

**For Discussion  
On 5 June 2001**

## **LegCo Panel Environmental Affairs**

### **Impact of Dredging and Reclamation on the Marine Environment**

#### **PURPOSE**

The paper provides, at the request of Members, information on the commissioning and implementation of the Environmental Impact Assessment (EIA) studies for dredging and reclamation works. It also explains the mechanism in monitoring the actual environmental impacts and comparing such impacts with those predicted in the EIAs.

#### **ENVIRONMENTAL IMPACT ASSESSMENT – PREDICTED IMPACTS**

2. Environmental assessments are undertaken for all dredging and reclamation works. Consultants are appointed to undertake EIAs for all Government works following standard competitive procedures which include assessment of their previous performance. An interdepartmental study management group, chaired by the Environmental Protection Department (EPD), provides guidance and advises on technical aspects of these studies.

3. The Technical Memorandum on the EIA Process (TM) issued under the EIA Ordinance is a guide for the EPD in assessing EIA studies of designated projects. The principles, procedures, guidelines, requirements and criteria for EIA studies are stipulated in the TM. In particular, Annexes 6 and 14 of the TM cover the guidelines and criteria for water pollution assessment. A broadly similar approach was also applied to studies undertaken before the EIA Ordinance came into effect.

4. The objective of the EIA process is to protect the marine environment during the implementation of the works through :

- (a) predicting the nature and extent of impacts arising from the works;

- (b) assessing the acceptability of these impacts;
- (c) identifying suitable mitigation measures, where necessary, for incorporation into the design of the works so as to avoid, minimize, and mitigate adverse impacts to acceptable levels; and
- (d) designing a comprehensive programme of environmental monitoring and audit (EM&A) and an action plan to ensure that the impacts are indeed kept within acceptable levels.

5. All environmental assessments of designated projects are required to follow the provisions of the EIA Ordinance. The environmental assessments for major dredging and reclamation works usually include extensive, computerised water quality modelling to study likely impacts on sensitive receivers including the marine ecosystem, fisheries and fish culture zones (FCZs), gazetted beaches and water intakes. Apart from water quality, environmental assessments include other aspects such as navigational safety. Examples of mitigation measures identified to contain environmental impacts of dredging and reclamation works include reduction in the size of the sand dredging area; limiting the mud disposal rate; limiting the overall dredging rate; and restricting the type and number of dredgers permitted within the main navigation channels.

## **PROJECT MONITORING – ACTUAL IMPACTS**

6. Monitoring during the progress of works is an essential element of the EIA process to measure and to limit the actual impacts of the works. It enables the project proponent and EPD to verify the predictions made by the EIAs, to assess the effectiveness of the mitigation measures, and to trigger additional mitigation measures should any unacceptable and/or unexpected adverse impact be observed.

7. Prior to commencing works in dredging and reclamation areas, water quality monitoring will be conducted to provide a measure of the background levels, thereby enabling impacts due to the works to be more easily identified. The actual impacts of the works will also be measured once the works have started.

8. In addition to surveillance by project proponents themselves, EPD oversees all the EM&A programmes and carries out routine enforcement work. As a general limitation of monitoring through sampling, it is not unusual that data sets obtained from

different monitoring programmes may give rise to variations under different conditions. Possible factors causing these variations include the timing and locations of the sample collection, daily and monthly tidal cycles, sediment influx from the Pearl River, changing weather conditions and occasionally disturbance of the seabed sediment by vessels not associated with the works in question. However, if the inconsistencies detected or difficulties encountered in interpreting monitoring data become a cause of concern, EPD will initiate its own investigation into the matter. Given Hong Kong's geographic location at the estuary of the Pearl River, the tropical and monsoonal weather and the enormous volume of shipping traffic in Hong Kong, it is not uncommon for confounding factors to cause variations in data and difficulties in interpreting the results of EM&A programmes.

9. In the case of the Penny's Bay reclamation project, the above monitoring process has been strictly followed. Particulars are contained in **Annex**.

