

**OPERATIONAL WASTE MANAGEMENT PLAN FOR
THE HONG KONG DISNEYLAND RESORT**

**Prepared by
HONGKONG INTERNATIONAL THEME PARKS LIMITED
EP-01/059/2000/A**

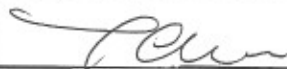

August 2005

HONG KONG DISNEYLAND RESORT
EP-01/059/2000/A

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HONG KONG INTERNATIONAL THEME PARK

August 2005

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1. INTRODUCTION

1.1 Background

The construction and operation of Hong Kong Disneyland was considered a Designated Project under the Environmental Impact Assessment Ordinance (EIAO) and its likely environmental impacts were assessed in the Environmental Impact Assessment for “*Construction of an International Theme Park in Penny’s Bay of North Lantau and its Essential Associated Infrastructures*” (Theme Park EIA Report).

Following approval of the Theme Park EIA Report, an Environmental Permit was issued to the Civil Engineering Department (CED), now Civil Engineering and Development Department (CEDD). Pursuant to that Environmental Permit, Hongkong International Theme Parks Limited (HKITP) subsequently applied for and was issued a Further Environmental Permit (FEP) in July 2000 (FEP-01/59/2000). In June 2005 HKITP applied for a variation to the FEP and an Environmental Permit (EP) (EP-01/059/2000/A) was issued which contains the requirements and obligations for the resort operations.

HKITP will operate, as of 12th September 2005, a Disney-branded theme park and resort, and associated complex and infrastructure at Penny’s Bay, Hong Kong (the HKDL Resort). The location of the resort is depicted in Figure 1. This Operation Waste Management Plan (OWMP) provides the framework and sets forth the requirements for the waste management for the operational phase of the Project. The waste management measures and procedures presented in this OWMP covers the operation activities in the following areas:

- Theme Park and Hotels
- Retail Dining and Entertainment Areas (RD&E) (although there is no RD& E at Opening Day)
- Public Areas such as the Government Landscape Area (GLA), the Car/Coach Park (CPK), Public Transport Interchange (PTI) and Ferry Pier

Please note that the waste management for the water recreation centre, which is a licensed area to HKITP and under a separate environmental permit, is addressed in a separate submission.

1.2 Requirement for an OWMP

The requirement for an OWMP is stated in Condition 3.21 of the EP No. EP-01/059/2000/A dated 5 July 2005 as follows: “*Three sets of waste management plan for the operational phase of the Project shall be submitted to the Director for approval at least one month before the Project commences operation. The plan shall be certified by the IEC as having regard to Section 6.7 and Section 16 of the EIA Report. The plan shall include details of how the mitigation measures of operational waste management will be implemented, together with the arrangements for avoidance, minimization, material recovery/recycling, collection, transportation and disposal of various types of waste generated during the operation of the Theme Park.*”

This OWMP has been prepared in accordance with the above requirement and with reference to Section 6.7 and Section 16 of the EIA Report and specifically Table 16.1p-Implementation Schedule for the Theme Park Operation Phase. The relevant requirements are summarised in Table 1.1.

Table 1.1 Requirements of the Operational Waste Management Plan

Requirement	Reference
Spent fireworks shall be collected immediately after the completion of the fireworks displays. The collection and disposal of spent fireworks shall be in accordance with the waste management plan for the operational stage approved under Condition 3.21 of this Permit.	EP Condition 3.14
Three sets of waste management plans for the operational phase of the Project shall be submitted to the Director for approval at least one month before the Project commences operation. The plan shall be certified by the IEC as having regard to Section 6.7 and Section 16 of the EIA Report. The plan shall contain details of how mitigation measures of operational waste management will be implemented, together with the arrangements for avoidance, minimisation, material recovery/recycling, collection, transportation and disposal of various types of wastes generated during the operation of the Theme Park.	EP Condition 3.21
A Waste Management Plan will be prepared including details of waste minimisation, material recovery etc.	EIA Table 16.1p (Log Ref E1)
Theme Park Operator shall implement a waste avoidance programme.	EIA Table 16.1p (Log Ref E3)
Theme Park operator shall implement a Materials Recovery and Recycling Programme which will include: <ul style="list-style-type: none"> • Glass bottles and jars • Paper • Aluminium cans • Plastics • Kitchen grease • Scrap metal • Laser printer toner cartridges • Green waste • Scrap lumber • Asphalt 	EIA Table 16.1p (Log Ref E4, E5, E6, E7, E8, E9, E10, E11, E12, E13)
Wherever practicable processes which produce less or no chemical waste will be preferred.	EIA Table 16.1p (Log Ref E14)
Containers for storage of chemical wastes are defined in Section 16 of the EIA.	EIA Table 16.1p (Log Ref E15)
Storage of chemical wastes clearly defined in Section 16 of the EIA.	EIA Table 16.1p (Log Ref E16)
Disposal of chemical waste will be via a licenced contractor.	EIA Table 16.1p (Log Ref E17)

In addition, Table 6.5g - Summary of Waste Management Impacts of the EIA report stated that *"the market driven recycling industry can recycle 23-26% of waste to be generated in the Theme Park. It is recommended that a additional further target of 10% for the recovery of recyclables and potentially, an extra 10% for the recover of source separated food waste (assuming that a composting facility for food waste planned in the Waste Reduction Framework Plan is available) is adopted in the Waste Management Plan of the Theme Park"*. While we have put in great effort in the design and planning of the HKDL Resort based on the experience gained in our overseas theme parks to facilitate high recycling and recovery rate of waste, the practicality of the above recycling rate at HKDL Resort, which in part is highly variable depending on the actual waste composition at the HKDL Resort, local recycling market situation and general awareness of the guests visiting the park, cannot be confirmed until HKDL Resort has actually commenced operation and real data on waste composition unique to the Hong Kong environment become available. For initial review purpose, we will adopt the 23-26% annual recycling rate as the starting target for HKDL Resort recycling effort.

We will work closely with EPD to review the recycling target at a later stage based on actual waste generation information.

1.3 Purposes of the OWMP

The purposes of this OWMP are:

- To identify and classify the types of waste arising from the operation of the HKDL Resort;
- To identify the potential for and present the arrangement for avoidance and minimisation, reuse, recycling, treatment and disposal of waste to be generated from the operation of the HKDL Resort; and
- To identify measures to ensure the HKDL Resort is maintained in a clean and tidy condition.

The OWMP is based on information relating to the operations of the HKDL Resort at Opening Day. It is recognised that during the life of the HKDL Resort there may be new forms of waste arising or the handling arrangements may change, thereby necessitating a revision to be prepared to the approved OWMP. HKITP will review and update this OWMP regularly should operating conditions change or new legislation or regulations be brought into effect.

1.4 Waste Management Organisation

HKITP will retain a waste management vendor to collect, recycle and dispose of all waste generated by the HKDL Resort. The scope of work and responsibilities of the waste management vendor are:

- Provision and maintenance of containers for waste and recyclable materials at the RCPs;
- Provision and maintenance of portable compactors at the RCPs;
- Transportation of portable compactors for waste disposal to and from the designated disposal point;
- Collection of recyclable materials from the recycle bins for recycling;
- Overall management of the RCPs;
- Collection and transportation of other wastes generated at the HKDL Resort (e.g. grease trap waste, chemical waste, and other waste that requires special handling).

HKITP's Environmental Team will be responsible for:

- Ensuring the wastes arising from the HKDL Resort are collected, handled, stored, transferred and disposed of in an environmentally acceptable manner which complies with the relevant requirements under the Waste Disposal Ordinance (WDO) and its regulations;
- Ensuring that the Waste Management Vendor properly implement the appropriate environmental protection and waste pollution control mitigation measures to minimize and control the potential for waste impact;
- Ensuring the waste minimisation measures and the reuse and recycling of materials are properly implemented;
- Monitoring the environmental parameters as specified in this OWMP;
- Providing training to cast members involved in the waste management process; and
- Reporting the waste monitoring and audit findings in the monthly report.

2. IDENTIFICATION OF WASTES ARISING

2.1 Definition of Wastes Arising

Wastes arisings have been generically identified for each of the main locations within the HKDL Resort areas as follows:

2.1.1 Theme Park and Hotels

Theme park and hotels including the back-of-house (BOH) areas will generate:

- municipal solid waste,
- chemical wastes (for example spent batteries, oils, greases etc. from maintenance of vehicles and mechanical facilities in the back-of-house area),
- grease trap wastes (from kitchens and food preparation areas),
- food waste,
- green waste, and
- fireworks waste (e.g. waste shells, cases, duds and electric match casings).

2.1.2 Retail Dining and Entertainment Areas

Retail Dining and Entertainment (RD&E) areas will generate:

- municipal solid waste,
- grease trap waste.

Although it should be noted there will be no RD&E area at Opening Day.

2.1.3 Public Areas

Public Areas including GLA, CPK and ferry pier will generate mainly municipal solid waste although the volume is not expected to be significant due to minimal food outlets in these areas.

2.2. Estimates of Waste Generation

The estimated waste arisings are summarised in Table 2.1 with details of each waste type given in separate paragraphs below.

Table 2.1 Estimated Waste Arisings

Item	Estimated Quantities per Month	Special Handling Required	Licences Needed
Municipal Wastes including food waste	Dependent on the patronage figure and is estimated to be about 20 tonnes per day	No for general waste, food waste to be composted together with green waste	No
Green Wastes	Dependent on the maintenance schedule and is estimated to be about 20 tonnes per month	To be composted together with the food waste	No
Chemical Wastes	Dependent on the maintenance schedule and is estimated to be about 0.1m ³ per day.	In accordance with chemical wastes handling procedures.	HKITP to register with EPD as chemical waste producer and chemical waste to be collected

Item	Estimated Quantities per Month	Special Handling Required	Licences Needed
			by licensed collector
Grease Trap Wastes	Dependent on the maintenance schedule and is estimated to be about 20m ³ per month.	Will engage registered collector only for disposal at WENT landfill.	No
Fireworks Wastes	Approximately 100kg per day.	<ul style="list-style-type: none"> No special handling requirement for normal trash. In accordance with chemical wastes handling procedures for those waste classified as chemical waste. 	For those waste classified as chemical waste, HKITP to register with EPD as chemical waste producer and chemical waste to be collected by licensed collector

2.2.1 Municipal Solid Waste

The largest portion of wastes to be generated from the operation of the Theme Park and Hotels is municipal solid waste (MSW). An estimate of the waste arisings from various areas of the Theme Park, food and merchandise outlets, and the Hotels has been prepared based upon the estimates of attendance and number of meals served. These estimates have been derived based on experience at other international theme parks and resorts, but are by no means absolute numbers. For the purpose of developing the waste management strategy and operational plan, these estimates have been adopted and are provided in table 2.1 and detailed in Appendix A (for Phase I Opening Day configuration).

