CHAPTER 21

Waste

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21. Waste

This chapter provides a summary of the waste impact assessment undertaken for the Inland Rail—Illabo to Stockinbingal project (the proposal). It describes the existing environment, assesses the impacts of construction and operation of the proposal, and outlines the recommended mitigation and management measures to minimise waste arisings and increase waste diversion from landfill.

21.1 Overview

Potential impacts from waste have been minimised by designing the proposal so that excavated material generated (a total of around 1.5 million cubic metres (m^3)) would be reused within the track formation or construction, as far as practicable.

During construction, waste generated would include packaging waste, such as pallets, plastic film wrap, cable reels, and metal straps/bands, and by-products of the construction process, such as concrete, wood, metal and unusable ballast. There are a range of potential impacts if waste is not managed appropriately, including:

- sediment and erosion from waste excavation and handling
- odours and dust from improper stockpiling/storage of spoil and other wastes
- traffic due to haulage of spoil to reuse locations (such as use for fill) and/or disposal locations.

To address these impacts, waste measures would be implemented under the Construction Environmental Management Plan (CEMP), which would include the implementation of waste targets for the proposal, requirements for waste segregation, and waste mitigation and management measures for the waste types and quantities, including contingencies for any unexpected waste volumes.

During operation, minimal waste would be generated during maintenance activities, including green waste, spoil, and other waste streams (e.g. concrete sleepers and rails) and potential impacts (e.g. from inappropriate waste transport) could arise from inappropriate management.

To address these impacts, general waste streams and waste generated from track maintenance procedures would be managed in accordance with ARTC's existing operational maintenance requirements and waste hierarchy principles, and the impact is expected to be minimal.

21.2 Approach

21.2.1 Legislative and policy context to the assessment

Key legislation relevant to the management of waste include:

- Protection of the Environment Operations Act 1997 (NSW) (POEO Act)

  The POEO Act establishes the procedures for environmental control, and for issuing environmental protection licences regarding matters such as waste, air, water, and noise.
- Protection of the Environment Operations (Waste) Regulation 2014 (the Waste Regulation):

  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.
- *Waste Avoidance and Resource Recovery Act 2001* (NSW)

  This Act promotes waste avoidance and resource recovery to achieve a continual reduction in waste generation. It also aims to ensure that resource management options are considered in line with the waste hierarchy (see section 21.5.4 for more details).

Other waste-related documents have also been reviewed as part of this assessment. These include:

- *Australian Dangerous Goods Code* (National Transport Commission, 2020)
- Dangerous Goods (Road and Rail Transport) Regulation 2009
- *Infrastructure Sustainability Technical Manual v1.2* (Infrastructure Sustainability Council of Australia (ISCA), 2017)
- *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and Volume 2 (A. Installation of Services; B. Waste Landfills; C. Unsealed Roads; D. Main Roads; E. Mines and Quarries) (Department of Environment and Climate Change (DECC), 2008)
- National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998

- *Waste Classification Guidelines—Part 1: Classification of Waste* (NSW Environment Protection Authority (EPA), 2014a) (Waste Classification Guidelines)
- NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA, 2014b).

21.2.2 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements (SEARs) relevant to waste, together with where they are addressed in the EIS, are provided in Appendix A.

21.2.3 Methodology

The waste impact assessment involved:

- a review of regulatory frameworks relating to waste management
- identification of potential waste-generating activities
- classification of waste arisings into waste classes, as applicable
- quantification of each waste type likely to be generated
- identification of potential risks associated with waste arisings from the proposal
- identification of waste management measures.

Estimates of waste arisings from the proposal are indicative only and may differ from the amount actually generated. Nonetheless, the waste management measures identified from the waste impact assessment remain applicable to the proposal in minimising waste generation and landfill disposal.

21.2.3.1 Definition of waste

Schedule 5 of the POEO Act defines waste as:

- 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
- any discarded, rejected, unwanted, surplus or abandoned substance
- 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
- any processed, recycled, re-used 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
- any substance prescribed by the regulations to be waste.

The ARTC *Earthworks Materials Management Specification* (ARTC, 2020b), Appendix B ETC-08-03 Rev1.3 and ETC-08-04 also includes some other definitions relevant to various wastes. These include:

- earth excavation: rippable or excavatable material. All materials such as earth, clay, sand, gravel, weathered or loose rocks, which can be removed by ripping or excavation, without regard to stockpiling, loading or carting, as defined for bulk excavation and confined excavation non-rippable materials
- fill: earth or rock materials placed as part of the construction process
- spoil: material surplus to the contract requirements that will be disposed of on or offsite
- topsoil: the upper most layer of the soil, usually dark in colour and rich in organic material.

