SARAJI EAST MINING LEASE PROJECT

Environmental Impact Statement

Chapter 15
Waste

BMA
BHP Mitsubishi Alliance

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15.0 Waste

15.1 Introduction

BM Alliance Coal Operations Pty Ltd (BMA) is seeking approval to develop the Saraji East Mining Lease Project (the Project) involving a single-seam underground mine and supporting infrastructure on Mining Lease Application (MLA) 70383 and MLA 70459 adjacent to, and accessed through, the existing open cut mine void within Mining Lease (ML) 1775. The Project will be adjacent to, but largely operate independently from, the existing Saraji open cut mining operations located approximately 30 kilometres (km) north of Dysart, Queensland.

This chapter of the Environmental Impact Statement (EIS) provides an assessment of the anticipated waste streams from the construction and operation of the Project, describing the regulatory framework, characterising solid and liquid waste streams and expected quantities, and proposed mitigation and management strategies to address the residual risks associated with waste generation by the Project.

Mine waste is considered separately in **Chapter 10 Geochemistry and Mine Waste**. Industrial wastewater discharge and air emissions and associated with the Project are discussed separately in **Chapter 8 Surface Water Resources** and **Chapter 11 Air Quality and Greenhouse Gas**.

15.2 Legislation and policy

This section details how waste management is regulated to protect existing environmental values and highlights legislative drivers relevant to the construction, operation and decommissioning of the Project.

15.2.1 Commonwealth

National Waste Policy: Less Waste, More Resources (National Environment Protection Council, 2009)

The National Waste Policy: Less Waste, More Resources (Commonwealth of Australia, 2018) (National Waste Policy) provides a framework for collective action by businesses, governments, communities and individuals to collaborate, embrace innovation and develop technologies to achieve sustainable waste management up to 2030.

The policy focuses on waste avoidance, improved material recovery and use of recovered materials to help Australia move closer to a more circular economy that eliminates waste and improve economic, social and environmental outcomes. The policy identifies five principles underpinning waste management, recycling and resource recovery in a circular economy:

- avoid waste
- improve resource recovery
- increase use of recycled material and build demand and markets for recycled products
- better manage material flows to benefit human health, the environment, and the economy
- improve information to support innovation, guide investment and enable informed consumer decisions.

National Environment Protection Measures (Implementation) Act 1998

The *National Environment Protection Measures (Implementation) Act 1998* includes provisions for the implementation of National Environment Protection Measures (NEPMs) across the Commonwealth as binding legal instruments specifying national standards for a variety of environmental issues.

Key NEPMs of relevance to waste and resource management for the Project include:

- Movement of controlled waste between States and Territories NEPM

  The Movement of Controlled Waste between States and Territories NEPM establishes a national system to track interstate transport of potentially dangerous controlled wastes; its requirements are incorporated within Queensland legislation (Section 15.2.2).

- National Pollutant Inventory (NPI) NEPM

  The National Pollutant Inventory (NPI) National Environment Protection Measure (NEPM) is a publicly accessible national database of pollutants emitted to land, air and water from various industrial facilities and diffuse sources. It holds emission estimates for 93 toxic substances and the source and location of these emissions. The NPI does not include greenhouse gas emissions.

  BMA is required to comply with the NPI NEPM. The NPI Guide provides direction and trigger levels for reporting on emissions and contains emissions estimation techniques for specific activities (e.g. coal mining, fuel storage, etc.) (Department of the Environment, 2015). Subject to meeting thresholds, project waste emissions to air, land and water are estimated and reported annually in accordance with NPI requirements (Section 15.5.1).

- Assessment of site contamination NEPM

  The Site Contamination NEPM provides a very detailed and consistent process for investigating contaminated land and sets national health-based standards for determining the risk of contamination to human and environmental health. Prior to construction of certain facilities, BMA will assess potential contamination and compare levels of contaminants with the appropriate levels in accordance with this NEPM to protect against human and environmental harm (refer **Chapter 5 Land resources**).

Construction and Demolition Waste Guide—Recycling and reuse across the supply chain

This guide published by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (2011) outlines opportunities for business and industry to invest in activities to create profit and improve environmental outcomes by extracting valuable resources from construction and demolition waste streams.

Australian Code for the Transport of Dangerous Goods by Road and Rail

The Australian Dangerous Goods Code (Edition 7.6, 2018) sets out the technical requirements and guidelines for transportation of dangerous goods across Australia. Dangerous goods anticipated to be used by the Project are further described in **Chapter 20 Hazards, Health and Safety**.

15.2.2 State

In Queensland, the strategic framework and regulatory requirements for managing waste are defined within the *Environmental Protection Act 1994* (Qld) (EP Act) and subordinate Environmental Protection Regulation 2019 (Qld) (EP Regulation) and the *Waste Reduction and Recycling Act 2011* (Qld) and subordinate Waste Reduction and Recycling Regulation 2011 (Qld) (Waste Regulation).

Environmental Protection Act 1994

The EP Act establishes a general environmental duty and sets out a framework to prevent environmental harm, nuisance and contamination assessment, management and monitoring obligations implemented through the Act and subordinate legislation.

The EP Act defines “waste” as anything that is:

- left over, or an unwanted by-product, from an industrial, commercial, domestic, or other activity, or
- surplus to the industrial, commercial, domestic, or other activity generating wastes.

Waste generated during the construction, operation and decommissioning phases of the Project may be in solid, liquid or gaseous form and will be described in terms of their physical and chemical characteristics and estimated waste generation rates to assess potential impacts and suitable management strategies.

Environmental Protection Regulation 2019

Environmentally relevant activities

Under the EP Regulation, certain waste management activities are environmentally relevant activities (ERA) and require approval; in Queensland, resource activities and ancillary activities are authorised by an Environmental Authority (EA). Of the waste-related ERAs defined in Schedule 2 of the EP Regulation, ERA 63 – sewage treatment will be authorised as ancillary to the resource activity under the

EA for the Project. Project waste will be managed by waste management facilities and contractors who are licensed for:

- waste disposal (ERA 60)
- resource recovery and transfer facility operation (ERA 62).

