

## 8. WASTE MANAGEMENT

### 8.1 Introduction

8.1.1 The Contractor is responsible for waste control within the construction site, removal of waste material produced from the site and to implement any mitigation measures to minimise waste or redress problems arising from the waste from the site. Activities during the construction phase will result in the generation of a variety of wastes which can broadly be classified into distinct categories based on their nature and the options for their disposal. These include:

- ◆ dredged marine mud;
- ◆ excavated materials suitable for reclamation and public fill;
- ◆ construction and demolition waste, including cleared vegetation, some of which may be suitable for reclamation and fill;
- ◆ chemical waste; and
- ◆ sewage.

8.1.2 In respect of the dredged marine mud, the marine pipelines connecting the on-shore PAFF facility with the receiving jetty with and the airport would require the excavation and disposal of an estimated 340,000m<sup>3</sup> of marine sediment. Based upon the review of historical data, it has been concluded that there is already a clear weight of evidence to indicate that the sediments to be dredged for this project are generally not contaminated to an extent that they would pose a threat to marine life if disturbed during dredging and put into suspension in the water column assuming the WQO for suspended sediments is satisfied and this has been assumed for the purposes of the EIA. However, in terms of applying for a license under the statutory controls required by the Dumping at Sea Ordinance (DASO) and following the process prescribed by ETWB 34/2002, it is noted that the results of the sediment testing along the pipeline alignment (Section 6.2.5.14 of the EIA) indicated that about 70% of the sediment was Category L material and could be disposed of at an open sea disposal site such as South Cheung Chau or the East of Ninepins. However, 30% of the sediment samples could be classified as Category M material based on ETWB 34/2002 and special disposal arrangement may be necessary. The actual disposal location will be determined in due course by DEP in conjunction with the Marine Fill Committee during the application for a DASO permit.

8.1.3 The tank farm and associated offices and workshops will be constructed on existing undeveloped reclaimed land. The site formation works will not be particularly extensive and as such large quantities of this type of waste material are not predicted. The total quantity of excavated material is estimated to be about 95,000m<sup>3</sup>. It is recommended that some of this material could be reused on site for purposes such as landscaping or to form bund walls. However, about 80,000m<sup>3</sup> will be surplus and require disposal off-site. Notwithstanding, this excavated material will be suitable for subsequent use as public fill in another reclamation and the closest facility for receiving public fill material is Tuen Mun Aea 38 C&D stockpile on an adjacent site.

8.1.4 Because the site is already clear and not previously developed, quantities of demolition waste will be minor and limited to the removal of temporary structures and slabs employed during construction. Similarly the vegetative covering to be cleared will not be

very substantial. The volume of other more general C&D material generated by the project will depend on the specific operating procedures and site practices. It cannot be quantified at present. However it is very important to recognise that, with careful management, waste arisings can be greatly reduced.

- 8.1.5 The site area, including the temporary haul roads, will have to be cleared at the start of construction of the vegetation. This process will include trees, in accordance with the tree survey report, and the mixture of topsoil and vegetative matter will form C&D waste, not being suitable for public fill, which will require disposal to landfill. However, by stripping/uprooting the vegetation first, before removing the top soil, it would be possible separate the earth into material for reuse on site, material suitable for public fill and the fraction that would require disposal to landfill. In this way, the amount of waste can be minimised.
- 8.1.6 It is unlikely that any large quantities of chemical wastes will be generated during the construction of this project but any materials should be handled, stored, transported and disposed of in an appropriate manner. Other wastes including sewage and general refuse will be generated and these will also need to be collected and disposed offsite appropriately.

## **8.2 Applicable Environmental Standard and Guidelines**

- 8.2.1 The Contractor shall comply with all relevant requirements of the Waste Disposal Ordinance. The Waste Disposal Ordinance prohibits the unauthorised disposal of wastes, with waste defined as any substance or article which is abandoned. Construction waste is not directly defined in the Ordinance but is considered to fall within the category of "trade waste". Wastes can only be disposed of at licensed sites under this Ordinance. Compliance with the Public Health and Municipal Services Ordinances (Cap 132) and the Public Cleansing and Prevention of Nuisances (Regional Council) By-laws will be required to control any nuisance from the collections and disposal of waste.
- 8.2.2 The Contractor will be required to reuse materials on site as far as practicable and minimise waste arisings. In this regard, reference should be made all relevant technical circulars including the Works Branch Technical Circular (WBTC) No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material and WBTC No. 32/92 on the Use of Tropical Hardwood on Construction Sites.
- 8.2.3 In addition, construction wastes which are wholly inert may be taken to public dumps. The Land (Miscellaneous Provisions) Ordinance (Cap 28) requires that dumping licences are obtained by individuals or companies who deliver suitable construction wastes to public fills, public filling barging points or public fill stockpiled areas. Under the licence conditions public dumps will accept only inert building debris, soil, rock and broken concrete.
- 8.2.4 Under the Waste Disposal (Chemical Waste) (General) Regulation under the Waste Disposal Ordinance (Cap 354), 'chemical waste' includes any scrap material and unwanted substances specified under Schedule 1 of the Waste Disposal Regulations. These are noted as posing serious environmental, health, and safety hazards if not stored and disposed of appropriately. Chemical wastes are often produced primarily as a result

of construction equipment maintenance activities, and include liquids such as waste oils and cleaning solvents. The Contractor must register as a chemical waste generator with the Environmental Protection Department (DEP) and arrange for a licensed collector to collect and dispose of the waste. Chemical wastes shall be handled, stored, transported and disposed with reference to the Code of Practice on the Package, Labelling and Storage of Chemical Wastes and A Guide to the Chemical Waste Control Scheme published by the DEP.