All excess excavated material from the construction works for spoil or disposal will be assessed in accordance with ARTC (2020b) Appendix B ETC-08-03 Rev1.3.

21.2.3.2 Waste classification

Waste in NSW is classified into six waste classes based on the level of risk posed to the environment and human health. These are: general solid waste (non-putrescible), general solid waste (putrescible), restricted solid waste, hazardous waste, liquid waste and special waste. Descriptions of each are outlined in the POEO Act, the Waste Regulation and supporting guidelines, such as the Waste Classification Guidelines. Most waste can generally be pre-classified into the waste classes above and would not require testing; however, any waste that is unable to be pre-classified may need to be tested to determine its classification in accordance with the POEO Act and subordinate legislation.

21.2.3.3 Waste strategy

ARTC policies and targets

ARTC has committed to achieving landfill diversion targets shown in Table 21-1 as per the *Inland Rail Sustainability Strategy*. These waste targets have been taken into consideration as part of the design, construction and operation stages of the proposal and are aligned with the waste targets identified in the Infrastructure Sustainability (IS) ratings developed by ISCA.

TABLE 21-1: ARTC WASTE-RELATED INLAND RAIL COMMITMENTS

Optimise resource efficiency and waste management	
Landfill diversion target	80–100% by volume of spoil
	50–90% by volume of inert and non-hazardous waste
	40–60% by volume of office waste

21.2.4 Risks identified

An environmental risk assessment was undertaken for the proposal (see Appendix G: Environmental risk assessment).

The environmental risk from waste is potentially considerable and requires targeted management/mitigation; however, designs have been optimised to minimise waste generation from the proposal as far as practicable.

Potential impacts associated with waste include generation of excess spoil that cannot be reused onsite (unsuitable for reuse or insufficient space) and needs to be disposed of.

Based on the risk assessment of the proposal, these are considered to be of low risk.

21.2.5 How potential impacts have been avoided/minimised

Potential impacts from waste may be avoided and minimised by:

- managing wastes in accordance with relevant legislative and policy requirements, as identified in section 21.5
- designing, constructing and operating the proposal in line with the principles of the waste mitigation hierarchy
- implementing waste management measures detailed within section 21.5
- managing hazardous waste in accordance with the mitigation measures provided in Chapter 20: Soils and contamination.

21.3 Impact assessment—construction

21.3.1 Waste-generating activities

The following activities are likely to generate waste during construction of the proposal:

- site preparation, including:
  - clearing and grubbing
  - topsoil stripping
  - site compound establishment
  - haul roads, access roads and laydown construction
  - fencing (temporary and permanent)
- cut-and-fill earthworks (resulting in disposal of surplus spoil, as detailed Table 21-2)
- drainage structure demolition, replacement or construction
- culvert and bridge demolition, replacement or construction
- welding
- ballasting and tamping
- level crossing upgrading or consolidation
- site compound operation
- plant and equipment.

In addition, planning for a workforce accommodation camp is currently underway and details (including an assessment of waste management impacts and mitigation measures for the camp) are presented in Appendix I: Workforce accommodation camp assessment).

Waste from site preparation may include vegetation, roots, tree stumps and general rubbish and debris.

Site compounds and storage facilities will be provided—some with office facilities and amenities. The establishment of these site compounds generate small quantities of construction waste, such as metals, wood, concrete, etc.

Wastewater generated by site compound operation would include grey water and sewerage from site amenities and wash-down water used for vehicles and amenities, which would be transported for offsite disposal.

Food waste, waste paper and cardboard, plastic, metal (including aluminium cans), glass, and electrical waste would be generated by construction staff, as well as from any office facilities included within the site compounds. Maintenance fluids generated during plant and equipment operation, including paints, solvents, lubricants and oils. Hydrocarbon and water mixtures or emulsions would be generated in plant and equipment wash-down areas within site compounds.

Waste generated during construction would include packaging waste such as pallets, plastic film wrap, cable reels, and metal straps/bands; and by-products of the construction process such as concrete, wood, metal and ballast.

21.3.1.1 Indicative waste classes and estimated quantities to be generated

Table 21-2 summarises the potential waste types, their waste class and quantities estimated to be generated during construction. Most of the waste arisings is likely to be classed as general solid waste (non-putrescible).

