For information

A NOTE FOR LEGISLATIVE COUNCIL PANEL ON DEVELOPMENT

5729CL – Disposal of Contaminated Sediment – Dredging, Management and Capping of Sediment Disposal Facility at Sha Chau

Introduction

In considering CB(1)396/08-09(07) on "5729CL – Disposal of Contaminated Sediment – Dredging, Management and Capping of Sediment Disposal Facility at Sha Chau" at the Panel meeting on 19 December 2008, Members requested the Administration to provide supplementary information on the method of disposal and operation, environmental monitoring of the proposed East of Sha Chau (ESC) facility, the key findings of environment impact assessment and the outcome of public consultation for the proposed facility.

The Administration's Response

Disposal Method and Operation Procedures

2. The selected site for the proposed facility at ESC is of about 5 – 6 metre water depth and is subject to relatively mild water current. The site has been studied extensively and the project has gone through the Environmental Impact Assessment Ordinance and obtained the Environmental Permit for commencement of works. The proposed facility comprising four mud pits of about 20 metre deep beneath sea bed will be formed by the conventional dredging method. To ensure that the dredging work will not cause adverse impact to the environment such as inducing excessive suspended solids in the adjoining water body, the dredging rate will be controlled to not exceeding 100,000 cubic metre per week, the maximum rate allowed under the Environmental Permit.

3. We will exercise on-site management of the disposal operation and adopt the current "drift disposal" method for regulating the disposal operations within the facility. Under this method, the site staff will check the water current speed and direction upon arrival of a dumping barge and determine from the computer modeling the best disposal location at the upstream of the water current within the pit such that

the disposed sediments after drifting following the water current direction will settle within the pit boundary. This will prevent uncontrolled contamination of the adjacent waters due to the drifting of the disposed sediments before they settle into the mud pits. Diagrams showing the disposal method and operation procedures are at **Annex 1**.

4. After the facility is filled with contaminated sediment, we will provide a capping layer of clean sediment to seal off the dumped contaminated sediment from the adjoining environment. This top layer is designed with sufficient thickness of not less than 3 metre to sustain natural scouring effects, and to prevent the deep burrowing animals to take up contaminated sediments, and thus providing a route for contaminants to be released into the environment.

Environmental Monitoring

5. We will implement an Environmental Monitoring and Audit (EM&A) programme throughout the construction as a checking mechanism to safeguard the environmental acceptability of the proposed facility. Similar EM&A programmes have been in place for all existing mud pits at ESC before. Each EM&A programme involves various field sampling and laboratory testing works to collect measurements for verifying that:

(i) the operation of the facility will not result in any exceedances of the water quality objectives of the water control zone at where the facility is situated;

(ii) the operation of the facility will not increase sediment contaminant concentrations over time at individual stations or a trend of increasing concentrations with proximity to the active pit;

(iii) the operation of the facility will not increase sediment toxicity over time at individual stations or a trend of increasing toxicity with proximity to the pit;

(iv) the operation of the facility will not affect the abundance of the fisheries resources and will not increase the tissue or whole body contaminant concentration over time in selected target species, and;

(v) recolonisation is occurring at the capped pits such that the affected seabed will return to its pre-dredged state for marine organisms.

6. According to a recent review on the monitoring results collected since 1993 on all existing mud pits at ESC, there is no evidence of any adverse impacts caused by disposal activities at the ESC, and the operation of the facilities has been proceeded in an environmentally acceptable manner. A summary of the review findings and a plan showing the approximate sampling locations for the sediment contamination and water quality are attached at **Annex 2**. Another review to further investigate the water quality of the nearby sites of the ESC facilities using the regular water quality monitoring results collected by the Environmental Protection Department (EPD) has revealed that key water quality parameters including the dissolved oxygen, total inorganic nitrogen, suspended solids, etc are within acceptable limits and the water quality is not adversely affected by the mud pits. Scientific results of water quality monitoring are shown at **Annex 3**.

