18 WASTE MANAGEMENT

18.1 INTRODUCTION

This chapter sets out the key issues pertaining to waste generation and management during the construction and operation of the various components of the Wandoan Coal Project (the Project) with the aim of protecting environmental values from the impacts of wastes. This chapter provides a summary of technical information from other chapters of the EIS relevant to waste management and minimisation.

This chapter excludes discussion on waste rock, which is addressed in Chapter 9 Geology, Mineral Resources, Overburden and Soils, and rejects and tailings management, which is discussed in Chapter 6 Project Operations.

18.2 METHODOLOGY OF ASSESSMENT

18.2.1 REGULATORY REQUIREMENTS

Commonwealth requirements

Annual reporting of Project waste emissions to land, air and water will be conducted in accordance with the National Pollutant Inventory (NPI) Guide managed by the Department of the Environment, Water, Heritage and the Arts (DEWHA). The NPI framework establishes a 'trigger' threshold usage for various substances. If more than the triggered amount of a substance is used, then emissions of that substance must be reported under the NPI. DEWHA have produced a number of manuals to guide emission reporting for specific activities.

Reporting on relevant Project activities will be conducted in accordance with the most current relevant Emission Estimation Technique Manuals. Emissions will be reported to DEWHA and will contribute to the publicly available NPI database at www.npi.gov.au

Reporting requirements under the *National Greenhouse and Energy Reporting Act 2007* (NGER) are discussed in Chapter 14 Greenhouse Gases and Climate Change.

State requirements

Waste management in Queensland is governed by the Environmental Protection Policies and Regulations under the *Environmental Protection Act 1994* (EP Act). Specific waste management legislation includes the Environmental Protection (Waste Management) Policy 2000 (EPP (Waste)) and the Environmental Protection (Waste Management) Regulation 2000 (Waste Regulation). Together with the Environmental Protection Regulation 1998 (EPR), these provide the legal and strategic framework for managing waste.

The EPP (Waste) provides a strategic framework for managing wastes by establishing a preferred waste management hierarchy:

- waste avoidance
- waste re-use
- waste recycling
- energy recovery from waste

- waste disposal.

The EPP (Waste) also requires that "cleaner production" should be considered in determining how waste is managed. A cleaner production program is defined in the EPP (Waste) as:

> '*a program to identify and implement ways of improving a production process so that the process –*
>
> *(a) uses less energy, water or another input; or*
>
> *(b) generates less waste; or*
>
> (c) *generates waste that is less environmentally harmful*.'

Certain waste management activities including disposal and transport of waste, are considered to be environmentally relevant activities (ERA) and require approval. The Waste Regulation also contains requirements for handling specific waste streams.

Certain regulated wastes are considered trackable wastes (section 17 Waste Regulation). This provides a process to allow such wastes to be tracked from the point of generation to the point of final processing, recycling or disposal.

Local requirements

The Project area is located within the jurisdiction of the Dalby Regional Council local government area, within the Miles and Wandoan districts. Prior to local government amalgamations on 15 March 2008, it was formerly under the jurisdiction of Taroom Shire Council. Requirements of the Taroom Shire Council Planning Scheme 2006 have been considered with regards to the Project's waste management strategy.

18.2.2 IDENTIFYING PROJECT WASTE STREAMS

The identification of waste streams for the Project was based on the conceptual design of the various Project components ranging from the early works and site preparation phases through the construction, operations and decommissioning phases. The characteristics of waste streams have been determined based on similar construction works and operations undertaken by the WJV participants on other projects.

18.2.3 IDENTIFYING WASTE MANAGEMENT PRACTICES

The proposed Project waste management practices have been derived from a number of sources, including past and present practices on existing WJV participants' operational sites. These will be based on on-site treatment processes identified in the concept design, typical waste management practices at relevant WJV participants' operations, the availability of waste recycling opportunities and other best practice methods where practicable.

18.3 EXISTING ENVIRONMENT

The current environment and existing environmental values of the Project area are described in Chapter 8 Land Use, but is generally characterised by past and current agricultural land uses. Large components of the Project area were cleared of native vegetation for agricultural development during post-war soldier settlement. Grain growing and beef production are now the major land uses with most properties in the Project area

being mixed agricultural enterprises. Accordingly, the agricultural background suggests that there is potential for land contamination to have occurred from crop spraying, cattle dips and/or spray races, and the storage of chemicals and fuel. This aspect has been assessed in Chapter 8 Land Use.

Following consultation with Dalby Regional Council and preliminary analysis of waste disposal options, it has been determined that the existing Wandoan landfill facility is not a suitable long term waste disposal option for this Project due to its small capacity. Preliminary discussions with the Dalby Regional Council have indicated that the current landfill is already nearing capacity from waste generated in the local region. Development of a multi-user, municipal waste disposal and recycling facility at a suitable location, on or immediately adjacent to the mining lease applications (MLAs) area for disposal of general and domestic waste is being discussed with Dalby Regional Council, in order to provide a long term solution to waste disposal in the Wandoan area.

