

19. WASTE MANAGEMENT

19.1 Potential Sources of Impacts

19.1.1 Construction Phase

19.1.1.1 General

Construction activities to be carried out for the EAR will result in the generation of a variety of wastes which include:

- Site clearance waste;
- General construction waste;
- Demolition waste;
- Chemical waste; and
- General refuse.

19.1.1.1.1 Site Clearance Waste

The volume of waste arising from the site clearance works is very much dependant upon the extent of the land resumption boundaries. The main wastes to arise from the site clearance works will be vegetation (semi-natural woodland, shrubs, grasses), refuse, and several temporary structures and industrial buildings. However, the volume of site clearance material that will be generated is not anticipated to be extensive.

19.1.1.1.2 Excess Excavated Material

The EAR will in most parts be at-grade, although, two bridges will have to be constructed over the proposed Kam Tin drainage channels. However, the total volume of excavated material is expected to be relatively limited, with only minor site formation works being required. In addition to the general formation profiling works, excavation will also be required for the construction of piles and pile cap foundations for the bridges, noise barriers and any necessary reprovisioning of services. Wherever possible, excavated spoil will be reused as fill on the embankment section of the route or as general fill on-site. Detailed cut and fill rates for the new road alignment are not presently known but will be balanced as is practicable to avoid unnecessary disposal.

19.1.1.1.3 General Construction Waste

General construction waste generated from the EAR construction works will consist of wood waste from formwork and falsework, material and equipment wrappings and surplus or rejected construction material (mainly concrete). The volume of waste is expected to be minimal due to

the scale of the road construction works, however, good site practices should be maintained and reuse of materials should be used whenever possible.

If general construction wastes are not removed from site regularly, they may hinder construction and present a safety hazard, in addition to causing potential water quality impacts from runoff. The storage and disposal of construction wastes also have the potential to create visual and dust nuisances.

19.1.1.1.4 Demolition Waste

A number of structures will have to be removed or demolished for the construction of the EAR. The exact number of buildings and GFA is not known at present, but it is expected that the disposal of this demolition waste will not have a significant impact on the demand for the public filling capacity.

The demolition contractor should adopt the selective demolition method so that reusable materials, like wood and metal, can be segregated and recycled, degradable waste can be disposed of at landfills, and inert demolition material can be reused on site or delivered to public filling areas. The disposal of demolition waste at public filling areas is unlikely to raise any long term environmental concerns because of their inert nature. The environmental impacts arising from the storage, handling and disposal of demolition waste will therefore be negligible.

19.1.1.1.5 Chemical Waste

Chemical waste substances likely to be generated by the construction activities of the EAR will, for the most part, arise from the maintenance of equipment. These may include, but not limited to, the following:

- Scrap batteries or spent acid/alkali from their maintenance;
- Used engine oils, hydraulic fluids and waste fuel;
- Spent mineral oils and cleaning fluids from mechanical machinery; and
- Spent solvents/solutions, some of which may be halogenated, from equipment cleaning activities.

Chemical waste may pose serious environmental, health and safety hazards if it is not properly managed. These hazards include:

- Toxic effects to workers;
- Adverse effects on water quality from spills;
- Fire hazards; and
- Disruption of sewage treatment works if chemical waste enters the sewerage system.

19.1.1.1.6 General Refuse

General refuse will be generated from the works sites of the EAR. The storage of general refuse has the potential to give rise to adverse environmental impacts. These include odour, if waste is not collected frequently, windblown litter, water quality impacts, if waste enters water bodies, and visual impact. The site may also attract pests and vermin if the waste storage area is not well maintained and cleaned regularly. In addition, disposal of wastes at sites other than approved waste transfer or disposal facilities, can also lead to similar adverse impacts at those sites.

19.1.2 Operational Phase

Waste other than from pedestrians and occasional littering by passing vehicles is unlikely to arise directly from the operation of the EAR. Other than standard street-cleaning, litter bins should be provided for pedestrian use.

19.2 Evaluation of Impacts

19.2.1 Construction Phase

19.2.1.1 Site Clearance Waste

As only limited site clearance works will be required for the construction of the EAR, it is anticipated that there will be minimal environmental impacts due to the limited volume of site clearance waste which will have to be stored, handled, transported and disposal of.

19.2.1.2 Excess Excavated Material

Excavated material generated from the EAR works is expected to be relatively limited.

With respect to the small quantity of excavated material arising from the construction works, it is anticipated that the majority of this will be used as fill during the construction of the embankment section or as general fill on-site. However, should any excavated material require off-site disposal, it is not anticipated to have a significant impact on the demand for public filling capacity or have any long term environmental impacts.

