

## Section 6

# Summary of Environmental Management and Monitoring Measures

## Preamble

This section has been compiled to record the full range of environmental management and monitoring measures the Applicant would adopt when planning and operating the Quarry. These measures are designed to effectively manage, mitigate, guide and monitor its operation of the Quarry throughout its entire operational life.

The measures are presented in tabular form (**Table 6.1**) and record the respective objectives and actions.

The actions in **Table 6.1** will be reviewed prior to the determination of the development application for the Proposal to remove any actions that duplicate draft conditions of development consent.

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**Table 6.1**  
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Desired Outcome	Action	Timing
<b>1. Traffic and Transport</b>		
Achieve safe and efficient road transport operations.	1.1 Prepare and implement a Driver's Code of Conduct for transport-related activities, with particular emphasis upon drivers of heavy vehicles.	Prior to commencement of site establishment activities. To be implemented throughout the entire life of the Proposal and reviewed annually.
	1.2 Prepare a detailed Traffic Management Plan to safely manage the traffic impacts during all phases of the Proposal.	Following receipt of development consent.
	1.3 Construct all road and intersection upgrades in accordance with relevant Austroads and RMS Standards.	During road works.
<b>2. Groundwater</b>		
Prevention of groundwater contamination.	2.1 Prepare and implement a Water Management Plan that includes a Groundwater Monitoring Program	3 months prior to commencement of the site establishment and construction stage
	2.2 Monitor groundwater levels and groundwater quality on site and in the down gradient hanging swamps.	Ongoing
	2.3 Design a groundwater monitoring program to provide a reliable database that informs management decisions regarding: <ul style="list-style-type: none"> <li>– impacts on groundwater levels on neighbouring properties and on any users of groundwater;</li> <li>– impacts of the Proposal on groundwater quality; and,</li> <li>– receiving systems down gradient.</li> </ul>	3 months prior to commencement of the site establishment and construction stage
	2.4 Commence background monitoring, including a comprehensive analytical suite to establish baseline groundwater quality	Prior to site establishment and construction stage
	2.5 Continue collection of groundwater levels from dataloggers or on a monthly basis.	Ongoing
	2.6 Coordinate groundwater monitoring with surface water monitoring.	Ongoing
	2.7 Compare groundwater levels to daily rainfall data and abstraction data for any bores pumping groundwater on site.	Annually

**Table 6.1 (Cont'd)**  
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Desired Outcome	Action	Timing
<b>2. Groundwater (Cont'd)</b>		
Prevention of groundwater contamination. (Cont'd)	2.8 Conduct an annual review of the monitoring data to review monitoring results; identify any impacts resulting from the operation of the Quarry; assess the need for mitigation measures; and assess if changes to the monitoring program as required.	Annually
	2.9 Maximise operational use of groundwater inflows to the extraction area in preference to water from external sources.	Ongoing
	2.10 Use sumps within the extraction area for storage of excess water, where possible.	Ongoing
	2.11 Minimise the risk of groundwater contamination by: <ul style="list-style-type: none"> <li>– lining or bunding workshop, wash down areas, chemical and fuel storages; and,</li> <li>– recycling waste water from wash down areas.</li> </ul>	Ongoing
<b>3. Surface Water</b>		
Maintenance of surface water quality.	3.1 Prepare and implement a Water Management Plan that addresses erosion and sediment control, water quality monitoring, measures for managing discharge, site water demand and infrastructure monitoring and performance assessment.	Site establishment and construction stage and ongoing
	3.2 Divert clean water flows away from areas of quarry-related disturbance.	Site establishment and construction stage and ongoing
	3.3 Ensure the ongoing performance of the on-site wastewater management system.	Ongoing
	3.4 Adopt a strategy for water management within the Site based on capturing, treating and recycling process waters.	Site establishment and construction stage, and thereafter monthly or following rainfall of >25mm in a 24-hour period
	3.5 Construct and operate surface water management controls such as diversion structures, sediment retention basins and dams.	Ongoing
	3.6 Monitor water quality in release water from the various structures and in downstream areas (e.g. Long Swamp Creek).	Ongoing
	3.7 Achieve a neutral effect on water quality compared to pre-development conditions in the receiving waters (via the Water Management Plan).	Ongoing