18.4 DESCRIPTION OF PROPOSED DEVELOPMENT

18.4.1 CONSTRUCTION PHASE

Waste generated during the early works phase will be associated with works external to the MLAs area, including upgrade of the Wandoan Township's potable water treatment facilities, upgrade of the town's wastewater treatment facilities, and, potentially, assisting Dalby Regional Council with construction of a new municipal waste disposal and recycling facility for Wandoan township. All planning and construction activities relating to these works would be undertaken in association with Dalby Regional Council. Waste from any early works and the initial construction activities will be disposed of at the existing landfill facility or by a licensed contractor.

Waste generated during the site preparation phase will be associated with works inside and immediately adjacent to the MLA areas, including construction of the accommodation facilities, the restoration, removal, relocation or demolition of existing structures, bulk earthworks, construction of the mine access to the accommodation facilities and MIA, and construction of security facilities. Chapter 8 Land Use and the associated Contaminated Land technical report discuss potential issues relating to land contamination from existing land uses that will require management during the site preparation phase.

Wastes generated during the construction phase will be from the construction of mine infrastructure including civil earthworks, concrete batching, structural components, and structural fit-out.

For the installation of the gas pipeline (if required to meet the power requirements of the Project), wastes generated during the construction phase will be from the installation and assembly of the pipeline and will include construction materials, vehicle emissions, effluent and general waste. The pipeline is expected to be constructed from steel and coated in a polymer seal to protect it from corrosion. All potential construction materials have been considered in the assessment of waste generation.

Chapter 5 Project Construction discusses in further detail the planned activities during early works, site preparation and construction phases.

18.4.2 OPERATIONAL PHASE

General operations will require continual clearing of vegetation, earthworks associated with ongoing mine development, maintenance of mobile and fixed plant, blasting and mine pit development, waste rock, coarse rejects and tailings disposal, rehabilitation, and maintenance of associated infrastructure.

General operation of the gas pipeline (if required to meet the power requirements of the Project) is not expected to generate significant amounts of waste materials. Minor amounts of liquid waste may be a result of routine maintenance activities on the pipeline.

Chapter 6 Project Operations provides detailed discussion of the planned activities during the operational phase.

18.5 INVENTORY OF WASTE STREAMS

18.5.1 EARLY WORKS WASTE INVENTORY

Wastes may be potentially generated during the early works phase, which is proposed before the granting of a mining lease. The waste streams generated during this phase are described below. No works will occur on the MLA areas in this phase.

Green waste

Green waste includes all vegetation cleared. The volume generated is expected to be low as the land has been significantly cleared by past land uses such as agriculture and cattle grazing. Potential impacts related to the generation of green waste from clearing of native vegetation are discussed in Chapter 17A Terrestrial Ecology. Vegetation clearing – if any - during early works will follow the Project Environmental Management Plan (refer Chapter 27) to minimise vegetation loss, as discussed further in the mitigation measures section.

Building wastes

Demolition of existing structures owned by the WJV that are off the MLA areas are expected to create concrete, metals, timber and other building materials as waste. Where possible, building material will be recycled.

Construction of the accommodation facilities – if not located on the MLAs area - are expected to generate concrete, metals, timber and other general building wastes. Building wastes generated are conservatively estimated at equating to approximately 10% of the total building materials required, allowing for defects, damage during transportation and offcuts.

General municipal wastes

There are not expected to be large quantities of general municipal wastes generated during early works. Storage of waste will be in skips or other suitable containment prior to disposal to a licensed waste disposal facility.

Sewage effluent

If required, sewage generated during early works will be discharged to a package plant wastewater treatment plant. Package plant systems will be hired from licensed contractors, who will be responsible for containment and maintenance.

Hazardous waste

Upgrading of the Wandoan Township's potable water and wastewater facilities may identify hazardous wastes for disposal. Existing homesteads, sheds and other farm structures also have the potential to contain hazardous substances such as asbestos and asbestos containing materials and lead based paints. Any waste materials deemed hazardous that are identified by audit and investigation prior to the upgrading or demolition of existing structures will be isolated and removed by licensed contractors.

Emissions

Vehicle emissions will be generated by construction vehicles during any land clearing and earth moving activities, and light vehicle movements to and around the works site. These impacts have been discussed in greater detail in Chapter 13 Air Quality.

18.5.2 SITE PREPARATION AND CONSTRUCTION WASTE INVENTORY

The following wastes are likely to be generated during the construction phase, which will commence following the grant of the mining lease.