These estimations, and their waste classification, would be confirmed during further design development and incorporated into the Construction Environmental Management Plan (CEMP) prepared for the proposal.

TABLE 21-2: CONSTRUCTION WASTE CLASSIFICATION AND QUANTITIES

Activity	Waste type	Waste classification	Estimated quantity
Site clearing and grubbing	Green waste (uncontaminated)	General solid waste (non-putrescible)	Zero offsite—stockpiled on site and reused
	Rubbish and debris	General solid waste (non-putrescible)	100 tonnes (t)
Topsoil stripping	Topsoil (uncontaminated)	General solid waste (non-putrescible) or virgin excavated natural material	Zero offsite—stockpiled onsite and reused
Rail formation	Rail sleepers and ballast (uncontaminated)	General solid waste (non-putrescible)	3.0 kilometres (km)
Site compound establishment	Concrete	General solid waste (non-putrescible)	100 t
	Metal	General solid waste (non-putrescible)	10 t
	Wood	General solid waste (non-putrescible)	10 t
	Glass	General solid waste (non-putrescible)	<1 t
	Plastic	General solid waste (non-putrescible)	<1 t
Fencing (temporary and permanent)	Metal	General solid waste (non-putrescible)	10.5 km
	Timber	General solid waste (non-putrescible)	21 km
Cut-and-fill earthworks	Excavated material	General solid waste (non-putrescible) or virgin excavated natural material	Approximately 1.5 million m^3 for reuse onsite where practicable
	Contaminated spoil and ballast	Special waste	<1 t Further investigations required
Demolition and replacement of structures such as culverts, bridges, drainage structures, farming structures	Wood	General solid waste (non-putrescible)	<1 t
	Concrete	General solid waste (non-putrescible)	460 m^3
	Metal	General solid waste (non-putrescible)	100 m^3
	Potential hazardous building materials (including asbestos)	Special waste	Further investigations required

Activity	Waste type	Waste classification	Estimated quantity
Welding	Metal	General solid waste (non-putrescible)	Rail off cut kept, other minimal (<1 t)
Site compound operations	Food waste	General solid waste (non-putrescible)	<1 t
	Water	Liquid waste	800 megalitres (ML)
	Paper	General solid waste (non-putrescible)	1.5 t
	Cardboard	General solid waste (non-putrescible)	2.5 t
	Plastic	General solid waste (non-putrescible)	<1 t
	Glass	General solid waste (non-putrescible)	<1 t
	Metal	General solid waste (non-putrescible)	30 t
	Electricals	General solid waste (non-putrescible)	2 t
	Vehicle/plant equipment maintenance	General solid waste (non-putrescible): Drained oil filters: ▸ rags and oily rags (only if they contain non-volatile petroleum hydrocarbons and no free liquids). Hazardous waste: ▸ containers ▸ holding oil ▸ grease ▸ lubricants (if residues have not been removed by washing)	<1 t

21.3.1.2 Potential impacts if waste is not managed appropriately

Potential impacts associated with aspects of waste generation and management during construction are summarised in Table 21-3.

TABLE 21-3: POTENTIAL IMPACTS ASSOCIATED WITH WASTE GENERATION AND MANAGEMENT

Aspect of waste management	Potential impacts
Generation of waste, including excavation and handling	▸ Dust from excavation, handling and movement of waste onsite ▸ Erosion and sedimentation due to runoff from excavations ▸ Mobilisation of acid sulfate or saline soils, where present ▸ Sediment laden/contaminated runoff and leachate generation, which, if located near to receiving watercourses, can impact water quality ▸ Noise from plant and equipment movement
Storage of and segregation of waste on site	▸ Odours and dust from stockpiling/storage of spoil and other wastes ▸ Cross-contamination of wastes due to improper segregation ▸ Erosion and sedimentation due to runoff from temporary stockpiles ▸ Sediment laden/contaminated runoff and leachate generation, which, if located near to receiving watercourses, can impact water quality ▸ Contamination of soils due to improper storage
Waste transportation	▸ Dust from loading waste onto vehicles and movement of waste collection on haul roads ▸ Road traffic noise from waste collection vehicles and from movement of spoil ▸ Traffic due to haulage of spoil to reuse locations (such as use for fill) and/or disposal locations ▸ Odours from loading waste onto vehicles and movement of waste collection vehicles to disposal or recycling facilities ▸ Mud tracking on road from waste collection vehicles
Non-classified or incorrectly classified waste transport and disposal	▸ Regulatory non-compliance ▸ Contamination of recycling facilities/landfills ▸ Contamination of soils, groundwater and/or surface water
Unlicensed waste contractors transporting waste	▸ Regulatory non-compliance ▸ Potential illegal dumping of waste

