1.2.3 Upon completion of the New Cruise Terminal, together with the existing cruise terminal in Tsim Sha Tsui, Hong Kong will have four berths in total for cruise vessels. This will better serve the needs of the cruise industry and help sustain Hong Kong's development as a regional cruise hub.

1.3 Potential consequences without the Project

- 1.3.1 The proposed dredging works are essential for construction and operation of the proposed cruise terminal at Kai Tak to provide the space needed for safe manoeuvring of cruise vessels clear of the fairway and cruise berth. Without the proposed dredging works, the safety of the cruise vessels' manoeuvring will be in question.

2 PROJECT DESCRIPTION

- 2.1.1 The scope of the Project comprises:
- dredging of marine sediment of about 1,380,000 m³ from the existing seabed in the Harbour area off the southern tip of the former Kai Tak Airport runway to provide the necessary water depth within the manoeuvring area for cruise vessels; and
 - Removal of existing seawall of about 322,300 m³ by dredging at the southern tip of the former Kai Tak Airport runway for cruise berth construction.
- 2.1.2 The Project is a Designated Project in accordance with Item C.12 of Part I, Schedule 2 of the EIAO, which specifies an "a dredging operation exceeding 500,000 m³".
- 2.1.3 It is planned to implement the proposed dredging in two stages. The staged dredging requirements for the cruise terminal are shown in **Figure 1.4**. The breakdown of the dredging volumes is given in **Table 2.1**.

Table 2.1 Volume of Dredging

Stages (Figure 1.4)	Volume of Dredging (m ³)	
	From Existing Seabed in the Harbour Area	From Existing Seawall
Stage 1 Dredging Total:	700,000 ⁽¹⁾	322,300
Stage 2 Dredging Total:	680,000	-
Total (Stage 1 + Stage 2):	1,380,000	322,300

Note 1: The total volume of 700,000 m³ includes the dredged material of 20,000 m³ to be generated from removal of the abandoned KTR outfall as shown in **Figure 1.4**.

3 CONSIDERATION OF ALTERNATIVES

3.1 Site Location

3.1.1 Adequate water depth, turning basin and landside developable space are the three key requirements in determining the location of cruise terminal. The proposed location at the runway tip would be best able to meet the above requirements when compared to the rest of Kai Tak. The PODP has proposed two-alongside berths configuration comprising a continuous 850 m long berth structure to cater for simultaneous berthing of one 360m and one 345m long cruise vessel. This is expected to be able to accommodate the longest cruise vessel commissioned to date. The proposed location for the cruise terminal at the runway tip has the deepest seabed along the former runway and larger manoeuvring space for receiving mega cruise vessels. The access from and to the main fairway is also a very direct one. Relocating the cruise terminal to the middle part of the former runway will affect the operation of the existing typhoon shelter, mooring buoys and submarine gas pipeline, which in turn would affect the implementation programme of the cruise terminal. Besides, more extensive seabed dredging would be required as the water depth there is much shallower (about 2-6m). This will not only increase the technical difficulties but will also bring about more severe environmental implications.

3.1.2 An alternative location for the cruise terminal at West Kowloon has been considered. The West Kowloon proposal is considered inappropriate in view of the water depth of the foreshore area for manoeuvring and/or berthing of mega cruise ships. The impact on the existing marine facilities and more importantly, the surrounding road network, public transport system and supporting facilities is considered unacceptable and as such this proposal was not supported.

3.2 Dredging Extent

3.2.1 The proposed size and configuration of the manoeuvring area is based on the minimum extent required for safe manoeuvring of cruise vessels as determined by the real time vessel simulation in order to minimize the associated waste generation as well as the direct disturbance to marine ecological and fisheries resources.

