

## 10 SUMMARY

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### 10.1 INTRODUCTION

This Environmental Impact Assessment (EIA) has been carried out for the construction and operation phases of Container Terminal (CT) 10 and CT 11. Concerns for cumulative operation noise have extended the study to include assessment of impact when later phases of the terminal are operating, CT 12 & CT 13. The assessment is based on earlier work carried out in the LAPH Studies, which included EIA of the terminal construction and operation. During the early stages of this study a number of fundamental changes were made to the operating characteristics of the terminals, these were :

- o an increase in throughput, from 1.6 M TEU per terminal to 2.0 M TEU per terminal; and
- o an increase in the plant requirements for terminal operation and external vehicles accessing the terminal.

To mitigate noise impact two significant changes have been made to the terminals. These changes, which have been assumed in this assessment, are :

- i) an additional barrier between CT 10 and CT11 and barrier heights increased from 13.7 metres to 25 metres above the reclamation level; and
- ii) an amended configuration for the later phases of the terminals (CT12 and CT13).

During the LAPH Studies it was assumed that reclamation material for the terminals would be sourced from a mega borrow area, sited on the Tsing Chau Tsai peninsula which lies immediately north of the CT10 and CT11 terminals. The LAPH Studies did not carry out quantitative impact assessment of the TCT borrow area and it was during these studies that the first quantitative assessment to predict potential impact was carried out. The assessment suggested that for the extraction rates required to meet programme constraints there would be exceedence of the Air Quality Objectives and noise criteria. For this reason the consultants were instructed to assume that reclamation material would be supplied from a marine source. The marine sand source has not been identified and would be subject to a separate EIA.

Though the main concentrations of residential development are somewhat remote from the terminals, at Discovery Bay and Peng Chau, they are susceptible to impact and, in addition, there are isolated sensitive receivers close to the terminals on the east side of the TCT peninsula. In this section the findings of the assessment are summarised under headings for the key impact areas.

### 10.2 NOISE

Basic assumptions in the assessments are that :

- i) night construction work, 23.00 hrs - 07.00hrs, will not be required; and
- ii) completed terminals will operate 24 hours each day.

The construction noise assessment has been carried out assuming that terminals CT10 & 11 will be constructed in parallel and has included contributions from other activity areas outside the terminal sites. For NSR at Discovery Bay, the exposed indicator on north Peng Chau and isolated receivers at Fa Peng/Tso Wan, unmitigated activities during construction of Berths 1 (Phase 1) and 5 (Phase 2) exceed the daytime assessment criterion of 60 dB(A). During the evening, construction noise is expected to exceed the NCO criterion of 60 dB(A). No construction activity has been considered at night-time, when the assessment criterion is lowered to 45 dB(A). The assessment assumes that construction activity will continue for a 16 hour day (0700hrs to 2300hrs), i.e., daytime and evening. In order to achieve the adopted daytime and NCO evening requirement, some form of mitigation will have to be incorporated into the construction activities. It is indicated in this report that mitigation by reducing sound power levels of earthmoving equipment could achieve the 60 dB(A) limits. This is consistent with US reported reductions from partial enclosures and analysis of quieter plant which is commonly available. In addition the provision of barriers, both permanent and temporary, can further mitigate impact. Programming allows control over positioning of concurrent noisy activities to reduce impact. The early construction of the noise bunds which are required to mitigate operation noise impact, will help to mitigate construction noise impact, though the effect of these attenuation structures has not been included in this assessment. In the event of night work being required the stringent night-time noise criteria would place severe restrictions on the activities which could take place.

The operation phase impacts cumulative assessment has been carried out to determine expected levels of impact for all terminal phases in operation. Night-time criteria are the most stringent and assessment has focused on the night time impact. The indicator receivers on the headland of Peng Chau and at Fa Peng are subjected to noise impact in excess of the enforcement requirement from Phase I. For receivers at Peng Chau the screening topography between receivers and noise sources will effectively mitigate impact, but for any receivers adversely affected a noise attenuation barrier may be required at the receiver. The indicator point at Fa Peng detects an adverse noise impact. Site visits have confirmed that the village at Fa Peng is deserted and houses there are derelict. In addition, topography will screen the village from most terminal activity. Distance attenuation and screening topography is sufficient to mitigate noise impact at Tso Wan. Modelling predicts that at the main concentrations of receivers at Discovery Bay and Peng Chau impacts do not exceed the enforcement criteria.

### 10.3 AIR QUALITY

Reclamation activities and the creation of large expanses of unsealed surfaces have a high potential to create adverse air quality impact. The key air quality impact is from dust generated during reclamation activity. The assessment assumed concurrent construction of CT10 & 11 measured against the 24 hour and annual average TSP concentrations. The 1 hour, non statutory guideline, was also used since it gives a better appreciation of construction phase impact. The most critical sensitive receiver was identified as China Light and Power facility within Pennys Bay and Fa Peng, on the east side of the TCT peninsula. Assessment suggests that for CT10/CT11 construction there would be no exceedence of the 24 hour and Annual Average TSP AQO or 1 hour guideline. However cumulative impact has not formed part of this study and to minimise impact normal good site practice (GSP) should be adopted. These GSPs would include damping down, coverage of stockpiles etc., and the imposition of a 15 km/hour speed control on site vehicles.

