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Contract ST 89/02 : SHA TIN HEIGHTS TUNNEL AND APPRO	ACHES
To: The Engineer's Representative	
Title of Submission : Waste Management Plan (Revision 10)	
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From : Contractor's Representative	
Name : Otto Lee	
Date: $(5 - (-0))$	
Signature	
repared by: OL/M	· · · · · · · · · · · · · · · · · · ·

c.c. MCAL - H.O. (w/e), ET (w/e) & IEC (w/e)

### CONTRACT ST 89/02 SHA TIN HEIGHTS TUNNEL AND APPROACHES

## CONTRACTOR'S SUBMISSION FOR Waste Management Plan

### SUBMISSION STATUS: FOR REVIEW

H	10 <sup>th</sup> Revision	2 Jan 2007
G	9 <sup>th</sup> Revision	13 Mar 2006
F	8 <sup>th</sup> Revision	24 Sept 2005
Е	7 <sup>th</sup> Revision	14 Mar 2005
D	6 <sup>th</sup> Revision	31 Jan 2005
С	5 <sup>th</sup> Revision (For Review)	14 Dec 2004
В	4 <sup>th</sup> Revision (For Review)	20 Oct 2004
А	3 <sup>rd</sup> Revision (For Review)	20 Sept 2004
Rev.	Description	Date

Prepared by:	Michael Tsang	Michael	15-(-)~7
	Environmental Officer	Signature	Date
Approved by:	Otto Lee Deputy Project Manager	Signature	 Date

Contract No. ST89/02 Sha Tin Heights Tunnel and Approaches

Waste Management Plan (Revision 10)

## Civil Engineering and Development Department Contract No. ST89/02

Sha Tin Heights Tunnel and Approaches

## Waste Management Plan

(Revision 10)

Prepared By	China State-China Railway JV
Date	2 Jan 2007
Certified By	Cinotech Consultants Ltd.
Signed	<u>Church Market</u> (E T Leader)
Date	<u>6/3/2007</u>
Verified By	CH2M HILL Hong Kong Limited
Signed	(I E C)
Date	1- Max 2007
Approved By Signed Date	China State China Railway Joint Venture (Deputy Project Manager)

China State - China Railway JV

Date	Amendment Reasons					
2 Jan 2007	Revision 10					
	Para.1, Section 1.1	Revise the completion date.				
	Section 3.2	Replace the Construction Manager by Deputy Project Manager				
	Section 4.1.3	Update the Waste Disposal Regulation				
	Table 6.1	Revise the estimated quantity of inert C&D materials to be generated.				
	Table 6.2	Revise the estimated quantity of non-inert C&D waste to be generated.				
	Table 9.1	Update the emergency drill plan				
	Appendix B	Update the organization chart				
	Appendix F	Revise the site plan for on-site sorting and material storage				
	Appendix G Revise the waste reduction targets					
15 Mar 2006	Revision 9					
	Section 4.2, p.10	Update of environmental guideline				
	Table 6.1, p.19	Update of data				
	Table 6.2, p.22	Update of data				
	Section 6.3.2, p.23	Clarify the dumping sites				
	Section 6.5.2, p.26	Clarifying of dumping sites				
	Table 9.1, p.29	Update of chemical drills status				
	Appendix A	Review the waste management policy				
	Appendix B	Update of waste management organization				
	Appendix F	Update the location of waste facilities				
	Appendix G	Adjust the waste objectives and targets				
26 Sent 2005	Dervision 9					
20 Sept 2005	REVISION 8					

### Amendment Records of Waste Management Plan

	Section 4.2	Update the environmental Guidelines				
	Section 6.1	Define the inert and non-inert C&D materials				
	Section 6.5.2	Amendment of control measures for refuse				
	Section 8.1	Review the daily cleanliness procedures				
	Section 8.2	Review the Weekly Tidying procedures				
	Section 9.2	Update the status of chemical spillage drills				
	Appendix B	Update the Organization chart				
	Appendix F	Site Plan for on-site sorting and material storage area				
14 Mar 2005	Revision 7					
	Section 1.2	Issuance of vEP				
	Table 6.2	Update the data				
28 Jan 2005 Revision 6						
	Section 2.0	Establish of waste management policy				
	Section 4.1	More description of legislative requirements				
	Section 4.2	Update the technical circular				
	Section 5.0	More details for waste management approaches				
	Section 6.1	More details for waste management hierarchy				
	Section 6.2	Update the data				
	Section 6.3	Update the data				
	Table 6.1 & 6.2	Previous figures based on BQ quantities of in-situ/compacted				
		volume. Rev. 6 based on updated survey & bulk volume.				
	Appendix A	Establish waste management policy				
	Appendix B	Update site organization				
	Appendix C	Provide more details for training contents				
	Appendix D	New checklist for waste management audit				
	Appendix F	Update the site condition				
	Appendix G	Setting up of objectives and targets				
	Appendix H	New form for trip ticket system				
14 Dec 2004	Revision 5					
	Line 3, 1 <sup>st</sup> para. of Section 2.2	ER's comment				
	Figure 2.1	ER's comment				
	Line 5-6, Section	ER's comment				
	4.2.1					
	Table 4.1 & 4.2	Update figures				
	Line 4, para. 2,	ER's comment				
	Section 4.2.2	ED1				
	(a) to (e), Section 4.2.3					
	Section 4.3.2					
( 	Figure 2	ER's comment				
	Appendix G	ER's comment				

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19 Aug 2004	Revision 4	
	1 <sup>st</sup> paragraph,	ER's comment
1	Section 2.2	
	Section 2.3	ER's comment
	Line 5, 1 <sup>st</sup>	ER's comment
	paragraph of	
	Section 4.2.2	
	Line 6-7, 2 <sup>nd</sup>	ER's comment
	paragraph of	
	Section 4.2.2	
	Line 3, $3^{ra}$	ER's comment
	paragraph of	
	Section 4.2.3	
	Line 2, last	ER's comment
	paragraph, Section	
	4.3.2	
	Line 9, Section 8.1	ER's comment
	Table 2.1	ER's comment
	Table 4.1 & 4.2	Update figures
	Figure 2.1	Describe the line of communication
	Appendix A	Update site organization
	Appendix B	Update site conditions
	Appendix H	New requirement
14 May 2004	Dovision 2	
17 May 2007	Revision 5	
	Section 2.2	Update site Organization structure
	Appendix I	
	Table 4.1, section	Update the figures
	4.2	
	Section 4.2.3	Update figures
	Appendix II	Update site conditions
	Appendix VII	Update site Organization structure

**Civil Engineering and Development Department Contract No. ST89/02** 

Sha Tin Heights Tunnel and Approaches

Waste Management Plan (Revision 10)

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#### **1.1 General Description of the Project**

China State-China Railway JV (CS-CR JV) has been awarded the Contract ST89/02 of Sha Tin Heights Tunnel and Approaches by the Civil Engineering and Development Department. (CEDD) of the Hong Kong Special Administrative Region (HKSAR). The Contract commenced on 18<sup>th</sup> November 2002 and shall be completed in June 2007.

The Project was established in the Updating of the second Comprehensive Transport Study (CTS-2 Update) in 1992 to alleviate the traffic congestion problems expected at the Lion Rock Tunnel, Tate's Cairn Tunnel and Tai Po Road. The Civil Engineering and Development Department is implementing the Project to construct Sha Tin Heights Tunnel and Approaches.

The Works to be executed under the Project include, but not exclusively, the following major items:

- Construction of approximately 1.0 km of dual 3-lane tunnel at Sha Tin Heights (the Sha Tin Heights Tunnel or SHT) with associated cross passages and the structural works of portal buildings at each portal ;
- Construction of two single lane strip road bridges with approximately total length of 1 km connecting to Che Kung Min Road ;
- Construction 0.6 km of dual 2-lane carriageway of approach road at Sha Tin Heights. About 0.3 km is under a reinforced concrete full enclosure ;
- Site formation for toll plaza of approximately 5.6 ha;
- Realignment of a section of existing Che Kung Miu Road ;
- Diversion of box culverts at Che Kung Miu Road ;
- Construction of noise barriers and noise enclosure ;
- Slope works, retaining walls, drainage and landscaping works associated with the above roadwork.

### 1.2 Objectives of the Waste Management Plan

This Waste Management Plan (WMP) has been prepared by China State – China Railway JV (CS-CR JV) based on the information and recommendation contained in the EIA Reports (1998 EIA Report & 1999 EIA Report), the Environmental Review Report (ERR, Sha Tin New Town Stage II Sha Tin Section) and the Environmental Permit (EP–104/2001/B). This WMP provides details of the measures and procedures to properly control and manage all waste generated from the construction activities.

