



Roads and Maritime Services/Sydney Airport Corporation Limited

Sydney Gateway Road Project

Environmental Impact Statement/ Preliminary Draft Major Development Plan

Chapter 24 Waste management



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Contents

24. Waste management	24.1
24.1 Assessment approach	24.1
24.2 Assessment of construction impacts	24.2
24.3 Assessment of operation impacts.....	24.8
24.4 Cumulative impacts	24.10
24.5 Management of impacts	24.10

Tables

Table 24.1 Construction waste estimates	24.3
Table 24.2 Estimated waste quantities from demolition activities	24.4
Table 24.3 Potential impacts associated with waste generation and management.....	24.5
Table 24.4 Management of construction waste.....	24.6
Table 24.5 Waste expected during operation.....	24.8
Table 24.6 Management of operational waste	24.9
Table 24.7 Waste management mitigation measures	24.11

Chapter 24

Waste management

This chapter summarises the waste management requirements for the project. It identifies potential waste management risks and how these risks have been and would continue to be managed. It provides a preliminary assessment of the types of wastes that would be generated by the project and measures to manage and minimise these wastes.

The SEARs relevant to waste are listed below. There are no MDP requirements specifically relevant to waste, however there is a requirement under section 91(1) of the Airports Act to assess the potential environmental impacts associated with a development (section 91(1)(h)), and to specify how those impacts may be dealt with (section 91(1)(j)). Full copies of the SEARs and MDP requirements, and where they are addressed in this document, are provided in Appendices A and B respectively.

Reference	Requirement	Where addressed
Key issue SEARs		
18	Waste	
18.1	The Proponent must assess predicted waste generated from the proposal during construction and operation, including: (a) classification of the waste in accordance with the current guidelines (b) estimates / details of the quantity of each classification of waste to be generated during the construction of the proposal, including bulk earthworks and spoil balance; (c) handling of waste including measures to facilitate segregation and prevent cross contamination; (d) management of waste including estimated location and volume of stockpiles; (e) waste minimisation and reuse; (f) lawful disposal or recycling locations for each type of waste; and (g) contingencies for the above, including managing unexpected waste volumes.	Sections 24.2.1 and 24.3.1 Sections 24.2.1 and 8.2.3 (bulk earthworks and spoil balance) Sections 24.2.3 and 24.3.3 Sections 24.2.3, 24.3.3 and 24.5 Sections 24.2.3 and 24.3.3 Section 24.2.3 Sections 24.2.3 and 24.5
18.2	The Proponent must assess potential environmental impacts from the excavation, handling, storage on site and transport of the waste particularly with relation to sediment/leachate control, noise and dust.	Sections 24.2.2 and 24.3.2

24. Waste management

24.1 Assessment approach

To facilitate waste avoidance and reduction planning and allow for considered and responsible management of unavoidable waste, the different types of waste that may be generated by a project need to be identified early in the project development process. Wastes need to be managed appropriately to avoid contaminating soils and water and generating leachate, odours and dust, with the associated potential for environmental, health and safety risks. Improper waste management can also lead to regulatory non-compliance, resulting in fines and reputational damage.

The waste management assessment considered the types, amounts and potential impacts associated with waste generated by the project. Based on the potential impacts identified, measures to manage waste during construction and operation are provided. The assessment has been undertaken in accordance with the resource management hierarchy outlined in the *Waste Avoidance and Resource Recovery Act 2001* and the *Environmental Sustainability Strategy 2019–23* (Roads and Maritime, 2019b). This hierarchy, which is considered at all stages of design development and construction planning, involves:

1. Avoiding unnecessary resource consumption
2. Promoting resource recovery, including reuse, reprocessing, recycling and energy recovery
3. Disposing wastes appropriately where avoidance and recovery are not feasible.

An overview of the assessment approach is provided below, including the legislative and policy context and a summary of the methodology.

