

Compliance audit program

Marrangaroo Quarry Final Audit Report

Metromix Pty Limited

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1. Introduction

1.1. Background

Marrangaroo Quarry is an open cut quartzite quarry located about seven kilometres west of Lithgow, NSW. The quarry comprised eight mining authorisations as summarised in Table 1.

Table 1 Summary of mining leases comprising Marrangaroo Quarry

Title	Grant	Expiry	MTW Area
ML 4635 (1906)	1 July 1941	1 July 2023	ML 4635 (1906)
ML 4636 (1906)	1 July 1941	1 July 2023	ML 4636 (1906)
ML 6388 (1906)	6 April 1973	1 July 2023	ML 6388 (1906)
PLL 584 (1924)	22 June 1942	1 July 2023	PLL 584 (1924)
PLL 602 (1924)	7 Sep 1942	7 Sep 2025	PLL 602 (1924)
MPL 221 (1973)	4 Jan 1984	3 Jan 2026	MPL 221 (1973)
ML 1522 (1992)	10 Oct 2002	9 Oct 2023	ML 1522 (1992)
ML 1801 (1992)	9 March 2020	9 March 2041	ML 1801 (1992)

All titles are held in the name of Metromix Pty Limited.

The Marrangaroo Quarry commenced operation in 1912, quarrying quartzite to supply lump silica to produce silica fire bricks. By the early 1970's, the quartzite was recognised as a high-quality construction material and since that time, the proportion of products produced from the Quarry and used for construction purposes has increased.

Development Consent (DA90/95) was first granted by Lithgow City Council in December 1995 and was last amended in December 2016 – approving the quarry to produce upto 220,000 tonnes per annum. The North-South Quarry extension was approved by Lithgow City Council in May 2002 (DA486/01). The mining leases approved the quarrying of clay/shale, kaolin, quartzite and structural clay.

As part of the compliance audit program undertaken by the NSW Resources Regulator (the Regulator), an audit of the mining operations associated with the Marrangaroo Quarry was undertaken on 4 May 2022.

1.2. Audit objectives

The objectives of the audit were to:

- Undertake a compliance audit of the Marrangaroo Quarry, titles held and operated by Metromix Pty Limited (Metromix) against the requirements of the *Mining Act 1992* and the conditions of the mining leases issued pursuant to that Act.
- Assess the operational performance of the Marrangaroo mining operations and the ability of the titleholder and/or operator to implement management systems and controls to provide for sustainable management of the operations.

1.3. Audit scope

The scope of the audit included:

- The mining and exploration activities associated with the Marrangaroo Quarry including:
 - mine development and exploration activities (if any) within ML1522, ML1801, ML4635, ML4636, ML6388, PLL584, PLL602 and MPL221
 - rehabilitation activities associated with mining and exploration activities.
- A review of documents and records pertaining to the mining and exploration activities.
- The assessment of compliance for the period commencing 4 May 2020 to 4 May 2022.

1.4. Audit criteria

The audit criteria against which compliance was assessed included:

- Mining Act 1992, specifically Sections 5, 6, 163C to 163E, 163G, 378D
- Mining Regulation 2016, specifically clauses 59 to 68
- Conditions attached to ML1522 (granted 10 October 2002)
- Conditions attached to ML1801 (granted 9 March 2020)
- Conditions attached to ML4635 (granted 1 July 1941, renewed 4 April 2003)
- Conditions attached to ML4636 (granted 1 July 1941, renewed 4 April 2003)
- Conditions attached to ML6388 (granted 6 April 1973, renewed 4 April 2003)
- Conditions attached to PLL584 (granted 22 June 1942, renewed 23 June 2003)
- Conditions attached to PLL602 (granted 7 September 1942, renewed 8 September 2004)
- Conditions attached to MPL221 (granted 4 January 1984, renewed 23 November 2006)
- Commitments made in the Amended Mining Operations Plan for the Marrangaroo Quarry, dated November 2020 (approved 16 December 2020)
- Exploration Reporting: A guide for reporting on exploration and prospecting in New South Wales (Version 2, March 2016)
- Rehabilitation Cost Estimation Tool Handbook (June 2017)
- ESG3: Mining Operations Plan (MOP) Guidelines, September 2013, and
- Guidelines and Format for Preparation of an Annual Environmental Management Report (January 2006).

1.5. Publishing and disclosure of information

This audit report was published on the Regulator's website consistent with:

- Section 365 of the *Mining Act 1992*
- Resources Regulator's Public comment policy
- *Government Information (Public Access) Act 2009*.

2. Audit methods

The audit process involved the interview of site personnel, a review of documentation and samples of records provided by the titleholder and/or operator and a site inspection of the operations to determine the level of compliance of the operations and assess the status of the operational performance. The audit process and methodology are described in more detail in the sections below.