Key Findings of Environmental Impact Assessment

7. We completed an Environmental Impact Assessment (EIA) Study for the proposed ESC facility in 2005 pursuant to the requirements of the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO). The EIA report approved by the Director of Environmental Protection (DEP) has the following key findings:

(i) the ESC site has been selected to avoid both direct and indirect impact to ecologically sensitive habitats;

(ii) environmental monitoring data collected since the commencement of operations in 1992 at the existing ESC contaminated mud disposal facility has demonstrated that the environmental impact due to the mud disposal activities at the ESC area is within acceptable level. As all the dredging, backfilling and capping operations proposed for this new facility will be designed to follow the current practice, no adverse unacceptable impact is expected to occur;

(iii) the ESC facility is designed as four separate pits, which minimizes the exposure time of contaminated mud to the marine environment and consequently reduces the magnitude of any potential impacts;

(iv) there will not be unacceptable impact to the water quality if the dredging, backfilling and capping operations are carried out within the allowed working rates; and

(v) long term environmental data from in and around the existing capped pits at ESC demonstrate that within a relatively short period of time, recolonisation of marine organisms occurs returning the site to a pre-dredged state.

8. In summary, the EIA study has predicted that the proposed works will comply with all environmental standards and legislation following the implementation of the recommended mitigation measures.

Outcome of Public Consultation

9. Under the EIAO, the EIA report for the proposed facility was exhibited for public inspection from 27 May 2005 to 25 June 2005. The report was considered and endorsed by the Advisory Council on the Environment (ACE) on 11 July 2005. Having closely examined the public comments received on the EIA report and ACE's recommendation, the DEP approved the report without conditions on 1 September 2005.

10. We engaged a Chinese White Dolphin expert to review in 2007 the impact of the proposed ESC facility on Chinese White Dolphins. The expert reviewed observation records of Chinese White Dolphins between 2001 and 2007 at the north of Lantau and the contaminants concentration of the tissue of Chinese White Dolphins. The results confirms that the facility will not cause unacceptable impacts to Chinese White Dolphins, and the risk that Chinese White Dolphins will be exposed to contaminants due to the facility is low.

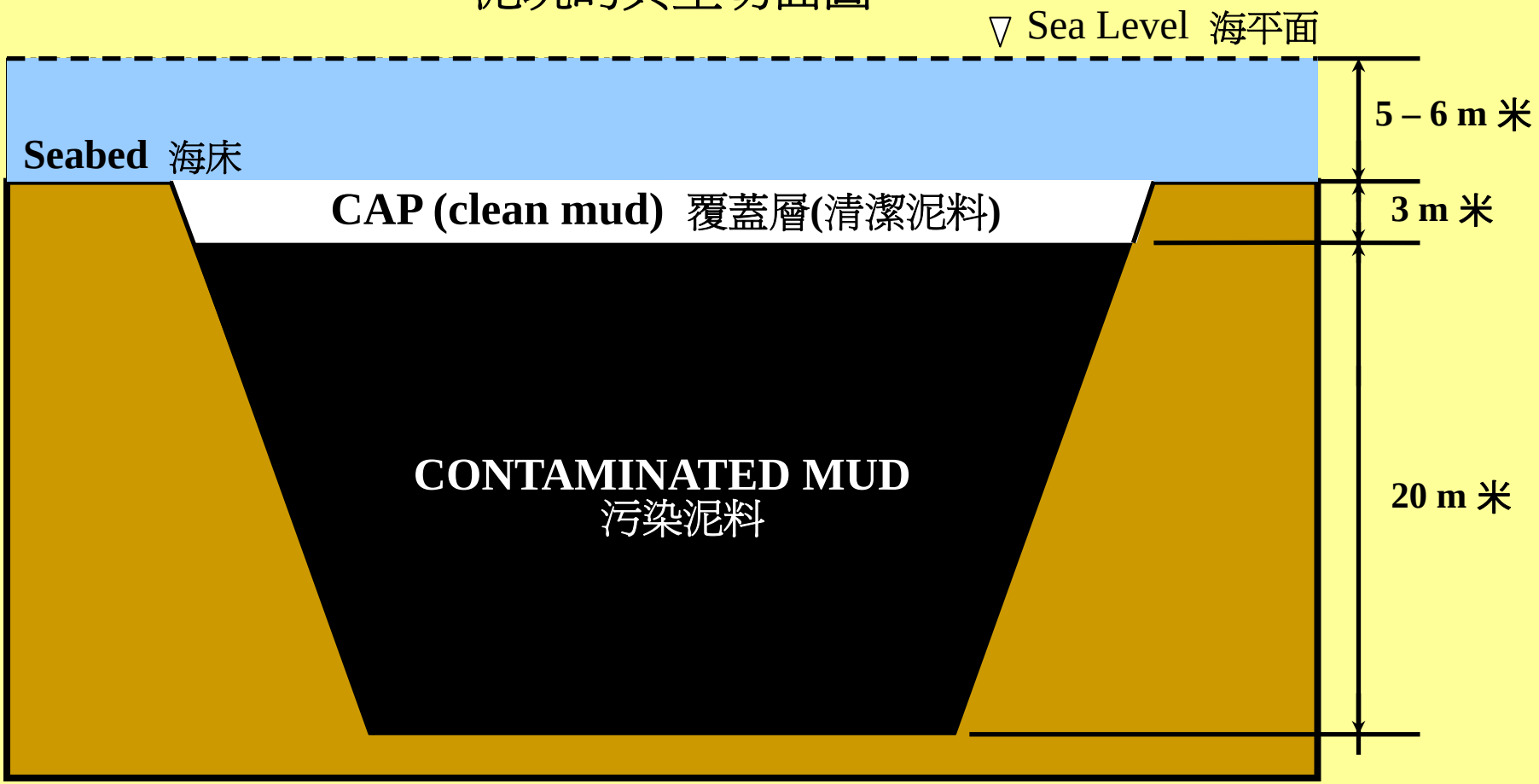
11. We consulted the Tuen Mun District Council (TMDC) at its meeting on 21 January 2008, Members of TMDC objected to this project and requested for additional information on site selection and long term water quality monitoring results. We consulted TMDC again on 28 February 2008 with the requested supplementary information. Members of the TMDC did not object to the gazetting of the proposed works under the Foreshore and Seabed (Reclamations) Ordinance (FSRO) but requested us to report back any objection to the proposed works received.

