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18.1 INTRODUCTION

Waratah Coal has undertaken a preliminary risk assessment for the project. The preliminary risk assessment is consistent with Australian Standard/New Zealand Standard ISO 31000:2009: Risk Management – Principles and Guidelines.

This chapter examines the safety, health and risk issues associated with the development and operation of the mine and associated infrastructure by:

- outlining legislative requirements for the project;
- identifying dangerous goods and hazardous substances likely to be used for the project;
- preparing a risk assessment for the construction and operation of the project;
- outlining the controls to be implemented for the project to protect the safety and health of employees and the public; and
- detailing emergency plans and emergency response capabilities.

This risk assessment does not consider the decommissioning phase of the project as the final desired landscape is still subject to landholder negotiations and government obligations in the years leading up to the time of decommissioning and the extent to which certain infrastructure can become public infrastructure. Notwithstanding, it is assumed that new technologies and innovations will be available leading up to the decommissioning phase (i.e. 25 – 30 years from commencement of the operational phase) and these are expected to alter the results of a risk assessment undertaken now.

Risks to the receiving environment are reported in the relevant specific EIS chapters.

18.1.1 LEGISLATIVE FRAMEWORK

The object of the various State and Commonwealth legislation in terms of managing the associated risks for the proposed project is primarily to protect the environment within context to safeguarding human health. To achieve this outcome the Acts in Table 1 provide a range of tools that include regulatory obligations. These regulatory obligations enforce compliance with respect to legislative strategies for both construction and operational phases across the project's life.

A range of Australian Standards, Codes of Practice and Guidelines which is also relevant to the protection of the health and safety of site works. These include:

- Australian Standard AS1692-1989: Tanks for flammable and combustible liquids. This standard specifies the design and construction requirements for tanks used for the purpose of storing flammable and combustible liquids;
- Australian Standard AS1940-2004: The storage and handling of flammable and combustible liquids. This standard sets out the requirements and recommendations necessary for the safe storage and

Table 1. Legislative Framework

APPLICABLE ACT	LEGISLATIVE OBLIGATION	COMPLIANCE STRATEGY
Coal Mining Safety and Health Act 1999	Establishes the obligations for personnel involved in the design, construction and operation of the mine.	The development and operation of the mine will be undertaken in compliance with the obligations of this Act, the Regulation and relevant Standards in addition to applying due diligence and implementing precautionary principals.
Dangerous Goods Safety Management Act 2001	This Act relates to the safe management, storage and handling of hazardous materials, particularly dangerous goods and combustible liquids.	Coal mine are exempt from this Act. Where the *Coal Mining Safety and Health Act 1999* is not the applicable Act, work practices will comply with this Act.
Explosives Act 1999	The Act provides guidance for the handling, use, transport, storage and manufacturing of explosives.	An authority will be sought to undertake work using explosives. The storage of explosive and other related dangerous materials will be undertaken in accordance with this Act.

APPLICABLE ACT	LEGISLATIVE OBLIGATION	COMPLIANCE STRATEGY
Radiation Safety Act 1999	The Act establishes requirements for the handling and storage of radioactive substances and the monitoring of persons exposed to the hazard.	The development and operation of the mine will be undertaken in compliance with the obligations of this Act.
Workplace Health and Safety Act 1995	The Act establishes the obligations to prevent a person's death, injury or illness being cause by a workplace, by a relevant workplace area, by work activities, or by plant or substances for use at a workplace.	The *Workplace Health and Safety Act 1995* (Div.2, s3) does not apply to a coal mine to which the *Coal Mining Safety and Health Act 1999* applies. Work practices associated with the rail line and infrastructure will comply with this Act when the *Coal Mining Safety and Health Act 1999* are not applicable.
Transport Infrastructure Act 1994	The Act is operated in conjunction with the *Transport Planning and Coordination Act 1994* and the *Transport Operations (Road Use Management) Act 1995*. The Act aims to provide a regime for the effective integrated planning and efficient management of a system of transport infrastructure.	It is likely the project will require approvals under the Act pertaining to transportation of oversized loads of plant, equipment and materials. These approvals will be obtained on an "as-needs" basis during the course of the project's future design and construction phases when the necessary design and construction information required for the permit applications is available.
Transport Planning and Coordination Act 1994	The objectives of the Act are to improve the economic, trade and regional development performance of Queensland, and the quality of life of Queenslanders, by achieving overall transport effectiveness and efficiency through strategic planning and management of transport resources.	Any activities associated with the development of the Project that may impact on a public passenger service, active transport system or works on a local government road may require approval under this Act.
Fire and Rescue Service Act 1990	This Act and the Fire and Rescue Service Regulation 2001 requires the operator to establish effective relationships with the Queensland Fire and Rescue Service to provide for the prevention of and response to fires and certain other incidents endangering persons, property or the environment and/or for related purposes or activities.	Emergency response procedures will be developed in consultation with the Emergency Services and other related Government agencies.

handling of flammable and combustible liquids and includes minimum acceptable safety requirements for storage facilities, operating procedures, emergency planning and fire protection;

- Australian Standard AS2187-1988: Explosives – Storage, transport and use. This standard establishes the acceptable requirements for storage, transport and use of explosives and detonators to ensure security and safety;
- Australian Standard AS2958-1995: Earth-moving machinery – Safety. This standard prescribes specific requirements for brake systems on self-propelled rubber-tyred vehicles. The objective of the standard describes relative design, manufactures, suppliers, employers and users of earth-moving machinery in minimizing the associated risks to the health and safety of persons required to work with or near earth-moving equipment;
- Australian Standard AS1170.4:2007: Structural design actions - Earthquake actions in Australia. This standard prescribes procedures to designers of earthquake actions and general detailing utilization requirements within the design phase of structures deemed to be subjected to earthquakes;
- Australian Standard AS4024: Safety of machinery - This standard outlines safety requirements for machinery and plant equipment and is typically associated with the design of machinery, rather than the applied use of the machinery;
- Australian / New Zealand Standard AS/NZS ISO31000:2009: Risk Management – Principles and Guidelines. This standard identifies the elements of risk management processes including risk assessment, risk analysis, evaluation and controls / treatment, review and system modification;
- Australian / New Zealand Standard AS/NZS4801 – 2001: Occupational Health and Safety Management Systems – specification with guidance for use. This standard specifies the requirements for an occupational safety and health management system to enable a proponent to formulate a policy and objectives that take into account legislative requirements and information about hazards or risks. The standard applies to hazards and risks over which the proponent exercises control over;
- Australian / New Zealand Standard AS/NZS1170.2:2002: Structural design actions - Wind actions. This standard prescribes technical data and provides procedures in as dynamic responses to wind actions and associated independent design requirements specified for a structure. Essentially, this standard describes procedures to designers of structures subject to varying wind actions;
- The Australia New Zealand Food Standards Code 2005. This code identifies the standards for food in Australia including processing for particular class of food hygiene; and
- Australian / New Zealand Standard AS/NZS1768:2007: Lighting protection. This standard prescribes to designers during planning phase's authoritative guidance on the principles and practices of lightening protection for various ranges of structures and systems. Recommendations in this Standard will reduce the probability of damage to a calculated acceptable level. Guidance is given on methods of enhancing the level of protection against lightening damage, if required.