2.2.2 Chemical Waste

The operation of the Theme Park will utilize a variety of chemicals, which will vary widely in rate of arising, volume, and type. Sources of chemicals include, for example, the rags and cleaning materials from the maintenance of the mechanical rides, spent batteries, spent chemicals from water treatment works, cleaning materials etc. Please refer to Appendix B for details of types of chemical waste likely to be generated.

2.2.3 Green Waste

Green waste will be produced through maintenance of the landscape areas within the HKDL Resort. These would include branch clippings, weeds, prunings etc. The amount would be less at the initial period of operation due to a relatively young landscape. As the plants begin to mature and some plants need to be removed/ replaced, the amount of green waste would increase.

2.2.4 Grease Trap Waste

The operation of various restaurants and food outlets at the Theme Park and Hotels will generate a significant amount of grease trap waste which will be collected and disposed of by the designated Waste Management Contractor.

2.2.5 Fireworks

The wastes generated by the fireworks shows consist of burnt shells, casing, duds and electric matches. Disposal of these are given later in the text.

2.3 Waste Minimization Measures

HKITP has incorporated a number of cost-effective waste minimization measures in the overall design of Theme Park facilities. In addition, HKITP has identified various operation procedures that will minimize waste generation during the Theme Park operations. These measures can be broadly classified into 1) Reduce 2) Reuse and 3) Recycle.

Reduce

- Implement Green Procurement policy whereby environmental requirement and initiatives are integrated into the daily purchasing and procurement decision process. In the context of waste reduction, environmentally responsible purchasing involves discouraging unnecessary purchases and encourage the purchase of products with improved recyclability, reduced packaging, greater durability and where economically rational, with high recycled content. Examples of green purchasing adopted are use of recycled paper for guide maps and letterheads and use of recycled materials for shopping bags.
- Limiting the use of disposable products for Theme Park activities, in particular use of reusable utensils, plates (using Melamineware instead of disposal items), glasses, cups and trays have been implemented in restaurants and food outlets as far as practical;
- Limiting the amount of packaging materials for all products sold in the Theme Park as far as practicable;
- Reducing the use of paper towels through the use of fast-action hand dryers in lieu of paper towels in most public wash room facilities;
- Use of reusable delivery cages, totes and wagons as opposed to wooden pallets and paper cardbox for distribution of merchandise from the central distribution center to various merchandise outlets within the Theme Park;
- Use of reusable plastic delivery containers for delivery of some food products (e.g. bakery products, drinks) to the central kitchen facilities or directly to various food outlets within the Theme Park;
- Limiting the laundry of towels and linens in the hotels by offering Guests the option to re-use towels and linens;
- Require third party service providers within the Theme Park to identify and incorporate waste minimization measures as part of their service requirements;
- Incorporate review of waste minimization measures as part of any regular review of all Theme Park operations;

- use of rechargeable batteries rather than disposable wherever possible and recycle used rechargeable batteries

Reuse

- Use of compost materials generated from the green waste and food waste recycling program for landscaping requirements within the Theme Park as far as practicable;

Recycle

- Encourage source segregation of recyclable materials by providing convenient access to recyclable material containers at various strategic locations, both in the Guest areas and back of house facilities, particularly in areas identified as major generators of waste and recyclable materials;
- Implement parallel collection system for waste and recyclable materials. For details of materials to be recycled, please refer to section 3.4.;
- Monitor development of new local markets for all types of recyclable materials generated at the Theme Park.

Furthermore, HKITP will implement as far as practicable the following waste avoidance measures recommended in the EIA:

- *“electronic communications (ie voice mail and email); message boards, routing slips and double-sided copying will be used, as far as practical”*. These measures have been adopted in the offices. For front line cast members who are “non-computer user”, computer terminals are provided at selected convenient BOH locations where they can access easily to facilitate the dissemination of these “e-messages”.
- *“worn linens to the maximum extent feasible be re-used to make scarves and aprons for cast members”*; Reuse/recycle of worn linens will be practiced as far as practicable.
- *“soft drinks be served in souvenir cups that are taken home by guests for reuse as opposed to being discarded at the Theme Park as waste, appropriate recycling bins should be set up to recover these cups for reuse or recycling if the visitors choose not to take them home”*; Souvenir cups will be sold at food outlets.
- *“hamburgers and similar food types will be wrapped in paper or an equally environmentally acceptable material instead of in polystyrene clamshells”*. Environmentally acceptable material such as paper and biodegradable plastic containers will be used for fast food sold in the park;
- *“unused prepared food will be sent to a food bank, and distributed to the needy, to the maximum extent feasible based upon available markets and third party recycling facilities”*. This option has been explored and currently not put in place due to local practice and concerns on hygiene condition during the transportation of prepared food.
- *“excess water-based paints will be reused as far as practical”*. This will be practiced as far as practical.
- *“plastic drink cup lids will be supplied to guests upon their request when purchasing beverages”*. This will be practiced as far as practicable.

- “fast-food service trays in selected locations will be washed and reused (instead of using disposable cardboard carry-out trays)”. Reusable plastic trays will be used in all fast-food outlets.
- “souvenir, booklets, dining-ware, etc. which are recyclable should have appropriate instructions and signs printed on the surface”. Signs where appropriate will be put on these materials.
- “all products sold in the Theme Park should be packed in minimal amount of packaging materials”. This will be practiced as far as practicable.
- “pallets made of more durable and reusable materials plastics than wood should be used in transportation of food, drinks, etc.”. Reusable pallets will be used in transportation of food.
- “the distribution centre of the Theme Park will utilise reusable shipping containers as far as practical instead of cardboard boxes for internal routing”. Reusable delivery cages will be used for internal delivery of goods.

Additional cost-effective waste minimization measures will be identified and implemented on an ongoing basis in the course of resort operations.

3. METHODOLOGY FOR WASTE HANDLING

3.1 Site Master Plan

It is essential to have an efficient and effective waste collection system to facilitate materials recovery and recycling while avoiding negative impact to HKDL Resort operations. . The site master plan showing the waste collection and storage facilities proposed is illustrated as Figure 2, which includes locations of refuse collection points, chemical waste storage areas and tentative waste disposal route.

3.2 Waste Collection Arrangements

Litter bins consisting of regular waste bins as well as specially-coded recycling bins will be provided at guest areas within the HKDL Resort as well as BOH areas. BOH areas are “back stage” areas including offices, workshops, supporting facilities, etc that are not accessible by guests. Recyclable wastes in the recycling bins will be collected and taken manually to the Refuse Collection Points (RCPs) at the BOH areas and put in designated container for recyclable materials, while other wastes in the “regular” litter bins will be taken manually to the RCPs and loaded into the portable compactors. Please refer to Appendix C for more detailed specifications on the portable compactors. The available compactor capacity at each RCP is listed in Appendix A.

To avoid potential nuisance to guests, waste collection vehicles will only travel along the roads at the BOH areas during operation hours. At the RCPs, the general waste stream will be compacted into portable compactors for off-site disposal to a Refuse Transfer Station on a daily basis, or more often as necessary. The recyclable waste stream collected in the designated containers for different types of recyclable materials will be taken to the North Lantau Refuse Transfer Station (NLRTS) or other appropriate locations for further sorting or processing and onward delivery to third party recyclers. In order to avoid any odour nuisance at the RCPs, there will be no sorting of general waste at the RCPs. In the event that a large amount of recyclable materials are discovered in general waste containers, these containers will not be loaded into the portable compactors but will be taken to NLRTS or other appropriate locations for further sorting.

The RCPs have been designed to be located at strategic locations within the Theme Park and away from public areas in BOH facilities. They are located adjacent to major waste generators at the Theme Park, primarily food outlets and at each of the 2 hotels. The location of the RCP's is shown on Figure 2. For Phase I Opening Day, the designated RCP locations are as follows:

- RCP 1 - Tomorrowland Terrace
- RCP 2 - Main Street Emporium
- RCP 3 - Jungle Cafe
- RCP 4 - Fantasy Faire
- RCP 5 - Winnie The Pooh Attraction
- RCP 6 - Outdoor Vending Building
- RCP 7 - Administration Building
- RCP 8 - Hollywood Hotel
- RCP 9 - Disneyland Hotel
- RCP 10 - GLA Public Areas
- RCP 11 - WRC Public Areas

A total of 11 RCPs are provided in the current scheme for the Phase I Resort. In the Theme Park EIA Report, it was estimated that there will be a total of 11 RCPs in the entire HKDL Resort, i.e. five hotel RCPs (one for each hotel), two RCPs for each Theme Park (four total) and two for the RD&E area. However, five additional RCPs have been provided for the Phase I Theme Park in order to provide more convenient access for waste disposal and minimize the distance for the movement of waste and recyclable materials to the RCPs and thereby minimize potential nuisance to the Guests. The number of RCPs will also be able to handle the planned growth at the Theme Park.

3.3 Specific Measures for General Refuse

3.3.1 Theme Park

Litter bins will be provided in various locations all across the Guest areas at the Theme Park. These litter bins will be specially designed for easy handling and to minimize exposure of waste and leaks during handling. Full containers will be replaced with empty litter bins by custodial Cast Members on a regular basis throughout the day and brought to the RCPs in carts. At the RCP, waste will be put into designated covered waste containers and loaded on a regular basis into the portable compactors with an integrated bin-lifter. This will prevent odor and leaks as the portable compactors are sealed units. Good housekeeping will ensure that the RCPs are kept clean and avoid any nuisance to Cast Members and the public. The portable compactors will be picked up by hooklift trucks and emptied at the refuse transfer station. Details and specifications with regards to the portable compactors are provided in Appendix C.

3.3.2 BOH Areas

The location of the various RCPs within the Theme Park were selected to provide easy access to the various restaurants and food outlets as they are expected to be the major waste generators in the Theme Park. Restaurant waste will be brought to the RCPs in containers that are compatible with the bin-lifting system of the compactors for easy loading. Separate containers will be provided for food waste recycling. Access to the RCPs will be through BOH routes.

In addition, there are two RCPs that will primarily serve the BOH facilities within the Theme Park. These RCPs will have similar waste handling arrangements but will take into account the particular waste generation patterns of the facilities that it serves. Waste will be brought to the RCP from the different BOH facilities by cleaning and custodial staff.