12. We gazetted the proposed works under the FSRO on 20 March 2008 and did not receive any objection or public opinions during the objection period. The gazette for authorization of the proposed works was published on 13 June 2008. We reported the outcome of gazettal to the Environment, Hygiene and District Development Committee (EHDDC) of the TMDC in November 2008 by means of circulating an information paper. Members of the EHDDC had no further comment on the proposed works except that the Chairman reminded us to reserve adequate capacity of the new facility for the disposal of sediment arising from maintenance works of the Tuen Mun River. We reported to TMDC on 6 January 2009 that there was no objection received up to 31 December 2008 and EHDDC also reported its views. Members of TMDC endorsed the proposed works.

13. We regularly attend the meetings of the Capture Fisheries Sub-Committee (CFS) and Aquaculture Fisheries Sub-committee (AFS) of the Advisory Committee on Agriculture and Fisheries for reporting on the latest situation about marine fill extraction and marine disposals within Hong Kong waters. We advised the CFS on 12 November 2007 and 25 February 2008 about the implementation of the proposed works. Members did not express any objection to the proposed works. We reported the progress of the proposed works to the AFS on 1 August 2008. Members requested for a briefing on the EIA for the proposed works, site selection and proposed disposal method. We briefed Members on the requested information on 5 December 2008 and 7 January 2009. Members did not express objection to the proposed works

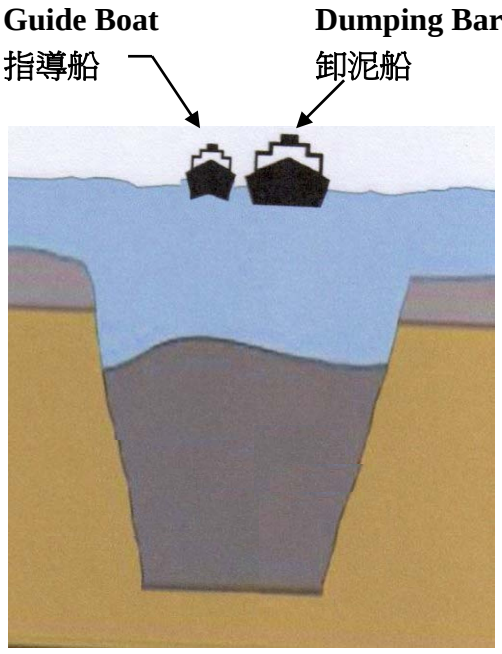
Civil Engineering and Development Department
Development Bureau
January 2009