Below are other direct sources of legislation which holds relevance to the Project including Commonwealth Standards, Codes of Practice and Guidelines:

- National Standard for Construction Work [NOHSC: 1016 (2005)];
- National Standard for Manual Tasks (2007);
- National Standard for Occupational Noise [NOHSC: 1007 (2000)];
- National Standard for Plant [NOHSC: 1010 (1994)];
- Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC: 1003 (1995)];
- Australian Code for the Transport of Dangerous Goods by Road and Rail, 7th Edition;
- Australian Code for the Transport of Explosives by Road and Rail, 3rd Edition;
- National Code of Practice for the Control of Workplace Hazardous Substances [NOHSC: 2007 (1994)];
- National Code Of Practice for Induction for Construction Work, May 2007;
- National Code of Practice for the Prevention of Falls in General Construction, April 2008;
- The National Code of Practice for the Prevention of Musculoskeletal Disorders from Performing Manual Tasks at Work (2007);
- National Code of Practice for the Prevention of Occupational Overuse Syndrome [NOHSC:2013(1994)];

- Mobile Crane Code of Practice 2006;
- Plant Code of Practice 2005;
- Risk Management Code of Practice 2007;
- Traffic Management for Construction or Maintenance Work Code of Practice 2008;
- API RP 520, Sizing, selection and installation of pressure relieving devices in refineries;
- API RP 752, Management of hazards associated with location of process plant buildings; and
- API RP 753, Management of hazards associated with location of process plant portable buildings.

18.1.2 DANGEROUS GOODS AND HAZARDOUS SUBSTANCES

The construction and operation of the mine site involves the storage and handling of dangerous goods and hazardous substances. A number of these products are regulated by the Australian Code for the Transport of Dangerous Goods by Road and Rail. In addition to these materials, a variety of hazardous substances will be managed in accordance with National Occupational Health and Safety Council Guidelines. A list of associated dangerous goods and chemicals and their indicative estimated quantities of volume which is likely to be stored at the project's site during both developmental phases are presented in Table 2.

Table 2. Likely dangerous goods and hazardous substances used during the construction and operation of the coal mine and associated infrastructure

CHEMICAL NAME	DG CLASS	RAW CONC. (WT%)	STORAGE CONC. (WT%)	UN NUMBER	PACKAGING GROUP	USE
Diesel Fuel	3 (Class C1)[1]	N/A	N/A	1202	III	Fuel for vehicles and mobile equipment
Lubrication oils	3 (Class C2)[2]	N/A	N/A	N/A	N/A	Hydraulic oils to lubricate plant and equipment
Ammonium nitrate / fuel oil (ANFO)	1.1D	N/A	N/A	0082	N/A	Explosives for blasting
Caustic soda (sodium hydroxide)	8	50	50	1823	II	Degreasing agent
Flotation agents (MIBC - methyl isobutyl carbinol)	3	99.5	99.5	2053	III	Use in CHPP
Anionic flocculants (acrylamide / acrylate copolymer)	N/A	99.5	10	N/A	N/A	Use in CHPP
Cationic flocculant (polydimethyl diyl ammonia chloride)	N/A	40	40	N/A	N/A	Use in CHPP
Sodium Hypochlorite	8	12	12	1791	II or III	Sewage Treatment Facility Water Treatment System
Sodium Hydroxide	8	10	10	1824	II or III	Sewage Treatment Facility Water Treatment System

CHEMICAL NAME	DG CLASS	RAW CONC. (WT%)	STORAGE CONC. (WT%)	UN NUMBER	PACKAGING GROUP	USE
Aluminium Sulphate	N/A	40	40	N/A	N/A	Sewage Treatment Facility Water Treatment System
Citric acid	N/A	95	95	N/A	N/A	Water Treatment System
Powdered activated carbon	N/A	100	100	N/A	N/A	Water Treatment System
Powdered polymer (cationic poly acrylamide)	N/A	100	100	N/A	N/A	Water Treatment System
Lime (calcium oxide)	8	100	100	1910	III	Water Treatment System
Solvents and thinners	3	99.5	99.5	1090	II	Degreasing agent
Sulphuric acid	8	15-51%	15-51%	2796	II	Batteries
Paints	3	N/A	N/A	1263	III	Paint

[1] – Class C1 – a combustible liquid that has a flashpoint of 150oC or less
[2] – Class C2 - a combustible liquid that has a flashpoint that exceeds 150oC

From time to time, other dangerous goods may be required as part of constructing and / or operating the mine site. In the event this occurs, existing (SOPs) will be reviewed to ensure safety processes and storage and handling procedures are adequate to ensure conformance with AS1940.

18.1.2.1 Construction Phase

A list of dangerous goods and hazardous substances and materials that may be used during the construction phase of the project is shown at Table 3. The approximate rate of use and maximum storage amount of each of the products likely to be stored at the project's site during construction is also included.

A (MSDS) register will be established on site prior to the commencement of construction. The MSDS information will be retained onsite and will be available to all site personnel.

18.1.2.2 Operational Phase

A list of dangerous goods and hazardous substances and materials that may be used during the operational phase of the project is shown at Table 4. The approximate rate of use and maximum storage amount of each of the products likely to be stored at the project's site during operations is also included.

The MSDS register established during the construction phase will continue to evolve through the operational phase and will be adapted to include new MSDS data over time. The MSDS information will continue to be retained onsite and will remain to be available to all site personnel.

Table 3. Approximate usage and storage volumes of dangerous goods and hazardous substances during the construction phase

CHEMICAL NAME	APPROX RATE OF USE	INDICATIVE MAXIMUM STORAGE VOLUME
Diesel Fuel	50,000 L/day	200,000 L
Lubrication oils	600 L/day	3,000 L
Hypochlorite solution (liquid chlorine)	200 kg / month	1,000 L bulky box

Table 4. Approximate usage and storage volumes of dangerous goods and hazardous substances during the operational phase

CHEMICAL NAME	APPROX RATE OF USE	INDICATIVE MAXIMUM STORAGE VOLUME
Diesel Fuel	95 ML/a	1,500,000 L
Lubrication oils	1.1 ML/a	20,000 L
Ammonium nitrate / fuel oil (ANFO)	47,000 t/a	700 t
Soda Ash	10 t/a	1 tonne pallet
Flotation agents (MIBC - methyl isobutyl carbinol)	1,450 t/a	50 t
Anionic flocculants (acrylamide / acrylate copolymer)	2,030 t/a	60 t
Cationic flocculant (polydimethyl diyl ammonia chloride)	232 t/a	5 t
Sodium Hypochlorite	2000 kg/a	1,000 L bulky box
Aluminium Sulphate	11 t/a	1 tonne pallet
Powdered polymer (cationic poly acrylamide)	400 kg/a	1,000 L bulky box
Lime (calcium oxide)	50 kg/a	500 kg
Solvents and thinners	50,000 L/a	5 x 1,000 L bulky box
Acids	1,000 L/a	500 L

18.2 RISK ASSESSMENT METHOD

Waratah has undertaken a risk assessment for each component of the project in order to meet its obligations to identify and manage potential impacts to safety and health associated with the project. In assessing the potential safety and health risks associated with this project, the guidance provided in AS/NZS ISO31000 was followed.

The assessment outlines the implications for, and the impact on, the surrounding land uses. The risk assessment incorporates:

- consideration of potential hazards (minor and major);
- the likely frequency of the potential hazard occurring;
- consideration of the cumulative risk to safety and health;
- the temporal extent of identified hazards;
- the effects and rate of usage of the hazardous substances to be used, stored, processed or produced by the project; and
- the type of infrastructure and plant and equipment to be used during the construction and operational phases of the project.

Potential incident scenarios from the project were identified through consideration of:

- the activities assumed to be carried out and facilities likely to be present during the construction and operation phases of the project (i.e. underground mining, construction and operation of the two CHPPs, vehicle use, dangerous goods use and handling); and
- the range of potentially hazardous incidents that might be associated with each of the activities/ facilities identified at the mine site.