2.1. Opening meeting

The opening meeting was held onsite at Marrangaroo Quarry on 4 May 2022. The audit team was introduced, and the scope of their responsibilities was conveyed to the auditees. The objectives and scope of the audit were outlined. The methods to be used by the team to conduct the audit were explained, including interview of personnel, review of documentation, examination of records and a site inspection to assess specific compliance requirements.

2.2. Site interviews and inspections

2.2.1. Data collection and verification

Where possible, documents and data collected during the audit process were reviewed on site. All information obtained during the audit process was verified by the audit team where possible. For example, statements made by site personnel were verified by viewing documentation and/or site inspections where possible. Where suitable verification could not be provided, this has been identified in the audit findings as not determined.

2.2.2. Site inspections

A site inspection was undertaken of the Marrangaroo Quarry including:

- access tracks and haul roads
- production infrastructure area including fuel and oil grease storage
- material stockpile areas
- revegetation areas
- approved extraction limit along the western boundary

2.3. Closing meeting

The closing meeting was held at the Marrangaroo Quarry office on 4 May 2022. The objectives of this meeting were to discuss any outstanding matters, present preliminary findings and outline the process for finalising the audit report.

2.4. Compliance assessment definitions

The reporting of results from the compliance audit was determined based on the definitions presented below in Table 2.

Table 2 Audit assessment categories

ASSESSMENT	CRITERIA
Compliance	Sufficient and appropriate evidence is available to demonstrate the particular requirement has been complied with.
Non-compliance	<p>Clear evidence has been collected to demonstrate the particular requirement has not been complied with. There are three subcategories of non-compliance reflecting the severity and level of risk associated with the non-compliance:</p> <p>NC1 – the absence of planning or implementation of a required operational element which has the potential to result in a significant risk.</p> <p>NC2 – an isolated lapse or absence of control in the implementation of an operational element which is unlikely to result in a significant risk.</p> <p>NC3 – an administrative or reporting non-compliance which does not have a direct environmental or safety significance.</p> <p>Note: The identification of a non-compliance in this audit may or may not constitute a breach of, or offence under, the <i>Mining Act 1992</i>. Non-compliances identified in this audit report may be further investigated by the Regulator and regulatory actions may be undertaken.</p>
Observation of concern	<p>Where an auditee may be compliant at the time of the audit but there are issues that exist that could result in the potential for future non-compliance if not addressed.</p> <p>Observation of concern was also used where an issue may not have particular compliance requirements, but which was not conducive to good management or best practice.</p>
Suggestion for improvement	Where changes in processes or activities inspected or evaluated at the time of the audit could deliver improvement in relation to risk minimisation, sustainable outcomes and management practices.
Not determined	<p>The necessary evidence has not been collected to enable an assessment of compliance to be made within the scope of the audit.</p> <p>Reasons why the audit team could not collect the required information include:</p> <ul style="list-style-type: none"> insufficient information on the file relating to the period covered by the audit or insufficient evidence collected to reach a conclusion the wording on the criteria (approval condition) meant that no evidence could be gathered, or it was too difficult to gather the evidence. <p>A 'not determined' assessment was also made where the condition was outside the scope of the audit.</p>
Not applicable	<p>The circumstances of the authorisation or licence holder have changed and are no longer relevant (e.g. no longer mining, mining equipment and plant has been removed).</p> <p>An invoking element in the criteria was not activated within the scope of the audit.</p>

2.5. Reporting

Following completion of the site audit, the audit checklists were completed, and audit notes were reviewed to compile a list of outstanding matters to be noted in the audit report. This report was prepared to provide an overview of the operational performance of the site in relation to the mining and exploration operations and identify any non-compliances or observations of concern noted by the auditors during the site inspections and interviews.

The draft audit findings were forwarded to Marrangaroo Quarry for comment. Consideration was given to the representations made during the finalisation of the audit report as discussed in the audit findings.

3. Audit findings

3.1. Mining operations plan

Condition 2 of PLL584, PLL602, ML1522, ML4635, ML4636, ML6388, MPL221 and condition 3 of ML1801 required the lease holder carry out mining operations in accordance with an approved mining operations plan (MOP).

Marrangaroo Quarry prepared the 'Amended Mining Operations Plan for the Marrangaroo Quarry, dated November 2020' (Marrangaroo MOP) to satisfy the requirements of the MOP conditions. The Marrangaroo MOP was approved by the Regulator on 16 December 2020.

Generally, evidence was available to confirm that the controls and mitigative strategies outlined in the Marrangaroo MOP were implemented as outlined in the following sections.