Typical Cross-section of Mud Pit
泥坑的典型切面圖



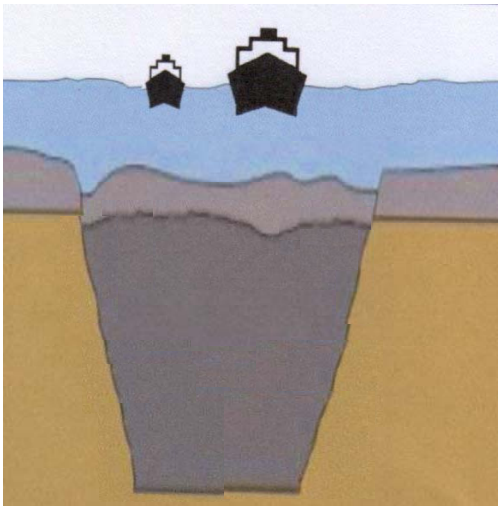
Schematic diagram showing the design of Contaminated Sediment Disposal Pits used in Hong Kong 香港採用的污染泥卸置坑設計示意圖
(Not to Scale) (不按比例**)**

Disposal Methodology　卸置方法



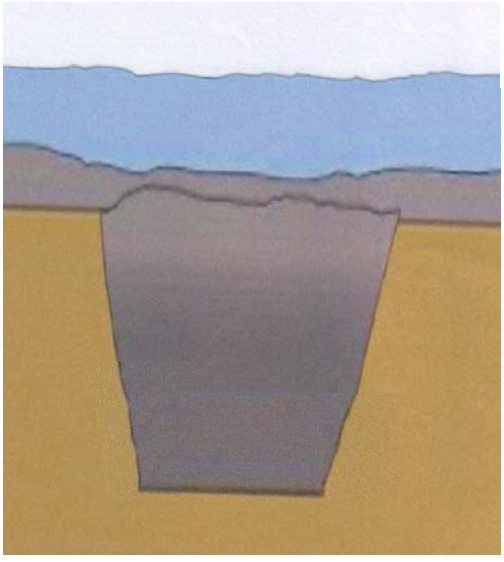
Disposal of contaminated mud in the disposal pit up to a level of 3m below the surrounding seabed

將污染泥料卸置在坑中，最高回填水平必須低於周圍海床 3 米



Capping using uncontaminated mud to isolate the disposed contaminated mud from environment