24.1.1 Legislative and policy context to the assessment

The assessment was undertaken in accordance with the SEARs and MDP requirements (provided in Appendices A and B) and with reference to the following:

- Relevant legislation, including the EP&A Act, the Airports Act and associated regulations, POEO Act, the *Waste Avoidance and Resource Recovery Act 2001* (NSW) and the Protection of the Environment Operations (Waste) Regulation 2014 (the Waste Regulation)
- *Environmental Sustainability Strategy 2019–2023* (Roads and Maritime, 2019b)
- *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a)
- *Waste Classification Guidelines* (NSW EPA, 2014a)
- *NSW Waste Avoidance and Resource Recovery Strategy 2014-21* (NSW EPA, 2014b)
- *Sydney Airport Master Plan 2039* (SACL, 2019a)
- *Sydney Airport Environment Strategy 2019-2024* (SACL, 2019b).

24.1.2 Methodology

The waste management assessment was desktop based and involved:

- Reviewing the regulatory framework for waste management
- Reviewing the proposed construction methodology to identify potential waste generating activities
- Identifying the potential types, quantities and preliminary waste classifications, including a review of Technical Working Paper 5 (Contamination and Soils) and Technical Working Paper 16 (Former Tempe Landfill Assessment)

- Considering waste management options
- Providing measures to avoid, reduce and manage wastes during construction and operation.

It is noted that the waste types and quantities estimated as an outcome of this assessment are indicative, and have been identified for the purpose of determining potential waste impacts and waste management approaches. Although the quantities of waste generated by the project may differ from these estimates, the identified waste management approaches would be appropriate to the final waste quantities.

24.1.3 Risks identified

An environmental risk assessment was undertaken as an input to the impact assessment (see Appendix G). This involved identifying potential environmental risks during construction and operation, and rating the potential risks according to likelihood, consequence and overall level of risk, in general accordance with *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines*. Waste management risks with an overall assessed risk rating of medium or above, identified by the environmental risk assessment, included:

- Inappropriate management of waste during construction and operation resulting in environmental, health and amenity impacts, including contamination, water quality impacts, odour and dust
- Inappropriate management of waste generated during construction resulting in excessive waste being directed to landfill.

Potential risks and impacts associated with disturbing contaminated soils and waste materials at the former Tempe landfill are considered in Chapter 12 (Air quality) and Chapter 13 (Contamination and soils).

24.2 Assessment of construction impacts

24.2.1 Waste generation

Waste generated during construction would mainly be from works associated with site preparation, demolition, construction of road infrastructure and landscaping. The types and quantities of construction waste generated by the project would vary throughout construction. The main waste stream would be excavated material (spoil) from earthworks and other activities. Spoil would be generated by works requiring excavation, including:

- Piling for bridge and overpass abutments
- Roadways and the active transport link
- Drainage infrastructure
- Retaining walls
- Utility works.

Construction of road infrastructure over the former Tempe landfill would also involve excavation in landfilled waste materials.

The main construction activities anticipated to generate waste are listed in Table 24.1 together with the wastes that may be produced, and their likely waste classifications (in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (NSW EPA, 2014a) (the Waste Classification Guidelines). Construction waste quantities, including estimated spoil generation, spoil reuse, and spoil surplus quantities, would be confirmed during detailed design as would classifications and reuse/recycling/disposal locations.

