

EIS Volume 1 Chapter 19

Waste Management



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19. Waste Management

This chapter describes the legislative context of waste management in South Australia, provides a description of the assessment of anticipated waste sources likely to be generated during construction and operation of the Project and options for waste management.

19.1. Key Findings

- The Project will comply with State legislation and guidelines for waste management and follow the waste management hierarchy as far as is practicable, with any waste materials to be reused or recycled where possible.
- On-site construction waste will be minimal as the tower sections will be largely preassembled and specified quantities of construction materials will be ordered and delivered.
- Waste streams will be separated to maximise opportunities for reuse and recycling, and stored and labelled to ensure each type of waste is handled in the most appropriate and efficient way.
- Where recycling is not feasible, waste will be collected and stored in designated waste storage areas for collection by an authorised contractor for off-site disposal at a licenced waste facility.
- Waste will be managed in accordance with a Waste Management and Minimisation Plan to be prepared for Project construction and operations.

19.2. Setting the Context

This section provides context for waste management for the Project. It describes:

- the relevant EIS Guidelines
- relevant requirements in legislation and other standards
- views of stakeholders and the environmental and social outcomes they would like the Project to meet
- Assessment methodology for waste management.

19.2.1. EIS Guidelines

The EIS Guidelines require a description of potential waste sources generated from the construction and operation of the Project, with details of waste disposal methods, including possibilities for reuse and recycling and interim and final waste disposal locations as set out in Table 19-1. The EIS Guidelines also require preparation of a waste management and minimisation plan for construction and operations.

Table 19-1: EIS Guidelines addressed in the Waste Management chapter

EIS Guidelines and Assessment Requirements	Assessment level
Construction, Operation and Maintenance Effects	
<i>Assessment Requirement 15:</i> The construction and operation of the proposal would require a range of impacts to be minimised, mitigated and monitored through an environmental management plan framework.	
<ul style="list-style-type: none"> • 15.2: Outline the sources of waste and methods of disposing waste material, including reference to management of vegetation removed, indication of temporary and final locations for spoil and other waste and the possibilities for reuse or recycling of all waste streams. Provide details of a waste management plan. 	Standard
<ul style="list-style-type: none"> • 15.3: Describe the likely impact and measures for the control of dust, vibration, noise, emissions, drag-out (i.e. onto the public roads) and litter during both construction and maintenance. 	Standard

EIS Guidelines and Assessment Requirements	Assessment level
<ul style="list-style-type: none"> 15.9: Outline the approximate size of the construction workforce including any need for any construction workers camps or accommodation. Describe the location and management of accommodation camps including sources of water and power, and the management of waste, wastewater and noise impacts. 	Standard
<p>Specialist reports and details</p> <p>A waste management and minimisation plan (for construction and operation) detailing the sources of waste including spoil and removed vegetation, the location of waste management storage areas (including the separation of waste streams, such as recyclables, hard waste and e-waste) and disposal facilities located on site or within laydown areas and provide details of how these facilities will be serviced.</p> <p>Details of any proposed wastewater management, including segregation, collection, treatment, storage, reuse and disposal of wastewater</p>	

Assessment requirements identified in Table 19-1 which are not addressed in this chapter are listed in Table 19-2 together with the applicable chapter.

Table 19-2: Assessment requirements addressed in other chapters

Assessment Requirement	Chapter
15.2 Management of removed vegetation	Chapter 7 Project Description
15.2 Management of soil during vegetation removal	Chapter 10 Physical Environment
15.3 Dust and emissions impacts during construction and maintenance	Chapter 14 Air Quality
15.3 Noise and vibration impacts during construction	Chapter 15 Noise and Vibration
15.3 Impacts and control of drag-out onto public roads	Chapter 16 Traffic and Transport
15.9 Noise impacts from construction camps	Chapter 15 Noise and Vibration
15.9 Construction workforce size and location and management of accommodation camps	Chapter 7 Project Description Chapter 9 Land Use and Tenure Chapter 10 Physical Environment Chapter 17 Socio-Economic Environment
15.9 Management of wastewater disposal	Chapter 10 Physical Environment

19.2.2. Requirements in legislation and other standards

The *Environment Protection Act 1993* (EP Act) sets out the general environmental duty to take all reasonable and practical steps to prevent or minimise any resulting environmental harm. This requirement includes the management of waste.

