21 Waste and resources

This chapter assesses the predicted waste generation during construction and operation of the Project, and provides a description of how waste would be managed.

21.1 Introduction

Waste and resources is listed under 'Other issues' in the SEARS, and includes reference to the commitments in the Scoping Report (TfNSW, 2019d) for the Project. **Table 21-1** sets out the SEARs relevant to waste and resources and identifies where the requirements have been addressed in this Chapter.

Table 21-1 SEARs

SEARs	Where addressed in this EIS
Other issues	
(Address) *the following issues in accordance with the commitments made in Chapter 9 of the Scoping Report:* *(f) waste and resources.* The Scoping Report (TfNSW, 2019d) makes the following commitments: A desktop waste and resource assessment will be undertaken as part of the EIS and will include:	
• a review of the likely waste streams and approximate volumes during construction and operation of the Project	**Section 21.4.1**
• a review of the likely resources required during construction and operation of the Project	**Section 21.4.1**
• development of management strategies to adequately address waste and resource use during construction and operation.	**Section 21.5**
The following legislation and guidelines will be considered as relevant during the preparation of the waste and resource assessment: • *Waste Avoidance and Recovery Act 2001*, specifically focusing on the management of construction waste through the waste management hierarchy established under this Act • *Waste Classification Guidelines* (NSW EPA, 2014a).	**Section 21.2**

21.2 Method of assessment

21.2.1 Legislative and policy context

The main legislation relevant to the management of waste are the *Protection of the Environment Operations Act 1997* (POEO Act), the *Protection of the Environment Operations (Waste) Regulation 2014* (the Waste Regulation), and the *Waste Avoidance and Resource Recovery Act 2007* (the WARR Act). The POEO Act establishes the procedures for environmental control, and for issuing environmental protection licences covering issues such as waste. Schedule 5 of the POEO Act defines waste as:

a. any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment

b. any discarded, rejected, unwanted, surplus or abandoned substance

c. *any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, processing, recovery or purification by a separate operation from that which produced the substance*

d. *any processed, recycled, reused or recovered substance produced wholly or partly from waste that is applied to land, or used as fuel, but only in the circumstances prescribed by the regulations*

e. *any substance prescribed by the regulations to be waste.*

The Waste Regulation regulates matters such as the obligations of consignors (producers and agents), transporters, and receivers of waste, in relation to waste transport licensing and tracking requirements.

The movement of controlled waste is also regulated by the *National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998*, made under the *National Environment Protection Council Act 1994* (Commonwealth).

In NSW, waste is classified in accordance with the *Waste Classification Guidelines 2014* (NSW EPA, 2014a) (the 'Waste Classification Guidelines'). Waste classification helps those involved in the generation, treatment and disposal of waste, ensure the environmental and human health risks associated with their waste is appropriately managed in accordance with the POEO Act and its associated regulations. Part 1 of the Waste Classification Guidelines provides advice and directions on classifying waste so that appropriate management of all waste types is achieved. Many waste types are pre-classified under the POEO Act and do not require testing. However, if a waste is not pre-classified, it may need to be tested to determine its classification. Waste material generated from the Project would be classified in accordance with these guidelines. The following waste classifications are relevant to the Project:

- special waste
- liquid waste
- pre-classified waste, including:
  - general solid waste (putrescible)
  - general solid waste (non-putrescible)
  - restricted solid waste
  - hazardous waste.

The WARR Act aims to ensure that waste management options are considered against the following waste management hierarchy:

1. avoidance of unnecessary resource consumption
2. resource recovery (including reuse, reprocessing, recycling and energy recovery)
3. disposal.

To support the waste management hierarchy, the *NSW Waste Avoidance and Resource Recovery Strategy 2014 -21* (NSW EPA, 2014b) provides a framework and targets for waste management and recycling in NSW. Targets established under this strategy include:

- avoiding and reducing the amount of waste generated per person in NSW
- increasing recycling rates to 70 per cent for municipal solid waste, 70 per cent for commercial and industrial waste, and 80 per cent for construction and demolition waste
- increasing waste diverted from landfill to 75 per cent
- managing problem wastes better, and establishing 86 drop-off facilities and services across NSW.