3.3 Dredging Programme

3.3.1 The programme for Stage 1 dredging is governed by the required commissioning date of the first berth. Thus, dredging required for operation of the first berth has to be carried out during the period from later half of 2008 to 2011 as the first stage in order to meet the commissioning programme for the first berth. Due to the site constraints, dredging for the second berth would need to be carried out at a later stage after decommissioning of the existing submarine gas pipelines. The actual program for Stage 2 dredging would also depend on the future demand for the cruise terminal. The current tentative programme is to commence the Stage 2 dredging in 2013 for completion in 2014 for the purpose of this EIA. The selected time horizon is the earliest possible timing for Stage 2 dredging. Our modelling assessment for Stage 2 dredging has included the impacts of all possible

concurrent marine works anticipated in or beyond 2012 except for the maintenance dredging described in Section 3.3.2. Maintenance dredging will not be carried out concurrently with the Stage 2 capital dredging. Therefore, no alternative programme has been considered for the capital dredging. Based on the water quality model predictions provided in the EIA report, no unacceptable water quality impacts are expected under the assumed programme for capital dredging with implementation of all the recommended mitigation measures.

- 3.3.2 The duration of maintenance dredging would be less than 6 months for each berth. Alternative programme for the maintenance dredging to be carried out in either dry or wet seasons has been considered under the water quality impact assessment. Based on the model predictions, maintenance dredging in wet season would contribute larger water quality impact and is therefore not preferred. It is recommended in this EIA that the maintenance dredging should not be programmed in wet seasons (April to September) to avoid the potential water quality impacts.

3.4 Dredging Equipment

- 3.4.1 Closed grab dredgers are considered as the most suitable dredgers for small volumes and contaminated mud. It is feasible to use small trailer suction dredgers yet these will give less control over handling of contaminated mud and produce more marine sediment by volume (due to high water content) when compared with grab dredging. Larger equipment as adopted for major reclamation projects such as the Penny's Bay reclamation and the Container Terminals in Kwai Chung has been considered. However, given that dredging is not on the critical path of the construction programme of the cruise terminal, it is suggested that closed grab dredgers being the most cost effective construction method with the least environmental impact shall be adopted for the dredging works for the cruise terminal.

3.5 Dredging Method, Dredging Rates and Staged Dredging Requirements

- 3.5.1 The capital dredging works will be carried out in two stages, in the areas as indicated in **Figure 1.4**. The total volume of capital dredging is estimated as 700,000 m³ for Stage 1 and 680,000m³ for Stage 2. The rates of dredging from existing seabed to provide the proposed manoeuvring area will not exceed 4,000m³ per day (using 2 closed grab dredgers) during both Stage 1 and Stage 2 dredging period. The dredging at and near the seawall area for berth construction will be carried out concurrently with the Stage 1 dredging at a maximum rate of 4,000m³ per day by 2 closed grab dredgers.
- 3.5.2 The total volume of maintenance dredging is estimated as 350,000m³ once every 5 to 10 years. The rates of maintenance dredging will not exceed 2,000m³ per day (using 1 closed grab dredger).
- 3.5.3 The dredging locations, rates, timing and phased implementation have been analyzed and confirmed by the technical assessments performed under this EIA to be environmentally acceptable. In particular, modelling assessment has been carried out under this EIA to assess the water quality impacts of undertaking the dredging in either the dry or wet season and concluded that the proposed dredging rates, locations and timing would not cause any unacceptable water quality and marine ecological impact, provided that all the mitigation measures recommended under this EIA are properly implemented.

3.6 Berth Structure

3.6.1 Dredging of existing seawall would be required for berth construction. The cruise terminal berth structure would need to be constructed within the land limits as a measure to protect and preserve the Harbour. Preliminary schemes for six types of berth structures have been developed and reviewed including:

- Option 1 – Piled Quay Deck;
- Option 2 – Precast Reinforced Concrete Caisson;
- Option 3 – Precast Concrete Blockwork Seawall;
- Option 4 – Bored Pile Retaining Wall with Anchor;
- Option 5 – Precast Reinforced Concrete Counterfort Wall; and
- Option 6 – Sheet Pile Cofferdam Wall