After identifying the range of hazards likely to cause an incident at the project's site, the following matters were considered for each hazard:

- design controls and mitigation measures identified for each hazard, including prevention and response measures;
- the consequences of each of the hazardous incidents if they were to occur, including direct impacts of incidents and the potential for propagation and secondary incidents;
- the probability of events occurring and leading to the hazardous incident;
- the probability of each hazardous incident occurring taking into consideration the proposed controls; and
- the extent to which hazard risk profiles are reduced as a consequence of implementing control and mitigation measures (residual risk).

18.2.1 ADOPTED DEFINITIONS

The following definitions have been adopted for the assessment of risks and hazards:

- a Hazard is something with the potential to cause harm. This can include hazardous substances, plant and equipment, work processes or other aspects of the environment;
- the Likelihood is the chance or probability of an event occurring;
- the Consequence refers to how much harm the hazard could do, how many people it could affect and whether the harm would be short or long term;
- the Risk is the likelihood that a harmful consequence might result when exposed to the hazard;
- "Major Accident Event (MAE)", means a sudden occurrence (including in particular a major emission, loss of containment, fire, explosion or release of energy) leading to serious danger or serious harm to persons, property, both the built or natural environment, whether immediate or delayed; and
- critical is defined as "Performance" that has the potential to result in:
  - a fatality;
  - serious environmental effects;
  - ongoing significant social issues;
  - significant adverse attention from media, non-government organisation;
  - loss of licence;
  - loss of a customer;
  - loss of corporate image; and
  - loss of production or revenue.

This definition covers people, plant and equipment, production, quality as well as systems and procedures.

18.2.2 RISK ANALYSIS CRITERIA

The risk assessment used for the assessment is based on the model contained in AS/NZS ISO31000. This Standard establishes a method for identifying risk profiles through combining the "Likelihood" of a hazard occurring with the "Consequences" of a hazard or impact occurring, in terms of its effect on the safety and health of personnel.

The highest risk incidents are judged to have the highest priority for consideration of additional risk reduction options. Conversely, low risk profiles are typically controlled through SOPs and controls and maintained through ongoing monitoring as part of the continuous improvement cycle.

Likelihood is a qualitative estimate of the frequency at which the issue or hazard may occur. Based on definitions shown in Table 5 an agreed estimate of the likelihood of occurrence was assigned to each identified hazardous incident. The contribution of the preventative and protective features were taken into account when assessing the likelihood of occurrence and potential consequence from each hazardous incident.

The assessment established the potential level of consequence to safety and health of the public in accordance with the definitions shown in Table 6. Where a hazardous incident may have multiple outcomes, each outcome was assessed individually.

The risk matrix shown in Table 7 was adopted for the assessment. The colour shading refers to the qualitative bands of risk level.

18.3 RISK ASSESSMENT

The risk assessment tables for construction and operational phase are structured to show the results of the raw risk profile and the residual risk profile. The tables present the results in the following order:

- the hazard that may impact on safety and health;
- the Consequence (C), Likelihood (L) and Risk (R) that may impact on safety and health;
- the strategy or strategies established to address the risk; and
- the Consequence (C), Likelihood (L) and Risk (R) that may impact on safety and health after the mitigation measures are in place.

When reporting the results of the risk assessment, the residual risk is generally discussed. In some cases the raw and residual risks are discussed and these typically are for scenarios that are assessed as high or extreme residual risks.

Table 5. Likelihood of occurrence ratings

PROBABILITY RANKING	DESCRIPTOR	DESCRIPTION
A	Almost certain	Has happened within the last year
B	Probably will occur	Has happened in the last 1 to 5 years
C	Might occur	Has happened in the last 5 to 10 years
D	Could occur	Has happened in the last 10 to 30 years
E	Exceptional event	Has not happened in industry but theoretically could happen

Table 6. Consequence ratings for safety and health losses

CONSEQUENCE RANKING	DESCRIPTOR	SAFETY AND HEALTH
1	Catastrophic	Multiple fatalities, significant irreversible effects to >50 people
2	Major	Single fatality, severe irreversible disability
3	Moderate	Moderate irreversible disability or impairment (Classified injury)
4	Minor	Reversible disability requiring hospitalization (Medical treatment case)
5	Insignificant	No medical treatment (First aid case)

Table 7. Risk assessment matrix

DEFINITIONS		CONSEQUENCE				
		Insignificant 5	Minor 4	Moderate 3	Major 2	Catastrophic 1
LIKELIHOOD	Almost certain A	Moderate A5	High A4	Extreme A3	Extreme A2	Extreme A1
	Probably will occur B	Moderate B5	High B4	High B3	Extreme B2	Extreme B1
	Might occur C	Low C5	Moderate C4	High C3	Extreme C2	Extreme C1
	Could occur D	Low D5	Low D4	Moderate D3	High D2	Extreme D1
	Exceptional event E	Low E5	Low E4	Moderate E3	High E2	High E1

18.3.1 CONSTRUCTION AND OPERATIONAL HAZARDS

Hazards associated with the construction and operation of the coal mine would generally be considered similar those of a large mine site. Typical hazards expected include:

- fuel spills – the storage and handling of fuel and oils that may result in spills and leaks;
- transport – the use of heavy vehicles, pedestrians and marine craft both on and offsite;
- heavy machinery – the use of heavy machinery that may result in injury to workers and damage to equipment;
- hazardous materials / substances / chemicals – the storage, handling and may result in spills and leaks;
- adverse weather – undertake activities in adverse weather conditions such as cyclones, storms, winds or heat that may result in equipment damage or injury;
- working at heights – injury associated with falls from heights and material falling from height;

- confined space entry, excavation and trenching – injuries associated with working in confined spaces;
- slips, trips and falls – through every day construction activities;
- dust exposure – exposure to long term dust (that may contain hazardous materials) resulting in injury or making the work place hazardous;
- excessive noise exposure - impacts to hearing from prolonged noise exposure;
- spontaneous combustion of coal stockpile –resulting in a fire risk at the site that may lead to injury or loss of life;
- undertaking underground mining operations – resulting in injury through working in a highly energized and potentially gaseous work environment;
- blasting and vibration – that may lead to injury to personnel or serious damage to equipment; and
- electrical work – electrocution, injury and fires which may damage or cause injures to personnel and equipment.

The lead construction contractor will implement a Safety and Health Management System (SHMS) that is consistent with the principals required by Waratah and fully complies with legislative obligations. A site specific construction safety and health management plan, work instructions, and permits to work will be completed prior to construction works commencing.

The risk assessment outcomes for the construction and operational phases of the project are shown in Table 8 and Table 9, respectively.

Table 8. Risk assessment outcome – construction activities

HAZARD	SAFETY AND HEALTH RAW RISK			MITIGATION MEASURES	SAFETY AND RAW RESIDUAL RISK		
	C	L	R		C	L	R
Dust emissions from vehicle operations	5	D	L	• water sprays on unsealed roads; • restricting vehicle speeds on unsealed haul roads to reduce dust generation and keep vehicles to well-defined roads; • minimise haul distances between construction sites to spoil stockpiles; • treat or cover stockpiled material to prevent wind erosion; • regularly clean machinery and vehicle tyres to prevent wheel entrained dust emissions; • route roads away from sensitive receptors wherever practical; • minimise topsoil and vegetation removal, and revegetate disturbed areas as soon as possible; • ongoing visual monitoring of dust on a daily basis, with ramping down of activities in the instance of high dust emissions; and • enclosed cabins to minimise operator exposure.	5	D	L
Traffic incidents – onsite movement of vehicles and mobile equipment	3	C	H	• licenced and competent operators; • site safety induction; • speed restrictions; • fatigue management strategies; • in-vehicle communications; and • roll-over protective structures fitted to equipment.	4	E	L