3.3.3 Hotels

Each of the hotels has provided its own dedicated RCP to handle its waste. These RCPs will have similar arrangements with portable compactors and containers for recyclable materials.

3.3.4 Public Areas

Two RCPs will be provided for the public areas associated with the Theme Park development, one for the GLA, PTI, Parking area, Ferry Pier and Promenade and one for Water Recreation Centre (The Waste Management Plan for WRC is covered under a separate submission). These RCPs will have containers for both general waste as well as recyclable materials. As these two RCPs do not have portable compactors, the full containers for general waste will be collected on a regular basis and brought to one of the RCPs with portable compactors (RCP 6) for disposal.

3.3.5 Future Expansion

The various RCPs within the HKDL Resort will be able to accommodate expected growth in waste volume over the course of the Resort development. HKITP has provided more RCPs than initial estimates in the Theme Park EIA Report primarily to provide convenient access from various areas within the Theme Park, but this will also enable RCPs to handle growth in waste volume over time. New RCPs will be provided as part of the development of the RD&E area. This will also apply for any new hotel development, with a dedicated RCP for each new hotel.

3.4 Specific Measures for Recyclable Materials

3.4.1 Theme Park

Bins for recyclable materials will be provided in Guest areas of the Theme Park adjacent to litter bins in order to encourage source segregation of such materials from the general waste stream. HKITP will provide sufficient number of bins for recyclable materials based on usage patterns in each area. These bins will be designed to complement the litter bins but will be clearly marked and differentiated to make it easy for Guests to use them properly. Figure 3 shows an example of these bins in one of the areas within the resort. For the Theme Park Guest areas, HKITP intends to provide one combined bin for all recyclable materials at an estimated ratio of one recycling bin for every five litter bins. It is anticipated that recyclable materials generated in these public areas will consist primarily of **plastic bottles and aluminum cans**. As such, it would be easier for Guests to put all recyclable materials in one bin. Custodial Cast Members will collect these recyclable materials and deposit them into designated containers provided in the RCPs for the recyclable materials. These containers will be taken to a sorting and consolidation facility currently proposed to be at NLRTS or other appropriate locations for further sorting and recycling (refer to Section 3.11).

3.4.2 BOH Areas

Cast Members will be trained to segregate the recyclable materials from the waste stream at their work place and deliver the separated materials to the RCPs and sort them into their respective recyclable material containers. Training will include multiple levels and format. Environmental policy and general environmental information will be provided in general training documents to raise awareness of the cast members. Job-specific on-the-site training will be provided to the Cast Members handling a particular type of waste e.g. training of segregation of food waste in the kitchen. Labels and leaflets will be put out in appropriate prominent locations to remind Cast Members on the correct procedures to follow.

The number and types of recyclable containers provided at each RCP will depend on the generation patterns of recyclable materials at each specific RCP. For example, RCPs serving merchandise outlets will have containers for **cardboard recycling**. Containers for **food waste** will be provided in the kitchen areas and other designated locations that will generate such waste (see Section 3.6 for details on food waste recycling). Special containers for recycling of **used cooking oil** will also be provided in the kitchen areas. Containers for **green waste** will be provided in the arboretum and other designated locations that will collect any plant trimmings and other landscaping waste (see Section 3.5 for details on green waste recycling). Containers for **scrap metal** will also be provided in areas (e.g. maintenance areas) that generate scrap metal waste.

Although electronic communications is encouraged, it is inevitable that paper waste will be generated from the office operations. **Paper recycling** program has been put in place where

paper collection bins are put in offices to collect used paper and subsequently delivered to paper recyclers. Apart from paper, **toner cartridges** will also be recycled.

All containers of recyclables will be taken to a sorting and consolidation facility currently proposed to be at NLRTS or other appropriate locations for further sorting and recycling (see Section 3.4.4). As additional markets for recyclable materials generated at the Theme Park are developed and identified, additional recycling containers can be provided for such materials.

3.4.3 Hotels

For the common areas in the hotels, bins for recyclable materials will be provided similar to the Theme Park to encourage source segregation of such materials from the general waste stream. For the individual hotel Guest rooms, a combined container for all recyclable materials will be provided to encourage similar source segregation.

For the kitchen facilities and other BOH area, Cast Members will be trained to segregate recyclable materials from the waste stream and sort them into their respective containers provided at strategic locations. The types of recyclables expected in hotels would be similar to the Theme Park BOH discussed above. The number and type of recyclable containers provided in each area will depend on generation patterns of recyclable materials. Custodial Cast Members will collect these recyclable materials and deposit them into designated containers provided in the RCPs for the recyclable materials. These containers will be taken to a sorting and consolidation facility currently proposed to be at NLRTS or other appropriate locations for further sorting and recycling (see Section 3.11).

3.5 Specific Measures for Green Waste

HKITP will implement a combined green waste and food waste recycling program. Green waste, including grass clippings, leaves, flowers, branches, prunings, weeds and other similar waste, will be collected in designated containers as discussed in 3.4.2 above and taken to the waste consolidation facility currently proposed to be at NLRTS or other appropriate locations to generate compost materials. Please refer to Appendix D for more details on the green waste and food waste recycling plan. The compost materials generated by the process will be utilized for landscaping requirements at the HKDL Resort as far as practicable.

3.6 Specific Measures for Food Waste

HKITP will implement a combined green waste and food waste recycling program. Food waste, including excess, spoiled or usable food or dairy products, meats, vegetables and meat trimmings, grains, bread and dough or similar waste, will be collected in designated containers as discussed in 3.4.2 above and taken to the waste consolidation facility currently proposed to be at NLRTS or other appropriate locations to generate compost materials. Please refer to Appendix D for more details on the green waste and food waste recycling plan. The compost materials generated by the process will be utilized for landscaping requirements at the HKDL Resort as far as practicable.

3.7 Specific Measures for Chemical Waste

HKITP has registered with EPD as a Chemical Waste Producer. HKITP will provide a suitable area for temporary storage of chemical waste on site. The location of the chemical waste store is shown in Figure 2. The Chemical waste Store will be constructed in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Waste issued

under Section 35 of the Waste Disposal Ordinance by the Environmental Protection Department as follows:

- the storage area will be used for chemical storage only;
- the storage area will be enclosed on at least three sides by a wall, partition or fence with a height of not less than two metres or the total height of containers in a stack, whichever is less. Suitable materials for the construction of such enclosures include concrete, brick and steel with protective coating or treatment. The enclosures will be rigidly erected and fixed to the area.
- adequate ventilation will be allowed by leaving some space between the top of the enclosure walls and the ceiling, or provision of louvres on the side of the enclosure walls;
- there will not be any connection to any surface water drains or foul sewers;
- adequate space will be allowed within the storage area for container handling by workers, including space for the manoeuvring of a trolley or other lifting devices in situations where large containers are stored;
- where the storage area is not within a building, it will be provided with a roof or similar covering designed to prevent rain and reduce heat from sunlight; where flooding of the area is likely, the floor area will be raised, for example, by adopting a raised platform design;
- where the storage area is not located within the premises in which chemical waste is produced, the storage area will be kept secure with an appropriate door/gate and locked at all time;
- the storage area will be kept clean and dry;
- the storage area will have an impermeable floor or surface made of suitable materials for the storage of containers of liquid chemical waste; an impermeable layer will prevent infiltration of liquid into the floor in case of leakage or spillage; an example is to apply epoxy resin treatment to the floor surface and cover it by heavy duty floor tiles to protect the epoxy layer from chemical and physical damage; other materials may be used so long as they will not be liable to chemical waste action with the wastes to be stored; the mechanical property of the impermeable layer/structure will also be able to withstand normal loading and physical damage caused by container handling; the condition of the impermeable layer/surface will be regularly inspected to ensure it is satisfactorily maintained;
- where containers of liquid chemical waste are stored, the area will be designed to contain the content of the largest container intended to be stored or 20% of the total quantity of chemical wastes stored, whichever is the greater; the height of such retention structure will not exceed 200 mm to allow convenient manual or mechanical lifting and handling of containers; the structure will be impermeable and the material used will not be liable to any chemical action with the wastes which would render the structure ineffective; an example of suitable material for the structure is high density brickwork covered by a cement layer;
- containers of incompatible chemical waste will not be stored together where potentially dangerous consequences may result in the event of contact between the wastes; wastes that are incompatible generally include those that will react with each other as follows:

- violently and dangerously;
 - with evolution of substantial heat and causing combustion;
 - to produce flammable, poisonous or harmful gases; or
 - to produce toxic, corrosive or unstable products;
- the storage area will be so designed such that there are compartments for separate storage of the incompatible wastes; there will be impermeable partition/walls erected between the compartments with a separate liquid retention structure for each of them.
 - stacking of containers of chemical waste is allowed provided that:
 - the enclosure walls or partition of the storage area are constructed out of an impermeable material;
 - the stacks of containers are made secure so as to prevent their falling down; and
 - containers are stacked with each of them in the normal upright position and can be readily moved when full;
 - as a general rule, the maximum height of a stock will be limited to 2.5 metres.

HKITP will ensure proper disposal of chemical waste through licensed collectors. Record and information including details related to waste production, consignment records (trip-tickets) or on-site treatment records where appropriate would be properly kept.

Procedures for dealing with spillages leakage or other accidents involving chemical waste will be prepared and training will be provided to staff members who handle chemical waste as part of their work.

3.8 Specific Measures for Grease Trap Waste

Oil and grease in wastewater arising from normal operations of restaurants and food preparation areas will need to be separated out, commonly by means of grease traps, before the wastewater is discharged from the premises. The oil and grease intercepted by grease traps, usually known as grease trap waste, needs to be removed regularly in order to ensure the proper functioning of the grease traps.

HKITP has incorporated into the overall design of the Theme Park facilities and hotels the appropriate facilities to collect, store and handle grease trap waste for its various restaurants and food preparation areas.

A registered grease trap waste collector will be employed to collect and deliver the grease trap waste to the Interim Grease Trap Waste Treatment Facility ("Treatment Facility") at the West New Territories Landfill in Tuen Mun for proper disposal. At present, the Treatment Facility is the only environmentally acceptable disposal outlet for grease trap waste collected in bulk by registered collectors. Proper cleaning records of grease traps will be maintained for inspection by the officers of EPD as required.

3.9 Specific Measures for Construction and Demolition Materials

Very little C&D waste is expected to be generated in the initial operation period of the HKDL Resort. C&D materials including **scrap lumber** and **asphalt** may be generated during the resort expansion and also maintenance works (such as rehabilitation of BOH roadways and parking lots). The construction contractors or maintenance vendors will be required to carry out waste sorting and to reuse the C&D material on site to the extent possible. The scrap

lumber collected could also be sent to the composting facility. Any surplus C&D waste will be delivered to appropriate waste disposal facilities.

