



ENVIRONMENTAL MONITORING PROGRAM

Wallerawang Quarry

FINAL

April 2019



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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Walker Quarries Pty Limited

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
V0	Alex Irwin	21 February 2019	Alex Irwin	26 February 2019
V1	Alex Irwin	2 April 2019	Alex Irwin	2 April 2019

Note * V0 represents the first version of this plan prepared by Umwelt Pty Ltd. This follows from Rev 4 produced by RW Corkery & Co. Pty Limited

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1.0 Scope

This Environmental Monitoring Program (EMP) has been prepared for the Wallerawang Quarry (the Quarry) by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Walker Quarries Pty Ltd (Walker Quarries) in accordance with Schedule 5 Condition 1(f) of Development Consent DA 344-11-2001 (as modified 7 December 2018) which requires the Environmental Management Strategy (EMS) include:

- copies of any strategies, plans and programs approved under the conditions of this consent; and
- a clear plan depicting all the monitoring to be carried out under the conditions of this consent.

In order to demonstrate compliance with environmental criteria nominated for the Quarry (as included in the statutory approvals), and to measure environmental performance of the Quarry, monitoring of the following will be undertaken (in accordance with the referenced management plan):

- Noise Management Plan.
- Blast and Explosives Control Management Plan.
- Soil and Water Management Plan (incorporating an Erosion and Sediment Control Plan).
- Biodiversity Management Plan.
- Bushfire Management Plan.
- Air Quality Management Plan.
- Pollution Incident Response Management Plan.

These management plans provide detailed information on the location, frequency, parameters, procedures and record keeping for monitoring the relevant emissions, outputs or activities. This EMP consolidates the environmental monitoring requirements of these management plans.

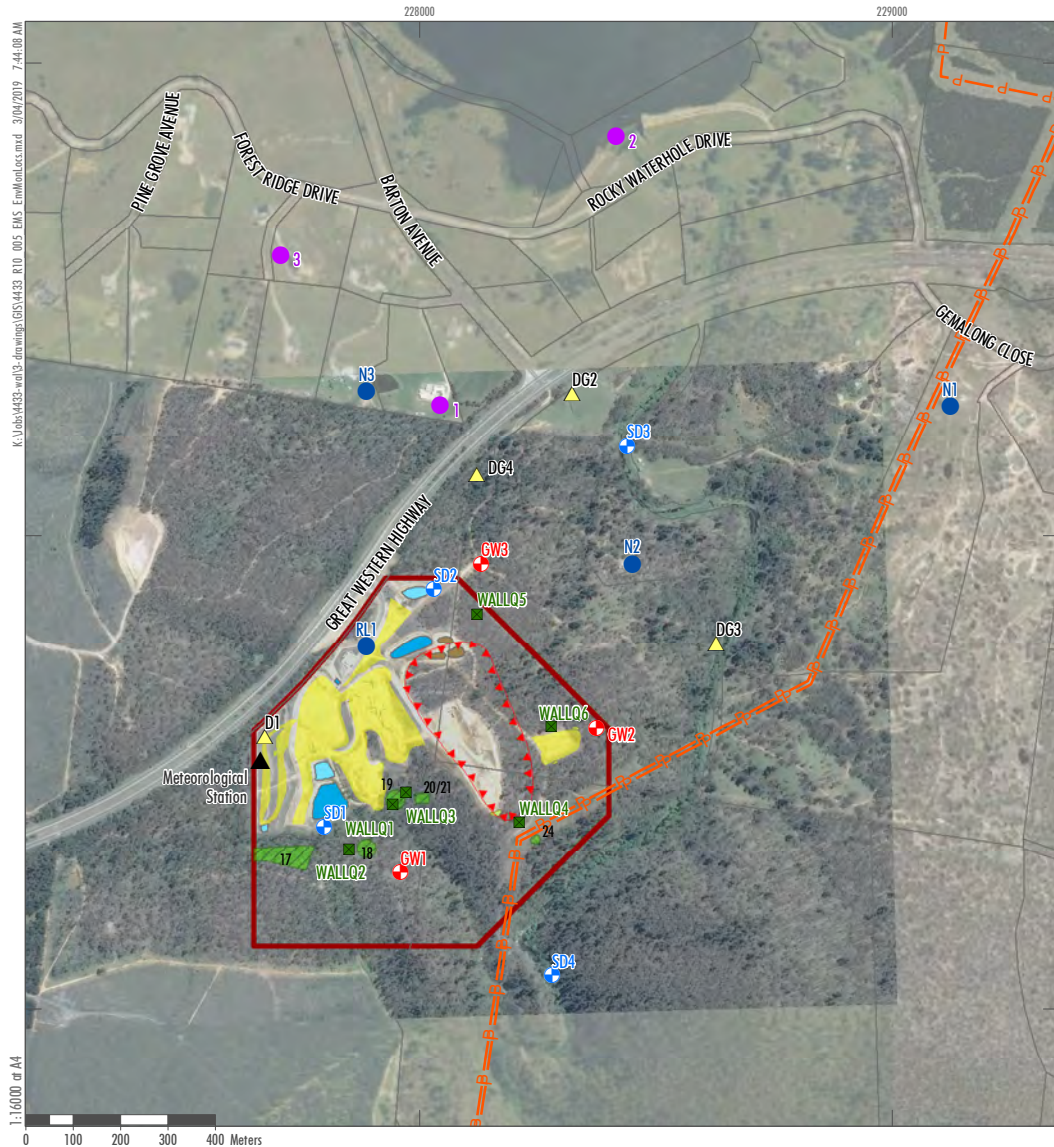
The Quarry Manager is responsible for the implementation and continued monitoring requirements for the Quarry. The EMP will be updated following any review and update to the referenced environmental management plan above.