HAZARD	SAFETY AND HEALTH RAW RISK			MITIGATION MEASURES	SAFETY AND RAW RESIDUAL RISK		
	C	L	R		C	L	R
Traffic incident – offsite movement of vehicles and mobile equipment	3	C	H	• licenced and competent operators; • traffic management plan; • safety induction for staff; • speed restrictions; • in-vehicle communications; • fatigue management strategies; • community engagement and consultation; • public notifications; and • ongoing liaison with authorities.	4	E	L
Construction activities – non specific	2	D	H	• site safety induction; • site safety management system incorporating risk assessments, (SOPs), (JSAs) and (JHA); • licenced and competent operators; • appropriate (PPE) provided to all on site personal; • ongoing maintenance of equipment; • industry standard work controls including for operating at height, in confined spaces, for hot works, safe operating at height controls, safe lifting and manual handling procedures, safe working around excavations and trenches; and • preferred contractor selection procedures.	3	D	M
Slump or subsidence	4	C	M	• site signage and notice boards; • ROPS fitted to vehicles and machinery; • site drainage management system implemented; and • ongoing site geotechnical inspections.	4	C	M
Leaks of oils, fuel, chemicals from vehicles during operations	5	B	M	• regular vehicle maintenance; • storage and handling of hazardous materials in accordance with AS1940; • refueling and material handling in areas set-up with spill containment devices and spill recovery kits; and • service vehicles and equipment offsite at authorised repair workshops where practicable.	5	C	L

HAZARD	SAFETY AND HEALTH RAW RISK			MITIGATION MEASURES	SAFETY AND RAW RESIDUAL RISK		
	C	L	R		C	L	R
Chemical release other than from vehicles	4	B	M	• storage and handling of hazardous materials in accordance with AS1940; • spill containment and recovery kits located on site; • site drainage system designed to contain spills on site; • on site HAZOP reviews undertaken routinely; • ongoing training to site personnel on hazard material storage and handling, and spill response; • MSDS available at all on-site hazardous material storages; • appropriate PPE available on site for all staff involved with handling, storage or use of hazardous materials; and • preventative maintenance program implemented as part of SOPs.	5	B	M
Excessive noise – construction activities	5	C	L	• equipment designed to Australian Standards and in accordance with Environmental Protection (Noise) Policy 2008; • appropriate PPE provided to all on site personal; • attenuation devices such as silencers, baffles etc included into the design where possible; • relocation of affected homesteads in the vicinity of the mine site; and • construction of noise attenuation infrastructure around homesteads.	5	D	L
Bushfire	4	D	L	• site specific Bushfire Management Plan (BMP) established prior to the commencement of construction; • emergency response procedures imbedded into Safety Management System; • fire protection infrastructure imbedded into site design and progressively installed during construction; and • ongoing consultation with authorities and surrounding landholders regarding fuel load management.	4	E	L
Contact with electrified wires or machinery	2	C	E	• implementation of a Control of Energy (isolations) procedure; • site safety management system incorporating risk assessments, SOPs, JSAs and JHA; and • use of appropriately qualified site personnel.	4	E	L

HAZARD	SAFETY AND HEALTH RAW RISK			MITIGATION MEASURES	SAFETY AND RAW RESIDUAL RISK		
	C	L	R		C	L	R
Failure of Emergency Response System	3	C	H	• compliance with Emergency Response System by all on site staff; • back-up systems for all operational areas built into the design process; and • scheduled, ongoing Emergency Response System training to all employees.	4	E	L
Sewerage Treatment Facility (STF) failure	4	E	L	• system design to minimise risk of failure (i.e. alarms, system monitoring); • secondary capture capacity in Site Water Management System; and • STF system operating secured.	4	E	L

Table 9. Risk assessment outcome – operational activities

HAZARD	SAFETY AND HEALTH RAW RISK			MITIGATION MEASURES	SAFETY AND HEALTH RESIDUAL RISK		
	C	L	R		C	L	R
Dust emissions from mine site operations	5	D	L	• watering of haul roads; • restricting vehicle speeds on unsealed haul roads to reduce dust generation and keep vehicles to well-defined roads; • minimise haul distances between construction sites to spoil stockpiles; • treat or cover stockpiled material to prevent wind erosion; • regularly clean machinery and vehicle tyres to prevent wheel entrained dust emissions; • route roads away from sensitive receptors wherever practical; • minimise topsoil and vegetation removal, and revegetate disturbed areas as soon as possible; • ongoing visual monitoring of dust on a daily basis, with ramping down of activities in the instance of high dust emissions; • water sprays at primary, secondary and tertiary sizing station stockpiles; • fully enclosed conveyor systems; • underground loading of coal at the preparation and preparation facilities; • wet process for the coal handling facility; • ongoing revegetation of stripped areas in the open cut mine pits; and • enclosed cabins to minimise operator exposure.	5	D	L

HAZARD	SAFETY AND HEALTH RAW RISK			MITIGATION MEASURES	SAFETY AND HEALTH RESIDUAL RISK		
	C	L	R		C	L	R
Traffic incidents – onsite movement of vehicles and mobile equipment	3	C	H	• licenced and competent operators; • site safety induction; • speed restrictions; • fatigue management strategies; • in-vehicle communications; and • roll-over protective structures fitted to equipment.	4	E	L
Traffic incident – offsite movement of vehicles and mobile equipment	3	C	H	• licenced and competent operators; • Traffic Managment Plan (TMP); • safety induction for staff; • speed restrictions; • in-vehicle communications; • fatigue management strategies; • community engagement and consultation; • public notifications; and • ongoing liaison with authorities.	4	E	L
Slump or subsidence	3	D	M	• ROPs fitted to vehicles and machinery; • ongoing geotechnical inspections of the benches, roads and pavements; • site drainage management system; and • ongoing site geotechnical inspections.	3	D	M
Drag line falls and contact with nearby support equipment	3	C	H	• clear operating procedures; • use of experienced operators and support personnel; • linked to site communications system; • onboard GPS navigation systems; and • ongoing geotechnical inspections of the benches.	3	D	M
Highwall rock falls	2	D	H	• pedestrian separation from face; and • falling object protective structures.	2	D	H
Leaks of oils, fuel, chemicals from vehicles during operations	4	C	M	• regular vehicle maintenance; • storage and handling of hazardous materials in accordance with AS1940; • refueling and material handling in areas set-up with spill containment devices and spill recovery kits; and • service vehicles offsite at authorized repair workshops where practicable.	4	D	L

HAZARD	SAFETY AND HEALTH RAW RISK			MITIGATION MEASURES	SAFETY AND HEALTH RESIDUAL RISK		
	C	L	R		C	L	R
Chemical release other than from vehicles	4	C	M	• storage and handling of hazardous materials in accordance with AS1940; • service equipment offsite at authorized repair workshops where practicable; • spill containment and recovery kits located on site; • site drainage system designed to contain spills on site; • on site HAZOP reviews undertaken routinely; • ongoing training to site personnel on hazard material storage and handling, and spill response; • MSDS available at all on-site hazardous material storages; • appropriate PPE available on site for all staff involved with handling, storage or use of hazardous materials; and • preventative maintenance program implemented as part of SOPs.	??	??	L
Blasting and explosive handling	1	E	E	• SOPs, JSAs and JAHs; • explosive materials handled and used in accordance with AS2187.2; • detonators shall be handled in accordance with the Explosives Act 1999; • explosive materials will only be handled by licenced personnel; • site specific blasting procedures implemented; and • ignition sources strictly controlled.	4	E	L
Excessive noise – operational activities	5	C	L	• equipment designed to Australian Standards and in accordance with Environmental Protection (Noise) Policy 2008; • appropriate PPE provided to all on site personal; • silencers, baffles etc included into the design where possible; • relocation of affected homesteads in the vicinity of the mine site; and • construction of noise attenuation infrastructure around homesteads.	5	C	L