3.6.2 After reviewing all the factors, Options 4, 5 and 6 are not recommended based on engineering considerations. Amongst the three short listed options, the piled quay deck (Option 1) would require the least amount of dredging at the existing seawall during construction. For the purpose of this EIA, however, Options 2 and 3 are assumed to be adopted to allow flexibility for the future in recognition that the cruise terminal developer may choose an alternative to the quay deck structure. In environmental terms the main difference between Options 1, 2, and 3 is the volume of dredging from the existing seawall. It should be noted that the volume of dredging from the existing seawall is significantly less in the case of Option 1, therefore the allowance for Options 2 and 3 in this EIA represents a worst case assumption

4 KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

4.1 Air Quality Impact

4.1.1 Dredging activities are marine based activities and negligible dust impacts on nearby air sensitive receivers (ASRs) would be expected. Referring to the marine site investigation results, the acid volatile sulphide (AVS) levels measured in all the sediment samples collected from the dredging area of the proposed cruise terminal were below the detection limit of 1 mg/kg. In general, high AVS concentrations in sediment indicate that odorous hydrogen sulphide gas is likely to be generated from the sediment. These AVS levels are far below the AVS levels of the odour remediated sediments collected from Shing Mun River and Sam Ka Tsuen Typhoon Shelter. Therefore, it is expected that the potential odour emissions from the sediments within the dredging area of the proposed cruise terminal would be minimal and adverse odour impact from the dredging activities in the Stage 1 and 2 areas would not be anticipated. Adverse odour impacts during the capital dredging are therefore not expected. Maintenance dredging would be carried out once every 5 to 10 years and adverse odour impacts at ASRs are also not expected.

4.2 Noise Impact

4.2.1 This EIA has predicted the construction noise impacts of the Project during normal daytime working hours, taking into account other concurrent projects within a 300m study area. Based on the latest available information, there are no existing Noise Sensitive Receivers (NSRs) identified within 300m from Project boundary and only two representative planned NSRs are identified for assessment during the Stage 2 dredging period as a conservative approach. Under the unmitigated scenario, the noise levels at all the representative planned residential NSRs would comply with the construction noise standard, and therefore no adverse noise impact is expected. Good site practices are recommended to further ameliorate the impacts. A construction noise environmental monitoring and audit (EM&A) programme is recommended to check the compliance of the noise criteria during normal daytime working hours if any planned NSRs within the 300m study area are occupied during the proposed dredging works.

- 4.2.2 Assessment on noise impact from maintenance dredging was also conducted. Results indicated that the predicted noise at the nearest NSRs would comply with the construction noise criterion of 75 dB(A).

4.3 Water Quality Impact

- 4.3.1 The water quality impact during the proposed dredging works has been assessed by mathematical modelling. Suspended solids are identified as the most critical water quality parameter during the dredging operations. The worst-case scenarios for the dredging works have been assessed and it is predicted that potential water quality impacts could occur at the flushing water intakes along the waterfront of the Victoria Harbour. However, the water quality impacts upon the intakes could be effectively minimized with the implementation of the proposed mitigation measures including deployment of silt curtains at appropriate dredging areas, and installation of silt screens at selected seawater intakes. There would be no unacceptable residual water quality impact due to the proposed capital and maintenance dredging works. A water quality monitoring and audit programme is recommended to verify whether or not impact predictions are representative, and to ensure that the proposed mitigation measures are implemented properly.