Green waste

Green waste includes all vegetation cleared across the MLAs area and surrounding lands associated with Project construction. The volume generated is expected to be relatively low compared with the area under construction as the land has been significantly cleared by past land practices. Potential impacts related to the generation of green waste from clearing of native vegetation are discussed in Chapter 17A Terrestrial Ecology. Any vegetation clearing will follow the Project Environmental Management Plan to minimise vegetation loss, as discussed further in the mitigation measures section.

Building wastes

Construction of the mine associated infrastructure is expected to create concrete, metals, timber and other general building wastes. Building wastes generated are conservatively estimated at approximately 10% of the total building materials required, allowing for defects, damage during transportation, offcuts, etc.

General municipal wastes

General municipal wastes will be generated from the construction accommodation and management facilities and will typically comprise food scraps, paper and cardboard, glass, aluminium cans, plastics and packaging. These wastes will be segregated and removed from site by a licensed contractor, as discussed in the mitigation measures section.

Sewage effluent

Sewage will be generated from the construction management facilities and accommodation facilities. The proposed upgrades to the Wandoan Wastewater Treatment Plant (WWTP) and installation of rising mains from the MIA and accommodation facility will enable sewage to be discharged to the Wandoan WWTP. There is a possibility that a grey water management facility may be constructed at the accommodation facility, subject to further investigation as part of the detailed design process. If developed, grey water management will comply and be maintained to Dalby Regional Council standards.

Further discussion on sewage effluent management is provided in Chapter 11 Water Supply and Management.

Hydrocarbon waste

Hydrocarbon contaminated wastes will comprise used solvents, oils and lubricants produced from the vehicle maintenance workshops, vehicle washdown, and minor leaks from refuelling operations. Hydrocarbon wastes are generally regulated and are discussed below in Regulated waste.

Regulated waste

Regulated waste will include used:

- tyres
- hydrocarbons including oils, emulsions, oily wastewaters and sludges generated from the oil/water separation process,
- filters
- solvents and paints
- batteries.

These wastes will be disposed of as follows:

- tyres will be either removed by the tyre supplier for reprocessing, or stored and appropriately disposed of once mining operations commence by burying in the mine overburden in a designated location which will be identified on the Environmental Management Register (EMR) managed by the Environmental Protection Agency (EPA)
- hydrocarbon wastes, including filters, solvents and paints, will be collected into waste storage tanks or other suitable containment devices and disposed of by a licensed contractor for reprocessing, recycling or final disposal
- batteries will be stored in a central bunded facility, and collected and disposed of by a licensed contractor for reprocessing, recycling or final disposal.

Air emissions

Vehicle emissions will be generated by construction vehicles during earth moving activities and transportation of construction materials, and light vehicle movements to and around the Project site. These impacts are discussed in greater detail in Chapter 13 Air Quality.

18.5.3 OPERATIONS WASTE INVENTORY

Operational phase waste streams generated by activities undertaken for the Project are described below.

Green waste

Green waste includes all vegetation cleared across the MLAs area and surrounding lands associated with the Project's operational development. Some clearing resulting from ongoing construction activities will also be undertaken, particularly associated with construction of supporting infrastructure, such as heavy vehicle roads and the conveyors from Run of Mine (ROM) coal dump stations in MLA 50229 to the coal processing plant on the MIA. The volume of green waste generated is expected to be relatively low compared with the areas under development as the land has been significantly cleared by past land practices. Potential impacts related to the generation of green waste from clearing of native vegetation are discussed in Chapter 17A Terrestrial Ecology. Any vegetation clearing will follow the Project Environmental Management Plan to minimise vegetation loss, as discussed further in the mitigation measures section.

Water management system

A system of environmental and sediment dams has been designed to capture water across the mine site, which, where feasible, will be recycled. The overall guiding principle for the mine water management system is, wherever possible, to separate water of varying quality to minimise the stored volumes of water with high concentrations of contaminants. For the purposes of the Project, three separate water management systems (in ascending order of cleanliness) are considered:

- pit/process water management system – managing water captured in pits, and water running off dump stations, the coal preparation plant (CPP), coal product stockpiles and other areas, which have the potential to contribute high concentrations of dissolved salts
- overburden runoff water management system – treating water running off overburden stockpiles and other disturbed areas of the site with the potential to have larger concentrations of suspended solids
- clean water system – water from undisturbed areas of the MLAs and the catchments discharging through the site from upstream.

Chapter 11 Water Supply and Management further discusses the potential impacts and management issues associated with capture and re-use of water.

Sewage effluent

Sewage will be generated at the MIA, CPP, security building and the accommodation facilities. As with construction, all sewage will be pumped through rising mains from these areas to the upgraded WWTP. A grey water management facility may be constructed at the accommodation facilities, subject to further investigation as part of the detailed design process. If developed, grey water management will comply and be maintained to Dalby Regional Council standards.

