Appendix 3

Potential Impacts and Mitigation Measures

Table A1 Summary of Pre-Construction Environmental Commitments

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
Principles of Environmental Protection (Biodiversity)	The mine site Project area The water supply borefield area	To address each of the following principles (set out in section 4A of the EP Act and described in Position Statement No. 7): • The precautionary principle; • The principle of intergenerational equity; • The principle of the conservation of biological diversity and ecological integrity; • Principles relating to improved valuation, pricing and incentive mechanisms; and • The principle of waste minimisation.	The Project has the potential to impact on the biodiversity values of the Project areas and surrounding environment.	Environmental costs will be estimated and identified as part of the impact assessment process and within agreements with contractors and suppliers. Waste minimisation principles will be reflected in project designs. Best practice principles will be used to guide detailed Project design. Preparation of an environmental management system (EMS), with a CEMP, OEMP, audit programs and monitoring programs.	The Project is not expected to have significant impacts on biodiversity.
Vegetation and Flora	The mine site Project area The water supply borefield area Off-site infrastructure and transport corridor Project area	To avoid adverse impacts on biodiversity and maintain the abundance, diversity, geographic distribution and productivity of terrestrial flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge, to achieve the objectives of: *Position Statement No. 2 Environmental Protection of Native Vegetation in Western Australia (2000);*	Loss of biological diversity and reduced regional representation of flora and vegetation communities. Loss of conservation significant flora Altered drainage patterns and surface water quality	Minimise clearing footprints during final design, to avoid drainage line vegetation, where possible, and impacts to conservation significant species and groundwater dependent ecosystems. Mine planning to include progressive clearing and rehabilitation to minimise the amount of bare soil at any one time. Undertake vegetation surveys of all off-site infrastructure and finalise disturbance footprints to avoid impacts to conservation significant species and groundwater dependent ecosystems;	The EPA objective to maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels will be met. No DRF or EPBC listed species will be disturbed. No Priority species will be directly impacted by the Project.

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
		Position Statement No. 3 Terrestrial Biological Surveys as an Element of Biodiversity Protection in Western Australia (2003); *EPA Guidance Statement No. 51. Terrestrial Flora and vegetation Surveys for Environmental Impact Assessment (2004).*			
Aboriginal heritage	The minesite Project area The water supply Project area Off-site infrastructure and transport corridor Project area.	Management and/or protection of heritage and/or archaeological sites, consistent with the provisions of the *Aboriginal Heritage Act 1972* and *EPA Guidance Statement No. 41 Assessment of Aboriginal Heritage* (EPA, 2004c).	Disturbance of archaeological and ethnological sites.	Aboriginal stakeholders will be actively engaged during the planning phase of the project to ensure that cultural values of the land in or near the project are not adversely affected. Approval under Section 18 of the AH Act; for removal / relocation of two archaeological sites, located to the north of the central pits, will be sought. Further archaeological investigations will be undertaken by qualified archaeological personnel, once all disturbance areas outside of E69/535 are finalised, such as the gas pipeline. Heritage surveys will be undertaken with Traditional Owners and a dated register of sites of concern will be maintained.	The Project will not impact upon any ethnographic sites. The Project will impact upon two archaeological sites located to the north of the central pits. Approval will be sought under Section 18 of the AH Act. .
Decommissioning and Closure	The minesite Project area The water supply Project area Off-site infrastructure and transport corridor Project area	To ensure that rehabilitation achieves a stable and functioning landform that is consistent with the surrounding landscape and other environmental values and achieve the objectives of the *EPA Guidance Statement No. 6. Rehabilitation of Terrestrial Ecosystems.*	The abundance of clays throughout the profile is likely to be highly erosive. The variability of water holding characteristics of the sub-surface soils has the potential to affect rehabilitation outcomes.	A DCRP will be completed prior to construction. Conduct an extensive risk assessment to identify risks to closure and controls.	Preparation of a DCRP will ensure the EPA objectives for rehabilitation, to achieve a stable and functioning landform that is consistent with the surrounding landscape and other environmental values are met.

Table A2 Summary of Construction Environmental Commitments

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
Principles of Environmental Protection (Biodiversity)	The minesite Project area The water supply borefield area	To address each of the following principles (set out in section 4A of the EP Act and described in Position Statement No. 7): • The precautionary principle; • The principle of intergenerational equity; • The principle of the conservation of biological diversity and ecological integrity; • Principles relating to improved valuation, pricing and incentive mechanisms; and • The principle of waste minimisation.	The Project has the potential to impact on the biodiversity values of the Project areas and surrounding environment.	Implementation of EMS, including a CEMP, EMPs, monitoring programs, audit programs, investigation procedures to ensure compliance with clearing permits etc.	The Project is not expected to have significant impacts on biodiversity.
Vegetation and Flora	The minesite Project area The water supply borefield area Off-site infrastructure and transport corridor Project area	To avoid adverse impacts on biodiversity and maintain the abundance, diversity, geographic distribution and productivity of terrestrial flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge, to achieve the objectives of:	Loss of biological diversity and reduced regional representation of flora and vegetation communities. Loss of conservation significant flora Increased weed distribution	Minimise clearing footprints, including the avoidance of drainage line vegetation where possible. Undertake progressive clearing to minimise the amount of bare soil at any one time. Implementation of clearing permitting procedures to prevent accidental clearing of vegetation	The EPA objective to maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels will be met. No DRF or EPBC listed species will be disturbed. No Priority species will be