Table 1.1 presents a summary of all environmental monitoring activity and presents the monitoring parameters, frequency, timing and additional information requirements for each monitoring requirement. The locations of all monitoring points are presented on **Figure 1.1**.

Table 1.1 Monitoring Requirements

Monitoring Parameter	Monitoring Location	Frequency	Criteria	Timing	Purpose	Additional Information to be Recorded
Meteorological Monitoring						
Rainfall (mm) Sigma theta (°) Air Temperature (°C) Wind Direction at 10 m (°) Wind Speed at 10 m (m/s)	Quarry Meteorological Station (northeast corner of ML 1633)	Continuous	Not Applicable	Monthly records to be downloaded from equipment.	To assist assessment of noise and air quality monitoring and for operational planning.	Monthly summary to be placed on website and reported in the Annual Review.
Noise Monitoring						
Attended Noise Monitoring L_{Amax} L_{Aeq} If considered necessary at the time of monitoring: L_{A10} L_{A50} L_{A90} L_{A99} L_{Amin}	N1: "Gemalong" property residence. N2: Access to "Cockatoo Pines" property. N3: 2 Cypress Place, Wallerawang. RL1: Quarry Site northern perimeter.	Every 6 months (June and December).	43 dB(A) L _{Aeq} (15 minutes) (Day). 43 dB(A) L _{Aeq} (15 minutes) (Evening). 39 dB(A) L _{Aeq} (15 minutes) (Night).	15 minutes.		Operator's Name. Location of Monitoring. Recording Intervals (date and time). Meteorological conditions. Statistical noise level descriptor with notes identifying noise sources. Instrument make, model, serial number and calibration details. Description of activities occurring during monitoring.
Equipment Sound Power Level Audit (L_{Amax} @ 10m (dBA))	All active mobile and fixed plant with Quarry.	Annual	Not Applicable	Instantaneous	To compare relative to previous records and establish trends in operating noise impacts.	Annual record of sound power levels to be reported in the Annual Review.
Blast Monitoring						
Ground Vibration Airblast Overpressure	1: 3 Cypress Place 2: Lake Wallace Dam Wall 3: 4 Beacraft Place Or other locations on request by landowner	Each blast event	Ground Vibration 5mm/s exceeded on no more that 5% of occasions and 10mm/s limit on all occasions. Airblast Overpressure 115dB _(Lin Peak) exceeded on no more that 5% of occasions and 120dB _(Lin Peak) limit on all occasions.	Instantaneous	To establish compliance with blast criteria and provide feedback on future blast design to blasting contractors.	Date Time Maximum Instantaneous Charge. Blast Location. Monitoring Location. Name of person recording the monitoring result.
Air Quality Monitoring						
Deposited Dust	4 x Dust Gauges DG1: northeast corner of ML 1633 DG2: Lot 1, DP872230 DG3: Coks River DG4: Lot 6, DP872230	Monthly	Annual Average Total Deposited Dust: 4g/m ² month. Annual Incremental Increase: 2g/m ² month.	Continuous through gauge placement analysed monthly and assessment based on the annual average.	To establish compliance with air quality criteria and manage potential dust impacts to the local environment including privately-owned residences and significant flora and fauna.	Date Time Monitoring Location. Name of person recording the monitoring result.
Water Monitoring						
TSS (mg/L) Sulfate (mg/L) Grease and Oil (mg/L) Electrical Conductivity (MS/cm) pH Surface Water Flow (high/medium/low/none)	EPL 1 (SD1) EPL 2 (SD2) SD3 (Coks River upstream) SD4 (Coks River downstream)	Monthly during discharge for EPL 1 (SD1) and EPL 2 (SD2) Annually for SD3 and SD4	30mg/L 250mg/L 5mg/L 1500MS/cm 6.5-8.5 Not Applicable	During discharge at EPL 1 (SD1) and EPL 2 (SD2) or in accordance with annual reporting requirements.	To establish compliance with water quality criteria and manage potential impacts to the local environment.	Date Time Monitoring Location. Name of person recording the monitoring result.