Hydrocarbon waste

Hydrocarbon contaminated wastes will comprise used solvents, oils and lubricants produced from the vehicle and dragline maintenance workshops, vehicle washdown, and minor leaks from refuelling operations. Hydrocarbon wastes are generally regulated and are discussed below in Regulated waste.

Blasting

Blasting will be undertaken principally using ANFO (ammonium nitrate and fuel oil), and initiating explosives such as boosters and detonators. The main waste materials will be minor quantities of fragments of expired detonating cord. This waste material requires no specialist management as most of the fragments become buried in the overburden removal process.

Overburden

The primary waste generated by the Project will be waste rock from the removal of overburden during the open cut mining operation. The management of overburden is discussed further in Chapter 9 Geology, Mineral Resources, Overburden and Soils.

Coal processing waste

Wastes produced from the processing of ROM coal are predominately coarse coal rejects and fine material slurry, known as tailings. Handling of coarse rejects and tailings is discussed further in Chapter 6 Project Operations.

Regulated waste

Regulated waste will include used:

- tyres
- hydrocarbons including oils, emulsions, oily wastewaters and sludges generated from the oil/water separation process
- filters
- solvents and paints
- batteries
- laboratory testing and process measurement wastes.
- These wastes will be disposed of as follows:
- tyres will be either removed by the tyre supplier for reprocessing, or be stored, and buried in the mine overburden in a designated location which will be identified on the Environmental Management Register (EMR) managed by the EPA
- hydrocarbon wastes, including filters, solvents and paints, will be collected into waste storage tanks or other suitable containment devices and disposed of by a licensed contractor for reprocessing, recycling or final disposal
- batteries will be stored in a bunded facility, and collected and disposed of by a licensed contractor for reprocessing, recycling or final disposal
- all laboratory testing and process measurement wastes will be handled in accordance with recognised industry best practices specific to any given waste, typically by designated maintenance contractors, and stored, handled and disposed to a designated licensed waste facility for reprocessing, recycling or final disposal.

Air emissions

Vehicle emissions will be generated by mining vehicles during operations and transportation of materials, and light vehicle movements to and around the Project site. The on-site gas fired power station, if constructed, will also emit thermal and gaseous emissions to the atmosphere. These impacts have been discussed in further detail in Chapter 13 Air Quality.

18.6 POTENTIAL IMPACTS

Wastes generated by the Project have the potential to create impacts upon the air quality, water (surface and groundwater) quality, soil quality and visual amenity of the site and the surrounding environment if they are not appropriately managed. Health impacts on employees, the public and fauna can be significant if waste is not properly managed.

18.6.1 LAND

The main potential impacts to land are associated with general municipal waste, contamination and future land use.

General municipal waste

General municipal waste has the potential to impact on the amenity of the site and surrounding environment and in some circumstances increases hazards to human and ecological health. For example, glass bottles (broken glass, fire starting potential), plastic films, ties and containers (animal entanglement, mosquito breeding habitat) and metal

containers (sharp edges, mosquito breeding habitat) can injure or otherwise impact on humans and animals. Discarded food and other putrescible wastes can attract vermin.

Soil contamination

A number of activities and substances have the potential to result in contamination of land and potentially expensive site remediation. Uncontrolled discharges or inappropriate storage of materials such as tailings, fuels, other hydrocarbons, laboratory waste or demolition material could result in areas of contaminated land that are environmentally hazardous and/or are unsuitable for future use until they are remediated.

Pending landholder requirements for remaining infrastructure and the results of investigations at the time of decommissioning, facilities such as tailings dams, CPP, fuel storage areas and maintenance workshop areas may be included on the EPA's Environmental Management Register.

Land use

Current and future land uses can be affected by soil contamination (refer previous section) or by inappropriate handling and disposal of wastes. The use of land areas can potentially be impacted by how and where wastes are handled, stored and disposed.

18.6.2 WATER

Groundwater

Whilst groundwater resources of the Project area are generally limited, there may still be some potential for contaminants to move through the soil profile and enter groundwater. Fuel and tailings are the two materials, based on volume, that will have the most potential to affect groundwater unless properly managed.

Contaminated groundwater could adversely affect users and ecological processes of groundwater dependent or groundwater affected ecosystems.

Surface water

Impacts on surface water can result from general municipal wastes or other contaminants being spilt or disposed of directly into a waterbody, or by being washed into a waterbody. Potential impacts include decreased water quality and/or aquatic habitat values.

18.6.3 AIR QUALITY

Air quality can be adversely affected by vehicle and machinery emissions, emissions from the proposed on-site gas-fired power generation, dust and odour. Whilst air modelling (refer Chapter 13 Air Quality) has predicted minimal impacts to air quality, best practice environmental management requires all practicable measures be adopted to minimise environmental impacts. Burning of wastes has the potential to cause air quality impacts.

