

Chapter 10

Waste management

10 Waste management

10.1 Introduction

As described in **Chapter 3 Proposal description**, the proposal involves the construction and operation of an EfW facility which will divert residual Municipal Solid Waste (MSW) and residual Commercial and Industrial (C&I) waste from landfill to recover energy.

The proposal will generate waste from construction activities and operational site use arising from maintenance, staff amenity spaces and the visitor and education centre. This chapter summarises the type and classification of waste generated and waste management approaches during construction and operation of the proposal. This chapter also outlines Cleanaway's commitments to support resource recovery by planning for separation of recoverable materials for high-value recycling on site. During the operational phase, source separation systems will be arranged for all relevant waste streams generated by onsite activities, including paper and card, comingled recyclables and food waste. This will enable residual waste from the site offices and visitor and education centre to be directed to energy recovery.

At this stage, detailed design has not been carried out. High-level estimates of waste generation rates have been developed for main waste streams during construction and operation, which supports the identification of potential impacts and mitigation measures. More refined waste estimation and management provisions will be detailed in the Construction Environmental Management Plan (CEMP) and Remediation Action Plan (RAP) as the proposal progresses. Detailed waste management provisions for site operation will be documented in the Waste Management Plan (WMP).

This chapter does not address waste inputs (feedstock) and outputs (ash residues from energy recovery) because they are core business for the facility. Details relating to these materials, including transport, handling and processing, are considered in **Chapter 3 Proposal description** and **Chapter 5 EfW policy**.

10.2 Existing environment

The site is currently inactive, with various disused buildings associated with a previous poultry facility. As such, the proposal site does not currently generate waste.

10.3 Assessment

Construction waste has been determined based on typical construction activities of this scale and site inspections, to detect potential land contamination and hazardous materials. Operational waste has been outlined based on typical waste generation in commercial and industrial activities similar to the site office and visitor and education centre.

10.3.1 Construction waste generation and management

Waste will be generated at the site during the construction and demolition (C&D) phase of the proposal. C&D waste will be managed in line with standard industry practice, to prevent environmental damage and, where possible, recover materials for reuse and recycling.

C&D waste management for the proposal is routine and adequately managed through standard industry practice. It will be documented in the CEMP and RAP before starting onsite works. The Waste Management Plan within the CEMP will outline:

- Types and volumes of waste likely to be generated
- The procedure for assessing, classifying and storing waste in line with the NSW EPA Waste Classification Guidelines¹
- Storage and treatment of waste on the site, including stockpiles
- Methods of transport and disposal of wastes, including waste that possesses hazardous characteristics, so that any waste leaving the site is transported and disposed of lawfully and does not pose a risk to human health or the environment
- Opportunities for reducing waste, reusing materials and increasing recycling
- Requirements for compliance with the Waste Avoidance and Resource Recovery Act 2001
- The Resource Recovery Orders and Exemptions requirements applicable to the waste on site.

The largest waste streams likely to be generated during the construction phase will be demolition materials from the existing buildings on the site and removal of potentially contaminated soil across the site before the main works starting.

¹ NSW Environment Protection Agency, 2014. Available from:
<https://www.epa.nsw.gov.au/~media/EPA/Corporate%20Site/resources/wasteregulation/140796-classify-waste.ashx>

The existing site includes buildings associated with a disused poultry facility, which will be removed from the site before starting construction. A site audit was performed to detect hazardous materials and a draft Remediation Action Plan (RAP) has been prepared, suggesting appropriate management and remediation approaches. The main sources of hazardous material are:

- Existing buildings contaminated with asbestos containing material (ACM), lead paint and potential legacy chemical spills
- Non-friable ACM identified in site fill at some locations.