## **CONCLUSION**

10. The EIA process is undertaken by consultants whose services are procured and supervised by government departments. In particular, a study management group comprising relevant government departments led by EPD provides guidance and advises on technical aspects of these studies.

11. The environmental assessment studies provide predictions of impacts from dredging and reclamation works and identified mitigation measures where required to contain impacts within acceptable levels. The studies also specify programmes of EM&A to ensure that the actual works would not give rise to impacts which are worse than predicted. The actual impacts of current major dredging and reclamation works have been shown by extensive monitoring to be in line with those predicted in the various environmental assessment studies.

Environment and Food Bureau  
Civil Engineering Department  
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### **Penny's Bay Reclamation: Monitoring Programme**

The Administration is committed to minimising environmental impacts caused by dredging and reclamation works. In the case of Penny's Bay reclamation (the Project), we completed in March 2000 an Environmental Impact Assessment (EIA) study for "Construction of an international theme park in Penny's Bay of North Lantau and its associated infrastructure" and another EIA study under the Northshore Lantau Development Feasibility Study. The EIA studies concluded that the Project would meet established environmental standards and legislation after implementation of the recommended mitigation measures. The two EIA reports were endorsed with conditions by the Advisory Council on the Environment on 17 April 2000 and approved by the Director of Environmental Protection on 28 April 2000. An environmental permit for the reclamation works was issued in April 2000.

#### **Environmental Monitoring and Audit (EM&A)**

2. Prior to commencing the dredging works, a baseline water quality monitoring was conducted in April and May 2000. To closely monitor and audit the Project, an EM&A programme was designed on the basis of the EIA and the baseline monitoring results. Environmental management meetings are held regularly with representatives from various departments and parties concerned to discuss the environmental monitoring and mitigation measures, including representatives from the Environmental Protection Department (EPD), Agriculture, Fisheries and Conservation Department (AFCD), Civil Engineering Department (CED), the Environmental Team (ET) Leader, the Independent Environmental Checker (IEC), the Engineer and the Contractor.

3. There are 19 water quality monitoring stations at Penny's Bay, Yam O and Ma Wan to measure the parameters, including dissolved oxygen, turbidity, temperature, salinity and suspended solid concentrations under the Project. In accordance with the EM&A programme, the ET takes samples three times a week at one metre below the surface, mid-depth and one metre above the seabed at each station. The IEC audits the monitoring results independently. There is also an event and action plan that the Contractor has to follow in case the monitoring results exceed the action and limit levels to ensure that there are no adverse impacts of the project on water quality.

## **Mitigation Measures**

4. To ensure that the environmental impacts caused by the Project would be minimised as far as possible, we have included the relevant mitigation measures stipulated in the environmental permit for the Project in the reclamation contract. We are also monitoring the performance of the Contractor to ensure strict compliance of the permit conditions.

5. In view of the fish kill reports at Ma Wan and Cheung Sha Wan fish culture zones in end-August 2000, the sampling frequency at the water quality monitoring stations at Ma Wan was increased to daily between 2 September and 13 December 2000. In addition, water quality measurements were taken at five locations daily near Cheung Sha Wan between 3 October and 20 December 2000. To further improve the water quality and to ease the concern of the public, two sections of silt curtain, each one kilometre long, were installed at Penny's Bay in March 2001. Two 24-hour water quality monitoring stations are being installed at Ma Wan and Cheung Sha Wan which measure automatically the turbidity and send the results directly to EPD and AFCD by telephone lines. The Engineer's staff have also been supervising closely the work of the Contractor to ensure that there is no malpractice, such as leakage of barges.

6. The Administration understands the concerns of mariculturists about the fish kill incidents which occurred last year. We will commission an independent investigation to review the causes of the incidents. Preparation work is now underway and we expect to commence the investigation in August 2001.

7. We will continue to closely monitor the environmental aspects in respect of the remaining works of the Project and will undertake all necessary mitigation measures to minimise any environmental impacts.

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