The potential impacts associated with excavating and disturbing soil, and associated impacts on water quality and groundwater, are considered in Chapter 13: Water quality and Chapter 20: Soils and contamination. The assessments concluded that impacts of sediment laden/contaminated runoff and leachate generation, mobilisation of acid sulfate or saline soils, and generation of contamination would be minimal due to the low level of contamination; low potential to encounter acid and saline soils within the proposal site; limited extent of sensitive receivers; progressive and short-term nature of construction work areas (as detailed in Section 8.2.14); and implementation of the proposed mitigation measures provided in these chapters.

The water quality assessment (refer to Chapter 13: Water quality) considers potential water quality impacts of construction activities, including surface water runoff control for earthworks. The soil and water management plan prepared and implemented as part of the CEMP would include measures to manage issues associated with erosion and sedimentation that have the potential to impact on water quality. Impacts on water quality as a result of handling and storage of wastes would be minimal, with appropriate storage of waste and implementation of the measures provided in Chapter 13 and section 21.5.

The air quality assessment (refer to Chapter 24: Air quality) considers the potential for dust associated with construction activities, including the movement of spoil and use of key construction infrastructure. The assessment concluded that dust generated by construction would be limited to sensitive receivers located within the separation distances identified in the assessment. Potential air quality impacts would be managed by implementing the measures provided in Chapter 24: Air quality, including developing and implementing a construction air quality management plan as part of the CEMP.

The traffic and transport assessment (refer to Chapter 11: Traffic, transport and access) considers potential traffic impacts during construction, including movement of vehicles transporting spoil. Potential traffic impacts would be managed by implementing the measures provided in Chapter 11: Traffic, transport and access, including preparing and implementing a construction traffic, transport and access management plan as part of the CEMP.

The construction noise and vibration assessment (refer to Chapter 16: Noise and vibration) includes consideration of potential noise and vibration impacts from earthworks (spoil generation), operation of construction compounds and road traffic noise. With the implementation of the mitigation measures provided in Chapter 16: Noise and vibration, noise impacts associated with waste generation, handling and transport are expected to be effectively managed.

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 21.3
- additional waste mitigation measures provided in section 21.5 are implemented.

21.3.1.3 Excavated material management

The main sources of excavated material are likely to come from the earthworks and site preparation activities, primarily at sections of the alignment in cutting, with smaller amounts to result from surrounding construction activities such as construction of cess drains. All suitable, uncontaminated topsoil and subsoil would be stripped for reuse within the proposal (as fill material for bulk earthworks). All excess excavated material from the construction works for spoil or disposal will be assessed in accordance with ARTC (2020b).

A total of 1.5 million m^3 of material is expected to be excavated and reused as far as practicable. Most of this material will be reused within the sections it is sourced/cut; however, some material will need to be hauled to other sections for reuse.

Some excavated material appropriate for reuse within the proposal would be treated and stockpiled at construction compounds onsite, in accordance with best-practice standards during construction, to ensure it is protected from degradation, erosion or mixing with fill or waste. It is estimated that about 113,000 m^3 of material would need to be processed onsite for reuse.

While no contaminated material was identified from the contamination assessment detailed in Chapter 20: Soils and contamination, small quantities of contaminated material may be identified within future design or investigative works. Any contaminated material would be managed onsite or offsite, where possible, in accordance with ARTC and regulatory requirements. Where onsite management is not feasible, the material would be disposed offsite at suitably licensed facilities.

21.3.1.4 Waste and spoil locations

Waste would be stored temporarily within the proposal site, including at construction compounds and the proposed workforce accommodation camp (refer to Appendix I). The exact location and volumes of waste stockpiles would be confirmed by the construction contractor(s) during detailed design.

21.3.1.5 Waste disposal

A majority of rural landfills are operated by local councils, which only accept domestic waste. Given this, larger landfills and transfer stations are the preferred waste facilities for disposal as they generally accept both domestic and commercial waste. Arrangements would be made with suitable waste management facilities to ensure that the waste types and quantities from the proposal can be accepted prior to haulage.

Table 21-4 lists some of the waste management facilities located within the region that may be considered for the disposal of waste from the proposal.