The main objectives of the WMP include the following:

- (i) To identify and classify the types of waste generated from the construction works;
- (ii) To identify the possible options for reuse, minimization, recycling, treatment,

storage, collection, transport and disposal of wastes arising from the construction activities;

- (iii) To identify measures in order to ensure the Site is maintained in a clean and tidy condition;
- (iv) To develop the monitoring and audit programme to ensure that the wastes arising from the construction activities are handled, stored, collected, transferred and disposed of in an environmentally acceptable manner which complies with the contract requirements and all the relevant *Ordinances* and *Regulations* in the Hong Kong SAR;
- (v) The hierarchy will be used to evaluate waste management options thus allowing maximum waste reduction and often reducing costs. Reduction measures will be introduced at the design and construction stages, wherever possible, by careful, purchasing control, reuse of excavation materials and good site management. By reducing or eliminating over-ordering of construction materials, waste is avoided and costs are reduced both in terms of purchasing and in disposing waste.
- (vi) This plan will be distributed to foremen, sub-contractor, architect/contract manager and employer for comments and agreement. Contractors of on-site instructions will be clearly indicated, communicated and complied with.

#### 2.0 WASTE MANAGEMENT POLICY

#### 2.1 Waste Policy Statement

Please refer to the **Appendix A** for the Waste Policy Statement.

#### 2.2 Waste Management Policy

- 2.2.1 The Waste Management Policy Statement (Appendix I) of CS-CR JV signed by Mr. Fu He (JV Board Member) and Ms. Lu Feng (JV Board Member) of China State – China Railway Joint Venture for commitment on the following aspects:
  - Legal compliance
  - Compliance to contractual or other requirements
  - Continual improvement in environmental performance
  - Waste avoidance, recycling and reuse
- 2.2.2 The Policy establishes an overall sense of direction and set the principle of action for CS-CR JV, and the goal as to the overall level of waste management responsibility and performance required, and against which all subsequent will be judged.
- 2.2.3 The Policy shall be gone through with our staff and subcontractors through the periodic training. It will also be posted on environmental notice board to make known to our staff and general public at our construction sites.
- 2.2.4 The Senior Project Manager of the CS-CR JV shall be in charge of the overall

co-ordination and implementation of the Waste Management Policy.

2.2.5 It is the intention of the JV to review the Waste Management Policy annually.

#### **3.0 ORGANIZATION AND STRUCTURE**

#### 3.1 Introduction

The roles and responsibilities of the JV's personnel responsible for the management of waste arising from the Project is outlined in this section, with the organization chart attached in **Appendix B**. The Contractor's Senior Project Manager will have the overall responsibility to ensure that the requirements of the WMP are properly implemented. The responsibilities of the key site staff for the management of the WMP are as follows.

#### 3.2 Individual Responsibilities

#### **Project Director**

The Director is the chairman of the Environmental Management System Committee. He is responsible for monitoring the Environmental Management System implementation.

He has executive responsibility for:

- Developing the waste management policy for the Project;
- Ensuring that sufficient resources are allocated for the implementation of the waste management policy and the waste management system.
- Regularly appraising the effectiveness of the policy and waste management system, and ensuring that the necessary changes are made.

#### Senior Project Manager

The Senior Project Manager (SPM) has the overall control over the Project and oversees implementation of waste management requirements. Specifically, he is responsible for ensuring that adequate resources are provided by CSCRJV and its subcontractors for the implementation of mitigation and management measures detailed n this Plan. The SPM will report directly to the Project Proponent on all waste management matters and will be the contact person of the Contractor for waste management matters relating the entire Project.

#### **Deputy Project Manager**

- The Deputy Project Manager (DPM) is responsible for the day-to-day overview of site practices in relation to waste management.
- He will assign Site Agent, General Foremen and Foremen as appropriate to assist him in the daily supervision (including the inspection on Daily Cleaning and Weekly Tidying) and in enforcing the on-site mitigation measures.
- Supervise the implementation of the Waste Management Plan.
- Liaise with subcontractors for contributory efforts on the successful implementation of the WMP.
- Reporting to the Senior Project Manager regarding correction status of

non-compliance of any waste management issues.

#### Safety Manager

- Advise site management on environmental protection measures.
- Attend Environmental Protection Committee Meeting.
- Ensure the implementation of the WMP and environmental protection policy.
- Liaise with Environmental Team (ET) for advice and remedial actions to deficiencies found on site.
- Co-ordinate all parties concerned in environmental protection for smooth running.
- Attend weekly environmental audit inspection.
- Reporting to the DPM regarding non-compliance of any waste management issues.

#### **Environmental Officer (EO)**

The EO shall report to the DPM and assist project management in respect to waste management issues apart from noise abatement, all pollution control and water pollution control, etc. The EO shall work parallel with the construction teams to ensue environmental issues are fully considered during the construction period. He shall also be responsible for:

- Assisting the DPM in reviewing method statement to ensure appropriate mitigation measures are implemented prior to execution of work;
- Revise the WMP in accordance with the recommendation from the ET and/or the IEC.
- Ensuring all relevant legislation and the Contractor's duty of care is complied with throughout the duration of the Project.
- Conduction of training on waste management to ensure that all the Contractor's representatives are aware of their responsibilities regarding the contents of the WMP.
- Coordinating waste management on site, gathering data on waste and keeping accurate records on waste movement both on and off site.
- Ensuring re-use or recycling of material already on site before it is carted away or new materials are imported, whenever possible.
- Investigating potential re-use and recycling opportunities and report to the Site Agent.
- Monitoring the environmental protection performance in daily site operations.
- Reporting to the Safety Manager regarding non-compliance of any waste management issues.

#### Section Agent

The Section Agent shall have the following duties in relation to waste management:

- Assisting the DPM in the implementation of WMP.
- Monitoring and controlling works including those of sub-contractors to ensure compliance of WMP.
- Reporting to the DPM regarding non-compliance of any waste management issues.
- Keeping observation on the statutory requirements about waste management.
- Supervising and arranging the maintenance of waste management facilities.
- Review and audit the waste management plan.
- Understand the waste management plan and appreciated respective responsibilities allocated to each grade of staff.

General Foremen shall be responsible for the following duties in relation to waste management issues:

- Assisting the Section Agent in the implementation of WMP.
- Controlling works including those of subcontractors to fulfill the requirement of waste management issues.
- Reporting to the Section Agent any non-compliance of waste management issues.
- Maintaining the on-site waste management facilities including sorting areas, temporary storage areas, general refuse bins and recycling bins, etc.
- Carrying out remedial actions or mitigation measures to rectify non-compliance.
- Carrying out routine maintenance of waste management facilities and keeping proper maintenance records shall be kept in site office.
- Conduct Daily Cleaning and/or Weekly Tidying Inspection.

#### Site Foremen

Site Foremen shall be responsible for the following duties in relation to waste management issues:

- Assisting the General Foremen in the implementation of WMP.
- Conduct Daily Cleaning Inspection.
   Promote good practice contributory to environmental protection.
   Instructing working on the requirements of the WMP

It is the responsibilities of all employees to be aware of the importance and requirements of waste management and implement the waste management procedures diligently.

#### 4.0 Environmental Legislation, Guidance and Contractual Requirements

CS-CR JV shall observe all applicable statutory requirements, legislation and associated regulations, and/or code of practices with regard to the waste to be generated in the construction activities. CS-CR JV will also apply necessary permits and licenses under these ordinances/regulations.

#### 4.1 Environmental Legislation

Relevant HKSAR legislation relates to the handling, treatment and disposal of wastes probably associated with the project include the following:

- The Waste Disposal Ordinance (Cap 354);
- The Waste Disposal (Chemical Waste) (General) Regulation (Cap 354);
- The Land (Miscellaneous Provisions) Ordinance (Cap 28);
- The Public Health and Municipal Services Ordinance (Cap 132) Public Cleansing and Prevention of Nuisances (Urban Council) and (Regional Council) By-Laws; and

#### 4.1.1 Waste Disposal Ordinance

The Waste Disposal Ordinance (WDO) prohibits the unauthorized disposal of wastes, with

waste defined as any substance or article which is abandoned. Construction and demolition(C&D) waste is not directly defined in the WDO but is considered to fall within the category of "trade waste". Trade waste is defined as waste from any trade, manufacturer or business, or any waste building, or civil engineering materials, but does not include animal waste.

Under the WDO, wastes can only be disposed of at a licensed site. A breach of these regulations can lead to the imposition of a fine and/or a prison sentence. The WDO also provides for the issuing of licences for the collection and transport of wastes. Licences are not, however, currently issued for the collection and transport of C&D waste or trade waste.

#### 4.1.2 Waste Disposal (Chemical Waste)(General) Regulation

Chemical waste as defined under the Waste Disposal (Chemical Waste) (General)Regulation includes any substance being scrap material, or unwanted substances specified under Schedule 1 of the Regulation, if such a substance or chemical occurs in such a form, quantity or concentration so as to cause pollution or constitute a danger to health or risk of pollution to the environment.