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
		Position Statement No. 2 Environmental Protection of Native Vegetation in Western Australia (2000); *Position Statement No. 3 Terrestrial Biological Surveys as an Element of Biodiversity Protection in Western Australia (2003);* *EPA Guidance Statement No. 51. Terrestrial Flora and vegetation Surveys for Environmental Impact Assessment (2004).*	Loss or degradation of flora and vegetation due to dust deposition Increased risk of fire Increased movement of people and vehicles (damage to native flora via off road travel) Increased fire risk Altered drainage patterns and surface water quality	and undertake regular inspections. Develop and undertake weed management procedures. Develop and implement a fire management plan. Restriction of vehicle movements to designated roads Develop and implement dust management plans	directly impacted by the Project. The Project is not predicted to increase or introduce weeds. The Project will reduce the impacts of altered fire regimes in the Project area. The use of brackish water is not expected to impact upon native vegetation.
Terrestrial fauna (including short-range endemics)	The minesite Project area The water supply borefield area Off-site infrastructure and transport corridor Project area	Maintenance of the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge consistent with the objectives of *EPA Guidance Statement No. 20 Sampling for Short-Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia (2004);* and EPA Guidance Statement No. 56 *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004a). Protection of Specially Protected (Threatened) fauna, consistent	Direct clearance or disturbance of fauna habitat Reduced connectivity of fauna populations, and/or isolation of local habitats Impacts to Conservation Significant species Increased risk of fauna mortality from vehicle strike Potential impacts to fauna due to alteration to hydrology	Manage clearing by confirming clearing edges prior to earthworks. Mine planning to include progressive clearing to minimise the amount of bare soil at any one time Collect and manage topsoil Vehicle speeds to be controlled and vehicles to only use authorised access routes Maintain a register of vehicle impacts on vertebrate fauna Control fire sources and ensure adequate firefighting equipment is available Control unnecessary noise and	The development of the Project is considered unlikely to have a significant impact on vertebrate fauna species that may occur within the Project area. Fauna habitat is well represented outside of Project area. The development of the Project is considered unlikely to have significant impact on the rocky ridgeline The development of the Project is not expected to have a significant impact

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
		with the provisions of the *Wildlife Conservation Act 1950.*	Effect of light and dust Effect of noise emissions. Potential to increase population of introduced species. Isolation of SRE habitat due to habitat fragmentation. Increase in populations of introduced predators.	shield lights Undertake regular erosion and sedimentation inspections and control erosion through rock armoring and/or redirection of fugitive drainage Clearing in rocky ridges / escarpments hilltops and mallee woodland/spinifex to be avoided wherever possible. Dust management measures to be implemented. Management measures will be implemented to control feral animals. Impacts to surface hydrology will be reduced by avoiding drainage features, wherever possible Implement management measures to minimise impacts of artificial water sources on migratory birds and waders. Implement weed management procedures.	on SRE fauna.
Subterranean fauna	The minesite Project area The water supply borefield area	Maintenance of the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts	Potential impact from changing water quality. Destruction of or damage to habitat areas (e.g. caves),	Due to the relatively low conservation value of subterranean fauna and habitat in the mine site and borefield areas, it is considered that the management strategies for mitigation of impacts to groundwater	The Project and the operation of the water supply borefields will not result in a loss of biodiversity of subterranean

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
		and improvement in knowledge consistent with the objectives of *EPA Guidance Statement No. 54. Sampling of Subterranean Fauna in Groundwater and Caves (2003).* Protection of Specially Protected (Threatened) fauna, consistent with the provisions of the *Wildlife Conservation Act 1950*	including increases to temperature and humidity.	and surface disturbance are generally sufficient to protect subterranean fauna values.	fauna.
Water - Surface	The mine site Project area The water supply borefield area Off-site infrastructure and transport corridor Project area	Maintain the integrity, ecological functions and environmental values of waterways. Maintain the quantity of surface water so that existing and potential environmental values, including ecosystem maintenance are protected to achieve the objectives of *EPA Guidance Statement No. 6. Rehabilitation of Terrestrial Ecosystems*.	Discharge of poor quality water to land or drainage lines Clearing and alteration of vegetation and habitat in the diversion channel area. Altered ephemeral drainage lines and their reliant vegetation communities (if any) and the habitats they provide through altered water availability and direct damage from larger or more frequent run-off events Increased prevalence and transport of weeds Increased erosion and sedimentation along	All site infrastructures will be constructed to minimise disruption to surface water flow, the potential for flooding of infrastructure, and the risk of groundwater contamination. The process plant and ore processing faculties will be constructed with contained drainage that discharges to the raw water pond for re-use in the plant. Levees at the pits will be adequately shaped and compacted to prevent the development of sections of weaknesses due to deterioration and scouring. Stockpiles of material will be established away from streamlines. Clearing of vegetation and topsoil will be progressive and kept to a minimum. Ad hoc servicing of vehicles will	The Project is not expected to result in significant impacts to surface water flow in the area. The Project will impact upon two ephemeral drainage lines and will result in the localised disruption to surface water flow.