3.1.1. Activities over the MOP term

Section 2.3 of the Marrangaroo MOP describes the activities that were proposed to be undertaken during the MOP term which includes:

- exploration activities – MOP section 2.3.1 identified that during the term of this MOP, exploration may be undertaken to further optimise and schedule future quartzite and overburden recovery within the North-South Quarry. Further discussion of the exploration within the mining leases is contained in Section 3.3 of this audit report
- construction activities – MOP section 2.3.2 identified that during the term of this MOP, excluding continued formation of internal haul roads as extraction progresses, no construction activities were planned
- overburden management – MOP section 2.3.4 notes that all waste rock/overburden material and unsaleable fines and split rock, not sold as fill material, would be placed as backfill within the South-West Quarry void. It was intended that the South-West Quarry would be backfilled to approximately 960m AHD and ultimately be used for product stockpiling. The South-West Quarry stockpile areas were observed by the audit team while on site (see Figure 2 below)
- waste management – MOP section 2.3.6 described the waste management systems in place for the Marrangaroo Quarry. Metromix advised that generally, waste was removed from site by a licensed waste contractor to a licensed landfill facility. This was not verified as part of the audit

3.1.2. Operational risks relating to rehabilitation

Section 3.2 of the Marrangaroo MOP outlined the environmental risks associated with the quarry and section 9.1 described the operational issues/threats which could potentially affect rehabilitation at the Marrangaroo Quarry.

Section 3.2.3 of the MOP recognized that material prone to generating acid mine drainage sulphides were identified within a 'discrete' zone of the southern face of the North-South Quarry. This zone was a 'contact zone' formed during the emplacement of the carboniferous granites and contained 'low grade' quartzite, shale and sandstone material. The sulphides, whilst significant in their concentration, were limited to a small area for which no further extraction activities were planned, shown in Figure 1 below. The audit team noted the geological investigations undertaken in 2015, which determined no significant/immediate risks posed by the presence of these sulphides. It was noted that the quarry managed the risk by ensuring no acidic water (pH of <6.5) was discharged from the quarry by monitoring on-site water storages and ensuring that where discharge events was likely (ie. due to significant wet weather), water was treated with alkaline amendment to increase pH to within the required criteria.

Figure 1 'Discrete' zone of material prone to generating acid mine drainage – southern face of the North-South Quarry



MOP section 3.2.5, soil types and suitability, identified that minimal subsoil occurs within the Western Extension Area, the principal area within which soil stripping would occur during the MOP term. The MOP also noted that appropriate sedimentation controls for soil stockpiles would be implemented and maintained until such time as a stable vegetation cover over the stockpile was achieved. Further, any soil stockpile likely to be retained for more than 3 months (with no naturally established vegetation cover) would be stabilised using a non-persistent cover crop". Metromix advised the audit team while on site that no temporary stabilisation of soil stockpiles was required and that the current practice adopted to further develop the soils on site involved capturing silts and mixing with overburden.

Figure 2 Soil stockpile observed at South-West quarry area



MOP section 3.2.6, surface water and erosion and sediment control, outlined the quarry's approach to clean and dirty water management, with all dirty water runoff generated on site being effectively contained in: the sediment retention dam - Dam B (approx 12ML capacity), the North-South Quarry Sump (approx 22ML capacity) and the BHP Dam (approx 11ML capacity). The spillway from Dam B was a licenced discharge point (LDP) under the sites Environment Protection Licence. An uncontrolled discharge of acidic water from Dam B via LDP 1 into Sanderson Creek was reported to the EPA on 12 November 2021 (the day the incident occurred). The uncontrolled discharge occurred due to a greater than forecast rain event commencing two days after a previous substantial rainfall

event, coupled with limitations on the rate at which water could be transferred from Dam B to the North-South Sump or the BHP Dam.

The Annual Environmental Management Report, February 2021, proposed the following to prevent any further occurrences of uncontrolled discharge:

- an electric pump with automatic water level sensor was to be installed in the first half of 2022, allowing automatic operation of the pump 24 hours per day without personnel required to attend site outside of operational hours. The diesel pump would also be maintained should extra pumping capacity be required for a short period to prevent discharge
- increased capacity of the BHP Dam through removal of the rock filter wall (which was replaced with a new primary silt retention channel). Water within the North-South Quarry Sump would be transferred to BHP Dam to provide for an additional passive siphoning system of water from Dam B to the North-South Quarry Sump using existing piping.