8.2.5 Also, reference should be made to the Water Pollution Control Ordinance for the control of sewage and any waste water from the site.

### **8.3 Mitigation Measures**

8.3.1 Based on the mitigation measures recommended in the EIA Report, the following measures, as summarized in the Environmental Mitigation Implementation Schedule in Appendix A, shall be undertaken when handling waste material during construction phase:

- (a) excavated material shall be re-used on site for purposes such as landscaping or formation of bund walls. If absolutely necessary any surplus should be conveyed to the nearest available public fill site after obtaining a suitable licence;
- (b) the site and surroundings shall be kept tidy and litter free;
- (c) no waste shall be burnt on site;
- (d) waste oils, chemicals or solvents shall not be disposed of to drain;
- (e) The Contractor shall identify a co-ordinator for the management of waste. The co-ordinator shall prepare and implement a Waste Management Plan which specifies procedures such as a ticketing system to facilitate tracking of loads and ensure that illegal disposal of waste does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. The Waste Management Plan shall be prepared with reference to Works Branch Technical Circular (WBTC) No. 29/2000 "Waste Management Plan" and WBTC 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material and issued to Engineer for approval and CED. CED should be contacted to confirm the availability for C&D and public fill waste;
- (f) all material shall be reused on site as far as practicable, including formwork, plywood, topsoil and excavated material;
- (g) good site practice shall be implemented to avoid waste generation and promote waste minimisation;
- (h) waste materials such as paper, metal, timber and waste oil shall be recycled as far as practicable;
- (i) falsework shall be constructed using proprietary steel systems rather than wood;

- (j) temporary structures used during construction shall be provided in the form of proprietary Portakabin type units sited on areas of permanent hard paving units as far as practicable;
- (k) re-use and recycle of waste must always be considered first. Waste disposal shall only be undertaken in the last resort. Any surplus material generated shall be sorted on site into C&D waste and the public fill fraction. The C&D waste shall be disposed of at a licensed landfill or deposited at an authorised waste transfer facility. Material suitable for public fill shall be re-used on site for uses such as landscaping or construction of bundwalls. If absolutely necessary, any surplus shall be delivered to the nearest public filling area, public filling barging point or public fill stockpile area after obtaining an appropriate licence. Suitable provisions shall be included in the construction contract to ensure that the Contractor sorts and recycles waste;
- (l) vegetation shall be stripped prior to site clearance and chopped and compacted to reduce its volume;
- (m) stockpiled material shall be covered by tarpaulin and /or watered as appropriate to prevent windblown dust and surface run off;
- (n) excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage and dust generation;
- (o) wheel washing facilities shall be used by all trucks leaving the site to prevent transfer of mud onto public roads;
- (p) dredged marine mud shall be disposed of in a gazetted marine disposal ground under the requirements of the Dumping at Seas Ordinance;
- (q) temporary storage areas for general refuse shall be enclosed. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station.
- (r) all waste containers shall be in good condition and fitted with lids or covers to prevent waste from escaping or the ingress of water;
- (s) all waste containers shall be in a secure area on hardstanding;
- (t) The Contractor shall register with EPD as a chemical waste producer under the Waste Disposal (Chemical Waste) (General) Regulation. A licensed contractor shall be employed to collect chemical waste for delivery to a licensed treatment facility. Suitable chemical waste storage areas shall be formed on site for temporary storage pending collection. All chemical wastes shall be handled, stored, transported and disposed of in accordance with the Code of Practice on the Package, Labelling and Storage of Chemical Wastes and A guide to the Chemical Waste Control Scheme published by the EPD.



- (u) emergency equipment to deal with any spillage or fire shall be kept on site;
- (v) a register of chemical products shall be kept on site together and include information on methods for safe handling, storage and disposal;
- (w) all containers used for storage of chemical waste shall be maintained in good condition and clearly labelled in both English and Chinese;
- (x) all storage areas for chemical waste shall be:
  - ◆ clearly labelled;
  - ◆ enclosed on at least 3 sides;
  - ◆ have impermeable floor and bunding sufficient to fully retain any spillage or leakages;
  - ◆ ventilated; and
  - ◆ covered to prevent rainfall from entering.
- (y) all types of asbestos including sources (such as clutch linings) shall be treated as chemical waste. Asbestos containing wastes shall be kept separate from other wastes;
- (z) all leaking containers shall be contained and removed from site as soon as practically possible;
- (aa) empty oil drums and chemical containers shall be removed from site as soon as is reasonably practicable;
- (bb) nightsoil arising from chemical toilets shall be transported by a licensed contractor to a Government Sewage Treatment Works for disposal in accordance with the Sanitation and Conservancy (Regional Council) By-laws; and
- (cc) training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.