TABLE 21-4: LOCAL WASTE FACILITIES

Facility name	Waste types accepted
Cootamundra Waste Depot	General waste, green waste, sorted recyclables, concrete and rubble, metals, clean soil, industrial waste, asbestos (EPA compliant) and other wastes including e-waste, stumps and logs and tyres.
Gundagai Burra Road Waste Depot	General waste, green waste, sorted recyclables, concrete and rubble, metals, clean soil, industrial waste, and other wastes, including e-waste, stumps and logs and tyres.
Junee Landfill Facility	General waste, green waste, sorted recyclables, fill, demolition/trade waste (including asbestos), tyres and other wastes (e.g. motor oil, e-waste, paint, gas bottles, whitegoods).

21.4 Impact assessment—operation

21.4.1 Waste generation from operating activities

Waste generated from operating activities of the proposal are likely to be minimal; most of the waste is expected to come from track maintenance procedures.

Small quantities of green waste may be generated during maintenance activities as a result of vegetation control, herbicide use and maintenance of the entire rail corridor. Other general debris and litter are expected to be collected during maintenance, under existing ARTC operations. Spoil (fouled ballast materials) and other waste streams (such as concrete sleepers, rails, timber and electricals) are also generated during maintenance. These activities already occur under ARTC's existing operational conditions.

During operations, maintenance of plant and vehicles would be conducted at offsite facilities and, as such, these activities do not form part of the proposal. The maintenance of locomotives and rollingstock will also not be carried out at the proposal site or as part of the proposal and, therefore, this has not been considered as an impact of the proposal.

21.4.2 Waste disposal

Waste generated during operation of the proposal would be managed as part of ARTC operational procedures. This may include the use of landfills identified in section 21.3.1.5.

21.5 Mitigation and management

21.5.1 Approach to mitigation and management

ARTC is committed to minimising the environmental impact of the proposal and is investigating opportunities to reduce actual impact areas where practicable. Mitigation and management measures for waste can be incorporated into the design, construction and operation of the proposal, in line with relevant waste regulations and existing ARTC policy, in order to ensure consistency in the waste management procedures throughout the entirety of the proposal.

Waste management during construction and/or operation would also be undertaken in accordance with ARTC's existing procedures and the relevant environment protection licences (EPLs). Implementation of these measures would help ensure that waste from the proposal is managed in accordance with any legislative requirements for waste disposal and waste tracking. In addition, waste auditing and monitoring would be undertaken to ensure that the construction waste management plan (WMP) is scaled with actual waste volumes.

A WMP will be developed for construction of the proposal. The WMP will cover waste types; estimated quantities for management; excavated material management and mitigation strategies; as well as contingencies for any unexpected waste volumes that may arise throughout construction of the proposal.

There is the potential for unexpected waste to be generated, including potentially contaminated material. During construction planning, suitable areas would be identified to allow for handling of unexpected waste materials, including contaminated materials. Any previously unidentified contaminated material would be managed

in accordance with the unexpected contamination finds protocol (refer to Chapter 20: Soils and contamination). Any spoil classified as restricted and/or special waste 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.

Continency measures (disposal) for wastes that cannot be avoided, reused, recycled or treated are also outlined in Table 21-7. The WMP will be developed as part of the CEMP and will comply with the conditions of approval, relevant regulatory requirements (including waste and occupational health and safety legislation), and industry standards and guidelines. The WMP will identify and demonstrate effective waste management measures to minimise waste during construction of the proposal.

The implementation of these mitigation measures will ensure impacts from potential residual risks or waste arisings from the proposal are minimised.

21.5.2 Expected effectiveness

ARTC would engage appropriately licensed waste contractors to manage the collection, recycling or disposal of waste that cannot be reused onsite. 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 proposal, by implementing the measures described in this section, is considered to be effective.

Implementation of these measures would help ensure that waste from the proposal is managed in an environmentally sound manner, and in accordance with any legislated requirements for waste disposal and waste tracking.

21.5.3 Interactions between mitigation measures

Chapter 20: Soils and contamination also contains mitigation measures that would be implemented to minimise potential waste impacts of the proposal.

21.5.4 Waste management hierarchy

All wastes generated during the construction and operation of the proposal are to be effectively stored, handled, treated, reused, recycled and/or disposed of lawfully and in a manner, that protects environmental values. Waste generated from the proposal will be managed in line with waste management hierarchy, which aims to maximise waste diversion from landfill. Principals of the waste management hierarchy are described in Table 21-5.