A person should not produce, or cause to be produced, chemical wastes unless he is registered with the EPD. Any person who contravenes this requirement commits an offence and is liable to fine and imprisonment.

Producers of chemical wastes must treat their wastes, utilizing on-site plant licensed by the EPD or have a licensed collector take the wastes to a licensed facility. For each consignment of wastes, the waste producer, collector and disposer of the wastes must sign all relevant parts of a computerized trip ticket. The system is designed to allow the transfer of wastes to be traced from cradle-to-grave.

The Regulation prescribes the storage facilities to be provided on site including labeling and warning signs. To minimise the risks of pollution and danger to human health or life, the waste producer is required to prepare and make available written procedures to be observed in the case of emergencies due to spillage, leakage or accidents arising from the storage of chemical wastes. He/she must also provide employees with training in such procedures.

## 4.1.3 Waste Disposal (Charges for Disposal Construction Waste) Regulation (Cap 354N)

The regulation sets out the details of the construction waste disposal charging scheme and identities the Designated Waste Disposal facility (DWDF) for disposal of construction waste at landfills, sorting facilities and public fill reception facilities.

The regulation sets the disposal charges at \$125 per tones at landfills, \$100 per tonne at sorting facilities and \$27 per tonne at public fill reception facilities in order to fully recover the capital and recurrent costs of the facilities according to the polluter pays principle.

The regulation requires the main contractor (of works with a value of \$1million or above) to make an application to the DEP within 21 days after of award of contract to establish a billing account. Once a billing account has been established the DEP will issue "CHIT" which will be used to record the disposal of waste at a designated waste disposal facility. When delivering a load of waste to a designated waste disposal facility the waste hauler appointed by the account holder will be required to produce a valid "CHIT".

#### 4.1.4 Land (Miscellaneous Provisions) Ordinance (Cap 28)

Construction and demolition materials (1) which are wholly inert may be taken to public filling areas. Public filling areas usually form part of land reclamation schemes and are operated by the Civil Engineering and Development Department (CEDD) and others. The Land (Miscellaneous Provisions) Ordinance requires that Dumping Licences are obtained by individuals or companies who deliver inert C&D material (or public fill) to the public filling areas. The licences are issued by the CEDD under delegated authority from the Director of Lands.

Individual licences and windscreen stickers are issued for each vehicle involved. Under the licence conditions public filling areas will accept only inert building debris, soil, rock and broken concrete. There is no size limitation on the rock and broken concrete, and a small amount of timber mixed with inert material is permissible. The material should, however, be free from marine mud, household refuse, plastics, metal, industrial and chemical wastes, animal and vegetable matters and any other materials considered unsuitable by the public filling supervisor.

#### 4.1.5 Public Cleansing and Prevention of Nuisances by Laws

These by-laws provide a further control on the illegal tipping of wastes on unauthorized (unlicensed) sites. The illegal dumping of wastes can lead to a fine and imprisonment.

#### 4.2 Other relevant Guidelines

CS-CR JV shall also observe throughout the construction period the following documents and guidelines that are also considered of relevance to the Project:

- Waste Reduction Framework Plan, 1998 2007, Planning, Environment and Lands Bureau, Government Secretariat (5 November 1998);
- 2001 Review of the Waste Reduction Framework Plan, Waste Reduction Committee;
- Environmental Guidelines for Planning in Hong Kong (1990), Hong Kong Planning Standards and Guidelines, Hong Kong Government;
- New Disposal Arrangements for Construction Waste (1992), Environmental Protection Department and Civil Engineering Department;
- A Guide to the Registration of Chemical Waste Producers (2001), Environmental Protection Department;
- A Guide to the Control on Import and Export of Waste (1999), Environmental Protection Department;
- Code of Practice on the Packaging, Labeling and Storage of Chemical Wastes (1992), Environmental Protection Department;
- Code of practice on the Handling Transportation and Disposal of Asbestos Waste,

Environmental Protection Department;

- Works Bureau Technical Circular No.2/93, Public Dumps;
- Works Bureau Technical Circular No.2/93B, Public Filling Facilities;
- Works Bureau Technical Circular No.16/96, Wet Soil in Public Dumps;
- Works Bureau Technical Circular No.4/98 and 4/98A, Use of Public Fill in Reclamation and Earth Filling Projects;
- Works Bureau Technical Circular No.25/99, 25/99A and 25/99C, Incorporation of Information on Construction and Demolition Material Management in Public Works Sub-committee Papers;
- Works Bureau Technical Circular No.12/2000, Fill Management;
- Works Bureau Technical Circular No.19/01, Metallic Site Hoardings and Signboards;
- Works Bureau Technical Circular No.06/2002 & 06/2002A, Enhanced Specification for Site Cleanliness and Tidiness;
- Works Bureau Technical Circular No.12/2002, Specifications Facilitating the Use of Recycled Aggregates;
- Environment, Transport and Works Bureau Technical Circular (Works) No.33/2002, Management of Construction and Demolition Material Including Rock;
- Environment, Transport and Works Bureau Technical Circular (Works) No.15/2003, Waste Management on Construction Sites;
- Environment, Transport and Works Bureau Technical Circular (Works) No.22/2003, Additional Measures to Improve Site Cleanliness and Control Mosquito Breeding on Construction Sites;
- Environment, Transport and Works Bureau Technical Circular (Works) No.31/2004, Trip Ticket System for Disposal of Construction & Demolition Materials
- Environment, Transport and Works Bureau Technical Circular (Works) No.19/2005, Environmental Management on Construction Sites

#### 5.0 WASTE MANAGEMENT APPROACH

#### 5.1 Training, Awareness and Competence

- i. It is policy of the CS-CR JV that all employees including workers, supervisors, managers and top management will be encouraged to attend environmental training so as to acquire skill and knowledge sufficient for waste management.
- ii. The SPM shall ensure all concerned site staff including subcontractors are aware of the environmental requirements under relevant environmental legislation, Contract Specifications and WMP requirements. Key site staff and staff of subcontractors, at the level of supervisor and above, shall be provided with copies of relevant environmental documents, which include but are not limited to the following:
  - Waste Management Policy Statement (Appendix I);
  - Concepts requirements of Site cleanliness and tidiness.
  - The steps/requirements of the WMP stipulated in the Contract.
  - Classification of different waste types in accordance with the WMP.
  - Proper segregation, handling and storage of different types of waste in accordance with the WMP.
  - Procedures and measures for waste minimization, reuse and recycling.
  - Locations of designated storage areas for different waste types in accordance with

- Procedures for handling chemical waste.
- iii. For the effectiveness of the implementation of the Plan, our management and supervisory staff, the relevant suppliers and subcontractors have to well understand this Plan including their roles in waste management.
- iv. Waste Management training from outside organizers, e.g. Construction Industry Training Authority (CITA), for site staff shall be arranged where and when necessary. Deputy Site Manager will endorse and approve funding for such course before application.
- v. EO shall prepare and schedule environmental briefing/training sessions for key site staff and staff representative of subcontractors. In general, these sessions will be conducted by the EO. In these sessions, waste management requirements and mitigation measures in the WMP would be explained. CS-CR JV's and sub-contractors' staff, at the level of supervisor and above, are required to attend the sessions.
- vi. Tool box talk on waste management shall be carried out to those workers or the construction team for improving their awareness on construction waste management. Contents of the tool box talk are attached in **Appendix C**.
- vii For the sake of enhancing environmental awareness to communities close to the work sites, environmental campaign(s) or award schemes shall be organized.