4.4 Waste Management Implications

- 4.4.1 The total volume of dredged sediment generated from the dredging of the seabed to provide the manoeuvring basin for the cruise terminal is estimated to be approximately 1.38 Mm³ during construction phase. Based on the results of the chemical and biological screening, approximately 430,000 m³ was classified as contaminated dredged sediment (Category M and H) requiring Type 1 – Open Sea Disposal (Dedicated Sites) or Type 2 - Confined Marine Disposal, and approximately 950,000 m³ was classified as Category L sediment suitable for Type 1 - Open Sea Disposal in accordance with the Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TCW) No. 34/2002 “Management of Dredged / Excavated Sediment”.
- 4.4.2 The total volume of dredged sediment generated from maintenance dredging during operational phase is estimated to be approximately 350,000 m³ every 5 to 10 years. Prior to any maintenance dredging, sediment sampling and testing will be carried out in accordance with the ETWB TCW No. 34/2002 to determine the contamination level of the dredged sediment. The most appropriate open sea or confined marine disposal site will be allocated for proper disposal of the dredged sediment on the basis of the chemical and biological test results in accordance with the ETWB TCW No. 34/2002.
- 4.4.3 The total volume of C&D material generated from the removal of the existing seawall by dredging for the berth structure construction is estimated to be approximately 322,300 m³ during construction phase. No C&D material would be generated from maintenance dredging during operational stage of the proposed cruise terminal. Other wastes generated from the capital and maintenance dredging are likely to include chemical waste from the maintenance of construction plant and equipment and general refuse from the construction workforce.
- 4.4.4 It is assumed all the C&D material generated from the Project would require off-site disposal. Seawall construction relies very heavily on the grading of materials. If the materials are not graded properly then there is the risk that the reclamation will wash out through the seawall and the seawall will collapse. Whilst the as-built drawings of the existing runway seawalls and reclamations have been obtained they do not give any information as to the grading of the existing materials. As such it is not possible with the information available to make any accurate assessment as to which materials may be suitable for reuse. As such a conservative estimate has been made for the purpose of the EIA. Nevertheless, the contractor for capital dredging should investigate the potential for reusing the C&D materials on site. If practical, the C&D material generated from the Project should be sorted and any unsuitable material removed to achieve the correct grading for seawall construction.

- 4.4.5 Mitigation measures are recommended in this EIA to minimise potential environmental impacts associated with handling and disposal of different wastes arising from the Project. Provided that the recommended mitigation measures are properly followed, adverse environmental impacts would not be expected from the capital and maintenance dredging.

4.5 Impact on Cultural Heritage

- 4.5.1 A Marine Archaeological Investigation (MAI) has been conducted to identify any marine archaeological remains within the proposed dredging area for construction of the new cruise terminal at Kai Tak. The 2007 MAI did not locate any archaeological resources but it established that it is possible that archaeological material could be deeply buried within the sub-seabed sediments, which may be adversely affected by the proposed dredging.
- 4.5.2 Due to the depth of proposed dredging and the fact that the archaeological potential of the area cannot be completely ruled out, the need of precautionary measures during dredging is required. Guidelines for a Monitoring Brief have been prepared in consultation with the Antiquities and Monuments Office (AMO).
- 4.5.3 The heritage significance of the remaining seawall structure is assessed to be low. Yet, the dredging activities of the proposed cruise terminal should ensure that disturbance to the existing seawall masonry outside the Project boundary should be avoided as far as practicable.

4.6 Marine Ecological Impact

- 4.6.1 Literature reviews of existing information with supplement findings from recent field surveys indicated that identified marine habitats within the Project area are of generally very low ecological value. There are no ecological sensitive receivers, such as Site of Specific Scientific Interests (SSSIs) and marine parks and / or reserves and other areas of ecological importance or conservation interest, in and within the immediate vicinity of the Project area.
- 4.6.2 Marine habitats within the Kai Tak area include soft bottom seabed, artificial seawalls, subtidal habitats and feeding ground of waterbirds. All the identified habitats are considered as generally very low of ecological value due to their highly artificial and disturbed nature. Species diversity and abundance in these habitats were low and no rare or restricted species was recorded. The species of conservation interest recorded within the Project area only include a single species of common hard coral (*Oulastrea crispate*) (but all colonies found are small in size, sparsely distributed and in very low coverage) and few species of waterbirds such as Little Egret and Great Egret. All these species of conservation interest recorded within the Project area are common and widespread in other Hong Kong waters.
- 4.6.3 Direct and indirect ecological impacts arising from the Project were identified and evaluated. The Project would result in the temporary loss of approximately 57 hectares of soft bottom benthic and subtidal habitats and about 1 km long of artificial intertidal habitat. Recent dive surveys revealed that there were about 1000 rocks / boulders located in the hard substrata sea area that falls within dredging site but only about 50 of them were found attached with small and isolated coral colonies. As an additional measure to protect coral, it is recommended to translocate those movable rocks / boulders attached with coral colonies to other nearby suitable habitats such as Junk Bay as far as possible. Considering that the benthic and intertidal habitats within the proposed dredging area are of very low ecological value and direct impact on some isolated coral colonies would largely be mitigated by translocation, no adverse impact is expected.
- 4.6.4 Other indirect impacts arising from the Project would be temporary and minimised with implementation of proper mitigation measures. Overall, no significant and unacceptable ecological impact on marine resource was anticipated from the Project.