Regulated waste

The EP Regulation establishes a waste tracking system, including obligations for generators, transporters and receivers of trackable waste to record, carry and keep prescribed information about the waste. Commencing on 4 February 2019, the Environmental Protection (Regulated Waste) Amendment Regulation 2018 (Qld) (Regulated Waste Regulation) provides a risk-based waste classification framework.

Regulated waste is now classified as:

- category 1 regulated waste (highest risk)
- category 2 regulated waste (moderate risk)
- not regulated waste / general waste (lowest risk).

Waste generators are responsible for classifying waste into a risk-based category by either:

- adopting a default waste category from Part 1 of Schedule 9 of the EP Regulation
- organising sampling and testing of the waste by an appropriately qualified person to demonstrate an appropriate risk-based category in accordance with Section 43 of the EP Regulation (tested waste).

Schedule 9 of the EP Regulation also provides a list of wastes that are not regulated waste. For the Project, this might include automotive equipment, computers, small batteries, treated timber and paint containers.

BMA intends to seek authorisation to extend the existing approvals for Saraji Mine (Environmental Authority (EA) EA Permit No. EPML 00862313) to dispose of scrap tyres from the Project within the spoil emplacements of the existing Saraji Mine pits to the extent approved by the relevant EA in accordance with Queensland's Operational policies for regulated waste (ESR/2015/1863, DES 2019) and Disposal and storage of scrap tyres at mine sites (ESR/2016/2380, DES 2016).

Land contamination

Land contamination can occur from inadequate environmental management and waste disposal practices or accidental spills. Land that is or has the potential to be contaminated by waste disposal activities or an accidental spill is required to be listed on the Environmental Management Register (EMR) or Contaminated Land Register (CLR). Land is listed on the EMR or CLR when the Department of Environment and Science (DES) is notified or becomes aware that certain types of activities (known as notifiable activities as per Schedule 3 of the EP Act) have been, or are being, carried out on the land, or if the land is contaminated land. Land contamination is discussed in **Chapter 5 Land resources**.

Waste Reduction and Recycling Act 2011

The *Waste Reduction and Recycling Act 2011* (Qld) (WRR Act) and its subordinate legislation (Waste Reduction and Recycling Regulation 2011) promotes waste avoidance and reduction and encourages resource recovery and efficiency.

The WRR Act outlines the preferred waste management hierarchy – avoid, reduce, reuse, recycle and energy recovery before safe treatment and disposal – and the principles for achieving good waste management. Under the WRR Act, a development condition may be imposed (on a development approval or as a condition on an EA) requiring a waste management program to be prepared for the authorised activities.

The Waste Reduction and Recycling Regulation is underpinned by a waste levy, which applies to general solid waste, commercial and industrial waste, and construction and demolition waste. Different levy rates apply for types of waste disposed.

Queensland Waste Management and Resource Recovery Strategy

The Queensland Waste Management and Resource Recovery Strategy outlines the high-level vision and direction for Queensland to divert waste from landfill by reusing or recovering resources. Building on the waste and resource management hierarchy, the strategy sets out three main strategic priorities:

- reducing the impact of waste on the environment and communities
- transitioning towards a circular economy for waste
- building economic opportunity.

15.2.3 Local

The Project is located within the Isaac Regional Council (IRC) Local Government Area (LGA). Under the Isaac Regional Planning Scheme 2021 (the planning scheme), mining and exploration activities are to occur within rural areas. Appropriate developments are to provide waste management infrastructure for the safe efficient storage and collection of waste and recycling materials, commensurate with the amount of waste generated, to maintain health and amenity of the community and natural environment.

Within the IRC LGA, the Mackay, Isaac and Whitsunday Regional Plan (Department of Local Government and Planning, 2012) outlines policies and programs to ensure the region's waste is minimised, reused or recycled and investment in resource recovery and suitable waste management and resource recovery sites.

The Isaac Waste Management Strategy 2020-2025 (IRC, 2020) provides long-term planning and management strategies to meet the waste management demands of the Isaac region recognising the influence of commercial waste contribution and Queensland waste levy. Through the strategy, IRC recognise the importance of maintaining at least 10 years of landfill life for waste disposal security of the region.

15.3 Description of environmental values

15.3.1 Environmental values

The EP Act defines an environmental value as a quality or physical characteristic of the environment that is conducive to ecological health, public amenity and safety. Environmental values with the potential to be impacted by waste generated from construction, operation and decommissioning of the Project include:

- health and wellbeing of sensitive receptors
- natural environment, including land, water resources, flora and fauna
- available capacity of regional waste management facilities and services.

More information on these values is presented in this section and other chapters of this EIS including **Chapter 5 Land resources**, **Chapter 6 Terrestrial Ecology**, **Chapter 7 Aquatic Ecology**, **Chapter 8 Surface Water Resources**, **Chapter 9 Groundwater**, **Chapter 13 Scenic Amenity and Lighting** and **Chapter 20 Hazards, Health and Safety**.

15.3.2 Existing environment

Existing environment of the Project Site, described in **Chapter 4 Land use and tenure**, is consistent with land used for livestock grazing with some areas of cropping activity to the south east. Resource and petroleum tenements overlie the Project Site and surrounding area.

In addition to foundation grain production, beef and service industries, there are 25 operating coal mines in the region, including BMA's Saraji Mine immediately west of the Project Site that has been operating as an open cut coal mine since 1974.

There are two homesteads located on freehold land within the Project Site (Lake Vermont Homestead and Meadowbrook Homestead) owned by BMA. Five additional homesteads surround the Project Site. BMA has agreements in place with the owners of Saraji Homestead 2 and Saraji Homestead 3 managing interactions with mining activities at Saraji Mine. Homesteads with conduct and compensation agreements in place for potential dust or noise nuisance impacts arising from mining

operations are not considered sensitive receptors but identified and considered in assessments for completeness. Prior to construction commencing on ML, MLA and off-lease areas, BMA will obtain consent from parties holding a lawful interest in land impacted by the works, secure appropriate land tenure arrangements (e.g. easements), and obtain relevant permits and approvals.