Approaches to safely remove this material and remediate the site are outlined in **Technical report G1 Remediation Action Plan**. This includes inspection and removal of ACM from buildings by appropriately licensed contractors before demolition and inspection and testing of building footprints for soils contamination before excavation works. A CEMP will be developed before construction for the appropriate management of waste on the site, having regard for the RAP for hazardous waste. All waste for disposal will be classified, transported from site and disposed of in line with the Waste Classification Guidelines.²

Preliminary earthworks design indicates a small net import of fill to the site, as outlined in **Table 10.1**. The construction works will aim to minimise disposal of waste soil by:

- Reusing clean excavated material onsite
- Minimising excavation of contaminated material and considering onsite capping and immobilisation where appropriate.

Table 10.1: Preliminary earthworks estimates

Earthworks material	Approximate volume
Reuse of in-situ materials (includes clean excavated material and ACM-contaminated material which is remediated according to the RAP)	50,000m ³
Imported fill material	11,000m ³
Unsuitable material removed from site	4,000m ³

At least seven species of high-threat weeds were identified during site biodiversity surveys. A weed management plan will be developed, specifying appropriate control and disposal measures to minimise impacts associated with the spread of weeds and plant pathogens. The CEMP will reflect these measures.

² NSW Environment Protection Agency, 2014. Available from: <https://www.epa.nsw.gov.au/~media/EPA/Corporate%20Site/resources/wasteregulation/140796-classify-waste.ashx>

10.3.2 Operational waste generation and management

The site will generate small amounts of operational waste from the site office, visitor and education centre, delivery of consumables and maintenance works. These waste streams will comprise typical commercial and industrial waste. Cleanaway is committed to demonstrating best practice in waste management and resource recovery by ensuring that source separation systems are in place for all relevant operational waste streams. This includes paper and card, comingled recyclables and food organics. Operational waste streams are documented in **Table 10.3** and are expected to include:

- General solid waste from site office spaces and the visitor and education centre
- Source-separated food organics from office lunchrooms and visitor and education centre canteen
- Comingled recycling from site office spaces and the visitor and education centre
- E-waste from end-of-life office equipment
- Pallets associated with deliveries and returned for reuse if possible
- Packaging associated with deliveries, potentially contaminated with chemical residues
- Minor waste streams of paints, solvents and other chemicals using in maintenance works, and related packaging
- Liquid effluent from site amenities, connected to the Sydney Water sewerage main via an onsite rising main and pump station.

An operational Waste Management Plan (WMP) will be developed during detailed design and will include:

- Types and volumes of waste expected to be generated
- Bin provision and sizing to support source separation of recyclable materials and hygienic storage of waste
- Bin storage locations and collection scheduling to preserve amenity
- Requirements for compliance with the Waste Avoidance and Resource Recovery Act 2001.

Preliminary waste generation has been estimated by applying the typical waste generation rates for offices, published in the City of Sydney Guidelines for Waste Management in New Developments 2018. The facility layout includes about 2,500m² of floorspace in the visitor and education centre and site offices which will generate operational waste similar to a commercial office.

The expected waste generation for major waste streams is:

- General residual waste: 2,600L/week
- Comingled recyclables: 4,400L/week
- Source-separated food waste: 900L/week.

Waste and recyclable materials will be removed from the site by appropriately licensed contractors and reused, recycled or disposed of at appropriately licensed facilities, in line with the NSW Waste Classification Guidelines. Minor waste streams, such as e-waste or waste arising from maintenance works, will be established in the WMP and serviced on an as-needed basis.

Cleanaway offers collection services for commercial and industrial waste as part of its core business and is likely to service the site during operation. Various other private service providers are also available.

Given that source separation systems will be in place to support high-value recovery of all relevant waste stream, the residual waste generated by the facility is 100% eligible for energy recovery under the NSW EfW policy. However, it will be transported over the property boundary and enter the facility via the weighbridge, before being deposited in the tipping hall. Residual waste from onsite operations will be subject to the same waste acceptance criteria as waste from external sources.

10.3.3 Summary of waste generation and management

Table 10.2 outlines the expected waste materials, expected classification and management pathways.