During the audit, Metromix advised the following measures were implemented to minimise the occurrence of uncontrolled discharges in future:

- visual inspections, including monthly inspections of the storages, to determine water levels and water quality
- drone survey software purchased (PropellorAero) which used drone photos taken by surveyors to determine the capacities of water storages on site
- the North-South Quarry sump was progressively pumped out following high rainfall in early 2022
- electric pump with float was installed at the BHP Dam to ensure the stored water did not exceed set levels. It was noted that the pump is checked as part of the weekly inspection schedule
- the diesel pump was regularly serviced, with service reports maintained and pre-start checks undertaken to provide a “spare pump” in the event it was needed.
- while the BHP dam capacity wasn’t physically increased as proposed, Metromix advised that relocating the water pump within the dam provided a better response for pumping water once trigger levels were reached to ensure desired capacity.

Figure 3 North-South Quarry Sump



Figure 4 BHP dam



Section 3.2.15 of the MOP noted that an Aboriginal artefact scatter was identified near Marrangaroo Creek in the southwest area of the quarry site. A 60 m conservation zone was established surrounding the scatter and Metromix advised that the site was located downslope of the North-South Quarry extension limit bund wall, and as such, the conservation zone was complied with as the area was relatively inaccessible.

Figure 5 Aerial photo of Aboriginal artifact scatter, downslope of the North-South Quarry extension limit bund wall



3.2. Rehabilitation

Condition 12 of mining leases PLL584, ML1522, ML4635, ML4636 and ML6388, Condition 2 of mining lease ML1801, and Condition 13 of mining leases MPL221 and PLL602 required that any disturbance resulting from the activities carried out under the mining leases must be rehabilitated to the satisfaction of the Director-General (or Minister in the case of ML 1801). An assessment of compliance with the MOP commitments in relation to rehabilitation of the site was undertaken during the audit as detailed in the following sections.

3.2.1. Risk assessment

To achieve successful rehabilitation outcomes, the lease holder must be able to identify and manage any risks that could compromise rehabilitation outcomes.

An environmental risk review was documented in section 3.1 of the approved MOP and an analysis of rehabilitation threats was documented in section 9.1 and Table 9.1. For the issues/ risks related to rehabilitation, there was one risk ranked as high and six ranked as medium. Key issues relating to risks to successful rehabilitation included:

- contaminated land present including acid mine drainage & salinity
- geotechnical instability and sediment and erosion control measures inadequate or fail and the final landform is a source of pollution and does not conform to final landform contours
- inadequate growth medium or mulch thickness applied to final landform and stabilising groundcover does not adequately establish with increased erosion and sediment risk
- invasive / noxious weeds are not being controlled appropriately and the final landform presents a biosecurity risk
- vegetation community is not self-sustaining and final landform requires significantly more management than undisturbed analogue sites

Generally, it was noted that Marrangaroo Quarry has identified and implemented controls to address key risks. For example:

- Geological investigations were undertaken by Central West Scientific (CWS) in 2015 which confirmed that acid rock drainage from the discrete contact zone is occurring. However, there were no significant/immediate risks posed by the presence of these sulphides – and Metromix have implemented actions to reduce the risk of this occurring in the future – as outlined in Section 3.1.2 above.

It was also noted that Metromix had engaged a consultant to prepare a rehabilitation management plan and associated rehabilitation risk assessment, in line with the operational rehabilitation reforms in place from July 2022.

3.2.2. Rehabilitation objectives and completion criteria

The post-mining land use goals were documented in section 4.2 of the approved MOP. The approved conceptual final landform rehabilitation plan which detailed the post-mining land uses for the site was included in Plan 4 of the MOP.

Rehabilitation objectives were noted in section 4.3 of the Marrangaroo MOP. As part of the quarry closure planning process, Marrangaroo Quarry has provided more detailed rehabilitation objectives for each phase, documented in Table 10 of the Marrangaroo MOP.

Table 13 of the Marrangaroo MOP outlined the performance indicators and the completion criteria for each domain for each stage of the rehabilitation process from decommissioning through to ecosystem sustainability. Where relevant, the completion criteria were linked to a trigger action response plan (TARP) which outlined actions required where TARP triggers were exceeded.

3.2.3. Rehabilitation progress

Rehabilitation activities and methodologies were noted to be described in sections 7.2 and 7.3 of the Marrangaroo MOP. Rehabilitation activities over the MOP term were to include:

- creation of the final extraction benches on the limit of the North-South Quarry including spreading of at least 0.3m of soil / fine overburden (and up to 0.5m where available) across the benches as they were finalised, with revegetation achieved using the natural seed bank and additional plantings that were cultivated using local provenance seed sources
- continued maintenance and monitoring of rehabilitation areas, and, if Metromix considered an area was not satisfactorily progressing towards ecosystem sustainability, additional soil material or soil conditioners / mulch may be added, and additional tree and shrub species may be seeded