Table 24.1 Construction waste estimates

Activity	Waste streams that may be produced	Likely classification of waste streams	Estimated quantities
Clearing and grubbing of vegetation, landscaped and/or turfed areas	Green waste	General solid waste (non-putrescible)	3,600 tonnes
Excavation and general earthworks	Spoil comprising virgin excavated natural material (VENM) or excavated natural material (ENM)	General solid waste (non-putrescible)	Up to 163,000 m ³ of excavated material, (subject to suitability for reuse on site)
	Contaminated soils (including asbestos containing materials)	Hazardous waste and/or special waste General solid waste (non-putrescible)	To be confirmed during detailed design
	Soils, general construction material and landfill capping material	General solid waste (non-putrescible)	To be confirmed during detailed design
Leachate management	Leachate	Liquid waste	200 to 450 kilolitres per day
Excavation within the former Tempe landfill	Spoil comprising virgin excavated natural material (VENM) or excavated natural material (ENM)	General solid waste (non-putrescible) General solid waste (putrescible) (small quantities only)	90,000 m ³
Construction of temporary ancillary facilities, new roads, road furniture, road widening, road surfacing, installing drainage structures, retaining walls and new bridges and other construction activities	Concrete, asphalt, aggregate, timber formwork, scrap metals, cable and packaging materials	General solid waste (non-putrescible)	25,000 tonnes
Demolition works	Timber, steel, fibre sheeting, brick, concrete, asphalt, road base, glass	General solid waste (non-putrescible)	See Table 24.2
Maintenance of construction plant, vehicles and equipment	Adhesives, lubricants, waste fuels and oils, engine coolant, batteries, hoses	General solid waste (non-putrescible) Hazardous waste	1,000 litres
	Tyres	Special waste	Less than 10 tonnes
Activities at construction offices and compounds	Putrescibles (food and other organic waste)	General solid waste (putrescible)	2 tonnes per week
	Paper, cardboard, plastics, glass and printer cartridges	General solid waste (non-putrescible)	1 tonne per week
	Wastewater, sewage and grey water	Liquid waste	87,000 kilolitres
Dust suppression, wash down of plant and equipment	Sediment-laden and/or potentially contaminated wastewater	Liquid waste	Included above

Table 24.2 Estimated waste quantities from demolition activities

Waste stream	St Peters interchange connection	Botany rail corridor	Works location		
			Terminal 1 connection and eastern terminal link	Qantas Drive extension	Total
Timber (tonnes)	60	10	20	190	280
Steel (tonnes)	130	10	140	1,700	1,980
Fibre sheeting (m ³)	80	0	10	380	470
Brick (m ³)	170	0	20	2,490	2,680
Concrete (m ³)	4,190	0	70	4,760	9,020
Asphalt (m ³)	0	0	350	2,650	3,000
Road base (m ³)	0	80	1,500	10,360	11,940
Glass (m ³)	10	0	10	200	220

The estimated material cut and fill quantities associated with earthworks are provided in Table 8.2. This table indicates that about 163,000 cubic metres of material is proposed to be removed and about 706,000 cubic metres is proposed to be imported. This does not include about 90,000 cubic metres of excavated waste from the former Tempe landfill that would be emplaced within the project site in the proposed emplacement mounds (described in section 24.2.3) and 80,000 cubic metres of imported clean fill that would be used as emplacement mound capping material. Further details regarding the emplacement area and mounds is provided in Section 7.10.2. The estimated excavated waste volumes and mound locations are preliminary and would be subject to detailed design and consideration by a range of stakeholders.

The material to be excavated from the former Tempe landfill is expected to be comprised of mostly non-putrescible material such as general building rubble and capping material. The proposed management of this material is discussed in section 24.2.3.

During construction, the volumes of leachate generation at the former Tempe landfill would be around 200 kilolitres per day under annual average rainfall conditions, and up to around 450 kilolitres per day under 90th percentile wet weather conditions (if they occur) at the start of construction.

The classifications of all waste streams would be confirmed following finalisation of the detailed design and construction planning, prior to any transfer off site.

24.2.2 Potential impacts if waste is not managed appropriately

The potential impacts associated with aspects of waste generation and management during construction are summarised in Table 24.3.

Table 24.3 Potential impacts associated with waste generation and management

Aspect of waste management	Potential impacts
Generation of waste, including excavation and handling	<ul style="list-style-type: none"> ■ Energy and water consumption associated with packaging ■ Impacts associated with extraction of resources ■ Environmental impacts associated with generation and handling on site, including dust, odour, sediment laden/contaminated runoff, leachate generation and noise
Storage of waste on site	<ul style="list-style-type: none"> ■ Sediment laden/contaminated runoff and leachate generation ■ Odours and dust ■ Health and safety of site personnel and neighbouring community ■ Littering ■ Site access restrictions
Storage and segregation of waste on site	<ul style="list-style-type: none"> ■ Cross contamination of wastes ■ Reduction in reuse of materials ■ Contamination of recycling facilities
Storage and disposal of liquid and/or contaminated waste	<ul style="list-style-type: none"> ■ Odours ■ Contamination of soils, groundwater and surface water
Waste transportation	<ul style="list-style-type: none"> ■ Dust, noise, traffic and odours ■ Mud tracking on road
Non-classified or incorrectly classified waste transport and disposal	<ul style="list-style-type: none"> ■ Regulatory non-compliance ■ Contamination of recycling facilities/landfills ■ Contamination of soils, groundwater and surface water
Unlicensed waste contractors transporting waste	<ul style="list-style-type: none"> ■ Regulatory non-compliance ■ Potential illegal dumping of waste