TABLE 21-5: WASTE MANAGEMENT HIERARCHY

Activity	Approach
Avoid	Maximise efficiency and avoid unnecessary consumption through avoiding waste-generating products and behaviours.
Reduce/treat	Maximise efficiency and avoid unnecessary consumption through reducing the quantities of waste generating materials and behaviours required to be undertaken within the proposal.
Re-use	Re-use, recycling, reprocessing and energy recovery, consistent with the most efficient use of the recovered resources.
Dispose	Some types of waste, such as hazardous chemicals or asbestos, cannot be safely recycled and direct treatment or disposal is the most appropriate management option.

The principles of the waste management hierarchy will be applied for each waste type. Note that not all activities in the hierarchy will be applicable and some waste types that are not able to be reused or treated may require disposal.

21.5.5 Waste segregation

Throughout the proposal, waste will be segregated into six different waste streams to minimise contamination (and improve the quality of materials for recycling) as well as increase waste diversion from landfill. Each waste stream has been colour coded as shown in Table 21-6 and measures to manage the construction waste streams are provided in Table 21-7.

TABLE 21-6: COLOUR-CODING SCHEME FOR WASTE SEGREGATION

Waste type	Colour
General waste	RED
Paper, cardboard, cans and bottles	BLUE
Metal	GREY
Plastics	ORANGE
Green waste and organics	GREEN
Other	WHITE

TABLE 21-7: CONSTRUCTION WASTE MANAGEMENT MEASURES

Waste type	Hierarchy	Management measure and reduction opportunities
Green waste	Avoid	Clearing would be minimised by placing temporary infrastructure in cleared areas, where possible, as well as optimisation of the construction footprint to reduce the extent of clearing.
	Reduce	Areas to be cleared would be marked to reduce incidental clearing.
	Re-use	As far as practicable, cleared material would be chipped, mulched and stockpiled for reuse during finishing works. Materials with special habitat value, such as hollow bearing logs or trees, would be selectively removed for re-use or placed in nearby vegetated areas.
	Dispose	Noxious weeds would be disposed of in accordance with relevant guidelines/requirements.
Rubbish and debris	Avoid	All personnel onsite will be trained to be mindful of consumption behaviours to avoid generating waste where possible.
	Reduce	All personnel onsite will be provided with waste training on how to use the waste bin system at each site compound and the level of source separation of waste required onsite prior to drop-off at site compounds.
	Dispose	Any rubbish or debris that is not recyclable will be placed in the general waste bin for collection by an authorised contractor and disposed of offsite.
Food Waste	Recycle	Food waste that is free from contamination (i.e. no plastics, metals or paper/cardboard) would be stored in organics bins at each site compound, for collection by an authorised contractor, and sent for composting offsite.
	Dispose	Any food waste that is contaminated will be placed in the general waste bin at each site compound, for collection by an authorised contractor and disposed of offsite.
Wastewater	Dispose	Wastewater/sewage from site compound amenities/ablutions would be removed by an authorised contractor for disposal in accordance with regulatory requirements.
Excavated material	Reduce	The proposal is designed to adhere to the natural ground profile, where practicable, in order to reduce earthworks.
	Re-use	Excavated material is expected to be re-used either for track formation/ construction, where practicable, in accordance with the Earthworks Materials Management Guideline.
	Recycle	Surplus material that cannot be re-used is to be considered for onsite recycling, where practicable.
	Dispose	Only small quantities of contaminated spoil will require offsite disposal at a licenced facility.