4.7 Fisheries Impact

- 4.7.1 Literature reviews of existing information indicated that identified fishing area in Kowloon Bay, eastern Victoria Harbour and Kwun Tong Typhoon Shelter are of moderate to high fisheries values while that in To Kwa Wan Typhoon Shelter and Kai Tak Approach Channel are of relatively low value. There are no Fish Culture Zones (FCZs) and important spawning or nursery grounds identified in and within the immediate vicinity of the Project area. The nearest mariculture areas are FCZs at Tung Lung Chau and Ma Wan which are 8 km and over 10 km away, respectively, of the Project area.
- 4.7.2 Direct and indirect impacts on fisheries resources arising from the Project were identified and evaluated. The Project will result in the temporary loss of approximately 57 hectares of fishing area. In view of the small size of affected area, temporary and insignificant loss of fisheries production and low impact on fishing activities, fisheries impacts due to direct loss of fishing area within the dredging area is considered as minor and acceptable.
- 4.7.3 Indirect impacts of change of water quality arising from the Project would be temporary and insignificant based on the predictions from water quality modelling. Mitigation measures suggested in the water quality assessment to control water quality would serve also to protect fisheries resources from indirect impacts. No significant adverse impact on fisheries resources would be expected from the Project and therefore no necessary fisheries-specific mitigation measures would be required.

4.8 Environmental Monitoring and Audit

- 4.8.1 Environmental monitoring and audit (EM&A) requirements for the Project have been specified in an EM&A Manual. The EM&A Manual contains details of proposed baseline and compliance monitoring programmes, implementation schedule of the environmental protection / mitigation measures, EM&A reporting procedures and complaint handling procedures.

4.9 Environmental Outcomes

- 4.9.1 The major environmentally sensitive areas that are potentially affected by the Project include planned developments on the former Kai Tak Airport runway, seawater intakes at the waterfront of the Victoria Harbour, cultural heritage and ecological resources within the proposed dredging areas, and marine ecological and fisheries resources in the Victoria Harbour. With the implementation of the proposed control and mitigation measures and the EM&A programme, all the identified sensitive receivers would be protected from adverse environmental impacts arising from the Project. A summary of the environmental impacts associated with the Project is given in **Table 3.1**.