The potential environmental impacts associated with excavating, handling, storing on site and transporting waste are considered in the following chapters:

- Chapter 9 (Traffic, transport and access) for impacts associated with heavy vehicle movements, including transport of waste
- Chapter 10 (Noise and vibration) for noise impacts associated with the use of construction equipment for excavation and stockpiling, and heavy vehicle movements
- Chapter 12 (Air quality) for air quality impacts including vehicle emissions, odour and dust, associated with the excavation, handling and transport of material, including material excavated from the former Tempe landfill
- Chapter 13 (Contamination and soils), Chapter 15 (Groundwater) and Chapter 16 (Surface water) for impacts associated with sediment, extracted groundwater, leachate generation and handling and storage of material on the project site
- Chapter 26 (Climate change and greenhouse gas), for impacts associated with greenhouse gas emissions associated with the use of construction equipment for excavation, handling and transport of waste.

Construction waste management activities would not have a significant impact on the environment or human health, assuming:

- The mitigation measures provided in the chapters listed above are implemented
- Construction wastes are managed as described in section 24.2.3
- Additional waste mitigation measures provided in section 24.5 are implemented.

24.2.3 Waste handling and management

All waste generated during construction would be managed using the waste hierarchy approach of avoidance and reuse before consideration is given to disposal. All wastes would be managed in accordance with the waste provisions contained within the POEO Act and other relevant legislative and policy requirements, as outlined in section 24.1.1.

Should waste be found to be unsuitable for reuse or recycling, disposal methods would be selected based on the classification of the waste material in accordance with the Waste Classification Guidelines. The Waste Classification Guidelines provide direction on the classification of waste, specifying requirements for management, transportation and disposal of each waste category.

The proposed approach to managing the different types of construction waste, including measures to facilitate segregation and prevent cross contamination, are provided in Table 24.4. Additional mitigation measures, proposed as an outcome of the assessment, are provided in section 24.5.

Table 24.4 Management of construction waste

Waste type	Management
Spoil	Excavated materials would be reused on site as engineering fill where fit for purpose and practicable. A portion of the material excavated from the former Tempe landfill would be reinstated in on-site emplacement mounds where possible (see further information in section 7.10.2). Where excavated materials cannot be reused or retained on site they would be classified and taken off site for appropriate reuse or to a waste management facility that is lawfully permitted to accept that type of waste for reuse, recycling or disposal (see further information below the table).
Contaminated spoil (including asbestos containing materials) that is not capped on site, and acid sulfate soils	In situ testing of soils in areas of potential contamination concern would be undertaken to determine the appropriate waste classification. Contaminated spoil would be sampled before being transported and disposed of at a suitably licensed off-site location.
General construction waste (concrete, asphalt, timber formwork, scrap metals, cable and packaging materials etc)	General construction waste would be managed in accordance with the waste hierarchy. Waste would be segregated and stockpiled on site, with materials such as bricks and tiles, timber, plastic, and metals separated and sent to a construction and demolition waste recycling facility. Construction waste would be classified in accordance with the Waste Classification Guidelines and directed to a waste management facility that is lawfully permitted to accept that type of waste.
Liquid waste	Wastewater, sewage, and grey water would be disposed to sewer or transported to an appropriately licensed liquid waste treatment facility. Leachate generated at the former Tempe landfill would be managed in accordance with the leachate management plan (see section 15.6). Extracted groundwater would be managed in accordance with a dewatering management strategy (see section 15.6).
Adhesives, lubricants, waste fuels and oils, engine coolant, tyres	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 disposal off site. Any potentially hazardous waste would be stored separately in clearly labelled receptacles and disposed of in accordance with its waste classification. Waste oil and oil filters would be stored in separate recycling bins and collected by an authorised contractor, and recycled off site, where feasible. Tyres would be collected by an authorised contractor for recycling or disposal off site at an appropriately licenced facility.