TfNSW, as a NSW Government agency, has a general responsibility to support these targets by implementing complementary policies and programs, including sustainable procurement incorporating resource recovery and waste reduction objectives into its operations complying with relevant regulations.

To support the waste management hierarchy, the NSW EPA have also made several Resource Recovery Orders and Resource Recovery Exemptions under the Protection of the Environment Operations (Waste) Regulation 2014. Resource Recovery Orders and Exemptions contain specific conditions and allow some wastes to be beneficially and safely re-used independent of the usual NSW laws that control applying waste to land, using waste as a fuel, or using waste in connection with a process of thermal treatment.

21.2.2 Approach and methodology

A qualitative desktop assessment was carried out to estimate waste types and quantities and to identify potential impacts and management approach. This involved:

- reviewing the regulatory framework for waste management
- identifying potential waste generating activities during construction and operation
- estimating the likely waste streams and volumes, including wastewater and demolition materials
- identifying the likely classification of waste streams in accordance with relevant legislation and guidelines
- estimating the quantities of bulk earthworks and spoil balance to be generated through the construction of the Project
- describing proposed management and handling techniques for key wastes streams
- identifying lawful disposal or recycling locations.

The waste types and quantities estimated in this Chapter are indicative and have been identified for the purpose of determining potential waste management options. Although the quantities of waste actually generated by the Project may differ from the estimates made, the identified waste management options are likely to be appropriate to the final waste quantities.

Potential impacts of transport during construction (which includes the transport of construction waste) are considered in **Chapter 12**. The management of contaminated soils and hazardous materials are considered in **Chapter 17** and **Chapter 20** of this EIS.

21.3 Existing environment

Currently Redfern Station (and associated car parks) contains general waste bins and special waste bins (i.e. sharps bins), which are serviced regularly by waste contractors. General waste bins are collected daily, and sharps bins less frequently or on request. Waste is removed from site by licenced waste contractors and disposed of at licensed waste facilities.

Waste (i.e. wheelie bins) from residential streets within the Project area is collected regularly by waste contractors organised by City of Sydney Council.

21.4 Impact assessment

21.4.1 Construction

Waste generation

The main construction activities anticipated to generate waste are listed in **Table 21-2** together with the materials that may be produced, potential NSW EPA Resource Recovery Orders that may be applicable and likely waste classifications. Where a NSW EPA Resource Recovery Order exists for a specific waste material the opportunity to re-use the waste under that order should be considered prior to disposal.

Table 21-2 Indicative types of waste generated during construction

Activity	Waste streams that may be produced	NSW EPA Resource Recovery Order which may apply	Likely classification of waste stream
Excavation and general earthworks including: • piling to a maximum depth of 18 metres (e.g. for pedestrian bridge works), and excavation to shallower depths for the services building, overhead wiring footings and other rail corridor works • temporary levelling of part of the Gibbons Street Reserve to provide a safe work area for the proposed ancillary facility • excavation for roadworks at Little Eveleigh Street, Ivy Street and Marian Street roadworks (to a depth of approximately 2.5 metres) • excavation for proposed car park (to a depth of approximately two metres) • excavation for utility route changes (to a depth of approximately three metres).	Spoil comprising virgin excavated natural material (uncontaminated soil and crushed rock), including aggregate, fines and road material	Excavated natural material order, recovered railway ballast order, recovered aggregate order, recovered fines order, reclaimed asphalt pavement order, and excavated public road material order	General solid waste (non-putrescible)
	Contaminated materials	N/A	Hazardous waste, restricted solid waste or special waste (including asbestos contaminated waste (non-friable))
Modification of buildings/building components including: • 125-127 Little Eveleigh Street: clear out and backfill of basement, partial removal of internal building • Platform 1 office building – partial removal of internal fabric • Marian Street entrance: demolition of existing stairway and existing car park • other infrastructure such as OHW, brick walls and privacy screens.	Concrete, asphalt, bricks, timber, tiles, metals, plasterboard, carpets, electrical and plumbing fittings and furnishings (such as doors and windows)	Plasterboard order, cement fibreboard order, recovered aggregate order, recovered fines order, reclaimed asphalt pavement order, and excavated public road material order	General solid waste (non-putrescible)
	Asbestos	N/A	Special waste
	Hazardous materials (walls with lead paint, polychlorinated biphenyls (PCB) containing materials from capacitors for fluorescent light ballasts and/or mercury from	N/A	Hazardous or restricted solid waste