Predictions on the generation and impact of greenhouse gases (GHG) are described in Chapter 14 Greenhouse Gases and Climate Change.

18.6.4 COMMUNITY

Inappropriate or inadequate waste management methods can adversely impact on the general community in the vicinity of the Project. In addition to the impacts described in preceding sections, the issues of wastewater treatment and landfill capacity in the Wandoan area are important in terms of potential impacts on the local community.

18.7 MITIGATION MEASURES

18.7.1 WASTE MANAGEMENT STRATEGY

Waste management strategies developed for the Project will apply over the life of the Project including early works, site preparation, construction, operations and decommissioning.

The principal objective of the waste management strategy for the Project is to minimise the impacts on land resources, water quality, air quality, and to manage waste in a manner that avoids any direct or indirect impacts on the environment or health of people working at the mine and the community.

The main strategies that will be adopted for the Project include waste minimisation (including waste segregation for re-use or recycling), cleaner production and ensuring wastes are disposed of to appropriate facilities.

Waste minimisation

Waste minimisation has been considered throughout the initial planning and conceptual design stages of the Project and will continue during detailed design, construction and operations. The waste management hierarchy has been considered when selecting the waste management strategies for each waste stream. The hierarchy is a framework for prioritising waste management practices to achieve the best environmental outcome. The waste management hierarchy as specified in the EPP (Waste) is outlined as follows, with waste avoidance being the preferred option and disposal being the least preferred outcome:

- waste avoidance
- waste re-use
- waste recycling
- energy recovery from waste
- waste disposal.

Cleaner production

Cleaner production is recognised as providing environmental, economic and broader, less tangible benefits to implementing organisations. It forms an important component of the continual improvement approach to management adopted by the WJV and is also consistent with Xstrata's Sustainable Development Policy (see Chapter 1 Introduction).

Cleaner production focuses on implementing ways to improve a production process (or processes) in order to:

- reduce the use of energy, water and other material resources, and/or
- generate less waste in the production process, and/or

- generate waste that is less environmentally harmful.

Many significant aspects of the Project have considered these cleaner production principles:

- the adoption of the waste management hierarchy as the cornerstone of waste management strategies
- the proposed co-location of the coal seam methane (CSM) gas pipeline with the Surat Basin Rail corridor will minimise vegetation clearing requirements and will reduce impacts on land use
- the proposed use of second-hand draglines, if available
- the potential use of CSM by-product water (normally considered a waste) as a raw water source for use in ROM coal processing
- recycling of process water through the coal processing phases, including recycling of tailings water back into the CPP
- the options for power supply consider the use of CSM gas, thereby resulting in less, and less harmful, air emissions.

The development and implementation of a comprehensive dragline and machinery maintenance program will ensure optimum performance and energy efficiency for all mechanical equipment used on site, and will help in generating less waste and less environmentally harmful wastes.

Waste handling, storage, collection and disposal

Considering the waste management hierarchy, materials will be segregated during handling and storage on-site. If materials can be re-used, such as metals, solvents, oils, and wood products, then this will be undertaken where practicable.

Storage of wastes will differ according to the specific waste, and is discussed further in the following sections. Flammable and combustible liquid wastes will be stored within facilities designed to AS 1940 – The Storage and Handling of Flammable and Combustible Liquids to prevent contamination of land, surface water and groundwater.

If waste materials cannot be reused on-site, then they will be collected by licensed contractors for off-site reuse, reprocessing, recycling, or final disposal. Market demand at the time will determine the ultimate the rate of recycling of recovered materials. Final disposal of wastes will be to a licensed waste facility that is suitable for the type and quantity of waste.

As highlighted in section 18.3 above, the existing Wandoan township landfill will be unsuitable for waste disposal associated with the Project, due to limited capacity. Development of a new waste disposal and recycling facility adjacent to the mine site, in association with Dalby Regional Council, will consider all relevant legislation and guidance associated with site selection, design and associated impact assessment, so as to minimise the potential impacts soils, groundwater, surface waters, visual amenity, air quality, noise, ecological health and human health.

18.7.2 CONSTRUCTION PHASE

Waste strategies

A list of the waste materials likely to be generated during the early works, site preparation and construction phases of the Project and the management of these materials is shown in Table 18-1. These strategies will be continually reviewed and improved during the mine construction phase.