#### 5.2 Waste Management Audit

- i. Monthly waste management audit with the assistance of Waste Management Audit Checklist (**Appendix D**) will be conducted to provide a direct means to trigger and enforce the specified environmental protection and pollution control measures. They shall be undertaken routinely to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. With well-defined pollution control and mitigation specifications and a well-established site inspection, deficiency and action reporting system, the site inspection is one of the most effective tools to enforce the environmental protection requirements on the construction site.
- ii. The Environmental Officer is responsible for formulating of the environmental site inspection, deficiency and action reporting system, and carrying out the site inspection works.
- iii. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site; it should also review the environmental situation outside the site area, which is likely to be affected, directly or indirectly, by the site activities. In conduction the audit, the following information shall also be made reference:

- Works progress and programme;
- Individual works methodology proposals (which shall include proposal on
- Associated pollution control measures);
- The contract specifications on environmental protection;
- The relevant environmental protection and pollution control laws; and
- Previous site inspection results
- iv. The CS-CR JV construction team and Sub-Contractors shall update the Environmental Officer with all relevant information of the construction contract for him to carry out the site inspections. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be passed to the Construction Manager for taking immediate action. The Construction Teams or Subcontractors shall follow the remedial actions formulated in the waste management audit checklist within the time-frame.
- v. Ad hoc site inspection will be carried out if significant environmental non-compliance is identified. Inspections may also be carried out subsequent to receipt of any environmental complaints or as part of the investigation work.
- vi. The Environmental Manager or Environmental Officer shall review the progress and programme of works to check all relevant environmental laws have not been violated, and that the any foreseeable potential for violating the laws can be prevented.
- vii. The CS-CR JV construction team and sub-contractors should regularly copy relevant documents to the Environmental Officer so that the checking work can be carried out. The document shall at least include the waste disposal records, wastage records for steel bar, concrete and wooden board.
- viii. The Waste Management Audit inspection procedures are shown below:
  - Ensure all proposed mitigation measures for the significant environmental aspects are well and effectively implemented.
  - Investigate and audit the subcontractors' equipment and work methodologies with respect to pollution control and environmental mitigation, and anticipate environmental issues that may require mitigation before the problem arisen.
  - Ensure that environmental protection and pollution control mitigation measures are properly implemented.
  - Conduct inspection on main environmental facilities and measures, such as the wheel washing facility, wastewater treatment facilities, water spraying practices, storage of stockpiles, chemical waste storage, etc., to ensure that these environmental facilities operate normally and effectively.
  - Should any non-compliance are identified during the course of inspection, the Contractor shall formulate and implement remedial measures promptly to rectify the situation. A further site inspection shall be arranged within seven days of the

previous inspection and conducted by the EO, during which non-compliance is found, to confirm such correction has taken place.

• If the identified non-compliances are revealed to be in relation to sub-contractors' activities, the relevant sub-contractor shall carry out remedial actions within 3 days. A further audit shall be conducted by the EO within seven days of the previous audit to check if the agreed environmental procedures and practices are satisfactorily implemented.

#### 5.3 Communication

- i. Communication (the sending and receiving of understanding) is the cornerstone of effective management, which may improve environmental performance by increasing awareness of all important issues.
- ii. A two ways communication shall be maintained always to all interested parties concerned, for example, CSCRJV staff, Client or his Representative (RE), Suppliers, Subcontractors, and Government Department, etc. A summary of the major communication channels relating to waste management is summarized in Table 5.1 and Figure 5.1.
- iii. This procedure describes the processes for effective communication regarding all environmental matters. The system will allow information to be provided and to be received internally and externally and shall be defined here to ensure effective and accurate communication relevant to the operations of the company Waste Management System in particular.

Means	Frequency	Purpose/Action	Responsible Party
CS-CR JV Site Inspection	Continually	Promote awareness of environmental procedures among workers and sub-contractors via continual and casual conversations	CS-CR JV
Site Inspection	Weekly	Face-to-face communications between ET and CS-CR JV site staff during the site inspection	ET
Ad-hoc Site Inspection	When necessary	Carried out if significant environmental problems are identified, e.g. environmental complaint	CS-CR JV, RE, ET & IEC
Site Meeting	Weekly	Face-to-face communications between ET and CS-CR JV site staff during the site inspection.	CS-CR JV, RE, ET & IEC
Ad-hoc Site Meeting	When necessary	Face-to-face communications between ET and CSCRJV when any emergency events occur.	CS-CR JV, RE, ET & IEC
EM&A Report	Monthly & Quarterly	Written communication among ET, CS-CR JV, Engineer / Engineer's Representative, IEC and EPD.	ET
IEC Site Audit	Monthly	Face-to-face communications between CS-CR JV, Engineer / Engineer's Representative, IEC and ET during the site audit	IEC
Electronic Copies of EM&A Reports on EIAO Web Page	Monthly	Enable the public inspection of the monthly EM&A Reports via the EIAO Internet Website and at the EIAO Register Office	ET

#### Table 5.1 Major Communication Channels Relating to Waste Management

#### Figure 5.1 Communication channel of key parties are presented as following:



Communication Channel Line of Project Management Responsibility

#### 5.3.1 Internal Communication

Internal communication will be enhanced by means of:

i) <u>Meeting</u>

Regular meeting should been held to discuss and review any environmental issues regarding the management system as well as the site environmental performance. Key staff including the Senior Project Manager, Construction Manager, Section Agents, Environmental Protection Officer, General Foreman and representatives of sub-contractors shall attend the meeting.

#### ii) <u>Training</u>

Environmental training conducted by the EO shall be held on site monthly or when it is deemed necessary to review relevant statutory regulations and environmental protection technology to all levels of staff as well as sub-contractors except workers. Environmental related contractual and statutory requirements shall also be discussed in the training.

#### iii) On-site Publicity

Environmental awareness shall also be promoted by means of on-site bulletin board and posters.

#### 5.3.2 External Communication

i. Complaints Handling

A complaint hotline shall be maintained for the whole construction period for receiving complaints from the public. Complaints in relation to environmental issues shall follow the following procedures the following:

- Log complaint and date of receipt onto the complaint database and inform the ET, IEC & ER.
- Investigate the complaint to determine its validity, and to assess whether the source of the problem is due to work activities.
- Mitigation measures shall be identified if the complaint is valid and due to works.
- If mitigation measures are required, advise the project team, ER accordingly.
- ET/EO shall conduct review of the project team's response on the identified mitigation measures, and of the updated situation.
- ET/EO shall submit interim report to EPD if the complaint is received via EPD. The interim report will clearly stare the status of the complaint investigation and the follow-up action within the time frame assigned by EPD.
- ET/EO shall undertake additional audit to verify the situation it necessary and ensure that any valid reason for complaint does not recur.
- ET/EO shall report on the investigation results and the subsequent actions to the source of complaint for responding to the complainant (If the source of complaint is via EPD, the results will be reported within the time frame assigned by EPD).
- ET/EO shall record the details of the complaint, investigation, subsequent action and results
- ii. During the complaint investigation wok undertaken by the ET, the operation team and sub-contractors shall corporate with the ET in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified as necessary in the investigation, the operation team and sub-contractors shall promptly carry to the required mitigation to the satisfaction of ET. Mitigation measures and results shall report to the ER, ET and IEC.
- iii. If necessary, major environmental sensitive receivers shall be visited or their residents' regular meeting shall be taken part, where the site environmental mitigation

measures should be explained and the residents' concern about the environmental issues should be listened and considered.

#### 5.4 Environmental Non-Conformance

In the event of non-compliance with the Waste Management System and its policy, the procedure for Corrective & Preventive Action shall be utilized to investigate the cause and identify the appropriate corrective and preventive action to mitigate the NC and to prevent the non-compliance from recurring. If deemed necessary by Senior Management, an emergency Management Review Meeting may be held to address the non-compliance and decide the appropriate action.

#### 5.4.1 Corrective Action

In case of any non-compliance regarding the environmental irregularities/ violation, the following procedures would be followed:

- The EO shall notify immediately the persons held responsible for not adopting the environmental protection measures.
- The EO shall report the incident to the SPM.
- The EO shall propose and carry out environmental mitigation measures in a timely manner. (N/C form in Appendix VII should be used)
- The EO shall evaluate the effectiveness of the mitigation measures, and insist on further mitigation measure if non-compliance still exists.

Once the mitigation measure is satisfactorily implemented, the non-compliance event would be closed out and the event would be recorded. The construction team will be informed of measures to prevent reoccurrence of the event where possible.

#### 5.4.2 **Preventive Action**

In order to ensure the environmental mitigation measures are effectively implemented, the following preventive actions are to be adopted:

- The EO shall liaise closely with the construction teams and site management.
- The SPM shall supervise the EO to record the corrected conditions regularly and make proper written records.
- The SPM shall arrange annually or as necessary, environmental meeting to review the environmental performance at site.
- The EO shall remind the workers of the importance of environmental protection, and investigate the implementation of environmental mitigation measures.

- The EO shall carry out *ad hoc* site environmental inspection to inspect the effectiveness of environmental protection works. The findings would be recorded and reported to the SPM.

The PM and the EO shall closely monitor the site environmental protection works by checking the relevant meeting minutes, permits, reports etc.

#### 5.5 Environmental Records

- i. Distribution of documents and data is controlled in accordance with the relevant quality procedures. The update version of the WMP will be used throughout the entire project period. The EO is responsible for the distribution of the WMP internally and to ET via SPM.
- ii. During the course of executing this Plan, a variety of environmental records would be generated. These records shall be kept by the EO during the entire project period. Key environmental records to be maintained are described in the Table 5.1.