15.3.3 Regional waste management facilities

IRC currently operates five regional recovery centres providing a combination of landfill and transfer station facilities (Moranbah, Clermont, Dysart, Middlemount, Glenden and St Lawrence) and three sites that operate solely as transfer station facilities (Nebo, Greenhill and Carmila).

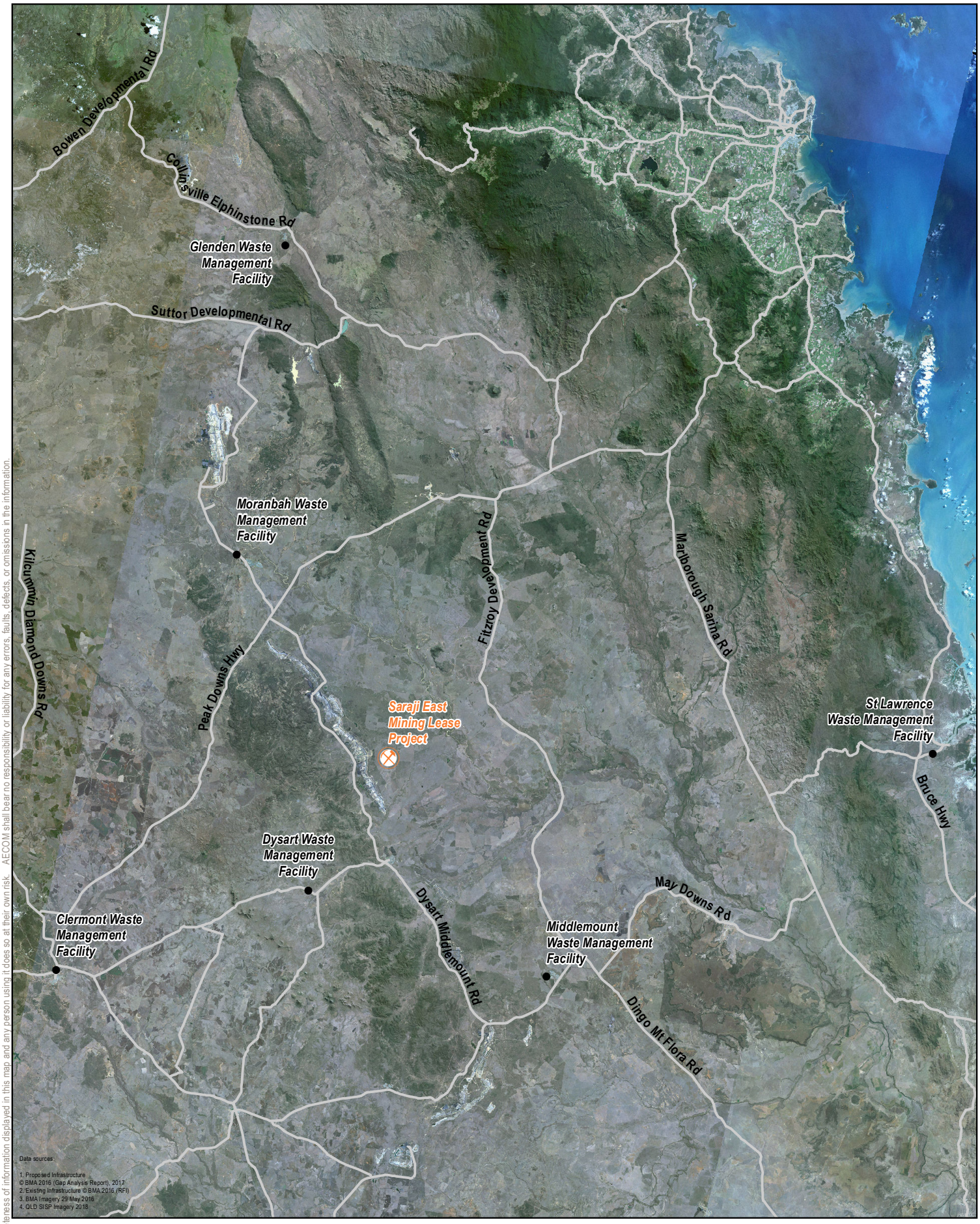
Regional waste facilities with potential to support the management of general solid wastes are outlined in Table 15-1; other than recovery of waste oils, liquid wastes are not accepted by IRC waste management facilities. Reputable private contractors operating in the region are licensed to transport and accept recyclable materials and regulated waste for recovery or treatment and disposal.

Table 15-1 Potential waste facilities to be used by the Project

Facility	Resource recovery	Disposal
Dysart Resource Recovery Centre	Waste oil, cooking oil, cardboard and paper, batteries, scrap metal, green waste, comingled recyclable waste, timber and tyres (excluding mining tyres).	General waste
Clermont Resource Recovery Centre		
Moranbah Resource Recovery Centre		

IRC's waste management facilities are designed and operated in alignment with the framework outlined in the Isaac Waste Management Strategy 2020-2025 (IRC, 2020), which was developed in consultation with mining sector. Early consultation with IRC on Project related resource recovery and anticipated waste disposal volumes during construction and operation have confirmed that the Project is not expected to overburden the existing and future capacities of the Isaac region waste management network.

Waste facilities in the region (see Figure 15-1) expected to receive waste from the Project, either Council operated or private regulated waste transporters and processing facilities will be confirmed as part of the waste management planning process subject to capacity and commercial arrangements.