The EP Act prescribes the waste management hierarchy (refer Figure 19-1) in the order of priority as follows:

- a) avoidance of the production of waste
- b) minimisation of the production of waste
- c) reuse of waste
- d) recycling of waste
- e) recovery of energy and other resources from waste
- f) treatment of waste to reduce potentially degrading impacts
- g) disposal of waste in an environmentally sound manner.

The EP Act also provides listed wastes which have specific requirements due to their potentially contaminating nature.

The *Environment Protection (Waste to Resources) Policy 2010* (Waste to Resources EPP) prescribes the general waste management obligations. The primary objective of the Waste to Resources EPP is to achieve sustainable waste management by applying the waste management hierarchy consistently with the principles of ecologically sustainable development. In order to meet the Waste to Resources EPP waste management objective, waste management should:

- promote best practice and accountable waste management
- include effective recording, monitoring and reporting systems for the treatment, transportation and disposal of waste and other matter
- promote environmental responsibility and involvement in waste avoidance, waste minimisation and waste management within the community.

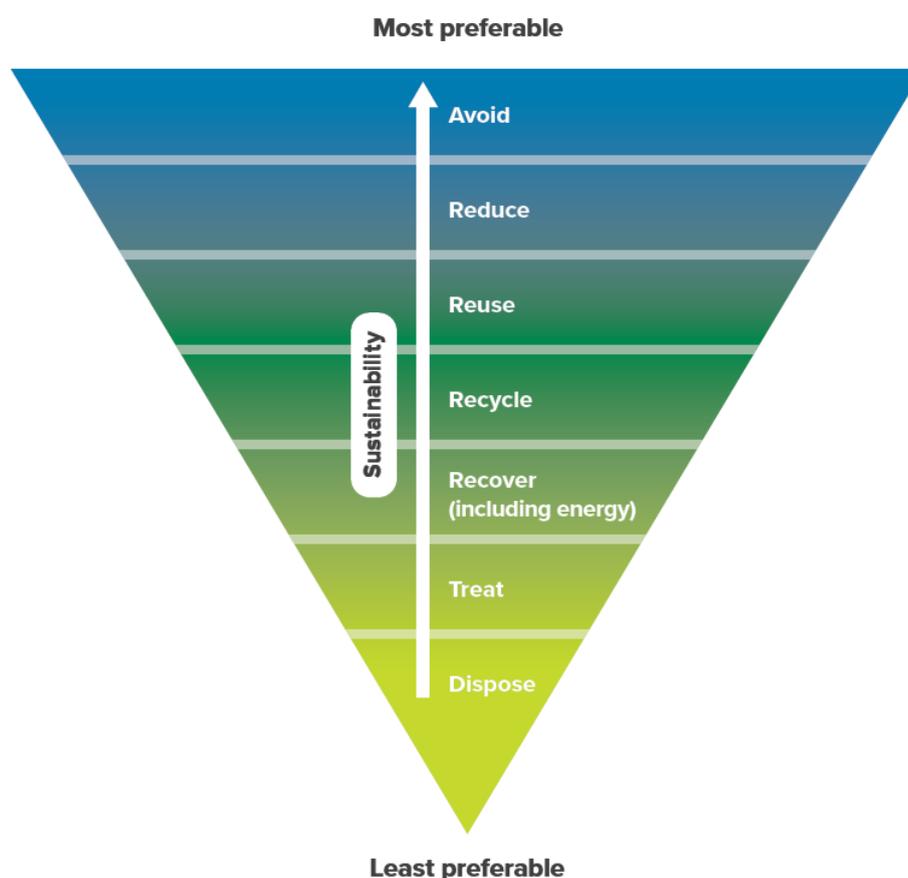


Figure 19-1: Waste management hierarchy

The *Environment Protection (Water Quality) Policy 2015* (Water Quality EPP) also established under the EP Act aims to achieve the sustainable management of waters, by protecting or enhancing water quality while allowing economic and social development.