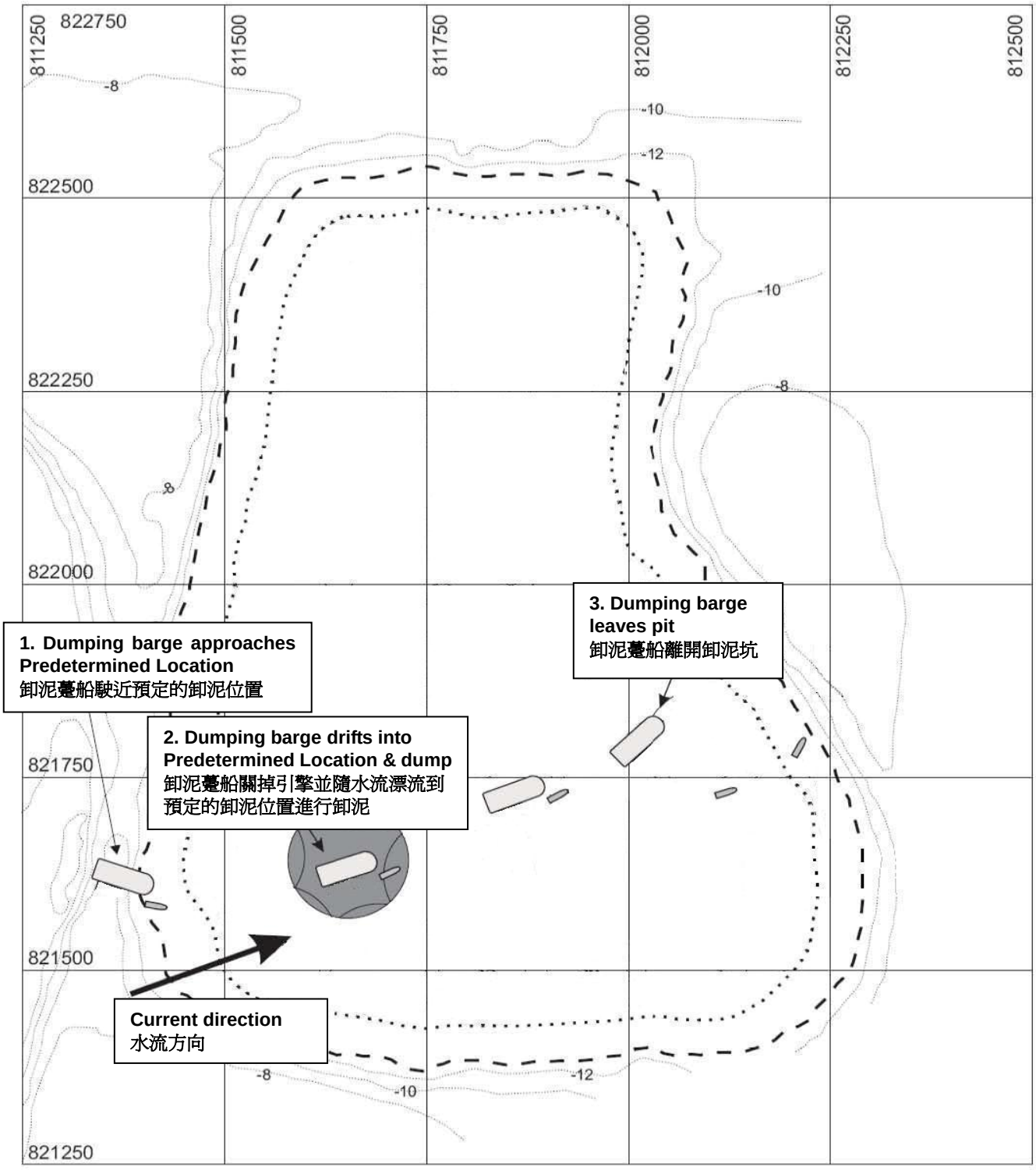
將清潔泥料覆蓋在污染泥料上，使之與周圍環境隔離



Completion of capping the pit to the original seabed level

覆蓋完成後，泥坑位置的海床會回復原狀

Operation Procedure 運作程序



Maximum backfill level 最高回填水平

Limit of dumping area 卸泥區範圍

150m

Predetermined Location 預定的卸泥位置

Dumping barge 卸泥躉船

Guide boat 指導船

Agreement No. CE 19/2004 (EP) - Environmental monitoring and audit for Contaminated Mud Pit IV at East of Sha Chau – investigation

Summary of Findings of Review of Monitoring Results from 1993 to 2007

Findings

Quality Monitoring of sediments outside facilities

Sediment concentrations of most contaminants were below their respective Lower Chemical Exceedance Level (LCEL), and exceedances of LCEL were observed for some contaminants very occasionally.

There were no observable trends of increasing contaminant concentrations in sediment with increasing proximity to the contaminated mud pits (CMP), and all contaminants showed either no or a weak relationship between their sediment concentrations and time.

There was no evidence of any adverse environmental impacts to sediment quality as a result of contaminated sediment disposal operations at East of Sha Chau.

Sediment Toxicity Testing of sediments outside facilities

Long term monitoring result indicated no history of toxic responses in organisms related to mud disposal operations as little or no toxicity was observed in sediments.

Testing for Contaminant concentration of Target Species

For samples collected from trawling, it was noted that the abundance of fisheries resources was similar between the Reference and Impact stations, and occasionally, was higher in the Impact than the Reference areas. This indicates that disposal operations at the CMP may not have any adverse effects on the abundance of fisheries resources. The CMP operation and facility is therefore considered to be environmentally acceptable in the context of fisheries resources.

For the biomonitoring, contaminant concentrations in the tissues and the whole body of the target species fluctuated over time, but no temporal trends of concern, i.e, increasing concentration over time, were observed for any of the target species.

Water Quality

There was no evidence of any adverse environmental impacts to water quality as a result of contaminated mud disposal operations at the East of Sha Chau CMP, and CMP operation and facility is considered to be environmentally acceptable in the context of water quality.

Conclusions

Based on the findings of the review of environmental monitoring data collected by various monitoring programmes from 1993 to February 2007, there is no evidence of any adverse impacts caused by disposal activities in the East of Sha Chau contaminated mud disposal facility, and the CMP operations and facility have proceeded in an environmentally acceptable manner.