Category	Waste Record
General	Environmental training records Monthly waste management audit results and/or reports Equipment maintenance or repair records Monitoring of noise, air quality or effluent discharge as required by the EPD Daily cleaning and weekly tidying checklist Copies of all plans, reports, applications, etc. submitted to the project Proponent and the EPD Correspondence with EPD, Project Proponent and other parties in relation to environmental matter Environmental meeting minutes
Waste Management	Chemical Waste Producer Registration Chemical waste collection and disposal records Trip tickets and documentation for collection and tipping of waste and waste removal Dumping licences Copies of relevant license of the waste haulers and waste collectors Records on quantities of waste reused / recycled Records for the implementation of Waste Objectives, Targets and Programmes Records of quantities of excavated material transferred to other construction sites for use Records on quantities of excavated material transfers to public filling areas Waste disposal records Records of quantities of waste generated, recycled and disposed of. Records sheets for monthly and yearly waste flow can refer to <b>Appendix E</b>
Chemical Storage	Material Safety Data Sheets A log of chemicals inventories
Complaints	Environmental complaint records Correspondence with relevant parties
Environmental Emergency	Emergency Incident Reports Chemical Spillage Drill Records
Non-compliance	Non-compliance Reports Non-compliance Reports Logbook.

Table 5.2Key Waste Management Records

iii. CS-CR JV shall submit such records in a monthly basis to the ER within the first week of the following calendar month.

#### 6.0 TYPES AND SOURCES OF WASTE AND CONTROL MEASURES

#### 6.1 Introduction

Different types and quantities of waste will be generated throughout the construction period from various construction activities and waste generating operations on the construction site. Waste generated from the construction activities should be divided into three distinction categories based on their composition. Generally, classification of waste includes, but is not limited to, the following:

- Inert C&D materials including soil, building debris, broken rock, concrete, etc.
- Non-inert C&D wastes including timber, metals, paper/ cardboard packaging materials, plastics, chemical waste, general waste, etc.

There are opportunities to minimise the amount of waste produced during the construction period by careful management. Moreover, the amount of waste material requiring disposal can be further reduced by re-use of materials on the site and by off-site recycling.

This section sets out the recycling, storage, transportation and disposal measures associated with wastes arising from the construction activities. CS-CR JV will implement the following waste management practices in accordance with the nature of different categories of wastes. Generally, the hierarchy for waste management adopted in the Waste Reduction Framework Plan launched by the government of HKSAR in 1998 will be referenced:

#### - Avoidance and minimization

- i. Avoid and minimize waste through changing or improving practices and design;
- ii. Take greater account of demolition in the technical choices that they are called to make in order to reduce the amount of waste generated by future demolition and to make it easier to re-use materials and carry out selective demolition;
- iii. Management of construction materials such that over-ordering, poor storage and maintenance, mishandling as well as improper operation procedures should be avoided.
- iv. The design of formwork should be maximized the use of standard wooden panels so that high reuse levels can be achieved;
- v. More alternatives such as steel formwork or plastic facing should be considered for repetitive areas to increase the potential for reuse;
- vi. Plywood containing tropical hardwoods shall not be used for hoarding or formworks;

#### - Reuse of materials (with limited reprocessing)

- ii. Reuse and recycling to divert C&D material from waste stream back to the construction cycle. This can be achieved through balancing cut and fill, reusing items such as hoardings, formworks and scaffoldings and recycling materials such as metals, concrete and asphalt.
- iii. Proper segregation and storage of wastes shall be undertaken to enhance reuse or recycling of materials and their proper disposal as far as practicable.

iv. A temporary storage area equipped with required control measures shall be provided onsite for temporary storage of construction and demolition material / waste.

#### - Recovery and recycling (may require reprocessing)

- i. Proper segregation and storage of wastes shall be undertaken to enhance recycling of materials and their proper disposal as far as practicable.
- ii. Sorting is important to recover waste for reuse and recycle. To facilitate sorting, a specific area as indicated in **Appendix F** shall be allocated for on-site sorting of waste while suitable containers should be provided to temporary store the sorted materials such as metals, concrete, timber, plastics, glass, excavated spoils, bricks and tiles, if practicable. If small area of the site limits detailed sorting, waste material should at least be separated into inert and non-inert portions.

#### - Treatment and disposal

- i. Public fill material should then be transported to public filling area while non-inert C&D waste should be disposed of at landfill. To avoid fly tipping, contractors should follow Works Bureau's practice under the trip-ticket system to ensure that truck drivers dispose of C&D material at proper places.
- ii. To properly treat or dispose of the waste materials according to relevant regulations, guidelines and good practices.

The above hierarchy should be used to evaluate and select the waste management options. The overall aim of the hierarchy is to reduce and minimize the volume of waste being generated and hence reduce the waste handling and disposal costs accordingly. In order to quantify the achievement in waste reduction in the project, Waste Objectives, Targets and Programmes have been established in **Appendix G**.

#### 6.2 Excavated Material

#### 6.2.1 Types and Sources

Excavated material is defined as inert virgin or reclamation fill material removed from the ground and sub-surface. Such material will mainly be generated from site clearance and construction works for the Shatin Heights Tunnel, Toll Plaza, Portal Buildings and Shatin Approaches. Taking into account of the reuse of materials on site, the quantity of excavated, fill and surplus material generated from the Shatin section is summarized in the Table 6.1.

Excavated Material		Estimated Annual Amount (m <sup>3</sup> )					Total Surplus for each type of	Proposed Disposal Site for Surplus	
		2002	2003	2004	2005	2006	2007	Excavated Material	Material
G . 1	Excavation	0	520,900	190,526	170,227	68,505	246	312,622 F 7 P	Fill bank in Tuen
Weak	Reuse on-site	0	517,427	102,960	17,100	295	0		Mun Area 38 / TM Recycling Plant
Rock	Surplus	0	3,473	87,566	153,127	68,210	246		
Artificial	Excavation	0	100	379	2,197	3,774	4,247	10,697	Tuen Mun Recycling plant
Hard Material	Reuse on-site	0	0	0	0	0	0		
	Surplus	0	100	379	2,197	3,774	4,247		
Grade II & better rock	Excavation	0	39,000	246,815	96,438	0	0		
	Reuse on-site	0	38,378	0	14,297	0	0	329,578	Lam Tei Quarry
	Surplus	0	622	246,815	82,141	0	0		
	Total Surplus							652,897m <sup>3</sup>	

 Table 6.1: Estimated Quantity of Inert C&D Waste Generated

#### 6.2.2 Control Measures

Surplus excavated materials shall be segregated from other wastes to avoid contamination thereby ensuring acceptability at public filling areas or reclamation sites and avoiding the need for disposal at landfill. The key aspects concerning the production and disposal of C&D materials are summarized below:

- (a) Excavated soil materials will be put on maximum re-use on site for the construction of site formation, embankment and slip roads thus minimizing off-site disposal.
- (b) The surplus soil and weak rock will be disposed of to the proposed fill bank in Tuen Mun Area 38 or TM Recycling Plant (or other public fill outlets, which is subjected to endorsement of the C&D materials management plan by the Public Fill Committee)
- (c) Surplus Grade II or better rock will be disposed to Lam Tei Quarry to be re-used as concrete aggregates.
- (d) Surplus artificial material will be disposed to the recycling facility in Tuen Mun Area 38 for processing. (Subject to the endorsement of the C&D materials management plan by the Public Fill Committee)
- (e) Design for reusing excavated spoils as back-fill material to balance cut and fill could reduce the generation of excavated spoils. If cut and fill could not be balanced on-site, possible exchange with other sites should be sought. Such matching of surplus excavated material and deficit of fill material can be assisted by the information

provided by Fill Management Division of the Civil Engineering and Development Department.

A Trip-ticket System for transporting surplus excavated material off-site shall be implemented. The method statement for the Trip-ticket System shall be detailed in section 7.

The excavated material may need to be temporarily stockpiled on-site for subsequent re-use. It is proposed that the surplus excavated material to be stockpiled at the toll plaza and Portion 9. Control measures shall be taken at the stockpiling area to prevent the generation of dust and pollution of storm drains. Key control measures are highlight below:

#### **Dust:**

- Wetting the surface of the stockpiled soil with water when necessary especially during the dry season;
- Covering the stockpiled soil with tarpaulin (inspect frequently to avoid holding water on surface and leading to mosquito breeding) or spraying the soil surface with dust suppression chemical;
- Hydroseeding for bared slope;
- Minimizing disturbance of the stockpiled soil; and
- Enclosure of the stockpiling area.

In addition, potential dust impacts due to the haulage of excavated materials should also be minimised by undertaking the following control measures:

- Dropping heights for excavated materials should be controlled to a practical height to minimize the fugitive dust arising from unloading;
- Materials should not be loaded to a level higher than the side and tail boards, and should be dampened or covered before transport;
- The traveling speed should be reduced to 11 km/hr to reduce dust dispersion and re-suspension from the operating haul trucks;
- Wheel washing facilities should also be installed and used by all vehicles leaving the site.

#### Water Quality:

- Installation of silt traps for the surface water drainage system; and
- Covering stockpiled material with tarpaulin during heavy rainstorm.