Table 18-1: Construction waste streams and management

Waste streams	Waste sources	Management strategies
Green waste	Clearing of vegetation for construction of the mine and associated infrastructure	Suitable material to be used on site to provide fauna habitat. Remaining material to be chipped and mulched, and reused during progressive rehabilitation and revegetation. Burning of green wastes will only occur as a last resort, subject to obtaining permits and approvals.
Paper and cardboard	Contractor crib rooms, offices, accommodation facilities	Segregation of paper and cardboard for removal off site for recycling where possible by a licensed recycling or waste contractor.
Glass	Contractor crib rooms, offices, accommodation facilities	Segregation of glass for removal off site for recycling where possible by a licensed recycling or waste contractor.
Recyclable plastics	Contractor crib rooms, offices, accommodation facilities	Segregation of plastics for removal off site for recycling where possible by a licensed recycling or waste contractor.
Processed timber and wood	Demolition of existing structures and left–over from new construction	Reused if possible, either on or off site. Where reuse is not possible, processed timber and wood to be removed from site and disposed to a licensed waste disposal facility. If hazardous materials are present, such as lead based paints, asbestos or timber treatment chemicals, specialist handling and disposal will be undertaken.
General and putrescible wastes	Contractor crib rooms, offices, accommodation facilities	General refuse to be collected in covered bins and removed from site at least once a week by a licensed contractor.
Concrete materials	Demolition of existing structures and left–over from new construction	Concrete to be removed from site and disposed to a licensed waste disposal facility.
Metals	Construction of conveyor, power lines and structures of the mine infrastructure area and accommodation facilities	Segregation and reuse on-site, otherwise disposal to a recycling facility or waste disposal facility.
Electrical wastes	Contractor crib rooms, offices, accommodation facilities	Segregation of electrical wastes for removal off site for recycling or reprocessing where possible by the waste contractor.
Sewage effluent	Contractor offices, crib room, accommodation facilities	Provision of dedicated package plant facilities during construction (pump out system) until pipeline connection to Wandoan WWTP is made available.
WWTP sludges	Upgraded wastewater treatment plant in Wandoan	Sludge to be collected by a licensed waste contractor and taken to a licensed waste facility.

Waste streams	Waste sources	Management strategies
Discharge from vehicle washdown	Construction vehicle washdown facilities near construction offices	Vehicle washdown water and associated contaminants will be collected and put through a hydrocarbon separator. Hydrocarbon emulsion will be disposed by a licensed contractor as a regulated waste, waters will be reused in the vehicle washdown process, and sediments will be disposed to the start-up tailings dam.
Oils (synthetic and mineral)	Routine servicing of vehicles and equipment at designated hardstand areas near the construction office facilities. Construction and assembly of the draglines and other mining equipment.	Waste oil to be removed from machinery in workshops using pneumatic pumps and oil transferred to bunded waste oil holding tank for collection by a licensed contractor for reuse, reprocessing, recycling or disposal.
Sealers, resins, solvents and paint materials	Construction of the MIA, accommodation facilities and conveyors, and assembly and maintenance of vehicles and equipment. Construction and assembly of the draglines and other mining equipment.	Stored in bunded areas then removed by licensed contractor for reuse, reprocessing, recycling or disposal.
Hydrocarbons and hydrocarbon contaminated materials	Routine servicing of vehicles and equipment at designated hardstand areas near the construction office facilities. Construction and assembly of the draglines and other mining equipment.	Stored in bunded areas then removed by licensed contractor for reuse, reprocessing, recycling or disposal.
Empty waste oil containers	Small and bulk drums and container that typically contained oils and greases	Empty drums to be stored in a covered, sealed and bunded area with enclosures in place for periodic collection by a licensed waste contractor for reuse, reprocessing, recycling or disposal.
Batteries	Mobile phones, radios, vehicles, equipment, etc	Mobile phone, radio and other batteries to be segregated and then collected by a licensed waste contractor for reuse, reprocessing, recycling or disposal.
Asbestos	Demolished existing structures	Asbestos will be removed and disposed by a specialist contractor.
Other regulated waste	Demolition, maintenance and construction activities	All regulated wastes shall be collected and removed by a specialised licensed waste contractor/s or specialist maintenance personnel. Tracking of all regulated wastes will be undertaken.
Tyres	Maintenance of vehicles	Tyres will be removed by the tyre supplier for reprocessing, otherwise tyres will be stored and appropriately disposed of once mining operations commence by burying in the mine overburden in a designated location which will be identified on the Environmental Management Register (EMR) managed by the Environmental Protection Agency (EPA)
Exhaust emissions	Vehicles and combustion engine operated equipment	Vehicles and other equipment to be maintained in good condition.

Waste management plan

A detailed Waste Management Plan (Construction) as part of the Project Environmental Management Plan will be prepared prior to the commencement of construction. The Waste Management Plan will address the following:

- identification of waste streams
- consideration of the waste management hierarchy when selecting waste management strategies, with emphasis on minimising any hazardous waste
- identification of solid, liquid or hazardous waste collection, storage and or disposal strategies
- training of all personnel on procedures concerning waste minimisation, handling, storage, reuse, segregation. collection and disposal
- waste removal and transport from site to be by appropriately licensed contractor/s with disposal only to licensed reprocessors, recyclers, or waste disposal facilities
- transport of any hazardous or regulated waste to comply with all relevant legislation including waste tracking requirements
- monitoring of waste streams and auditing against the Waste Management Plan to ensure overall objectives are being met.