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LEGEND

- Saraji East Mining Lease Project
- Regional waste management facilities
- Major Road

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Figure 15-1

Regional waste facilities

Environmental Impact Statement
Saraji East Mining Lease Project

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Projection: Map Grid of Australia - Zone 55 (GDA94)

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15.4 Potential impacts

Potential impacts to identified environmental values and receptors (Section 15.3) may result from excessive waste generation from the inefficient use of resources or from the improper management of wastes generated by the Project.

Generation of wastes will occur throughout construction, operation and decommissioning activities that will occur during the life of the Project (approximately 20 years) as described in **Chapter 3 Project Description**. These wastes are generally consistent with other underground coal mines in the region.

To assess potential impacts in this section, Project wastes are estimated, characterised (according to physical and chemical properties) and broadly classified as:

- Regulated waste: wastes defined by legislation (is commercial waste or industrial waste of a type, or containing a constituent of a type defined in Section 42 of Schedule 9, Part 1, Column 1 of the EP Regulation) that require specific controls or actions for handling and disposal to manage certain physical or chemical properties of those wastes (e.g. flammable, combustible, corrosive, or containing a hazardous constituent).
- General waste: wastes not defined as regulated waste under legislation that may be putrescible (easily decomposed, recyclable by composting) or non-putrescible (not easily decomposed, may be recyclable) wastes.
- Recycling: waste materials that can be reused or reprocessed to recover resources.

Mine wastes, such as spoil, coal and coarse rejects and tailings generated by the Project are discussed in detail in **Chapter 10 Geochemistry and Mine waste**. Wastewater including mine affected water is discussed in **Chapter 8 Surface Water Resources**.

15.4.1 Construction

During the three-year construction phase, waste will be generated by the haul road and infrastructure upgrade works and services upgrades (communications, water, power supply and sewage). Wastes generated during construction are anticipated to include:

- regulated waste such as clinical waste, grease trap waste, lead acid batteries, hydrocarbon waste, paints, resins, detergents, solvents, batteries, sewage sludge and tyres
- general waste such as food scraps, aluminium cans, paper, cans, ceramics, glass, plastics, packaging materials, textiles, timber offcuts and pallets
- recycling such as cleared vegetation, excavation materials, concrete, timber, scrap metal and steel offcuts, bricks, aggregate and sand from the construction of the Coal Handling Preparation Plant (CHPP) and other mine related infrastructure, water supply pipeline and Mine Infrastructure Area (MIA).

Wastes generated by project construction activities are presented by waste type and characteristics, source, approximate quantities (after reuse opportunities are applied) and proposed management strategy in Table 15-2.

Table 15-2 Construction waste generation and management

Waste stream	Waste type	Waste source	Estimated quantity	Management strategy
Cleared vegetation	Recycling; solid, putrescible, green waste	Site infrastructure (i.e. CHPP, water pipeline, transmission line, rail spur and conveyor)	< 1 tonnes (t)	Where possible use on re-vegetated areas, onsite as fauna habitat and or chipped as mulch for landscaping, erosion control and rehabilitation activities.
Non-mining excavated waste	Recycling; solid, inert, construction waste	Site infrastructure, underground mine portal	5 t	Used as fill onsite where suitable for construction of haul roads and laydowns.

Waste stream	Waste type	Waste source	Estimated quantity	Management strategy
Concrete and bricks	Recycling; solid, inert, construction waste	Site infrastructure (i.e. accommodation village, CHPP, mine portal and MIA)	35 t	Minimise waste by producing/procuring only the amount necessary. Reuse on site where suitable for construction of haul roads and pads. Concrete not suitable for reuse will be transported by a waste contactor off site for recycling.
Steel/metal offcuts	Recycling; solid, inert, construction waste	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	20 t	Minimise waste by producing/procuring only the amount necessary. Segregation and collection onsite. Transportation from site by a waste contractor for re-use or offsite recycling.
Timber pallets and offcuts	Recycling; solid, inert, construction waste	Site infrastructure (i.e. accommodation village, CHPP and MIA)	200 t	Minimise waste by producing/procuring only the amount necessary. Undamaged pallets returned to the workshop/warehouse for reuse; some damaged pallets repaired and reused. Irreparably damaged pallets transported from site by a waste contractor for offsite recycling.
Paints, resins, sealers and solvents	Regulated waste [Category 1 – solvents, Category 2 – paints]; liquid, flammable, combustible, toxic containing hazardous constituents	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	2 t	Minimise waste by producing/procuring only the amount necessary. Collection onsite and stored in a regulated area. Transportation offsite by authorised regulated waste contractor and disposal by a regulated waste receiver.
Putrescibles and organic (food waste) and some plastics	General waste; solid, putrescible and non-putrescible	Site infrastructure (i.e. accommodation village, CHPP, MIAs and construction offices)	160 t	Taken offsite for disposal to authorised waste facility.
Paper, cardboard, some plastics, metal cans	Recycling; solid, commingled, putrescible and non-putrescible	Site infrastructure (i.e. accommodation village, CHPP, MIA and construction offices)	8 t	Collection and segregation onsite. Transportation by a waste contractor for offsite recycling.

Waste stream	Waste type	Waste source	Estimated quantity	Management strategy
Waste electrical and electronic equipment	Recycling; solid, inert and potentially containing hazardous constituents	Site infrastructure (i.e. accommodation village, CHPP, MIA and construction offices)	<1 t	Collection and segregation onsite. Transportation by a waste contractor for offsite recycling.
Grease trap wastes	Regulated waste [Category 2] and recycling; liquid and potentially containing hazardous constituents	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system	2.5 t	Collected and transported offsite by a licensed regulated waste contractor to a licensed regulated waste receiver for recycling.
Waste oil and containers	Regulated waste [Category 2] and recycling; liquid and solid	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	130 t	Collected and stored onsite in a bunded and covered area. Transported offsite by authorised regulated waste transporter to an authorised regulated waste facility, for filtering and dehydration processes and recycling.
Hydrocarbon contaminated waste	Regulated waste [Category 2] and recycling; liquid	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	24 t	Collected and stored onsite in a bunded area. Transported offsite by authorised regulated waste transporter to an authorised regulated waste facility, for disposal.
Oily water	Regulated waste [Category 2] and recycling; liquid	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	12 t	Oil will be separated from water. The resulting oil will be collected and transported offsite by a licensed regulated waste transporter to a licensed regulated waste receiver for recycling. The separated water will be managed as part of the mine water management system.
Tyres	Regulated waste [Category 2]; solid, inert	Vehicles for the construction of site infrastructure	2,000 t	Tyres will be transported to Saraji Mine for disposal in existing Saraji Mine spoil dumps to the extent authorised by the existing approved EA Permit: EPML00862313.