3.10 Specific Measures for Fireworks Waste

Spent Product and Fireworks Waste

Spent fireworks product, which is fireworks debris, electric match wires, and remaining devices from discharged fireworks, will be collected immediately after the completion of each fireworks show and disposed of in a “Fireworks Waste” dumpster. Spent product will be inspected to confirm that there is no longer an explosion or fire hazard and may be disposed of as general trash according to internationally acceptable practice. However, HKITP will work with the waste management vendor to further define the nature of these spent fireworks product according to local regulations and determine the proper disposal channel.

Some devices may appear to be live after firing. The Fireworks Master will take extra care to assure that no live product is thrown away with spent product.

Live Waste

Any device with remaining fireworks composition is considered “Live Waste” and will need to be disposed of properly. Live Waste, which will not be stored and transported in the same box with non-fired product, will be disposed of at the Mode A store located in Kau Shat Wan managed by the Commissioner of Mines (COM). Prior to disposal, live waste will be temporarily stored in the designated partition for the Mode A Store on site. Transportation will be made via COM’s explosives delivery vessel.

Show Cancellation

A fireworks show may be cancelled due to weather and other unforeseen circumstances. Fireworks that are not fired or not damaged will be temporarily stored and returned to the manufacturers, whereas the damaged products will be temporarily stored and will be transferred to the Mode A store managed by COM for disposal.

3.11 Outlets for Recyclables

A key element contributing to the success of any recycling program is the ability to identify and secure reliable end-markets for the recyclable materials segregated from the waste stream. In this regard, it is important to have a good understanding of the local market for recycled materials in Hong Kong. A discussion of the Hong Kong recycling market was provided in the draft waste management plan prepared by HKITP in May 2002 which is copied in Appendix E for reference purpose.

Based on the understanding of the local recycling market, the expected waste composition from the HKDL Resort operation (taking into account the waste minimisation measures already put in place to minimise waste generation at source, see Section 2.3) and the recycling initiatives implemented by HKITP, the following materials will be recovered from the waste stream and taken to the sorting facility for recycling:

- Paper and Cardboard
- Aluminium cans
- Plastics
- Food Waste

- Used Kitchen Oil
- Scrap metal
- Green waste
- Construction waste including scrap lumber and asphalt
- Laser printer toner cartridges

The recyclables collected from the HKDL Resort will be taken to a sorting and consolidation facility currently proposed to be at NLRTS or other appropriate locations for further sorting and consolidation for subsequent delivery to third party recyclers. It is proposed to operate this sorting and consolidation activity at an appropriate area where recyclable containers will be unloaded manually and put into designated containers for different types of recyclable materials. It will then be consolidated with a vertical baler before sale to third party recyclers who typically run further processing operations in Mainland China. Some specific examples include recycling of cardboard and paper for production of toilet paper; processing of plastics into pellets which are sold as raw materials for plastic products factories; use of aluminum cans and scrap metal as raw materials for industrial use; use of used cooking oil as raw materials for the manufacture of soap and detergent, etc. HKITP will work with the waste management vendor to obtain documentations/certification where available and appropriate on the end use of these recyclables.

4. ENVIRONMENTAL MITIGATION MEASURES

4.1 Cleanliness and Dust Control

All waste containers, portable compactors and waste collection vehicles will be cleaned regularly to maintain cleanliness and avoid any nuisance to the public. A cleaning programme will be implemented by the waste management vendor that will include cleansing of all containers, equipment and vehicles on a regular basis.

The cleaning programme for waste containers will ensure that all containers are kept sufficiently clean at all times. All waste containers will be inspected for cleanliness before the containers are put into service at the RCPs. Upon completion of a collection cycle, the outside of all containers will be cleared of any waste or debris that may accumulate in the course of container change-over. There is a designated wash area within the RCP for the routine washing of the containers. The cleaning programme will also ensure that the inside of each container will be cleaned and disinfected regularly in order to prevent the problem of insects and odours. Portable hand-controlled manual high-pressure washers will be used.

Dust control will form part of the cleaning program. The following key measures will be incorporated to control dust during the operation and minimise any nuisance to the public:

- portable compactors and waste collection vehicles will be designed to minimise dust from the tipping operations;
- any waste spillage will be swept immediately to minimise dust; and
- all equipment will be regularly cleaned as part of the overall maintenance, cleansing and good house-keeping operations to remove any accumulations of materials or debris which may form dust.

4.2 Odour Control

Any emission of odour arising from the operation will be minimised through good housekeeping, a planned policy of prevention and close supervision. A variety of maintenance measures will be undertaken to ensure that odour emissions from the operation are minimised. These will include the following:

- RCPs will be fitted out in an easy to clean manner that offers the minimum opportunity for putrescible waste to accumulate;
- design of plant and equipment will facilitate cleaning/washing of any surfaces with which waste comes into contact;
- use of seals will minimise the release of odour and their integrity will be routinely checked;
- regular cleaning/deodorising/disinfection of RCPs, containers, portable compactors, equipment and vehicles will be incorporated into operations; and
- optional deodorising units may be incorporated onto the portable compactors and collection vehicles as necessary.

All RCPs, including those adjacent sensitive locations, will be monitored on a regular basis throughout the day to ensure no areas are in need of extra cleaning. Mitigation measures will be implemented as appropriate.

4.3 Visual Impact

All the RCPs are located in areas that are not accessible to the public and designed to minimize any visual intrusion to the Guest areas within the Theme Park. Appropriate landscaping or other screening device will be incorporated and maintained to minimize and such intrusion. In addition, movements of waste collection vehicles within the Guest areas of the Theme Park will be undertaken outside of Theme Park operation hours.

4.4 Noise Control

Noise generation will be minimised through the selection and use of equipment with silencing features. General maintenance procedures, including regular lubrication of moving parts, will enable optimum performance of all plant and ensure that all silencing equipment is working at all times and thereby result in minimising noise generated.

All staff will also be trained to handle all operational procedures with proper attention to its surrounding environment and provide minimum interference to the public by avoiding any unnecessary generation of noise.

4.5 Effluent Control

The RCPs have been designed to ensure proper control over the release of any foul water or effluent generated from the waste. Each RCP incorporates a compactor pad that will be connected to the foul water sewer system. All activities that can potentially release any effluent will be undertaken in the compactor pad (e.g. loading of waste into containers and portable compactors). The compactor pad is curbed and sloped such that any wastewater will be directed to the foul sewer system.

Waste containers will be covered at all times to minimise water infiltration. The portable compactors are designed to avoid any spillage of leachate from the waste containers during the loading process and all leachate will be self-contained within the portable compactors. This leachate will then be discharged along with the refuse at the appropriate disposal point. All equipment will be washed down at the designated wash area which is connected to the foul sewer system.

For those RCPs without portable compactor, effluent from normal operation of RCP will be collected via floor drain and conveyed to sewage system.

5. EMERGENCY RESPONSE PROCEDURES

5.1 Typhoon and Adverse Weather Operations

All outdoor waste collection bins will be secured in place when Typhoon signal no. 3 is hoisted. The RCPs will remain open for the receipt and processing of waste during the period that a typhoon signal No. 3 or No. 8 or Black Rainstorm warning is hoisted. The transfer of full portable compactors to the Refuse Transfer Station will continue until typhoon signal No. 8 is hoisted. Once typhoon signal no. 8 is reached, waste will continue to be loaded at covered or sheltered RCPs (e.g. hotels). As storage space allows, all filled waste containers will be moved to the sheltered or covered RCPs to minimise environmental nuisance. All exterior waste containers will either be secured in place, or moved to a temporary storage area for the duration of the severe typhoon conditions as necessary. All mobile equipment will also be parked in secure locations.

Should the duration of the typhoon or surge in waste volume require such measures, additional equipment will be mobilised to clear the stored waste as quickly as possible once the typhoon conditions have passed.

5.2 Fire Loads

Should a waste container have waste on fire or smoking, cast members and waste management vendor employees will be trained on the proper response procedures. If deemed safe, staff will either immediately put out the fire with small fire fighting equipment on-hand, or move the waste container to a safe, preferably exterior, location prior to attempting to douse the fire. In either case, staff will notify the HKITP and/or the Penny's Bay Fire Department via the HKTP Central Command Centre. Should the fire be severe, staff will stay on location to help with cordoning off the area for safety.

5.3 Waste Spillage

Cast members and waste management vendor staff will be trained in spill control and good housekeeping measures and to appreciate the importance of these aspects to the efficient and environmentally-acceptable operation of the facility.

A spill control plan for wastes, in particular chemical waste, will be developed as part of the emergency response plans for the operations. The spill control plan will identify the following:

- list of materials of concern which may be encountered, including materials which may be contained in incoming waste, unacceptable wastes and materials/chemicals which will be used within the airport;
- guidance on spill response activities, including demarcation, control, clean up and evacuation procedures and lines of reporting;
- guidance on personal protection measures;
- list of resources provided for the control and clean up of spillage with details of their location; and

- description of required staff training in the response procedures.

Guidance on spill response activities will include a step-by-step approach listing appropriate instructions covering:

- immediate provisions required for supervision of the spill area and for the initial control and minimisation of risks, including rescue of any injured person(s) and determination of the presence of fire, smoke or fumes;
- notification of supervisory staff, the designated safety officer and other senior staff;
- evaluation of the nature of the spill to determine the appropriate response, including the need to wear protective clothing, prevention of further spillage, containment of the spill, notification of the Fire Services Department or other emergency services, evacuation procedures and cleaning up and remediation of the spill and any contaminated materials;
- identification of the spilled substance by container labels, shipping papers or vehicle placards;
- identification of the means necessary to prevent any spilled material from entering the sewer, site drainage system or escaping from the site; and
- disposal of any contaminated soils and/or absorbent materials.

An Incident Report will be prepared to record the nature of the spill, any injuries to staff or other persons and the details of the resultant remediation.

6. MONITORING AND AUDIT REQUIREMENTS

This OWMP details the anticipated wastes generation during operation, methodologies for the collection and handling of wastes as well as the wastes minimisation measures through avoidance, recovery and recycling. Waste management monitoring and audit is important to ensure the procedures and mitigation measures proposed in this OWMP are properly implemented and followed.

The objectives of the waste management monitoring and audit are:

- to ensure the wastes are handled, collected, stored and transferred and disposed of in compliance with the OWMP and relevant regulations, and
- to ensure the OWMP, in particular the environmental mitigation measures, is implemented properly and effectively.