HAZARD	SAFETY AND HEALTH RAW RISK			MITIGATION MEASURES	SAFETY AND HEALTH RESIDUAL RISK		
	C	L	R		C	L	R
Fire in coal stockpiles and CHPP	4	C	M	• fire suppression system designed to Australian standards; • plant designed to minimise fire risk; • ongoing maintenance of fire protection system; • site specific Emergency Response Plan (ERP); • site fire fighting vehicles and equipment fully operational and maintained; • regular stockpile inspections; and • keep stockpiles mobile through regular turning.	4	D	L
Bushfire	4	C	M	• site specific BMP in place; • emergency response procedures imbedded into the SHMS; • trained fire safety officers onsite at all times, and additional support on call during high fire risk periods; • fire protection infrastructure imbedded into site design; and • ongoing consultation with authorities and surrounding landholders regarding fuel load management.	4	D	L
Contact with electrified wires or machinery	2	C	E	• implementation of a Control of Energy (isolations) procedure; • use of appropriately qualified site personnel; and • ongoing preventative maintenance program as part of SOPs.	2	C	E
Failure of Emergency Response System	3	C	H	• compliance with Emergency Response System by all on-site staff; • back-up systems for all operational areas built into the design process; • ongoing Emergency Response System training to all employees; and • establishment of emergency response procedures with local / regional authorities, surrounding landholders and nearby mining operations.	4	C	M
Sewage Treatment Facility failure	4	E	L	• system design to minimise risk of failure (i.e. alarms, system monitoring); • secondary capture capacity in Site Water Management System; and • STF system operating secured.	4	E	L

HAZARD	SAFETY AND HEALTH RAW RISK			MITIGATION MEASURES	SAFETY AND HEALTH RESIDUAL RISK		
	C	L	R		C	L	R
Underground mining operations	3	C	H	• use of only appropriately qualified staff; • ongoing training and routine re-certification; • defined shift cycles to reduce fatigue; and • appropriate systems design (ventilation, dewatering, electrical circuit protection).	4	C	M
Operational activities – non specific routine works	3	C	H	• site safety induction; • site safety management system; • appropriate PPE provided to all on site personal; • ongoing maintenance of equipment; • industry standard work controls including for operating at height, in confined spaces, for hot works, safe operating at height controls, safe lifting and manual handling procedures, safe working around excavations and trenches; and • preferred contractor selection procedures.	4	C	M

18.4 PRELIMINARY HAZARD ANALYSIS

A preliminary hazard assessment was undertaken to model and review potential hazards associated with the mine and potential risks to safety and health of its workforce and individuals that may interact with the project. The hazard assessment process allows for a consistent method to be applied to the overall project components to compare potential safety and health risks against statutory requirements and workforce / stakeholder expectations.

This preliminary hazard assessment provides a preliminary assessment of the risks associated with the construction and operation of the mine infrastructure. A further detailed hazard assessment will be conducted as part of completing the detailed design phase of the project to ensure where possible risk mitigation is embedded into the design features.

Waratah propose to adopt industry standard measures to assess and develop risk mitigation strategies and these will include the implementation of a project wide SHMS, ongoing reviews assessing the constructability of the rail infrastructure, the development of SOPs and the completion of a HAZOP assessment.

18.5 RISK CONTROLS

18.5.1 SAFETY AND HEALTH MANAGEMENT SYSTEMS

In accordance with *The Coal Mining Safety and Health Act 1999* Waratah Coal will prepare and implement a SHMS that integrates risk management elements and practices to ensure the safety of workers and contractors. The SHMS will be an auditable and documented system. The system will form part of the overall site management system and includes specific operating procedures that incorporate organizational structures, planning activities, responsibilities, site practices, procedures, processes and identifies resources required for the development, implementation, review and maintenance of the safety and health policy. A brief description of the SHMS elements is shown in **Figure 1**.

The objectives of the SHMS are to protect the safety and health of all site workers, contractors and visitors, and to ensure compliance with all relevant legislation. The SHMS will be integrated with the EMS as many of the controls established to protect safety and health are also established to minimise risk to the receiving environment.

The SHMS will be audited by an external party on an annual basis, as required by AS/NZS4801:2001. The SHMS will be a "live" document that will undergo regular review to ensure currency is maintained through the operation of the mine site. The ongoing review process will include the compilation and assessment of data relating to safety and health issues, such as reported near misses, accident reports and general sickness data.

18.5.2 SAFETY CONTROLS

Hazards that pose a potential safety risk to staff, contractors and visitors to the site have been identified and assessed in accordance with the risk assessment procedures described in Section 18.2. The risk assessment is considered to be a preliminary risk assessment, with a more detailed risk assessment proposed during the latter stages of the detailed design phase. Descriptions of identified controls are provided in the following sections.