Waste stream	Waste type	Waste source	Estimated quantity	Management strategy
Batteries	Regulated waste [Category 2 – lead acid batteries] and General waste [small batteries]; solid, corrosive, containing hazardous constituents	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	4 t	Collection and segregation onsite. Transportation by a waste contractor for offsite recycling.
Sewage effluent and sludge	Regulated waste [Category 2] and recycling [effluent]; liquid and solid	Site infrastructure (i.e. accommodation village, and offices) for 375 equivalent persons (EP)	25 mega litres (ML) (effluent) 5,000 t (sludge)	Sewage from temporary workers accommodation village and temporary construction workers offices will be pumped by a licensed contractor and transported to a local council sewage treatment plant.

15.4.2 Operation

Operational waste will be generated through mine development, mining works and from workshops and offices. Waste types likely to be generated during operation include:

- regulated waste such as hydrocarbon wastes, waste oils, oily water and oil by-products (e.g. oil filters, drums, sludges, grease and rags), paints, resins, detergents, solvents, batteries, spoil, rejects, tyres, sewage effluent and sludge
- general waste such as food scraps, rags, glass, ceramics, plastics and packaging materials
- recycling such as cardboard and paper, aluminium cans, cans, glass, hard plastics, conveyor belt rubber, timber offcuts and pallets.

Waste streams generated throughout project operation are presented by waste type and characteristics, waste source, approximate quantities and proposed management strategy over the 20-year life of mine in Table 15-3. Wastes quantities are estimated based on comparable operations in Central Queensland and assumes a maximum mining rate of 11 million tonnes per annum (Mtpa) of Run of Mine (ROM) coal. Mine wastes such as dewatered tailings are addressed separately in **Chapter 10 Geochemistry and Mine waste**.

Table 15-3 Operation waste generation and management

Waste stream	Waste type	Waste source	Estimated quantity	Management strategy
Waste oil	Regulated waste [Category 2] and recycling; liquid	Site infrastructure (i.e. underground equipment, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	110 kilo litres (kL) per annum	Minimise waste by procuring only the amount necessary. Collected and stored in a bunded area. Transported offsite by an authorised regulated waste transporter to an authorised regulated waste facility, for filtering and dehydration processes and recycling.

Waste stream	Waste type	Waste source	Estimated quantity	Management strategy
Waste oil containers	Regulated waste [Category 2] and recycling; solid	Site infrastructure (i.e. underground equipment, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	20 t per annum	Collected and stored onsite in a bunded and covered area. Transported offsite by authorised regulated waste transporter to an authorised regulated waste facility, for filtering and dehydration processes and recycling.
Oily sludge, absorbent, degreaser, grease, oily rags, oil filters	Regulated waste [Category 2] and recycling; solid	Site infrastructure (i.e. underground equipment, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	110 t per annum	Collected onsite then transported offsite by an authorised regulated waste transporter to an authorised regulated waste facility, for filtering and dehydration processes and recycling.
Hydrocarbon contaminated waste	Regulated waste [Category 2] and recycling; solid	Site infrastructure (i.e. underground equipment, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	440 t per annum	Segregated onsite then transported offsite by an authorised regulated waste transporter to an authorised regulated waste facility.
Scrap metal	Recycling; solid, inert, construction waste	Site infrastructure (i.e. underground equipment, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	8.5 t per annum	Minimise waste by producing/procuring only the amount necessary. Stored in bins and/or skip bins and/or stockpiled in appropriate areas to be collected by scrap metal merchants under the supervision of waste contractor.
Food waste (putrescibles) and some plastics and paper not suitable for recycling	General waste; solid, putrescible and non-putrescible	Site infrastructure (i.e. underground equipment, CHPP, MIA and offices)	3,750 t per annum	Waste will be compacted and transported offsite by the waste contactor to an authorised waste facility.
Recyclable waste (paper and cardboard, metal cans and some plastics)	Recycling; solid, commingled, putrescible and non-putrescible	Site infrastructure (i.e. underground equipment, CHPP, MIA and offices)	1,660 cubic metres per annum	Collection and segregation onsite. Transportation by a waste contractor for offsite recycling.

Waste stream	Waste type	Waste source	Estimated quantity	Management strategy
Paints and resins	Regulated waste [Category 1 – solvents, Category 2 – paints]; liquid, flammable, combustible, toxic containing hazardous constituents	Site infrastructure (i.e. underground equipment, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	3 t per annum	Minimise waste by producing/procuring only the amount necessary. Collection onsite and stored in a regulated area. Transportation offsite by a licensed regulated waste transporter and disposal offsite by a regulated waste receiver.
Timber pallets and offcuts	Recycling; solid, inert, construction waste	Site infrastructure (i.e. CHPP and MIA)	10 t per annum	Minimise waste by producing/procuring only the amount necessary. Undamaged pallets returned to the workshop/warehouse for reuse; some damaged pallets repaired and reused. Irreparably damaged pallets transported from site by a waste contractor for offsite recycling.
Tyres	Regulated waste [Category 2]; solid, inert	Mining / heavy vehicles and light vehicles required for operational activities.	480 t per annum	Minimise waste by producing/procuring only the amount necessary. Tyres will be transported to Saraji Mine for disposal in existing Saraji Mine spoil dumps to the extent authorised by the existing approved EA Permit: EPML00862313.
Conveyor belts	Recycling; Solid, inert	Conveyor system	Minimal	Collection and segregation onsite. Transportation by a waste contractor for offsite recycling.
Grease trap waste	Regulated waste [Category 2] and recycling; liquid	Site infrastructure (i.e. underground equipment, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	35 kL per annum	Collected onsite then transported offsite by an authorised regulated waste transporter to an authorised regulated waste facility.
Waste electrical and electronic equipment	Recycling; solid, inert and potentially containing hazardous constituents	Site infrastructure (i.e. CHPP, MIA and offices)	<1 t per annum	Collection and segregation onsite. Transportation by a waste contractor for offsite recycling.
Printer cartridges	Recycling; solid, inert and potentially containing hazardous constituents	Offices	<0.5 t per annum	Collection and segregation onsite. Transportation by a waste contractor for offsite recycling.