The monitoring and audit will cover the wastes handling, recycling and disposal procedures within the HKDL Resort, as well as off-site sorting facility and the composting facility. The results of the waste management audit will be reported monthly in the Monthly EM&A report. Records identifying the waste arisings, the nature and composition of materials, the quantities of wastes as well as the volumes or tonnes of reduced, reused, recycled and otherwise recovered materials would be kept for monitoring to check the effectiveness of waste reduction measures implemented.

In addition to the monthly monitoring of waste arisings the OWMP and the recycling programmes would be reviewed annually to determine the performance of waste avoidance measures and the recycling programmes.

7. REPORTING REQUIREMENTS

In order to monitor and audit the waste handling and disposal procedures a record would be kept which clearly identifies the quantities of waste arisings, the nature of materials, as well as the volumes or tonnes of reduced, reused, recycled and otherwise recovered materials.

This record as well as the waste reduction and recovery rate achieved would be included in the monthly Environmental Monitoring and Audit Report which will be prepared and submitted to EPD in accordance with the requirements of the EP. The details and format of this monthly report is given in the Operation Environmental Monitoring and Audit Plan.

Figure 1 – Location Plan for the Hong Kong Disneyland Resort



LEGEND:

- | | | |
|------------------|-----------------------------|---------------------------|
| 1 Theme Park | 8 Coach Park | 15 Top Soil Storage |
| 2 Theme Park BOH | 9 Disney Rail Station (MTR) | 16 Future RD&E |
| 3 Moderate Hotel | 10 Water Recreation Center | 17 Drainage Channel |
| 4 Deluxe Hotel | 11 Utility Yard | 18 Tree Farm |
| 5 Disney PTI | 12 Arboretum | 19 Service Berth |
| 6 VEPA | 13 Penny's Bay Rail Link | 20 Car Park |
| 7 GLA | 14 Ferry Pier | 21 Police & Fire Stations |

Illustrative Plan - OPENING DAY



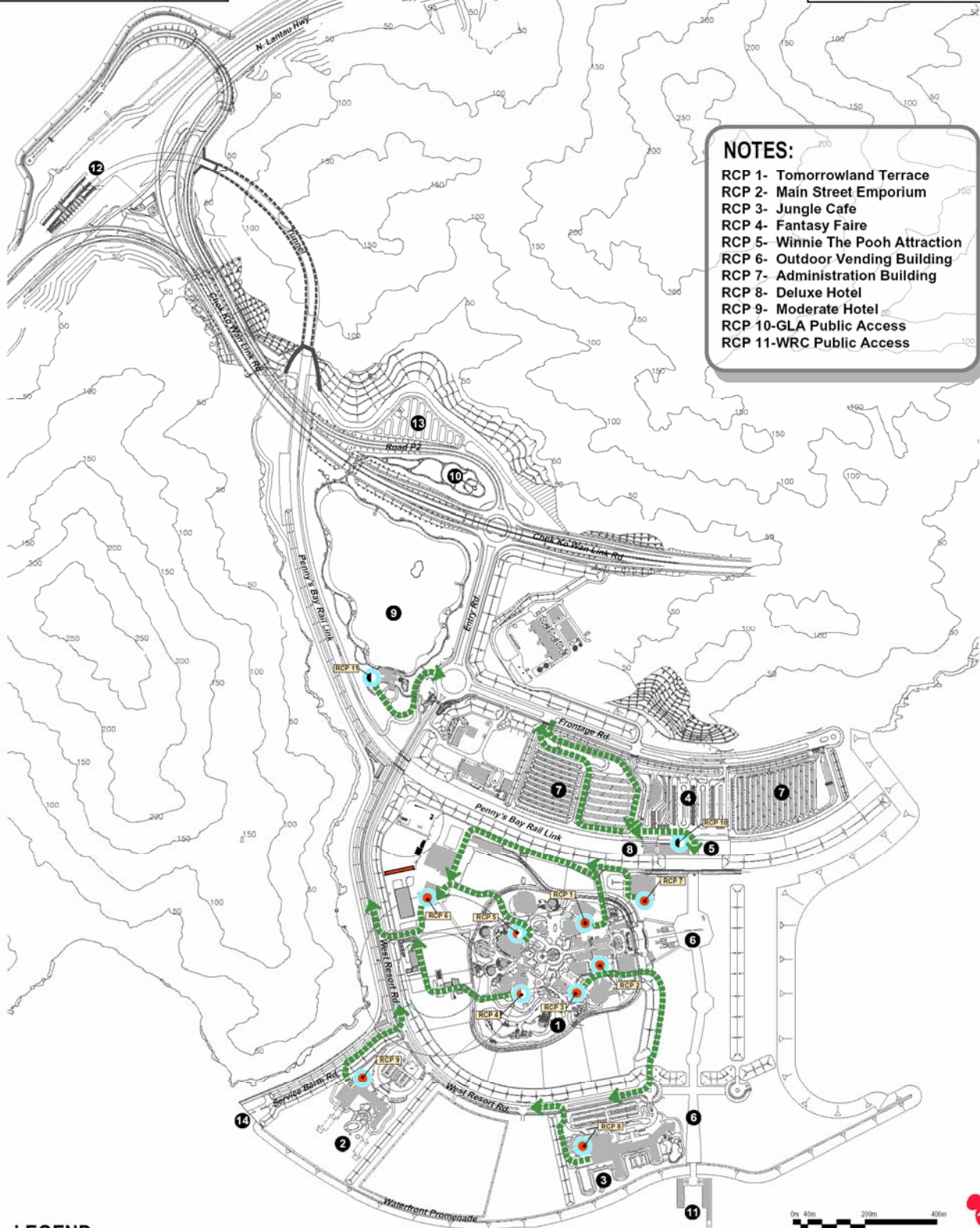
HONG KONG
Disneyland
香港迪士尼樂園

Figure 2 – Location Plan for the RCPs within the Hong Kong Disneyland Resort

Hong Kong International Theme Park Ltd.
Waste Management Plan

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- NOTES:**
- RCP 1- Tomorrowland Terrace
 - RCP 2- Main Street Emporium
 - RCP 3- Jungle Cafe
 - RCP 4- Fantasy Faire
 - RCP 5- Winnie The Pooh Attraction
 - RCP 6- Outdoor Vending Building
 - RCP 7- Administration Building
 - RCP 8- Deluxe Hotel
 - RCP 9- Moderate Hotel
 - RCP 10-GLA Public Access
 - RCP 11-WRC Public Access



LEGEND:

- 1 Theme Park
- 2 Moderate Hotel
- 3 Deluxe Hotel
- 4 Disney PTI
- 5 VEPA
- 6 GLA
- 7 Coach/ Car Park
- 8 Disney Rail Station (MTR)
- 9 Water Recreation Center
- 10 Arboretum

- 11 Ferry Pier
- 12 Yam-O PTI
- 13 Tree Farm
- 14 Service Berth

- Refuse Collection Point w/ Trash Compactor
- Refuse Collection Point w/ Trash Compactor at "Land-Locked" Service Area
- Refuse Collection Point w/ Trash Bin at "Land-Locked" Service Area
- Waste Management Vehicular Circulation
- Chemical Waste Storage

Resort Waste Management Plan

HKDL AREA DEVELOPMENT - JULY 05/02/2012



HONG KONG
Disneyland
香港迪士尼樂園

Figure 3 - Examples of Recycle Bin used in Hong Kong Disneyland Resort



Appendix A

**Appendix A
Hong Kong Disneyland Resort
General Waste Volume Calculations
Phase 1 - Opening Day**

	Service Area	Portable Compactor	Estimated Total Daily Tonnage	Portable Compactor Capacity	Spare Compactor Capacity
RCP 1 Tomorrowland Terrace	On Stage	Yes	3.19	8.00	251%
RCP 2 Main Street Emporium	On Stage	Yes	4.10	8.00	195%
RCP 3 Jungle Café	On Stage	Yes	0.66	8.00	1212%
RCP4 Fantasy Faire	On Stage	Yes	1.73	8.00	462%
RCP 5 Winnie-the-Pooh Adventure	On Stage	Yes	1.11	8.00	721%
RCP 6 Outdoor Vendor Building	BOH	Yes	1.08	8.00	315%
RCP 7 Adminsitration Building	BOH	Yes	0.50	8.00	1600%
RCP 8 Hong Kong Disneyland Hotel	Hotel	Yes	3.56	8.00	225%
RCP 9 Disney's Hollywood Hotel	Hotel	Yes	2.33	8.00	343%
RCP 10 GLA Public Areas*	Public	No	1.00	N.A.	N.A.
RCP 11 WRC Public Areas*	Public	No	0.46	N.A.	N.A.
TOTAL			19.72		

*Note: Only covered waste bins will be provided at RCP 10 & 11.
Wastes from RCP 10 and RCP 11 will be collected and disposed of at the Portable Compactor at RCP 6.

Appendix B

Chemical Waste Which May be Generated at Hong Kong Disneyland Resort

	Chemical Waste	Estimated Waste Quantity per day
1	Waste lithium Batteries	0.1 no.
2	Waste Nickel Cadmium Batteries	0.1 no.
3	Waste Oil	0.1 L
4	Waste Oil and Water	0.1 + 0.1 L
5	Waste Oil Rages and Absorbent	0.1 no.
6	Waste Paint Related Material	0.5 L
7	Waste Filter (engine oil filter, fuel filter)	0.1 no.
8	Waste Rubber Type / Brake Pads	1 no.
9	Waste Paints / Thinner	0.5L
10	Waste Lubricant	0.1 L
11	Waste Grease	0.1 L
12	Waste Machine Cooling Solution	0.1 L
13	Waste Fibre Glass	0.1 m ³
14	Waste Cleaning Solution for Paint	0.5L
15	Wastre Chemical Solution for Paint Stripping	0.5L

Note: The nature of chemicals used and estimated volumles are provided for planning reference and may change according to actual operation needs.



PAKAWASTE
WASTE HANDLING SYSTEMS



All PAKAWASTE equipment conforms to the EC machine safety directive (89/392/EEC amended by 91/368/EEC, 93/44/EEC and 93/68/EEC)

PORTABLE COMPACTORS



PORTAKRUSH 800H

The newest compactor in the PORTAKRUSH range and available as both a 14 cubic yard skip lift P800 or 32 cubic yard hooklift machine P800H.