Table 3.1 Summary of Environmental Impacts Associated with the Project

Sensitive Receivers / Assessment Points	Impact Prediction Results	Relevant Standards / Criteria	Extents of Exceedances	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
Air Quality Impact					
<p>Planned developments on the former airport runway including:</p> <ul style="list-style-type: none"> Residential Development Planned Hotel Landscape Deck at Cruise Terminal Planned Runway Park 	<p>Dredging activities are marine based activities and negligible dust impacts on nearby ASRs would be expected. Referring to the marine site investigation results, the AVS levels measured in all the sediment samples collected from the dredging area of the proposed cruise terminal were below the detection limit of 1 mg/kg. In general, high AVS concentrations in sediment indicate that odorous hydrogen sulphide gas is likely to be generated from the sediment. These AVS levels are far below the AVS levels of the odour remediated sediments collected from Shing Mun River and Sam Ka Tsuen Typhoon Shelter. Therefore, it is expected that the potential odour emissions from the sediments within the dredging area of the proposed cruise terminal would be minimal and adverse odour impact from the dredging activities in the Stage 1 and 2 areas would not be anticipated. Adverse odour impacts during the capital dredging are therefore not expected. Maintenance dredging would be carried out once every 5 to 10 years and adverse odour impacts at ASRs are also not expected.</p>	<ul style="list-style-type: none"> The EIAO-TM stipulates that the hourly TSP level should not exceed 500 µgm-3 (measured at 25°C and one atmosphere) for construction dust impact assessment. Standard mitigation measures for construction sites are specified in the Air Pollution Control (Construction Dust) Regulation. In accordance with the EIAO-TM, odour impact predicted at an air sensitive receiver should meet 5 odour units based on an averaging time of 5 seconds. 	Not applicable	<p><u>Construction Dust</u></p> <p>Negligible dust impacts would be expected from dredging activities. In order to further ensure compliance with the AQOs at the ASRs, requirements of the Air Pollution Control (Construction Dust) Regulation, where relevant, shall be adhered to during the construction period.</p> <p><u>Odour: Impact from Capital Dredging and Maintenance Dredging</u></p> <p>No adverse odour impact is expected from the Project. However as a precautionary measure to minimize the potential odour emissions during dredging operation, if any, the dredged sediment placed on barge should be properly covered during its transportation to the mud dumping pits, as far as practicable to minimise the exposed area and hence the potential odour emissions during transportation of the dredged sediment.</p>	None
Noise Impact					
<p>Planned residential developments on the former airport runway.</p>	<ul style="list-style-type: none"> This assessment has predicted the construction noise impacts of the Project during normal daytime working hours, taking into account other concurrent projects within a 300m study area. Based on the 	<ul style="list-style-type: none"> The NCO provides the statutory framework for noise control of construction work other than percussive piling using powered 	Not applicable	<p>Good site practices to ameliorate the construction noise impact:</p> <ul style="list-style-type: none"> Only well-maintained plant should be operated on-site and plant should be serviced regularly during the 	None

Sensitive Receivers / Assessment Points	Impact Prediction Results	Relevant Standards / Criteria	Extents of Exceedances	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	<p>latest available information, there are no existing NSRs identified within 300m from Project boundary and only two representative planned NSRs are identified for assessment during the Stage 2 dredging period as a conservative approach. Under the unmitigated scenario, the noise levels at all the representative planned residential NSRs would comply with the construction noise standard, and therefore no adverse noise impact is expected. Good site practices are recommended to further ameliorate the impacts. A construction noise EM&A programme is recommended to check the compliance of the noise criteria during normal daytime working hours if any planned NSRs within the 300m study area are occupied during the proposed dredging works.</p> <ul style="list-style-type: none"> Assessment on noise impact from maintenance dredging was also conducted. Results indicated that the predicted noise at the nearest NSRs would comply with the construction noise criterion. 	<p>mechanical equipment (PME) between the hours of 1900 and 0700 hours or at any time on Sundays and general holiday (that is, restricted hours). Noise control on construction activities taking place at other times is subject to the Criteria for Evaluating Noise Impact stated in Table 1B of Annex 5 in the EIAO-TM. The noise limit is Leq_(30 minutes) 75 dB(A) at the façades of dwellings and 70 dB(A) at the façade of schools (65 dB(A) during examinations).</p>		<ul style="list-style-type: none"> construction program. Mobile plant, if any, should be sited as far away from nearby NSRs as possible. Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum. Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from nearby NSRs. Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities. 	
Water Quality Impact					
<p>Seawater intakes along the waterfront of Victoria Harbour and far field coral sites identified in Junk Bay, Green Island and Cape Collinson</p>	<p>The model results indicate exceedances of WSD water quality (SS) criterion at 6 flushing water intakes along the water front of Victoria Harbour.</p>	<ul style="list-style-type: none"> WSD flushing water quality intake criterion for SS: < 10 mg/l Target water quality objectives at coral sites for SS elevations: < 30 % of the background ambient levels Sedimentation rate at corals: < 100g/m²/day 	<p>Full compliance would be achieved with implementation of all the recommended mitigation measures</p>	<ul style="list-style-type: none"> Use of closed grab dredger during maintenance and capital dredging deployment of silt curtains at appropriate dredging areas, and installation of silt screens at selected seawater intakes during capital dredging Avoid maintenance dredging in wet season (April to September). 	None
Waste Management Implications					
<p>Water quality, air, and noise sensitive receivers at or near the Project site, the waste</p>	<p>Main waste: dredged marine sediment with a total volume of approximately 1.38 Mm³ from capital dredging and</p>	<ul style="list-style-type: none"> Waste Disposal Ordinance (Cap. 354) Waste Disposal 	Not applicable	<ul style="list-style-type: none"> Contaminated dredged sediment (Category M and H) would require either Type 1 -- 	None