Monitoring Parameter	Monitoring Location	Frequency	Criteria	Timing	Purpose	Additional Information to be Recorded
Biodiversity Monitoring						
General site inspections	Within the Quarry Site	Monthly	Not applicable	Monthly site review of vegetation condition to be reported annually.	To monitor any short term changes to vegetation condition that may require remedial action.	Date Time Name of person undertaking monitoring.
Purple Copper Butterfly sightings / presence and Blackthorn distribution and condition	Blackthorn Patches: – 17; – 18; – 19; – 20/21; and – 24.	Annual	Not applicable	Monitoring will coincide with the adult flying and juvenile larval seasons (October-November), respectively.	To monitor presence of the threatened species and the distribution and condition of habitat within the Quarry Site. To record performance of management measures and rehabilitation activities incorporating the Blackthorn.	Date Time Name of person undertaking monitoring.
Vegetation: Flora species diversity Percentage foliage cover by canopy, lower-storey and groundcover Weed species and percentage cover Fauna species presence	Plots: – Wall01; – Wall02; – Wall03; – Wall04; – Wall05 and – Wall06.	Annual	Not applicable	Monitoring will coincide with the Purple Copper Butterfly monitoring program.	To monitor existing vegetation condition and performance of management measures and rehabilitation activities. Parameters to include: <ul style="list-style-type: none"> • vascular plant species abundance (modified Braun-Blanquet scale); • dominant species; and • foliage cover in each stratum. 	Date Time Name of person undertaking monitoring.
Rehabilitation Monitoring						
Landform Survey	Completed landforms	Following landform construction	Slopes as per Plans 3 & 4 of MOP.	Following landform construction	Confirm landform establishment criteria achieved.	
Visual Inspections	General Quarry Site	Quarterly	Refer to Section 8.1.3 of MOP.	Quarterly.	Confirm no occurrence of erosional or other actions detrimental to rehabilitation.	Photos to be taken,
Soil Analysis	Soil application areas	Following soil spreading	Soil depth pH & erodibility	Following soil application	Confirm achievement of performance criteria of Table 17 of the MOP.	
Vegetation	Rehabilitation Areas (locations to be established following completion of significant rehabilitation campaign)	Annual	Comparison to Analogue site of Quarry Site (WALL 01 to WALL 06)	To coincide with the Quarry Site vegetation monitoring program.	To review progress of vegetation against completion criteria of the MOP (Table 17). Parameters to include: <ul style="list-style-type: none"> • vascular plant species abundance (modified Braun-Blanquet scale); • dominant species; and • foliage cover in each stratum. 	Refer to Section 8.1.5 of the MOP



Legend

- | | | |
|---|--|---|
| Quarry Site - ML1633 | Cadastral boundary | ▲ Meteorological Station |
| Stockpile Area | Remnant Patches of <i>Bursaria spinosa</i> | ● Noise Monitoring Locations |
| Sediment Basin | ▲ Air Quality Monitoring Locations | ■ Surface Water Monitoring Location |
| Silt Cell | ■ Biodiversity Monitoring Locations | ● Groundwater Bore Location |
| Storage Dam | ● Blast Monitor | —P— Power Line |