TECHNICAL SPECIFICATION	SINGLE CYLINDER
Overall length	6580 mm (259 in)
Overall width	2410 mm (95 in)
Overall Height	2750 mm (108.25 in)
Loading height	1400 mm (56.75 in)
Loading aperture height	1400 mm (56.75 in)
Loading aperture width	1400 mm (56.75 in)
Ram size (2 off)	102 mm (4 in)
Volume	24.5 cu.m (32 cu.yd)
Cylinder thrust	24 tonnes (23.62 tons)*
Normal operating pressure	148 kg/sq.cm (2100 psi)*
Dry cycle time	50 secs
Motor rating	7.5 kw (10 hp)
Power supply rating (415v 3phase)	32 amp
Oil reservoir capacity	70 ltr (15.39 gals)
Total weight	5 tonnes (4.9 tons)

* Projected design capabilities.

PAKAWASTE LIMITED

For further information and technical data, contact our sales staff at:

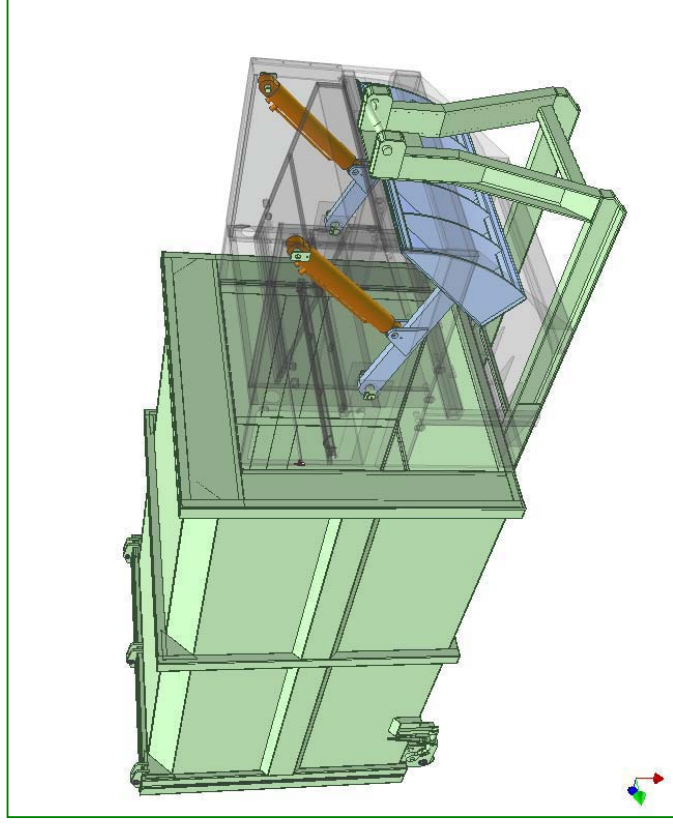
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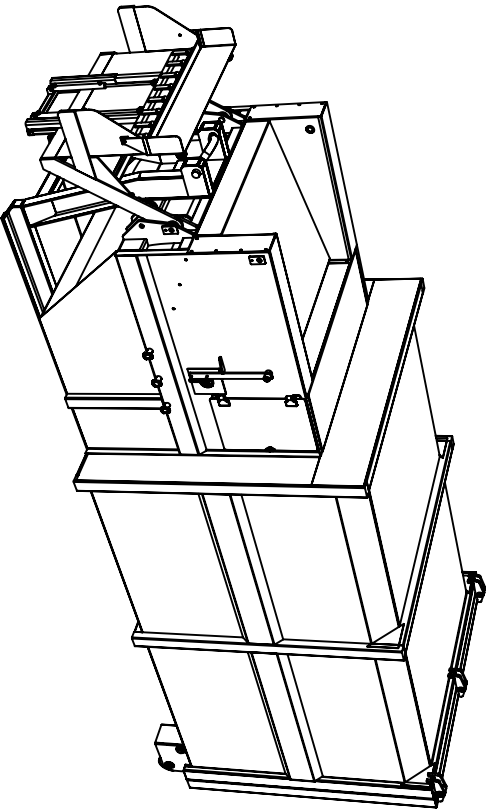
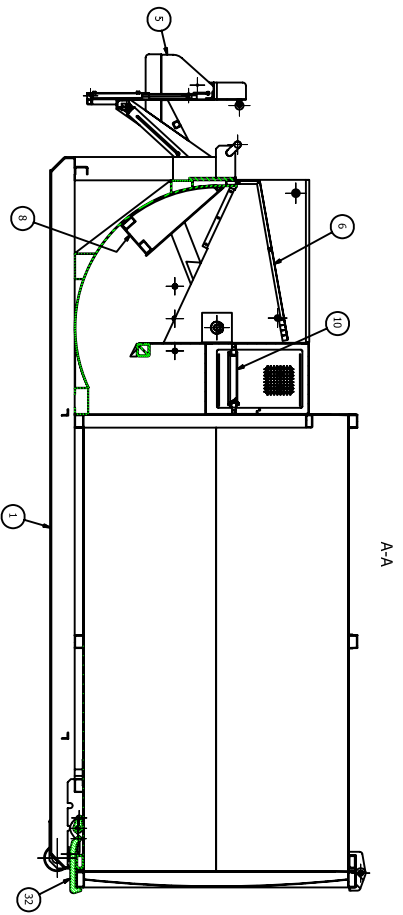
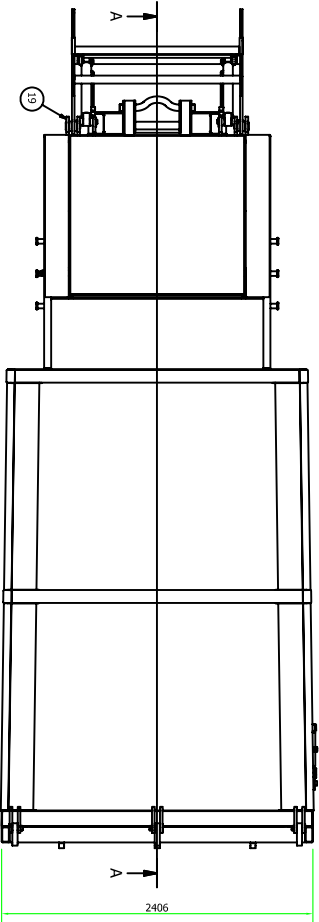
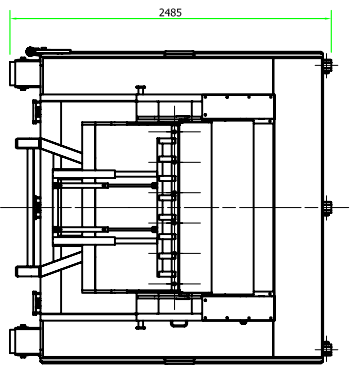
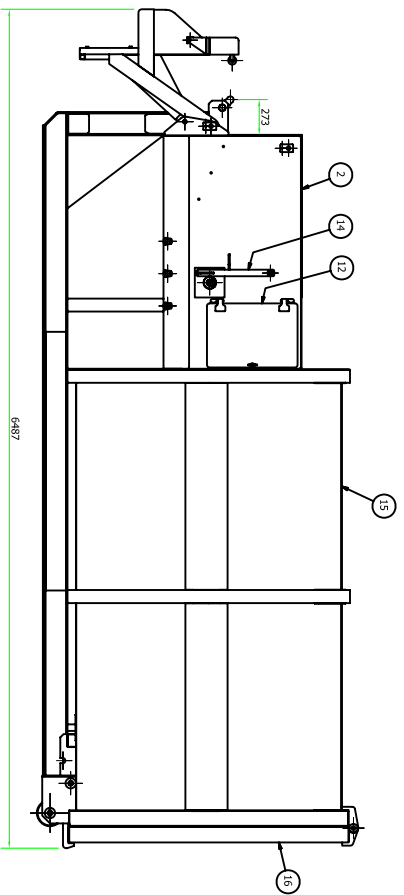
EMAIL sales@pakawaste.co.uk • technical@pakawaste.co.uk • WEB www.pakawaste.co.uk

Portakrush 800H



Loader





ITEM	QTY	DESCRIPTION	COMMENTS
1	1	UNDERFRAME (European Spec)	SEE DWG No. PT-0004_12
2	1	COMPACTOR BODY	SEE DWG No. PT-0004_03
3	1	END LOADER (COMB LIFT TYPE)	SEE DWG No. PT-0004_16
4	1	COMPACTOR LOADING DOOR	SEE DWG No. PT-0004_20
5	1	COMPACTOR SHIELD (PARKBOX)	SEE DWG No. PT-0004_13
6	1	POWER UNIT ACCESS DOORS	SEE DWG No. PT-0004_18
7	1	COMPACTOR LOADING DOOR HANDLE	SEE DWG No. PT-0004_21
8	1	CONTAINER G4 (European Spec)	SEE DWG No. PT-0004_07
9	1	CONTAINER DISCHARGE DOOR	SEE DWG No. PT-0004_17
10	1	END LOADER MOUNTING BRACKETS	SEE DWG No. PT-0004_06
11	3	CONTAINER LOCKING GEAR	SEE DWG No. PT-0004_19

Parts List

Pakawaste Ltd
 Unit 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
 Tel: 01777 78000 Fax: 01777 78200
 www.pakawaste.co.uk

Drawn By	Checked By	Date
R. Porter	R. Porter	08/04/2005
Rev	Rev	Rev
R800 (European Spec) GA		
PT-0004_14		

APPENDIX – D

FOOD WASTE AND GREEN WASTE RECYCLING PLAN

Introduction

The need to recycle organic waste has been increasingly recognized in order to provide a useable material rather than a waste product and also to minimize the amount of organic waste that goes to landfill.

Hong Kong International Theme Park limited (HKITP) places highest priority on implementation of waste reduction, reuse and recycle initiatives. Although currently there is no food and green waste recycling market in Hong Kong, HKITP realized the need to implement a recycling program for these waste due to the relatively large volume of generation by the Hong Kong Disneyland Resort (HKDL). Through combined effort with its waste management vendor, recycling of green and food wastes through composting was identified as a possible means of recycling of green and food wastes generated from the HKDL operation.

Collection of Green & Food Wastes on site

- Green Waste

Open skips will be provided at designated locations to collect green waste generated at the Hong Kong Disneyland Resort and Hotels. Green wastes for collection will include grass clippings, leaves, flowers, branches, pruning, weeds or other similar loose waste.

- Food Waste

Special containers with designated color and labels will be provided for the collection of food waste at the kitchens and other locations that will generate food waste. Food waste for collection will include, but not limited to, excess, spoiled or usable food or dairy products, meats, vegetable and meat trimmings, grains, bread and dough or similar waste.