Assessment of Water Quality of the Western Water Control Zone (NWWCZ) with respect to the operations of East Sha Chau Contaminated Sediment Disposal Facility

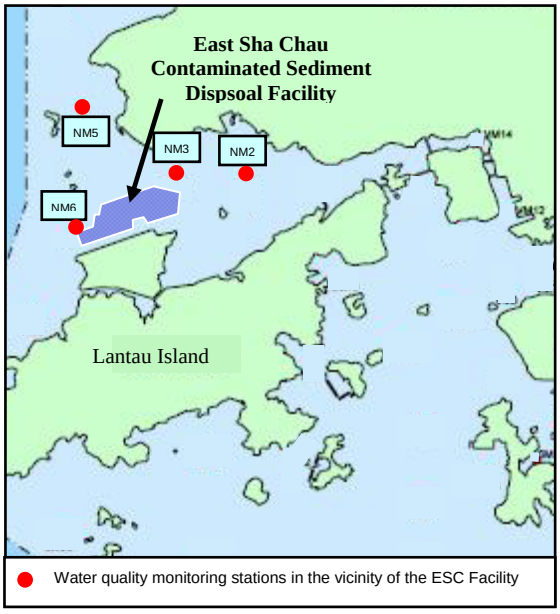
1. Introduction

Since end of 1992, a series of contaminated sediment pits have been operating at the East of Sha Chau (ESC) for the disposal of contaminated sediment arising from works (such as maintenance dredging of navigation fairway, river flood protection works and other infrastructure development works). Though it has been revealed from latest environmental monitoring results that there is no evidence of any adverse impacts caused by disposal activities at the ESC, the community still has concerns on whether there will be water quality impact arising from the operation of the contaminated sediment disposal facility general.

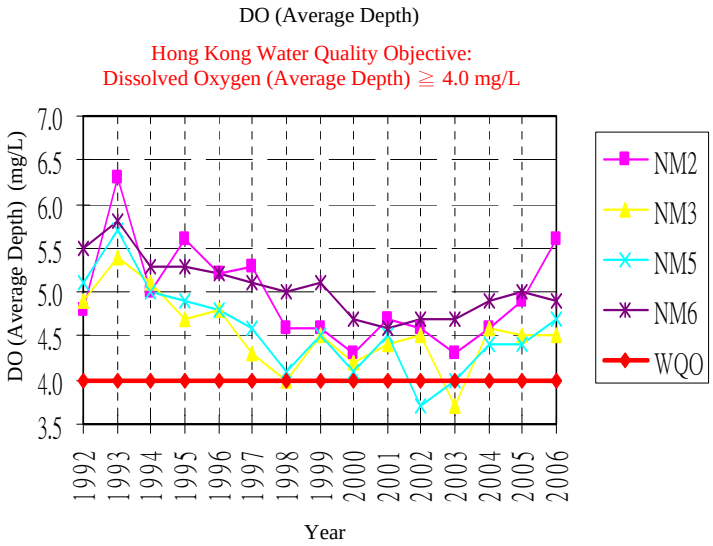
2. Scope of Study

On this subject, this study adopts the regular water quality monitoring data collected by Environment Protection Department (EPD) from the North Western Water Control Zone (where the disposal facilities are sited). This monitoring information (from 1992 till end of 2006) provides invaluable, independent and auditable information for the comparison between the monitoring results and the water quality objectives according to the objective of this study. Assessment results are shown below.

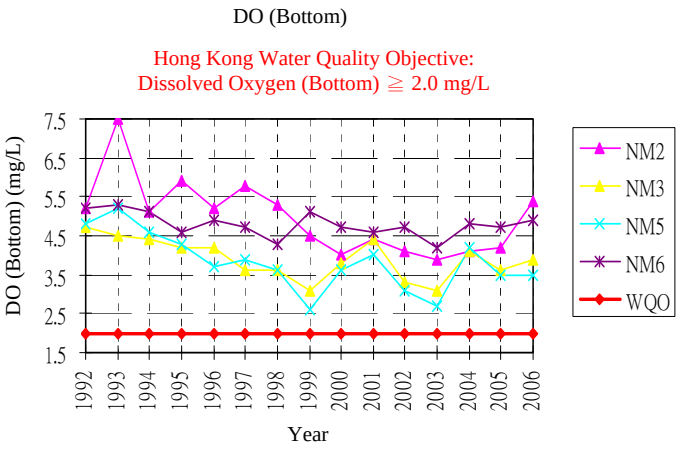
3. Assessment Results of Key Water Quality Parameters (1992 – 2006)