Evidence was available to indicate that rehabilitation activities are generally progressing in line with the MOP requirements. For example:

- vegetation was observed to be establishing on the final extraction benches on the limit of the North-South Quarry (Figure 6). Metromix advised the benches were backfilled and seeded progressively
- establishing native vegetation was also observed along the extraction limit western boundary (Figure 7)
- Metromix advised that a soil manure hydromulch mix was used in erosion areas along the site boundaries and water management structures across the site. Native vegetation seeds endemic to the region were used for revegetation, as confirmed in the three yearly monitoring report prepared by Aquila Ecological Surveys, dated January 2022. It was also noted that felled timber was used to lay down on benches for use in erosion control
- the surrounding revegetation areas along the South-West quarry area were observed to be establishing well and Metromix noted that spray seeding along the southern bank was successful. Metromix advised that there was no formal schedule for monitoring and maintaining the rehabilitation sites, other than the six existing monitoring sites. Metromix engaged a contractor (New Era) who undertook spray seeding and weed management on an annual basis, which was targeted based on the site. Some bare patches along the benches (Figures 9 to 11) were observed during the audit.

Figure 6 Revegetation of the benches- North-South Quarry



Figure 7 Extraction limit western boundary



Figure 8 Natural vegetation area – Monitoring Point 2



Figure 9 Native revegetation along South-West quarry boundary



Figure 10 Native revegetation along South-West quarry boundary



Figure 11 Bare areas along the benches



Marrangaroo Quarry developed and implemented rehabilitation monitoring programs to monitor the progress of rehabilitation works. Examples of the rehabilitation monitoring reports were reviewed by the audit team, including:

- Marrangaroo Quarry Monitoring of Revegetation, report prepared by Aquila Ecological Surveys, January 2022 which outlines results of monitoring plots (MARRQ1 to MARRQ6)
- Environmental Monitoring, Metromix Pty Limited, 2020 Annual Environmental Management Report, Marrangaroo Quartzite Quarry, February 2021, and
- Environmental Monitoring, Metromix Pty Limited, 2021 Annual Environmental Management Report, Marrangaroo Quartzite Quarry, February 2022.

3.3. Exploration

Section 2.3.1 of the MOP identified that exploration may be undertaken during the MOP term, to further optimise and schedule future quartzite and overburden recovery within the North-South Quarry. All exploration was to be completed in accordance with relevant conditions of the mining authorities and relevant details reported within the AEMR.

It was confirmed on site and in the audit team's review of the 2020 and 2021 Annual Reports for Marrangaroo Quarry that no exploration activities had been undertaken during the audit period.

3.4. Reporting

3.4.1. Annual rehabilitation reporting

Condition 3 of mining leases PLL584, ML1522, ML4635, ML4636, ML6388, MPL221 and PLL602 required the lease holder to lodge an annual environmental management report (AEMR) that contained a review and forecast of performance of, amongst other things, the accepted mining operations plan, and where relevant, progress towards final rehabilitation objectives.

Condition 3 of ML1801 required the lease holder to prepare a rehabilitation report that provided a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP.

Marrangaroo Quarry submitted annual environmental management reports or annual reviews for the audit scope period as follows:

- Metromix Pty Limited, 2020 Annual Environmental Management Report, Marrangaroo Quartzite Quarry, February 2021

- Metromix Pty Limited, 2021 Annual Environmental Management Report, Marrangaroo Quartzite Quarry, February 2022

It was noted that the reports provided information on the progress of rehabilitation across the site, with consultants' reports included as appendices (for example, the Marrangaroo Quarry Monitoring of Revegetation report, dated January 2022). Section 4 of the reports provided information on specific rehabilitation activities undertaken across the site during the reporting period including:

- For 2019-2020, continued placement of fine (<150mm) overburden material and biomass as a growth medium ready for the revegetation east of the new haul road, and annual photographic monitoring of the 6 monitoring plots.
- For 2020-2021, completion of hydromulching (~0.33ha) previously prepared for rehabilitation; spray seeding of 0.1 ha; and weed spraying of ~1.8ha which was reassessed in late 2021 and further control undertaken in 2022. Fine overburden material and biomass recovered during the reporting period has been stockpiled within the extraction area and will be spread over additional completed areas during the next reporting period. In addition to ongoing visual inspections of revegetated areas, formal revegetation monitoring was also completed by Aquila Ecological Surveys (Aquila) in January 2022 as part of the of the three yearly surveys required by DA 090/95.

It was noted that there was no specific assessment of progress against the objectives and completion criteria defined in Table 13 of the MOP. As **suggestion for improvement no. 1**, Marrangaroo Quarry should consider providing a discussion of rehabilitation progress against the completion criteria identified in the MOP. It was noted this would be addressed as Marrangaroo Quarry transitioned into the rehabilitation reform process from 2 July 2022.