Waste stream	Waste type	Waste source	Estimated quantity	Management strategy
Sewage effluent and sludge	Regulated waste [Category 2] and recycling [effluent]; liquid and solid	Site infrastructure (i.e. offices, MIA, mine portal and CHPP). During the operational phase, the Project will employ up to 500 Full Time Equivalent (FTE), however based on the above 4-week roster rotation with 12-hour shifts, an approximate 125 workers are expected to be in residence at peak times during operation (Chapter 3, Section 3.8.19). Water usage and wastewater production estimates are therefore based on these predicted workforce numbers. The generation of wastewater has been calculated based on 180 L per equivalent population per day, in accordance with 02-2014-3.1 Gravity Sewerage Code of Australia (Water Services Association of Australia, 2014).	8 ML (effluent) 2 t (sludge) per annum	A sewage treatment plant (STP) will service the MIA, including sewage received from CHPP and from the washdown facilities at the mine portal. Sewage will be treated by primary filtration to remove solids and disinfection to ensure it is safe to work with before being discharged to mine affected water management system. No irrigation to land or discharge offsite is proposed. Waste sludge will be pumped to storage tanks before being pumped out and transported off-site by a licensed contractor to a licensed disposal facility.

15.4.3 Decommissioning and rehabilitation

Project decommissioning and rehabilitation will occur on a staged basis over several years prior to final closure. It is anticipated that major infrastructure, water dams and other facilities will be decommissioned and removed from site, while concrete pads and mine roads will be ripped and removed or covered with benign waste rock, topsoil and revegetated. Project decommissioning and rehabilitation is further discussed in **Chapter 5 Land resources**.

Prior to decommissioning, a comprehensive assessment of waste expected to be generated by the Project will be undertaken to ensure wastes are managed in accordance with the waste management hierarchy. Depending on condition and demand, infrastructure including the CHPP, workshops, warehouses, plant and equipment will be repurposed for other BMA operations rather than being disposed as waste.

During decommissioning, the types of wastes expected to be generated include:

- regulated waste such as hydrocarbon wastes, detergents, tyres, batteries, solvents, paints and chemicals
- recycling such as construction materials including concrete, timber, metals, bricks and aggregates.

While most recoverable waste streams will be repurposed by BMA, waste streams expected to be generated throughout Project decommissioning are presented by waste type and characteristics, waste source, approximate quantities and proposed management strategy in Table 15-4.

Table 15-4 Decommissioning waste generation and management

Waste stream	Waste type	Waste source	Estimated quantity	Management strategy
Paints, resins, sealers and solvents	Regulated waste [Category 1 – solvents, Category 2 – paints]; liquid, flammable, combustible, toxic containing hazardous constituents	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	3 t, assuming nominal supply for servicing for repurposing	Collection onsite and stored in a regulated area. Transportation offsite by authorised regulated waste contractor and disposal by a regulated waste receiver. Depending on condition and demand, repurpose for other BMA operations rather than disposal.
Waste oil and containers	Regulated waste [Category 2] and recycling; liquid and solid	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	130 t, assumed for dismantling remaining infrastructure	Collected and stored onsite in a bunded and covered area. Transported offsite by authorised regulated waste transporter to an authorised regulated waste facility, for filtering and dehydration processes and recycling.
Hydrocarbon contaminated waste	Regulated waste [Category 2] and recycling; liquid	Site infrastructure (i.e. accommodation village, CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	440 t, assumed for dismantling remaining infrastructure	Collected and stored onsite in a bunded area. Transported offsite by authorised regulated waste transporter to an authorised regulated waste facility, for disposal.
Scrap metal	Recycling; solid, inert, construction waste	Site infrastructure (i.e. CHPP, MIA, water pipeline, transmission line, rail spur and conveyor system)	20 t, assumed remaining to be removed	Stored in bins and/or skip bins and/or stockpiled in appropriate areas to be collected by scrap metal merchants under the supervision of waste contractor.
Concrete and bricks	Recycling; solid, inert, construction waste	Site infrastructure (i.e. accommodation village, CHPP, mine portal and MIA)	30 t, assumed remaining to be removed	Transported by a waste contactor off site for recycling.
Waste electrical and electronic equipment	Recycling; solid, inert and potentially containing hazardous constituents	Site infrastructure (i.e. accommodation village, CHPP, MIA and construction offices)	3 t, assuming most can be repurposed	Repurpose where possible. Collection and segregation onsite. Transportation by a waste contractor for offsite recycling.

15.5 Mitigation measures

To protect environmental values and receptors identified in Section 15.3, BMA will implement a practical framework for waste minimisation and management specifically designed to avoid and minimise waste generation and ensure proper management of wastes generated by the Project. This section details Project waste management objectives, performance standards/indicators and management strategies. This section also outlines controls for segregation/storage (Section 15.5.2), waste transport (Section 15.5.3) and spill response (Section 15.5.4) for the Project.

In accordance with the proposed EA conditions outlined in **Appendix O-1 Summary of Commitments**, and consistent with the Saraji Mine EA, Condition D1 Waste requires BMA to develop and implement mitigation measures through a Waste Management Plan (WMP).