Sensitive Receivers / Assessment Points	Impact Prediction Results	Relevant Standards / Criteria	Extents of Exceedances	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
<p>transportation routes and the waste disposal site.</p>	<p>0.35 Mm³ once every 5 to 10 years from maintenance dredging</p> <p>Of the sediment to be generated from capital dredging, approximately 430,000 m³ was classified as contaminated dredged sediment (Category M and H) and approximately 950,000 m³ was classified as Category L sediment</p> <p>Sediment to be generated from maintenance dredging will be tested in accordance with the ETWB TCW No. 34/2002</p> <p>Other wastes: Chemical waste from plant and equipment maintenance during capital and maintenance dredging; and</p> <p>C&D material (of about 322,300m³) from dredging of the existing seawall at the former airport runway during capital dredging at construction stage. Inert C&D material to be disposed off-site to the designated public fill reception facility</p>	<p>(Chemical Waste) (General) Regulation (Cap. 354C)</p> <ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance (Cap. 28) Public Health and Municipal Services Ordinance (Cap. 132) - Public Cleansing and Prevention of Nuisances Regulation Annexes 7 & 15 of EIAO TM Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N) 		<p>Open Sea Disposal (Dedicated Sites) or Type 2 - Confined Marine Disposal at contaminated mud pit allocated by MFC.</p> <ul style="list-style-type: none"> Category L sediment is suitable for Type 1 - Open Sea Disposal at gazetted marine disposal ground allocated by MFC. Mitigation measures and good site practices recommended in the EIA report on waste management should be incorporated into the contract document to control potential environmental impact from handling of the identified wastes arising from the Project 	
Impact on Cultural Heritage					
<p>Archaeological resources within the Project site boundary</p>	<p>The MAI did not locate any marine archaeological remains within the Project site boundary and concluded no further MAI is necessary.</p> <p>Direct impact to the seawall masonry is expected. However, the section of affected seawall within the project boundary has been established to have low cultural heritage value.</p>	<ul style="list-style-type: none"> Antiquities and Monuments Ordinance (Cap. 53) Environmental Impact Assessment Ordinance (EIAO) (Cap. 499, S.16) Technical Memorandum on the Environmental Impact Assessment Process (EIAO-TM) Guidance Notes on Assessment of Impact on Sites of Cultural Heritage in 	<p>Not applicable</p>	<ul style="list-style-type: none"> It is recommended that the dredging contractor should monitor the dredge spoils. A procedure for briefing the dredging contractors about the possible presence of marine archaeological resources during dredging and a procedure for handling them have been developed in consultation with the AMO, to ensure compliance with the AMO standards and protection of any archaeological resources at the proposed dredging site The heritage significance of 	<p>None</p>

Sensitive Receivers / Assessment Points	Impact Prediction Results	Relevant Standards / Criteria	Extents of Exceedances	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
Marine Ecological Impact					
Ecological resources at and near the P Project site	<ul style="list-style-type: none"> Direct impacts to the marine ecological resources would include temporary loss of approximately 57 hectares of soft bottom and subtidal habitat and about 1km of artificial intertidal habitat. All the marine habitats and associated marine life that would be directly lost are all of very low ecological values and taking into account of all the mitigation measures proposed including coral translocation and provision of newly constructed seawalls, such impact is considered as minor. Indirect impacts on the marine ecology would be associated with changes of water quality due to dredging activities. Considering that the benthic, intertidal and subtidal communities identified in the Kai Tak area are of generally very low ecological value and in view of the temporary nature of such impact, only minor indirect impact on marine resources is anticipated. During the dredging works, increased marine traffic and noise generated from construction plant could cause disturbance impacts to the associated wildlife including the waterbirds of conservation interest. It is expected that displacement of waterbirds to the nearby waters for roosting and feeding area may occur temporarily but adverse impact is not anticipated. 	<ul style="list-style-type: none"> Environmental Impact Assessment Studies (GN-CH) Hong Kong Planning Standards and Guidelines (HKPSG) Marine Archaeological Investigation Guidelines. 	Not applicable	<ul style="list-style-type: none"> Coral translocation of directly affected colonies, as far as practicable, to avoid and minimize direct loss of this fauna of conservation interest Water quality control measures such as installation of silt curtains around dredger(s) and use of closed grab dredger to minimise indirect impact on marine life due to change of water quality. Appropriate good site practices on noise control are recommended to be adopted during the dredging works to minimise noise disturbance to nearby waterbird population. Re-construction of new seawalls to recover loss of artificial intertidal habitats. 	<ul style="list-style-type: none"> Temporary loss of 57 hectares of soft bottom benthic habitat of very low ecological value. Water quality modelling impacts on the marine ecology associated with changes of water quality due to dredging activities within the Project area would be acceptable after implementation of proper mitigation measures.