#### 6.3 Construction and Demolition (C&D) Material

#### 6.3.1 Types and Sources

C&D materials include the non-inert portion (C&D waste) and inert portion (public fill), which will mainly arise from the construction of administration buildings, tunnel portals, and the demolition of existing structures such as village houses. It comprises unwanted

materials generated during the construction, including rejected materials, materials which have been over ordered or are surplus to requirements, and materials used and discarded. The C&D materials may include:

- Wood from formwork and falsework;
- Materials and equipment wrappings;
- Unusable/surplus concrete/grouting mixes;
- Site clearance waste; and
- Damaged/contaminated/surplus construction materials.

The types and estimated quantities of Surplus C&D material arising from the Project is summarized in the Table 6.2.

Waste Types / Sources		Disposal Sites/ Treatment Methods	Estimated Amount	Generation Period
i.	Chemical waste (Spent lube oil, waste battery, empty chemical drums & Degrease tank)	Collected by licenced chemical waste collectors	3,200 kg	2007
ii.	Waste Steel Bars	Recycled	20 tonnes	2007
iii.	Waste Formwork and Scaffold Materials	Reused	5 m <sup>3</sup>	2007
iv.	Un-used Formwork and Scaffold Materials	Disposed at landfill site ( NENT)	10 m <sup>3</sup>	2007
v.	Waste Pallet	Returned	20 pallets	2007
vi.	Waste Paper (paper, cardboard & packaging materials)	Recycled	600 kg	2007
vii.	Waste Plastic (plastic bottle)	Recycled	10 kg	2007
viii.	Canteen Waste and General Refuse	Disposed at landfill site (NENT)	65 m <sup>3</sup> /month	2007

Table 6.2: Estimated Quantities of Non-inert C&D Waste Generated

#### 6.3.2 Control Measures

Careful design, planning and good site management shall be maintained to minimise over-ordering and waste materials such as ready mixed concrete, mortars and cement grouts.

The formwork will be designed to maximise the use of standard wooden panels so that high reuse levels can be achieved. More durable alternatives such as steel formwork or plastic facing shall be considered for repetitive areas to increase the potential for reuse.

C&D materials shall be, as much as possible and practicable, separated into reusable items

and materials to be disposed of or recycled. It shall be conducted at the immediate working area to avoid loss or leakage during handling.

All C&D materials arising from the Project shall be sorted on-site and be separated into different categories for disposal at landfills, public filling areas, or reused and recycling as appropriate. Areas within site (as shown in **Appendix F**) have been assigned for the on-site sorting and/or storage of C&D materials. The areas shall be reviewed from time to time to suit the phases of the Works.

Useful materials such as timber, rubble and steel/metal shall be segregated for reuse. For example, formwork and timber shall be cleaned for reused, off-cuts of reinforcement shall be sorted into usable lengths and short off cuts stacked for scrap metal. Where it is no longer reusable, steel and metal items will be sent as scrap for recycling.

Segregated materials shall be temporarily stored at designated areas for reuse on site. Steel will be stored at the reinforcement yards, timber at the formwork yard and rubble in a stockpile (either covered or sprayed for dust emission control). Wood waste shall be stored separated from other general construction waste to minimize any contamination which would render the waste unsuitable for disposal at public dumps.

In order to minimize the impacts of the demolition works, demolition waste shall be cleared as quickly as possible after demolition.

The remaining non-reusable C&D materials shall be sorted on-site into inert portion (e.g. rock, brick, bituminous material, concrete and soil, etc.) as "public fill" and non-inert portion (e.g. timber, vegetation and paper, etc.) as "C&D waste". The "public fill" shall be dumped into Public Filling Facility as assigned by CEED at Tuen Mun Area 38.

Whilst the C&D waste containing no more than 20% by volume of inert content shall be disposed of at the NENT or WENT Landfill by licensed waste collectors.

A Trip-ticket System for transporting of C&D material off-site shall be implemented. The method statement for the Trip-ticket System shall be detailed in section 5.

#### 6.4 Chemical / Chemical Waste

Chemicals such as oil, grease, paint and solvents will be stored on-site for use during the construction phase of the development. If not handled, stored or used appropriately, contamination of land and water could occur. The accidental discharge of hazardous materials during construction activities is a potential risk to the local environment.

#### 6.4.1 Types and Sources

- Chemical waste, as defined under the Waste Disposal (Chemical Waste) (General) regulation, includes any substance being scrap material, or unwanted substances specified under Schedule 1 of the Regulation. Chemical wastes likely to be generated from construction activities will, for the most part, arise from the maintenance of equipment. These may include, but need not be limited to the following:

- i. Scrap batteries or spent acid/alkali from maintenance;
- ii. Oil retrofitting and used engine oil;
- iii. Hydraulic fluids;
- iv. Used air, oil and fuel filters from machinery;
- v. Spent mineral oils/cleaning fluids from machinery;
- vi. Mechanical machining producing spent mineral oils/cleaning fluids; and
- vii. Spent solvents/solutions from equipment cleaning activities.
- The potential activities which could result in spills are:
  - i. Use of machinery and vehicles potential for fuels, oils and lubricant spills;
  - ii. Transport, storage and handling of fuels, machinery oils, grease;
  - iii. Transport, storage and handling of cement and other construction materials; and
  - iv. Transport, storage and handling of paints, solvents, chemical adhesives, epoxies and other chemicals.
- Impacts associated with hazardous materials will primarily be associated with the storage and handling during the construction phase.
- Although chemical waste will be generated throughout the whole construction period, it is anticipated that the quantity, in particular the lubricating oil and solvent chemicals produced from plant usage and maintenance, will not be significant. The estimated monthly generation of chemical waste (mainly lubricating oil and solvent) will be relative small, about a few hundred liters per month.

#### 6.4.2 Control Measures

- Under the statutory requirement of the Waste Disposal (Chemical waste) (General) Regulation, CS-CR JV shall register with the Environmental Protection department (EPD) as a Chemical Waste Producer.
- To achieve the general aim of qualitative prevention (reducing the hazards posed by construction and demolition waste), measures must first of all be taken to limit the use of dangerous chemicals in the construction of new buildings.
- Good housekeeping practices should be adopted to deal with chemical waste includes:
  - (i) Generating less chemical waste through:
    - Delivering appropriate quantity of chemicals to the construction site.
    - Avoiding unnecessary wastage of chemicals by using the chemicals more sensible and in accordance with the manufacturer's instructions.
    - Finishing one bottle/container of chemicals before opening the next one for use.
    - Collecting the remaining chemicals in suitable containers.
    - Removing the unused chemicals out of the construction site after completion of the project.
  - (ii) Preventing illegal discharge of chemicals or chemical wastes through staff of the project.

(iii)Minimising the volume of unused chemicals to be disposed of through:

- Using the chemicals before the expiry date.
- Ordering appropriate quantity of chemicals and avoiding unnecessary storage of excess chemicals.

- Chemical waste shall be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Waste*. The details are described as follows:

(i) Containers used for the storage of chemical waste shall:

- Be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;
- Have a capacity of less than 450 liters unless the specification have been approved by EPD; and
- Display a label in English and Chinese in accordance with instruction prescribed in Schedule 2 of the Regulations.

(ii) The storage area for chemical waste shall:

- Be clearly labeled and used solely for the storage of chemical waste;
- Be enclosed on at least three sides;
- Have an impermeable floor and bunding, 110% capacity of the largest container or 20% of the storage capacity, whichever is the greatest;
- Have adequate ventilation;
- Be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and
- Be arranged so that incompatible materials are adequately separated.

(iii)Chemical waste shall be disposed of:

- Via a licensed waste collector;
- To a facility licensed to receive chemical waste, i.e. Chemical Waste Treatment Facility in Tsing Yi; or
- To a re-user of the waste, under the approval from the EPD.
- Prior approval from EPD shall be sought by Contractor for disposal of chemical waste to landfill. Trip tickets issued for every chemical waste collection made by the licensed waste collector shall be copied to the ER and the original tickets should be maintained by the EO for future reference.
- Site personnel (e.g. maintenance worker and machine operators) involved in chemical waste handling shall be instructed and familiar with the waste handling procedures and guidelines as stipulated in EPD's *Code of Practice on the Packaging, Labeling and Storage of Chemical Wastes*.
- Records of maintenance, such as cleaning and repairing of chemical storage area, shall be completed for each designated area and maintained by EO for future reference.