15.5.1 Waste minimisation and management framework

Project wastes generated from construction and operation will be managed through development and implementation of a Project-specific Waste Management Plan to identify waste streams, infrastructure and management systems, including interfaces with the existing waste management framework associated with the adjacent Saraji Mine.

The Waste Management Plan will describe Project waste streams and corresponding management strategies to align with the preferred waste management hierarchy – avoid, reduce, reuse, recycle and energy recovery before safe treatment and disposal (illustrated in Figure 15-2) and comply with legislative requirements (i.e. EA and waste tracking requirements).

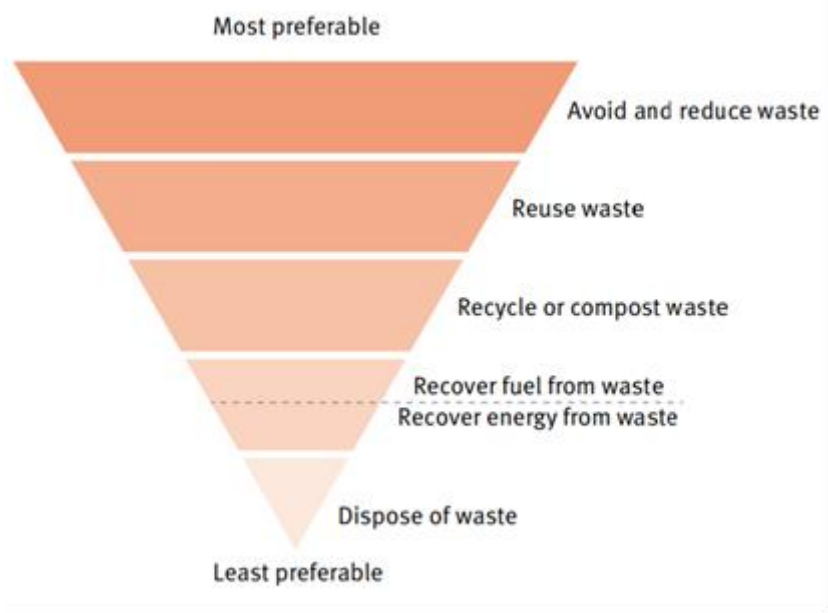

Figure 15-2 Waste and resource management hierarchy

The Waste Management Plan will detail a Project-specific program safe reuse, recycling and disposal of each waste stream and detail waste management control strategies for segregation and storage, transport and procedures for dealing with accidental spills. Primary objectives of the Waste Management Plan will be to:

- avoid or minimise waste generation
- maximise resource recovery through reuse and recycling
- safely manage waste streams to protect health and environmental values
- comply with waste management, monitoring and reporting requirements.

The Project's general waste streams will be effectively managed onsite or by waste management facilities and recycling / reprocessing services available in the region. Of the Project's general waste streams, only tyres (and potentially other bulk scrap rubber) will be transported to Saraji Mine for disposal in existing Saraji Mine spoil dumps to the extent authorised by the existing approved EA Permit: EPML00862313.

To facilitate waste management for the Project, the Project EA will need to specifically condition proposed interactions with Saraji Mine, including transporting waste to the existing Saraji Mine spoil dumps, as acceptable. Depending on the waste management activities and corresponding thresholds for waste sorted, stored or disposed of at the Project Site, the Project EA is expected to authorise sewage treatment (ERA 63) and include conditions for monitoring treated sewage effluent.

Key strategies for management of Project wastes in accordance with the waste management hierarchy are summarised in Table 15-5. The Project WMP will identify the types and approximate quantities of wastes expected during the Project decommissioning and rehabilitation phase, along with corresponding waste management strategies.

Table 15-5 Waste management hierarchy and controls

Hierarchy	Waste type
Avoid and reduce waste	• accurate material estimation and specification to avoid wastage of construction materials such as steel and concrete • purchase in bulk or products in minimal or biodegradable packaging to avoid unnecessary or excess packaging • regular stock reviews for efficient stock control • site inductions to include waste awareness training • review production processes to identify opportunities to generate less waste or waste that is less environmentally harmful or reusable for another process • natural resource use efficiency for the Project discussed in **Chapter 2 Project Alternatives and Justification**.
Reuse waste	• reuse timber pallets • return waste oil containers for cleaning and reuse • mine affected water from the Process Water Dam can be used for dust suppression on haul roads where authorised by the EA • encourage reuse practices and review industry developments to identify opportunities for external reuse programs
Recycle or compost waste	• sort and segregate recoverable waste streams to maximise reuse and recycling • recycle batteries, aluminium, steel, paper, cardboard and appropriate plastics • collect waste oil and hydrocarbon contaminated waste for licensed contractor to transport offsite and reprocess for recycling, recovery and/or disposal • collect scrap metal and empty drums for transport by a licensed waste contractor for recycling (crushing) offsite • collect timber offcuts and unusable pallets for recycling offsite • collect paper and cardboard for recycling • collect and return printer cartridges and batteries • encourage reuse practices and review industry developments to identify opportunities for external reuse program
Recover – energy/fuel from waste	• collect hydrocarbon contaminated rags, absorbent and containers for transport offsite by a licensed waste contractor to a licensed facility for recovery • monitor industry developments to identify new opportunities for generation of waste energy.
Dispose of waste	• general waste will be segregated and stored in a safe, secure manner ready for disposal at a licensed landfill offsite • effluent from onsite STP will be treated and disposed of during construction

Subject to meeting thresholds, Project waste emissions to land (air and water) will be estimated and reported annually in accordance with NPI requirements. Monitoring and audit reviews will identify non-conformances and opportunities for improvement that can be addressed by corrective and adaptive management processes set out in the Waste Management Plan. The Project will adopt similar waste performance indicators to those in Table 15-6.