SA Waste Strategy

The current SA Waste Strategy 2015 – 2020 supports maximising the reuse, recycling and recovery of materials. Its mission is to achieve a resource efficient South Australia, by minimising South Australia’s demand on primary resources, and maximising the reuse, recycling and recovery of materials, using the framework of the waste management hierarchy and the principles of ecologically sustainable

development. A new waste strategy supporting the principle of circular economy is currently under development by the State government.

19.2.3. Views of stakeholders

Waste generation and subsequent management have not been specifically raised during community engagement for the Project. Details of community consultation are set out further in Chapter 6 Stakeholder Engagement.

19.2.4. Assessment method

The assessment for management of Project waste involved:

- reviewing the regulatory framework for waste management
- identifying waste generating activities and waste sources
- identifying the likely classification of waste in accordance with relevant legislation and guidelines
- identifying waste disposal options
- identifying waste management options and strategies.

19.3. Potential Waste Sources and Impacts

Potential sources of waste generated during construction and operation of the Project are described in Table 19-3.

Table 19-3: Potential sources of waste from the Project

Potential sources of waste	Project element and or activity	Construction	Operation
General construction	<ul style="list-style-type: none"> • Tower footings, land clearance for access and stringing tracks, substation and ancillary infrastructure, laydown areas, construction camp 	✓	
Spoil	<ul style="list-style-type: none"> • Spoil from excavation materials 	✓	
Potentially contaminated soil	<ul style="list-style-type: none"> • Tower footings, land clearance for access and stringing tracks, substation and ancillary infrastructure, laydown areas, construction camp 	✓	
Clean fill material	<ul style="list-style-type: none"> • Tower footings, land clearance for access and stringing tracks, substation and ancillary infrastructure, laydown areas, construction camp 	✓	
Vegetation and organic material	<ul style="list-style-type: none"> • Tower footings, land clearance for access and stringing tracks, substation and ancillary infrastructure, laydown areas, construction camp 	✓	✓
Wastewater	<ul style="list-style-type: none"> • Construction camp • Concrete batching 	✓	
Waste concrete	<ul style="list-style-type: none"> • Tower footings, substation and ancillary infrastructure 	✓	
Waste concrete	<ul style="list-style-type: none"> • Tower components, substation and ancillary infrastructure 	✓	
Conductor drums	<ul style="list-style-type: none"> • Tower components, substation and ancillary infrastructure 	✓	
Electrical conductors, insulators	<ul style="list-style-type: none"> • Tower components, substation and ancillary infrastructure 	✓	✓
Steel	<ul style="list-style-type: none"> • Tower components, tower footings, substation and ancillary infrastructure 	✓	

Potential sources of waste	Project element and or activity	Construction	Operation
Domestic waste	<ul style="list-style-type: none"> Construction camp waste (i.e. kitchen waste, paper, cardboard, plastics glass) 	✓	✓
Timber	<ul style="list-style-type: none"> Tower footings, land clearance for access tracks and stringing tracks, substation and ancillary infrastructure, laydown areas, construction camp 	✓	
Hazardous materials and chemicals	<ul style="list-style-type: none"> Tower footings, land clearance for access and stringing tracks, substation and ancillary infrastructure, laydown areas, construction camp 	✓	✓

Potential sources of impacts from Project generated waste sources include:

- procurement planning / ordering errors resulting in excess quantities of construction materials
- stockpiled cleared vegetation and spoil
- unsegregated stockpiling of waste
- incorrect disposal or reuse of soils as result of improper soil classification
- incorrect management of packaging resulting in the dispersal of plastic, paper, laminated wood and cardboard, leading to littering of the surrounding local environment
- incorrect waste management associated with domestic waste resulting in windblown rubbish and littering of the local environment
- incorrect management of wastewater resulting in contamination of the surrounding environment
- incorrect management of hazardous materials (such as fuels and oils) resulting in the contamination of the surrounding environment.