All construction wastes will be managed in accordance with the Waste Management Plan, Site Work Conditions as defined by the WJV, and other contractual requirements.

18.7.3 OPERATION

Waste strategies

The waste streams generated from operation of the Project and the selected management strategies are listed in Table 18-2. These strategies will be reviewed periodically and updated throughout the mine operation.

Table 18-2: Operational waste streams and management

Waste material	Waste sources	Management strategies
Green waste	Clearing of vegetation for ongoing development of mine	Suitable material to be used on site to provide fauna habitat. Remaining material to be chipped and mulched, and reused during progressive rehabilitation and revegetation. Burning of green wastes will only occur as a last resort, subject to obtaining permits and approvals.
Paper and cardboard	Contractor crib rooms, accommodation village, administration building, warehouse, workshops, CHPP	Segregation of paper and cardboard for removal off site for recycling by waste contractor where possible.
Glass	Contractor crib rooms, accommodation village, administration building, warehouse, workshops, CHPP	Segregation of glass for removal off site for recycling by waste contractor where possible.
Recyclable plastics	Contractor crib rooms, accommodation village, administration building, warehouse, workshops, CHPP	Segregation of recyclable plastics for removal off site for recycling by waste contractor where possible.

Waste material	Waste sources	Management strategies
Metals	Contractor crib rooms, accommodation village, administration building, warehouse, workshops, CHPP, maintenance and fabrication of machines and equipment and the replacement of machinery parts.	Metal will be segregated using marked bins. Bins will be regularly monitored and serviced by the recycling contractor.
General and putrescible wastes	Contractor crib rooms, accommodation village, administration building, warehouse, workshops, CHPP	General refuse to be collected in covered bins and removed from site by licensed contractor at least once a week.
Air filters	Machinery	Filters to be collected in drums and stored in bunded areas for collection by supplier. If serviceable, suppliers to reuse or reprocess. Unserviceable filters, depending on filter construction, recycle metal components and dispose of residue to a waste disposal facility.
Batteries	Mobile phones, radios, vehicles, equipment, etc	Mobile phone, radio and other batteries to be segregated and then collected by a licensed waste contractor for reuse, reprocessing, recycling or disposal.
Empty waste oil containers	Small and bulk drums and containers that typically contained oils and greases	Empty drums to be stored in a covered, sealed and bunded area with enclosures in place for periodic collection by a licensed waste contractor for reuse, reprocessing, recycling or disposal.
Grease	Waste grease from the accommodation facility kitchens, workshop, shutdowns and dragline maintenance	Waste grease will be placed in a bunded storage container. Waste grease will be collected periodically by a licensed waste contractor for reuse, reprocessing or disposal.
Hydrocarbons and hydrocarbon contaminated materials	Routine servicing and shutdown overhaul of vehicles and equipment in workshops and maintenance facilities, refuelling and fuel storage facilities. Construction and assembly of the draglines and other mining equipment.	Stored in bunded areas then removed by licensed contractor for reuse, reprocessing, recycling or disposal.
Discharge from vehicle washdown	Vehicle and equipment washdown facilities, and maintenance facilities	Vehicle washdown water and associated contaminants will be collected and put through a hydrocarbon separator. Hydrocarbon emulsion will be disposed by a licensed contractor as a regulated waste, waters will be reused in the vehicle washdown process, and sediments will be disposed to the tailings dam.
Oils	Routine servicing and shutdown overhaul of vehicles and equipment in workshops, including synthetic and mineral oils	Waste oil will be evacuated from machinery in the workshop using pneumatic pumps and the oil will be transferred to waste oil holding tanks. These tanks will be in a bunded area. The waste oil will be collected by a licensed contractor.