## 10.4 WATER QUALITY

Dredging and reclamation activities have a high potential to adversely affect water quality by the re-suspension or introduction of material into the water column. The assessment suggests that the mariculture zone and gazetted bathing beach at Ma Wan will not be adversely affected and that the non-gazetted beach at Discovery Bay will also have limited impact due to low water movement within the immediate area. The main fishing areas, used by the fleet at Cheung Chau, are in the waters south of Hong Kong and are similarly unlikely to be affected by the reclamation activities. To reduce the impact of material dispersing into the water column silt curtains were considered but are unlikely to be effective given the activity levels expected. Reducing the areas of exposed fill is regarded as a more practical approach. The magnitude of impacts due to nutrients and metals cannot be estimated at this stage as the physical and chemical characteristics of the marine fill are unknown. Nutrient levels were flagged as being of concern in previous studies which identified that the low current velocities and shallow waters of Discovery Bay, together with modified hydrodynamic characteristics caused by the physical barrier of the port development, left little scope for the immediate study area to assimilate additional nutrient loadings, due to accumulation of pollutants resulting from reduced flushing. Due to the lack of information on the chemical characteristics of the marine fill it has not been possible to evaluate the potential impact (if any) with respect to nutrients. If clean sand is used, it will be unlikely that there will be a problem with nutrients. However, if the fill contains a proportion of fines (mud) the potential for nutrient contamination will be dependent on the actual proportion of fines and the actual content of nutrients.

Disposal of dredged material will depend on its composition. Chemical analysis of sediments has found evidence of Class B and Class C contamination. More intensive sampling is required to confirm the presence and extent of this material. For Class C - seriously contaminated material - special procedures are required with disposal to a specially designated dumping ground, for example the contaminated dump site at East Sha Chau.

Construction will be carried out sequentially in both terminals from west to east. Embayment is not considered to be a significant issue related to CT10, eastern terminal, construction. There is potential for impact at the interface between the CT10 activities and the backup areas and the phasing of this work will need further assessment. More critical will be the partial closure of the mouth of Pennys Bay during the construction of CT11 which will create a partial enclosure of Pennys Bay. No new discharges should be allowed into Pennys Bay during the period of embayment prior to reclamation of the Bay,

During the operation phase of the terminals accidental spills, stormwater discharges and sewage disposal are identified as the key issues. Sewerage will be directed to the new Sewerage Treatment Works to be constructed on North Lantau at Siu Ho Wan. In the interim any discharges should be directed east into the deeper faster flowing waters outside Discovery Bay. Storm drains will collect terminals runoff and direct it to discharge points in the southern side of the terminals. The use of grit and oil interceptors and a regular maintenance programme are identified as applicable and acceptable mitigation. Accidental spillage, at refuelling areas and from rupture of containers, will require provision of bunded areas with interceptors, for refuelling operations, and the identification of procedures for a "quick response team" to follow in the event of a spill.

## 10.5 WASTE MANAGEMENT

Container terminal developments are not expected to generate significant waste management related impacts, provided good site practice (GSP) is adhered to. Ships cargoes handled are containerised operations and are not expected to generate significant quantities of general wastes. General and commercial wastes are anticipated to include materials such as paper, plastic, food packaging and containers, scraps of food and similar wastes from canteen and administrative offices.

Wastes generated by ships are required by the MARPOL convention to be stored on board ship for disposal on arrival at port. These wastes will include fuel oil, oily bilge water and ballast from bunker fuel tanks, (MARPOL Annex 1), noxious liquids (MARPOL Annex II) and general rubbish (MARPOL Annex V). Annex I and II substances would be classified as chemical wastes and would therefore require appropriate treatment at the chemical waste treatment centre at Tsing Yi. The facility has a dedicated collection/transfer barge and includes storage capacity for 5000 tonnes of MARPOL Annex I wastes at Tsing Yi.

In the event of damage and rupture to containers during transfer operations material could be deposited within the terminal and be washed through the storm drain system, or fall directly into the adjacent waters. Containment and absorption would be applicable in both cases and provision of an emergency action plan and a quick response team will need to be in place at port opening.

## 10.6 VISUAL IMPACT AND GLARE

The visual impact of the terminals will be experienced during the day-time as a physical change associated with blocking of views, and during the night-time from safety and security lighting creating potential glare impact.

Receivers to the west will be the most affected by the visual aspects of CT10 and CT11 developments. Residents at Discovery Bay will experience loss of their existing panoramic view from the 25 metre high, 600+ metre long noise bund though sympathetic landscaping will help to mitigate this impact. Other receivers to the south and east will be less severely affected since distance will relegate the terminals to a small part of the overall panorama. These receivers will also view the terminals against the backdrop of the TCT peninsula or Sz Pak headland. Within the terminal landscaping has been proposed to soften the edges of the terminal boundary.

Assessment has indicated that glare at certain positions along the Container Port Road may be significant and exceed the guideline limit considered acceptable by the Highways Department. This adverse impact may be mitigated by providing cut-off louvres for light towers within the terminals.