3.4.2. Annual exploration reporting

Section 163C of the *Mining Act 1992* and clause 59 of the Mining Regulation 2016 required the preparation and submission of an annual report which provides full particulars of all exploration and other operations, or activities conducted during the 12-month period. Condition 6 of PLL 584, ML4635, ML4636, ML1522 and ML6388, and condition 7 of PLL 602, requires the lease holder to provide an exploration report, within a period of twenty-eight days after each anniversary of the date this lease has effect and must be to the satisfaction of the Director-General.

The audit team noted that none of the mining leases required exploration reporting as a condition of authorisation.

Marrangaroo Quarry submitted annual environmental management reports for the audit scope period as follows, which include details of exploration:

- Metromix Pty Limited, Fifth Exploration Report for Marrangaroo Quartzite Quarry for the period 10 October 2019 to 9 October 2020, dated 10 November 2020
- Metromix Pty Limited, Sixth Exploration Report (Part A and B) for Marrangaroo Quartzite Quarry for the period 10 October 2020 to 9 October 2021, dated 9 October 2021.

The reports for the 2020 and 2021 reporting periods were reviewed by the auditor and were found to be generally in accordance with the relevant departmental guidelines and templates.

3.4.3. Compliance and environmental incident reporting

Condition 4 of ML 1801 required the lease holder to provide notification to the Department upon becoming aware of any breaches of the conditions of this mining lease or breaches of the Act or Mining Regulation 2016. None of the other mining leases had a similar condition.

Condition 5 of ML 1801 required the lease holder to provide environmental incident notifications and reports to the Secretary no later than seven (7) days after those environmental incident notifications and reports are provided to the relevant authorities under the *Protection of the Environment Operations Act 1997*.

As noted in the Marrangaroo Quarry annual reviews, Marrangaroo Quarry reported one environmental incident to the EPA during the audit period, under the requirements of its environmental protection licence. The incident involved an uncontrolled discharge of acidic water via LDP 1 into Sanderson Creek reported on 12 November 2021 (the day the incident occurred). The uncontrolled discharge occurred due to a greater than forecast rain event commencing two days after a previous substantial rainfall event, coupled with limitations on the rate at which water could be transferred from Dam B to the North-South Sump or the BHP Dam.

The incident was not reported to the Regulator. However, the failure to report to the Regulator was not considered a breach of condition 5 of mining lease ML 1801 given the incident occurred outside of this title area. As **suggestion for improvement no. 2**, as good practice, all incidents reported to the EPA should be reported to the Regulator within the timeframes outlined in Condition 5 of ML 1801.

3.5. Other mining lease compliance requirements

3.5.1. Notice to landholders

Condition 1 of mining leases PLL584, PLL602, MPL221, ML1522, ML1801, ML4635, ML4636 and ML6388 required the lease holder to provide a notice in writing to each landholder within the lease area advising that the lease has been granted or renewed. None of the leases have been granted or renewed within the audit scope period, therefore, the notification requirements were not verified during the audit.

3.5.2. Security deposit

Condition 23 of mining leases PLL584, ML1522, ML4635, ML4636 and ML6388, Condition 7 of mining lease ML1801, and Condition 25 of mining leases MPL221 and PLL602 required the lease holder to provide and maintain a security deposit to secure funding for the fulfilment of obligations under the mining lease.

The security deposit required for the Marrangaroo Quarry across all its titles was \$979,000. A review of departmental records confirms that this amount is held.

3.5.3. Co-operation agreement

Condition 8 of ML1801 required the lease holder to make reasonable attempts to enter into a co-operation agreement with the holders of any overlapping titles.

A review of published departmental mapping system "Minview" confirmed that there were no overlapping titles.

3.5.4. Other conditions

PLL584, PLL602, ML1522, ML4635, ML4636, ML6388 and MPL221 are older leases that have a range of conditions that are no longer included as lease conditions on newer leases. These conditions and an assessment of compliance are provided below.

- Blasting (condition 10 on PLL584, ML1522, ML4635, ML4636, ML6388 and condition 11 on PLL602 and MPL221) – given that compliance with blasting requirements is a condition of the environmental protection licence for the site and is regulated by the NSW Environment Protection Authority, compliance with the blasting conditions was not determined.
- Prevention of soil erosion and pollution (condition 14 of PLL584, ML1522, ML4635, ML4636 and ML6388, and condition 16 of PLL602 and MPL221) – drone footage taken during the audit along the western side of the North-South Quarry extension limit bund wall identified what was thought to have been a significant landslip, directing sediment and debris into Marrangaroo Creek (see Figures 12 to 14). Metromix has since advised that this is a historic issue, which occurred during extraction of the resource where material had been pushed over the high wall. This was raised as observation of concern no. 1 and will be subject to further investigation by the Regulator.