Waste type	Management
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 off site. Where recycling is not feasible, waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for disposal off site at a licenced waste facility
Green waste	As far as practicable, weed-free green waste would be chipped, mulched and reused on site, transferred to another site (in accordance with an agreement that the waste can be legally accepted for the intended use under section 143 of the POEO Act), or collected by an authorised contractor and recycled off site. Weeds would be disposed of in accordance with relevant guidelines/requirements

Unexpected waste material

Construction waste quantities, including estimated spoil generation, spoil reuse, and spoil surplus quantities, would be confirmed during detailed design. Classifications and reuse/recycling/disposal locations would also be confirmed at that stage. There is the potential for unexpected volumes of waste to be generated, including potentially contaminated material. Measures to manage unexpected waste material are provided in section 24.5.

Any spoil classified as contaminated in accordance with the Waste Classification Guidelines would be directed to a waste management facility that is lawfully permitted to accept that type of contaminated waste. As there are a number of solid waste landfills in Sydney that are licensed to accept contaminated soils it is anticipated that the volumes of contaminated spoil generated by the project could be readily accommodated at these facilities.

Off-site recycling and disposal locations

There are a number of locations for off-site recycling and disposal of construction waste generated by the project. Waste facilities in Sydney licensed to lawfully accept general solid waste (putrescible) and vegetation/green waste 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 number of waste facilities in Sydney are licensed to lawfully accept asbestos, including:

- Elizabeth Drive Landfill, Kemps Creek
- 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.

24.2.4 Summary of impacts on Sydney Airport (Commonwealth) land

The potential waste sources, likely classifications and waste management approaches for waste generated on Sydney Airport land would be in accordance with those discussed in sections 24.2.1 and 24.2.3, with the exception that any spoil proposed for reuse would need to not exceed the limits for soil contamination provided in Schedule 3 of the Airports (Environment Protection) Regulations 1997.

The potential waste management impacts on Sydney Airport land would be generally in accordance with those described in section 24.2.2 with the exception that excavation and emplacement activities at the former Tempe landfill would expose waste material, which may have the potential to attract birds.

The presence of wildlife (birds and other animals such as flying foxes or bats) on or in the immediate vicinity of an airport site can create an aviation safety hazard. Wildlife strike can occur as a collision between a bird or other wildlife and an aircraft in flight or during take-off or landing. It is considered unlikely that material excavated from the former Tempe landfill would be of the type to attract wildlife (ie putrescible material). Nonetheless, measures would be implemented during construction at the former Tempe landfill to minimise this potential risk. These would include:

- Staging the excavation to minimise the area of disturbance at any one time
- Minimising the size and area of exposed stockpiles
- Ensuring material that has been disturbed, uncapped, or temporarily stockpiled is suitably covered at the end of each day.

Construction waste management activities would not have a significant impact on Sydney Airport land, assuming:

- The mitigation measures provided in the chapters listed in section 24.2.2 are implemented
- Construction wastes are managed as described in section 24.2.3
- Additional waste mitigation measures provided in section 24.5 are implemented.

24.3 Assessment of operation impacts

24.3.1 Waste generation

Waste generated by the operation of the project would be limited. The main waste streams would include:

- Oils, liquids and chemicals used for maintenance of plant and equipment used in road maintenance activities
- General litter along roads
- Landscape and vegetation waste
- Waste grit and soil from road sweepers.

Table 24.5 summarises the expected wastes during operation and their likely waste classification.