Potential impacts from waste generating activities on soils (stockpiling and contamination), water sourcing and use and wastewater disposal are assessed in Chapter 10 Physical Environment.

Strategies and options for the management of waste sources generated from the Project are described below in Section 19.4 and will be further detailed in the Waste Management and Minimisation Plan (refer Section 19.5). With appropriate and effective waste management measures in place to manage Project generated waste, waste related impacts to the local or surrounding environment from Project activities are not expected.

19.4. Waste Management

Waste management for the Project will be undertaken in accordance with the waste management hierarchy which underpins the objectives of the Waste to Resources EPP and in line with the South Australian Waste Strategy (EPA SA 2015). The waste management hierarchy (refer Figure 19-1) demonstrates the preferred approaches to waste management to ensure sustainable development and reuse of resources during construction and operation of the Project. Under the hierarchy, avoiding waste generation is most preferable and disposal of waste least preferable.

19.4.1. Avoidance and reduction of waste

The Project will be required to avoid waste generation and endeavour to reuse waste where practicable. Waste will be avoided through strategic selection of materials during design and purchasing which take into account options which may reduce waste generation for the Project. Careful planning for procurement of the specific types and quantities of materials required for construction activities, including the temporary construction camp will further minimise waste generation.

Measures to achieve avoidance and reduction of waste may include:

- development of a procurement policy which considers waste avoidance measures such as:
 - ordering site specific or prefabricated items where practicable to minimise surplus material
 - consideration of packaging material provided by suppliers during purchasing and reduce this requirement where possible, or consider returnable packaging
 - consideration of recycled items when selecting materials
 - consideration of reusable materials for meal packaging at accommodation camps
- refinement of waste stream estimates to ensure adequate on-site storage and waste segregation to facilitate recycling
- refinement of estimated volumes of materials for construction.

19.4.2. Reuse and recycling

Measures to separate waste streams will be implemented to maximise opportunities for reuse of waste materials on site. This includes segregation of wastes into appropriate dedicated bins or areas on site, or transportation to a designated recycling facility. The Project will reuse or recycle waste material where possible including concrete, timber, plastic, and metals (refer Table 19-4).

Table 19-4: Construction waste recycling and reuse

Waste source	Recycling options
Waste concrete	<ul style="list-style-type: none"> • Transport to another Project site for use. • Where this is not possible, waste concrete will be collected in washout bays, solidified and transported to a licensed facility for reuse or disposal.
Excess steel	<ul style="list-style-type: none"> • Recycle at other sites where applicable, or collect during and after construction and recycle via scrap metal recyclers.
Timber e.g. formwork, pallets etc.	<ul style="list-style-type: none"> • Reuse where applicable or return to supplier for reuse. • If not accepted by supplier, separate and dispose of at waste facility for mulching where applicable.
Conductor drums	<ul style="list-style-type: none"> • Return to supplier for reuse.
Electrical (HV and LV), conductors, insulators	<ul style="list-style-type: none"> • Return to supplier for reuse.
Vegetation and organic material	<ul style="list-style-type: none"> • Stockpile for use in rehabilitation where required.
Spoil from excavation materials	<ul style="list-style-type: none"> • Reuse in areas that require capping / rehabilitation. • If not required, remove from site using appropriate waste contractor.