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
			discharge pathways.	only be undertaken by trained personnel using spill trays and in the presence of spill cleanup kits. The main fuel storage, fuelling and servicing area will be bunded and lined to prevent infiltration of spills. The bund will discharge to an oily water separator; Wash downs will be undertaken using quick break detergents at a properly constructed wash down bay, which discharges to a sediment settlement sump/oily water separator. Waste disposal areas will be constructed outside of known drainage lines and with contained drainage that discharges via a sediment sump/oily water separator; Landfills will be constructed to comply with the requirements of the Environmental *Protection (Rural Landfill) Regulations (2002)* Chemical storage areas will be designed in accordance with the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007. Surface water run-off collected from disturbed areas within the Project area will only be discharged if the	

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
				water is of suitable quality;	
Groundwater	The minesite Project area The water supply Project area Off-site infrastructure and transport corridor Project area	Minimise the adverse effects of release of water on environmental, social and cultural values consistent with the objectives of *EPA Guidance Statement No. 48. Groundwater Environmental Management Areas, Mine Void Water Resource Issues in Western Australia, 2003.*	The Project has the potential to result in groundwater storage of dangerous goods.	Install a network of groundwater monitoring bores prior to the commencement of ground disturbing activities to capture sufficient baseline data and enable routine monitoring of groundwater quality Ad hoc servicing of vehicles will only be undertaken by trained personnel using spill trays and in the presence of spill cleanup kits Bunding and lining of the main fuel storage, fuelling and servicing areas to prevent infiltration of spills. The bund will discharge to an oily water separator Wash downs will be undertaken using quick break detergents at a properly constructed wash down bay, which discharges to a sediment settlement sump/oily water separator Waste disposal areas will be constructed outside of known drainage lines and with contained drainage that discharges via a sediment sump/oily water separator Landfills will comply with the requirements of the *Environmental*	With management strategies in place, significant impacts to groundwater through contamination are not expected to occur throughout the life of the mine

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
				Protection (Rural Landfill) Regulations (2002) including containment of contaminated stormwater runoff. Sewerage facilities will be constructed to comply with relevant regulatory requirements.	
Aboriginal heritage	The minesite Project area The water supply Project area Off-site infrastructure and transport corridor Project area.	Management and/or protection of heritage and/or archaeological sites, consistent with the provisions of the *Aboriginal Heritage Act 1972* and *EPA Guidance Statement No. 41 Assessment of Aboriginal Heritage* (EPA, 2004c).	Disturbance of archaeological and ethnological sites.	All archaeological sites will be avoided wherever possible. If disturbance is unavoidable a Section 18 application will be lodged under the *Aboriginal Heritage Act 1972*. Aboriginal stakeholders will be actively engaged during the construction phases of the project to ensure that cultural values of the land in or near the project are not adversely affected. Management measures will be implemented to prevent impacts to heritage exclusion zones and archaeological sites (e.g. from dust, surface water diversion drainage). Construction workers will be made aware of the presence of heritage exclusion zones and that they may not enter these.	The Project will not impact upon any ethnographic sites. The Project will impact upon two archaeological sites located to the north of the central pits. Approval will be sought under Section 18 of the AH Act.
Soil	The minesite Project area	To maintain the ecological functions and landscape values of	Permanent modification of the landscape.	Maximum amounts of topsoil and subsoil will be collected and	The Project will meet the EPA objectives for the