- Transmission lines, Communication lines and Pipelines (condition 15 of PLL584, ML1522, ML4635, ML4636 and ML6388, and condition 17 of PLL602 and MPL221) – these conditions were not determined during the audit.
- Fences and gates (condition 16 of PLL584, ML1522, ML4635, ML4636 and ML6388, and condition 18 of PLL602 and MPL221) – Metromix owned some of the land that comprised the Marrangaroo Quarry with the remaining land parcels being Crown Land or land owned by Lithgow City Council for which Metromix had agreements in place. Fences and gates within the quarry site were maintained by Metromix.
- Roads and access tracks (conditions 17 and 18 of PLL584, ML1522, ML4635, ML4636 and ML6388, and conditions 19 and 20 of PLL602 and MPL221)– roads and tracks traversed during the site inspection were generally observed to be well maintained.
- Trees and timber (condition 19 of PLL584, ML1522, ML4635, ML4636 and ML6388, and condition 21 of PLL602 and MPL221)– given that Metromix own some the land that comprises the Marrangaroo Quarry and had licences to use the land parcels owned by Crown Land or Lithgow City Council, no approvals to fell trees or cut timber on the lease were required.

Figure 12 Landslip North-South Quarry bund wall



Figure 13 Sediment and debris upslope of Marrangaroo Creek



Figure 14 Top of the bund wall at the northern end of the North-South Quarry extension limit bund wall



4. Compliance management

4.1. Identifying compliance obligations

Identifying compliance obligations is a critical step in the development of an effective compliance management system. Compliance obligations for a quarry can include:

- regulatory requirements (for example, environmental legislation)
- conditions imposed on the grant, renewal, or transfer of mining leases
- specific commitments made by the organisation (for example, MOP commitments)

Once identified, compliance obligations should be reviewed periodically to identify any changes in those obligations (for example, changes in legislation).

Marrangaroo Quarry established and implemented systems to manage compliance obligations and action tracking (MyRapid Portal). Staff interviewed during the audit demonstrated a good knowledge of most compliance obligations, particularly those associated with the mining lease conditions and the MOP commitments. Metromix undertook the following to identify and monitor their compliance obligations:

- The Metromix diary (excel spreadsheet) was maintained and accessed by the senior leadership team for monitoring and discussion at monthly managers meetings. The spreadsheet includes all compliance obligations required by statutory documents including MOPs and annual reports, and was observed to be colour coordinated to highlight when certain compliance obligations were due or overdue and open and outstanding issues were discussed.
- A "SHE Schedule" was also maintained by the Site Manager which included regular inspections, audits, house-keeping inspections – with a QMS focus. Any actions were also included in the Rapid system.
- Monthly site safety meetings were held at the site which included environmental aspects with actions raised and discussed and updated at subsequent meetings.
- Monthly inspections were undertaken, and the inspection checklist was emailed to the quarry manager. Any irregular issues were entered into the Rapid system as a hazard with corrective action assigned to the responsible individual with due dates etc.
- All incidents (environmental and safety) were noted to be reported and tracked via the MyRapid system, with new incidents and identified actions assigned to individuals with specific details of who is involved and what, where and when the incident occurred with interim actions taken,

corrective actions assigned, and the assessed risk. This included environmental incidents, breach notices, regulator visits and regulator notices.

- The quarry slope stability was also assessed daily by the excavator operator and recorded in a logbook that was kept in the excavator. Anything noted as a hazard was completed as a hazard note and included in rapid.

It was noted that the obligations documented in the compliance database did not include all obligations imposed by the *Mining Act 1992* (for example, the requirement to obtain consent prior to suspending operations (Schedule 1B of the Act)). As **suggestion for improvement no. 3**, Metromix should consider expanding the obligations in the compliance database (Metromix Diary) to include all statutory conditions and obligations under the *Mining Act 1992* and regulation.

4.2. Inspections, monitoring and evaluation

An effective inspection, monitoring and evaluation process is required to:

- monitor the implementation of the risk controls
- evaluate the effectiveness of those controls based on an assessment of inspection and monitoring data
- implement an adaptive management approach if monitoring shows that controls may be ineffective.

Metromix used surveyors and drone technology to take periodic photos of the quarry pit which were overlain with the approved extraction area boundaries to provide a visual reference of where work was occurring in the pit to ensure mining activities were not occurring outside of the mining lease boundary. Visual indicators such as depth and extraction boundary markers were also used on site to assist operators to identify their position in relation to the mining lease boundary. Metromix purchased drone survey software (PropellorAero) to further assist with this.