Activity	Waste streams that may be produced	NSW EPA Resource Recovery Order which may apply	Likely classification of waste stream
	fluorescent and compact fluorescent tubes)		
Dust suppression, wash down of plant and equipment, and staff amenities at construction sites (such as toilets)	Sediment-laden and/or potentially contaminated wastewater, sewage and grey water	N/A	Liquid waste
Station fit-out and general construction activities and resource use	Concrete waste, timber formwork, scrap metal, steel, plasterboard, cable and packaging material	Plasterboard order, and cement fibreboard order	General solid waste (non-putrescible)
Maintenance of construction plant, vehicles and equipment	Adhesives, lubricants, waste fuels and oils, engine coolant, batteries, hoses	N/A	Hazardous or restricted waste (non-putrescible)
	Tyres	Recovered tyres order	Special waste
Activities at offices and crib rooms	Putrescibles	N/A	General solid waste (putrescible)
	Paper, cardboard, plastics, glass and printer cartridges	N/A	General solid waste (non-putrescible)
Clearing and grubbing of vegetation, landscaped and/or turfed areas	Green waste, and potentially sharps (i.e. used syringes etc.)	Compost order, and mulch order	General solid waste (non-putrescible), and special waste (i.e. clinical and related waste)

The types and quantities of construction waste generated by the Project would vary throughout construction. The quantities and classifications of all waste streams would be confirmed following finalisation of the detailed design.

With respect to waste generation, the estimated spoil/waste volumes that may be generated by the Project are shown in **Table 21-3**.

Table 21-3 Estimated spoil and waste volumes

Component	Spoil/waste volumes (approximate)
Site establishment and enabling works	200 tonnes (Gibbons Street Reserve)
Utility and overhead wiring relocations/ adjustments	150 tonnes
Main construction works	250 tonnes from demolition and 1920 tonnes from piling and foundations (including 125-127 Little Eveleigh Street) 1,200 tonnes (Marian Street entrance) 320 tonnes (drainage works)
Little Eveleigh Street and Ivy Street works	2,500 tonnes
Marian Street roadworks	550 tonnes
Estimated total spoil/waste volume	**7,090 tonnes**

Waste management

The waste types discussed in **Table 21-2** above are listed in **Table 21-4** below alongside the likely waste management approaches. All waste generated would be regularly removed from site as required by licensed contractors, in order to avoid potential issues associated with odour generation, decreased visual amenity and creating environments that attract animals/pest species (e.g. rats and mice).

Table 21-4 Construction waste management

Waste type	Management
Spoil	Spoil comprising virgin excavated natural material (uncontaminated soil and crushed rock) would be managed in accordance with the waste management hierarchy (described in **Section 21.2**). As a worst case, all spoil generated would be disposed offsite at a licensed waste facility (e.g. landfill). However, where possible, spoil would be reused onsite as part of the Project (as backfill, etc.), or reused on other project site/s or at a re-purposing facility, including in accordance with NSW EPA Resource Recovery Order/s that may apply (where feasible). The suitability of spoil to be reused onsite (or on alternate project site/s or at a re-purposing facility) would be confirmed during detailed design (e.g. through further contamination investigations and identification of other viable sites). Note that spoil may be stockpiled onsite (e.g. within the ancillary facility areas) prior to reuse or disposal.
Contaminated soil and contaminated fill	In situ testing of soils in areas of potential contamination concern would be undertaken to determine the appropriate waste classification. Contaminated materials would be sampled and tested before being either being appropriately contained and disposed of at a suitably licenced offsite location or managed in situ where there is no unacceptable risk to human health or ecological values.