19.4.3. Treatment and disposal

If waste materials cannot be reused on site, they will be collected by appropriately licensed contractors for offsite reuse, reprocessing, recycling or final disposal. Final disposal of wastes will be to a licensed waste facility that is suitable for the type and quantity of waste. Waste tracking forms will be provided to the waste facility upon arrival.

Measures to manage the treatment and disposal of waste materials during construction and operation include:

- ensuring wastes which cannot be reused or recycled and require disposal are clearly segregated from those which have the potential to be reused
- providing segregated bins for subcontractors to dispose of construction waste (i.e., metal, plastics and cardboard)

- inducting contractors and staff into site waste management practices
- disposing of hazardous materials in accordance with the handling and disposal requirements of the *Work Health and Safety Regulations 2012*
- disposing of general wastes in accordance with local council requirements
- ensuring camp ablutions facilities are installed in accordance with the On-site Wastewater Systems Code and the *South Australian Public Health (Wastewater) Regulations 2013*.

Only appropriately licensed transport contractors will be engaged to transport waste material off site. The contractors appointed to transport waste will be required to demonstrate and ensure that:

- they are licensed to transport the type of waste they are contracted to receive / handle
- waste is transported to a licensed facility capable of receiving the type of waste and quantity they are carrying
- waste is adequately covered during transport
- waste data forms are provided to the waste facility upon arrival.

19.4.4. Management of waste sources

In addition to the waste management measures for the Project aligned to the waste management hierarchy, specific waste source management options will be implemented across the Project site to ensure appropriate waste handling and to ensure waste-related impacts to the local and surrounding environment are minimised. Waste source management will be updated based on refinement of Project design and detailed in the Waste Management and Minimisation Plan (See Section 19.5).

Key waste sources anticipated during Project construction and operation and associated management options are described in Table 19-5.

Table 19-5: Waste sources and management options during Project construction and operation

Waste source	Management options	Construction	Operation
General construction	<ul style="list-style-type: none"> • Manage general construction waste in accordance with EP Act waste management hierarchy. • Classify all waste in accordance with the EPA SA 842/19 waste definitions guideline and separated into waste streams. • Classify construction waste material in accordance with the EPA SA 842/19 waste definitions guideline and separate into waste streams for reuse or recycling potential and stockpiled on site. • Clearly label waste in a secure storage area that ensures waste is contained and managed in the most appropriate and efficient manner i.e. reuse, recycled, disposed. • Store electrical waste for collection by an authorised contractor for recycling offsite, where feasible, or dispose at an appropriately licenced facility. • Where offsite disposal is required, dispose to a suitable licensed facility by an appropriately licensed transport contractor in line with EPA SA requirements. 	✓	
Spoil from excavation materials	<ul style="list-style-type: none"> • Use spoil material from excavation works on site where appropriate (e.g. for capping of access roads, spread between tower footings). • Where not suitable for on-site use, use spoil for other purposes such as capping offsite, or classify and take offsite to a licenced waste management facility that is permitted to accept that waste for reuse, recycling or disposal. 	✓	