**Table 6.1 (Cont'd)**  
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Desired Outcome	Action	Timing
<b>3. Surface Water (Cont'd)</b>		
Maintenance of surface water quality. (Cont'd)	3.8 Monitor the terrestrial / and aquatic condition in downstream waters.	Ongoing
	3.9 Record rainfall, site water use, dam levels and any pumping volumes around the site.	Ongoing
	3.10 Retain records of inspections and maintenance in the site office.	Ongoing
Prevention of hydrocarbon contamination of water on the Site.	3.11 Ensure all storage tanks are either self-bunded tanks or bunded with an impermeable surface and have a capacity to contain a minimum 110% of the largest storage tank capacity.	When constructed or installed
	3.12 Refuel all equipment within designated areas except for less mobile equipment.	Ongoing
	3.13 Undertake all maintenance activities within designated areas of the Site (e.g. workshop).	Ongoing
	3.14 Direct all water from wash-down areas and workshops to oil/water separators and containment systems.	Ongoing
	3.15 Follow a 3-phase remedial action plan In the event of a spillage of a potentially contaminating material, e.g. oil.	Ongoing
<b>4. Noise and Vibration</b>		
Minimise any noise or blasting-related impacts on surrounding landholders and/or residents.	4.1 Prepare and implement a Noise and Vibration Management Plan incorporating the following. i) A summary of noise and blast-related design and operational safeguards. ii) Blast notification protocols for those residences within 2km of the extraction area. iii) A noise monitoring program. iv) Blast monitoring protocols. v) Protocols for incident identification and notification. vi) Protocols for management of noise or blasting complaints.	3 months prior to commencement of site establishment and construction stage.
	4.2 Include noise and blast-related sensitivities and expectations in site-specific induction for all site personnel and contractors.	Prior to commencement of site establishment and construction stage.
	4.3 Ensure no blasting occurs within 500m of the Grotto within the Shrine of Our Lady of Perpetual Mercy – “Penrose Park”.	Ongoing
	4.4 Notify all residents within a 2km radius of the extraction area prior to each blast.	At least 24 hours prior to blasting occurring.

**Table 6.1 (Cont'd)**  
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Desired Outcome	Action	Timing
<b>5. Terrestrial Ecology / Biodiversity</b>		
Minimisation of long term impact on flora and fauna on and around the Site.	5.1 Prepare and implement a Landscape and Rehabilitation Management Plan that includes but is not limited to management of: <ul style="list-style-type: none"> <li>i) Soil stripping and stockpiling.</li> <li>ii) Vegetation clearing protocols.</li> <li>iii) Clearing, handling and placement of hollow-bearing trees.</li> <li>iv) Weed management.</li> <li>v) Bush fire management.</li> <li>vi) Threatened species management.</li> <li>vii) Biodiversity offset Area(s), once secured.</li> <li>viii) Progressive and final rehabilitation of the Site.</li> </ul>	3 months prior to commencement of site establishment and construction stage.
	5.2 Include management of the Koala in threatened species management in light of community comments on local population not identified in ecological surveys.	
Secure the biodiversity offset area(s) in perpetuity for the purposes of biodiversity conservation.	5.3 Prepare a Biodiversity Offset Strategy to describe the methods through which the biodiversity offset area(s) would be secured and managed in perpetuity.	3 months prior to commencement of extraction operations.
	5.4 Incorporate the rehabilitated Fines Storage Area 1 and southern barrier into the biodiversity offset area.	Following the completion of operational activities in these areas.
	5.5 Secure in perpetuity the biodiversity offset area(s).	By the end of Year 2 of operations.
Rehabilitate disturbed areas to create a final landform that maintains or improves biodiversity values of the Site.	5.6 Undertake monitoring programs annually in accordance with an approved Landscape and Rehabilitation Management Plan to review the progress of rehabilitation and condition of vegetation within the biodiversity offset area. The findings and resulting actions will be reported in the Annual Review for the Proposal.	Ongoing.
	5.7 Review rehabilitation progress annually against performance indicators provided in an approved Landscape and Rehabilitation Management Plan.	Annually.

**Table 6.1 (Cont'd)**  
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Desired Outcome	Action	Timing
<b>6. Aquatic Ecology</b>		
Avoid and minimise impacts on aquatic vegetation and aquatic animal habitats where possible.	6.1 Establish and implement a water quality monitoring program in the Water Management Plan that includes a contingency plan for responding to elevated levels of pollutants attributed to the Proposal.	3 months prior to commencement of operations and for the life of the Quarry.
	6.2 Minimise the mobilisation of sediment into Long Swamp Creek through the use of standard sediment and erosion control procedures during construction of the intersections and access roads and during operational activities.	Ongoing
<b>7. Aboriginal Cultural Heritage</b>		
Provide appropriate protection to the existing and any unknown Aboriginal artefacts.	7.1 Maintain a 100m buffer zone set back from the identified rock shelter site.	Ongoing
	7.2 Prepare and implement an Aboriginal Cultural Heritage Management Plan to manage those identified and any potentially unknown sites of Aboriginal heritage value within the Site.	3 months prior to commencement of site establishment and construction stage and for the life of the Quarry.
	7.3 Arrange for the full or partial salvage of Aboriginal objects at the following Aboriginal cultural heritage sites: <ul style="list-style-type: none"> <li>– Full salvage at AHIMS 52-4-0315 and AHIMS 52-4-0316 within the proposed extraction area.</li> <li>– Full salvage at AHIMS 52-4-0319 located within the alignment of the access track to Fines Storage Area 1.</li> <li>– Partial salvage of AHIMS site 52-4-0320 that is located adjacent to the access track to Fines Storage Area 1.</li> </ul>	Prior to operations commencing in the extraction area accordance with an Aboriginal Cultural Heritage Management Plan and with the involvement of the local Aboriginal community.
<b>8. Air Quality</b>		
Site activities are undertaken without exceeding EPA air quality criteria or goals.	8.1 Prepare and implement an Air Quality Management Plan incorporating the following. <ul style="list-style-type: none"> <li>i) A summary of all air quality-related design and operational safeguards.</li> <li>ii) An air quality monitoring program.</li> <li>iii) Protocols to minimise greenhouse gas emissions from the Proposal.</li> <li>iv) Protocols for incident identification and notification.</li> <li>v) Protocols for management of air quality-related complaints.</li> </ul>	3 months prior to commencement of site establishment and construction stage.
	8.2 Include appropriate training and education regarding air quality related-impacts for all staff and in induction processes.	Ongoing