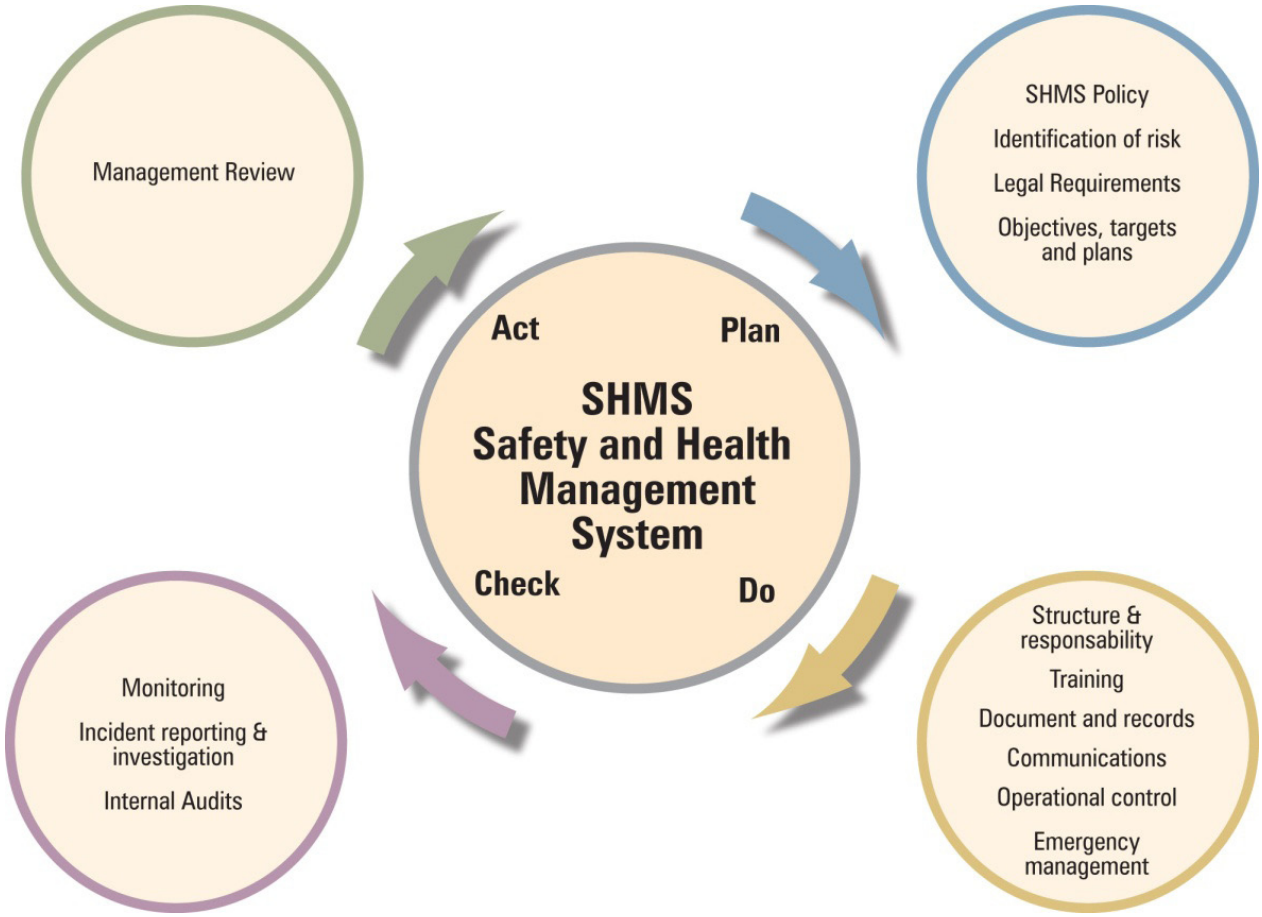
18.5.2.1 Equipment Operations

Vehicles and equipment that will be used as part of the construction and operation of the mine site will be maintained and serviced on a regular basis. The use and maintenance of equipment and vehicles will only be undertaken by fully trained and competent personnel and will be undertaking in accordance with prescribed manufacturers specifications. Detailed maintenance schedules and records will be retained onsite through the life of the operations.

18.5.2.2 Traffic Incidents - Offsite

The primary access to the mine site will be via a new road off the Capricorn Highway located approximately 7 km to the west of the Alpha Township. This would provide a more direct access route from Alpha than via the Clermont-Alpha Road, which follows the Alpha Creek alignment. The overall assessment of transport and traffic impacts associated with the construction

Figure 1. Safety and Health Management System Elements



and operation of the mine site is provided in Volume 5, Appendix 21.

A review of the road crash history of the area identified that of the 62 vehicle accidents in the region of the mine site during the period 2004 - 2008, the significant majority of accidents were single vehicle. Only five of the accidents involved two cars, with four of those nominating the cause of the crash as "hit animal". Therefore, only one accident in this region occurred during 2004-2008 as a direct result of two cars colliding. The limited conflicts between vehicles most likely reflect the low volumes in the region.

Historically, traffic incidents on local roads nearby the mine have been minimal, with higher crash rates generally observed along unsealed sections of roads. Therefore, by providing a sufficiently sealed access road with adequate sight distance and appropriately formed intersections, a safe driving environment for mine traffic will be provided. In addition to this, local residents currently using the Clermont-Alpha Road will also benefit from having a more efficient and safer route.

The new mine is expected to significantly increase the amount of new traffic in the region, albeit from a very low base. Notwithstanding, no road in the local area is expected to carry more than 3,000 vehicles per day (vpd), inclusive of background traffic growth and direct mine traffic. As such, it is expected that a Level Of Service (LOS) A will be maintained on all roads in the vicinity of the mine site. (Level of Service (LOS) is defined by the time spent following other vehicles. For a 100 km/h road, a LOS A is achieved where percentage following time is less than 40% - refer to Chapter 13 Traffic and Transport, Volume 2)

The critical intersection in the network will be where the new mine access Road intersects the Capricorn Highway. Traffic accessing the mine will predominantly be outbound from Alpha, requiring a right turn off the highway to proceed to the mine. Therefore, this intersection will be designed with full channelised turn lane for right turn movements off the highway to turn north towards the mine. The right turn lane would incorporate a minimum length of 250 m, to cater for both full deceleration and queuing for Type 2 road trains. This intersection will necessitate a median to separate opposing flows and lighting and signage to a suitable standard.

18.5.2.3 Traffic Incidents - Onsite

A variety of vehicles and heavy earth moving equipment including haul trucks, loaders, scrapers, graders, rollers, water trucks, dump trucks and four-wheel drives, are likely to operate on roads and access roads within the project's site. Due to the size of these vehicles accidents involving these vehicles may result in serious injury or incident.

Waratah will provide a safety induction to all employees and contractors prior to operating any vehicles on the mine site. Any worker or contractor operating a vehicle on site will be required to have the appropriate level of training and licenses. All vehicles will be fitted with radios for two-way communication and appropriate speed control signs and other various traffic signage, together with prescribed driving procedures will be used on site to minimise the risk of an accident occurring. In addition Waratah will prepare an onsite Traffic Management Plan (TMP) that addresses light and heavy vehicle operations, road design, road maintenance, traffic rules and movements and parking.

To ensure a suitable level of visibility the watering of roads and access areas will be undertaken regularly to reduce dust generation. Mine traffic will occur 24 hours per day, with a significant amount of night driving likely to occur and as such adequate additional night lighting will be incorporated into the design of the haul roads and access tracks

18.5.2.4 Blasting and Explosives Handling

Waratah will undertake blasting activities during the operation of the mine. The requirements of the *Explosive Act 1999*, Coal Mining Safety and Health Regulations 2001 and AS 2187.2:2006 will be adhered to in order to minimise the risk of an incident associated with the use, storage and / or handling of explosives. Potential risks associated with blasting include dust generation, excessive noise and vibration, and impacts associated with flyrock strike and air-blast. These risks can result in injury to workers and contractors if appropriate mitigation measures are not implemented. These measures include the development of specific SOPs, the use of licenced operators to design and undertake blasts, the use of appropriate warning signs and devices and appropriate controls to restrict access to risk areas during blasting activities.

In regard to explosive material handling and storage, a specialist explosives company will provide the materials

associated with blasting operations. All personnel involved in the handling and storage of explosives will be licensed and trained in all aspects of the transport, handling, mixing and use of explosive materials. All materials will be stored at the onsite bulk explosives storage facility that will be designed to conform to AS 2187.1:1998.

Licensed transport operators will be used to transport of dangerous goods to the project's site. Where appropriate standard exist for the transport of hazardous materials (i.e. AS 1678.5.1.002:1998) only those operators that conform to the applicable standard will be used.

18.5.2.5 Exposure to High Voltage

During the construction phase, power will be generated through a series of onsite generators. During operations power will be supplied through a 66 kV overhead line to the various infrastructures. In both phases potentially lethal levels of voltage and amperage will be distributed across the site. All onsite power transmission sources will be designed by appropriately qualified electrical engineers and will follow current industry standards and design certification requirements.

Prior to commencing work on site all workers and contractors will be required to undergo a site safety induction. This induction will include specific components in relation to dealing with high and low voltage systems. Specific SOPs will be developed to address the safety risks associated with operating in the vicinity of high voltage circuits.

Given the potential consequences associated with the risks from exposure to high voltage circuits the residual risk is considered extreme and requires ongoing specific and specialised controls through the construction and operation of the mine site.

18.5.2.6 Interaction with Operating Machinery

During construction and operation activities, site personnel may be at risk of interacting with operating high energy machinery including earth moving equipment, vehicles, crushers and longwall shearers which may result in serious injury. Prior to commencing work on the site a detailed site induction will be provided for all staff which will include discussion about the risks of personnel injury associated with interacting with high energy equipment. In addition, Waratah will develop detailed SOPs that include procedures for operating in areas of high energy machinery.

18.5.2.7 Working at Height

Working at height will be required during construction and operation of the mine site. For such activities, Waratah will develop safe operating procedures to control associated risks. Prior to undertaking any works on site, all staff will be required to undertake a site safety induction and posses the necessary industry competencies and training to undertake at height works. Appropriate elevated work platforms and fall arrest equipment (i.e. securing harnesses) will be provided, with staff fully trained in their use. In addition, appropriate PPE to mitigate the risks from falling objects (i.e. hard hats and eye protection) will be mandatory for working at heights.