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
	The water supply Project area Off-site infrastructure and transport corridor Project area.	soils and landforms to achieve the objectives of *EPA Guidance Statement No. 6. Rehabilitation of Terrestrial Ecosystems (2006)*	Increased erosion and sedimentation. Loss of habitat.	stockpiled. Topsoil stockpiles will be located to the north-west of the Project area to minimise the potential for contamination from the processing plant and erosion from surface water flows. The top 200 mm of soil will be collected for stockpiling as topsoil. Topsoil stockpiles will be kept as low as practicable (ideally < 2 m) to preserve biological activity and viable seed reserves Topsoil will be paddock-dumped by trucks rather than using scrapers, to minimise damage to the structural stability of the topsoil. Topsoil materials from the hill and flat areas will be separated Detailed topsoil management procedures will be developed for inclusion within the CEMP, prior to the commencement of ground disturbance.	management of soils if the collection and storage of topsoil are undertaken appropriately
Air Quality	The minesite Project area	Prevention of gaseous and dust emissions from impacting on the local community and environment consistent with the objectives of the *EPA Guidance Statement No. 18: Prevention of Air Quality*	Wind erosion from stockpiles. Land clearing and construction activities. Exhaust emissions from	Progressive clearing will be implemented to minimise exposed soil. Standard dust management measures will be implemented (e.g. use of water cart for dust	With the implementation of appropriate management measures, the Project is not expected to result in significant dust emissions.

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
		Impacts from Land Development Sites 2000. Australian Standard AS 2985 Workplace Atmospheres – Method for sampling and gravimetric determination of respirable dust. *Occupational Safety & Health Act 1984.* *Occupational Safety Regulations 1996.* Ambient Air Quality NEPM (2003). National Environment Protection Measure (NEPM) for Ambient Air Quality 1998. The National Environment Protection Measure (NEPM) PM10 standard – 50 µg/m^3 (24hr average), as the criteria to assess potential health impacts at sensitive receptors. The Kwinana EPP Area C TSP limit – 150 µg/m^3 (24hr average) (as criteria to assess potential amenity impacts).	vehicles and machinery.	suppression on roads and areas to be cleared). A community complaints system will be developed and implemented. The TSF and WSF will be designed and constructed to ensure that dust emissions from these facilities are adequately managed. Crushing (sprays) and stockpiling facilities will be constructed with appropriate dust suppression equipment.	
Noise	The minesite Project area Off-site infrastructure and transport corridor	Ensure that noise emissions meet appropriate criteria and do not adversely impact on the social surroundings Ensure noise impacts comply with	Impacts to noise sensitive premises (Wingellina, Kalka and Pipalyatjara communities)	Appropriate location of infrastructure. Construction works to be carried out in accordance with relevant	The Project is expected to comply with the *Environmental Protection (Noise) Regulations 1997*

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
	Project area	statutory requirements to achieve the objectives of *EPA Guidance Statement No. 8. Environmental Noise.*	Disturbance of fauna from construction activities.	legislation and standards. Noise management plan is to be developed and implemented. This will include consideration of a mining plan to mitigate night time noise impacts on the Wingellina Community (if required).	
Visual Amenity	The minesite Project area Project area	To ensure visual impacts comply with statutory requirements to achieve the objectives of *EPA Position Statement No. 7 Principles of Environmental Protection.*	Any visual impacts during the construction phase of the Project would be temporary and as such no mitigation or management is proposed.	N/A	The Project is not expected to result in long term visual impacts to the landscape.
Light	The minesite Project area Off-site infrastructure and transport corridor Project area	Ensure light emissions meet appropriate criteria and do not adversely impact on the social surroundings. Ensure light impacts comply with statutory requirements to achieve the objectives of *EPA Position Statement No. 7 Principles of Environmental Protection.*	Impacts from illumination at night to fauna and sensitive receptors (Wingellina, Kalka and Pipalyatjara communities).	Appropriate location of infrastructure to minimise light emissions on sensitive receptors and installation of lighting to Australian Standards. Install light shields on lighting and minimise illumination levels. Face lighting towards the construction zone. Operate flights during the day	Lighting from the Project is not expected to result in significant impacts to sensitive environmental receptors or the local communities.
Greenhouse Gases (GHGs)	The mine site	To prevent gaseous emissions from impacting on the local	GHG emissions from generators,	Achieve GHG emissions targets by fitting out site offices	The GHG emissions from the Project will be reduced

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
		community and environment consistent with the objectives of '*The Draft State Environment (Ambient Air) Policy 2009*	construction equipment and light vehicles.	accommodation camp with energy efficiency devices and applications. Develop an operational monitoring programme for GHG emissions. Minimise vegetation clearing. Implementation of initiatives to reduce diesel and electricity consumption.	by project design to the minimum practicable for economic production. Provided the adequate management measures are implemented, the impact of GHG emissions from the Project is expected to be minimal.
Hazardous Substances and Wastes	The minesite Project area Off-site infrastructure and transport corridor Project area	To ensure liquid and solid wastes do not adversely affect groundwater or surface water quality or lead to soil contamination. Minimise the environmental impacts of hydrocarbons/chemicals through appropriate storage, handling and disposal. Reduce the volumes of waste through product selection, reuse and recycling. Comply with statutory requirements to achieve the objectives of *Position Statement No. 6 Towards Sustainability (2004); and Position Statement No. 7 Principles of Environmental Protection (2004).*	Contamination of groundwater, surface water and soil. Food source for feral animals.	Waste will be handled and disposed in an appropriate manner wastes. Opportunities will be identifies to avoid, minimise and recycle waste. A Construction Environmental Management Plan will be developed and implemented to ensure that all wastes and hazardous substances are managed and disposed of appropriately during construction of the Project; A Waste Management Plan will be developed and implemented. A Dangerous Goods Inventory will be prepared. The processing plant, landfill and sewage facility will constructed to minimise potential spillages and contamination.	The storage and use of hazardous materials, and the generation and disposal of wastes both on-site and off-site is expected to result in negligible environmental impacts.