Sensitive Receivers / Assessment Points	Impact Prediction Results	Relevant Standards / Criteria	Extents of Exceedances	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
Fisheries Impact					
<p>Fisheries resources at and near the Project site.</p>	<ul style="list-style-type: none"> The Project will result in the temporary loss of about 57 hectares of fishing area. In view of the small size of affected area, temporary and insignificant loss of fisheries production and low impact on fishing activities, fisheries impacts due to direct loss of fishing area within the dredging area is considered as minor and acceptable. Indirect impacts on fisheries resources would be associated with changes of water quality due to dredging activities. In view of the temporary and localised nature of such impact, only minor impact on capture fisheries resources is anticipated. No impact on culture fisheries resources is anticipated as the nearest FCZs Tung Lung Chau and Ma Wan are over 8km and 10km away from the project area respectively. 	<ul style="list-style-type: none"> Control Ordinance (Cap.358) International Union for Conservation of Nature and Natural Resources (IUCN) 2006 Red Data Books The PRC National Protection Lists of Important Wild Animals and Plants EIAO-TM Annex 9 and Annex 17 in order to provide complete and objective identification, prediction and evaluation of potential fisheries impacts arising from the Project. Fisheries Protection Ordinance (Cap. 171) – aims to promote the conservation fish and other forms of aquatic life within the Hong Kong waters by regulating fishing practises to prevent detrimental activities to the fisheries industry. The Ordinance came into effect on 30 June 1997. Marine Fish Culture Ordinance (Cap. 353) – regulates and protects marine fish culture by designating areas of fish culture zone, granting license, prohibiting unauthorized vessels and any deposition of 	Not Applicable	No necessary fisheries-specific mitigation measures would be required.	<ul style="list-style-type: none"> Temporary loss of 57 hectares of fishing area at Kowloon Bay. Water quality modelling predicted that indirect impacts on fisheries resources associated with changes of water quality due to dredging activities within the Project area would be acceptable after implementation of proper mitigation measures.

Sensitive Receivers / Assessment Points	Impact Prediction Results	Relevant Standards / Criteria	Extents of Exceedances	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
		<p>chemicals or other substance which are likely to cause injury to fish in a fish culture zone. The list of designated fish culture zones was last revised in January 2000.</p> <ul style="list-style-type: none"> The Water Pollution Control Ordinance (Cap.358) – aims to control water pollution in the waters of Hong Kong. Water control zones are designated with individual water quality objectives to promote the conservation and best use of those waters in the public interest. The most updated water quality objectives for the Victoria Harbour Water Control Zone were revised in June 1997. 			

5 CONCLUSION

- 5.1.1 The EIA has determined the likely nature and extent of environmental impacts predicted to arise from the Project. Where necessary and practicable, the EIA has specified mitigation and control measures to reduce the environmental impacts to acceptable levels.
- 5.1.2 With the recommended mitigation measures applied, the Project would be environmentally acceptable and no unacceptable residual impacts are anticipated. The schedule of implementation of the recommended mitigation measures has been provided in the EIA report. Monitoring requirements have also been specified in a separate EM&A Manual to ensure proper implementation of the recommended mitigation measures.