Table 10.2: Waste generation and management summary

Waste stream	Source	Phase	Estimated quantity	Expected waste classification under NSW Waste Classification Guidelines	Expected management pathway
Excavated soil Topsoil, subsoil, rock, gravel and silt	Excavation of the waste bunker and other site works	Construction	50,000m ³ reused onsite	General solid waste (non-putrescible) – pre-classified	Temporarily stockpiled for collection and offsite reuse, in line with the CEMP. The soil will be either virgin excavated natural material (VENM) or excavated natural material, covered by a current Resource Recovery Order and Exemption and suitable for reuse onsite or recovery on other construction projects.
Contaminated excavated soil Asbestos impacted soils, topsoil or fill material contaminated with ACM, hydrocarbons or other chemicals (for example, lead)	Excavation of contaminated fill or soils with surface contamination from previous land use.	Construction	4,000m ³ disposed offsite	Soil contaminated with ACM would initially be classified as special waste and need remediation in line with the RAP. Soil contaminated with hydrocarbons, lead paint or other chemicals could be classified as restricted or hazardous waste, depending on contaminant concentration and leachability, potentially requiring offsite remediation and/or disposal. Testing of building footprints will be carried out in line with the RAP.	The final RAP will define the preferred approach to fill contaminated with ACM. Proposed pathways in the draft RAP include: <ul style="list-style-type: none"> • Systematic excavation, inspection, manual removal of ACM and reuse of remediated fill • Capping and isolation within onsite landform • Offsite disposal (most expensive option, appropriate if material not needed on site).

Waste stream	Source	Phase	Estimated quantity	Expected waste classification under NSW Waste Classification Guidelines	Expected management pathway
Demolition waste Timber (painted/treated), metals, concrete, electrical and plumbing components	Existing buildings to be removed from site	Construction	19,000 tonnes ³	General solid waste (non-putrescible) – pre-classified Some materials may be identified and classified as special waste (ACM) or restricted solid waste.	As per the draft RAP: <ul style="list-style-type: none"> • Inspection, removal of hazardous material by licensed contractors and demolition of remaining structures and disposal at appropriately licence facilities • Inspection and testing of building footprints to determine whether soil contamination has occurred • Segregation of materials, to support resource recovery where appropriate.
Green waste Trees, shrubs and weeds	Vegetation removed from cleared land	Construction and operation	Included within demolition waste estimate.	General solid waste (non-putrescible) – pre-classified	Temporary stockpiling onsite and removal for composting or disposal at licensed facilities. A site weed management plan will be developed, specifying measures to manage high-threat weeds identified on the site.
General construction waste Concrete, metal, timber, plastic wrapping and strapping, packaging, electrical and plumbing components	Offcuts, excess material, packaging	Construction	2,600m ³	General solid waste (non-putrescible) – pre-classified	Stored in onsite skip bins and transported offsite for disposal or recycling.

³ Assuming existing structures are steel framed and a demolition generation rate of 0.47t/m³ (WRAP Net Waste Tool – Demolition bill of quantities estimator. Available at: <http://nwtool.wrap.org.uk/ToolHome.aspx>)

Waste stream	Source	Phase	Estimated quantity	Expected waste classification under NSW Waste Classification Guidelines	Expected management pathway
Septic waste	Toilets for site workers	Construction	7,000L/week at peak construction	Liquid waste	Portable toilets provided and serviced by an appropriately licensed contractor. All liquid waste managed offsite at an appropriately licensed facility.
Scrap metal	Offcuts, damaged items	Construction	Included within total general construction waste estimate.	General solid waste (non-putrescible) – pre-classified	Stored in dedicated recycling bins for offsite transport to metal recycling facilities.
Wooden pallets	Materials delivery	Construction and operation	Not quantified, as generation will be linked to ad hoc site deliveries rather than regular generation.	General solid waste (non-putrescible) – pre-classified	Stored for reuse or returned to the supplier for reuse where possible.
General residual waste	Site offices and visitor and education centre	Operation	2,600L/week	General solid waste (non-putrescible) – pre-classified	Suitable for energy recovery without pre-sorting as source separations systems will be in place for all recyclable material streams. Stored in dedicated residual waste bins and transported across the weighbridge for reporting and inspection before energy recovery. Regular scheduled collection.
Food waste	Site office, workers lunch area, visitor and education centre	Operation	900L/week	General solid waste (putrescible) – pre-classified	Construction: Stored in residual waste bins and transported offsite for disposal. Operations: Stored in dedicated organics bins and transported offsite for composting. Regular scheduled collection.