#### 6.5 General Refuse

#### 6.5.1 Types and Sources

General refuse, which mainly consists of food waste, packaging materials and waste paper, will be generated from the site canteen and site office. A site canteen for serving 120 staff shall be erected near the site office. It is estimated that there will be about 105 kg of canteen related general refuse to be generated per day. It is also estimated that there will be about 350 workers working on-site during the peak construction period. Based on an assumption of daily waste generation rate of 0.6 kg per staff, the total quantity of general refuse to be generated from the construction workforce is estimated to be about 315 kg per day. Assuming the average density of general refuse is about 150 kg per cubic meter, the estimated volume of general refuse will be about 2.1m<sup>3</sup> per day.

#### 6.5.2 Control Measures

- To encourage environmental awareness and try to reduce waste by reducing the number of photocopies to a minimum and by copying on both sides of paper for internal documents and external documents where appropriate;
- Participation in a local collection scheme shall be considered;
- Sufficient recycle bins should be deployed at convenient locations to facilitate collection of recyclables including wasted aluminum cans, plastic bottles and papers;
- Sufficient refuse collection bin should be deployed at convenient locations to facilitate collection of non-recyclables for disposal to landfill site at NENT or WENT.
- General refuse including food wastes, such as lunch boxes, and domestic wastes generated on-site shall be stored in enclosed bins or compaction units separated from construction and chemical wastes.
- General refuse should be removed from site from site twice a day in order to minimise odour, pest and litter impacts.
- Burning of refuse on site shall be strictly prohibited.
- Records of disposal of general refuse shall be maintained by the EO and kept on site for future reference.

The General Foremen shall inspect and manage the site condition with respect to the general refuse on-site during the daily site walk.

#### 7.0 TRIP TICKET SYSTEM

#### 7.1 Introduction

Environment, Transport and Works Bureau has promulgated under the *Environment*, *Transport and Works Bureau Technical Circular (Works) No.31/2004* a trip-ticket system for public works contracts for the proper disposal of C&DM at public filling facilities or landfills in order to minimise the incidence of illegal dumping.

In accordance with this Technical Circular, the CS-CR JV will establish a trip-ticket

system to monitor the disposal of public fill and C&D waste at public filling facilities and landfills, and to control fly-tipping.

#### 7.2 Method Statement for Trip Ticket System Implementation

The Contractor shall complete the relevant details on the Construction and Demolition Material Disposal Delivery Form (**Appendix H**) in duplicate except the Time of Departure for each and every vehicular trip transporting construction and demolition (C&D) material.

The Contractor shall present the completed form to site supervisory staff (Engineer's Representative, ER) for stamping and marking the time of departure prior to the vehicle leaving the site. The original form shall be on board throughout the vehicular trip and the supervisory staff shall retain the copy.

For each vehicular trip, the Contractor shall obtain a receipt (stamped Form) from the operator of Public Filling Facility/Landfill/Recycling Plants.

The Contractor shall submit the receipt issued by the operator for the public filling facility/landfill to ER within 2 working days of the vehicular trip after the disposal of the C&D material.

The receipt shall contain the following information:

- an unique receipt number;
- the name of the public filling facility/landfill;
- the date and time of the dump activity;
- the vehicular registration number;
- an indication of the truckload (public filling facility only);
- gross and tare weight of the vehicle (landfill only);
- weight of the material dumped at the landfill (landfill only);
- Contact number of the public fill facility (public filling facility only).

The ER shall check the Contractor's compliance with the requirements by carrying out random checks on the forms and receipts submitted by the Contractor. The monthly summary reports produced by Public Fill Sub-Committee (PFSC) and director of Environmental Protection (DEP) could be referred to assess the Contractor's compliance.

#### 8.0 SITE CLEANLINESS AND TIDINESS

#### 8.1 Daily Cleanliness

"Daily cleaning" shall include cleaning and tidying up after work of tools, equipment, unused materials, storage areas and common areas such as passageways, daily removal of waste materials from works areas, removal of any rubbish and debris dumped into the Site by the public.

An Inspection Checklist for Daily Cleaning (**Appendix I**) has been developed by CS-CR JV with approval of the Engineer to facilitate the daily checking.

The inspection checklist should be reviewed and updated whenever there is a change in work nature or work location and re-submitted for approval by the Engineer.

The inspection checklist should be include an assessment on the cleanliness and tidiness of all work locations, plus the Public Cleaning Areas. Items to be checked against for each work location should include, but not limited to, the following:

- Maintenance of passageways, common accesses and public areas free of obstruction;
- Proper storage and stacking of materials;
- Proper placement and storage of tools and equipment after work;
- Proper sorting, storage and/or disposal of waste materials in accordance with the Waste Management Plan;
- Proper securing of hoarding, barriers, guarding, lighting, and signing of works;
- Prevention and removal of water ponds, stagnant water and flooding;
- Conditions of cleanliness and tidiness of the Site including Public Cleaning Areas in the perspective of the general public;
- Other cleaning requirements as instructed by the Engineer.

Site Foremen shall be assigned at each work section to inspect the Site after each Daily Cleaning. He should check and ensure the cleanliness and tidiness of the Site, complete the inspection checklist, record the areas requiring improvements, and take photographs of the areas where cleaning and tidying up works have been done and where improvement actions area required.

#### 8.2 Weekly Tidying

"Weekly Tidying" shall include the cleansing and tidying up of the common areas and accesses, cleansing and/or reconditioning of hoardings, barriers, guarding, lighting, signage and/or traffic cones, cleansing of external covers for plant and equipment, removal of waste and debris etc. so as to ensure that the plant and equipment, hoardings, as well as the Site as a whole, to be clean and tidy.

An Inspection Checklist for Weekly Tidying (**Appendix I**) has been developed by CS-CR JV with the approval of the Engineer to facilitate the weekly checking.

The inspection checklist should be reviewed and updated whenever there is a change of work nature or work location and re-submitted for approval by the Engineer. The inspection checklist should include an assessment on the cleanliness and tidiness of the Site conditions at various work locations, including the Public Cleaning Areas. Items to be checked against each work location should include, but not limited to, the following:

- Through cleansing of passageways, common accesses and public areas;
- Re-organizing of storage materials for better utilization of storage spaces if appropriate;
- Maintenance and re-conditioning of tools and equipment;
- Cleansing of external covers for plant and equipment;
- Collection and removal of disposal waste materials off site in accordance with the Waste Management Plan;
- Cleansing, re-conditioning and/or replacement of hoarding, barriers, guarding, lighting, and signage of works to good working condition;
- Clearing of drains and channels to prevent flooding;

- Other cleansing requirements as instructed by the Engineer from the perspective of the general public.

General Foremen shall be assigned to inspect the Site after each Weekly Tidying. The assigned persons shall check and ensure the cleanliness and tidiness of the Site, complete the inspection checklist, record the areas requiring improvements, take photographs of areas where cleaning and tidying up works have been done and where improvement actions are required. The completed inspection checklist and photographs (where appropriate) shall be submitted, in the morning of the working day following to the Engineer for checking and recording.

#### 9.0 Environmental Emergency Procedures

Environmental emergency preparedness shall be developed for quick and correct respond to environmental accidents and emergency situations in order to mitigate their harmful effects on both the environment and human health. The following procedures describe the common arrangements for handling environmental emergency situations.

#### 9.1 Chemical/ Chemical waste Spillage

In case of spillage, leakage or accidents arising from the pumping or handling of chemical or chemical waste, the following procedures in Spill Response Procedure shall be followed, except as instructed by the Engineer's Representative.

#### 9.2 Spill Response Procedure

The environmental emergency procedures for dealing with spillage / leakage of chemical waste are presented in **Appendix J**.

#### 9.3 Chemical Spillage Drills

A chemical spillage drill in accordance with the procedures set out in the Spill Response Procedure shall be carried half yearly. A programme for carrying out the chemical spillage drill is listed in Table 9.1

	<u> </u>	
Drill	Plan Date	Status
1	April 2003	Completed on 22/4/2003
2	Oct 2003	Completed on 11/11/2003
3	April 2004	Completed on 29/5/2004
4	Oct 2004	Completed on 1/11/2004
5	April 2005	Completed on 3/5/2005
6	Oct 2005	Completed on 30/11/2005
7	April 2006	Completed on 26/5/2006
8	Oct 2006	Completed on 31/10/2006
9	April 2007	

#### Table 9.1 Drills and exercises to test the preparedness for emergency are scheduled below

#### 10.0 REPORT

CS-CR JV shall submit a report on the implementation of the WMP to the Engineer after the completion of the Contract. The report shall include the following and any other information as the Engineer may consider appropriate:

- The quantities of different types of C & D material as estimated at the commencement of the Contract ;
- A statistics on the monthly quantities of different types of C & D material general and their disposal method ; and
- Reasons for any significant difference between the estimated quantities at (a) and the actual quantities at (b).

# Appendix A

## **Waste Management Policy Statement**

#### Appendix B: Organization Chart for Waste Management



#### **Appendix C: Tool Box Talk**

#### Session One - One-Site Waste Management

#### Objectives

- To understand the importance of the Waste management in the construction operations.
- To introduce the Waste management plan.