Table 24.5 Waste expected during operation

Activity	Waste streams that may be produced	Likely classification of waste streams
Road sweeping and road maintenance	Green waste, waste grit and soil from road sweepers, litter, asphalt	General solid waste (non-putrescible)
Maintenance activities	Oils, liquids and chemicals and containers	Hazardous waste General solid waste (non-putrescible)

24.3.2 Potential impacts

The impacts associated with waste generation and management during operation would be similar to those for construction (see section 24.2.2), albeit at a much smaller scale. Operational waste, including general litter clean-up, would be managed in accordance with existing operational maintenance requirements and the impact is expected to be minimal.

24.3.3 Waste handling and management

Table 24.6 outlines the proposed waste handling and management measures for operational waste.

Table 24.6 Management of operational waste

Waste type	Management
Oils, liquids and chemicals used for maintenance	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, any potentially hazardous waste would be stored separately in clearly labelled receptacles and disposed of in accordance with its waste classification. Waste oil and oil filters would be stored in recycling bins and collected by an authorised contractor, and recycled off site, where feasible.
General litter along roads	Any litter would be collected by an authorised contractor for recycling or disposal at a licenced waste facility.
Landscape and vegetation waste	As far as practicable, weed-free green waste would be chipped, mulched and reused on site, or collected by an authorised contractor and recycled off site. Weeds would be disposed of in accordance with relevant guidelines/requirements.
Waste grit and soil from road sweepers	Waste grit and soils from the road sweeper would be transported for recycling or disposal at a licensed waste facility.

Off-site recycling and disposal locations

The locations for recycling and disposal of wastes during operation would be the same as during construction (see section 24.2.3).

24.3.4 Summary of impacts on Sydney Airport (Commonwealth) land

The types of wastes expected to be generated on Sydney Airport land would not be greater or different to those identified for the project as whole. The proposed handling and management of these wastes would also address potential impacts on Sydney Airport land.

Consistency with the Sydney Airport Master Plan

The *Sydney Airport Master Plan 2039* (SACL, 2019a) (the Master Plan) identifies waste and resource recovery as key environmental issues. By implementing the Master Plan and associated *Sydney Airport Environment Strategy 2019-2024* (SACL, 2019b), Sydney Airport Corporation plans to manage and reduce potential impacts from waste and resource recovery by:

- Avoiding unnecessary resource consumption and waste generation
- Minimising waste by changing behaviours
- Recycling and recovering of beneficial materials
- Disposing of waste to landfill as a last resort.

Key relevant initiatives under the Master Plan include:

- Ensure that appropriate consideration for waste management and resource recovery is included in the planning and design for all major proposed developments within the airport site

- Ensure that waste management and resource recovery are considered for the construction phase of development proposals, aligning with Green Star requirements
- Continue to implement the tenant management strategy and ensure that tenants include waste management and resource recovery in their environmental management plans.

The project design has included a focus on waste management and resource recovery, by minimising the project footprint and incorporating reuse of material within design elements (for example the emplacement mounds). Implementation of the measures provided in section 24.5 will also ensure consistency with the Master Plan.

24.4 Cumulative impacts

Cumulative impacts would occur if other projects and activities also generate demand for resource recovery, recycling and disposal capacity in Sydney.

Construction of the project would potentially occur at the same time as the Botany Rail Duplication, the F6 Extension and the New M5 projects. However, as discussed in section 24.2.3, there are numerous facilities lawfully able to accept waste from the project and other projects. These facilities are considered to have significant capacity.

Therefore, there is not expected to be any substantial impact as a result of the interaction of the construction of the project with other proposed activities (including projects) locally and regionally.

Waste generation during operation is expected to be minimal and therefore no cumulative impacts are expected.

24.5 Management of impacts

24.5.1 Approach

Approach to mitigation and management

The project has been designed, as far as practicable, to minimise spoil volumes, and maximise the reuse of material by means of the proposed emplacement mounds. The approach to waste management would be guided by the waste management hierarchy, with a focus on reducing resource use and minimising waste generation as the highest priority. Wastes generated during construction would be reused and recycled where possible. Wastes that cannot be reused/recycled will be disposed of at appropriately licensed facilities.