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
				Domestic and construction waste will be minimised through the re-use and recycling of materials, where possible.	
Social	The minesite Project area The water supply Project area Off-site infrastructure and transport corridor Project area.	Comply with statutory requirements to achieve the objectives of Position *Statement No. 6 Towards Sustainability (2004); and Position Statement No. 7 Principles of Environmental Protection (2004).*	Impacts to the local community by: • Heritage sites being damaged or entered into; • A reduction in air quality; • Construction noise; and • The visual amenity of the area being affected.	The Social Impact Analysis and Management Plan will be implemented to prevent potential impacts to local indigenous communities. Providing employment and training opportunities for the local and regional community. Creating business development opportunities for the benefit of the local and regional economy; Undertaking an environmental management program in collaboration with the local community; Developing plans and programs, in collaboration with the local community, which specify the how Hinckley Range will interact with the local community; and Managing traffic to ensure it doesn't impact on the local community.	The mining operation will not impact negatively upon the social and cultural values of the Wingellina Community instead it will enhance the living standards of the local community whilst respecting and preserving their social and cultural values.
Decommissioning and Closure	The minesite Project area The water supply	To ensure that rehabilitation achieves a stable and functioning landform that is consistent with the surrounding landscape and other	The abundance of clays throughout the profile is likely to be highly	The DCRP will be implemented during construction i.e. topsoil stockpiling.	Implementation of DCRP will meet the EPA objectives for rehabilitation, to achieve a stable and

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
	Project area Off-site infrastructure and transport corridor Project area	environmental values and achieve the objectives of the *EPA Guidance Statement No. 6. Rehabilitation of Terrestrial Ecosystems.*	erosive.		functioning landform that is consistent with the surrounding landscape and other environmental values.

Table A3 Summary of Environmental Commitments for Project Operations

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
Principles of Environmental Protection (Biodiversity)	The mine site Project area The water supply borefield area	To address each of the following principles (set out in section 4A of the EP Act and described in Position Statement No. 7): • The precautionary principle; • The principle of intergenerational equity; • The principle of the conservation of biological diversity and ecological integrity; • Principles relating to improved valuation, pricing and incentive mechanisms; and • The principle of waste minimisation.	The Project has the potential to impact on the biodiversity values of the Project areas and surrounding environment.	Mine operations will be implemented in accordance with a EMS, including the implementation of an OEMP, EMPs, audit programs, monitoring programs etc.	The Project is not expected to have significant impacts on biodiversity.
Vegetation and Flora	The minesite Project area The water supply borefield area Off-site infrastructure and transport corridor Project area	To avoid adverse impacts on biodiversity and maintain the abundance, diversity, geographic distribution and productivity of terrestrial flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge, to achieve the objectives of: *Position Statement No. 2*	Loss of biological diversity and reduced regional representation of flora and vegetation communities. Loss of conservation significant flora Increased weed distribution Loss or degradation of flora and vegetation due to dust	Undertake progressive rehabilitation to minimise the amount of bare soil at any one time. Implement weed management procedures. Implement Fire Management Plan. Restrict vehicle movements to designated roads. Implement Operational Dust	The EPA objective to maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels will be met. No Priority species will be directly impacted by the Project.

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
		Environmental Protection of Native Vegetation in Western Australia (2000); *Position Statement No. 3 Terrestrial Biological Surveys as an Element of Biodiversity Protection in Western Australia (2003);* *EPA Guidance Statement No. 51. Terrestrial Flora and vegetation Surveys for Environmental Impact Assessment (2004).*	deposition Increased risk of fire Increased movement of people and vehicles (damage to native flora via off road travel) Increased fire risk Altered drainage patterns and surface water quality	Management Plan	The Project is not predicted to increase or introduce weeds. The Project will reduce the impacts of altered fire regimes in the Project area. The use of brackish water is not expected to impact upon native vegetation.
Terrestrial fauna (including short-range endemics)	The minesite Project area The water supply borefield area Off-site infrastructure and transport corridor Project area	Maintenance of the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge consistent with the objectives of *EPA Guidance Statement No. 20 Sampling for Short-Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia (2004);* and EPA Guidance Statement No. 56 *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004a). Protection of Specially Protected (Threatened) fauna, consistent	Impacts to Conservation Significant species Increased risk of fauna mortality from vehicle strike Potential impacts to fauna due to alteration to hydrology Impacts associated with the TSF, including mobilisation of metal, acid or salts Effect of light and dust, including toxicity associated with metal in dust Effect of noise emissions Potential to increase population of introduced species	Mine planning to include progressive rehabilitation to minimise the amount of bare soil at any one time. Vehicle speeds to be controlled and vehicles to only use authorised access routes Maintain a register of vehicle impacts on vertebrate fauna Undertake management measures, specified in the Fire Management Plan, so fire sources are controlled and adequate firefighting equipment is available on-site. Control unnecessary noise Animals (except avifauna) will be prevented from accessing the operational mine site area, including	The development of the Project is considered unlikely to have a significant impact on vertebrate fauna species that may occur within the Project area. The development of the Project is not expected to have a significant impact on SRE fauna.