Transportation of Green and Food Wastes

Green waste and food waste containers will be collected and transported on a daily or an as-needed basis within the specific collection hours with the tail-lift truck and delivered to the off-site recycling facility currently proposed to be at the North Lantau Refuse Transfer Station (NLRTS) or other appropriate locations for further recycling or composting.

Recycling Operations

Collection vehicles will bring the food waste containers to the NLRTS or other appropriate locations while green waste will be brought in with open-top containers. If necessary, tree trunks and branches will be broken down into smaller pieces with the built-in wood chipper.

The green waste and food waste will be put into the in-vessel composting unit to go through the biological process to turn the waste into compost. It is a continuous process that can generate compost in approximately 14 days. The composting unit is full enclosed and will not create any significant impact to the environment. The final compost product will be put into bags to facilitate

storage and transport. A more detailed description of the composting process and composting unit follows.

The proposed composting system can handle up to 3 tons per day of organic waste. The actual green waste and food waste generation patterns at the Hong Kong Disneyland Resort project will be reviewed to make necessary adjustments and recommendations in order to maintain an effective composting operation.

Market for Compost Materials

Compost materials will be the main product from the recycling process. HKITP have committed to reuse these materials within the Resort area if the quality of the compost material meets the landscaping requirements. HKITP will also explore other potential users for any excess compost materials generated by the recycling activities. Potential outlets could include road medians managed by Government, or landfill restoration projects.

Composting Process

An in- vessel technology has been selected by HKITP's waste management vendor for use in the composting of food and green waste at the NLRTS or other appropriate locations. It provides a controlled environment for the composting mass and an enclosed environment to contain emissions. The system utilises a modular horizontal composting chamber. Each chamber is individually controlled and monitored ensuring consistent and predictable product.

Material to be composted enters one end of the unit where a central shaft ensures that the mix is uniform and moisture is evenly distributed. The central tine-bearing shaft is turned intermittently, in both forward and reverse directions, and is under programmable logic controller (PLC) control. This facilitates process control, and permits agitation (aeration) and residence time of material in the units to be independently manipulated.

The central shaft, by way of the tines arranged around it, moves the material through the unit and folds air into the mix from the overhead airspace. Regular but periodic movement prevents compaction of wastes and maintains oxygen levels while minimizing operating costs. Supplementary low-volume air injection (less than half stoichiometric oxygen demand) also ensures that the material is maintained in an aerobic state and the compost process proceeds at an optimum rate, without the evolution of nuisance odor.

Each unit incorporates a relatively low volume headspace. This ensures that the amount of air that is passed through the process is minimized, reducing the size of the bio-filter and the cost of moving air. There are no fugitive emissions from the Composting System as the entire system is under negative pressure. Importantly, plant operators are not exposed to the composting atmosphere, reducing the risk of respiratory illness or disease and providing a more comfortable work environment.

Each composting unit is equipped with monitoring equipment that provides on-line diagnostic facilities and an auditable record demonstrating compliance with Australian State EPA guidelines and AS 4454 and equivalent. Each unit is fully insulated protecting the process from the influence of fluctuating ambient environmental conditions, including solar heat gain and moisture loss.

Equipment Description

The Composting equipment is an enclosed U-shaped vessel with a central axial. The equipment consists of a longitudinal tube, equipped with angled blades on a shaft to lift and aerate the compost to provide oxygen whilst advancing the mass through the composting stages towards the exit.

The tine bearing shaft and is periodically rotated to maintain porosity, achieve mixing and aerate the material. Shaft movement is computer controlled and, along with the feed-rate of waste, determines the retention time of material in the composter.

Shaft rotation and aeration are under smart control. The units contain temperature and other sensors, and feedback from these enables the on-board computer to optimize processing. All composting units are equipped with Internet connections to enable smooth software upgrades, remote monitoring and control, and facilitate troubleshooting.

It is heated and insulated to compliment the heat produced by the composting process. The moisture content is controlled. The composting equipment minimizes labour so that once the organic waste is shredded and mixed it is fed into the hopper and the process is then automated to minimize human intervention until the quality compost emerges at the other end.

Requirements for composting:

- Add ‘green’ waste (high nitrogen waste – food, grass, weeds etc.) to ‘brown’ waste (high carbon waste – wood chips, tree and shrub prunings etc.)
- Shred and mix them to give the correct C:N ratio.
- Add micro organisms or allow them to populate.
- Preserve and control the heat produced by composting process.
- Provide the correct water content and control it in its need to change during the process.
- Control aeration.

Materials that cannot be composted should be removed from the food and green wastes if they are present in significant amount, e.g. plastic (except compostable types), glass, metal and unshredded wastes, etc.

The Microbiology of Composting

The biological degradation process of composting can be broadly described in terms of four stages of micro-organism activity, characterized by different temperature ranges.

- 1st Stage (1-2 days) - The mesophilic stage elevates the temperature to start the composting process.
- 2nd Stage (4-5 days) - The thermophilic stage further elevates the temperature to ensure the destruction of pathogens, weed seeds and larvae.
- 3rd Stage (5-6 days) - As the nutrients are used up, the heat generating microbiological activity declines and the mesophilic activity resumes.
- 4th Stage (3-4 days) - The maturation stage is the completion of the controlled in-vessel composting process where the temperature returns to an ambient level and the composter produces a material that improves soil structure and assists plant growth.

The microbial decomposers require suitable environment for the biological degradation which includes water, temperature and atmosphere.

Process Control

i) Type of waste being processed

The proposed composting process can handle virtually any organic waste. The main parameter to regulate is moisture content; optimally this should be around 45-60%. However, particle size, the nutrient balance and pH of the material also influence compost quality. The proposed units can easily cope with contaminants such as plastic bags, cans and even glass; many of these materials can then be removed from the compost by screening or the waste by pre-sorting. These units have been installed to process sewage grit and screenings, biosolids, food waste, fruit, vegetables, fish and poultry wastes and even “dirty” organics grossly contaminated with plastic, glass and metal from a Materials Recovery Facility (MRF).

ii) Screening of compost

If the material entering the process is small enough then screening may not be required. However, if larger particles are composted or the material is contaminated with plastic, etc., then screening will be required.

iii) Waste shredding

This depends on the type and volume of waste to be processed but any waste should be less than 75mm (3”) long. Leaves, weeds, grass clippings and other small vegetation can be composted without prior processing. Kitchen and restaurant wastes and offal may also be composted without prior shredding or macerating

iv) Mixing

The composting equipment regularly mixes the composting waste during processing. Alternative technologies generally rely on premixing to achieve uniformity, which may lead to zones of poor porosity, air channelling and uneven treatment. Unmixed systems potentially exhibit different conditions at sides and edges compared to the vessel centre. The proposed composting equipment’s mixing prevents this.

v) Optimal particle size for the process

Small particles typically compost more rapidly than large particles. Faster composting leads to improved microbial activity and disinfection, reduced retention times and lower treatment cost. Unfortunately, small particles generally result in reduced porosity, requiring increased air pressure and energy costs. The proposed equipment’s shaft continually ‘lofts’ the composting material maintaining good porosity, ensuring that HotRot can not only treat fine material, such as sewage treatment plant screenings, that other systems cannot process but that better composting of other materials can be obtained by reducing feed particle size. Processing smaller particles through the system also minimizes the need for screening of the final product.

All particles including green waste (yard trimmings) should be less than 75mm (3”) in length. By spending effort on reducing the particle size at the start of the process, the compost process can proceed faster and the need to screen compost at the end of the process can be avoided. Because an in-vessel composting system has a fixed volume, the capacity of the proposed unit is also a function of the bulk density of the material being process; the greater the bulk density the greater the system capacity. Because air is introduced mechanically in an unit, small particles do not hinder aeration. In non-agitated systems, larger particles and therefore greater void volumes are required to ensure adequate aeration.

vi) Moisture content

The average moisture content of the material fed to the composting unit must be less than 60% and greater than 45% by mass. Short-term fluctuations outside this range are acceptable but unsustainable for more than about a day. Food, sewage sludge and offal are generally wet wastes and it is necessary to either dewater or add relatively dry materials as bulking agents. Paper and cardboard can be used to control moisture although not ideal when used with wastes that have little fibrous structure. Wood waste, wood shavings, bark and chipped green-waste (yard trimmings) are all excellent bulking agents.

vii) Process time

The residence time within the unit can be varied according to the waste being processed and the desired quality of the compost. Processing times are typically in the range of 14 to 20 days but longer or shorter times can be used.

viii) Composting curing

Curing will also take longer. Curing is essential to allow ammoniacal-nitrogen generated during the composting process, and present in the product, to be converted to nitrate-nitrogen. This biological process can only occur when the material cools to less than 30°C. If material is to be spread broad-acre on agricultural land then curing may not be required.

Safety Feature

The proposed composting units are fitted with appropriate systems to prevent worker injury. These include visible and audible warning of shaft rotation, various guards and safety interlocks and safety grills on inspection hatches. The self-contained design means that workers are not exposed to the composting atmosphere during normal operation.

The main drive on each unit is also torque-load controlled and will first reverse and then shutdown if excessive torque loads are recorded. Lids are common key locked and inspection hatches are fitted with safety grills. Feed systems utilize enclosed conveyors and hoppers. The outlet is shrouded to prevent access. Emergency stops are located at convenient points on the machine, ancillary equipment and control panel and all drives are fitted with field isolators.

Appendix E Local Market for Recyclable Materials ¹

The key to the success in any recycling program is the ability to secure reliable end-markets for the recyclable materials segregated from the waste stream. In this regard, it is important to have a good understanding of the local market for recycled materials in Hong Kong. While there is a developed market for recycled waste products, the focus, until recently, has been on the commercial and industrial sector, with the market for recyclable materials heavily geared towards export, primarily to Mainland China as well as other countries in the region. There is a well-established network of waste recyclers and traders, so the market is quite dynamic and but also subject to significant fluctuations due to market forces.

It is critical to have a good understanding of the composition of the waste stream and the available type and quality of recovered materials that will be generated from the Theme Park operations. On this basis, the most suitable outlets for such materials can be investigated and determined. It is useful to know the specific requirements of the market (i.e. product specifications) in order to maximize the value of the recycled products. The greatest factor in the success of commodity marketing efforts is the ability to consistently deliver processed materials to end-market standards in a timely and efficient manner. With proven capability, one can achieve a favoured market status.

Government Policy and Current Markets

About 1.76 million tonnes of MSW were recovered in Hong Kong in 2000. This represented about 34% of the total MSW arising in the city. The recovered wastes were either recycled locally (0.22 million tonnes) or exported to the Mainland and other countries for recycling (1.54 million tonnes). It should be noted that the majority of these materials are recycled by an informal sector operating under market conditions with little support from the government. Government, companies and non-governmental organizations have started to launch recycling programs in the last few years but the quantity recovered through the formal recovery system is small.