Waste type	Management
Demolition waste (concrete, asphalt, bricks tiles, timber, metals, plasterboard, carpets, electrical and plumbing fittings and furnishing) including Hazardous waste Restricted waste or General solid waste (non-putrescible)	Demolition waste would be managed in accordance with the waste management hierarchy outlined in **Section 21.2**. Where feasible, materials would be re-used under a NSW EPA Resource Recovery Order. Otherwise construction and demolition waste would be segregated and sorted at a Materials Processing Facility or Materials Recycling Facility. Electrical waste would be stored for collection by an authorised contractor for recycling offsite, where feasible, or disposal at an appropriately licenced facility. All demolition waste would be classified in accordance with the Waste Classification Guidelines (NSW EPA, 2014a) and where it cannot be re-used, directed to a waste management facility that is lawfully permitted to accept that type of waste.
Asbestos (Special waste)	The disturbance, movement, storage, handling, and transport of asbestos containing materials must be conducted by a NSW EPA licensed contractor and the materials must be disposed of at an appropriately licenced facility. These activities would be conducted in accordance with the *Work Health and Safety Act 2011* and supporting *Work Health and Safety Regulations 2014*, and relevant SafeWork NSW and SafeWork Australia guidelines/codes of practice.
Liquid waste	Wastewater, sewage, and grey water would be disposed to sewer (where lawfully permitted), or otherwise transported to an appropriately licenced liquid waste treatment facility.
Adhesives, lubricants, waste fuels and oils, engine coolant, tyres, gas cylinders/bottles and other gas items (cartridges)	Waste from construction vehicle and plant maintenance activities would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal. Where feasible, containers holding oil, grease, and lubricants would be washed prior to disposal, or stored separately for disposal as hazardous waste. Waste oil and oil filters would be stored in recycling bins and collected by an authorised contractor, and recycled offsite, where feasible. Tyres would be re-used under the Recovered Tyres Resource Recovery Order where feasible or otherwise collected by an authorised contractor for recycling or disposal offsite at an appropriately licenced facility. Gas cylinders/bottles and other gas items would be separated from other waste streams and removed from site to a facility authorised to receive empty gas cylinders/bottles and other items.
Office waste including kitchen waste, paper, cardboard, plastics, glass	Recyclable materials such as paper, cardboard, plastics, glass, ferrous, and non-ferrous containers would be stored at recycling bins for collection by an authorised contractor and recycled offsite. Where recycling is not feasible, waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal at a licenced waste facility.

Waste type	Management
Green waste	As far as practicable, green waste would be chipped, mulched and reused for vegetation management (including in accordance with a NSW EPA Resource Recovery Order where feasible), or collected by an authorised contractor and recycled offsite. Noxious weeds would be disposed of in accordance with relevant guidelines/requirements.
General solid waste (putrescible)	General waste would be collected on-site in designated waste collection bins. No recyclable or contaminated materials would be placed in these bins. A waste contractor would pick up the bin(s) and take them off-site as required to a licensed landfill for disposal.

21.4.2 Operation

Waste generation

The main types of activities with the potential to generate waste during operation are listed in **Table 21-5**, together with the likely waste materials and classifications.