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
		with the provisions of the *Wildlife Conservation Act 1950.*	Increase in populations of introduced predators.	TSF and landfill areas. Dust management measures to be implemented Management measure will be implemented to control feral animals Implement weed management procedures.	
Subterranean fauna	The minesite Project area The water supply borefield area	Maintenance of the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge consistent with the objectives of *EPA Guidance Statement No. 54. Sampling of Subterranean Fauna in Groundwater and Caves (2003).* Protection of Specially Protected (Threatened) fauna, consistent with the provisions of the *Wildlife Conservation Act 1950*	Potential impacts from groundwater abstraction from borefield. Potential impact from changing water quality.	Due to the relatively low conservation value of subterranean fauna and habitat in the mine site and borefield areas, it is considered that the management strategies for mitigation of impacts to groundwater are generally are sufficient to protect subterranean fauna values.	The Project and the operation of the water supply borefields will not result in a loss of biodiversity of subterranean fauna.
Surface Water	The minesite Project area The water supply borefield area Off-site	Maintain the integrity, ecological functions and environmental values of waterways. Maintain the quantity of surface water so that existing and potential environmental values, including ecosystem maintenance are	Pits and mine infrastructure may have impacts on flow paths and regimes and water quality (e.g. turbidity, and/or contamination) Discharge of poor quality water to land or drainage	An inspection and maintenance regime will form part of levee system management; Stockpiles of material will be managed to avoid erosion during rainfall events.	The Project is not expected to result in significant impacts to surface water flow in the area.

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
	infrastructure and transport corridor Project area	protected to achieve the objectives of *EPA Guidance Statement No. 6. Rehabilitation of Terrestrial Ecosystems.*	lines Clearing and alteration of vegetation and habitat in the diversion channel area. Changes to surface water flow and groundwater recharge, e.g. Increased/decreased volumes, velocities and changes to the flooding regime, increased and decreased seepage through receiving and diverted ephemeral drainage lines: Altered ephemeral drainage lines and their reliant vegetation communities (if any) and the habitats they provide through altered water availability and direct damage from larger or more frequent run-off events. Increased prevalence and transport of weeds. Increased erosion and sedimentation along discharge pathways.	Ad hoc servicing of vehicles will only be undertaken by trained personnel using spill trays and in the presence of spill cleanup kits. Wash downs will be undertaken using quick break detergents at a properly constructed wash down bay, which discharges to a sediment settlement sump/oily water separator; Contaminated stormwater will be retained on site. Storage of chemicals will be undertaken in accordance with the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007. Chemical spill kits will be available to contain and neutralise each chemical used on site. Neutralised chemicals will either be disposed of to landfill or re-used in the process.	The Project will impact upon two ephemeral drainage lines and will result in the localised disruption to surface water flow.
Groundwater	The minesite Project area The water	Minimise the adverse effects of the abstraction and release of water on environmental, social and cultural values consistent	The Project has the potential to result in groundwater contamination from seepage from the TSF	Establishment of a groundwater monitoring programme identifying changes to groundwater levels and analysing potential contamination	It is anticipated that the base of the open pit mine will be below current groundwater levels. Due