#### Contents

- Introduction
- Why bother
  - Proper waste management could reduce material wastage by improper use and damage during handling and storage, and thus reduce project expenditure
  - > Comply with environmental legislation
  - > Give an improved image
  - > Stay in business
  - > Reduced amount of waste costs less in waste transportation and disposal
  - > Reduced amount of waste conserves landfill space
  - Proper waste management increases site safety, work efficiency and also increases company's public image
- Site Management
  - > On-site issues
  - > Off-site issues
- Introduction on Waste Management Plan
  - Policy statement
  - Project environmental organization
  - Individual responsibilities
  - > Summary of environmental impacts and mitigation plans
  - > Contingency plan

#### Session Two – Handling of Chemical and Chemical Waste

#### **Objectives**

• To understand the proper practices in handling of chemicals waste

#### Contents

- Definition
  - > Chemical: refer to Dangerous Goods Ordinance
  - Chemical waste: the Waste Disposal (Chemical Waste)(General) Regulation defines Chemical Waste as any substance or thing being scrap material, effluent, or an unwanted substance or by-product arising from the application of or in the course of any process or trade activity, and which is or contains any substance or chemical specified in the prescribed schedule if such substance or chemical occurs in such form, quantity or concentration so as to cause pollution, constitute a danger to health or risk of pollution to the environment.
- Suitable place for storing chemicals or chemical waste
  - Store in an area with impermeable floor and bunds
  - Store incompatible chemical or chemical waste in different and secure areas
  - Allow adequate ventilation
  - Far away from water courses
  - Prevent expose from direct sunlight
  - > Containers should be checked for leakage or spillage before use
  - Stacked containers should be made stable and safe from falling down
  - Display a hazard warning panel at the entrance of the storage area
  - > Sufficient air space in container when storing liquid wastes
  - Containers should be securely closed.
- All chemicals or chemical wastes should be clearly and correctly labeled
- Workers handling chemicals or chemical wastes should be competent and trained.

# **Appendix D**

## Waste Management Audit Checklist

# Appendix E

## **Monthly & Yearly Waste Flow Tables**

# Appendix F

# **Site Plan for On-site Sorting**

## and

## **Material Storage Area**

### Appendix G: WASTE OBJECTIVES, TARGETS AND PROGRAMMES

WASTE OBJECTIVE, TARGET AND PROGE	<b>R</b> EF NO.: <b>ST8902/WOTP/01</b>					
In order to quantify the achievement in waste reduction in the project, the following Objective and Target have been set with actions, deadlines and responsibilities.						
Project : Sha Tin New Town Stage II Contract No. ST89/02 – Sha Tin Height Tunnel and Approaches						
Objective : To reduce the wastage of concrete						
Target : To control the concrete wastage to not more than 2.5% of the total amount of concrete used in 2007.						
Action 1) Improve concreting schedules to prevent and minimize wastage.	<u>Deadline</u> On monthly basis	Responsibility Construction Departments				
2) Record the amount of concrete purchased.	On monthly basis	Quantity Survey Department				
3) Record the amount of concrete used for structural works	On monthly basis	Quantity Survey Department				
4) Record the amount of other concrete used (e.g. paving of haul roads).	On monthly basis	Quantity Survey Department				
5) Monitor and maintain the record for implementation and achievement in the reuse of excavation material on site	On monthly basis	Environmental Department				

WASTE OBJECTIVE, TARGET AND PROGRAM	<b>REF NO.: ST8902/WOTP/02</b>				
In order to quantify the achievement in waste reduction in the project, the following Objective and Target have been set with actions, deadlines and responsibilities.					
Project : Sha Tin New Town Stage II Contract No. ST89/02 – Sha Tin Height Tunnel and Approaches					
Objective : To reduce the wastage of steel bars.					
Target: To control the steel bars wastage to not more than 2.5% of the total amount of steel bars used in 2007.					
<ul> <li><u>Action</u></li> <li>Accurately estimate the suitable size/length of steel bars</li> </ul>	<u>Deadline</u> On monthly basis	<u>Responsibility</u> Construction Departments			
2) Record the amount of steel bars purchased.	On monthly basis	Quantity Survey Department			
3) Record the amount of wasted steel bars.	On monthly basis	Quantity Survey Department			
4) Monitor and maintain the record for implementation and achievement in the reuse of excavation material on site	On monthly basis	Environmental Department			

WASTE OBJECTIVE, TARGET AND PROGRAM	<b>REF NO.: ST8902/WOTP/03</b>				
In order to quantify the achievement in waste reduction in the project, the following Objective and Target have been set with actions, deadlines and responsibilities.					
Project : Sha Tin New Town Stage II Contract No. ST89/02 – Sha Tin Height Tunnel and Approaches					
Objective : To collect waste paper for recycling					
Target : To collect at least 170 kg in average of waste paper per month by the waste paper collector in 2007.					
<ul> <li>Action</li> <li>1) Collection boxes/bins for waste paper and carton should be provided in the site</li> </ul>	<u>Deadline</u> Completed	<u>Responsibility</u> Administration Dept.			
2) Assign a waste paper collector.	Completed	Administration Dept.			
3) Coordinate with the waste paper collector for paper collection	On need	Administration Dept.			
4) Record the amount of waste paper collected.	On monthly basis	Environmental Department			

### **Appendix H: Trip Ticket**



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# **Appendix I**

# **Inspection Checklist for**

# **Daily Cleaning and Weekly Tidying**

### **Appendix J: Spill Response Plan**

- 1. Spill Prevention and Precaution
- 1.1 General Precaution
  - Avoid disorder and storage of unnecessary materials in working areas
  - Prevent obstructions and tripping hazards
  - Prepare all required equipment prior to commencement of work
  - Prohibit smoking at or near the dangerous goods stores

#### 1.2 Storage Precautions

- Use solid and impermeable enclosure walls or storage containers
- Reduce the danger of falling of stacked containers
- Provide tightly closed lips to avoid leakage of chemical wastes to further reduce the danger of container falling
- Store compatible chemical wastes in the same Storage area
- Inspect the storage area to detect if any leakage or defective containers on a regular basis
- Use suitable containers, which are resistant to the stored chemical wastes, to avoid leakage or spillage
- Check the conditions of the storage containers regularly
- Identify and provide suitable notices in storage area
- Prohibit open flame and smoking near the chemical waste storage area
- Prevent mixing of incompatible chemical wastes
- Carry out mixing of compatible chemical waste outside of storage area
- Store large and heavy containers on the floors as far as possible or avoid storage of these containers higher than 2 feet from the floor
- Keep chemical waste containers below eye level
- Provide adequate space for handling of the containers
- Maintain a log of chemical wastes
- Separate incompatible chemicals from each other
- 1.3 Transfer and Transport Precautions
  - Consider the size of the container to avoid overfilling
  - Use pumps to transfer chemical wastes instead of simple pouring
  - Provide containment structure to hold the chemical wastes when leakage or spillage of chemical waste occurs
  - Use safety and suitable labeled containers
  - Use suitable carriers to transfer the chemical waste containers from one location to another
  - Employ licensed waste collectors to be responsible for chemical waste transport
- 2. Response Actions

Workers should be aware of emergency telephone numbers (Appendix F), locations of spill kits (i.e. site car), emergency exit and evacuation routes. Medical emergency response should be undertaken whenever necessary. The response actions to an accident would include the following steps:

- Keep untrained personnel away from the spillage area or evacuate all personnel and call the emergency service if the spills are highly toxic and volatile
- Provide forced ventilation in the spillage area
- Allow only trained persons who have equipped with protective clothing and equipment to enter the spillage area for clean up
- Transfer the spills back into containers using suitable equipment whenever practicable
- Use suitable absorbing materials to clean up the spills and dispose the absorbing materials

as chemical wastes

- Use suitable solvent to clean the spillage area after removing the spills
- Prepare necessary protective devices, safety equipment, containers and clean up materials for emergency use
- Train Staff to handle the spillage of chemicals
- Evaluate the potential hazard of the chemical wastes
- 3. Spill Clean Up and Disposal
  - Prevent spreading of fumes and vapours by closing doors and windows of spillage area
  - Control the leakage of the chemical wastes and absorb the spills using suitable absorbing materials
  - Use acidic or alkaline solution for neutralization wherever appropriate
  - Take special precautions for flammable wastes and wastes in power form
  - Keep and label the clean up wastes
  - Clean the spillage area and equipment used in the response actions
  - Dispose the clean up wastes as chemical wastes
- 4. Safety Equipment
  - Fire extinguishers
  - Brush, dustpan, mop and bucket
  - Dry sand
  - Tissue and towel
  - Containers including plastic bags, drums, etc.
  - Absorbing materials
  - Pumps
  - Sampling devices