Waste would be managed during construction in accordance with the CEMP. The CEMP would include a Construction Waste Management Plan, which will define the processes, responsibilities and management measures that would be implemented during construction to manage waste. This would include procedures for the assessment, classification, management and disposal of waste in accordance with the Waste Classification Guidelines. Further information on the CEMP, including the Construction Waste Management Plan, is provided in Chapter 27 (Approach to environmental management and mitigation).

There is the potential for unexpected volumes of waste to be generated, including potentially contaminated material. During construction planning, suitable areas would be identified to allow for contingency management of unexpected waste materials, including contaminated materials. Any previously unidentified contaminated material would be managed in accordance with the unexpected contaminated finds procedure described in Chapter 13 (Contamination and soils).

Expected effectiveness

Roads and Maritime has experience managing potential impacts associated with waste generation as a result of road developments of a similar scale and scope to this project.

All mitigation measures would be consolidated and described in the relevant environmental management plans for construction and operation. The plans would identify measures that are common between waste types and/or impact categories. Roads and Maritime would engage appropriately licensed waste contractors to manage the collection, recycling or disposal of waste that cannot be reused on site. Waste contractors would also be required to provide evidence of the works compliance with legislative requirements, conditions of approval and standards and guidelines.

Auditing and monitoring would be undertaken to ensure that management approaches provided in the environmental management plans are implemented and appropriate. As such, the management of waste throughout the project through implementing the measures outlined in Table 24.7 is considered to be effective.

24.5.2 List of mitigation measures

Measures that will be implemented to manage waste are listed in Table 24.7.

Table 24.7 Waste management mitigation measures

Impact/issue	Ref	Mitigation measure	Timing
Waste generation and recycling	WM1	Detailed design will include measures to minimise excess spoil generation. This will include a focus on optimising the design to minimise spoil volumes, and the reuse of material on site.	Detailed design
Construction waste and spoil management	WM2	A Construction Waste Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will adopt the waste hierarchy principles contained in the <i>Waste Avoidance and Resource Recovery Act 2001</i> and will detail processes, responsibilities and measures to manage waste and minimise the potential for impacts during construction.	Pre-construction/ construction
	WM3	Construction waste will be minimised by accurately calculating materials brought to the site and limiting materials packaging where possible.	Construction
	WM4	All waste disposal will be in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA, 2014a).	Construction
Attraction of wildlife at the former Tempe landfill	WM5	The following measures would be implemented during works at the former Tempe landfill to avoid attracting wildlife: <ul style="list-style-type: none"> ■ Staging the excavation to minimise the amount of exposed waste at any one time ■ Minimising the size and area of exposed stockpiles ■ Ensuring material that has been disturbed, uncapped, or temporarily stockpiled is suitably covered at the end of each day. 	Construction
Management of unexpected waste materials	WM6	Suitable areas will be identified to allow for contingency management of unexpected waste materials, including contaminated materials. Areas will be hardstand or lined areas that are appropriately stabilised and bunded, with sufficient space for stockpile storage.	Construction
Operational waste management	WM7	Operational waste, including general litter clean up, will be managed in accordance with existing operational maintenance requirements for the project and the waste hierarchy principles contained in the <i>Waste Avoidance and Resource Recovery Act 2001</i> .	Operation

24.5.3 Managing residual impacts

Residual impacts are impacts of the project that may remain after implementation of:

- Design measures to avoid and minimise impacts (see sections 6.4 and 6.5)
- Construction planning and management approaches to avoid and minimise impacts (see sections 6.4 and 6.5)
- Specific measures to mitigate and manage identified potential impacts (see section 24.5.2).

Construction waste quantities, including estimated spoil generation, spoil reuse, and spoil surplus quantities, would be confirmed during detailed design and construction planning. There is potential for unexpected volumes of potentially contaminated spoil to be generated. Any spoil classified as contaminated in accordance with the Waste Classification Guidelines would be directed to a waste management facility that is lawfully permitted to accept that type of contaminated waste. There are a number of solid waste landfills in Sydney that are licensed to accept contaminated soils. It is anticipated that the volumes of contaminated spoil generated by the project could be readily accommodated at these facilities.