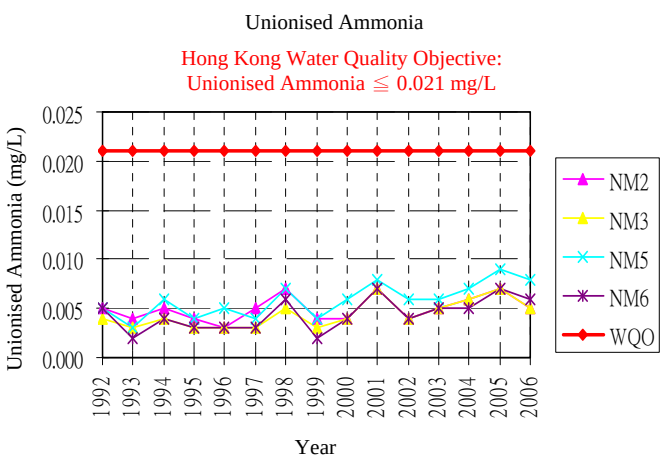
Sketch 1 – EPD's Water Quality Monitoring Station



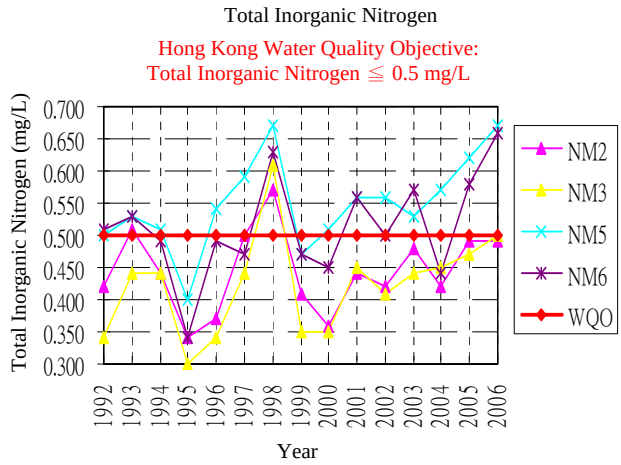
Sketch 2 – Key Water Quality Monitoring Parameter (Dissolved Oxygen (Average Depth))



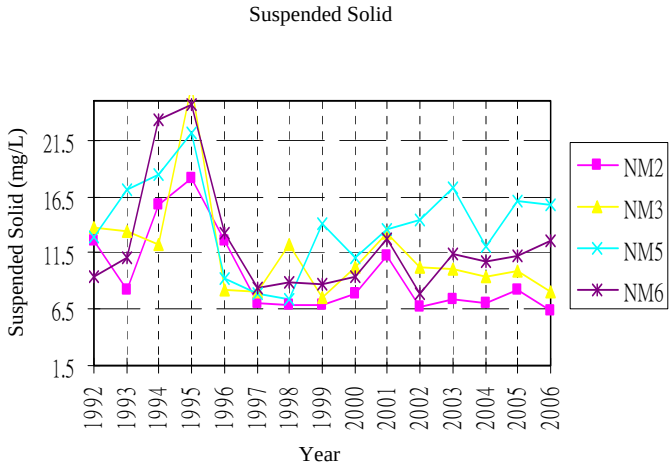
Sketch 3 – Key Water Quality Monitoring Parameter (Dissolved Oxygen (Bottom))



Sketch 4 – Key Water Quality Monitoring Parameter (Unionised Ammonia)



Sketch 5 – Key Water Quality Monitoring Parameter (Total Inorganic Nitrogen)



Sketch 6 – Key Water Quality Monitoring Parameter (Suspended Solid)

Sketch 1 shows the location of the East Sha Chau Contaminated Sediment Disposal Facility and the nearby Water Quality Monitoring Station. Sketches 2 to 6 shows the trend of key water quality monitoring parameters (including Dissolved Oxygen (Average and Bottom), Unionized Ammonia, Total Inorganic Nitrogen and Suspended Solid).

4. Conclusion

According to EPD's water quality monitoring data, operations of the East Sha Chau Contaminated Sediment Disposal Facility do not affect the quality of the marine water in the vicinity of the facility within the North Western Water Control Zone.