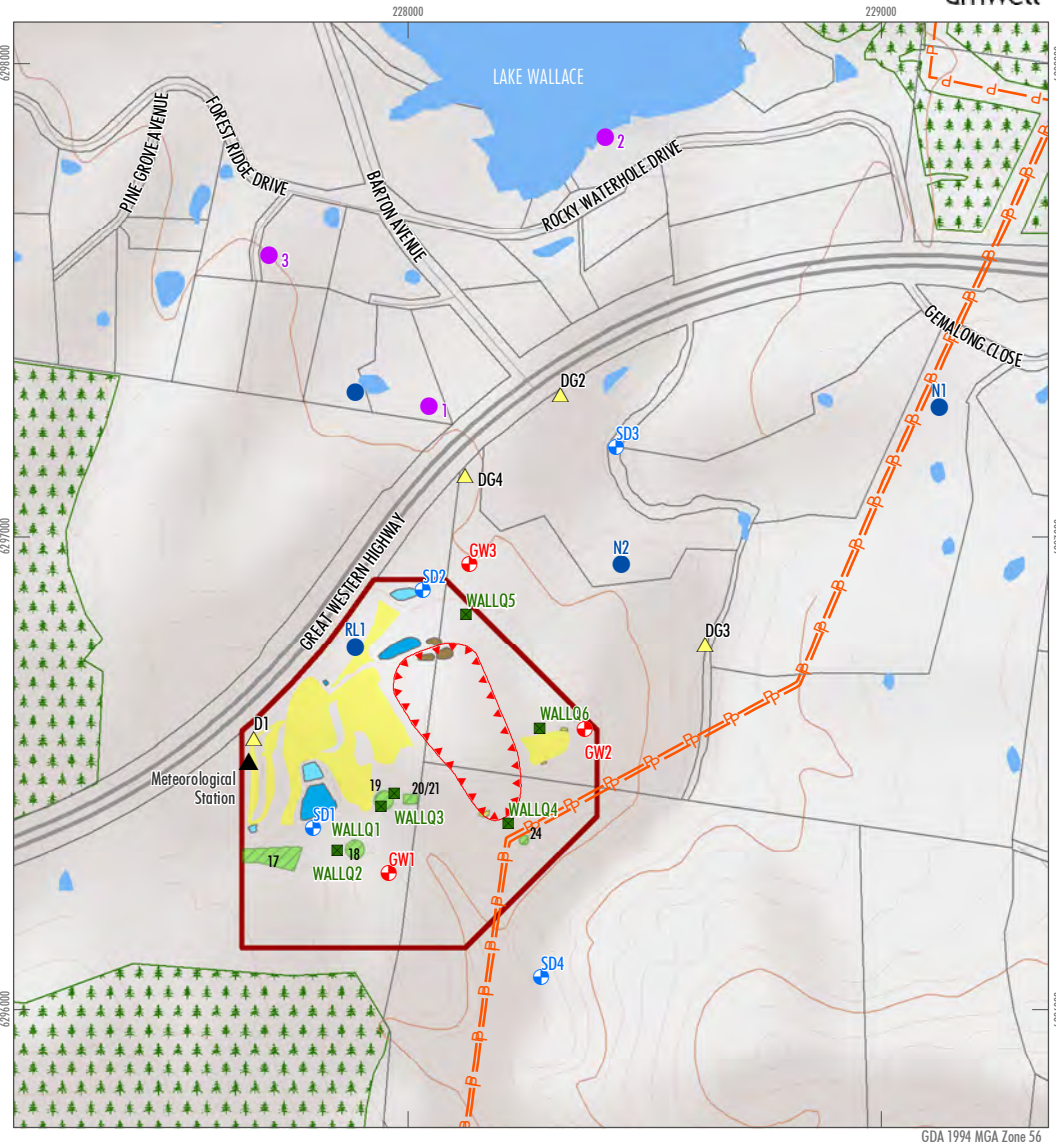


FIGURE 1.1
Environmental Monitoring Locations

2.0 Environmental Monitoring Summary

In accordance with the requirements of Section 66(6) of the *Protection of the Environment Operations Act 1997* (PoEO Act), each month Walker Quarries will publish a summary of all pollution monitoring data on their website.

All incident reporting and notifications would occur in accordance with the referenced environmental management plans and the EMS.

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