18.5.2.8 Fuel Storage and Handling

Prior to the commencement of construction activities, Waratah will apply for a permit to store flammable and combustible liquids at the mine site. Diesel will be used on site to refuel site vehicles. It is proposed that diesel fuel will be stored in bulk storage tanks and appropriately designed storage facilities in accordance with extent legislative and design requirements. Key risk mitigation controls will include:

- adherence to AS1940-2004 and AS1692-1989 in relation to the design of tanks and storage facilities, including fire suppression systems;
- design of appropriate infrastructure protection, bunding and spill capture infrastructure at hazardous materials facilities;
- development of an excess and egress plan for tankers entering and leaving the site and specific facilities where hazardous materials are stored;
- training to all personnel involved in the storage, handling and use of fuels and other hazardous materials;
- training to all personnel in relation to emergency response procedures;
- routine inspection and maintenance programs to ensure the structural integrity of infrastructure and equipment;
- strict control and ignition sources; and
- safety inductions and SOPs regarding the use, storage and handling of fuels and other hazardous materials.

18.5.2.9 Spontaneous Combustion at Coal Stockpile

During the operation phase coal stockpiles may combust spontaneously resulting in fire and smoke that may pose a safety and health risk to onsite workers. Waratah will develop management systems specific to minimising the risk of spontaneous combustion occurring and also to manage the risks should spontaneous combustion occur. These procedures would include routine monitoring of the coal stockpiles, stockpile compaction and minimising the stockpile stagnancy. In the situation where spontaneous combustion occurs, mitigation procedures would include excavation of stockpile hot spots, spreading and the recirculation of ROM coal.

18.5.2.10 Bushfire

A BMP will be prepared that provides a strategic approach to the management of bushfires in the mine area. This document will provide plans and processes based on contemporary "best-practice" for managing fires in tropical Savannah systems that best mitigate wild fire risks. The BMP will be focused on preservation of life and infrastructure in a context that adheres to ecological needs wherever possible. Moreover the BMP will include strategies that minimise the risk of fire leaving the mine site.

To further mitigate the risks to workers, infrastructure will have bushfire protection embedded into the design process. The maintenance of the fire protection equipment will be carried out as part of routine site management. It is therefore expected that the bushfire risk to the mine site will largely be managed through routine maintenance, albeit with review and revision of the procedures if the projected changes occur.

18.5.2.11 Flooding

Waratah is proposing to divert Tallarenha Creek in two areas on the mine site to allow for the construction of infrastructure and to separate creek water and the upstream catchments from local drainages on the proposed mining areas. In addition to the diversion Waratah will construct a levee bank along the eastern side of the site as a further flood mitigation measure. The location and design of the proposed diversions and levees have been established using the results of the detailed flood assessment undertaken for the Project.

The risks associated with flooding to mine site personnel have also been undertaken as part of the flood impact assessment (see Volume 5, Appendix 17).

18.5.2.12 Security

The mine site will be fully enclosed with appropriate fencing to restrict unauthorised access to the site. Access to the site will be via a continuously manned gatehouse as the principal entry point, augmented with an internal access security system. Secondary external access points will be locked at all times and will only be used by authorised mine site personnel.

Access to the site by visitors will be permissible under a strictly controlled system with defined SOPs. The system will incorporate procedures to ensure visitors are fully authorised to access the site, have satisfactorily completed site inductions and are registered into the site SHMS. The site security system will be routinely reviewed to ensure procedures remain current and continue to achieve security objectives.

18.5.3 HEALTH CONTROLS

Hazards that pose a potential health risk to staff, contractors and visitors to the site have been identified and assessed. The risk assessment is considered to be a preliminary risk assessment, with a more detailed risk assessment proposed through the latter stages of detailed design. Descriptions of identified controls are provided in the following sections.

18.5.3.1 Air Quality

The overall assessment of potential air quality issues associated with the construction and operation of the mine is provided in Volume 5, Appendix 18.

Waratah will implement a range of measures to minimise the risk of exposure by employees and contractors to dust, particulates, gases and vapours in the workplace in order to avoid potential for adverse health effects. The primary mechanism for minimising potential adverse effects to the workforce is to include engineering design controls for all major infrastructure that have the potential to generate large volumes of particulates, vapours and / or gasses. In addition to design controls, a control program will be established by Waratah that includes addressing the potential sources (i.e. operating machinery, clearing vegetation), controlling potential pathways (i.e. covering stockpiles, watering roads, enclosing conveyors, progressive revegetation) and providing appropriate training and PPE to minimise potential exposure risks.

Dust and particulate monitoring will be undertaken at the mine site and will be incorporated into the site EMS. Where exceedances to safety and health standards are identified, a review step will be established and process modifications will be implemented.

18.5.3.2 Odour

The Project is expected to generate odours from the underground mine ventilation shaft and the onsite waste management areas. The coal quality analysis shows that the coal has a low sulfur concentration. As such it is not expected that odours from the underground ventilation shafts will be detrimental to personnel onsite or offsite.

The waste management policy that will be adopted for the mine site is that waste products will be taken offsite by licenced contractors to licenced facilities for disposal. There will be facilities set aside onsite for waste transfer; however, these sites will be set away from areas of where personnel will be concentrated and will be protected from prevailing winds. Given these design controls it is not expected that odours from the onsite waste transfer facilities will be detrimental to personnel onsite or offsite.

18.5.3.3 Chemicals

A wide range of chemicals will be used during the construction and operation of the coal mine (see Table 2). Prior to the commencement of construction, Waratah prepare SOPs for the storage, containment, disposal and spill response for all potentially hazardous materials that will be used on site. These SOPs will be integrated into the site safety management system. Where standards exist for the storage and containment of hazardous materials i.e. AS 1940:2004: The storage and handling of combustible and flammable liquids, handling and storage procedures will be compliant with relevant legislation and Australian Standards. In particular all hazardous material storages will be designed with appropriate containment bunding and interceptor infrastructure to minimise the potential for risks. Furthermore, all personnel involved in the storage and handling of hazardous materials will be provided the necessary training to ensure industry competencies are met.

18.5.3.4 Pests

The project is not expected to result in an increase in the abundance or distribution of pests during the construction or operational phase. A Pest Management Plan (PMP) will be prepared as part of the construction and operational EMPs. The underlying principal will be that pests will be managed on site, and procedures will be implemented to prevent the increase in abundance and spread of pests.

18.5.3.5 Food Hygiene

The majority of the 1,900 workers at the mine site will be FIFO (1,872) although 28 staff will be permanently housed in Alpha. The camp will be operated by specialised service providers, experience in the operation of workers camps in central Queensland. Waratah will stipulate that the preferred contractors will be required to operate the workers camp in accordance with relevant food and hygiene legislation, including the *Food Production (Safety) Act 2000* and the *Food Act 1981*. Adherence to the Australia New Zealand Food Standards Code 2005 will also be mandatory.

18.5.3.6 Waste Management

Prior to the commencement of construction activities, Waratah will prepare a WMP that identifies the onsite waste management procedures required to comply with extant environmental protection legislation.

Typical mitigation measures that will be applied at the site include the purpose design of waste management and transfer areas located away from areas where personnel are concentrated, a hierarchical approach to waste management will be implemented on site, wastes will be removed from site via licenced contractors, waste water and sewerage will be treated at the onsite sewage treatment plant, with treated waste water and effluent to be discharged to the process water dam for reuse in the operation. Waste sludge will be removed from site by licensed contractor to a licenced disposal facility.

The construction and operation of the mine will ultimately increase the volume and diversity of the waste from the project area compared to the existing land use. While the waste produced during the construction works will be of short duration (in comparison to the operational phase of the project), waste will continue to be produced during the operation and maintenance of the mine site.