Waste material	Waste sources	Management strategies
Oil filters	Routine servicing and shutdown overhaul of equipment in the workshop	Oil filters will be placed into regulated waste drums which will be drained and crushed on site and collected by a waste contractor. Oil from drained filters will be collected by a licensed recycler and the metal casings segregated for metal recycling.
Sealers, resins, solvents and paint materials	Routine servicing and shutdown overhaul of vehicles and equipment in workshops, construction of conveyors, construction and assembly of the draglines and other mining equipment.	Stored in containers in bunded areas then removed by licensed contractor for reuse, reprocessing, recycling or disposal.
Tyres	Maintenance of vehicles	If possible, tyres will be removed by the tyre supplier for reprocessing, otherwise tyres will be stored and appropriately disposed of by burying in the mine overburden in a designated location which will be identified on the Environmental Management Register (EMR) managed by the Environmental Protection Agency (EPA)
Blasting residue (from use of ANFO explosive, boosters and detonator)	Blasting of overburden	Fragments to be buried in overburden stockpiles.
Conveyor belts	Conveyor operation and maintenance	Where possible, conveyor belts will be reused, reprocessed, recycled, or disposed to licensed waste disposal facility.
Process water	Coal handling, preparation and processing	Further discussion is provided in Chapter 11 as part of the mine water management system. Process water will be recycled as much as possible, including recycling of prcoess water from the tailings dam back into the CPP. Final disposal of process water will be to the tailings dam.
Tailings	Coal handling, preparation and processing	Fine particulates from the coal processing will be disposed to the tailings dam as a slurry. Tailings will be capped, following suitable drying of materials. The tailings dam will then be rehabilitated and revegetated. Chapter 6 provides further discussion on tailings.
Coarse rejects	Coal handling, preparation and processing	Disposal will be into Austinvale Pit, and other designated pits. If possible, some coarse rejects may be used for civil works, such as haul road construction depending the characteristics of the coarse rejects.
Potable water treatment plant sludge	Sludge is generated from treating raw water to become potable water	Sludge will be collected by Dalby Regional Council's waste contractor and disposed to a licensed waste facility.
Grey water	Contractor crib rooms, accommodation village, administration building, warehouse, workshops, CHPP	Subject to detailed design investigation, where possible, grey water from sinks, showers, and laundry facilities, to be captured and reused for toilet flushing and watering of landscaping around the MIA and accommodation facilities. Chapter 11 provides further discussion on grey water management.

Waste material	Waste sources	Management strategies
Wastewater treatment plant effluent	Wandoan Wastewater Treatment Plant	Continued disposal as per existing licensing requirements, with potential beneficial reuse options investigated during detailed design.
Wastewater treatment plant sludge	Wandoan Wastewater Treatment Plant	Continued disposal as per existing licensing requirements, with potential beneficial reuse options investigated during detailed design.
Exhaust emissions	Vehicle and other combustion engine plant and operated equipment	Gas fired power station, and vehicles and other equipment to be maintained in good condition.

Waste management plan

A detailed Waste Management Plan (Operations) as part of the Project Environmental Management Plan and Plan of Operations will be prepared prior to the commencement of operations, and updated yearly to reflect the current activities of the Project. The Waste Management Plan will address the following:

- identification of waste streams and establishment of a baseline measurement for each stream
- consideration of the waste management hierarchy when selecting waste management strategies, with emphasis on minimising waste
- identification of solid, liquid or hazardous waste collection, storage and or disposal strategies
- training of all personnel on procedures concerning waste minimisation, handling, storage, reuse, segregation, collection and disposal
- waste removal and transport from site to be by appropriately licensed contractors with disposal only to licensed reprocessing, recycling or waste disposal facilities
- transport of any hazardous or regulated waste to comply with all relevant legislation including waste tracking requirements
- monitoring waste streams and identifying opportunities for reduction and reuse of wastes
- auditing against the Waste Management Plan to ensure waste management strategy objectives are being met.

All operational wastes will be managed in accordance with the Waste Management Plan, Site Work Conditions, as defined by the WJV, and other relevant requirements.

18.7.4 DECOMMISIONING

At the end of the mine life, any remaining infrastructure will be decommissioned and removed from site in accordance with the Waste Management Plan. Chapter 25 Rehabilitation and Decommissioning describes the conceptual decommissioning and rehabilitation strategies developed for the Project including performance indicators to ensure minimal residual impacts to the surrounding environment.

18.8 RESIDUAL IMPACTS

Provided that the requirements of the relevant Waste Management Plans are complied with, potential environmental impacts arising from waste materials associated with the Project are expected to be minor to negligible.

Areas identified on-site as needing to be listed on the EPA's Contaminated Land Register (CLR) or Environmental Management Register (EMR), such as areas subjected to contaminating activities (existing or future), and a tyre disposal area, will be identified, listed and remediated where possible.

Subject to site identification and impact assessment and in associated with Dalby Regional Council, Wandoan Township will have a new multi-user waste disposal and recycling facility established that will meet all relevant requirements, regarding siting, sizing, construction, operation and maintenance, that will benefit the Township and the Project.

18.9 CONCLUSIONS

The reporting and management of wastes associated with the construction, operation and decommissioning of the Project will be undertaken in accordance with best practice, relevant legislation, guidelines, and the Project Waste Management Plans. It is expected that Project generated waste will be able to be managed at a suitably located off-site waste disposal and recycling facility managed by the Dalby Regional Council, or by a licensed waste contractor as appropriate depending on the waste type.

18.10 REFERENCES

Australian Standard *AS 1940 – The Storage and Handling of Flammable and Combustible Liquids.*

Taroom Shire Council Planning Scheme 2006.