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
	supply Project area Off-site infrastructure and transport corridor Project area	with the objectives of *EPA Guidance Statement No. 48. Groundwater Environmental Management Areas, Mine Void Water Resource Issues in Western Australia, 2003.* Ensure that the mining activity does not adversely affect the quality and quantity of water available to other existing and potential groundwater users. Maximise water use efficiency.	and WSF, processing plant, waste rock landform, waste disposal facilities; and storage of dangerous goods. Reduced water availability for existing bore users and other groundwater users including groundwater dependant environmental systems through dewatering of the mine Creation of permanent water body in pit voids at mine closure will potentially attract feral animals to area.	from TSF, WSF, process plant area, process ponds; waste landfill and WWTP; Volumes of water abstracted from the pits will be kept to the minimum required for safe mining operations; Volume of water abstracted from production bores will be monitored Ad hoc servicing of vehicles will only be undertaken by trained personnel using spill trays and in the presence of spill cleanup kits Wash downs will be undertaken using quick break detergents at a properly constructed wash down bay, which discharges to a sediment settlement sump/oily water separator Landfills will comply with the requirements of the *Environmental Protection (Rural Landfill) Regulations (2002)* including that contaminated stormwater will be retained on site; Wastewater will be collected by sewer and passed to an activated sludge package system.	to uncertainty in regard to regional recharge it is not currently possible to predict whether these pits will contain water following closure. Ongoing monitoring of ground water quality during the 40 year life of mine, will dictate final use and closure options Groundwater levels at the mine area are expected to be altered, as described above. However, this is not expected to significantly impact on any other groundwater users, nor ecological communities. With management strategies in place, significant impacts to groundwater through contamination are not expected to occur throughout the life of the mine
Aboriginal heritage	The minesite Project area The water supply Project	Management and/or protection of heritage and/or archaeological sites, consistent with the provisions of the *Aboriginal*	Disturbance of archaeological and ethnological sites.	Aboriginal stakeholders will be actively engaged during the rehabilitation phases of the project to ensure that cultural values of the	The Project will not impact upon any ethnographic sites. The Project will impact upon

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
	area Off-site infrastructure and transport corridor Project area.	*Heritage Act 1972* and *EPA Guidance Statement No. 41 Assessment of Aboriginal Heritage* (EPA, 2004c).		land in or near the project are not adversely affected. Mine site employees and subcontractors will be made aware of the presence of heritage exclusion zones and that they may not enter these. Management measures will be implemented to prevent impacts to heritage exclusion zones and archaeological sites (e.g. from dust, surface water diversion drainage).	two archaeological sites located to the north of the central pits. Approval will be sought under Section 18 of the AH Act.
Soil	The minesite Project area The water supply Project area Off-site infrastructure and transport corridor Project area.	To maintain the ecological functions and landscape values of soils and landforms to achieve the objectives of *EPA Guidance Statement No. 6. Rehabilitation of Terrestrial Ecosystems (2006)*	Permanent modification of the landscape. Increased erosion and sedimentation. Loss of habitats.	Topsoil and subsoil will be applied to rehabilitation areas prior to ripping and seeding. Topsoil stockpiles will be re-seeded as soon as practical, to minimise loss of topsoil through dispersion and erosion. Detailed topsoil management procedures will be developed for inclusion within the OEMP.	The Project will meet the EPA objectives for the management of soils if the storage, collection and reapplication of topsoil are managed appropriately and progressive rehabilitation is implemented.
Air Quality	The minesite Project area	Prevention of gaseous and dust emissions from impacting on the local community and environment consistent with the objectives of the *EPA Guidance Statement No. 18: Prevention of Air Quality Impacts from Land Development Sites 2000*.	Wind erosion from TSF and waste rock landforms. Blasting, handling and haulage/conveying of ore and overburden. Crushing and grinding at the process plant.	Crushing (sprays) and stockpiling facilities will be operated with appropriate dust suppression equipment in place. Progressive rehabilitation will be implemented to minimise exposed soil.	With the implementation of appropriate management measures, the Project is not expected to result in significant dust emissions.

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
		Australian Standard AS 2985 Workplace Atmospheres – Method for sampling and gravimetric determination of respirable dust. *Occupational Safety & Health Act 1984.* *Occupational Safety Regulations 1996.* Ambient Air Quality NEPM (2003). National Environment Protection Measure (NEPM) for Ambient Air Quality 1998. The National Environment Protection Measure (NEPM) PM10 standard – 50 µg/m^3 (24hr average), as the criteria to assess potential health impacts at sensitive receptors. The Kwinana EPP Area C TSP limit – 150 µg/m^3 (24hr average) (as criteria to assess potential amenity impacts).	Exhaust emissions from vehicles and machinery. Transportation and handling at port facilities.	Dust management measures will be implemented (e.g. use of water cart for dust suppression on roads and areas to be cleared) Dust levels and sulphur dioxide will be monitored and reported. A continuous improvement programme will be implemented. A community complaints system will be implemented. Scrubbers will be operated on the process plant to minimise emissions. All excess flash steam, non-condensable purges, emergency shutdown vents and the safety relief system will be directed to the HPAL scrubber system where any acid entrainment is removed through a combination of centrifugal separation and venturi scrubbing, meeting industry best practice standards prior to release of steam. A continuous emissions monitoring system (CEMS) will be operated to monitor stack emissions.	Modelling indicates that the process plant can be operated to comply with all appropriate criteria.
Noise	The minesite Project area Off-site infrastructure and transport	Ensure that noise emissions meet appropriate criteria and do not adversely impact on the social surroundings Ensure noise impacts comply	Impacts to noise sensitive premises (Wingellina, Kalka and Pipalyatjara communities). Disturbance of fauna from	Noise management plan is to be implemented.	The Project is expected to comply with the *Environmental Protection (Noise) Regulations 1997*