Waste source	Management options	Construction	Operation
Contaminated soil	<ul style="list-style-type: none"> Classify soil by an appropriately qualified environmental practitioner in line with best practice and in accordance with the CEMP. In the unlikely event that contaminated soils are encountered, segregate soils from the surrounding environment to prevent cross contamination and remove from site for remediation or disposal according to the nature of contamination. 	✓	
Stockpiled soils / clean fill material	<ul style="list-style-type: none"> Locate temporary topsoil stockpiles in areas clear of vegetation as far as practicable and away from defined watercourses to reduce the potential for surface water erosion impacts to creek lines. Re-spread stockpiled topsoil following completion of construction activities (as far as practicable and subject to suitability) and leave sites to naturally revegetate. Manage soil stockpiles in accordance with the EPA SA Guideline for stockpile management. Size of stockpiles typically below 2 m in height (to be determined by material quantity requirements, space availability, stockpile stability and safety). 	✓	
Vegetation and organic material	<ul style="list-style-type: none"> Stockpile cleared vegetation for use in rehabilitation where required. Place cleared vegetation stockpiled during access and clearing over returned topsoil to assist in natural regeneration. Dispose of noxious weeds in accordance with relevant guidelines / requirements. 	✓	✓
Wastewater	<ul style="list-style-type: none"> Manage camp wastewater in accordance with health regulations and relevant EPA SA requirements. Alternatively treat sewage for irrigation over a pre-approved disposal area. Use licensed contractors where wastewater is removed for offsite treatment or disposal. 	✓	
Waste concrete	<ul style="list-style-type: none"> Transport waste concrete to other sites for use. Where this is not possible, waste concrete will be collected in washout bays, solidified and transported to a licensed facility for re-use or disposal. 	✓	
Conductor drums	<ul style="list-style-type: none"> Return conductor drums to supplier for reuse. 	✓	
Electrical (HV and LV), conductors, insulators	<ul style="list-style-type: none"> Return all waste electrical material to supplier for reuse. 	✓	✓
Steel	<ul style="list-style-type: none"> Recycle steel components at other sites where applicable or collect during and after construction for recycling via authorised scrap metal recyclers. 	✓	
Domestic waste	<ul style="list-style-type: none"> Store waste containing food appropriately (covered), and regularly remove from site for disposal to reduce the likelihood of attracting pests and vermin (including birds) and to prevent the occurrence of windblown rubbish. Store recyclable materials such as paper, cardboard, plastics, glass, ferrous, and non-ferrous containers at recycling bins for collection by an authorised contractor and recycling off site. Where recycling is not feasible, collect waste and store in designated waste storage areas for collection by an 	✓	✓

Waste source	Management options	Construction	Operation
	authorised contractor for off-site disposal at a licenced waste facility.		
Timber (e.g. formwork, pallets etc)	<ul style="list-style-type: none"> Re-use excess and / or waste timber material where applicable or return to the supplier for reuse. If timber is not accepted by the supplier, separate timber and dispose of at waste facility for mulching where applicable. 	✓	
Hazardous materials and chemicals	<ul style="list-style-type: none"> Dispose of all waste hazardous substances to a suitably licensed facility by an appropriately licensed transport contractor, in line with state legislation and EPA SA requirements. Collect waste from construction vehicle and plant maintenance activities and store in designated waste storage areas for collection by an authorised contractor for off site disposal. Store containers holding oil, grease and lubricants separately for recycling / return to supplier or disposal as hazardous waste Store waste oil and oil filters stored in recycling bins for collection by an authorised contractor and recycled off site (where feasible). Handle fuels in accordance with relevant standards and guidelines. Bund diesel fuel storages at laydown areas. Store chemicals and fuels in appropriate containers suitable for purpose. Separate hazardous materials and store in accordance with relevant legislation and regulations. Clean up any spills in accordance with relevant guidelines. 	✓	✓

19.5. Waste Management and Minimisation Plan

A Waste Management and Minimisation Plan will be prepared for the Project and will detail the sources of waste from Project construction and operation and the measures to be implemented to manage, reuse, recycle and safely dispose of the identified waste.

The Waste Management and Minimisation Plan will describe measures to minimise mismanagement of construction waste, unnecessary loss of vegetation, cross contamination of soil and release of hazardous chemicals to the environment and windblown rubbish. The plan will detail appropriate management and mitigation controls that will be implemented to avoid and or minimise potential impacts associated with waste generation from the Project.

As part of the Waste Minimisation and Management Plan, a monitoring program will be developed to ensure the measures put in place to manage waste (e.g. collection and storage areas, licensed contractors) are inspected / reviewed, maintained and updated if required. The monitoring programs will be implemented during the construction phase and will continue during the operational phase of the Project.