The decline of manufacturing industry in Hong Kong is the main factor which has led to the shrinking supply of industrial scrap and local markets and therefore a reduction in the quantity of materials recovered in the last few years. However, as Mainland China is the main market for many of the recyclable materials which have a high market price, the market for good source separated materials still exists and China is expected to be the main outlets for recyclables recovered in Hong Kong for the foreseeable future.

In Hong Kong, the major kinds of recyclable wastes recovered included paper, plastics, ferrous metal and non-ferrous metal, which accounted for about 98% of the waste recovered. The remaining 2% were glass, wood, rubber tyres and textile.

¹ Extracted from Draft HKITP Waste Management Plan dated May 2002 prepared by Onyx PWM Environmental Services Ltd

It is the Government's policy to promote waste avoidance, minimization, recovery for reuse and recycling. The Government launched the Waste Reduction Framework Plan in November 1998 for implementing various waste reduction measures.

The overall objectives of the Waste Reduction Framework Plan are to reduce the amount of waste produced that requires disposal; prolong the life of our landfills; and reduce the increasing costs of transportation, treatment and disposal of waste.

The Plan adopts an integrated approach for reducing waste by implementing three programs, namely:

- Prevention of Waste Program to reduce generation of waste at source and increase the amount of waste recovered for recycling;
- Institutional Program which includes setting up a Waste Reduction Committee Resource Recovery Units in EPD and sectoral task forces to spearhead and facilitate the implementation of waste reduction in the community; and
- Waste Bulk Reduction Program which includes technological tools such as waste-to-energy and composting to reduce the volume of waste requiring final disposal.

Paper and Cardboard

Waste paper, including cardboard, is one of the most commonly collected waste materials in Hong Kong. About 826,000 tonnes of waste paper were recovered in Hong Kong. This represented about 57% of the waste paper generated (dry weight). The recovered waste paper was either recycled/reprocessed locally (22% or 182,000 tonnes) or exported to other countries for recycling (78% or 644,000 tonnes). Mainland China is the major end market for exported waste cardboard with the Philippines, Indonesia and South Korea being other more minor outlets. Around 58,000 tonnes of waste paper were imported for recycling. Thus, the total quantity of paper waste reprocessed in Hong Kong was 240,000 tonnes.

According to the EPD's data, there are around 120 private waste paper collectors and 2 paper recyclers in operation. Both recyclers also import waste paper from overseas. The recycled paper produced by local recyclers is confined to corrugated paper and duplex papercard for packaging. A variety of waste paper including the high value waste paper (e.g. white paper and computer printout), old corrugated cardboard, newspapers and other mixed paper, are being exported to overseas countries for recycling.

The market for mixed paper waste in Hong Kong is much poorer due to high levels of contamination and low value of mixed paper. The economic value from waste paper recycling is also particularly volatile and there is keen market competition with waste paper imported from other countries.

Aluminum Cans and Scrap Metal

Metal waste collection has been practiced in Hong Kong for several decades. From small individual scavengers or waste collectors, it has been developed into today's large-scale collection and recycling profession. The recycling rate for commercial/ industrial scrap metal is high in Hong Kong. With the recent decline of manufacturing industry, however, recycling companies collecting commercial/industrial scrap metal have difficulty in securing good quality materials.

Waste metals are broadly classified into two types: ferrous and non-ferrous metal. The most common ferrous metals recovered in Hong Kong are pig or cast iron, tinplate, alloy steel scrap, and other scrap. Non-ferrous metals recovered include copper & alloys, zinc, nickel, tin, aluminum, magnesium, lead and precious metal.

In 2000, about 637,000 tonnes of ferrous metal were recovered. This represented about 88% of the ferrous metal waste generated in Hong Kong. The recovered metals were mostly exported for recycling, with Mainland China being the largest importer. The major kinds of ferrous metals recovered included structural steel, scrap vehicle and scrap home appliances.

About 83% of the total non-ferrous metal arising was recovered in 2000. Out of the 92,500 tonnes recovered, about 16,500 tonnes were reprocessed locally, while the remaining 76,000 tonnes were exported overseas for recycling. The non-ferrous metal wastes recovered were mainly exported to Mainland China, Japan and Korea, with Mainland China taking up 73.8% of the total non-ferrous metal waste exported from Hong Kong.

According to the data collected by EPD, there are about 120 ferrous and 150 non-ferrous waste metal dealers in Hong Kong. Some of them collect other waste materials as well (mainly paper).

Plastic Bottles, Bags and Packaging

The recycling of plastic waste is limited to clean scraps and rejects from manufacturing sources. There is very limited reprocessing of post-consumer plastic such as plastic bottles and plastic bags due to practical constraints and barriers described below.

In 2000, about 165,100 tonnes of plastic waste were recovered in Hong Kong. This represented about 30% of the total plastic waste arising (dry weight). The recovered plastic waste was either recycled locally (8.5% or 14,100 tonnes) or exported to the Mainland and other countries for recycling (91.5% or 151,000 tonnes).

Most local plastic recyclers consume only clean and homogeneous pre-consumer plastic waste which is collected from the industrial sector. The plastic waste recycling process starts with the sorting by resin types. The plastics are rinsed to remove contaminants. The sorted and washed waste is then crushed and mixed with colourant before melting and pelletising. The pellets produced will be sold to plastic product manufacturers as raw material.

In addition to the general constraints on waste recovery/recycling in Hong Kong such as high land and labour costs, low environmental awareness, lack of financial incentives to reduce waste, space limitation, decrease in demand and supply of recyclable wastes, there are other factors which further limit the extent of plastic waste recovery and recycling activities in Hong Kong. These include:

- The contaminated nature of plastic waste, in particular when co-mingled with domestic waste, increases the cost of cleaning and lowers the market value of the recovered plastic waste.
- The low density and bulky nature of plastic waste further increases the cost of collection and requires more space for storage when compared with other recyclable materials. For example, a typical 1-litre PET bottle weighs less than 30g. The sale of a full-truck-load of plastic waste is often too low to recover the transport (driver and petrol) cost required to deliver the load.
- The mixing of different resin types of plastic make reprocessing even more difficult.
- The volatile market price is a main barrier to the plastic recovery and recycling industry. The industry has indicated that the price of virgin plastic materials has dropped significantly in the past years and this has put severe pressure on the price of recovered plastic materials.
- Other constraints include high operation costs and regulatory control in the Mainland. Though plastic scrap is included in the supplementary list of waste categories that can be used as raw materials for import, the industry has been adversely affected as the control of importing these materials to the Mainland becomes more stringent.

One of the pre-requisites for successful plastic recovery and recycling is the use of plastic coding to facilitate the sorting process. It is a simple and effective means to ensure plastic containers and materials of various resins can be identified for proper treatment. A voluntary plastic coding system has been initiated in Hong Kong by the EPB based on a commonly used and internationally recognised coding system, i.e. one used by the Society of Plastics Industry, USA.

Glass Bottles

Glass bottles come in two types: "returnable bottles" that can be collected for repeated

use, and "one-way bottles" that are thrown away after being used once. Once collected, the returnable bottles will be washed, disinfected and then used again until the bottles are unsuitable for reuse. The majority of one-way bottles, on the other hand, are delivered to landfills for disposal.

Excluding glass beverage bottles that are recovered through the "deposit-and-refund" systems of local beverage manufacturers, about 600 tonnes of glass waste were recovered in 2000. This represented about 1% of the glass waste generated in Hong Kong. The glass bottles were mainly recovered/reused locally.

The glass bottles recovered in Hong Kong are mainly post-consumer beverage bottles collected from refuse collection points and service outlets such as hotels, bars and restaurants. These bottles are then processed by local bottle rinsers.

Some local beverage manufacturers collect and wash their empty bottles for re-filling. However, local beverage manufacturers are increasingly prone to using "one-way" glass bottles to match up to imported bottlers.

According to the data collected by the EPD, there are 2 waste glass collectors/re-processors in Hong Kong. An average of about 18,000 glass bottles were collected everyday from refuse collection points, service outlets and scavengers. The bottles will then be cleaned, dried and sold to soy sauce manufacturers and fruit juice producers for bottling purposes.

In order to increase glass recycling rate and identify more outlets for waste glass in Hong Kong, the Hong Kong University of Science and Technology has conducted a study on the use of waste glass as a raw material for cement production with funding from the Environment and Conservation Fund. The results of the study proved that making cement with glass waste was technically feasible. In 2001, EPD invited Expression of Interest on recycling of waste glass bottles from organizations with relevant experience.

Wood/Pallets

The market for waste wood is mainly within Hong Kong. Waste wood is typically re-fabricated into wooden cases or containers which are made to order. The re-fabricated containers are used as packaging for the export of goods. The waste wood recycling industry is found to be declining due to the decline of the manufacturing industry in Hong Kong. As an example, the Hong Kong International Airport has not been able to identify local markets for wood pallets generated by the cargo operations at the airport despite significant efforts. While potential end-users have been identified in Mainland China, securing import permits has proven to be quite difficult.

Textiles

Textile recovery and recycling exists in two forms in Hong Kong. The first form which is more common, is to collect and then export the rags for re-spinning. The second form is to collect and sort the rags into different grades before selling them to local metal workshops for use in cleaning. The decline of metal industries in Hong Kong is partly responsible for the significant reduction in the recycling of textile waste locally. A limited quantity of good quality clothing are collected and sold to buyers (mainly for overseas market).

Food Waste

Currently, there is no market for food wastes in Hong Kong. The public composting facility in Sha Ling currently handles livestock wastes and its design capacity is 20,000 tonnes per year.

EPD has proposed to develop a site at Ngau Tam Mei into a small-scale organic waste composting plant. Expressions of Interest for this development were invited in November 2000. According to EPC, the response was encouraging and the submissions received are being assessed. Subject to the outcome of assessment, immediate follow-up work and tendering for developing the composting plant at Ngau Tam Mei will commence.

Chemical Waste

The Chemical Waste Treatment Center provides an integrated system for the treatment of a wide range of chemical wastes generated in Hong Kong. It operates various treatment systems that incorporate the recovery of water, heat, energy and materials at every available point.

Grease Trap Waste

At present, the Interim Grease Trap Waste Treatment Facility ("Treatment Facility") at the West New Territories Landfill in Tuen Mun is the only environmentally acceptable disposal outlet for grease trap waste collected in bulk by registered collectors. The grease trap waste is treated, solidified and disposed of at the landfill. There is no recycling of grease trap waste at the Treatment Facility.