Metromix established a monthly inspection and monitoring regime for the quarry site including some basic environmental checks such as chemical storage, erosion and sediment issues, water storage and stormwater discharges, and occurrence of weeds. It was noted the checklist did not address all the commitments of the MOP. As **Suggestion for improvement no. 4** the monthly inspection checklist should be reviewed and revised to include a more comprehensive range of environmental checks in accordance with the MOP requirements, including a check of the rehabilitated areas across the site.

Where Marrangaroo Quarry used external consultants to complete monitoring programs (such as the revegetation survey), recommendations from these reports were not routinely entered into the compliance database. Whilst there was evidence available to demonstrate that some of the recommendations from external reports were actioned, there was potential for these actions to be missed. As **suggestion for improvement no. 5**, Metromix should consider entering the recommendations from external consultant reports into the compliance database to provide a more robust system for tracking any actions required.

4.3. Subcontractor management

Many mines use contractors to undertake specialist tasks. Whilst the responsibility for compliance or the implementation of environmental controls is often passed to the contractor, the lease holder will retain accountability for compliance with its lease conditions and other compliance obligations. It is important that the lease holder exercises management control of its contractors by specifying contract requirements, providing oversight of contracted works, and evaluating the performance of the contractor during the contracted works. The audit team noted that subcontractor requirements and oversight was largely managed through Rapid Induct.

4.4. Record keeping

Sections 163D and 163E of the *Mining Act 1992* related to the creation and maintenance of records required under the Act, the regulations, or a condition of title. Records must be kept in a legible form for production to any inspector and must be maintained for a period of four years after the expiry or cancellation of the title.

Generally, records were available to demonstrate compliance with most requirements, including MOP requirements. Records requested during the audit were made available for the audit team to review. Examples of records sighted during the audit included:

- environmental incident reports
- Marrangaroo Quarry Monitoring of Revegetation, report prepared by Aquila Ecological Surveys, January 2022 which outlines results of monitoring plots (MARRQ1 to MARRQ6)
- exploration reporting
- annual environmental reporting
- Metromix monthly environmental checklist including assessment of weeds
- Metromix MyRapid Portal, including examples of notifications to manager
- examples of Incident reporting via MyRapid portal which includes environmental incident and breach notices, regulator visits and regulator notices
- operational planning including Metromix diary and SHE Schedule 2022
- Marrangaroo site specific induction information including environmental awareness induction and other online training and inductions
- Marrangaroo Risk assessment worksheet dated 13 December 2017

5. Audit conclusions

From the evidence reviewed during the audit, and observations made on site during the audit site inspections, it was concluded that Marrangaroo Quarry was generally compliant with the requirements of the mining lease and MOP in relation to the operations of the Marrangaroo Quarry.

Metromix has established systems for compliance management. Further development of the compliance obligations in the compliance database would be beneficial to promote a more robust approach to compliance management on site.

One observation of concern and five suggestions for improvement were identified during the audit, as summarised in Table 3 and Table 4. Regulatory actions may be undertaken in relation to the non-compliance identified during the audit.

Table 3: Summary of observations of concern

OBSERVATION OF CONCERN NO.	DESCRIPTION OF ISSUE	RECOMMENDATION
1	<p>Drone footage taken during the audit along the western side of the North-South Quarry extension limit bund wall identified what was thought to have been a significant landslip, directing sediment and debris into Marrangaroo Creek.</p> <p>Metromix has since advised that this is a historic issue, which occurred during extraction of the resource where material had been pushed over the high wall.</p>	Subject to further investigation by the Regulator

Table 4: Summary of suggestions for improvement

SUGGESTIONS FOR IMPROVEMENT	DESCRIPTION OF ISSUE
1	Marrangaroo Quarry should consider providing a discussion of rehabilitation progress against the completion criteria identified in the MOP. It is noted this will be largely addressed as Marrangaroo Quarry transitions into the rehabilitation reform process from 2 July 2022.
2	As good practice, all incidents reported to the EPA should be reported to the Regulator within the timeframes outlined in Condition 5 of ML 1801.
3	Marrangaroo Quarry should consider expanding the obligations in the compliance database (Metromix Diary) to include all statutory conditions and obligations under the <i>Mining Act 1992</i> and regulation.
4	The monthly inspection checklist should be reviewed and revised to include a more comprehensive range of environmental checks in accordance with the MOP requirements, specifically including a check of the rehabilitated areas across the site.
5	Marrangaroo Quarry should consider entering the recommendations from external consultant reports into the compliance database to provide a more robust system for tracking any actions required.