Table 21-5 Indicative types of waste generated during operation

Activity	Waste streams that may be produced	Likely classification of waste stream
Disposal of general rubbish in Station bins	General non-recyclable and putrescible waste (such as food waste from Station rubbish bins)	General solid waste (putrescible)
	Recyclable wastes such as plastics and aluminium cans, glass, office waste including paper and plastics	General solid waste (non-putrescible)
Disposal of sharps bins at the Station	Sharps such as needles or other sharp items	Special waste
Infrastructure maintenance	Cable and conduit off-cuts from maintenance of electrical infrastructure	General solid waste (non-putrescible)
	Solvents, paints, adhesives, cleaning fluids, greases, acids and alkali materials, and spent spill kit absorbent materials used to clean up accidental spills during maintenance	Hazardous waste and/or special waste
	Waste oil from transformers	Hazardous waste
	Used light bulbs/LED tubes and used light fixtures	Hazardous waste
	Bioretention basin sediment/sludge	General solid waste (non-putrescible)
Use of Station customer facilities (such as toilets)	Sewage and grey water	Liquid waste

The volumes of wastes generated during operation would be managed alongside the existing waste streams from Redfern Station. Wastes would be managed by the implementation of standard waste management strategies (provided in **Table 21-6**).

Waste management

Waste handling and management approaches are provided in **Table 21-6**, based on the waste management hierarchy for the identified types of waste likely to be produced during operation.

Waste would be managed in line with the existing Sydney Trains maintenance protocols as outlined in **Table 21-6**.

Table 21-6 Management of operational waste

Waste type	Management
General rubbish and Station waste such as food waste, paper, cardboard, plastics, glass	Bins would be provided for collection by an authorised contractor for off-site recycling or disposal at a licenced waste facility.
Sharps waste	Bins would be provided for collection by an authorised contractor for off-site disposal at a licensed waste facility.
Adhesives, lubricants, waste fuels and oils, engine coolant, tyres	Waste from maintenance activities would be collected and stored in designated waste storage areas, for collection by an authorised contractor for off-site disposal. Where feasible, containers holding oil, grease, and lubricants would be washed prior to disposal or stored separately for disposal as hazardous waste. Waste oil and oil filters would be stored in recycling bins, collected by an authorised contractor, and recycled offsite, where feasible.
Liquid waste	Wastewater, sewage and grey water would be disposed to sewer or transported to an appropriately licenced liquid waste treatment facility.
Other general solid waste	Note that as noted in **Chapter 18**, detention basins or bio-retention basins may be incorporated into the Project during detailed design (for water treatment). These may require periodic cleaning resulting in waste material requiring disposal.

21.4.3 Recycling and disposal locations

There are a number of options for recycling and disposal of construction and operation waste generated by the Project. Waste facilities in Sydney licensed to accept general solid waste (putrescible) include (but are not limited to):

- Clyde Transfer Terminal
- Eastern Creek Resource Recovery Park
- Kemps Creek Advanced Resource Recovery Park
- Lucas Heights Resource Recovery Park
- a number of waste transfer stations.

A larger number of licenced facilities in Sydney accept general solid (non-putrescible) waste and vegetation/green waste.

A number of waste facilities in Sydney are licenced to accept asbestos, including:

- Elizabeth Drive Landfill, Kemps Creek
- Eastern Creek Resource Recovery Park
- Genesis Xero Waste – Landfill and Recycling
- Horsley Park Waste Management Facility
- Jacks Gully Waste and Recycling Centre
- Kimbriki Recycling and Waste Disposal Centre
- Lucas Heights Resource Recovery Park
- Wetherill Park Resource Recovery Facility.

Recyclables such as containers (plastics, glass, cans, etc), paper and cardboard would be collected by an authorised contractor for off-site recycling. There are a number of materials recovery facilities in Sydney. The recycling facility would be determined by the contractor engaged to collect the material.

Specific facilities and collection contractors would be selected during the later stages of the Project and documented in the CEMP.