Waste type	Hierarchy	Management measure and reduction opportunities
Topsoil	Re-use	Topsoil would be stockpiled for re-use during rehabilitation. Stockpiles would be managed to maintain soil structure and quality.
	Treat	Low-quality topsoil would be treated with ameliorants to improve structure and fertility.
	Dispose	Surplus or unusable topsoil would be disposed at locations within the rail corridor as far as practicable.
Concrete	Avoid	Precast elements would be used where possible (e.g. sleeper and culverts). Procurement of surplus concrete powder would be avoided by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.
	Re-use	Sleepers would be reclaimed and re-used, where appropriate, in line with ARTC procedures.
	Recycle	Concrete waste would be crushed and recycled where practicable.
	Dispose	Concrete waste that cannot be recycled would be collected and stored in designated storage areas for offsite disposal by an authorised contractor.
Ballast	Avoid	Procurement of surplus ballast would be avoided as far as practicable by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.
	Recycle	Surplus ballast that cannot be re-used is to be considered for onsite recycling, where practicable.
	Dispose	All unusable ballast would be re-used offsite where the requirements of ARTC's resource recovery order and exemption issued by the NSW EPA for excavated material* is met.
Metal	Avoid	Procurement of surplus metal, including rail, would be avoided, as far as practicable, by adhering to the procurement plan. Scrap metal would be reduced by limiting offcuts.
	Recycle	Suitable rail off-cuts or scrap metal (including metal bands from packaging of construction materials and hot waste from welding) would be reclaimed and reused as per ARTC procedures. Any materials not reused onsite will be stored for collection by an authorised contractor and recycled offsite. Market demand for this recyclable waste would also be considered.
Wood	Avoid	Procurement of surplus wood would be avoided, as far as practicable, by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.
	Re-use	Wood waste would be stored onsite for re-use, where practicable.
	Recycle	Wood waste that cannot be re-used onsite (including cable reels from packaging) would be collected in designated recycling containers for offsite disposal by an authorised contractor, where recycling is considered feasible. Market demand for this recyclable waste would be considered.
	Dispose	Any contaminated or treated wood that is not suitable for recycling will be stored in designated waste storage areas for collection by an authorised contractor for offsite disposal.
Glass	Recycle	Glass waste would be stored in dedicated glass bins at each site compound, for collection by an authorised contractor and recycled offsite, where feasible.
	Dispose	Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor offsite disposal.
Plastic	Avoid	Procurement of surplus plastic would be avoided, as far as practicable, by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.
	Recycle	Plastic waste would be stored in recycling bins at each site compound, for collection by an authorised contractor and recycled offsite.

Waste type	Hierarchy	Management measure and reduction opportunities
	Dispose	Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal.
Rubber	Avoid	Procurement of surplus rubber (e.g. gloves, earplugs, tyres) would be avoided as far as practicable by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.
	Dispose	Rubber waste will be disposed of in the general waste bin for collection by an authorised contractor for offsite disposal.
Paper	Avoid	Procurement of surplus paper would be avoided as far as practicable by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.
	Reduce	Waste paper from office/administration facilities would be minimised by enabling 'secure print' feature on all printers and by encouraging double-sided printing.
	Recycle	Waste paper would be stored in recycling bins at each site compound, for collection by an authorised contractor, and recycled offsite, where feasible.
	Dispose	Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal.
Cardboard	Avoid	Procurement of surplus cardboard would be avoided as far as practicable by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.
	Recycle	Waste cardboard would be stored in recycling bins at each site compound, for collection by an authorised contractor, and recycled offsite, where feasible.
	Dispose	Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite disposal.
Aluminium cans	Recycle	Aluminium scraps would be stored in recycling bins at each site compound, for collection by an authorised contractor, clubs or charities, and recycled offsite.
Electrical waste	Avoid	Procurement of surplus appliances and cabling would be avoided as far as practicable by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.
	Re-use	Product stewardship arrangements would be sought, with a view to some electrical appliances being re-used under return to supplier arrangements.
	Recycle	Electrical waste would be stored in dedicated bins at each site compound, for collection by an authorised contractor, and recycled offsite, where feasible. Market demand for this recyclable waste would also be considered.
	Dispose	Where recycling is not considered feasible, the waste would be collected and stored in designated waste storage areas for collection by an authorised contractor for offsite drop-off.
Oil, grease, lubricants, oily rags and filters	Avoid	Procurement of surplus oil, grease and lubricants would be avoided as far as practicable by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.
	Recycle	Only waste oil and oil filters will be stored at each site compound for collection by an authorised contractor, and recycled offsite, where feasible.
	Dispose	The waste 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.
Pallets	Avoid	Procurement of surplus pallets would be avoided as far as practicable by adhering to the Sustainable Procurement Guide and the NSW Government Resource Efficiency Policy.

Waste type	Hierarchy	Management measure and reduction opportunities
	Reduce	Delivery of material on pallets would be limited wherever possible. If materials have to be delivered to site on pallets, ensure that pallets are returned to the supplier at time of delivery, where practicable.
	Re-use	Product stewardship arrangements would be sought, with a view to pallets being re-used under the stewardship of the supplier.
	Recycle	Options to recover wood from pallets by chipping, for re-use as mulch, would be pursued where practicable (i.e. if untreated and uncontaminated).
	Dispose	Wood pallets not suitable for reuse or recycling will be stored in designated waste storage areas for collection by an authorised contractor for offsite drop-off.