Waste stream	Source	Phase	Estimated quantity	Expected waste classification under NSW Waste Classification Guidelines	Expected management pathway
Recyclable containers, paper and packaging	Site office, workers lunch area, visitor and education centre	Operation	4,400L/week	General solid waste (non-putrescible) – pre-classified	Stored in comingled recycling bins and transported offsite for recycling. Regular scheduled collection.
E-waste	Site office	Operation	Not quantified, as generation will be linked to occasional office upgrades rather than regular generation.	No classification within the NSW Waste Classification Guidelines as this waste should not be disposed to landfill.	Stored separated and collected for recycling. Collection arranged as necessary.
Paints, solvents, waste oils, chemicals and related packaging, defective mechanical and electrical components	Building fit-out and ongoing maintenance during operations	Construction and operation	Not quantified, as generation will be linked to ad hoc site activities and maintenance rather than regular procedures. Provisions in the WMP will prevent environmental risk.	Liquid waste Empty containers which held these products: general solid waste (non-putrescible) – pre-classified. General solid waste (non-putrescible) – pre-classified	Stored separately onsite in line with the WMP and transported off site for disposal or recycling. Collection arranged as necessary.
Green waste	Maintenance of the green roof and green walls	Operation	Not quantified, as generation will be linked to the flora species chosen during detailed design.	General solid waste (non-putrescible) – pre-classified	Removal by maintenance personnel for composting or disposal at licensed facilities.

10.4 Mitigation

Table 10.3 describes the measures that would be applied to avoid, minimise or mitigate the potential impacts associated with the waste generated as a result of the proposal. More detailed provisions for waste management and resource recovery will be covered in the CEMP and WMP.

Table 10.3: Summary of potential impacts and proposed mitigations for construction and operational waste

ID	Potential impact	Proposed mitigation
Construction mitigation measures		
W1	Health risks arising from handling or contact with ACM.	ACM contaminated soil will be identified and remediated in line with the RAP.
W2	Health risks arising from handling or contact with contaminated soil and hazardous waste materials.	Existing buildings and potentially contaminated soil within building footprints will be assessed and remediated as per the RAP.
W3	Waste of recyclable resources through unnecessary disposal to landfill.	Waste will be managed in line with the waste hierarchy. The CEMP will include provisions for segregation and separate collection of recoverable materials, including green waste, excavated natural materials and metals.
W4	Pollution of land or waterways including groundwater through accidental escape of waste or runoff.	The CEMP will include measures for containment of waste during storage and transport, such as covering, fencing and bunding.
W5	Spread of weeds, pests or pathogens within recovered waste materials.	A weed management plan will be developed, outlining appropriate control and disposal options of high threat weeds identified on site.
W6	Pollution of land or waterways through disposal of waste to an inappropriate site.	The CEMP will include a requirement that all waste be delivered to an appropriately licensed facility for recovery or disposal.
Operation mitigation measures		
W7	Waste of recyclable resources through unnecessary disposal to landfill or energy recovery	Waste will be managed in line with the waste hierarchy. A WMP will be developed and will include provision for source separation systems for recyclable materials, including food waste, paper and card and comingled recyclables. No operational waste will be disposed directly to the tipping hall for energy recovery.
W8	Loss of amenity for workers, visitors or neighbours due to odour and vermin	A WMP will be developed during detailed design for the adequate provision for storage and collection of waste.
	Escape of litter causing <ul style="list-style-type: none"> • Pollution of land and waterways • Harm to wildlife • Loss of amenity to neighbouring properties. 	
W9	Pollution of land or waterways through disposal of waste to an inappropriate site.	The WMP will include a requirement that all waste be delivered to an appropriately licensed facility for recovery or disposal.