**Table 6.1 (Cont'd)**  
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Desired Outcome	Action	Timing
<b>9. Soils</b>		
Rehabilitate using available soil resources.	9.1 Place topsoil over silts to a depth of at least 0.2m thickness, in addition to 0.4m of subsoil.	During Rehabilitation stages
	9.2 Lay down stripped subsoil and topsoil from the extraction area in a similar stratigraphical order (i.e. subsoil beneath topsoil).	During Rehabilitation stages
	9.3 Place subsoil and topsoil over all rehabilitated areas. While subsoil thickness can vary, topsoil would be placed to at least 0.2m thickness.	During Rehabilitation stages
Maintenance of soil value for rehabilitation and minimisation of soil loss through erosion.	9.4 Rapidly protect rehabilitated surfaces from rainsplash erosion with mulch (or equivalent) and seeded to encourage pasture growth.	During Rehabilitation stages
	9.5 Apply soil conditioners, if required, for successful rehabilitation and to support pasture.	During Rehabilitation stages
	9.6 Construct topsoil stockpiles as low (<2m), flat, elongated mounds.	Ongoing
	9.7 Seed any stockpiles retained for over three months with a non-persistent cover crop.	Within 3 months of stockpile construction
	9.8 Place stockpiles at least 5m from any retained vegetation, potentially concentrated water flows (e.g. diversion drains or natural drainage lines), roads or potential hazard areas.	When stockpiling
	9.9 Avoid handling the soils when wet to protect any structure that may have developed.	Ongoing
	9.10 Avoid driving on the topsoil and subsoil stockpiles, as well as the respread soil, to maximise soil aggregation and prevent compaction, particularly when the stockpiles are moist.	Ongoing
	9.11 Divert surface water flow away from soil stockpile areas.	Prior to commencement of stockpiling
	9.12 Install silt-stop fencing or similar immediately down-slope of stockpiles, until stable vegetation cover is established.	Immediately following stockpile construction
<b>10. Visibility and Lighting</b>		
Reduce the impact of the Proposal on the visual amenity of private and public vantage points.	10.1 Minimise the extent of land disturbance / clearing in advance of quarrying.	Site establishment and construction stage
	10.2 Revegetate and landscape amenity barriers with native vegetation. Ensure woody trees are planted on the northeastern barrier to achieve a visually appealing outcome from the adjoining lot.	As soon as barriers are constructed



**Table 6.1 (Cont'd)**  
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Desired Outcome	Action	Timing
<b>10. Visibility and Lighting (Cont'd)</b>		
Reduce the impact of the Proposal on the visual amenity of private and public vantage points. (Cont'd)	10.3 Commence progressive rehabilitation of the Site focusing particularly on the revegetation of disturbed areas where no longer required.	As soon as areas are available for rehabilitation
	10.4 Maintain a high standard of housekeeping to achieve a visually attractive site.	Ongoing
	10.5 Prepare a Lighting Management Plan for lights required for night-time operations to minimise light spill from the operation.	3 months prior to commencement of processing operations
<b>11. Socio-economic</b>		
Adverse impacts on members of the local community are minimised.	11.1 Implement a complaint management procedure or protocol to ensure that any complaint received is dealt with decisively and appropriately.	Prior to site establishment and construction stage
	11.2 Continue to engage with local community members in accordance with an approved Community Engagement Plan.	Ongoing
	11.3 Form and maintain a Community Consultative Committee.	Ongoing
	11.4 Undertake a voluntary noise reduction program to further mitigate noise sources influencing noise levels at the Shrine of Our Lady of Mercy – “Penrose Park”..	Prior to establishment and construction stage
	11.5 Implement a blast notification protocol and pre-emptively discuss planned blasting with surrounding residents.	Prior to operational stage
	11.6 Support community organisations, groups and events as appropriate.	Ongoing
	11.7 Implement a Driver's Code of Conduct to ensure the safety of all road users and communities through which product transport trucks would pass.	Prior to establishment and construction stage
	11.8 Continue to adhere to all operating condition commitments.	Ongoing
	11.9 Implement the recommendations provided in each of the specialist assessments of the Proposal.	Prior to establishment and construction stage

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