* *Excavated material under ARTC's excavated material 2020 order and exemption includes soil, sand, ballast, rock or aggregate that is derived through activities within the rail corridor, and that satisfies the requirements of that order and exemption.*

TABLE 21-8: OPERATIONAL WASTE MANAGEMENT MEASURES

Waste type	Hierarchy	Management measure and reduction opportunities
Green waste	Re-use	As far as practicable, green waste generated from maintenance activities would be chipped, mulched and re-used for vegetation management or collected by an authorised contractor and recycled offsite.
	Dispose	Noxious weeds would be disposed of in accordance with relevant guidelines/requirements.
Rubbish and debris	Recycle	Rubbish and debris, and any unexpected waste, encountered during general track and corridor maintenance may include spoil, wood, concrete, electrical waste and other litter. Such wastes would be collected by an authorised contractor and recycled offsite, where recycling is considered feasible.
	Dispose	Where rubbish, debris and litter are not suitable to be reused, the waste would be collected by an authorised contractor and disposed offsite at a suitably licensed facility.

21.5.6 Recommended mitigation measures

The measures outlined in Table 21-9 sets the framework to achieve the specific waste-management objectives detailed in Table 21-7.

TABLE 21-9: WASTE MITIGATION AND MANAGEMENT MEASURES

Ref	Impact	Mitigation measure	Timing
WM1	Waste management	Detailed design would include measures to minimise spoil generation. This would include a focus on optimising the design to minimise spoil volumes and the reuse of material onsite.	Detailed design/ pre-construction
WM2	Waste management	A waste management plan would be prepared for the proposal, including: ▸ waste targets for the proposal ▸ estimated waste generation (volumes and types of waste arisings) ▸ waste mitigation and management measures for the waste types and quantities, and also contingencies for any unexpected waste volumes ▸ general protocols and performance objectives for keeping the worksite clean and tidy ▸ processes for monitoring, documenting and reporting waste types, volumes and how these arisings compare to waste targets (e.g. description of waste streams and estimated volumes, temporary waste storage areas and disposal locations on and offsite (including stockpiles and landfilling) as well as waste disposal and National Environmental Protection Measures (NEPM) criteria for disposal sites ▸ requirements for waste segregation (e.g. inert—including virgin excavated material, vegetation, building and demolition waste, concrete and asphalt; solid—such as food waste and litter, industrial/regulated—such as asbestos; hazardous—such as flammable liquids; liquid—such as sewage ▸ requirements for secure temporary storage, collection frequency and disposal/recycling requirements ▸ effluent management for construction staff amenities ▸ procedures and reporting/documentation requirements for ensuring waste transporters and receivers are appropriately licenced according to the type of waste ▸ requirements for training, inspections, audits, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction ▸ any other requirements necessary to comply with conditions of approval, subsequent approvals or regulatory requirements.	Construction

Ref	Impact	Mitigation measure	Timing
WM3	Waste management	All waste generated would be classified in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014a) and disposed of in accordance with the relevant requirements of the Protection of the Environment Operations (Waste) Regulation 2014.	Construction
WM4	Waste management	Operational waste, including general litter clean up, would be managed in accordance with ARTCs existing operational maintenance requirements and the waste hierarchy principles in the *Waste Avoidance and Resource Recovery Act 2001* (NSW).	Operation

21.5.7 Managing residual impacts

The potential impacts from waste were originally identified in the environmental risk assessment (see Appendix G). The (pre-mitigation) risks associated with these impacts, which were identified by the environmental risk assessment are provided in the Table 21-10. Further information on the approach to the environmental risk assessment, including descriptions of criteria and risk ratings, is provided in Appendix G.

The mitigation measures identified in Table 21-9 would be applied to manage these impacts identified. The significance of potential residual impacts (after application of these mitigation measures) is rated using the same approach as the original environmental risk assessment.

Provided the mitigation measures are implemented, the proposal poses a negligible-to-low risk of impacts from waste, as identified by the risk assessment in Table 21-10.

TABLE 21-10: RESIDUAL IMPACT ASSESSMENT—WASTE

Phase	Potential impacts	Pre-mitigated risk			Mitigation measures (refer to Table 21-9)	Residual risk			How residual impacts would be managed
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating	
Construction	Generation of excess spoil that cannot be reused onsite (unsuitable for reuse or insufficient space) and needs to be disposed of.	Possible	Moderate	Medium	WM-1 to WM-4	Possible	Minor	Low	n/a