Despite an overall increase in waste compared to baseline conditions, the cumulative impacts of the waste are considered to be minor due to the implementation of best practice protocols and a responsible waste

management approach, ensuring the potential for harm to human health is minimised, and where possible, avoided completely.

A contractor's construction EMP will be developed and implemented during construction to contain and limit risks to safety and health from accidental release of waste materials, such as oil spillages. It is expected that this construction EMP will be consistent with the waste requirements of the EMP contained in **Volume 1, Chapter 7**.

18.5.3.7 Noise – Offsite

Noise and vibration assessments (see **Volume 5, Appendix 20**) indicate that occupational safety and health levels for noise will be exceeded beyond the project site at a number of homesteads in the immediate vicinity of the mine site. Waratah will work with each landholder to establish suitable mitigation measures to minimise the impacts excessive noise. These measures could include relocation of the homestead outside of noise exceedance levels, acquisition of the property from the owners, noise attenuation modifications and infrastructure.

18.5.3.8 Noise – Onsite

Through the onsite SHMS, Waratah will implement a range of measures to minimise the risk of exposure by employees and contractors to elevated operational noise levels in the workplace in order to avoid potential for adverse health effects. Where possible equipment used onsite will comply with AS 2436. In situations where this is not possible, design controls will be utilised to mitigate operational noise to the extent possible to minimise the risk of hearing injury. Additional measures that will be implemented include the identification and assessment of potential occupational noise hazards and the development of noise control programs to reduce operational noise to appropriate levels. Where operational noise exceeds $LA_{eq,8h}$ 85dB(A) further measures such as the use of hearing protection devices would be implemented.

18.6 EMERGENCY PLANNING AND RESPONSE

18.6.1 EMERGENCY PLANNING

An ERP will be implemented at the site as part of the overall site HSMS prior to the commencement of construction activities. The system will be modified as the site transitions through to full scale operations of the mine. The ERP will include specific procedures aimed at identifying and minimising risks in an emergency response situation, address rescue and escape procedures, provide for regular testing and review of emergency response procedures and prescribe the requirement for routine auditing to ensure the consistency and effectiveness of the system.

Site safety inductions will include specific discussion in relation to emergency response procedures for the site. This will include SOPs associated with rescue and escape procedures in addition to onsite first aid infrastructure and processes.

Designated first aid and emergency rescue facilities and equipment will be established at the site prior to the commencement of construction and then will remain onsite throughout the life of the project. Appropriately trained personnel will be onsite at all times to provide first aid and to implement emergency response procedures when required. First aid response and provision will be included in the site induction training that will be provided to all site personnel.

A fully trained fire unit will be onsite at all times. This unit will consist of appropriately trained personnel from the mine workforce and will have access to fully maintained and functional firefighting equipment (i.e. water tankers, light units fitted with quick spray units, appropriate communications and appropriate PPE). The members of the fire unit will undergo constant refresher training and all fire fighting facilities and equipment will be installed, serviced, maintained and inspected by a certified agency.

All hazardous materials storages, fuel storages areas, administration buildings, workshops, industrial facilities (i.e. CHPP) and accommodation facilities will have a dedicated fire alarm, suppression and fire fighting systems. First aid and firefighting equipment (hand held extinguishers and fire hoses) will be located at strategic points within each facility and building. Firefighting equipment and exit locations will be appropriately signed and all work areas will be within the required distance to reach emergency exits.

Waratah will liaise with local State Emergency Services, Queensland Ambulance Services and local ambulance and hospital services to plan emergency response procedures. Waratah will look to standardise onsite emergency response procedures and training with other

nearby mines and support agencies should there be a need for additional trained personnel and resources to address an emergency situation elsewhere.

18.6.2 EMERGENCY RESPONSE PLAN

The ERP defines the processes for emergency response for incidents occurring at the mine site. It will be used as a guide for the Emergency Response Team Leader, Emergency Response Team Members and all site personnel. The ERP will form a critical component of the SHMS.

The following structure outlines the typical format that will be adopted for the ERP. This structure should be considered as a guide for the purpose of the EIS only. The final ERP structure will be dependent on the final development and structure of the site overall site SHMS and noting that this system will be developed in full, closer to the commencement of construction activities. Notwithstanding the document style identifies the key factors of an ERP, namely the statement of purpose of the ERP, the development of defined procedures to implement in emergency situations, identification of key roles and the identification of responsibilities each of those role fulfill in an emergency situation, training requirements for all personnel and the processes for testing the ERP.

- Introduction:
  - Purpose; and
  - Scope.
- Procedure:
  - Notification of an Emergency;
  - Identifying Emergency;
  - Personnel First on Scene;
  - Emergency Response Team; and
  - Emergency Management Team.
- Roles and Responsibilities:
  - Site Senior Executive;
  - Registered Mine Manager / Project Director (Construction);
  - Site Safety and Health Officer / Project Director Safety and Health (Construction);
  - Open Cut Examiner;
  - ERZ Controller;
  - Superintendent Site Emergency Response;
  - Security Superintendent;
  - Emergency Response Team Leader/s;
  - Emergency Response Team (ERT);
  - Paramedic;
  - Ambulance Driver;
  - Security First Responder;
  - Site Personnel;
  - Incident Log;
- Specific Incident Procedures;
- Training;
- Emergency response training and Exercise mandatory rules;
- Emergency Vehicles and Equipment; and
- Emergency Siren Testing.
- References:
  - Appendix A – Evacuation Procedure;
  - Appendix B – Personal injury Procedure;
  - Appendix C – Fire or Explosion Procedure;
  - Appendix D – Tyre Fire/Explosion Procedure;
  - Appendix E – Vehicle Accident Procedure;
  - Appendix F – Flooding Procedure;
  - Appendix G – Hazardous Substances Spill or Release Procedure;
  - Appendix H – Bomb Threat Procedure;
  - Appendix I – Bomb Threat Checklist;
  - Appendix J – Emergency Reporting Form; and
  - Appendix K – External Directory.

18.7 CONCLUSION

Overall, the risks assessed are considered to be common to all open cut and underground mining activities and are subject to legislative obligations and controls measures which are provided by way of Commonwealth and State legislation. This includes both construction and operational activities.

No risk assessment has been undertaken for the rehabilitation phase of the project as the final design landscape is still subject to landholder negotiations and government obligations. It is assumed that new

technologies and innovations are too be expected throughout the mine's operational life, (i.e. 25 - 30 years from commencement of the operational phase) and as such will alter current baseline risk assessment results which have been currently undertaken. Waratah commits to doing a detailed risk assessment considering risks to safety and health associated with the decommissioning phase of the project.

Mine site construction and operational preliminary risk assessment results indicated that the baseline safety and health risk profile varied from Low to Extreme. Once mitigation measures and design treatments are applied to the assessed hazards the residual risks are either ranked as being Low or Moderate. With exception being risks associated with the inclusion of highwall operations which were assessed as being a High risk.

Across the baseline risk assessment, no Extreme or High ranking risks were detected outside the mine site boundary; however, offsite hazards associated with vehicle movements were ranked High. Applied control measures and design treatments downgraded the associated risk to Moderate.

18.8 COMMITMENTS

To minimise the potential risk to the health and safety of onsite and offsite personnel as a result of construction and operational activities associated with the mine site, Waratah will commit to:

- construction phase defaulting under a formal SHMS in accordance with all relevant legislative requirements;
- undertake the operations of the mine site under a formal SHMS in accordance with all relevant legislative requirements;
- monitor and implement amendments to the SHMS where necessary and frequently ensuring its applicability and currency to be maintained throughout the life of the project; and
- frequently liaise with internal and external stakeholders with respects to safeguarding and improving the SHMS.