Table 15-6 Performance indicators for waste management for the Project

Hierarchy	Waste type
Establish and maintain a waste minimisation program	Waste minimisation program developed and implemented
Comply with EA conditions	100% compliance
Comply with applicable BMA standards	100% compliance
Apply the waste hierarchy to management of Project waste	Identify opportunities to minimise volumes of waste generated Control strategies applied to each waste type that is consistent with the waste hierarchy

Hierarchy	Waste type
	Review waste management to identify opportunities for improvement
Safe storage and disposal of waste and hazardous substances	100% hazardous wastes tracked, managed and disposed of in accordance with AS 1940 - The Storage and Handling of Flammable and Combustible Liquids (AS 1940)

15.5.2 Segregation and storage

To prioritise segregation of wastes, waste management areas and receptacles distributed onsite will be easily identifiable, using clear signage and colour coding. Enough appropriately sized bins will be provided to maximise recycling opportunities and appropriate segregation of hazardous wastes. Solid wastes will be retained in wheelie bins and skip bins and liquid wastes will be contained within bunded areas to reduce the risk of accidental release of wastes prior to offsite disposal. Smaller bins and larger bins or skips will be covered (where practical) to reduce the potential for attracting insects and vermin.

Waste handling and storage will aim to control environmental impacts (such as odours, noise from transfer and transport, dust from transfer and transport, leachate from storage vessels and vermin/pests) through:

- designated location for waste collection, sorting and transfer to collection vehicles
- designated traffic routes for waste transport
- covered storage vessels to minimise odours and vermin/pests
- housekeeping practices
- regular monitoring and reporting.

Waste will be sorted and stored for minimum time prior to removal by waste contractor.

15.5.3 Transport of waste

The WMP will include details of the locations of regulated waste facilities, offsite recycling facilities, offsite facilities, and authorised waste facilities. It will outline specific addresses, operational capacities, the types of waste each facility is permitted to handle. The plan will map potential transportation routes for each waste stream, ensuring efficient and safe transport while minimising environmental impacts. The capacity of these facilities to receive waste throughout the Project's lifespan will be assessed, confirming their ability to manage the projected waste volumes without disrupting existing waste networks.

Waste removed from site will be transported by a licensed contractor to a facility lawfully allowed to accept such waste. Waste generation and movements will be monitored, recorded and reported routinely as part of waste contractor reports, environmental performance audits, waste tracking requirements and compliance reporting.

The transportation of waste removed from site will utilise the existing road network in the local area, which includes parts of Saraji Road, Peak Downs Mine Road, Peak Downs Highway and Lake Vermont Road. Project impacts on traffic and transport conditions are further discussed in **Chapter 14 Transport** and **Appendix J-1 Traffic and Transport Impact Assessment**.

15.5.4 Spill response

Onsite facilities for the storage of flammable and combustible materials will be designed and constructed in accordance with the most current version of AS 1940 to reduce the risk of loss of containment.

Activities will be undertaken in a way that minimises the risk of ground and water contamination through hydrocarbon and/or chemical spills (and the generation of associated waste). Management measures for the prevention of spills and to minimise the risk of harm if a spill occurs include:

- site drainage designed to facilitate retention of spills onsite
- stormwater directed away from potentially contaminated areas

- engineered hardstand above the natural ground level
- construction of appropriate spill containment facilities for all areas where process reagent and petroleum products are stored (e.g. impervious containment and bunding around stationery/fixed storage areas in accordance with Australian Standard (AS) 1940)
- regular inspection and maintenance of spillage control devices
- overfill protection
- efficiency measures such as auto-shutoff nozzles on vehicles
- procedure for the storage and handling of hazardous substances
- procedure for the refuelling and servicing of vehicles and machinery
- prompt spill clean-up and reporting
- spill kits located at points that are easily identifiable, accessible and most likely to be needed such as high-risk areas i.e. refuelling points and the workshops
- firefighting equipment readily available, easily identifiable and accessible in high risk areas associated with hydrocarbons
- appropriate personal protective equipment to be used.

The potential for underground spills will be minimised by:

- storing oil drums in locations where the possibility of impacts from vehicles is minimised
- appropriate housekeeping
- capture of oil drained from machinery during maintenance in containers which will be returned to the surface and pumped into the waste oil storage facility.

15.6 Residual impacts

The Project will generate waste streams consistent with other mine site operations in the region through to closure of the mine (approximately 20 years).

The residual impact assessment has been informed by comparing the estimated waste streams produced by the Project against regional waste generation characteristics, as sourced from the Recycling and Waste in Queensland 2020 report (Queensland Government, 2020). The Project will contribute 2 percent of waste landfilled or incinerated in the broader Mackay region, based on the 2019/2020 period.

The estimated waste streams produced by the Project will be managed by licensed waste contractors who will be required to comply with industry standards and all statutory requirements pertaining to waste and resource management through condition of contract. Furthermore, complying with the requirements of the Waste Management Plan, potential environmental impacts arising from waste materials associated with the Project are expected to be minor to negligible.

Areas subject to contaminating activities (existing or future) including tyre disposal areas will be identified, listed on the EMR or CLR and remediated where practical. Land contamination is discussed in **Chapter 5 Land resources.**

15.7 Summary and conclusions

During the construction, operation and decommissioning of the Project, wastes generated will be consistent with those waste types generated by other mines operating in the region.

To protect identified environmental values and receptors, BMA will implement a practical framework for waste minimisation and management specifically designed to avoid and minimise waste generation and ensure proper management of wastes generated by the Project.

Throughout all Project phases, waste generation will be minimised through strategic planning, procurement and continuous improvement in the implementation of the waste management hierarchy

as set out in the Project specific Waste Management Plan. Appropriately licensed waste contractors will be engaged to transport, recycle and dispose of wastes at licensed waste management facilities in compliance with EA and other legislative requirements. In consultation with regional operators, residual wastes will be disposed of at local offsite waste management facilities as appropriate depending on waste type.

Cumulative impacts associated with waste production will be minor due to implementation of a responsible proven waste management approach.