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
	corridor Project area	with statutory requirements to achieve the objectives of *EPA Guidance Statement No. 8. Environmental Noise.*	vehicles and mobile equipment, crushing and screening, blasting operations and transport of ore		
Visual Amenity	The minesite Project area Project area	To ensure visual impacts comply with statutory requirements to achieve the objectives of *EPA Position Statement No. 7 Principles of Environmental Protection.*	Impacts to visual amenity of local sensitive receptors (Wingellina, Kalka and Pipalyatjara communities) and visitors the area.	The final Decommissioning, Closure and Rehabilitation Management Plan will be implemented to reduce the impacts to the Project areas visual amenity, both during operation and closure of the site.	The Project is not expected to result in long term visual impacts to the landscape.
Light	The minesite Project area Off-site infrastructure and transport corridor Project area	Ensure light emissions meet appropriate criteria and do not adversely impact on the social surroundings. Ensure light impacts comply with statutory requirements to achieve the objectives of *EPA Position Statement No. 7 Principles of Environmental Protection.*	Impacts from illumination at night to fauna and sensitive receptors (Wingellina, Kalka and Pipalyatjara communities).	Appropriate location of infrastructure to minimise light emissions on sensitive receptors and installation of lighting to Australian Standards. Face lighting towards the operation zone. Operate flights during the day	Lighting from the Project is not expected to result in significant impacts to sensitive environmental receptors or the local communities
Greenhouse Gases (GHGs)	The mine site	To prevent gaseous emissions from impacting on the local community and environment consistent with the objectives of *the Draft State Environment (Ambient Air) Policy 2009.*	GHG emissions from power generation, mine equipment, light vehicles and plant operations.	Implement an operational monitoring programme for GHG emissions. Implementation of initiatives to reduce diesel and electricity consumption	The GHG emissions from the Project will be reduced by project design to the minimum practicable for economic production. Provided the adequate management measures are implemented, the impact of GHG emissions from the Project is expected to

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
					be minimal.
Hazardous Substances and Wastes	The minesite Project area Off-site infrastructure and transport corridor Project area	To ensure that liquid and solid wastes do not adversely affect groundwater or surface water quality or lead to Minimise the environmental impacts of hydrocarbons/chemicals through appropriate storage, handling and disposal. Reduce the volumes of waste through product selection, reuse and recycling. Comply with statutory requirements to achieve the objectives of *Position Statement No. 6 Towards Sustainability (2004); and Position Statement No. 7 Principles of Environmental Protection (2004).*	Contamination of groundwater, surface water and soil. Food source for feral animals.	Waste will be handled and disposed in an appropriate manner wastes. Opportunities will be identifies to avoid, minimise and recycle waste. A Waste Management Plan will be developed and implemented. Domestic waste will be minimised through the re-use and recycling of materials, where possible.	The storage and use of hazardous materials, and the generation and disposal of wastes both on-site and off-site is expected to result in negligible environmental impacts.
Social	The minesite Project area The water supply Project area Off-site infrastructure and transport corridor Project	Comply with statutory requirements to achieve the objectives of Position *Statement No. 6 Towards Sustainability (2004) and Position Statement No. 7 Principles of Environmental Protection (2004).*	Impacts to the local community by: • Heritage sites being damaged or entered into; • A reduction in air quality; • Operational noise; and	The Social Impact Analysis and Management Plan will be implemented to prevent potential impacts to local indigenous communities. Creating business development opportunities for the benefit of the local and regional economy. Ensuring all operations are planned	The mining operation will not impact negatively upon the social and cultural values of the Wingellina Community instead it will enhance the living standards of the local community whilst respecting and preserving their social and cultural

Factor	Relevant Areas	Environmental Objectives	Potential Impacts	Management And Mitigation	Predicted Outcomes
	area.		• The visual amenity of the area being affected.	to be undertaken with utmost cognisance for health and safety of the residents of Wingellina. Undertaking an environmental management program in collaboration with the local community. Developing plans and programs, in collaboration with the local community, which specify the how Hinckley Range will interact with the local community. Managing traffic to ensure it doesn't impact on the local community.	values.
Decommissioning and Closure	The minesite Project area The water supply Project area Off-site infrastructure and transport corridor Project area	To ensure that rehabilitation achieves a stable and functioning landform that is consistent with the surrounding landscape and other environmental values and achieve the objectives of the *EPA Guidance Statement No. 6. Rehabilitation of Terrestrial Ecosystems.*	The abundance of clays throughout the profile is likely to be highly erosive. The variability of water holding characteristics of the sub-surface soils has the potential to affect rehabilitation outcomes.	The DCRP will be implemented during operations. Conduct risk assessment to update risks to closure and controls.	Implementation of DCRP will meet the EPA objectives for rehabilitation, to achieve a stable and functioning landform that is consistent with the surrounding landscape and other environmental values.