19.2.1.3 General Construction Waste

Construction and demolition wastes currently form approximately 35% of the annual take-up of the limited landfill void available in Hong Kong, although this proportion has varied widely over recent years. Therefore, it is important to minimise, wherever possible, the amount of wastes which are disposed of by landfill, using the recommended mitigation measures in *Table 19.6a*.

Although expected to be limited in quantity, the storage, handling, transport and disposal of general construction wastes have the potential to create visual, water, dust and associated traffic impacts.

General construction waste should therefore be removed from site as soon as practicable in order to avoid adverse environmental impacts due to on-site storage of the material.

To conserve the capacities at landfill sites, general construction waste with more than 20% (by volume) inert material should not be disposed of at landfills. It is therefore good practice to segregate wastes at construction sites before disposing of inert materials (concrete, soil, cement/bentonite, etc) at public filling areas and the degradable wastes (wood, paper, plastic, etc) at landfills. The production of general construction wastes should be minimised by the careful control of ordering procedures which can result in surplus materials. The avoidance of over-ordering and the segregation of materials will minimise waste arising requiring landfill disposal.

19.2.1.4 Demolition Waste

As only a small quantity of demolition waste will be generated as a result of the construction of the EAR, it is anticipated that the environmental impacts will be negligible.

19.2.1.5 Chemical Waste

It is difficult to quantify the volume of chemical waste which may arise from the construction activities as it will be highly dependent on the Contractor's on-site maintenance activities, the length of construction works, and the numbers of plant and vehicles utilised. However, it is anticipated that the quantity of chemical waste, such as lubricating oils and solvent, produced from plant maintenance will be small.

Storage, handling, transport and disposal should be undertaken in accordance with the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. Provided that this occurs, and chemical wastes are disposed of at a licensed facility, the contractor should be in compliance with all relevant regulations and there will be little environmental impact.

19.2.1.6 General Refuse

The number of construction personnel who will work on site has not yet been determined. However, provided that the recommended mitigation measures are adopted, the environmental impacts caused by the storage, handling, transport and disposal of general refuse is expected to be minimal.

19.2.2 Operational Phase

No impacts are expected during the operational phase.

19.3 Recommended Mitigation

19.3.1 Construction Phase

The following mitigation measures are recommended in order to minimise the waste related impact of the EAR.

General refuse will be generated largely by food service activities on site, so reusable rather than disposable dishware should be used if feasible. Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated or easily accessible, so separate labelled bins for their deposit should be provided wherever feasible.

Office wastes can be reduced through recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered if one is available.

19.4 Residual Impacts

With the implementation of the recommended mitigation measures, potential residual waste management related impacts will be avoided or reduced to acceptable levels such that they have no adverse health, or environmental resource related impacts.

19.5 Operational Phase

As no impacts are expected during the operational phase, no mitigation measures have been specified.

19.6 Conclusion

The potential impacts of waste arising from the construction and operational phases of the EAR have been assessed. Key issues include the need for effective waste management planning during the construction phase, effective management of chemical/industrial and other potentially hazardous wastes, and the strong preference for reuse of clean surplus material rather than disposing of it at public filling areas. Waste management methods and practices and other mitigation measures have been recommended to ensure that potential impacts are avoided or controlled to acceptable levels.

As the potential volume of waste generated from the construction of the EAR is expected to be minimal, the implementation of an environmental monitoring and audit (EM&A) programme is not considered necessary.

A summary of the recommended mitigation measures is outlined in *Table 19.6a* below.

Table 19.6a - Summary of Recommended Mitigation Measures During Construction and Operation of the Project

Phase	Recommended Mitigation Measures
Construction Phase	<ul style="list-style-type: none"> • The Contractor should develop a site specific Waste Management Plan to define the Permitted waste hauliers should be used to collect and transport wastes to the appropriate disposal points. The use of permitted waste carriers, and the implementation of a ticketing system, should also ensure the avoidance of fly-tipping. • Permitted waste hauliers should be used to collect and transport wastes to the appropriate disposal points. The use of permitted waste carriers, and the implementation of a ticketing system, should also ensure the avoidance of fly-tipping. • If practicable, the EAR contractors should liaise with other contractors of West Rail who require fill material, in order to minimise the amount of inert excavated material to be delivered to public filling areas. • General construction waste should be removed from site as soon as practicable in order to avoid adverse environmental impacts due to on-site storage of the material. • Storage, handling, transport and disposal of chemical wastes should be undertaken in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. • General refuse generated on-site should be stored in enclosed bins or compaction units separate from construction and chemical wastes. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimise odour, pest and litter impacts. • To minimise the volume of materials requiring landfill disposal, wastes should be segregated at the construction sites before either re-using or recycling materials, or, utilising inert materials at public filling areas and disposing of the degradable wastes at landfills. The production of general construction wastes should be minimised by the careful control of ordering procedures which can result in surplus materials.
Operation Phase	None required.