## 8.4 Waste Disposal Recommendations

8.4.1 The recommended disposal sites for the different types of waste are detailed in Table 8.1 below:

**Table 8.1 Recommended Waste Disposal Sites**

Type of Waste	Disposal Site
Inert material (dirt/soil, concrete, bricks, masonry, ceramics, tiles, etc.) which comply with the requirements of the Public Dumping License	Re-use on site.
C&D waste (plastics, glass, wood, including cleared vegetation etc.)	WENT Landfill; or NWNT Transfer Station

Type of Waste	Disposal Site
Chemical waste (as defined under Schedule 1 of the Waste Disposal (Chemical Waste) Regulation)	Chemical waste treatment facility at Tsing Yi; or other approved facility.
General refuse	WENT Landfill; or NWNT Transfer Station
Marine dredged mud*	South of Cheung Chau, the Brothers or East Sha Chau

\* subject to quality

## 8.5 EM&A Requirements

8.5.1 EM&A is recommended during the construction phase only and the effective management of waste arisings during the construction phase will be monitored through the site audit programme.

8.5.2 The aims of the waste audit are:

- ◆ to ensure the waste arising from the works are handled, stored, collected, transferred and disposed of in an environmentally acceptable manner; and
- ◆ to encourage the reuse and recycling of material.

8.5.3 The Contractor shall will be required to pay attention to the environmental standard and guidelines detailed in Section 8.2 and carry out appropriate waste management and obtain the relevant licence/permits for waste disposal. The Environmental Team Leader (ETL) (see Section 1) shall ensure that the Contractor has obtained from the appropriate authorities the necessary waste disposal permits or licences including:

- ◆ Chemical Waste Permits/licenses under the Waste Disposal Ordinance (Cap 354);
- ◆ Public Dumping Licence under the Land (Miscellaneous Provisions) Ordinance (Cap 28);
- ◆ Marine Dumping Permit under the Dumping at Sea Ordinance (Cap 466); and
- ◆ Effluent Discharge Licence under the Water Pollution Control Ordinance.

8.5.4 The Contractor shall refer to the relevant booklets issued by the DEP when applying for the licence/permit and the ETL shall refer to these booklets for auditing purposes.

8.5.5 During the site inspections and the document review procedures as mentioned in Section 11 of this Manual, the ETL shall pay special attention to the issues relating to waste management and check whether the Contractor has followed the relevant contract specifications and the procedures specified under the laws of Hong Kong (see above Section 8.2). In addition to the site inspections, the ETL shall review the documentation procedures prepared by the Waste Coordinator once a week to ensure proper records are being maintained and procedures undertaken in accordance with the Waste Management Plan.

8.5.6 The Contractor's waste management practices should be audited with reference to the checklist detailed in Table 8.2 below:

**Table 8.2 Waste Management Checklist**

Activities	Timing	Monitoring Frequency	If non-compliance, Action Required
All necessary waste disposal permits or licences have been obtained	Before the commencement of demolition works	Once	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. Apply for the necessary permits/ licences prior to disposal of the waste. The ES shall ensure that corrective action has been taken.
Only licensed waste haulier are used for waste collection.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to use a licensed waste haulier. The Contractor shall temporarily suspend waste collection of that particular waste until a licensed waste haulier is used. Corrective action shall be undertaken within 48 hours.
Records of quantities of wastes generated, recycled and disposed are properly kept. For demolition material/waste, the number of loads for each day shall be recorded (quantity of waste can then be estimated based on average truck load. Should landfill charging be implemented, the receipts of the charge could be used for estimating the quantity).	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The Contractor shall estimate the missing data based on previous records and the activities carried out. The ETL shall audit the results and forward to the FSR and IEC for approval.
Wastes are removed from site in a timely manner. General refuse is collected on a daily basis.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to remove waste accordingly.
Waste storage areas are properly cleaned and do not cause windblown litter and dust nuisance.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to clean the storage area and/or cover the waste.



Activities	Timing	Monitoring Frequency	If non-compliance, Action Required
Different types of waste are segregated in different containers or skip to enhance recycling of material and proper disposal of waste.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to provide separate skips/ containers. The Contractor shall ensure the workers place the waste in the appropriate containers.
Chemical wastes are stored, handled and disposed of in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i> , published by the EPD.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to rectify the problems immediately. Warning shall be given to the Contractor if corrective actions are not taken within 24 hrs and the Waste Control Group of the EPD shall be identified.
Demolition material/waste in dump trucks are properly covered before leaving the site.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to comply. The Contractor shall prevent trucks shall leaving the site until the waste are properly covered.
Wastes are disposal of at licensed sites.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall warn the Contractor and instruct the Contractor to ensure the wastes are disposed of at the licensed sites. Should it involve chemical waste, the Waste Control Group of EPD shall be notified.

Note: ETL – Environmental Specialist, IEC – Independent Checker (Environment), FSR – Franchisee’s Site Representative