21.5 Management and mitigation

21.5.1 Overview

A CEMF (**Appendix D** of this EIS) describes the approach to environmental management, monitoring and reporting during construction. Specifically, it lists the requirements to be addressed by the construction contractor in developing the CEMP, sub-plans, and other supporting documentation for each specific environmental aspect.

A Waste Management Sub-Plan would be developed for the Project as identified by Section 6.9 of the CEMF.

The performance outcomes for waste management as well as mitigation measures to be included in the Waste Management Sub-Plan are detailed below.

21.5.2 Performance outcomes

The performance outcomes for the Project in relation to waste are as follows:

- waste from construction and operation of the Project is classified in accordance with the Waste Classification Guidelines (NSW EPA, 2014a)
- waste types once classified are reviewed against appropriate guidelines to manage waste appropriately
- at least 80 percent (by volume) of non-contaminated spoil excavated during construction would be diverted from landfill, either by re-using suitable material on site or identifying other sites/re-purposing facilities where suitable material may be re-used
- contaminated and asbestos contaminated wastes are safely disposed of in accordance with their relevant waste classification.

The Project would be designed, constructed and operated to achieve these performance outcomes.

21.5.3 Mitigation measures

The mitigation measures that would be implemented to manage waste are listed in **Table 21-7**. Note that mitigation measures related to contamination and hazardous materials are contained in **Chapter 17** and **Chapter 20** of this EIS respectively.

Table 21-7 Mitigation measures

ID	Mitigation measure	Applicable location(s)
Construction		
WM1	A Waste Management Sub-Plan would be prepared as part of the CEMP. The Sub-Plan would: • identify requirements consistent with the waste and resource management hierarchy and cleaner production initiatives • include relevant measures from the *National Waste Policy: Less Waste, More Resources* (Department of Agriculture, Water and the Environment, 2018) • ensure resource efficiency is delivered through the design and construction practices • provide consistent clear direction on waste and resource handling, storage, stockpiling, use and reuse management measures	Project area

ID	Mitigation measure	Applicable location(s)
Construction		
	• outline procedures for stockpiling of wastes (refer to mitigation measure WM2) • set out processes for disposal, including on-site transfer, management and the necessary associated approvals/permits. All waste generated would be regularly removed from site as required by licensed contractors, in order to avoid potential issues associated with odour, visual amenity and attracting animals/pest species • outline that waste generated within the Project area would be segregated at source and suitably stored in designated waste management areas within the Project area • include material tracking measures to track waste and recyclables generated from the Project and removed from the Project area. Material tracking records would include types, volumes and management measures for waste and resources arising from/used for the Project • outline an unexpected finds protocol to manage the potential for unexpected finds during construction of the Project (i.e. asbestos or other hazardous materials) • include a process for auditing, monitoring and reporting.	
WM2	Stockpiled wastes would be: • appropriately segregated to avoid mixing and contamination • appropriately labelled • appropriately stored to minimise risk of erosion • less than three metres in height with an appropriate height to length batter ratio (e.g. 1:3) • located as far away as practical from sensitive receivers, ecological areas and watercourses.	Project area
WM3	Where a NSW EPA Resource Recovery Order exists for a specific waste material the opportunity to re-use the waste under that order should be considered prior to disposal. Current orders (and exemptions) are found on the NSW EPA website: https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework/current-orders-and-exemption The current orders should be periodically reviewed during construction for applicability.	Project area
WM4	All waste would be assessed, classified, managed and disposed of (where they cannot be re-used) in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014a).	Project area
WM5	Waste segregation bins would be located at various locations within the Project area, if space permits, to facilitate segregation and prevent cross contamination.	Project area

Provided recommended mitigation measures are implemented, residual environmental impacts as a result of waste and resource use from construction of the Project are unlikely, except for any contributions of waste from the Project to offsite landfill. Operation of the Project would also contribute minor ongoing waste streams, which would be dealt with at offsite licensed waste facilities, including landfill in some cases, in line with existing Sydney Trains maintenance protocols.